

NEPAL ELECTRICITY AUTHORITY

TRANSMISSION/PROJECT MANAGEMENT DIRECTORATE

A Year Book-Fiscal Year 2022/2023 (2079/2080 BS)



Sunwal 132 kV Substation



August 2023 (BHADRA 2080)
Durbar Marg, Kathmandu, Nepal





MESSAGE FROM THE MANAGING DIRECTOR

To promote the clean and sustainable alternative energy sources; Nepal Electricity Authority (NEA) is meeting its target to ensure access to affordable, reliable, sustainable and modern energy for all by next two years in the country with supply of energy to commercial, agricultural and industrial loads basically by tapping hydropower and solar potentials.

On the other facet, the Government of Nepal has ambitious program of industrial growth, development of major cities along with Special Economic Zones (SEZ), conversion and replacement of fossil fueled vehicles to electric vehicles, increasing lift irrigation facilities, replacing cooking gas with electricity, heating and air conditioning / cooling, electrification of railway lines and use of ropeway / cable car for transportation to enhance the economic activities. To cope with the growing load demands; huge quantum of power is to be wheeled from generating stations to the load centers to meet the domestic loads and transact access/deficit power to/from cross border countries. A study shows that extensive investment of around NPR 2.3 Trillion is required within 5-year period to build the transmission infrastructures to meet the demand for the period. NEA is heading to invite grant and loan assistance from partnering countries and development partners to fulfill the funding gaps.

Despite underlying challenges on land acquisition, right of way, tree clearances, managing funding gaps and other prevalent issues, the Transmission Directorate and the Project Management Directorate put their effort to successfully commission seven substations with 1718 MVA capacity and three transmission sections with the 413 ckt. km length in the last fiscal year.

I have truly found contentment to convey few words to the joint issue "YEAR BOOK" by the Transmission Directorate and the Project Management Directorate on the occasion of Nepal Electricity Authority's 38th anniversary.

The private sector's active involvement in generation and building transmission infrastructure from the points of generations to the grid points is appreciated. I have firm belief that the private sectors are getting tremendous benefit by wheeling their generated energy using NEA's transmission facilities and benefit shall be intensified further when planned and under construction 220kV and 400kV trunk lines get completed. At the consumer side, NEA has already speeded up the development of transmission networks so that the bulk consumers shall realize the safe, quality and reliable direct connection from the planned/under construction high voltage ring mains.

I express my satisfaction to the completion of DPRs and the verge of completion of acquisition of substation lands for building 220kV, 132kV and 66kV transmission system in the periphery and within Kathmandu valley to meet the load demands of 2030 (925MW), 2040(1825MW) and 2050(3169MW) with due consideration of N-1 contingency. Similarly, the studies on the transmission system for 10 (ten) major city cluster outside Kathmandu valley to enhance the reliability, quality and meeting the energy demand until 2050 is under completion stage. DPRs for 400kV & 220kV multi-circuit south corridor transmission lines along the postal highway (approx.600km) are in the approval phase in India Exim Bank for getting Line of Credit (LoC-IV) from Government of India.

At last, but not the least, I would congratulate for the effort put by the team to bring this publication, which may give valuable insight to various stakeholders on activities & plans of transmission business group.



.....
Kul Man Ghising
Managing Director



MESSAGE FROM THE DEPUTY MANAGING DIRECTOR, TRANSMISSION DIRECTORATE

Transmission network is the backbone of electrical power system as it transmits bulk amount of electrical power from remote generating stations to the various load centers or distribution substations. Optimal planning and timely execution of new transmission infrastructure, up gradation of existing network and the effective and efficient system operation are the key aspects for optimal operation of electrical power system. In NEA, these activities are under the purview of Transmission Directorate.

NEA management has decided to bring out the current publication which covers brief description of various transmission line and substation projects being recently completed, under implementation and those under considerations to be developed in the future, up gradation and rehabilitation works, system information and the utmost effort laid by the Directorate besides of several challenges to improve the stability and reliability of transmission network, in addition to regular operation and maintenance activities undertaken during the year under review.

The fiscal year 2022/23 AD (2079/80 BS) has been quite successful for the Directorate. Transmission loss has remained at 4.49%. Eight transmission line projects namely New Modi-Lekhnath 132 kV line, Butwal-Lumbini 132 kV line, Mainahiya-Sampatiya 132 kV line, Dordi Corridor 132 kV line, Ramechap (Garjyang)-Khimti 132 kV line, Kushaha-Kataiya 132 kV Second Circuit line, Chameliya-Syaule-Attariya 132 kV Second Circuit line, Lekhnath-Pokhara 132 kV transmission line up gradation and one new substations namely Sunwal 132/33/11 kV substation have been completed and put into satisfactory operation. In this year, many existing grid substations have been upgraded to enhance the substation capacity by 352.4 MVA. This year has observed an addition of 1398.4 MVA transformer capacity and 92.5 MVar capacitor bank in the grid. Similarly, 263 circuit km of transmission line has been constructed in this fiscal year.

Under this Directorate 810 circuit km of 132 kV, 496 circuit km of 220 kV and 576 circuit km of 400 kV transmission line are under construction. Further, 851 circuit km of 132 kV, 1752 circuit km of 220 kV and 1938 circuit km of 400 kV transmission line are planned for construction in the years to come. Similarly, 5346.5 MVA of grid substation capacity worth of infrastructure is under construction and 9654.5 MVA is planned for execution in the coming FYs.

The GoN roadmap of building 15000 MW in 10 years demands building up transmission systems capable of handling such quantum of power and the Directorate is committed to working towards its fulfilment. The Directorate has come up with planned and systematic efforts to augment transmission system capacity by constructing new transmission

lines and substations of 132 kV, 220 kV and 400 kV voltage levels, adding new circuits in the existing towers and upgrading the substation capacities wherever necessary to overcome the bottlenecks and meet the increasing power demand and to enhance export or import with neighboring countries. After the first 400 kV Dhalkebar-Muzzaffapur cross-border transmission line, JV Company has been formed for the construction of Indian Portion of the Butwal-Gorakhpur 400 kV cross-border transmission line. Millennium Challenge Account (MCA) Nepal in close coordination with this Directorate has taken initiative for construction of Nepal portion of line and substations. Other cross border lines are also at the different levels of study.

As a system operator, the Load Dispatch Centre (LDC) has performed quite satisfactorily. Through rigorous effort, it has been able to maintain power supply quality, match supply and demand by optimal dispatching of available generating plants and import/export of power between Nepal and India and through shutdown coordination keeping the interruptions minimum. To make it more effective and efficient, Load Dispatch Centre (LDC) has been upgraded with the latest SCADA/EMS (and related hardware, incl. central IPABX - system). Also the emergency / backup control centre at Hetauda is functional.

I sincerely believe that this publication will inform NEA stakeholders about the efforts undertaken by Transmission Directorate to cope with the supply and demand situation in the country, highlight the effort undertaken by the Directorate to expand transmission infrastructure for reliable, secure and uninterrupted power delivery to the valued consumers and provide comprehensive information about the INPS and ongoing projects.

I would like to appreciate the great effort put in by my colleagues to bring out this publication. We shall update this publication on annual basis. Any suggestion on the improvement of this Publication is always welcome.



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Dirghayu Kumar Shrestha
Deputy Managing Director



MESSAGE FROM THE DEPUTY MANAGING DIRECTOR, PROJECT MANAGEMENT DIRECTORATE

Project Management Directorate in Nepal Electricity Authority has been implementing projects funded by Asian Development Bank (ADB) and European Investment Bank (EIB). It is a matter of immense pleasure that this year book publication has provided an opportunity to introduce a wide range of transmission line and substation projects under PMD. Currently, PMD is executing wide range of projects like high voltage overhead transmission lines & underground transmission lines, high voltage transmission substations, overhead & underground distribution lines, distribution substations, solar power plants with Battery Energy Storage System(BESS), implementation of substation automation system in the existing substation, implementation of smart metering system in Kathmandu valley, establishing data center and distribution control center with system automation and overall NEA's institutional strengthening by implementing revenue management system and enterprise resource planning in NEA.

Till date considering development of transmission infrastructures, PMD has completed 40 km of Dana-Kusma 220kV double circuit transmission line and associated substations at Dana (220/132kV, 100 MVA; 132/33 kV, 25 MVA), Kusma (220/132kV, 100 MVA), New Butwal (220/132kV, 100 MVA), New Bharatpur (220/132 kV, 320 MVA), 26 km of Samundratar-Trishuli 3B 132 kV double circuit line and associated substation at Samundratar (132/33 kV, 60 MVA; 33/11 kV, 16 MVA) and 82 km of Marsyangdi-Kathmandu 220 kV double circuit transmission line has been completed and commissioned. New Bharatpur 220kV substation under execution from the project of PMD was charged in July 2023.

Similarly, a number of transmission line and substation projects are under different stages of completion. 178 circuit km of 400 kV line, 492 circuit km of 220 kV and 327 circuit km of 132 kV transmission line, 1265 MVA capacity of 400/220 kV, 1680 MVA capacity of 220/132, 263 MVA capacity of 132/66 kV, 722 MVA capacity of 132/33, 545 MVA capacity of 132/11 kV substations, 200 MVA capacity of 33/11 kV substation, 350 km of 33/11 kV overhead line, 840 km of 11 kV underground distribution line, 1894 km of 400 Volt overhead line and 1117 km of 400 Volt underground line is being constructed in the different provinces of Nepal under PMD. Six nos. of 33/11 kV substations with capacity of 39 MVA and 80 km of 33kV, 111 km of 11kV and 58 km of 400 V overhead distribution lines were also added in NEA system in FY 2022/23 under PMD. In augmenting the distribution section in major cities through undergrounding lines through different projects under PMD, it has been able to complete 468 km of 400V, 400 km of 11kV and 3 km of 33kV lines.

In order to ensure safety & reliability of electricity supply, underground cable laying works to upgrade the distribution system is being executed in major places of Kathmandu such as Ratnapark, Maharajgunj, Kuleshwor, Kirtipur, Baneshwor and major places of Lalitpur

and Bhaktapur. In outside Kathmandu valley, PMD is also executing the upgradation of the distribution system by laying underground distribution cables in cities like Pokhara and Bharatpur.

With the intention of adopting modern digital technology into its system to enhance its operational efficiency, reduce energy loss and enable itself to serve its consumers in a better way, smart grid and smart metering system has been introduced by PMD. Smart meter installation in areas under Ratnapark and Maharajgunj Distribution Centers has been accomplished successfully as pilot project and PMD plans to spread the technology to other distribution centers as well in the Kathmandu valley.

Proper implementation of Smart Meters, Enterprise Resource Planning (ERP), Distribution Automation System and Substation Automation System is only possible with the establishment of modern Distribution Command Control Center and Data Centre. The Distribution Command and Control Centre & Data Centre which is being constructed at the premises of Load Dispatch Centre, Siuchatar is also near to the completion. Similarly, automation of grid substations through installation of Substation Automation System (SAS) in thirteen (13) grid substation within the valley is also at the verge of completion. Further, PMD plans to extend the substation automation system to the remaining substations all over the country for which the contract has been awarded for thirty-nine (39) grid substations. The EV charging infrastructure for enhancing Nepal to utilize smart technology and promote greener environment friendly nation, PMD is executing to install 62 fast EV chargers at strategically important locations.

In order to keep in track the future need of infrastructures, PMD has been involved in detail engineering and environmental study of more than 2000 circuit km of 400 kV transmission lines and associated substations, 290 circuit km of 132 kV transmission lines 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, the consultant has been drafting the master plan for the future.

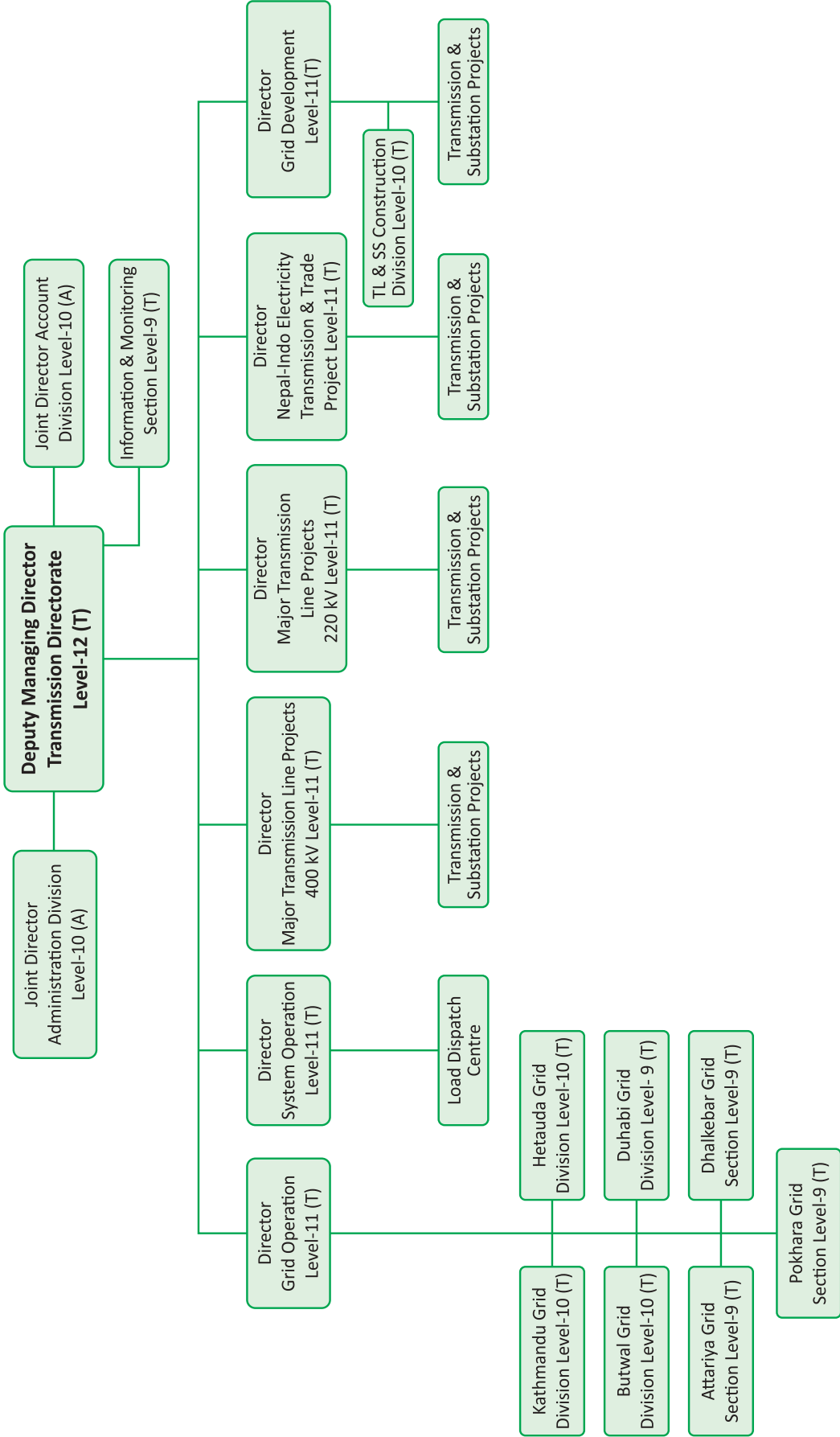
I would like to thank and congratulate the entire PMD staff & project teams for keeping up the best efforts. Finally, my sincere gratitude & congratulations to the team in bringing out this publication.



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Tara Prasad Pradhan
Deputy Managing Director
Project Management Directorate

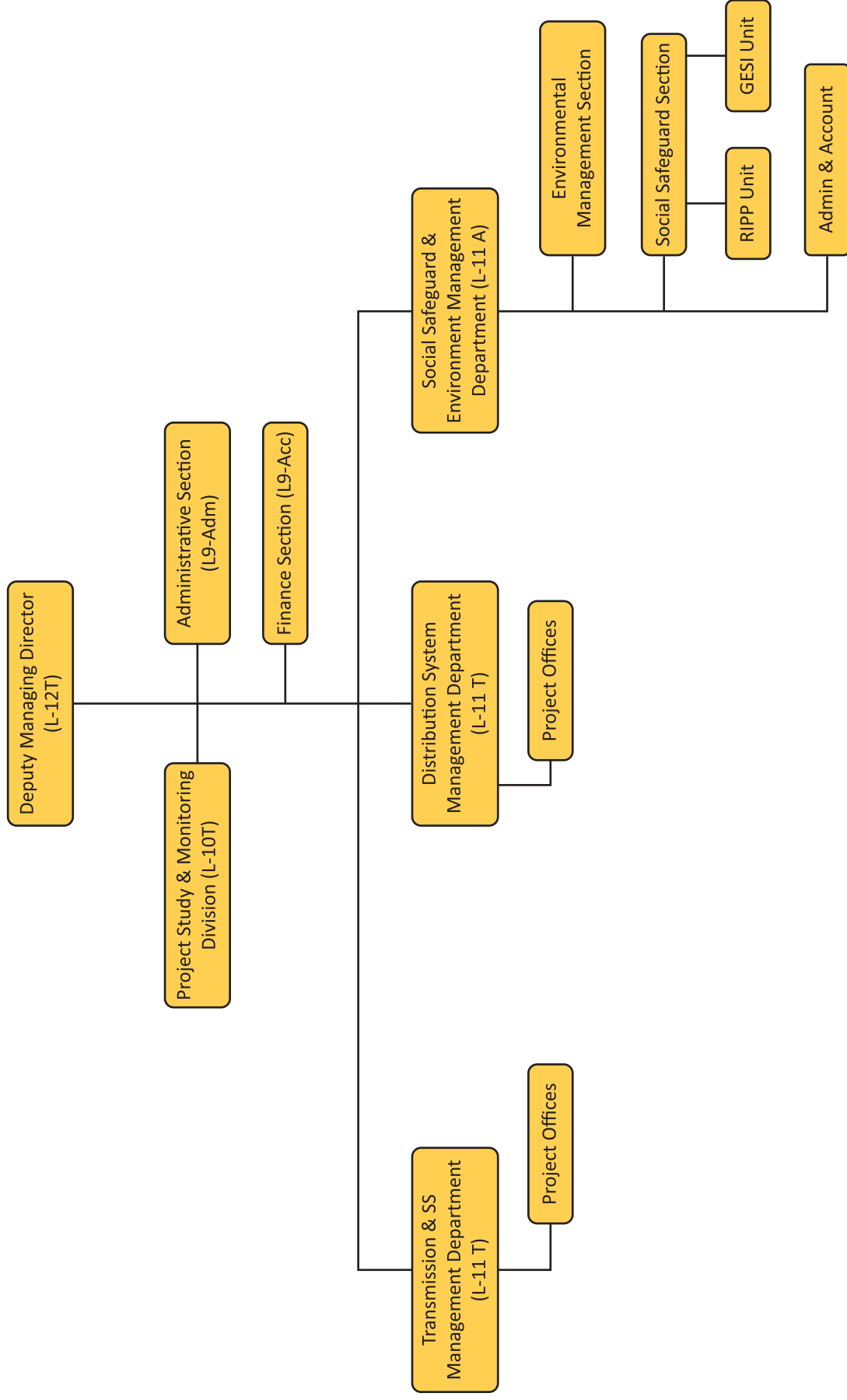
TRANSMISSION DIRECTORATE

ORGANIZATION STRUCTURE



PROJECT MANAGEMENT DIRECTORATE

ORGANIZATION STRUCTURE



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Abbreviations

ACSR	Aluminum Conductor Steel Reinforced SC Single Circuit
DC	Double Circuit
TL	Transmission Line
SS	Substation
P/S	Power Station
HPP	Hydro Power Project
INPS	Integrated Nepal Power System IPP Independent Power Producer
NEA	Nepal Electricity Authority
NRs.	Nepalese Rupee
GoN	Government of Nepal
ADB	Asian Development Bank
WB	World Bank
EoI	Exim Bank of India
KfW	German Development Bank
EIB	European Investment Bank
JICA	Japan International Cooperation Agency
IEX	Indian Energy Exchange

Electrical Terminology

V	(Volt)	-Unit of voltage
kV	(Kilovolt)	-1,000 volts
W	(Watt)	-Unit of active power
kW	(Kilowatt)	-1,000 watts
MW	(Megawatt)	-1,000 kW
Wh	(watt-hour)	-Unit of Energy
kWh	(kilowatt-hour)	-1,000 Wh
MWh	(Megawatt-hour)	-1,000 kWh
GWh	(Gigawatt-hour)	-1,000 MWh
TWh	(Terawatt-hour)	-1,000 GWh
VA	(Volt-ampere)	-Unit of apparent power
kVA	(kilovolt-ampere)	-1,000 VA
MVA	(Megavolt-ampere)	-1,000 kVA
VAr	(volt-ampere reactive)	-Unit of reactive power

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TRANSMISSION DIRECTORATE

Transmission Directorate is one of the directorate in NEA, headed by the Deputy Managing Director Mr. Dirghayu Kumar Shrestha. The Directorate is fully devoted to its responsibility of planning, constructing, operating and maintaining high-voltage transmission lines and substations from 66 kV to 400 kV voltage level.

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

Grid Operation Department (GOD), System Operation Department (SOD), Grid Development Department (GDD), Major 220 kV Transmission Line Department and Major 400 kV Transmission Line Department are the five departments under this directorate and each of them is headed by a Director.

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 transmission 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.

The Directorate is responsible for operating INPS in synchronous mode with Indian Grid to make the system more reliable, secured and robust. 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 vital role in the power flow between Nepal and India. Joint Venture Company between NEA and Power Grid, India for the construction of Indian Portion of the Butwal-Gorakhpur 400 kV cross-border transmission line has been formed and contract agreement has been signed for transmission line and substation. Millennium Challenge Account (MCA) Nepal funded by Millennium Challenge Corporation (MCC) has taken care of construction of Nepal portion of Butwal-Gorakhpur 400 kV cross-border transmission line and associated substations. The bid for transmission line is under evaluation and substation bidding is yet to submit.

RECENTLY COMPLETED PROJECTS

1. Sunwal 132 kV Substation

The objective of this project was to supply adequate and reliable power to Palpa Cement Industry, Laxmi Steel Industry, other existing industries including power supply to existing and newly constructed 33 kV distribution network. The substation is constructed at Charpala, ward no. 7 of Sunwal Municipality of Nawalparasi (Susta Paschim) district.

The cost of Project was NRs 687 million and funded by GoN through Ministry of Industry, Commerce and Supplies and. Project scope of works included construction of new substation with 132/33 kV, 2x63 MVA, 3-phase and

132/11 kV, 22.5 MVA, 3-phase power transformers and construction of 7 nos. of 33 kV feeders and 4 nos. of 11 kV feeders with complete relay & protection system and substation automation system. The contract agreement was signed on September 2019 with Energy Pac-Sigma Con JV in September 2019.

Power transformer (2*63 MVA, 132/33 kV) was charged on Dec 8, 2022. Currently around 40 MW load to nearby industries Laxmi Steel, Sarwottam Cement, Palpa Cement is being served by this substation. Another power transformer (1*22.5 MVA, 132/11 kV) was charged on Feb 26, 2023 to feed around 2 MW load to the local feeders (Asnaiya and Rammapur) uninterruptedly.



Sunwal 132kV Substation Switchyard

2. New Modi-Lekhnath 132 kV Transmission Line

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

Scope of the project was to construct 43.28 km 132 kV double circuit transmission line with ACSR Bear conductor to connect existing Modi HEP with Lekhnath substation and also construct New Modi & Lahachowk substations.

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

The transmission line package was awarded to M/S Kalpataru Power Transmission Ltd on 21st June 2018. The transmission line from New Modi switching

substation to existing Lekhnath substation via Loop-in-Loop out at Lahachowk Substation has been completed, commissioned and charged on 14th February, 2023.

Land acquisition for transmission line was one of the most challenging works in this project. The people's resistance, demand for shifting of towers at different places had made the project difficult to achieve the target. Project team in close co-ordination with district administration and local governance and other stake holders was finally able to complete the project. Many corporate social responsibility programs were held in local levels by Environment and Safeguard Department.



Lahachowk Substation

3. Butwal-Lumbini 132 kV Transmission Line

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

The scope of project was to construct 18 km double circuit 132 kV transmission line from Jogikuti substation, Butwal to Mainahiya substation with ACSR BEAR conductor including 2 km 500 Sq. mm XLPE underground cable, one 132/33/11 kV substation at Mainahiya with 132/33 kV, 2x45 MVA and 33/11 kV, 16 MVA power transformer, 2*15 MVar capacitor banks, four nos. of 33 kV line bays and 132 kV line bay extension at Jogikuti substation.

Construction of the Mainahiya 132/33/11 kV substation and 132 kV transmission line was completed and charged on October 18, 2022.



Mainahiya Substation

4. Mainahiya - Sampatiya 132 kV Transmission Line

Objective of this project was to facilitate cross-border power trade between Nepal and India. The Joint Steering Committee (JSC) on Nepal - India cooperation in power sector had agreed to implement this 132 kV cross border transmission line which interconnects Mainahiya substation (Nepal) with Sampatiya substation (India). The cost of project was US\$ 8.0 Million and funded by GoN. The project was initiated in FY 2075/076 (2017/18) .

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

The construction of this line was completed and successfully charged on May 27, 2023.



Transmission Line in Marchawar

5. Lekhnath Pokhara 132kV Transmission Line Up-gradation

Objective of this project was to reinforce existing power supply system of Pokhara city by upgrading the conductor of existing 132 kV transmission line. The scope of project was to replace 7 km ACSR Wolf conductor from Pokhara substation to Lekhnath substation with High Temperature Low Sag (HTLS) conductor. Project was initiated in FY 2077/078.

The reconductoring work was completed and line has been successfully charged on March 15, 2023. The cost of the project was about NRs 45 Million and funded by GoN and NEA.

6. Dordi Corridor 132 kV Transmission Line

Objective of this project was to evacuate power from IPP projects of Dordi river and its tributaries in Lamjung district. The project was funded by GoN. Scope of the project was to construct 10.167 km long 132 kV double

circuit transmission line from Kirtipur to Udipur with ACSR Cardinal Conductor and 132/11 kV, 10 MVA substation at Kirtipur.

Kirtipur 132/11 kV substation construction works was completed long before. Regarding Kirtipur-Udipur 132 kV transmission line, foundation works as well as tower erection and stringing works of conductor and OPGW had been almost completed last year. But due to devastating flood in Dordi river on Asadh 2078, 4 (four) no. of transmission towers were collapsed affecting the completion of the project. The foundations and the towers destroyed by flood were reconstructed and the transmission line was successfully charged on April 06, 2023.



Kirtipur 132/11 kV Substation

7. Ramechap (Garjyang) -Khimti 132 kV Transmission Line

Objective of this project was to evacuate power generated from IPP projects in Khimti and Likhu corridors. The project was funded by the GoN.

The scope of works under the project was to:

- Construct 31 km 132 kV double circuit transmission line with ACSR Bear conductor and 132/33/11 V substation with 132/33kV, 30 MVA, 3 phase power transformer and 33/11kV, 6/8 MVA, 3 phase power transformer at Garjyang and construct 132 kV bays at New Khimti substation. For this work, contract was signed in February 2017 with Pinggao Group Co. Ltd
- Construct 220 kV GIS bay at New Khimti substation for connecting 220/132 kV, 200 MVA (4*66.67, 1 phase) bank of auto transformers, 132/33 kV, 2*30 MVA power transformer, 3 nos. 132 kV bays and 8 nos of 33 kV indoor bays. For this work, contract was signed in March 2020 with MSIPL-CHINT J/V.

As of July 2023, Garjyang Newn Khimti 132 kV double circuit transmission line is under operation. The Garjyang New Khimti first circuit line with 132/33/11kV Garjyang substation was charged on October 16, 2022. The second circuit line and 132/33 kV New Khimti substation was charged later on June 07, 2023. The addition of 220/132 kV, 200 MVA (4*66.67, 1 phase) bank of auto transformers is in final stage of completion.

8. Kushaha- Kataiya 132 kV Second circuit Transmission Line

Nepal and India government had agreed to construct this cross border transmission line for further enhancement of import/export of power. The estimated cost of the project was US\$ 5.5 Million and funded by GoN. The contract was awarded to M/S Sigma Con - Narendra Nirman JV on September 19, 2019.

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

Recently, Kushaha 132/11 kV substation and Kushaha-Kataiya 132 kV transmission line LILU works were completed and all the line bays and transformer bays have been completely charged on July 18, 2023.



After Charging Kushaha Substation

9. Chameliya- Syaule- Attariya 132 kV Second Circuit Transmission Line

Objective of the project was to reinforce the power supply system and lay down infrastructure for power evacuation from different IPPs in Darchula and Bajhang district.

Scope of this Project was to construct 131 km second circuit transmission line on same double circuit tower of existing Chameliya-Attariya 132 kV transmission line and bays extension work at associated substations. This project was initiated in FY 2074/075 (2017/018).

All works of the project has been completed recently and the second circuit from Chameliya to Attariya has been successfully charged in July 14, 2023.



132 kV Bay Extension work at Syaule Sub-station

Comparison of Transmission Line Length in last Nine Fiscal Years

S.N.	FY	Circuit 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	3143	255	78	3990	606
6	2076/077	514	3240	437	78	4269	280
7	2077/078	514	3541	741	78	4874	605
8	2078/079	514	3817	897	102	5329	455
9	2079/080	514	3979	1101	148	5742	413
Total Increment in Eight Years							3118

Comparison of Substation Capacity in last Nine 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	4300	364
7	2077/078	6434	2134
8	2078/079	7149	715
9	2079/080	8867	1718
Total Increment in Eight Years			6735

Comparison of Capacitor Bank Capacity in last Nine Fiscal Years

S.N.	FY	Total Capacity (MVar)	Total Increment (MVar)
1	2071/072	443.644	
2	2072/073	463.644	20
3	2073/074	473.644	10
4	2074/075	473.644	0
5	2075/076	516.144	42.5
6	2076/077	546.144	30
7	2077/078	643.644	97.5
8	2078/079	656.144	75
9	2079/080	748.644	92.5
Total Increment in Eight years			367.5

The details of existing, under construction, plan and proposed high voltage transmission lines and substations that are being executed by different Departments under this Directorate are presented in Annexure B.

I. GRID DEVELOPMENT DEPARTMENT

This department is headed by the Director and is responsible for planning, constructing, supervising and commissioning of new transmission line and substation projects up to 132 kV voltage level.

Brief summary of the projects being executed by this department are presented below:

PROJECTS UNDER CONSTRUCTION

1. Singati-Lamosangu 132 kV Transmission Corridor

The 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 38 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 erection and 1st circuit conductor stringing works have been completed. One circuit has been charged on Ashadh 31, 2078 (July 15, 2021). About 36 km conductor stringing in the 2nd circuit and major civil, equipment installation works at Singati have also been completed. One Line Bay at Lamosangu

Substation, one Line bay and one Transformer bay has been commissioned. Second circuit line and Singati substation will be commissioned in the year 2023/24.

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

Objective of this project is to extend the transmission line from Kapilvastu district to Arghakhachi, Gulmi and Banglung districts to improve the power supply situation, reduce trippings due to long distribution network and decrease the technical loss. It will also provide the electrical network for power evacuation of proposed hydroelectric projects in this region. The overall cost of the project is around US\$ 39.5 Million and funded by GoN. This project was initiated in FY 2065/066 (2008/09) and is expected to be completed by 2023/24.

Complete scope of the project includes construction of 86 km, 132 kV double circuit transmission line with ACSR Bear conductor and construction of new 132/33kV, 30MVA & 33/11kV, 16 MVA substations each at Motipur (Kapilvastu district), Sandhikharka (Arghakhachi district), Tamghas & Paudi-Amarai (both in Gulmi district) and Burtibang (Baglung district). Out of these, Motipur 132/33/11 kV substation, 37.605 km (75.21 circuit km) Motipur - Sandhikharka 132 kV transmission line and Sandhikharka 132/33/11 kV substation has been charged on 2078/08/09, 2078/12/11 and 2078/12/12 respectively. Further, civil construction works such as Buildings (Staff Quarter, Control Building, Guard House and Store House) and switchyard foundations in Tamghas and Paudi-Amarai substation have been completed. Similarly Control Building, Staff Quarter, Store Building and Switchyard Foundation construction works of Burtibang substation is almost completed. Regarding Sandhikharka Burtibang 132 kV transmission line, check survey, geotechnical investigation, tree counting, 91 number of tower foundation, 64 number of tower erection and 10 km span conductor stringing has been completed.

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

Objective of this project is to reinforce the power supply system of Morang and Sunsari districts to meet the increasing power demand of 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 2024.

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 under construction Biratnagar substation with 132/33 kV, 2*63MVA and 33/11kV, 16MVA Power Transformers at Ramganj Belgachiya.

As of July 2023, regarding transmission line, construction of 73 Nos. of tower foundations out of 80 has been completed. Likewise, 72 Nos. of tower erection has been completed. Land acquisition process for tower pad has been completed and compensation distribution work is in progress. Structural designs & drawings and foundation designs & drawings of Pile foundation of 5 tower locations have been approved.

Regarding substation construction works, Switchyard foundation, Control Building and Staff Quarter construction works in final stage of completion. Switchyard Equipments such as Power Transformer, Disconnecting Switches, CRP, SAS Panels, Communication Equipments, Capacitor Banks have been delivered to site. Switchyard foundation works at 33/11 KV Tanki substation is in progress.

4. 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 6 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 September 2023.

As of July 2023, in substation all the civil construction works including staff quarter, control building and foundation works have been completed. Major substation equipments have been installed. Regarding the transmission line, out of 68 towers, 67 foundations and 67 tower erection works and 16.5 km out of 20 km conductor stringing works have been completed. Single circuit transmission line has been charged from 13 November, 2021 to supply Hongshi-Shivam Cement Industry. Delay in approval of additional tree cutting in the RoW of transmission line has affected the early completion of the project.

5. 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 Pangtan-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 2024.

As of July 2023, check survey, detail engineering, resistivity measurement, soil test works are completed. Tower design, foundation design, tower schedule works has been completed. Construction of 36 out of 64 number of tower foundation has been completed. IEE implementation and approval for tree cutting is under final stage

6. 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. The line passes mainly through Banke-Bardiya National parks at Banke District and traverses through Surkhet and Dailekh district mainly throughout the middle mountainous and high hill side region.

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 Cardinal conductor, 132 kV bay extension works at Kohalpur and 132/33 kV substation at Dailekh. Estimated project cost is US\$ 29 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 March 2024.

As of July 2023, in Kohalpur-Surkhet 132 kV transmission line section; 100 Tower foundation out of 162 has been completed and in 55 location Tower Erection has been completed. Transmission line materials (Conductors, Insulators and Hardware fitting and Tower parts) have been delivered at site. Likewise, Notice for acquiring private lands in Banke and Surkhet districts has been published and for few locations, land compensation is already provided, Tree cutting in Surkhet Division forest has been almost completed.

Similarly, construction of bays in Kohalpur substation is in progress. Maximum electrical equipment has been reached at site.

Further, in Surkhet-Dailekh 132 kV transmission line section, land acquisition for Dailekh (Chupra) substation has been completed, IEE has been approved and contract

has been signed in March 2023 for construction of line and Contractor has been mobilized to site. For Dailekh Substation, the bidding document is under preparation.



7. Dhalkebar- Loharpatti 132 kV Transmission Line

Dhalkebar Loharpatti 132 kV Transmission Line Project has been initiated to reinforce the power supply system, cater increasing power demand, enhance quality and reliability of power supply of Mahottari and Dhanusha districts.

Scopes of project include construction of 20 km long 132 kV double circuit transmission line with ACSR Cardinal Conductor from existing Dhalkebar substation to Loharpatti with 132/33 kV, 2*30 MVA and 132/11 kV, 22.5 MVA substation at Loharpatti. The estimated cost of the project is NRs 1125 Million and is funded by GoN. The project was started in 2021 and expected to be completed in 2024.

As of July 2023, major transmission line equipment/material (tower and conductor) have been delivered to site. Moreover, outdoor switchyard equipments (Circuit Breaker, Isolator, CT, PT, LA etc.) for Substation have been delivered to site. All other equipment/material for transmission line and substation are in the inspection stage and delivered to the site soon.

All 64 Tower foundation and 26 Tower Erection has been completed. For the substation, the foundation and erection of the gantry structure and equipment structure is almost completed. Construction of control room, staff quarter and store cum guard house is in the final stage.

8. Raxaul Parwanipur 132 kV Second Circuit Transmission Line

Raxaul – Parwanipur 132 kV second circuit transmission line project has been initiated for increasing import/export of power between India and Nepal. This line will be helpful to meet increasing industrial demand of Birgung corridor.

Scope of this project includes construction of 22 km second circuit transmission line on same double circuit tower of existing Raxaul-Parwanipur 132 kV transmission line and expansion of 132 kV bay at Raxaul and Parwanipur substation. Estimated cost of the project is US\$ 1.5 Million and funded by GoN.

As of July 2023, all the civil works and erection of electrical equipments has been completed. The project is expected to be completed by October 2023.



Erection and Installation of equipments at Parwanipur SS

9. Dhalkebar – Balganga 132 kV Transmission Line

This project is initiated with the objective of improving voltage and supplying adequate and reliable power in Dhanusha district. The total project cost is about NRs. 2000 Million and funded by Government of Nepal. The project is initiated in fiscal year 2075/076 and is expected to be completed by the end of fiscal year 2081/082.

Scope of the project includes construction of about 24 km long; double circuit 132 kV transmission line with

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

As of July 2023, the construction of the boundary wall and guard house with store at Balganga substation and its Soil Investigation has been completed. The tender for substation has been floated. For transmission line, the contract has been awarded to Sigma Con. Pvt. Ltd. and the design/drawings are in the process of approval.



Guard House With Store

10. Kaligandaki-Ridi 132 kV Transmission Line

Objective of this project is to increase the quality and reliability of power supply in Palpa, Gulmi, Argakhachi and Syangja districts as well as to supply power to CG Cement after the completion of Ridi 132 kV substation. Project is initiated in FY 2075/076 with the funding by GoN through Ministry of Industry, Commerce and Supplies. The cost of this project is estimated to be NRs 1450 Million.

The project scope of works includes construction of about 23 km Double circuit transmission line (ACSR BEAR Conductor) on double circuit tower and 60 MVA, 132/33/11 kV substation at Kuseni, Palpa and 132 kV GIS bay extension works at Kaligandaki 'A' HEP.

The contract for transmission line construction was awarded in April 2022 and as of July 2023, twelve numbers of tower foundation works out of 70 have been completed successfully. Transmission line materials (ACSR BEAR Conductor, Long Rod Polymer Insulators, Hardwares, Earthing materials) have been reached at site.

Regarding Ridi 132/33/11 kV substation, construction of boundary wall and store cum guard house has been already completed. The contract agreement for the construction and installation of facilities such as Switchyard, Control

building and Quarter building has been done on 30th November 2022.

As of July 2023, check survey, Geotechnical works, design drawing approval of Lightning Arrestor, Disconnecting Switch, XLPE cable etc. equipment have been completed.



Tower Foundation works of Kaligandaki Ridi 132 kV Transmission Line

11. Bhumahi – Hakui 132 kV Transmission Line

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

The scope of the project includes construction of a 14.4 km long 132 kV double circuit transmission line from Sunwal 132 kV substation to new 132 kV substation in Hakui with ACSR Cardinal Conductor in steel lattice structure. The new 132/33/11 kV substation shall be constructed at Hakui with 132/33 kV, 2x 100 MVA, 3 phase power transformer, 7 numbers of 33 kV feeders and 2 numbers of 25 MVAR Capacitor Bank. Contract Agreement for construction of Hakui substation has been signed with Nepal Hydro and Electric limited in November 2022. The contract agreement for construction of 132kV double circuit transmission line was made in February 2023 with Mudhbary and Joshi construction Pvt. Ltd.

As of July 2023, construction of boundary wall at Hakui substation is ongoing and soil test for transmission line has been completed and designing of towers is ongoing.



Construction of boundary wall at Hakui Substation

12. Amarpur-Dhungesaghu 132 kV Transmission Line

Objective of this project is to interconnect the Kabeli Corridor and Koshi Corridor transmission line projects so that the power from Kabeli Corridor 132 kV transmission line project can be partially diverted to the Koshi Corridor 220 kV transmission line project during normal operation. This project shall be a link for evacuation of power effectively from the growing number of IPPs in the Kabeli river basin. Also, in case of any fault in the Kabeli Corridor in the lower sections this project intends to improve the reliability by diverting the power into koshi corridor transmission line. The Project is initiated in FY 2075/76 (2018/19) and expected to be completed by end of the year 2024/25. The estimated cost of the project is NRs. 1042 Million and funded by GoN.

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

As of July 2023, contractor has been mobilized at site and soil test for tower pad has been completed. Design, review of transmission line equipments are in progress.

13. New Khimti-Lamosanghu-Kathamandu Transmission Line Up-gradation

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

The scope of project in the first phase includes replacement of 45 km ACSR Bear conductor from New

Khimti substation to Lamosanghu substation with High Temperature Low Sag (HTLS) conductor and Upgradation of existing 220/132 kV, 100 MVA Power Transformer to 200 MVA Auto Transformer at New Khimti Substation. Estimated cost of the project is NRs 1160 Million and funded by GoN. This project is initiated in FY 2078/079 and expected to be completed by the end of year 2024.

As of July 2023, 22.5 km of reconductoring works out of 45 km from New Khimti to Lamosanghu section has been completed with close coordination for shutdown with LDC. Remaining works will be resumed within end of July, 2023. Tender for Upgradation of existing New Khimti Substation will be floated by the end of July 2023.



Conductor Restringing Works at New Khimti Substation

14. Malekhu 132 kV Substation Expansion Project

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

The scope of project includes construction, installation of 2x30 MVA power transformers at Malekhu switching station and 33 kV line bay expansion at existing Jahare and Dhading Besi 33 kV substation. Estimated cost of the project is NRs 290 Million and funded by GoN. This project is initiated in FY 2078/079 and expected to be completed by 2080/81.

As of July 2023, civil foundation works at Malekhu, Jahare and Dhadingbesi substations have been completed, major electrical equipments like Power Transformer, Circuit Breaker, Lightning Arrestor, Disconnecting Switch has arrived at site and Power Cable and Steel Structures are in process of factory dispatch.



Civil Foundation at Malekhu 132 kV switching station

15. Surkhet Substation

Objective of this project is to strengthen the power supply system and improve power transfer capacity to meet increasing demand of Karnali province and Surkhet. The estimated cost of project is Nrs. 750 million and funded by GoN. NEA has signed the contract agreement with NHE (Nepal Hydro & Electric Limited.) for all the works. The project is initiated in FY 2079/80 and is expected to be completed by May 2024.

Scope of the project includes construction of Surkhet Substation with power transformer capacity of 132/33kV, 2*30 MVA. Detail drawing designs of civil works has been approved. The construction of guard house, prefab building almost been completed. Construction of control building, switchyard foundation, staff quarter, drainage and boundary wall are in progress. Approval of design drawing of major electrical equipments have been almost done. Some major items like 132kV Circuit Breaker, LA, XLPE Power cable and, DS are delivered at site.

16. 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. Recently the project is being under execution with the fund of government of Nepal (GoN).

About 6 km transmission line in Kathmandu district and 4 km transmission line in Bhaktapur district have been completed. Construction of remaining 18 km transmission line in Lalitpur district was stopped due to protest by local people demanding 100% right of way (RoW) compensation or complete shift of transmission line and

consequently previous contract was terminated. NEA is taking initiations and conducting dialogs with concerned people and authorities to complete the remaining works. So far, there is no progress in the construction of remaining works.

However, the construction of line bay at Matatirtha substation will be started in fiscal year 2080/81 to charge the 132 kV double circuit transmission line from existing Matatirtha substation to Chobhar substation .

17. Sunkoshi 132 kV Substation

Sunkoshi 132 kV Substation Project was conceptualized to connect the existing Lamosangu 132 kV substation with proposed Barhabise 220/132 kV substation at Sindhupalchok district. The purpose of the project is to improve the grid stability of the transmission system.

Scope of the project includes 12 km single circuit stringing with Bear conductor on existing double circuit transmission line towers, expansion of two 132 kV line bays at Barhabise substation and one 132 kV line bay at Lamosangu substation. This project is initiated in FY 2075/076 (2018/19) and funded by GoN.

The transmission license of the existing substation being in the name of Shiva Shree Hydropower Ltd., the project had no progress since a long time. The meeting in presence of Managing Director of NEA on 2079/07/23 has clarified the scopes of Shiva Shree Hydropower Ltd. and NEA. As per the decision of the meeting, the transmission line materials to be provided by NEA has been dispatched to site. The stringing works to be carried out by Shiva Shree Hydropower Ltd. is yet to be started.

18. Prasauni Birgunj 132kV Underground Electricity Transmission Line

Presently, the electrical demand has drastically increased due to the establishment of new industries at Birgunj area. In order to meet the growing load demand of Birgunj area, NEA has decided to construct 132/33 kV AIS substation at Prasauni, LILO of Parwanipur Raxaul 132 KV Transmission Line to Prasauni substation and extension of 132 kV line to Birgunj substation through underground cable and construction to 132/66 kV GIS Birgunj substation and interconnection with existing 66/33/11 kV Birgunj substation.

The scope of the project includes the construction of 132/33 kV 2*100 MVA AIS Prasauni substation with LILO arrangement of existing 132 kV Parwanipur - Raxaul

double circuit line, 145KV, 1Cx1200 sqmm (XLPE) copper cable for underground line from Prasauni to Birgunj s/s and 132/66 kV 2*100 MVA GIS Birgunj substation.

As on July 2023, land acquisition works for substations and switchyard at Prasauni has been completed. M/s COVEC-CREGC-KALIKA JV has been awarded the job for design and construction of substations and underground transmission line. The topographical survey of substations and route of transmission line has been completed by the contractor. The layout drawing of substations are under review. The soil investigation works at Birgunj substation and tower location of Prasauni substation is ongoing. The site grading works for substations are also under progress. Drawing and design of retaining wall, boundary wall, gate, guard house and staff quarters are in progress and the construction will start immediately after approval of these structures



Figure 1: Topographic Survey at Prasauni Substation



Figure 2: Topographic Survey at Gandak Canal near Prasauni Substation



Figure 3: Soil Investigation Works for Staff Quarter at Birgunj Substation



Figure 4: Site Clearance and Survey at Birgunj Substation



Figure 5: Soil Investigation for Tower at Prasauni Substation



Figure 6: Site Leveling Works at Birgunj

19. Lalbandi-Salimpur 132 kV Transmission Line

Objective of this project is to enhance the quality and reliability of electricity supply in Sarlahi district. After construction of substation at Chainpura, the substation will supply power to Dumariya, Malangawa and Barathawa 33/11 kV substations. The estimated cost for the project is about US\$ 12 million and funded by GoN. This project is initiated in FY 2074/075 and expected to be completed in FY 2081/082.

The project scope of works include construction of about 20 km long double circuit 132 kV transmission line with ACSR Bear conductor from existing Nawalpur substation to proposed Salempur (Chainpura) substation as well as construction of 132/33 KV, 2x30 MVA and 33/11 kV, 16 MVA substation at Chainpura.

As of July 2023, contract agreement for construction of 132 KV double circuit transmission line and substation has been signed on April 10, 2023. Contractor has mobilized at site and soil test of transmission towers and design review of various equipments are in progress.

PROJECTS UNDER PLANNED AND PROPOSED

1. Kushma Lower Modi Modi 132 kV Line

In Dhaulagiri zone, Kaligandaki corridor project shall evacuate the power generated from projects at Dana and Kusma to New Butwal substation. The Dana-Kusma 220kV line has been charged but Kusma-New Butwal section is in the verge of completion. Also, 6 km, 132 kV DC transmission line was constructed between Kusma 220/132kV SS to Lower Modi IPP substation switchyard with single circuit. There exists only single circuit line between Kusma and Modi PH switchyard which has created a bottle neck in power flow between them. Thus, the connection of Kusma Substation and New Modi Substation is proposed through 132kV DC transmission line for better reliability and system stability. The proposed site is located in ward no 17 of Pokhara Metropolitan city which is south west side of existing Pokhara substation.

Scope of the project comprises of stringing of 6 km, 132 kV 2nd circuit on existing Kusma-Lower Modi line and also construction of 9 km, 132kV DC transmission line and 2 Nos. of 132 kV bay expansion at New Modi substation.

This project is initiated in FY 2078/079 (2021/22). The tender of transmission line and associated 132kV bay works has been floated. The completion period for the construction work is 21 months.

2. Godak –Soyak 132 kV Transmission Line

The project is conceptualized to make LILO arrangement in second circuit of Damak-Phidim transmission line and to connect with existing Godak substation. The purpose of the project is to improve the grid stability. This project is initiated in FY 2075/076 (2018/19) and expected to be completed in 2081 BS. The project cost is estimated to be NRs.553.4 Million and funded by GoN.

Scope of the project includes construction of 6.61 km long double circuit 132 kV transmission line with ACSR Bear conductor.

As of July 2023, The tender has been floated for the construction of the transmission line and the bid evaluation is underway. The construction is expected to complete in 18 months from the contract effective date.

3. New Pokhara (Birauta) 132 kV Substation

Objective of this project is to reinforce the power supply system of Pokhara valley. The proposed site is located in ward no 17 of Pokhara Metropolitan city which is south

west side of existing Pokhara substation and is near lake side.

Scope of the project comprises of construction of 132/11 kV, 2X30 MVA indoor GIS substation. The substation will be powered by loop in and loop out facilities of Syangja-Lekhnath 132 kV transmission line by construction of 132 kV 600m underground cable from substation to the termination tower near 159 tower number of existing transmission line. Project scope also include construction of 11 kV outgoing feeder up to the suitable connection point to enhance the capacity of existing feeders.

This project is initiated in FY 2075/076 (2018/19). Land acquisition for LILO tower is completed and IEE is approved. Consultant selection process for detail design and construction supervision is going on. The project is be funded by JICA and GoN.

4. Lahan - Sukhipur 132 kV Transmission Line

This project is initiated to cater loads of 33/11 kV substations to improve voltage profile and reduce loss in Siraha district.

Scope of the project includes construction of about 17 km long, double circuit 132 kV transmission line with ACSR Cardinal conductor and construction of 132/33 kV, 2x45 MVA substation at Badahari, Sukhipur Municipality – 6 of Siraha district. The proposed line will originate from existing Lahan substation and will be connected to the proposed Sukhipur substation. This substation will feed Siraha, Bisanpur, Bhagwanpur and other new proposed 33/11 kV substations.

As of July 2023, IEE report of the project has been approved. Construction of boundary wall at Sukhipur substation has been completed. The project is funded by GoN. The project is funded by GoN. The tender process will be conducted in FY 2080/81. The project is expected to be completed in FY 2083/84.



Boundary wall at Sukhipur Substation

5. Rupani – Bode Barsain 132 kV Transmission Line

This project is initiated to cater loads of 33/11 kV substations to improve voltage profile and reduce loss in Saptari district.

Scope of the project includes construction of about 18 km long, double circuit 132 kV transmission line with ACSR Cardinal conductor and construction of 132/33 kV, 2x45 MVA substation at Bodebarsain Municipality – 3. The proposed line will originate from existing Rupani substation and will be connected to the proposed Bodebarsain substation. This substation will feed Bode Barsain, Bisanpur and other proposed 33/11 kV substations.

As of July 2023, IEE report of the project has been approved. The construction of boundary wall at Bode Barsain substation has been completed. The project is funded by GoN. The tender process will be conducted in FY 2080/81. The project is expected to be completed in FY 2083/84.



Boundary wall at Bodebarsain substation

6. Chandrapur - Sukhdevchaulk 132 kV Transmission Line

This project is initiated with the objective of developing 132 kV transmission line and 132/33/11 kV substation to supply power to existing 33/11 kV substations, reduce frequent tripping & outages, improve voltage profile in middle and southern parts of Rautahat district and also to meet increasing power demand of industrial consumers.

Scope of the project includes construction of around 37 km long, double circuit 132 kV transmission line with Cardinal conductor and construction of 132/33/11 kV, 2x63+2x24 MVA capacity substation at Saruatha in Yamunamai Rural Municipality Ward No.4. The proposed line will originate from existing NEA Chandranigahpur 132 kV substation and will be connected to the proposed Saruatha substation. The Saruatha Substation will feed 33/11 kV Gaur, Manpur and Maulapur substations and also proposed SEZ at Jhunkhunma in Yamunamai Rural Municipality.

As of July 2023, the Detail Feasibility study work, Environment (IEE) study work and Geo-Investigation work of the project has been completed. IEE Report of the project is approved. The land acquisition works for construction of substation at Saruatha has been completed. Construction of Boundary Wall and construction of Guard House with Store Building at Saruatha Substation is almost completed now. The Estimate and Bidding documents for construction of 132 KV Double Circuit transmission line and 132/33/11 kV Saruatha substation of the project has been under finalization.

This project is funded by GoN and is expected to be completed in FY 2083/84.



Construction Boundary wall at 132/33/11 kV Saruatha Substation in Yamunamai RM Rautahat

7. Bafikot-Khungri 132 kV Transmission Line

Objective of this project is to evacuate power from different IPP's at Rolpa, Rukum (east) and Rukum (west) districts and its tributaries and to expand transmission network in Rolpa and Rukum districts. The project cost

is estimated as US\$ 35 Million and funded by GoN. This project is initiated in FY 2075/076 (2018/19) and expected to be completed in 2082/083.

The project comprises of construction of about 75 km long 132 kV double circuit transmission line from Khungri substation (Rolpa) to Uttarganga substation Hub, Bafikot (Rukum) along with one 132/33/11 kV, 30 MVA substation at Ghartigaun, Rolpa.

As of July 2023, Detail survey of the line route as well as the Initial environmental examination (IEE) works has been completed. Land acquisition for the substation at Ghartigaun, Rolpa is completed. The construction of the boundary wall, access road, and store building is under progress. ICB Bidding document for line and substation work is under preparation and projected to be floated in FY 2080/81.

8. Jhurjhure 132 kV Transmission Line

Objective of this project is to improve the power quality in the areas of East Makawanpur, West Sindhuli and South Lalitpur areas. The project will supply power to under-construction 33/11 kV Hattisude and Raigaun substations. Also, it will facilitate power evacuation from IPPs of that area. The project is funded by GoN.

Scope of the project includes construction of about 45 km long 132 kV double circuit transmission line with Bear conductor and construction of 132/33/11 kV substation at Jhurjhure, Makwanpur.

As of July 2023, detail Feasibility Study of the project is completed and IEE study of the project is being carried out by NEA Engineering Company Ltd.

9. Kathmandu Valley System Reinforcement

Objective of this project is to enhance the existing power supply infrastructure of Kathmandu and Bhaktapur districts through construction of new substations at Thapathali, Maharajgunj and Rajdurbar of Kathmandu and Sirutar of Bhaktapur districts.

Scope of the project includes construction of about 1 km underground cable from Teku to Thapathali substation and new 132/11 GIS substation at Thapathali; about 9 km underground cable from Balaju substation to Rajdurbar substation with new 132/11 kV GIS substations at Maharajgunj and Rajdurbar and also about 3 km underground cable from existing Bhaktapur substation to Katunje and new 132/11 kV GIS substation at Sirutar. Consultant selection process for detail design and construction supervision is going on. The project is funded by JICA and GoN.

10. Syaule Sanfebagar 132 kV Transmission Line

Objective of this project is to reinforce the power supply system of Achham, Bajura districts of Surdurpashchim Province. It will also evacuate power from Budiganga Hydropower Project (20 MW) which is currently under construction by Government of Nepal.

Scope of the project includes construction of about 70 km 132 kV double circuit transmission line from existing Syaule substation to Bayalpata in Sanfebagar Municipality in Achham district and Construct a new 132/33/11 kV sub-station in Bayalpata in Sanfebagar Municipality.

As of July 2023, Detail Feasibility Study of the project is completed. Land is identified for the substation. Land acquisition and Environmental study will be carried out in FY 2080/81.



Proposed Sanfebagar Sub-Station site at Bayalpata, Achham

11. Auraha Simara 132kV Transmission Line

The objective of the Auraha Simara 132kV Transmission Line Project is to cater increasing industrial loads of Special Economic Zone (SEZ) in Simara and to supply more power in Simara area. After completion of this project, the reliability and power supply quality in the Pathlaiya, Simara, Dumarwana, and surrounding areas, primarily the northeast side of Bara district, will be significantly improved. The project is initiated in the year 2079/80 and is expected to be completed in FY 2082/083. The total cost of the project is estimated to be around NRs. 3000 Million, and it is funded by GoN.

The main components of the project include the following:

- Construction of about 3 km 132 kV multi-circuit transmission line with LILO arrangement in the existing Pathlaiya-Parwanipur double circuit transmission line and a new 132/33/11kV substation at Auraha.
- Construction of 132 kV double circuit underground line from Auraha substation to existing Simara 66/11kV substation.

- Upgradation of Simara substation into 132/66/11kV GIS substation.

As of July 2023, the detailed survey works have been completed and the Initial Environmental Examination (IEE) study is currently in progress.

12. Damak Keraun Biratnagar 132kV Transmission Line

The objective of the project is to cater to the increasing industrial and commercial loads of Morang, Sunsari and Jhapa districts. This project is initiated in FY 2079/080.

The project comprises of about 65 km long 132 kV double-circuit transmission line with ACSR Bear conductor from existing Damak substation to under-construction Biratnagar (Barju) substation via under-construction Keraun and existing Duhabi substations.

As of July 2023, the MoU for Detail feasibility study of the project is in process.

13. Nepalgunj-Nanpara Cross-Border 132 kV Transmission Line

Objective of the project is to exchange (import/export) power with India. Presently, with the existing 33 kV feeder from Nanpara substation, UPPTCL is supplying around 15 MW power to Nepalgunj. After construction of 132 kV double circuit line, it can feed bulk power to the industrial and domestic sector in Nepalgunj as well as to nearby cities like Kohalpur, Guleriya. This project is initiated in FY 2079/080.

Scope of the project includes construction of about 17 km long double circuit 132 kV transmission line with ACSR Bear conductor and upgradation of existing 33/11 kV Nepalgunj Substation to 132/33/11 kV, 2*63 MVA.

As of July 2023, Feasibility study and cadastral survey has been concluded and ToR approval for IEE is at final stage. The estimate has been submitted for approval and the tender will be floated soon.

14. Attariya-Dhangadi 132 kV Transmission Line Project

The objective of this project is to enhance the power supply system and increase the quality, reliability of power supply to industrial, commercial and domestic consumers of Dhangadi Sub-Metropolitan in Kailali district. This project is initiated on FY 2079/80 with the funding by GoN.

Scope of the project includes construction of 15.5 km long 132 kV double circuit transmission line from existing

Attariya 132 kV substation to new 132 kV substation in Dhangadi with ACSR BEAR Conductor in steel lattice structure and 1.5 km underground cable transmission line with 800 Sq. mm XLPE cable. The new 132/33/11 kV substation shall be constructed at Dhangadi with 132/33 kV, 2x 63 MVA and 33/11 kV 16 MVA, 3 phase power transformer and 2 numbers of 15 MVAR Capacitor Bank.

As of July 2023, the survey License has been issued by DOED. The Detail Feasibility study and survey works is in the final stage of completion. The IEE works for the project is in progress.



132 kV Transmission Line Survey works at Dhangadi

15. Dhaubadi – Meghauli 132kV Transmission Line

The objective of the project is to enhance the power supply system of western part of Chitwan district. After completion of the project, the power supply system in Chanauli, Madi, Meghauli, Golaghat and south-west part of the Bharatpur Metropolitan City shall be improved in reliability, capacity and security perspectives. This project is initiated on FY 2079/080. The project is expected to enter into the construction stage in FY 2080/081. The total cost of this project is around NRs. 232 Million .

The project comprises of about 15 km long 132kV double circuit transmission line with ACSR Cardinal conductor. The transmission line shall originate from the proposed Gaidakot 132/33 kV substation at Gaidakot Municipality ward no. 10, Mukundapur, Nawalparasi district and shall connect the proposed Meghauli 132 kV substation at Bharatpur Metropolitan City ward no. 26, Chitwan district.

As of July 2023, the decision for land acquisition for Meghauli 132kV substation is made and the feasibility study of the project is completed while the environment study (IEE) of the project is ongoing.



16. Godak – New Anarmani Transmission Line

Objective of the project is to improve quality and reliability of electricity supply in Anarmani and surrounding areas of Jhapa district. The project shall connect the Godak substation with proposed 400/132 kV New Anarmani substation. Also, the existing Anarmani substation shall be connected to the New Anarmani substation by a double circuit 132 kV Transmission line to strengthen eastern part of National grid. This project is initiated in FY 2075/076 (2018/19) and expected to be completed in 2083 BS. The estimated project cost is NRs.1500 Million and funded by GoN.

The Scope of Project includes construction of:

- Approx. 44 km double Circuit 132 kV transmission line from Godak to New Anarmani substation,
- Approx. 14 km double circuit 132 kV transmission line from proposed New Anarmani substation to existing Anarmani substation,
- Construction of necessary line bays at Godak and Anarmani substations
- 132/33/11 kV New Anarmani substation at Jhapa

As of July 2023, the decision for land acquisition of land for the proposed New Anarmani substation has been made and the preliminary works are underway for land acquisition. The Terms of Reference for the feasibility study of the project has been approved and the feasibility study shall start in FY 2080/081. The environmental study (IEE) will be initiated in the next fiscal year.

II. MAJOR 220 KV TRANSMISSION LINE DEPARTMENT

PROJECTS UNDER CONSTRUCTION

1. Koshi Corridor 220 kV Transmission Line

The objective of Koshi Corridor 220kV Transmission Line Project is to evacuate power from various hydropower projects in Arun and Tamor river basins mainly Sankhuwasabha, Bhojpur, Taplejung, Panchthar, & Terhathum districts of Koshi Province, Nepal and to make the transmission and distribution network of NEA more resilient in the eastern part of Nepal. This project is funded by EXIM Bank of India under its Line of Credit II- 250 MUSD to Government of Nepal, whereas 90 MUSD shall be utilized under this project. Balance Cost of the Project shall be jointly financed by Government of Nepal and NEA.

The scope of project is divided to the following packages:

Package KC1: This package includes the construction of 106 km long 220 kV transmission line from Tumlingtar, Sankhuwasabha to the Inaruwa Substation via. Baneshwar and Basantapur of Sankhuwasabha District. All towers are designed for 220kV double circuit vertical configuration where the section from Tumlingtar-Basantapur is designed carrying double circuit ACSR Twin Moose conductor, and the section from Basantapur-Inaruwa is designed to carry double circuit ACSR Quad Moose conductors, however, scope under this package is limited for single circuit stringing only. For the construction of this package contract had been awarded to Kalpataru Power Transmission Ltd., India on June, 2016. The contract cost of this packages is US\$ 39.227 million. Despite covid -19 pandemic, lockdown imposed by GoN and various RoW issues the construction of the Transmission Line has been completed and put into operation at 220 kV voltage level since August 4, 2022.

Package KC2: This package includes the construction of three new 220 kV level AIS substation at Tumlingtar, Baneshwar & Basantapur of Sankhuwasabha District and two numbers of 220kV line bay extension at Inaruwa Substation. The scope includes the construction of 220/132/33kV substation at Tumlingtar, Sankhuwasabha District with two banks of 100 MVA, auto transformers formed with 7 numbers of 220/132 kV, 33.33MVA single phase auto transformers and two numbers of 30 MVA, 132/33 kV, 3 phase power transformers, construction of 220/33kV substation at Baneshwar, Sankhuwasabha District with two numbers of 30 MVA, 220/33 kV, 3 phase power transformers, construction of 220/132/33kV substation at Basantapur, Sankhuwasabha District with two banks of 100 MVA, auto transformers formed with 7 numbers of 220/132 kV, 33.33MVA single phase auto transformers and one numbers of 30 MVA, 132/33 kV, 3 phase power transformer and construction for two numbers of 220kV line bay extension at Inaruwa Substation. For the construction of this package contract had been awarded to Larsen & Toubro Ltd., India on October 2018. The contract cost of this package is US\$ 26.0908 million. Despite covid -19 pandemic and lockdown imposed by GoN and the construction of the Tumlingtar, Baneshwar & Inaruwa Substations were completed and are in operation at 220 kV voltage level since August 4, 2022. Basantapur Substation still requires additional time to complete because of its extreme climatic conditions (rain, and snow at altitude: 2,450m above mean sea level), extreme topographic conditions (substantial cutting, filling, and stabilization works for bench formation). Both these conditions are not conducive to labour motivation,

physical capacity to work, and the plants & machineries also get demobilized during such periods of hardships. Furthermore, there is considerable effort required on land development and site formation involving cutting and filling works up to 30m, and stabilization of such filled-up slope using the rather novel Mechanically Stabilized Earth retaining wall techniques. Also, additionally, a substantial quantity of hard-rock has been encountered on this very site which has slowed works down further. Almost major works at Basantapur substation have been completed and is scheduled to be commissioned by the end of September, 2023.

Package KC3: This package includes the construction of 35 km long 220 kV transmission line from Dhungesanghu, Taplejung to Basantapur, Sankhuwasabha District and construction of 132/33kV AIS substation at Dhungesanghu, Taplejung District which includes two banks of 15 MVA, power transformers formed with 7 numbers of 132/33 kV, 5 MVA Single phase power transformers. All towers are designed for 220kV double circuit ACSR Twin Moose conductor with vertical configuration, however, scope under this package is limited for single circuit stringing only. For the construction of this package contract had been awarded to KEC International Ltd. on June 2018. The contract cost of this package is US\$ 24.527 million. On the substation end, the most prominent problems are its remote location, terrible road conditions, and topography. Located in the remote hills of Taplejung, this substation is not just difficult to get to during winter or monsoon seasons, but it is also difficult to get the works going because of the substantial quantity of earthworks involved in formation of benches and the difficulty in keeping those cut and filled slopes stable. The transmission section passes through altitudes up to 3,000m through dense forests that are difficult to traverse and clear. The difficulty in acquiring forest clearance, and physical access to some locations have posed significant problems to timely completion of these works. Similarly, in the past, labour shortage, COVID-19 pandemic also caused significant delays. As of now, civil works at Dhungesanghu substation are almost complete barring road, some protection & finishing works whereas electrical testing and commissioning works are under progress. On the transmission line part, out of 127, 220kV towers, 118 number of foundations have been casted, 108 towers have been erected, and 26 km stringing has been completed. This transmission line and substations are scheduled to be charged by the end of December, 2023.

Package KC4: This package includes the second circuit stringing of 35 km long 220 kV transmission line from Dhungesanghu, Taplejung to Basantapur, Sankhuwasabha District and construction for four numbers of 220kV line bays extension at Basantapur Substation. For the construction of this package, the contract was awarded to Nepal Hydro & Electric Limited (NHE) on November 2022. The contract cost of this package is NPR 24.527 million. As of now, almost all design drawings of substation are finalized, civil works at Basantapur substation are started and all the materials required for transmission line are delivered at site. This transmission line and substation is scheduled to be commissioned by the end of February, 2024.

Package KC5: This package includes the second circuit stringing of 106 km long 220 kV transmission line from Tumlingtar, Sankhuwasabha to the Inaruwa Substation via. Baneshwar and Basantapur of Sankhuwasabha District, upgradations of Dhungesanghu Substation to 220 kV voltage level and 220 kV line bays extension at Tumlingtar & Baneshwar Substation. This packages is proposed to be funded by EXIM Bank of India under its Line of Credit IV-750 MUSD to Government of Nepal, whereas 35 MUSD shall be utilize under this packages.



Baneshwar Substation



Basantapur Substation



Transmission Line Stretch from Basantapur to Dhugesangu Section



Dhugesangu Substation

2. 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 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\$ 6,432,900.86 + NRS 547,472,116.35. The Power Grid Corporation of India has been awarded the consultancy service contract for the project supervision on 6th July 2016.

The scope of the project includes construction of 28 km long 220 kV transmission line from Chilime Hub to Trishuli 3B Hub substation and construction of 2x160 MVA, 220/132 kV plus 1x50 MVA, 132/33 kV substation at Thambuchet, Rasuwa. The line has two sections, one section (Chilime Hub substation to Mailung) is 20 km line of double circuit twin Bison ACSR conductor and the other section (Mailung to Trishuli 3B Hub) is 8 km line of four circuit twin Bison ACSR conductor. The 220/132 kV transformer includes two Banks of 160 MVA Auto transformers formed with 7 numbers of 220/132 kV, 53.33MVA Single phase auto transformers and 132/33 kV transformer includes 50 MVA, 132/33 kV, 3 Phase Power Transformer.

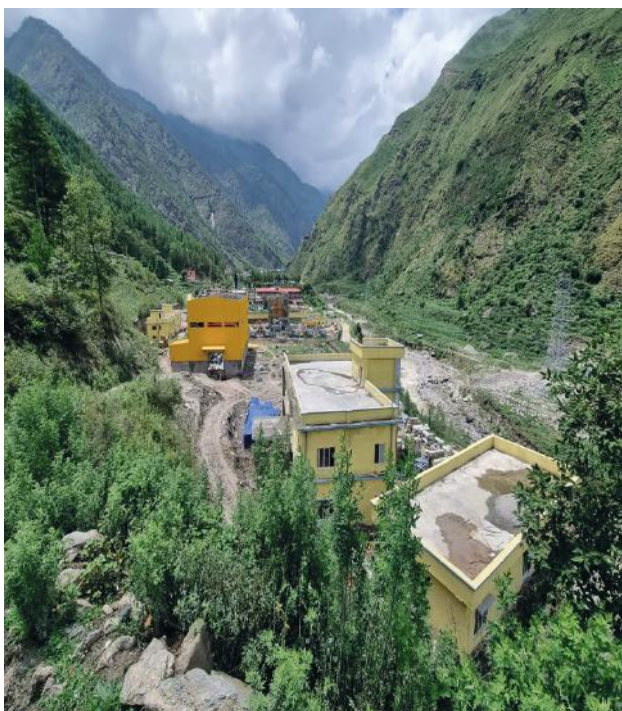
The project is mainly divided into four contract packages and is currently under implementation phase. An EPC contract was signed between NEA and Pinggao Group Co., Ltd, China for the Package-1 (220kV Chilime Hub-Trishuli-3B Hub Transmission Line) and Package-2 (Chilime Hub GIS Substation & Trishuli-3B Hub Hybrid GIS Substation) on 13th November 2017 and contract was effective from December 20, 2017.

Similarly, The power Grid corporation of India was awarded the consultancy service contract for the procurement and project supervision. The project cost is estimated at US\$ 39 Million and is jointly funded by Government of Nepal, Germany (KfW) & European Investment Bank (EIB). Most of the equipment foundations have been completed and supply of major equipment of the Substation including Auto/Power Transformers, 220kV & 132kV GIS have been dispatched to the site. Substation is scheduled to be completed by October, 2023.

As of July 2023, regard to the transmission line construction, 53 out of 79 complete tower foundation and 12 nos. of legs foundation have been completed along with 48 nos. of tower erected & stringing work of 11 km circuit length completed. Except special OPGW an OPGW hardware all the materials like conductor, earth wire, normal OPGW, insulators, hardware (Line, Normal OPGW & Earthwire), tower earthing materials and tower parts have been dispatched to the site. The transmission line is scheduled to be commissioned by October, 2023.



Stringing works



Chilime HUB Substation (PEB & CRB)

3. Trishuli 3B 220 kV HUB Substation

Currently, in Trishuli basin, numerous hydropower projects are in their advanced phase of construction and many new projects are being constructed, namely: Upper Trishuli 3A, Upper Trishuli-1, Upper Trishuli 3B, Sanjen, Rasuwagadhi, Upper Mailung HPP 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 this project includes construction of 2x160 MVA 220/132 kV plus 1x50 MVA 132/33 kV substation at Kispang Rural Municipality of Nuwakot district. The 220/132 kV transformer includes two Banks of 160 MVA Auto transformers formed with 7 numbers of 220/132 kV, 53.33MVA Single phase auto transformers and 132/33 kV transformer includes 50 MVA, 132/33 kV, 3 Phase Power Transformer. The 220 kV bays will be of Hybrid GIS type which will be the first in Nepal at 220kV voltage level while the 132 kV and 33kV bays will be of AIS type.

The total project cost is estimated to be US\$ 16.5 Million with the joint funding of Government of Nepal, Germany (KfW) and European Investment Bank (EIB). Contract was signed with M/s PINGGAO GROUP CO., LTD (China) on November 13, 2017 with the contract value of US\$ 12.5 Million and the contract became effective from December 20, 2017.

The progress on design/drawing is about 99.5% and overall physical progress of the project is about 95.35% by the end of fiscal year 2079/80 B.S. Major challenges of the project were to complete the site leveling and river/rivulet protection works. About 99% of site leveling and 99% of the river/rivulet protection have been completed. Preliminary works like Quarter Building and boundary walls were completed in 2017. Installation of 6(six) numbers of 220/V3 /132/V3 /33kV, 53.33MVA, single phase auto transformers and 1 number of 132/33kV , 50MVA three phase transformer have been completed. Major foundations of gantry and equipment structures are completed and 60% of Gantry erection works are also completed. Control Room Building, FFPH Building and 9 numbers of SPR building are completed. 10 numbers of HGIS and 13 numbers of CB installation works have been completed. Almost 90% of earthing work and 85% of cable trench construction works are completed. All equipment are delivered to the project site while CRP/SAS, Battery and Battery Charger, LT switchgear are at custom point for the clearance.

Since the transmission facilities under this project are to be completed urgently to evacuate the power from various IPPs (around 600MW in near future), the early completion of the project is given high priority. Due to COVID-19 Pandemic, design issues and contractor's non-performance, the completion schedule of project was impacted and is re-scheduled to be completed by October, 2023.



Overall View of the Trishuli 3B Hub substation

4. Lekhnath-Damauli 220 kV Transmission Line

The objective of this project is to enhance the power evacuation capacity of the Integrated National Power System in the Gandaki region of Nepal. This will be achieved through the construction of a 220 kV, 45 km long double circuit transmission line with MOOSE ACSR conductor, connecting Lekhnath Substation to New Damauli Substation. Additionally, a 220/132 kV (6x100 + spare 1x100 MVA) GIS substation will be constructed at Lekhnath, and a 220/132 kV (2x63 MVA), 132/33 kV (2x30 MVA), 33/11 kV (2x8 MVA) GIS substation will be built at New Damauli (Byas, ward no 13).

The estimated cost of this project is US\$ 90 Million. The project is jointly funded by the GoN and Germany (KfW). Forty-Nine (49) Million EURO will be supported by German Development Bank (KfW) as a grant whereas remaining expenditure will be borne by GoN/NEA. The project is expected to be completed in the Fiscal Year 2082/83.

As of July 2023, construction works for the access road to New Damauli Substation and the bridge over the Chhabdi River are in progress. The contractor, M/S Kirateshwar Construction & Drilling Company Pvt. Ltd., has completed so far the construction of the foundation and raft works of the Chhabdi Bridge. Additionally, the construction of Staff quarter building/transit camp is also going on. The contractor Kaya-Deepdarshan-Green Tara JV has completed structural works of the first and second floor of the Quarter Building (out of four) at New Damauli Substation.

M/S FICHTNER GmbH, Germany, is the Procurement and Implementation Consultant for the project. The technical evaluation of the construction of Transmission

Line (Package A) and construction of Substation (Package B) is completed. The financial evaluation of both the packages is in final stage. The issuing of LoI is expected to be completed by September 2023. The construction schedule will be 24 months from the date of contract effectiveness, and the commissioning of the facilities is planned for the last quarter of 2025.



Staff Quarter Building Under Construction at New Damauli Substation

5. Tumlingtar-Sitalpati 220 kV Transmission Line

The objective of this project is to extend the reach of the INPS at 220kV level from the existing Tumlingtar Substation to the proposed Sitalpati Substation which can later function as a hub for evacuating power generated from the Arun River basin at Sankhuwasabha and Bhojpur district. Additionally, the Sitalpati Substation will also pool the power of local IPPs, transmit it to Tumlingtar Substation which can readily evacuate that power using the transmission infrastructure laid down under Koshi Corridor 220kV Transmission Line Project. This project's estimated total cost is NPR 4482 million and is funded by the Government of Nepal. The project is initiated on August 2022 and expected to be completed by May 2025.

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

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

transformer and 33/11 kV, 2*6/8 MVA three phase transformer

- Construction of 2 nos. of 220kV line-bay extensions at the existing Tumlingtar Substation

For the construction of above scope of Transmission Line and Substations, the contract was signed with M/s Kalpataru Power Transmission Limited, India and the contract was effective from 7th November, 2022. The duration of contract is 30 months. As of July 2023, the contractor has completed the Detailed survey, check survey, Cadastral survey and Tree enumeration activities of Transmission Line in which total 39 nos. of tower will be constructed. Whereas the topographical survey has been completed for substation and civil activities like Terrace formation is under progress at Sitalpati and foundation of Gantry has been started at Tumlingtar Substation. NEA Engineering Company Limited has been appointed as the supervision consultant. The Design and Engineering activities for both transmission line and substations are under progress.

PROJECTS UNDER PLANNED AND PROPOSED

1. Trishuli 3B - Ratmate 220kV Transmission Line

Objective of this project is to increase power evacuation capacity. The line will upgrade the capacity and reliability of the Integrated Nepal Power System (INPS). The project is located in Nuwakot and Dhading District.

The original scope of this project was to construct about 24 km long double circuit 220 kV transmission line with twin moose conductor from Trishuli 3B Hub Substation to Ratmate 400/220 kV Substation and 220 kV bay extensions at Trishuli 3B Hub and Ratmate Substations. Ratmate 400/220 kV substation is going to be implemented by Millennium Challenge Account Nepal (MCAN) under the compact agreement between the GoN and Millennium Challenge Corporation (MCC), USA.

During the study, it was found that Ratmate-Rasuwadhi-Kerung 400kV Transmission Line Project has a common route from Trishuli 3B Hub to Ratmate. So, NEA management decided to drop the construction of Trishuli 3B-Ratmate 220 kV Transmission Line and take up the construction of 220 kV Multi circuit transmission line from Galchhi to Ratmate through this project. The line will have LIL arrangement near Galchhi for Marsyangdi-Kathmandu 220 kV TL and terminates at Ratmate Substation. Detail

survey of the project has been completed. MOU for the soil investigation has been signed with ChesCo (Chilime Engineering and Services Company Ltd.)

As of June, 2023, IEE as per the approved ToR has been submitted to DoED for approval. The Construction of the transmission line shall be commenced from first quarter of 2023.

2. Dhaubadi Iron Mines Electricity Transmission Line

The objective of this project is to supply the reliable and sufficient power for the proposed Dhaubadi Iron Industry in Nawalparasi (East) district to improve the power supply system in Kawasoti, Devchuli and Mandhyabindu Municipality through interconnection of existing Kawasoti 132kV substation. The source of fund for executing the project is managed from government of Nepal and the project is expected to enter in to the construction stage in FY 2080/81.

The scope of the project is to construct the Dhaubadi 220/132/33 kV Substation connecting to New Bharatpur-New Butawal 220kV transmission line by 220kV twin-Bisson ACSR conductor in four-circuit tower through LIL arrangement. The substation shall also be connected to Bharatpur-Bardaghat 132kV transmission line by 132kV Panther conductor in double circuit tower through LIL arrangement. The total length of transmission line shall be about 4.52 km. The substation shall be equipped with two numbers of 220/132kV, 100MVA three phase transformers. The total cost of the project is around NPR 1440 Million and the fund for the construction of the project has been allocated by GoN through Ministry of Industry, Commerce and Supplies.

As of July 2023, the feasibility study of the project is completed. The Environment study (IEE) is at the final stage and draft IEE report is submitted to DoED for Approval. The preparation of tender documents for transmission line part and process of getting land for substation area are in progress. The construction of transmission line is planned to begin in this Fiscal Year 2080/81 while the construction of substation shall be commenced in the Fiscal Year 2081/82.

3. Dharan 220/33 kV Substation

Dharan and adjoining area offers a huge potential for industrial and commercial sector to grow. The present 33 kV supply system from Dhabhi is insufficient to cater the demand and therefore, to provide adequate, reliable and

uninterrupted power supply in these areas, it is essential to build high voltage substation at Dharan. The study of the project was initiated in FY 2076/077 and expected to be completed in FY 2082/083. The estimated project cost is USD 19 million. The request for funding for this project has been submitted to Exim Bank of India under LOC- IV.

The scope of this project includes construction of 220kV (GIS)/33/11 kV AIS (Indoor) substation at Dharan by Loop-in-Loop-out (LIL) facility with double circuit Quad Moose to the existing Koshi Corridor 220kV Transmission Line. 220/33 kV, 3*25/30 MVA three phase and 33/11 kV, 2*16 MVA three phase transformers have been proposed with the construction of Multi-circuit Dead end tower for LIL arrangement. Also, the capacity enhancement of existing 220/33 kV, 2*25/30 MVA three phase transformer at Baneshwar, Sankhuwasabha with the 220/33 kV, 2*63 MVA three phase transformer will be carried out within this scope of work.

As of July 2023, Topographical survey, soil investigation of substation land and the IEE approval from DOED has been completed and the construction of staff quarter is under progress.

4. Palpa 220 kV Substation

To enhance the reliability in the Butwal-Bhairahawa Industrial region and to improve the supply condition of Palpa, Gulmi and Argakhachi districts, 220/132/33kV Substation has been envisaged in Madi Phant of Palpa District with the provision of interconnecting 220kV Kushma-New Butwal 220kV D/C Transmission line and 132kV Kaligandaki-Butwal D/C Transmission Line. The proposed Substation shall consist of 220 (GIS)/132(AIS)/33kV/11kV, 7x66.66 MVA (with one spare) Auto Transformer and 2*50MVA 3 phase Transformers. Palpa Substation can facilitate to inject the additional power to Kaligandaki –Butwal 132kV D/C Transmission Line by enhancing reliability to 220kV and 132kV system network.

The required land (172 ropanies) for the construction of the proposed substation has been acquired. About 70% of acquired land cost has been distributed to the respective land owners. The topographic survey has been completed by Project Development Department, NEA. Similarly soil Investigation work has been completed by CHESCO. The TOR of IEE study has been completed and final IEE shall commence soon. TOR for the consultancy services has been finalized. Financial assistance for the project has been proposed to Exim Bank of India under LoC-IV. The

completion of the project is scheduled on FY 2082/83.



Proposed Palpa Substation Site

5. Kathmandu Valley Transmission System Expansion Project

Kathmandu Valley Transmission System Expansion Project is conceptualized to fulfill the skyrocketing demand of Kathmandu Valley including Banepa city of Kavrepalanchok District consisting of 6 Nos. of Project Packages summarized with construction of new as well as upgradation of 31 Substations and 160.21km Transmission Lines in different voltage level i.e., 66kV, 132kV, 220kV.

Considering the energy demand forecast of the year 2030 A.D., 2040 A.D. and 2050 A.D., the project is conceptualized to fulfill such energy demand by expansion, upgradation and extension of new and existing Substations and Transmission Lines. The study shows that, the peak demand in Kathmandu Valley will be as shown:

S.N.	Year	Peak Demand (MW)
1	2030	925
2	2040	1825
3	2050	3169

To overcome such peak demand, NEA has proposed to construct new substations and Transmission Line under Kathmandu Valley Transmission System Expansion Project.

The project is categorized into Package A, Package B, Package C, Package D, Package E and Package F to execute the project in such a way to meet the requirement as early as possible.

Considering the unavailability of land and very high cost of land in prime location within Kathmandu Valley including Banepa City of Kavrepalanchok District, the Substations will be GIS type whilst Transmission Lines will be Overhead type, Monopole type and Underground type as per requirement recommended by the study.

To construct the GIS substations, around 441 Ropani of land has to be acquired among which land acquisition of 10 Ropani for Banepa 132/11 kV Substation, 4.5 Ropani for 132/11 kV Tokha Substation, 52 Ropani for 220/132/66 kV Tinipale Substation, 4 ropani for 66/11kV Goldhunga Substation and 3.5 Ropani for 132/11 kV Dahachok Substation has been completed.

The study has shown that, to construct the new Substations and transmission line facilities and upgradation of existing Substations and Transmission lines will invite around USD 520 Million. NEA has processed for line of credit from EXIM BANK of CHINA.

6. Gandak-Nepalgunj Transmission Line

This is one of the projects under the Government of Nepal's DOLLAR CREDIT LINE AGREEMENT with the Export-Import Bank of India. The project aims to improve the power transmission infrastructure in Nepal and cater to the increasing demand for electricity due to urbanization, industrialization, and economic development.

The main components of the project include the construction of transmission lines and substations at various locations. The project is divided into several packages for tendering, each focusing on specific sections of the transmission line and substations. Here are the key elements of the project:

Transmission Lines:

The project involves the construction of a 220 kV Multicircuit Transmission Line from Gandak Substation (Nawalparasi West District) to New Nepalgunj Substation (Banke District) via Kapilvastu Substation (Kapilvastu District). The total length of the transmission line is approximately 320 km. It will pass through various locations and substations along the route.

Substations:

The project includes the construction of new 220/132/33/11 kV Substations at Parasi (Nawalparasi West District), Kapilvastu Substation (Kapilvastu District), Betani Substation (Banke District), and other locations. These substations will be equipped with the necessary equipment, transformers, and control systems to handle the transmission of electricity.

Bay Extensions:

The project also involves the extension of existing substations to accommodate additional bays for 220 kV and 132 kV circuits. The bay extension works will be carried

out at Gandak, Hakui, Mainahiya, Lumbini, Shivpur, New Lamahi, and New Nepalgunj Substations.

Cost Estimates:

The cost estimates for the entire project, including transmission lines, substations, bay extensions, consultancy services, right-of-way compensation, project management, and environmental management, are approximately 240.15 Million under the loan and 140.35 million US dollars to be funded by the GoN.

Benefits of the Project: The project aims to improve electricity supply to industries, increase system adequacy and reliability, improve power quality, and support the overall economic development of Nepal.

Implementation Period:

The project's implementation period varies for different packages, but the construction period for the entire project is envisaged to be 36 months.

Overall, the Gandak-Nepalgunj Transmission Line Project is a significant infrastructure development initiative that will enhance the power transmission network in Nepal and meet the growing electricity demand in the country.

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-Muzaffarpur 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 BS.

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 lockdown 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).

Similarly, for the construction of 400 kV GIS substation at Hetauda and Inaruwa, contract has been awarded to Siemens Limited, India on December 2018 with contract price of US\$ 28.41 million and NPR 410.54. But, COVID-19 pandemic and lockdown imposed by Government of Nepal has affected the works schedule of the substation. Furthermore, due to flooding of Inaruwa Substation on 19-21 October 2021, some of the parts of the GIS have been damaged leading to the re-manufacturing and reimport of those damaged GIS parts. As of July 2023, all the engineering design works, civil works and equipments erections works at both sites are almost completed and 400 kV Indoor GIS works, GIS bus duct, cable laying & termination, Control Relay Panel & Substation Automation system (SAS), Online Partial Monitoring Discharge System (PDM), Visual Monitoring System (VMS) and communication system installations testing and commissioning works are under progress.

At Inaruwa, the 400 kV GIS High Voltage test and final commissioning works is planned on first week of August 2023 and accordingly charging the substation before August 15, 2023 whereas, at Hetauda the 400 kV GIS HV test and final commissioning works is planned on first week of September 2023 and accordingly charging the substation before September 15, 2023.



400/220 kV Inaruwa layout



167 MVA Transformers at Hetauda site



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

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. Power Transmitting capacity of this line has not been finalized and will be designed as per future scenario. The project is started in 2072/073 and expected to be completed in 2083/084.

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 2023, the land acquisition for the Uttarganga substation hub at Bafikot, Rukum (West) has been completed. Construction of boundary wall and the store building is completed. 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 F/Y 2080/81.

3. Ratmate-Rasuwasagadhi-Kerung 400 kV Transmission Line

The Ratmate – Rasuwasagadhi - 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 construction work is to be commenced from FY 2081/82 and expected to be completed by FY 2083/84. The project's estimated cost is US\$ 96.79 Million.

Initially, scope of the project was design, supply and construction of approximately 70 km of 400 kV double-circuit transmission line with Quad Moose ACSR conductor from Rasuwasagadhi border point at Rasuwa district to Ratmate substation at Nuwakot district, with a power carrying capacity of 5000 MW. But, now after merger of Trishuli 3B-Ratmate 220 kV Transmission Line Project in this project, the scope has been revised to upper double circuit 5000 MW (from Rasuwasagadhi border point at

Rasuwa district to Ratmate substation at Nuwakot district,) and lower double circuit 3000 MW (from Trishuli 3B Hub to Ratmate substation at Nuwakot district). Furthermore, back-to-back 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 2023, the detail survey works for this project has been completed. The route alignment of the transmission line has been optimized which required re-survey of certain portions. Cadastral survey and Geotechnical Investigation works have been completed. Similarly, Environmental Impact Assessment (EIA) study is being executed 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. Scoping and TOR documents for the EIA study has been presented to DoED.

Furthermore, Load flow analysis of the Nepali side of the Ratmate-Rasuwasagadhi-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 (SGCC), Beijing and similar report of Tibet Electric Grid has also been received. Cooperation agreement on the feasibility study of Power Grid Interconnection between China and Nepal has been extended for two years from March 2022 and the 4th Joint Group Meeting between NEA and SGCC was held in Beijing, China on June 13th, 2023.



The 4th Joint Group Meeting of China-Nepal Power Grid Interconnection Project between NEA, Nepal and SGCC, China on 13th June, 2023 in Beijing, China

(Attended by Mr. Dirghayu Kumar Shrestha, DMD of NEA and Mr. Zhu Guangchao, Deputy CTO of SGCC).



4. Nijgadh – Harnaiya 400kV Transmission Line

The objective of this project is to enhance the power supply system in Bara and Rautahat district and to be part of South Corridor projects as a backbone of national electric grid. After completing the project, the power supply system in Kalaiya, Simraungadh, Harnaiya, Haraiya and south-west part of the Rautahat district shall be improved in reliability, capacity and security perspectives. This project is initiated on FY 2075/076. The project is expected to enter in to the construction stage in FY 2081/082. The total cost of this project is around 48MUSD.

The project comprises of about 35 km long 400 kV four-circuit transmission line with ACSR Quad-Moose conductor. The transmission line shall originate from the proposed Nijgadh 400/132 kV substation and connects the proposed Harnaiya 400 kV substation at Adarsha Katwal Rural Municipality, Bara. The 400 kV substation at Motihari, India is about 45 km from the Harnaiya so it has a potential to have interconnection between them in future.

As of July 2023, land acquisition for Harnaiya substation is completed and the design and study of the project is ongoing.

5. Harnaiya - Inaruwa Transmission Line

The objective of this project is help to evacuate power from various hydropower projects to perspective industrial load center in the southern part of Nepal as well as to facilitate the electricity trade with India and to make the transmission and distribution network of NEA more resilient in the southern part of Nepal. This project is funded by EXIM Bank of India under its Line of Credit IV- 750 MUSD to Government of Nepal, whereas 180.5 MUSD shall be utilize under this project. Balance cost of the project shall be jointly financed by GoN and NEA.

At Nijgadh, the under construction 400 kV Hetauda-Dhalkebar line will be kept loop in loop out and from Nijgadh Substation 400 kV multi (four) circuit transmission line head towards Harnaiya substation (Bara district), southern part of the Nepal and move towards east part of the Nepal along the Postal Highway of Nepal and terminate at Bode Barsain substation (Saptari district) where the under construction 400 kV Inaruwa-Dhalkebar line will be kept in loop in loop out. This 400 kV multi (four) circuit transmission line upper two circuits will charge at 400 kV voltage level and it start from Nijgadh Substation and end on Bodebarsain Substation whereas bottom two circuit will charge at 132 kV level and kept

loop in loop out arrangement at Harnaiya Substation (Bara district), Saruatha substation (Rautahat district), Salimpur substation (Sarlahi district), Manara substation (Mahottari district), Balganga substation (Dhanusha district), Sukhipur substation (Sirha district) and Bode Barsain substation (Saptari district). Further, 400 kV multi circuit transmission lines from Bode Barsain substation to Inaruwa substation (Sunsari district) and its associated bay extension works at Bode Barsain and Inaruwa substation shall be considered in the second phase of the project.

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 for 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 400 kV Transmission Line

Objective of this project is to establish high voltage cross-border transmission link capacity of about 2,000 MW to facilitate exchange of power with India and to improve the reliability of power supply. The estimated project cost is around US\$ 170 million and it is funded by World Bank, GoN and NEA. After the closing of the World Bank loan on October 31, 2021, the project is being financed by GoN and NEA. NEA Engineering Company Limited is appointed as a design check and construction supervision Consultant for 400 kV Hetauda-Dhalkebar-Inaruwa Transmission Lines and Hetauda-Dhalkebar-Inaruwa 220kV substations construction works. This project was started in AD 2012 and likely to be completed by the end of 2024.

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, 2 nos. of 220 kV lines bays for termination of 220 kV Hetauda-Dhalkebar D/C Lines and 220 kV line bays for the termination of 220 kV Double Circuit lines from Bharatpur.
- Design, supply and construction of Dhalkebar substation: 220/132 kV, 2X160 MVA Transformers and its associated bays, 2X315 MVA, 220/132 kV Transformer bays, 2 nos. of 220 kV lines bays for termination of 220 kV Khimti-Dhalkebar D/C Lines, 2 nos. of 220 kV lines bays for termination of 220 kV Hetauda-Dhalkebar D/C Lines, 2 nos. of 220 kV lines bays for termination of 220 kV Dhalkebar-Inaruwa D/C Lines and 2 nos. of 220 kV lines bays for termination of 220 kV Dhalkebar-Muzzaffarpur D/C Lines.
- Design, supply and construction of Inaruwa substation: 220/132 kV, 2X160 MVA and 220/33 kV, 2X63 MVA Transformers and its associated bays; 132 kV, 25 MVA 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.



Erected 400kV Tower at Koshi River



220/132/33kV Inaruwa Substation

For the construction of Hetauda-Dhalkebar-Inaruwa 400 kV Double circuit Transmission lines, 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 date 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 end of 2024.

As of July 2023, out of 792 tower pads, 752 foundation have been completed and 729 towers have been erected . The remaining parts fall in the forest area and balance with community dispute locations. The process of tree-felling and stacking of remaining community forest along the right-of-way of the route is under process in Makwanpur district. There is public dispute at some location which is also hindering the progress. The quad hardware fittings are now delivered at site stores. The insulator hoisting work is started in Hetauda-Dhalkebar and Dhalkebar-Inaruwa section. The ROW identification and compensation fixation of land parcel under ROW are in progress. The quad ACSR Moose Conductor stringing work is started in Dhalkebar-Inaruwa section.

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.

Further, 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 substation majority of the substation equipment foundation, equipment & its structure installation, switchyard panel room and cable trench works are completed. The control & relay panels are placed inside the switchyard panel room. The 132kV equipment testing work has been started. Hetauda substation is expected to be completed by the end of year 2023.

The 220/132/33kV Inaruwa substation is charged at 220kV voltage level on August 2, 2022. The other remaining civil works of the substation is expected to be completed by end of October, 2023. One nos. of 33kV line bay is supplying power to 33/11kV Inaruwa substation which help to improve the voltage & reliability of Inaruwa. Further, two nos. of 33kV line bay will supply power to 33/11kV Khanar Substation after completion of under construction double circuit 33kV line which ultimately reduce the load of Duhabi substation. The capacity of 220/132/33kV Inaruwa substation is 446MVA.

2. Hetauda-Bharatpur-Bardaghat 220 kV Transmission Line

This World Bank funded project started in 2008 with the objective of enhancing the transmission capacity and bolstering the reliability of the Integrated Nepal Power System (INPS). However, the funding of the World Bank has been closed since 31st October 2021. Now, the Project is being constructed using fund from the Government of Nepal and NEA's internal budget. 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.

2.1 Bharatpur-Bardaghat 220 kV Transmission Line

Scope of the project is to construct 74 km long, 220 kV double circuit transmission line with Twin Bison ACSR conductor (initially charged at 132 kV) from Bharatpur to Bardaghat. After the termination of contract with M/S Central China Power Grid International Economic & Trade Co. Ltd, China (CCPG) on June 5, 2017, 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. The new Contractor has completed all works except two towers located in Dumkibas region of the corridor. Due to plea for the stay order against the construction of tower in this region, the construction work was stopped for almost 2 years. After the suspension of stay order of Supreme court, the dispute with public at Dumkibas was resolved and the construction was resumed by the contractor in May 2023 and expected to complete the work within the August 2023. Almost all the compensation have been disbursed to the affected families.

As of July 2023, out of 246 tower pads, 246 tower foundations, 246 tower erections and stringing of 142 circuit kilometers of conductors have been completed. 100% of the site is cleared and about 99.9% of Project Affected Families (PAFs) are compensated for their structure damage. The line is expected to be completed by August, 2023 after reaching mutual agreement between the Project team and the affected families to construct the section with proper compensation to the affected families as directed by the Supreme Court of Nepal.





220 kV Transmission Line of Bharatpur Bardaghat Section

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 was terminated on 29th April, 2019. After the termination of contract, new contract for balanced work (contract No. NIETTP/AF/HB/ICB/02) was awarded to M/S KEC International Ltd., India on 5th June, 2020 with the contract value of US\$ 5.4 Million and NPR 368.8 Million.

The scope of Hetauda-Bharatpur 220 kV Transmission Line 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 and was terminated on 17th Apr 2022. After the termination of contract, new contract for balanced work (Contract No. HBBTLP-NCB-079/80-001) was awarded to M/s Mahavir Shree

International Pvt. Ltd., Kathmandu on 12th March 2023 with the contract value of NPR 237 Million.

As of July 2023, Hetauda Bharatpur line section: out of 226 tower pads, 225 tower foundations have been casted, 224 towers have been erected, about 144 circuit km stretch has been strung and its supplementary tasks have also been completed. As this line connects Old Hetauda SS, New Hetauda SS and New Bharatpur SS at Aaptari, the line (circuit-II) between Old Hetauda SS to New Bharatpur SS has been charged at 132kV voltage level. 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 September of 2023. The overall progress of the construction of substation is about 96%. Almost all the equipment has been supplied and the installation works is about to complete. The Contract with the Contractor M/S Zhongding International Engineering Ltd. of this substation project has been terminated on 17th April 2022. After contract signing for the balanced work of the SS, M/s Mahavir Shree International Pvt. Ltd. is working in all sub-stations and expected to complete the whole scope till February 2023.



Hetauda-Bharatpur 220 kV Transmission Line



New Bharatpur SS at Aaptari.

PROJECTS UNDER PLANNED AND PROPOSED

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

As a part of the Transmission Master Plan of Nepal, the project started with the envisage of evacuating the power generated from the Eastern region of Nepal on the horizon of 2040, especially from the Arun River Corridor and Dudhkoshi River Corridor. The project was supported by World Bank under Power Sector Reform and Sustainable Hydropower Development Project. However, the fund from the World Bank has been discontinued since December 2022, and currently, the study is being carried out by NEA using its own fund. ELC Electro-consult S.p.A., Italy has been appointed as a consultant for Feasibility and Detailed Engineering Design in September 2019, whereas on August 2021, WAPCOS Ltd, India in association with Environment and Resource Management Consultant, Nepal was appointed as the consultant for Environment & Social Impact Assessment study. The Consultancy service for the feasibility and detailed Design is 2.98 million USD and for Environment and Social Study is 0.5 million USD.

The scope of the project includes a feasibility study, Power Flow Analysis, Detailed Design, Cost Estimates, Bid Document Preparation, and Environment & Social Study including Forest clearance Permit work for the following Transmission Lines and Concomitant Substations.

- TL1: Arun Hub (Sitalpati) – Inaruwa 400kV transmission Line
- Arun Hub-Inaruwa 400kV Transmission line emanates from the Sitalpati (Arun Hub) substation in Sankhuwasabha District passing Bhojpur and Dhankuta District before it reaches the Inaruwa Substation in Sunsari District. The transmission line is approximately 94km long with Double circuit towers carrying Quad Moose ACSR Conductor.

Under this transmission line, four 400kV line bays will be constructed in Sitalpati (Arun Hub) substation.

- TL2: Arun Hub (Sitalpati)-Tingla-Dudhkoshi 400kV Transmission Line
- Arun Hub-Tingla-Dudhkoshi 400kV Transmission line starts from the Sitalpati substation, Sankhuwasabha District which passes Bhojpur and Khotang district before it reaches Tingla Substation in Solukhumbu district where 400/132 kV new substation will be constructed with 4 number of 400kV Line bays, 2 numbers of ICT bays and 2 numbers of 132kV line bay for interconnection with existing 132/33/11 kV Tingla Substation. From the Tingla substation, the 400kV Transmission Line passes through the Okhaldhunga district finally terminating at the Dudhkoshi Substation located in Khotang District. The Line length from Sitalpati to Tingla is 75km while from Tingla to Dudhkoshi is around 35km which brings the total line length to 110km. TL2 is a 400kV Double Circuit Transmission Line with a quad moose conductor. Out of which about 15 km stretch from Dudhkoshi Dam toe to Dudhkoshi Main substation will be constructed with Multi-circuit multi voltage towers to cater the 132kV line coming out from Dudhkoshi Dam toe. To connect Dudhkoshi Substation, two 400kV line bays will be constructed at Dudhkoshi main Substation.

- TL3: Inaruwa-Anarmani 400kV Transmission Line

The main purpose of TL3: Inaruwa-Anarmani 400kV Transmission Line is to increase the reliability of the power supply in the load center of Eastern Nepal and to support the regional power trade between Nepal, India, and Bangladesh. 90km Long 400kV multi circuit transmission line with quad moose conductor emanates from the Inaruwa substation in Sunsari district passes Morang district and ends in New Anarmani 400/132kV Substation in Jhapa district. 6 numbers of 400kV line bays will be constructed at the Inaruwa substation and a new 400/132kV Anarmani Substation will be constructed in the Jhapa district with 4 numbers of 400kV Line bays, 2 number ICT bays and 2 numbers of 132kV line bays for interconnection between the old Anarmani substation and New Anarmani 400/132kV Substation.

Progress Status

As of July 2023, Power Flow Analysis, Desk Study, Detailed Survey, and Tower Spotting of all the TLs have been

completed. The tower design of TL-1 & TL-2 (Arun Hub-Tingla section) is near completion while for TL-3 and TL-2 (Tingla- Dudhkoshi section) design task is underway. Similarly, the Bidding document, specification, detailed cost estimates, and financial and economic analysis for all three lines are underway. On the part of the substation design, the consultant is currently working on the final design. The Geotechnical investigation for TL-1 & TL-3 along with all the substations has been completed. Necessary Land for the expansion of Tingla SS has been acquired while for New Anaramani SS, the process of land acquisition is underway.

On the part of Environment and Social Study, Terms of Reference (TOR) for the study from the Department of Electricity Development (DOED) have been approved. Baseline data collection for all three lines has been completed, Stakeholder Engagement Plan (SEP) has been published for all three lines. Tree enumeration work for TL1 and TL3 has been completed. The consultant is working on the finalization of the IEE/ESIA report along with the RFP, RAP, VIPDF, VIPDP, and GAP reports.

The project is expected to be completed by the 30th of November, 2023.

IV. SYSTEM OPERATION DEPARTMENT (SOD)

The Load Dispatch Centre (LDC) located at Syuchatar, Kathmandu under the System Operation Department (SOD) of Transmission Directorate is the apex body to ensure the integrated operation of the power system in Nepal. It is the main control centre which is responsible for smooth operation of the power system network considering all the system parameters, constraints and limits, thereby, ensuring the reliability and quality of the power supply to the consumers of the grid round the clock.

The main function of LDC:

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

- LDC restores the normal functioning of the power system as early as possible after the occurrence of the fault in the system.

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

1	Annual System Peak Demand	2171.15 MW	2080-03-26 (July 11, 2023)
2	Annual System Energy Demand	12880.557 GWh	
3	Annual National Peak Demand	1986.39	2080-02-18 (June 01, 2023)
4	Annual National Energy Demand	11547.437 GWh	
5	Annual Load Factor	66.36%	
6	Total Exported Energy(Annual)	1333.12 GWh	
7	The Maximum Exported Energy in a Single Day	10.505 GWh	2079-06-26 (Oct. 12, 2022)

The key accomplishments of LDC in this Fiscal Year

• Export through IEX DAM

NEA started importing power on short term basis from Indian Exchange Market since April 2021. And on the same year Nepal started exporting power to India through IEX from the power generated from Trisuli and Devighat hydropower stations on November 2021 by participating in the Day Ahead Market in the Indian Energy exchange Market with support of NVVN as the trading partner. 10 hydroelectric plants with total 451.72 MW capacity have been approved by the designated authority of India for selling their generation to India.

NEA is selling the generation from these plants to India during wet season. Whereas, Nepal buy power from Indian Exchange Market on Day a Head basis (DAM) during the dry season when the discharge of water is low in the river. By considering and fulfilling the country demand the extra power is sold in the IEX _ DAM market



during wet season. Similarly, to fulfill the country demand the deficit power that is required during dry season is purchased from IEX_DAM market.

The power trading unit in LDC has been given the responsibility to bid daily on IEX-DAM for selling and purchasing power from India to balance the supply and demand and to optimized the resources the most . Furthermore, short term planning scheduling, is been done from this unit. Depending upon the national demand and availability of various Peak Run of the River Plants, Storages Plants, selling more and purchasing less quantum during the high price and using the power from the storages plants and PROR plants during the high price blocks has been done. The planning is in such manner that the power is provided to all the consumer with the optimization of the resources. So far around 1.3 MU(million units) of energy has been sold to India from IEX in this FY 79/80. which helps to generate a substantial amount of revenue contributing positively to the financial health of NEA.

- **Frequency and voltage control:**

Frequency and voltage are the crucial parameters of the power system as it determines the quality of power supply to customers. In this FY, the system frequency was precisely maintained at around 50 Hz almost throughout the time. The voltage attained in most of the load centers' substations is in the range of permissible limit of +/- 10% at 132 and 66 kV as per NEA Grid Code. However, in the some of the Central Terai, Mid-Western and Eastern regions, occasionally during summer, system voltage was recorded low than the permissible limit at some of the substations. Strategically located Capacitor banks at various substations by Grid Department contributed in combatting the low voltage issues to some extent. However, those were not sufficient enough during the peak summer times and needs to be upgraded to maintain the voltage at the desired level.

- **Dispatching and scheduling:**

Effective short-term demand forecasting, daily energy scheduling of INPS, and proficient dispatching of generation have made it possible to optimize the supply-demand situation with the available generation and import and export of power from India. This has enabled LDC to realize the economic dispatch of power keeping the voltage and frequency of the system within a standard limit. The tactical planning of the water level usage of the Kulekhani reservoir power plant supported in maintaining the decent level of reservoir at present despite Kulekhani power plants being best utilized in this fiscal year as well.

Similarly, the generations from NEA ROR and PROR plants as well as all IPPs have also been optimally utilized and hence LDC was able to maintain the disciplined operation of the system throughout the year.

- **Shutdown coordination:**

LDC, being the focal entity for coordinating all shutdown events, is responsible to manage and carry out all the planned, scheduled, breakdown and emergency shutdowns. This fiscal year, many scheduled shutdown of major power plants and transmission lines were completed under the close coordination with LDC. Likewise, different grid divisions also managed the shutdown of major transmission lines for maintenance and during emergency breakdown situations. Similarly, the approved shutdown schedule and emergency shutdown plan of IPPs were implemented successfully. The skillful handling of the system by the operator during the shutdown period has made it possible to supply power with minimum interruption.

- **Partial system tripping:**

The watchful monitoring of the system and the prompt decision of the system operator during abnormal situations has helped significantly in controlling the partial tripping of the system. In this fiscal year, 72 number of partial system trippings occurred with the total interruption duration of 7 hours and 48 minutes. The partial system trippings in most of the cases were caused mainly due to the transmission line constraints prevailing in many parts of the country at present. However, the system restoration time after each tripping event has been drastically minimized with the proficient actions taken by the system operators.

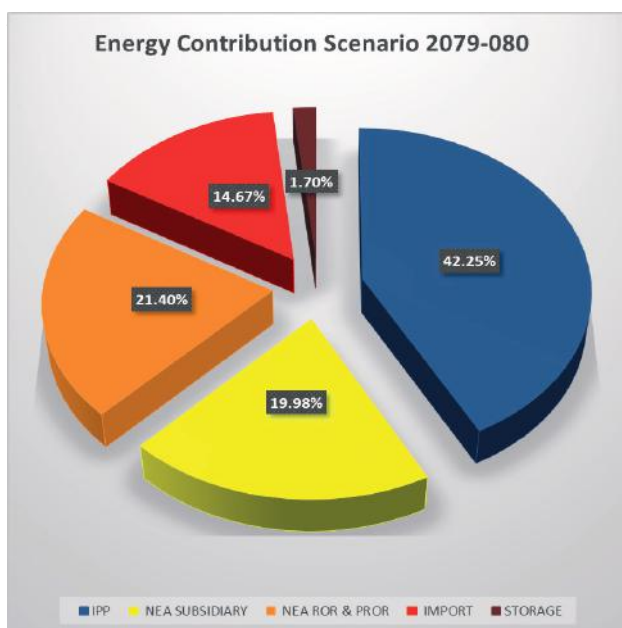
- **Maintenance of SCADA and communication facilities:**

For the continued smooth functioning of the INPS, the data acquisition from the power stations and substations must be updated according to the latest changes/modifications in the respective stations. The trained manpower in the LDC has been able to keep the data up-to-date in the SCADA software in the LDC, through the regular maintenance works of three primary components of SCADA: RTU, Communication equipment and optical fibers, and master stations. A significant amount of revenue is being received annually by leasing optical fiber cable to Nepal Telecom and other private companies.

- **Status of Supply and Demand:**

In this fiscal year, with the commissioning of 27 new IPPs, 498.28 MW of installed capacity is added to the INPS which includes few major power plants such as Solu

Khola Dudhkoshi (86MW), Super Dordi Kha (54MW), Super Madi (44MW), Upper Kalangagadh (38.46MW), Upper Balekhi (36MW), Lower Likhu (28.1MW), Dordi Khola (27 MW), Upper Dordi A (25MW) etc. This assisted in fulfilling the increased demand of the system and also helped to minimize power import to a certain extent in the dry season and made it possible to export during the wet season. The overall national energy demand and peak demand increased by 8.06 and 13.66 percent respectively in this FY compared to the last FY. The percentage of imported energy as compared to the total demand this year is almost equal as that of last year because of the increased energy demand but less precipitation this year. However, the exported energy during the wet season has increased from 4.4% last year to 10.3% this year.



Energy contribution scenario for annual energy demand management (2079/80)

Challenges

- Because of the addition of more and more generators in the system, the existing aging transmission arrangements are inadequate to evacuate power to load centers. Depending on the system scenarios, the transmission lines Hetauda-Pathalaya 132 kV, Damauli-Bharatpur 132kV, Bharatpur-Kawasoti-Bardghat 132 kV, Lekhnath-Syanga-Kaligandaki A, Marsyangdi-New Bharatpur 132 kV, Duhabi-Damak 132 kV, Dhalkebar-Nawalpur 132kV, Mirchaiya-Lahan 132kV, Khimti-Lamosanghu 132kV, Balaju-Syuchatar 132kV, LModi-Modi 132kV etc were being operated almost in full capacity continuously which have originated the power interruption at times in some areas. In addition to those challenges, transformer capacity constraints at New-Khimti Substation,

Hetauda Substation, Syuchatar Substation, Balaju Substation etc are also posing serious restrictions in the power system operation.

- In this fiscal year, difficulty in the smooth power supply to the western part of the country (west from Bharatpur) has been realized due to the unavailability of sufficient generation in the western part of the country to cater to the growing demand in that area. Due to the transmission lines' constraints, surplus generation of the eastern part of the country cannot be transmitted to the west thus major areas of the western part of the country have been supplied from the imported power from the Tanakpur(India). Despite Nepal being a generation surplus country in the wet season, still imported power is playing a vital role in the supply of power in the western part. However, many upcoming IPPs are in the process of commissioning in the western part as well which can significantly contribute in solving this issue, provided the transmission line congestion is timely addressed.
- Power evacuation of the newly commissioned IPPs due to various constraints prevailing in the power system network is also one of the biggest challenges faced by LDC.
- The frequent forced outages of power plants during the rainy season and frequent tripping of transmission lines has created difficulty in the smooth operation of the system, thereby influencing the export schedule intermittently.

Future Plan

NEA is planning to synchronize the Indian system with INPS and this is almost in the final phase of implementation. The installation of SPS (special protection scheme) and a communication system within the Nepalese power system is already accomplished. Installation works of the SPS system at the existing Dhalkebar, Chandranigahapur, Kamane, Bharatpur, Butwal, Hetauda, Bhaktapur, and Lamahi substations is already completed. The synchronization of INPS with the Indian system will be done shortly. The strengthening of the protection system and the communication system of present INPS is in the process of implementation. Synchronization of two grids will increase the reliability and security of the INPS system as well as creates more opportunity for power exchange between two countries and also third country through market transactions.

The details of the System Load Curve, capacity balance, and energy balance are presented in Annexure A.

V. GRID OPERATION DEPARTMENT

The Transmission Directorate's Grid Operation Department (GOD) has the crucial responsibility of ensuring the reliable and high-quality transmission of power from remote generating stations to various load centers. Its scope of work encompasses the efficient management and oversight of substations and transmission lines, ranging from 66 kV to 400 kV. The department is also actively involved in preventive maintenance to avert potential issues, as well as breakdown maintenance to quickly address any disruptions. Moreover, GOD undertakes projects for substation capacity expansion, equipment replacement, and reinforcement, as well as reactive power compensation and rehabilitation initiatives. This ensures that the transmission infrastructure remains robust and can cope with increasing demands.

Furthermore, the department plays a vital role in facilitating connections to Independent Power Producers (IPPs) and Bulk Consumers at different voltage levels, adhering to the guidelines set forth in the NEA Grid Code. To effectively manage their responsibilities, GOD exercises supervision over three grid division offices situated in Kathmandu, Hetauda, and Butwal, as well as four grid branch offices located at Duhabi, Pokhara, Attariya, and Dhalkebar.

In essence, the Grid Operation Department plays a pivotal role in the seamless functioning of Nepal's power transmission network, ensuring a stable and uninterrupted power supply to meet the nation's energy needs.

Kathmandu Grid Division

Kathmandu Grid Division located at Minbhawan, Kathmandu has fifteen substations namely Balaju, Banepa, Baneshwor, Bhaktapur, Chapali, K3, Lainchaur, Lamosanghu, Matatirtha, New Chabahil, New Patan, Panchkhal, Siuchatar, Teku and Indrawati. The division is responsible for routine and breakdown maintenance of 66 kV and higher voltage transmission lines inside the Kathmandu Valley and those which are connected to the Kathmandu valley mainly from Chilime, Devighat, Khimti, Marsyangdi, Trishuli, Trishuli 3A and Kulekhani.

This division has replaced damaged single unit of 132/66kV, 3*16.5 MVA power transformer at Chapali substation by 132/66kV, 1*16.5 MVA spare transformer. This division has executed Tower protection work at tower no. 16 and 18 of Khimti-Lamosanghu 132kV transmission line, tower no. 21 of Bhaktapur-Chapali 132kV transmission line, tower no. 78, 96 and 99 of Chilime-Nuwakot 66kV transmission line.



Replacement of damaged single unit of 132/66 kV, 3*16.5 MVA power transformer at Chapali substation

Hetauda Grid Division

Hetauda Grid Division is located at Chowkitole, Hetauda. Ten Substations namely at Amlekhgunj, Bharatpur, New Bharatpur (Aaptari), Birgunj, Hetauda, Kamane, New Parwanipur, Pathlaiya, Purbi Chitwan (Hardi) and Simara are supervised, operated and maintained by this division. This division is also responsible for routine and breakdown maintenance of 66 kV and higher voltage transmission lines in Bara, Parsa, Makawanpur & Chitwan and some portion of Tanahun Districts.

This division has upgraded 66/11 KV, 30 MVA Power transformer at Hetauda Substation and shifted 66/11 KV, 10 MVA power transformer from Hetauda substation to amlekhjung substation replacing 66/11 KV, 3 MVA power transformer. This division has replaced 66 kV SF6 Circuit Breaker of Parwanipur Circuit-2 Bay at Hetauda substation, 11kV VCB Switchgear (2 nos. Incomers, 8 nos. of outgoing panels 1 no of Buscoupler, 3 nos. VCB panels for Capacitor bank and 4 nos. of trunking Chamber) at Simara Substation, 11kV VCB Switchgear (1 nos. 11kv Incomers, 4 nos. of outgoing panels) at Amlekhgunj Substation, 11kV VCB Switchgear (1 nos. 11kv Incomers, 7 nos. of outgoing panels, 1 no of Capacitor Bank Breaker) at Pathaliya substation.

Butwal Grid Division

Butwal Grid Division is located at Yogikuti, Butwal. This division supervises, operates and maintains eleven substations namely at Kawasoti, Bardghat, Butwal, New Butwal, Chanauta, Gandak, Motipur, Mainahiya, Sandhikharka, Lamahi and Ghorahi. This division is also responsible for routine and breakdown maintenance of 132 kV and higher voltage transmission lines in Nawalparasi, Rupandehi, Kapilvastu, Arghakhachi, Palpa

and Dang districts.

Butwal grid division has restored tower number 18 of Lamahi-Ghorahi 132 KV Transmission Line section and tower protection work was carried out at Lamahi-Kusum 132kV Transmission Section on tower no. 215, 218, 219, 220, 398,399. This division has executed the installation work of 33kV bus section isolator at Mainihawa substation which solved the issue of outage of both 132/33kV 45MVA power transformer during bus fault and maintenance of feeders and installation of new 132kV bus protection relay in Lamahi substation. This division has maintained the broken conductor at Bardaghat-Kawasoti and Butwal-Kaligandaki Section and weak jumper in transmission line.



Erection of tower number 18 of Lamahi-Ghorahi 132 KV Transmission Line section

Attaria Grid Branch

Attaria Grid Branch is located at Attaria, Kailali. This branch has nine Substations to supervise, maintain and operate namely Attaria, Bhurigaun, Hapure, Kohalpur, Kusum, Lalpur (Mahendranagar), Lamki, Pahalmanpur and Syaule. This division is also responsible for routine and breakdown maintenance of 132 kV and higher voltage transmission lines from East Shivkhola of Banke District connecting Kusum - Lamahi Substation up to west

Gaddachauki connecting Lalpur - Tanakpur Powerhouse, India. The operating area of this branch includes Baitadi, Banke, Bardia, Dadeldhura, Dang, Darchula, Doti, Kailali and Kanchanpur districts.

This branch has executed Tower protection work at Attariya-Chameliya 132 KV transmission line on tower no. 346 and 377, at Attariya-Balach 132 KV transmission line on tower no. 377 and 89, at Kohalpur-Bhurigaun 132 KV transmission line on tower TN102 and at Kohalpur-Kusum 132 KV transmission line on tower no. 529 and 530. This branch has upgraded 33kV busbar at Lalpur substation, 16.6 MVA Power transformer at Attariya Substation and 110V Battery at Lalpur and Attariya substation. This branch has been organizing regular patrolling and bush cutting work in 132 kV Transmission Line.

Pokhara Grid Branch

Pokhara Grid Branch is located in Pokhara. The major responsibility of this branch is to supervise, maintain and operate 132 kV and 220kV substations and transmission lines in Gandaki province. This branch has eight substations namely at Damauli, Pokhara, Lekhnath, Markichowk, Syangja, Dana, Kushma and Lahachowk. The transmission lines under this branch includes 132 kV transmission lines Modi Khola - Pokhara - Lekhnath - Damauli - Bharatpur section, Kaligandaki - Lekhnath section and Middle Marsyangdi- Markichowk - Marsyangdi section and 220 kV line from Dana substation to Kushma substation.

The branch has upgraded 132KV busbar conductor and jumpers of Syangja (Rangkhola) substation from bear to cardinal conductor and 132/33KV 12MVA spare transformer has been shifted from Lekhnath Substation to Markichowk Substation. Two Spans of Conductor Stringing work done at Damauli- Bharatpur 132KV Transmission line (Tower No. 202 and 210) after being damaged by storm and Punctured Porcelain Insulator Replacement with Long Rod Polymer in Lightning prone areas in Lekhnath-Damauli 132KV Transmission Line

The tower protection work by constructing gabion wall at landslide area of tower no 58 of Modi-Pokhara 132 KV transmission line, the construction of retaining wall at landslide area of tower no 50 of Mid-Marsyangdi-Marsyangdi 132 KV transmission line and emergency river protection work at Kaligandaki river for Tower no 13 of Dana -Kusma 220 KV transmission line. PCC work for line clearance has been done.

*Insulator Replacement Works*

Dhalkebar Grid Branch

Dhalkebar Grid Branch is located at Dhalkebar. This branch supervises, maintains and operates seven substations namely at Chandranigahpur, Dhalkebar, Lahan, Mirchaiya, Rupani, Tingla and Nawalpur. This branch carries out maintenance and operation of 132 kV and above voltage level transmission lines in Saptari, Siraha, Dhanusa, Sindhuli, Ramechhap, Mohattari, Sarlahi, Rautahat and Bara districts. The transmission lines in this branch includes 132 kV double circuit transmission lines from Mahauli of Saptari district to Nijgadh of Bara district, 220 kV double circuit transmission line with twin Bison conductor from Dhalkebar to Khimti substation at Kirne of Ramechhap district. This branch also operates and maintains Nepal portion of Dhalkebar- Muzaffarpur 400 kV double circuit transmission line.

The branch has completed the design, supply, installation, testing and commissioning of 12 kV switchgear protection panel in dhalkebar substation, replaced the 33 kV Incomer Breaker by new Breaker in Mirchaiya Substation and replaced the 132 kV Mirchaiya-2 feeder Y phase and B phase CVT by new one in Dhalkebar substation. 33 kV LV side of 132/33 kV 63 MVA transformer current transformer was upgraded to CT ratio of 1200/1 and 33 kV Dhanushadham feeder CT ratio was upgraded from 150/5 to 400/1 in Dhalkebar substation.

Tower protection work completed in tower number 15 of Khimti Dhalkebar 220 kV Transmission Line. Tower protection work of other towers of same route tower numbers 107, 136, 159, 122, 137, 133 were also completed.

*400 kV conductor repair sleeve*

Duhabi Grid Branch

Duhabi Grid Branch is located at Duhabi. There are six substations under the supervision of this branch namely at Amarpur (Kabeli), Phidim (Thapatar), Godak, Damak (Parajungi), Anarmani and Duhabi. This branch is also responsible for operation and maintenance of 132 kV and higher voltage transmission line in Panchthar, Illam, Jhapa, Morang, Sunsari and Saptari districts. This branch also operates and maintains cross border transmission lines from Kushaha (Nepal) to Kataiya (India).

This branch has replaced existing 33/11kV, 16.6 MVA power Transformer No. 2 by new 33/11kV 24 MVA power Transformer in Anarmani substation. The branch has completed the RCC Boundary Wall and Drainage System Construction Works of East of Duhabi S/S. Old 6.02 MVAR Sub Capacitor Bank has been charged by the Replacement of all Capacitor bank units and by the maintenance work of Oil immersed Type Reactors. This branch has executed the rerouting of 132 kV Damak-Godak Double Circuit Transmission Line at Tower No. 12

& 15 by constructing pile foundation for tower legs and erecting DB+0 Tower to replace DA Normal tower along with dismantling and restringing of conductor & OPGW with required hardwares. Repair, crimping & Stringing of middle (Y-phase) conductor broken at Tower No. 36 in 132 kV Damak-Godak Double Circuit Transmission Line at Mahamai, Ilam. This division has been organizing regular patrolling and bush cutting work in 132 kV Transmission Line.



RCC Boundary Wall and Drainage System Construction Works of East of Duhabi S/S

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 equipment are being carried out to meet increasing power demand and reduce voltage drop problem. The replaced transformers are reused at other substations after necessary overhauling and maintenance works. Relocations of such power transformers are cost effective and immediate solution for load management.

Various works executed by this department have supported to reduce power interruption due to inadequate substation capacity. The department has carried out and completed various up-gradation and reinforcement works in FY 2079/080, detail of which is in Annexure B.

B. Major reinforcement/upgradation works in progress

The major up-gradation and 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 signed the Grid Connection Agreement with 59 Independent Power Producers (IPPs) for 2412.332 MW power to meet the future load demand. Among those 53 IPPs will produce total of 2352.332 MW hydro power and remaining 6 IPPs will produce total of 60 MW solar power.

D. Transmission Loss Status

Comparison of Transmission Line Loss of different F/Y.

S. N.	F/Y	Total Import Energy(MWh)	Total Export Energy(MWh)	Transmission Line Loss Energy(MWh)	Transmission Line Loss in Percentage
1	2068/69	3736805.66	3520922.32	215883.34	5.78%
2	2069/70	3772905.51	3574865.1	198040.41	5.25%
3	2070/71	4120153.81	3889823.1	230330.71	5.59%
4	2071/72	4394005.17	4193004.03	201001.14	4.57%
5	2072/73	3097302.02	2934259.90	163042.12	5.26%
6	2073/74	5552927.57	5275058.79	277868.78	5.00%
7	2074/75	6347849.13	5980995.92	366853.21	5.78%
8	2075/76	7005397.48	6700648.12	304749.36	4.35%
9	2076/77	7149391.47	6826833.47	322558.00	4.51%
10	2077/78	8170175.54	7791266.07	378909.47	4.64%
11	2078/79	10111556.74	9659983.88	451572.86	4.47%
12	2079/80	11708172.92	11182998.99	525173.92	4.49%

The single line diagram (SLD) of the existing high voltage substations are presented in Annexure C.

PROJECTS UNDER EXECUTION

Grid Operation Department is executing various projects to increase the capacity of the Grid substations to cater the increasing load demand and to buy spare power transformers necessary for immediate replacement. The detail of the projects under execution has been presented in Annexure B.

Emergency Restoration Systems (ERS) use in NEA

Failures and damages to transmission towers may occur due to landslides, high wind loading, storm damage, rock slides, mud slides, erosion of foundations, river cutting, vandalism or sabotage. Total monetary and other losses resulting from an extended outage of a key transmission line may be huge and further it is site specific.

A few of the utility's direct losses are; cost of restoration, higher grid losses on alternate transmission lines, contractual penalties for non-availability of the transmission line, possible higher generation cost or costs for power plant reductions or shut downs. All these situations demand some quick, easy and reliable restoration system and Emergency Restoration System (ERS) may play this role and many more than this. Past experience has also proved that huge losses due to line failures and force shutdowns has been saved by using ERS technology. ERS tower provides the quick solution as there is no need of foundation work and permanent land acquisition work.

VI. ADMINISTRATION DIVISION

Administration Division is responsible for planning, organizing, directing and controlling of policies related to human resource management under Directorate which consists of job analysis, placement, transfer, training and development, staff welfare, disciplinary actions etc. As of now, the total no. of approved positions is 771 and 977 employees are working under this directorate including transmission and substation projects implementing under directorate. The details of employees working under Directorate and its offices are as presented in annexure of this report.

VII. FINANCE DIVISION

Finance Division is responsible for carrying out overall financial and accounting functions of Transmission Directorate with key responsibility areas including revenue administration, accounting operation, budgetary control and treasury management. This division is also responsible for financial planning, control and monitoring of the various departments/projects under the directorate.

The expenditure of all the projects executing under Transmission Directorate is around 57.6 % in the FY 2079/80.

Fiscal Year	Approved Budget in thousand, NRs	Expenditure in thousand, NRs	Percentage of Expenditure (%)
2073/74	9,037,000	4,234,036	46.85
2074/75	15,863,650	4,541,787	28.63
2075/76	14,787,896	11,091,739	75.01
2076/77	14,364,995	13,690,313	95.3
2077/78	13,116,353	9,403,828	71.7
2078/79	10,026,250	9,762,593	97.37
2079/80	20,409,283	11,755,164	57.60

The main reason for decrease in financial progress of last fiscal year is due to the delay in land acquisition of various substations of Kathmandu valley because of various reasons.

The net income in Transmission Directorate in F/Y 2079/80 from various sources including sale of tender form, access rental (including OPGW) and other miscellaneous sources is NRs. 61,39,01,092.



PROJECT MANAGEMENT DIRECTORATE (PMD)

Project Management Directorate (PMD) under 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 like construction of transmission lines, substations and distribution systems, upgrading of transmission line through high capacity High Tension Low Sag (HTLS) conductors, modernization of distribution system, installation of smart metering 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 lines up to 400 kV voltage level with length of more than 2000 circuit km and substations associated with it under ADB Grant No. 0361: Project Preparatory Facility for Energy (PPFE).

PMD has been involved in preparation, planning, procurement and implementation of both transmission and distribution projects. It is also engaged in introducing modern technology in NEA such as by implementing substation automation system in the existing substations, electric vehicle charging, implementation of smart metering system, high voltage transmission & distribution system undergrounding, distribution system automation and solar PV power plants with Battery Energy Storage System (BESS). PMD is also working to improve NEA's financial accounting and management decision support systems through Institutional Strengthening Project. It shall improve efficiency of

business operations and increase employee productivity by implementing Enterprise Resource Planning (ERP) and Revenue Management System (RMS) across all provinces of Nepal in about 181 revenue collection centers.

PMD has its own Social Safeguard and Environmental Management Department (SSEMD) to address environmental and social safeguard issues in the projects effectively and efficiently with strong commitment.

A number of transmission lines and substations of different voltage level ranging from 132 kV to 400 kV are under construction and several 400 kV lines and associated substations are also under study. PMD is also playing a vital role in distribution sector with the construction of 33/11 kV substations, 33 kV lines, 11 kV and 400 Volt lines in most needy and strategic places which shall help NEA to connect more consumers, reduce loss and increase supply reliability.

Till date, PMD has been successful in completing 40km of Dana-Kusma 220 kV double circuit transmission line and associated substations at Dana (220/132kV 100 MVA; 132/33 kV 25 MVA) and Kusma (220/132kV 100 MVA), 26 km of Samundratar- Trishuli 3B 132 kV double circuit line and associated substation at Samundratar (132/33 kV 60 MVA; 33/11 kV 16 MVA), 82 km of Marysangdi-Kathmandu 220 kV double circuit transmission line from Markhichowk, Tanahu to Matatirtha, Kathmandu, New Butwal substation (220/132 kV 100 MVA), New Bharatpur substation (220/132 kV 320 MVA).

PMD engagement includes the following major works in transmission sector:

1. Engineering and environmental study of 2000 circuit km of 400 kV transmission line and 300 circuit km of 132 kV transmission lines and associated substations.
2. Bid document preparation and under bidding phase

for design, supply, construction and installation of 25 circuit km of 132 kV underground transmission line, 84 circuit km of 132 kV and 132/66 kV, 132/33 kV, 132/11 kV substation all totaling a capacity of 648 MVA.

3. Construction work of 178 circuit km of 400 kV transmission line, 492 circuit km of 220 kV transmission line and 233 circuit km of 132 kV transmission line and construction work of 1265 MVA of 400/220 kV substation, 2000 MVA of 220/132 kV substation, 263 MVA of 132/66 kV substation, 745 MVA of 132/33 kV substation, 545 MVA of 132/11 kV substation.
4. Completed the construction and upgradation of 357.4 MVA capacities of different 132 kV substations and 620 MVA capacities of different 220 kV substations.

PMD has been working continuously to adopt modern technology in transmission system. It has initiated automation of grid substations in Kathmandu valley (13 nos.) eventually leading to automation of substation all around the country (39 nos). PMD is also adopting to use drone technology in transmission line surveying and stringing works.

In fiscal year 2080/81, PMD has targeted to complete following transmission line and substations:

1. Construction of 88 km, 220 kV double circuit transmission line from Kushma to New Butwal
2. Construction of 21 km of 220 kV double circuit transmission line from New-Butwal to Bardaghat
3. 220/132 kV, 320 MVA Markhichowk Substation at Tanahun and 220/132, 320 MVA at Matatirtha Substation at Kathmandu
4. 220/132 kV, 160 MVA Bahrabise Substation
5. Khimti–Barhabise 400 kV double circuit transmission Line of length 44 km
6. 400 kV, 630 MVA substation at Khimti and 400 kV, 320 MVA substation at Barhabise
7. 220/132 kV, 160 MVA Udipur substation and 220/132 kV, 320 MVA Bharatpur substation
8. 132 kV Teku substation (153 MVA), Phutung substation (90 MVA), Thimi substation (90 MVA), Chobhar substation (90 MVA) and Changunarayan substation (45 MVA) at different parts of Kathmandu valley.
9. Installation of Substation Automation System (SAS) at 13 grid substations within Kathmandu Valley.

Project Highlights:

A) Recently Completed Projects/ Commissioned Projects

1) New Bharatpur S/S under Marsyangdi – Corridor Transmission Line Project

Marsyangdi Corridor 220 kV Transmission Line Project once completed will evacuate approximately 1600 MW of power generated by the hydropower stations in the Marsyangdi river basin and its tributaries like Dordi, Chepe etc. to the Integrated Nepal Power System (INPS). The Project has completed testing and charging of New Bharatpur substation (220/132 kV 320 MVA) at Aanpatari, Chitwan on 2080/04/05 under no load.



Completely Installed 2 nos. of 220/132/33 kV 3-Ph 160 MVA Transformer in New Bharatpur Substation

B. Under Construction/Execution Projects:

1) Tamakoshi- Kathmandu 220/400 kV Transmission Line Project

Tamakoshi-Kathmandu 220/400 kV Transmission Line Project is being executed by Nepal Electricity Authority (NEA) and funded by Nepal Government and Asian Development Bank (ADB) under Electricity Transmission Expansion and Supply Improvement Project (ETESIP) and Power Transmission Distribution and Energy Enhancement Project (PTDEEP). The project focuses on the development of power transmission facilities to evacuate the hydro power generated in Dolakha, Ramechhap and Sindhupalchok districts having more than 1000 MW capacity to the Khimti substation at Dolakha district and Lapsipedi Substation at Kathmandu district and shall be subsequently connected to the national grid. The notable hydropower projects which will be evacuated are national pride project Upper Tamakoshi hydropower plant of Dolakha and Madhya-Bhotekoshi, Chaku Khola & Balefi corridor hydropower projects in Sindhupalchok district. The project is constructing approximately 42.80

km long 400 kV double circuit transmission line from Khimti Substation to Barhabise Substation, 220/132/11 KV 160 MVA GIS substation at Barhabise Municipality of Sindhupalchowk district, approximately 46.50 km long 400 KV double circuit transmission line from Barhabise substation to Lapsipedi substation of Kathmandu district and approximately 10km long 132 KV double circuit transmission line from Lapsipedi substation to Changunarayan substation and approximately 4 km long 132 kV four circuit LIL0 transmission line from Changunarayan substation to Duwakot of Bhaktapur.

Scope of Works:

The project has three packages. The scopes of the packages are:

A. Package I

Construction of Transmission Line from Khimti Substation to Barhabise Substation:

Voltage level: 400 kV

Circuit: Double

Tower: Steel Lattice with double peak (OPGW and earthwire)

Number of towers: 118

Transmission line length: 42.80 km

Conductor: Moose conductor in quad configuration

Contractor: KEC International Ltd., India

Project completion date: 31 October 2023

B. Package II

Construction of 400kV Transmission Line from Barhabise Substation to Lapsipedi Substation:

Voltage level: 400 kV

Circuit: Double

Tower: Steel Lattice with double peak (OPGW and earthwire)

Number of towers: 122

Transmission line length: 46.50 km

Conductor: Moose conductor in quad configuration

Construction of Transmission Line from Lapsipedi Substation to Duwakot of Bhaktapur:

Voltage Level: 132 KV

Circuit: Double and Four Circuit

Tower: Steel Lattice with single peak (OPGW)

Transmission line length: 14 km

Conductor: Bear conductor

Contractor: Larsen & Toubro Limited, India

Project completion date: 30 September 2023

C. Package III

Construction of 220 /132/11 kV GIS substation at Barhabise, Sindhupalchowk

Voltage Level: 220/132/11 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 220/132 kV 160 MVA and 132/11kV 5 MVA

Contractor: The Joint Venture of Guangxi Transmission & Substation Construction Co. and Shenzhen Clou Electronics Co. Ltd, China

Project completion date: 31 October 2023.

Progress Status:

Package-I: Khimti-Barhabise 400 kV Transmission Line

Check survey, detail survey and soil investigation have been completed and transmission line is in construction phase. All the design and drawings of the different components of the transmission line are approved. Out of 118 number of towers, 99 numbers of tower foundations are completed with 83 numbers of towers are erected. Out of 42.80 km of line stringing, 22.85 km of conductor stringing is completed. Almost 97 % of land acquisition for tower pad for Dolakha district and around 75% for tower pad for Sindhupalchowk district is completed.

Tree-cutting is approved from the Government of Nepal (GON) and the contract with the Forest and Soil Conservation Department is completed. Tree cutting in Dolakha district has been completed. In supply part 4500 MT of tower materials (around 99% of tower material), 1024 km Moose conductor, 45 km of earth wire, 5000 numbers of long rod insulator, complete set of hardware fittings, has reached site.

Package I: Physical Progress: 85%, Financial Progress: 77%.



Stringing for Khimti-Barhabise 400 kV Transmission Line

Package II: Barhabise-Lapsipedi 400kV and Lapsipedi-Changunarayan 132kV Transmission Line)

Check survey, detail survey and soil investigation along with the measurement of earth resistivity are completed and the transmission line is in construction phase. Proto-testing of towers are successfully completed. All the design and drawing related works of the different components of the transmission line are completed. Out of 122 towers of 400 kV voltage level, 114 numbers of foundation works and 108 numbers of tower erection have been completed. Land acquisition process for tower pad in Sindhupalchok and Kavrepalanchok district are completed and the almost 97% of respective land owners have received the compensation. Compensation amount for right of way is being distributed along the conductor stringing area. Land acquisition notice in Kathmandu have been published. Almost 99% of the transmission line equipment have been delivered at the site.

Package II: Physical Progress: 88.1%, Financial Progress: 86.21%.



Stringing for Barhabise-Kathmandu 400 kV Transmission Line

Package-III: Barhabise Substation

Survey, soil investigation and site preparation works like cutting filling and levelling along with constructions of boundary wall and retaining wall have been done at the beginning of construction works. Construction of staff quarters, internal drain, construction and erection of power transformer foundation, foundations of 132

kV gantry, lightning arresters and CVTs have been completed. Construction of 220 kV, 132 kV and Control Building and Pre-Engineered GIS Building foundation and erection, fire-fighting pump house, substation earthing work, cable trench are under construction. Supply and delivery of 145kV and 245 kV GIS, ACDB, DCDB, Control/Relay Panels & SAS, power and control cable, 220/132 kV power transformers, 132/11kV power transformer, LT transformer, DG set, earthing materials, steel structures, PEB structures, EoT crane, 220 and 132 kV CVTs, lightning arresters, Bus Post insulators have been done to the site. Factory Acceptance Test (FAT) of communication equipment, fire-fighting system and 12 kV switchgear are completed and are in the process of delivery.

Package III: Physical Progress: 75%, Financial Progress: 40% .

2) Marsyangdi Corridor 220 kV Transmission Line Project

Marsyangdi Corridor 220 kV Transmission Line Project once completed will evacuate approximately 1600MW of power generated by all the hydropower stations in the Marsyangdi river basin and its tributaries like Dordi, Chepe etc. to the Integrated Nepal Power System (INPS). The Project planned to construct 113 km long Double Circuit 220 kV Transmission Line from Manang to Bharatpur, Chitawan. Also there will be construction 4 nos. of 220kV substations in the different locations. The project is jointly financed by European Investment Bank (EIB), GoN and NEA. For this Project GoN and EIB have signed the loan agreement of US\$ 90 Million and rest shall be managed from GoN and NEA funding.

The complete scope of the project has been divided into 3 contract packages and are being executed by three different contractors.

A. Package I:

Construction of Transmission Line from Udipur Substation to Bharatpur Substation:

Voltage level: 220 kV

Circuit: Double

Tower: Steel Lattice with double peak (OPGW and earthwire)

Transmission line length: 67 km

Conductor: Drake HTLS conductor in twin configuration

Contractor: Pinggao Group Co. Ltd., China

Project completion date: 31 October 2023



Strung Udipur Markhichowk Section of 220 kV Line

B. Package II: Constructions of 220kV Substations at Udipur and Bharatpur

- Construction of 220/132kV GIS substation at Bharatpur, Chitawan

Voltage Level: 220/132 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 220/132 kV 2x160 MVA

- Construction of 220/132kV GIS substation at Udipur

Voltage Level: 220/132/33 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 220/132 kV 2x160 MVA and 132/33kV 50MVA

Contractor: Larsen and Toubro Ltd., India

Project completion date: 31 October 2023.



PEB Building with 220 kV Gantry in Bharatpur SS

C. Package III Construction of Transmission Line from Manang Substation to Udipur Substation and construction of associated Manang and Khudi Substations:

- Construction of Transmission Line from Manang Substation to Khudi Substation to Udipur Substation:

Voltage Level: 220KV

Circuit: Double

Tower: Steel Lattice with double peak (OPGW and earthwire)

Transmission line length: 46km

Conductor: Drake HTLS conductor in twin configuration (20km) from Khudi to Udipur and Moose Drake HTLS conductor in twin configuration (26km) from Manang to Khudi.

- Construction of 220/132kV GIS substation at Khudi

Voltage Level: 220/132/33 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 220/132 kV 160 MVA and 132/33kV 50 MVA

- Construction of 220/132kV GIS substation at Manang

Voltage Level: 220/132/33 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 220/132 kV 100 MVA and 132/33kV 30 MVA

Contractor: TBEA Co. Ltd., China

Project completion date: 31 December 2023.



3) Marsyangdi - Kathmandu 220 kV Transmission Line Project

Marsyangdi - Kathmandu 220kV Transmission Line Project was conceptualized to transfer power from Marsyangdi Corridor to Kathmandu valley which ultimately reinforces

Integrated Nepal Power System (INPS) and improve reliability of transmission system. The scope of this project includes construction of 82km double circuit 220kV transmission line from Markhichowk, Tanahun to Matatirtha Kathmandu with twin Moose ACSR conductor and construction of 220/132 Substations of capacity 320MVA (2x160 MVA) at Markhichowk and 320MVA at Matatirtha. The substation in Matatirtha will be air insulated type(AIS) while in Markhichowk, the substation shall be of gas insulated type(GIS).

The first contract package agreement for Marsyangdi – Kathmandu transmission line was concluded on June 2016 with M/s. Tata Projects Ltd. India. The line length of the transmission line is 82.0 km double circuit which has 233 towers and the transmission line has commissioned and came into operation from 21st June 2022 (7th Ashad 2079) in 132kV voltage level.

The second contract package agreement for substations was concluded on 30 December, 2020 with China Machinery Engineering Corporation, China, after contract was terminated with Shenzhen Farad Electric Co. Ltd which was unable to complete the contract performed on December 2017. Nearly 95% of work related with supply and delivery has been completed while about 75% of civil work and 80% of erection and installation work has been completed.

Substation Package: Constructions of 220kV Substations at Markhichowk, Tanahu and Matatirtha, Kathmandu

- Construction of 220/132kV GIS substation at Markhichowk, Tanahu

Voltage Level: 220/132 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 220/132 kV 2x160 MVA

- Construction of 220/132kV AIS substation at Matatirtha, Kathmandu

Voltage Level: 220/132/33 kV

Substation type: Air Insulated Substation (AIS)

Capacity: 220/132 kV 2x160 MVA

Contractor: China Machinery Engineering Corporation, China

Project completion date: 31 October 2023.



Markhichowk 220kV GIS Hall and Control Room Building



Matatirtha 220kV AIS Substation

4) Kaligandaki Corridor 220 kV Transmission Project

This project is being executed under the loan received by the Government of Nepal from Asian Development Bank (ADB) towards the SASEC Power System Expansion Project. The project has two different packages

Package-I: Dana-Kushma 220 kV Transmission Line and Associated Substation at Dana and Kushma

Dana-Kushma 220 kV double circuit transmission line with twin Moose conductor (40km) and associated 220/132/33kV 100MVA substation at Dana and 220/132kV 100MVA substation at Kushma under contract package are already commissioned and put into operation charged. M/s Tata Projects Ltd., India was the contractor for the package.

- Package-I: Kushma – Butwal 220 kV Transmission Line

Voltage Level: 220KV

Circuit: Double

Tower: Steel Lattice with double peak (OPGW and earthwire)

Transmission line length: 89.5km

No. of Towers: 236

Conductor: Drake HTLS conductor in twin configuration.

Contractor: Larsen and Toubro Ltd., India

Project completion date: 30 August 2023

The 220 KV (twin bundle) double circuit transmission line originates from the Kushma substation located in Khurkot VDC of the Parbat District and terminates at the New Butwal sub-station near Ramnagar in Makrahar VDC of Rupandehi district, in the Lumbini province of Nepal. The transmission line passes through diverse terrain, including undulated hilly areas, cultivated land, barren land, forest stretches, and the terai region.

STATUS OF PROGRESS			
S.N.	ITEMS	BOQ_QTY	IMPORT
1	Supply of Materials	100%	99%
2	Foundation	236	236
3	Erection	236	234
4	Stringing	89	82



Strung Kushma-New Butwal 220kV Transmission Line



Strung Kushma-New Butwal 220kV Transmission Line

5) New Butwal – Bardaghat 220kV 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. substation shall be of gas insulated type(GIS).

The first contract package agreement for 220kV New Butwal substation was concluded with M/s. Tata Projects Ltd. India. It was commissioned and came into operation from November 2021.



New Butwal 220kV Substation

- Transmission Line Package: New Butwal-Bardghat 220 kV Transmission Line

Voltage Level: 220KV

Circuit: Double

Tower: Steel Lattice with double peak (OPGW and earthwire)

Transmission line length: 21km

No. of Towers: 236

Conductor: Moose conductor in twin configuration.

Contractor: Power China SEPCO1 Electric Power Construction Co. Ltd., China

Project completion date: 31 December 2023

The transmission line is in construction phase Check with survey, detail survey and soil investigation all have been completed.

Due to delay in EIA approval and COVID-19 pandemic, project activities has been delayed. However, approval of forest land use and tree cutting has been cleared by Ministry of Forest & Environment.

6) Lapsipedi 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

Lapsipedi and 132/11 kV 45 MVA SS at Changunarayan. However, additional scope of Upgradation of existing 66/11kV Teku Substation to 132/66/11kV voltage level and Construction of two new 132kV line bays at Existing Suichatar 132kV substation for charging existing Suichatar-Teku 66kV Transmission Line on 132kV has been included in its new scope.

- Construction of 220/132kV GIS substation at Lapsipedi

Voltage Level: 220/132/11 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 220/132 kV 1x160 MVA and 132/11kV 22.5MVA

- Construction of 132/11kV GIS substation at Changunarayan, Kathmandu

Voltage Level: 132/11 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 132/11 kV 1x45 MVA

- Construction and Upgradation of 132/66/11kV GIS substation at Teku, Kathmandu

Voltage Level: 132/66/11 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 132/66kV 63MVA and 132/11 kV 2x45 MVA

132kV AIS bay expansion at Suichatar Substation: 2 nos.

All 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. 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.

The contract has been awarded to M/s Larsen and Toubro Limited, India on November 2020 and expected to be completed within end of December 2023.

Around 94% of plants and equipments to be supplied from abroad of all four substations i.e., Lapsipedi, Changunarayan, Suichatar and Teku Substation has been delivered at site. In Changunarayan substation, around 80% of civil works are completed, finishing work of

Control Room building, FFPH, GIS building and Water tank and Installation and testing of the major equipment (GIS, transformer etc.) is in progress.

All works for first phase charging of Teku and Suichatar substation will be completed within 2 months and remaining works will be completed within end of December 2023.

- Construction of 220/132kV GIS substation at Markhichowk, Tanahu

Voltage Level: 220/132 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 220/132 kV 2x160 MVA

- Construction of 220/132kV AIS substation at Matatirtha, Kathmandu

Voltage Level: 220/132/33 kV

Substation type: Air Insulated Substation (AIS)

Capacity: 220/132 kV 2x160 MVA



GIS Hall- 132kV Changunarayan substation



GIS Hal, Control Room Building and LM Tower of 132kV Changunarayan Substation

7) Kathmandu Valley Transmission Capacity Reinforcement Project

The major objective of the project is to augment Grid Substation capacity by constructing three new 132/11 kV GIS Substations of 2x45 MVA capacity each at Chobhar, Phutung and Thimi. The contract was awarded to M/s Pinggao Group Co. Ltd, China. Manufacturing of major equipment such as power transformer and GIS equipment has already been completed and design /drawings of most of other electrical equipment also has been concluded. Also design/drawings related to civil works such as superstructure/substructure design/drawing has already been approved. Due to local protest and obstruction, works were delayed at the Chobhar, however after agreement between local authorities, local people and NEA, site has been resumed from November 7, 2022. Due to the geological and social problems, civil works at the site was delayed severally and contract completion period was extended upto 31st March, 2024. Addition of these substations inside Kathmandu valley will increase the reliability of the distribution network and also help to serve the qualitative electricity supply to the consumers. These new substations are very much needed for the growing demand in the outskirt of the valley and also to reduce burden on existing substation.



Control Room Building works under progress at Phutung Substation

8) Kathmandu Valley Substation Automation Project

NEA has strongly felt the need of a smarter and more reliable grid system that will lead the existing transmission system not only towards digitization and modernization but also towards the centralized supervision based monitoring and control of power system parameters which are essential to maintain the health of integrated system providing uninterrupted and quality power to the end users.

Further, after completion of this project, it is expected to reduce the ongoing operational cost, improvement of grid reliability, increasing the life of equipment and improvement of organizational effectiveness. This is the first phase implementation of Substation Automation System (SAS) in transmission grid substations of NEA. Under this project, all thirteen (13) grid Substation within Kathmandu Grid Division will fully be automated and be operated remotely from Master Control Centre(MCC) located at Baneshwor Substation.

The contract of this ongoing project has been awarded to M/S GE T&D India Limited on 5 January 2020 and is expected to be completed by November 2023. All the materials as per contract like disconnecting switches, Control Relays panels, protection relays, bay controllers, servers and automation equipment have been delivered to the site and installation works are under way.

9) Upgrading of Khimti-1, Bahrabise and Lapsipedi Substation to 400 kV

The major objective of this project is to upgrade the capacity of New Khimti, Barhabise and Lapsipedi Substations at 400kV voltage level. Upgradation of these substations which were initially planned to operate at 220kV level is essential to operate New Khimti-Barhabise-Lapsipedi transmission line at 400kV level (rated voltage level) in order to enhance the full transmission capacity of the line for transmitting increased power flow due to additions of hydro power plants and increased system demand .

The scope of this project is as follows:

- Construction of 400/220kV GIS substation at existing 220/132/33kV New Khimti Substation

Voltage Level: 400/220kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 400/220 kV 2x315 MVA plus 1x105 MVA

Line bays: 2 nos. of 400kV

- Construction of 400/220kV GIS substation at existing 220/132/11kV Barhabise Substation

Voltage Level: 400/220kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 400/220 kV 2x160 MVA plus 1x53.33 MVA

Line bays: 4 nos. of 400kV

Reactor: 420kV 50MVAR

- Construction of 400/220kV GIS substation at existing 220/132/11kV Lapsipedi Substation

Voltage Level: 400/220kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 400/220 kV 1x315 MVA plus 1x105 MVA

Line bays: 4 nos. of 400kV

Reactor: 420kV 50MVA

M/s Grid Solutions SAS, France is the contractor working for this project. The Contract was signed on October 02, 2020 and is effective from 11 December 2020. The project is planned to complete in 900 days since the date of contract effectiveness. The contract time has been extended up to 31 May 2024.

At New Khimti substation, works associated with land development, retaining wall, major equipment foundations is completed by almost 80% whereas engineering design work concluded by almost 90%. Installation of 220kV GIS Bays is under way. Major equipment including 400kV GIS, 220kV GIS, CRP and SAS, Station Transformer are delivered to the site except Power Transformers are under factory testing.



Work progress at New Khimti Substation



Work Progress at Bahrabise Substation

At Bahrabise: Land development work, retaining wall, Major equipment foundations is completed by almost 40% whereas Engineering design concluded by almost 90%. Equipment such as 400kV GIS, Tower parts, CT, etc., are stored at site while others like CRP SAS, LT switch gears are on transit. Power Transformers are under testing.



Work Progress at Bahrabise

At Lapsipedi all the works associated with this site is on hold due to land related issue. Preliminary survey has been completed. The engineering works will immediately commence after the resolution of the social issue.

10) Dadakhet-Rahughat 132 kV Transmission Line and Substation Project

In order to improve the supply situation in the Dhaulagiri zone and to evacuate power from hydropower plants that are in the process of generation or in the pipeline of the construction in Myadgi River Basin and Kaligandaki river basin of Myadgi district, the Dadakhet-Rahughat 132kV transmission line project is being constructed under the loan assistance from Asian Development Bank under Electricity Grid Modernization Project (EGMP). The remaining funding will be done from GoN and Nepal Electricity Authority. The project is located at Myadgi district of Gandaki Province.



Plantation at Rahughat SS

Scope of works under this project are construction of 132 kV transmission line that connects the Dadakhet Substation to Dana- Kusma 220kV transmission line through proposed Rahughat 220/132kV substation. The package comprises of following two main components:

- 25 km, 132 kV double circuit transmission line with CARDINAL conductor.
- Construction of a 132/33 kV, 30MVA Substation at Dadakhet and 220/132kV, 200MVA Rahughat Substation at Rakhupile.

Progress Status:

With completion of land acquisition of about 64 Ropani at Dadakhet and about 92 Ropani at Rakhupile, the project has successfully completed the construction of staff quarter, guard house and boundary wall work at Dadakhet substation and land development work at Rahughat substation. Substation & transmission line works are in progress.

Till now, the contractor has supplied conductor, stubs, tower parts, CT, CVT, isolators, battery charger, 220/132kV GIS equipment, DG etc. In Dadakhet substation, the foundation work of switchyard and retaining wall work is ongoing. The superstructure works of control building has been completed. In Rahughat substation, the design/engineering works for building land profile is undergoing. In the transmission line, 15 nos. of foundations have been completed. Till now, the project has physical progress of 38.96% and financial progress of 43.28%.

11) Construction of 132 kV Keraun Substation

This project is being executed under the loan received by the Government of Nepal from Asian Development Bank (ADB) towards the EGMP.

Objective of this project is to strengthen the power supply system and improve power transfer capacity to meet increasing demand in the north-east part of Morang district. The scope of the project includes the construction of substation at Keraun with power transformer capacity 132/33kV 2x63MVA and 132/11kV 22.5MVA. The project will also construct 15km Keraun-Rangeli & 25km Keraun-Biratchowk double circuit 33kV sub-transmission Line to supply power to 33kV substations at Biratchowk and Rangeli. Keraun 132/33kV substation shall be fed by Duhabi-Padajungi 132kV Transmission Line by LILo arrangement at Keraun, Morang.

Contract agreement of the Project was concluded with the successful bidder M/s Energypac Engineering Ltd

Bangladesh-SR Associates Infrastructure Pvt. Ltd., India on 11 June 2021 and the contract has been effective from 10 August 2021 with having the project completion period of 27 months.

As of July 2023, construction of boundary wall, staff quarter and guard house has been completed. Steel tubular pole erection work has been partially completed and the stone pile work of the switchyard area has been just started from 15 July 2023. Most of outdoor equipment has been delivered at site. Construction work for civil structures foundation has been started. The project has been expected to be completed by the end of July 2024.

12) Construction of 132 kV Pangtan Substation

The purpose of this project is to evacuate power from different IPPs of Balefi Corridor in Sindhupalchowk district to the NEA grid system. This project intends for the construction of a 132/33 kV 30 MVA & 33/11 kV 8 MVA substation at Pangtan and necessary bay extension works at Barhabise substation.

Land acquisition for the Pangtan (Balefi) substation has been accomplished. Construction of approach road, compound wall, fencing and protection works has been completed at substation site. Contract agreement for the construction of substation was concluded with M/S CQNEC-NHE JV, Nepal on 22 July 2022 with the project completion period of two years. Layout finalization, soil testing works along with design drawing finalization of most of equipment for the substation has been completed. Construction of labor camp in the site has been completed. The overall progress of the project is about 17%.

13) 132/66 kV Transmission Line Upgradation Project

Objective of the project is to upgrade the power carrying capacity of some of the 132 kV transmission lines of NEA grid by changing the existing ACSR conductor with HTLS (High Tension Low Sag) conductors. The transmission lines are namely:

- Pathlaiya – Dhalkebar (Double Circuit - 102 km),
- Hetauda – Kamane (Double Circuit - 9.5 km)
- Kamane – Pathlaiya (Double Circuit - 28 km),
- Suichatar – Matatirtha (Double Circuit - 5 km),
- Suichatar – Teku (Double Circuit - 4.5 km),
- Suichatar – Balaju (Double Circuit - 4 km)



The total circuit length of the transmission line is approximately 153 km.

Also, this project is going to change hardware, fittings, connectors and accessories of above-mentioned line along with upgradation of CTs of respective substations to cater higher capacity current. This project is initiated in fiscal year 2077/078 (2021/22) and is being funded by ADB. Estimated cost of the project is about US\$ 15 Million. The contract agreement was concluded on 30 May 2022 with M/s HG Power Transmission SDN BHD, Malaysia. The completion time for the project is 900 days from the contact effective date.

Survey, design, manufacturing and supply of first lot of HTLS conductors, CTs, hardwares, fittings, connectors and accessories have been completed and upgradation of Hetauda – Kamane 132 kV Transmission line section is ongoing.

14) Mulpani Substation Construction Project

The main objective of this project is to augment grid capacity of Kathmandu Valley by constructing 132kV substation at Mulpani. Under this project 132 kV GIS substation will be constructed at Kageshwari-Manohara Municipality near Baba Chowk, Mulpani. This project intends to cater the demand growth of eastern part of the Kathmandu district and supply the reliable electricity to the consumers. Scope of this project includes construction of one GIS substation with 4 Nos of 132 kV Line bays, 132kV 2x45 MVA power transformers, 8 nos. of 11 kV outgoing feeder with other required facilities. LILO arrangement will be done in the Bhaktapur-Chapali line by constructing new dead end towers at substation premise.

This project was initiated in FY 2021/22 and is sub-project of the Electricity Grid Modernization Project (EGMP) – Additional Financing funded by ADB. For the execution of the contract, Contract Agreement was concluded with M/s TBEA Co., Ltd, China on 21 August 2022 with project completion period of 18 months from the effective date of contract. Design works related to the project are ongoing and site construction works are also started and progressing.

15) Kathmandu Valley Transmission Capacity Reinforcement Project (Phase II)

The project is the continuation to the Kathmandu Valley Transmission Capacity Reinforcement Project-Phase I and serves the objective to augment transmission capacity of Kathmandu Valley by construction new substation and 132kV underground lines.

The primary focus of this project is to construct 132kV substation in Koteswor/Balkumari area in order to cater the growing load of the area and reduce burden in existing Bhaktapur-Baneshwor-Patan 66 kV transmission line. The scope includes construction of 132 kV GIS substation at Balkumari and lay 12km 132kV double circuit underground transmission line from existing Bhaktapur substation to the Balkumari substation through Thimi substation.

Package I (Bhaktapur-Thimi 132kV UG TL)

This package includes the construction of 132kV double circuit underground transmission line from existing Bhaktapur substation to Thimi 132kV substation which is under construction through another project of PMD. The length of the line is approximately 4km. The contract is awarded to M/s KEC International Ltd., India. At present detail engineering and design work is undergoing.

Package II (Thimi-Balkumari 132kV UG TL)

This package includes the construction of 132kV double circuit underground transmission line from proposed Thimi 132kV substation to proposed Balkumari substation which is approximately 8km in length. At present estimation and bidding document preparation is undergoing.

Package III (Balkumari 132kV substation)

The proposed GIS substation at Balkumari will have capacity of 132/11kV 2x45 MVA and 132/66 kV 2x63 MVA transformers. The scope also includes LILO of existing Bhaktapur-Baneshwor-Patan 66 kV transmission line in the substation area. Estimation and bidding document preparation is undergoing for substation construction.

NEA is in the discussion with Kathmandu Valley Water Management board for providing approximately 4 ropanis of land at its sewerage treatment plant at Balkumari. The discussions are going in the positive direction.

16) Grid Substation Automation Project (Phase-II)

In order to digitalize the NEA transmission grid system, NEA has implemented Grid Automation Project Phase II, which is continuation Grid Automation Project Phase I initiated in the Kathmandu valley.

Basically focused in installing digital and automation infrastructures for digital control and monitor of 39 nos. of existing transmission grid substations outside Kathmandu valley, the project has been started. The project has been commenced from fiscal year 2078-79 and is expected to complete by 2082-83. The project is financed by ADB under loan agreement of EGMP.

The scope of the project includes construction of 6 Master Control Centers (MCC) at six grid division offices viz. Duhabi, Dhalkebar, Hetauda, Butwal, Pokhara and Attariya with the installation of Substation Automation System(SAS) in 39 old grid substations and 15 nos. of newly commissioned substation with total integrating altogether of 54 grid substations to LDC at Siuchatar, Backup LDC at Hetauda and at respective MCC stations, that will help in remote control and monitoring of grid substations.

The project will install state-of-art modern substation technology at all those substations and MCCs including digital surveillance of major equipment at all the grid substations, motorized isolators, separate fault detector systems, hot-line communication and SCADAs.

It is expected that the project will serve to speed up the control and monitoring tasks, assist in easy preventive maintenance, provide remote control of relays and bays and assist in data collection of power system variables for future analysis.

The project has been awarded to M/s GE T&D India Limited on 19 December 2022. The time period of completion is 900 days from contract effective date. At present, survey of existing substations and design works are undergoing.

17) Ghorahi – Madichaur 132 kV Transmission Line and Substation Project

This project is initiated by Government of Nepal and funded by Asian Development Bank (ADB) under Electricity Grid Modernization Project (EGMP) to electrify Rolpa district since the district hasn't been connected to national grid. Objective of this project is to reinforce the 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 (Interconnected Nepalese Power System).

Scope of Works:

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), which crosses various municipalities and rural municipalities of Dang, Pyuthan and Rolpa districts. One 132/33/11 kV 30 MVA AIS substation hub will be constructed at Khungri

of Rolpa along with 2 nos. of 132 kV bay extension at Ghorahi Substation.

Progress Status:

The land acquisition for the Khungri substation at Khungri, Rolpa has been completed. Civil works of constructing boundary wall, store building along with others protection works at substation land are completed. The detail survey of the transmission line route and Initial Environment Examination (IEE) of the project is also completed.

The contract was signed with KEC International Limited, India on 28 December 2022. The soil investigation and check survey of the transmission line has been completed. The detail engineering design for the line and substation is going on.

Physical Progress: 17.57 %

Financial Progress: 14.55 %

18) Borang – Lapang 132 kV, Lapang – Ratmate 220 kV Transmission Line and Substation Project

Objective of this project is the evacuation of electric power to INPS generated by the IPP's of Aankhu Khola Corridor & Budhigandaki corridor and helping to enhance the transmission system of Nepal. The project is located in Dhading and Nuwakot districts. Cost of this project is estimated to be US\$ 39 Million and funded by GoN and ADB and project is expected to be completed on March 2025.

Scope of the project includes construction of 24 km 220 kV double circuit transmission line with twin Moose conductor from proposed Lapang Biharthok substation to proposed Ratmate substation and construction of 24 km 132 kV double circuit transmission line with Bear conductor from proposed Borang substation to proposed Lapang Biharthok substation along with the construction of Borang 132/33/11 kV AIS substation and Lapang Biharthok 220/132/33/11 kV GIS substation.

- Transmission Line : Ratmate-Lapang 220 kV Transmission Line

Voltage Level: 220KV

Circuit: Double Tower: Steel Lattice with double peak (OPGW and earthwire) Transmission line length: 24km

Conductor: Moose conductor in twin configuration.



- Transmission Line: Lapang-Borang 132 kV Transmission Line

Voltage Level: 132KV

Circuit: Double

Tower: Steel Lattice with single peak (OPGW)

Transmission line length: 24km

Conductor: single Bear conductor

- Construction of 220/132kV GIS substation at Lapang

Voltage Level: 220/132/33 kV

Substation type: Gas Insulated Substation (GIS)

Capacity: 220/132 kV 2x100 MVA, 132/33kV 30 MVA and 33/11kV 8MVA

- Construction of 132/33/11kV AIS substation at Borang

Voltage Level: 132/33/11 kV

Substation type: Air Insulated Substation (GIS)

Capacity: 132/33 kV 30 MVA and 33/11kV 8 MVA

As of July 2023, land acquisition has been completed for both Borang and Lapang Biharthok substations. M/s JV of SEPCO1 and POWER SICHUAN has been awarded the contract for design and construction of all the transmission line and substation works. The survey of substations and transmission line has been completed and check survey is in progress. Preliminary locations of tower has been prepared which are being verified and updated by contractor in field. The collection of cadastral maps along the transmission route and substation has been completed but detail information of cadastral for tower footing and Right of Way has not been completed. The layout design of Borang and Lapang Biharthok substation is also under going.

19) Kohalpur – Nepalgunj 132 kV Transmission Line Project

KNTLP is a crucial project to improve the power supply capacity with quality and reliability at Banke district. After construction of substation at Bakaspur, Janaki Rural Municipality of Banke district by looping in and looping out (LILO) of existing Kohalpur-Mahendranagar 132 kV double circuit line, the substation will be able to 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 on funded by ADB under EGMP-Additional Financing. Estimated cost of the project is US\$ 12 Million. Scope of the project includes construction of

about 10 km long double circuit 132 kV transmission line in multi-circuit towers with ACSR BEAR and 132/33 kV, 2x63 MVA substation at Bakaspur along with 2 132kV line bays that will exchange power with India through the 50 km long double circuit 132 kV transmission line from Nanpara, Uttar Pradesh.

- Transmission Line : From Kohalpur to Nepalgunj

Voltage Level: 132KV

Circuit: Four circuit Tower: Steel Lattice with single peak (OPGW)

Transmission line length: 10km

Conductor: single Bear conductor

- Construction of 132/33/11kV AIS substation at Basakpur, Nepalgunj

Voltage Level: 132/33/11 kV

Substation type: Air Insulated Substation (GIS)

Capacity: 132/33 kV 2x63 MVA and 33/11kV 2x30 MVA

As of July 2023, statutory compliances like IEE approval, issuance of construction license have been accomplished. Land for the proposed substation has been acquired at Banke, Janaki Rural Municipality at Ward no. 06, Bakaspur. The Contract has been awarded to M/s Power China SEPCO1 Electric Power Construction Co. Ltd., China on 5th July 2023 with 30 months schedule. The contract will be effective soon for starting the construction works at the site.

20) Arun Khola (Dumkibas) 132 kV Substation Project

The Project is focused to improve the power quality and reliability of Nawalparasi (Bardaghat Susta-East) district. After construction of substation by looping in and looping out arrangement of Bardaghat-Sardi 132 kV double circuit transmission line at Tamang Gaun, Binayee Triveni Rural Municipality, the substation will be able to feed power to the industries nearby as well as to upcoming 33/11 kV substations. Furthermore, the 11 kV feeders emanated from the substation will reduce the lengthy feeders from 132/11 kV Bardaghat substation and 132/33/11 kV Kawasoti substation and the proposed substation will feed Dumkibas, Benimanipur, Arunkhola households around, hence improving both the voltage and reliability.

This project is initiated in FY 2075/076 (2018/19) and later on funded by ADB under EGMP-Additional financing. Estimated cost of the project is US\$ 7 Million.

Scope of the project includes construction of 132/33 kV, 2 x30 MVA substation and required civil structures.

As of July 2023, The Contractor M/s Godrej & Boyce Mfg. Co. Ltd., India has concluded the land survey and soil investigation which helped to finalize the general arrangement layout. The design drawing of compound wall has been approved and construction of the same has been initiated. The architecture of staff quarter, control room building and gantry structures has been approved and the structural drawings for the same are under review for approval. The design drawing and GTP of some electrical equipment like LT switchgear, Bus Post Insulators have been approved and other equipment like CB, Transformers, Lighting Arrestors, Isolators are under review for approval. The project is anticipated to be completed by 2024.

21) Amlekhgunj 132kV Substation Construction Project:

Presently, the electrical demand has drastically increased due to the establishment of new industries at Simara area. In order to meet the growing load demand of Simara area, NEA has decided to construct 132/66 kV GIS substation at Amlekhgunj.

The scope of the project includes the construction of 132/66/11 kV GIS substation with transformer capacities of 132/66kV 2x100 MVA and 66/11 kV 2x10 MVA substation at Amlekhgunj with LIL arrangement of existing 132 kV Hetauda - Pathlaiya double circuit line and existing 66 kV Hetauda - Amlekhgunj - Simara double circuit line.

As of July 2023, the land acquisition process of private lands has been completed for the substation. The contract for the construction of the substation has been awarded to M/s TBEA Co., Ltd., China. Contractor has already mobilized their manpower to the site. Approval of Electrical and Civil Designs are in progress.

C. Under Bidding/Studying/Planning Phase Projects

1) Chobhar Patan Underground 132 kV Transmission Line Project

The main objective of this project is to construct 4.5km length of 132 kV double circuit underground transmission line from under construction Chobhar substation to the existing New Patan substation and to construct new 132 kV GIS substation at Lagankhel, Patan. At present Patan substation is operated in 66kV system. The substation is highly overloaded

due to growing load of Lalitpur. The main aim of this project is to upgrade the substation into 132kV system by constructing 132kV GIS substation nearby 66kV substation and interconnecting into 66kV system by installing 132/66kV interconnecting transformer which will reduce the burden of 66kV lines. Also, separate 132/11kV transformers shall be installed to supply local loads.

IEE of the 132 kV underground transmission line for Chobhar to Patan has been completed. Bid has been published for construction of Chobhar to New Patan underground transmission line and for the construction of New Patan 132 kV GIS substation.

Package I (Chobhar-Patan 132kV UG TL)

This package includes the construction of 132 kV double circuit underground transmission line from Chobhar 132kV substation to New Patan substation which is approximately 4.5km in length.

Package II (Upgradation and Construction of 132 kV GIS substation at Patan)

The proposed GIS substation at Patan will have capacity of 132/11kV 3x45 MVA and 132/66 kV 2x63 MVA transformers. The scope also includes interconnection of existing Patan 66 kV substation.

2) Hetauda-Parwanipur 132 kV DC Line Upgradation and Construction of 132 kV Parwanipur-Pokhariya TL and 132 kV Substation at Pokhariya

This project basically intended for the construction of 132kV transmission line and substation to cater growing industrial loads of nearby Birgunj area. The project activity consists of following packages.

Package-I (Conductor upgradation works of Pathlaiya-Parwanipur Transmission Line)

This package includes the replacement of existing 132 kV double circuit ACSR Bear conductor from Piluwa (Pathlaiya) Substation to Parwanipur Substation (about 17 km line length) by appropriate size High Temperature Low Sag (HTLS) conductor to enhance transmission capacity of the line. Bidding process is undergoing under this package.

Package-II (Construction of 132kV Parwanipur-Pokhariya Transmission Line)

This package includes the construction of 132kV Parwanipur-Pokhariya Four Circuit transmission line



with approximately 21 km length. The transmission line is planned and designed to provide the electricity supply through 132kV transmission line especially to the industrial consumers. Also two circuits shall be connected to the proposed 132kV Pokhriya substation from the existing 132kV Parwanipur substation.

The IEE report has been approved by Nepal government. The survey of the line has already been accomplished by Engineering Directorate of NEA. The cadastral map of the transmission line has been prepared and land acquisition process for the tower pads has been initiated.

The design of all types of 132 kV four circuit tower has been completed. The bidding process for package has been initiated. The cost estimate and the Bid document are under preparation stage.

Package-III (Construction of 132 kV Pokhriya Substation)

This package includes the construction of new 132/33/11kV substation at Pokhriya (Parsa district) and bay extension work in existing substation at Parwanipur (Bara District) to meet the current demand of industrial growth in the area. The bidding process is in the last phase and Contract Agreement shall be done shortly with selected bidder.

Land acquisition work for proposed Pokhriya Substation has also been completed.

Likewise, Nijgadh - Pokhriya 400 kV approximately 65 km transmission line along with the 400kV substations in Nijgadh and Pokhriya has also been planned to meet the future electricity demand of industrial sector in Birgunj area. Till now, the detailed and cadastral survey work has been completed by Engineering Directorate of NEA. IEE is under way by NEA-ESSD. Land acquisition works for the Proposed Nijgadh substation and transmission tower pads have also been initiated.

3) Engineering and Environmental study of Transmission Lines and associated Substations under ADB Grant no. 0361 (Project Preparatory Facility for Energy (PPFE))

The prime objective of the services under Project Preparatory Facility for Energy (PPFE), Grant No. 0361 funded by ADB, is to procure project preparation support consulting service from different consulting firms. The consulting firm is to prepare Detail Project Report including detail transmission line and substation

design with tower spotting and demarcation in the site, safeguard studies, preparation of cost estimate and preparation of the bidding documents in detail enough to provide adequate information and data to ensure that the project will be ready for procurement and construction immediately after the completion of intended project preparation support consulting service. Following project preparatory studies are ongoing under PPFE:

I. New Butwal- Lamahi 400 kV Transmission Line Construction Project

As a part of development of east-west backbone network of 400kV transmission line, Nepal Electricity Authority, Project Management Directorate is associated with the detail due diligence study of 400 kV transmission lines and substations in the western part of the country.

This New Butwal – Lamahi 400 kV transmission line is located in western region of Nepal. Approximate length of this transmission line is 160 km and is distributed within 5 (five) districts namely Nawalparasi West, Rupandehi, Kapilvastu, Arghakhanchi and Dang of Lumbini province. This line originates from New Butwal substation located in Badera of Nawalparasi West District and will pass through Motipur Substation (Kapilvastu District) and will terminate at Lamahi (Rihar) of Dang district. Further to that construction of Motipur and Lamahi 400kV Substations are also envisaged under the scope of this project.

The construction of New Butwal- Lamahi 400 kV Transmission line starts from AP-16 of the New Butwal – New Damauli 400 kV Transmission Line implemented by Millennium Challenge Account (MCA), Nepal. This New Butwal – Lamahi 400 kV transmission line will share two circuits of the New Butwal – New Damauli 400 kV transmission line from New Butwal substation to AP- 16 (Nearby Sarvottam Cement Factory). The New Butwal – AP16 line section of New Butwal – New Damauli 400 kV transmission line will be multi circuit which is under the scope of MCA Nepal.

The focus of this New Butwal–Lamahi 400kV transmission line would be further extended to the west through which electricity can be transported from hydropower collection hubs to customers across the country and through which electricity can be exchanged to India.

As a part of project readiness, DPR of the project has been finalized, cost estimate & bidding documents have been already prepared. In addition to that, the project has also submitted the IEE report to the Department of

Electricity Development (DOED) for necessary further action and has also applied for obtaining construction license for the project. Further to that, the project has also initiated for private land acquisition for construction of Motipur 400kV substation. Officer for preliminary action for land acquisition has been appointed by the cabinet and further action related to land acquisition at Motipur (Kapilvastu) is going on.

It is expected that the submitted IEE will be approved by the Ministry of Energy, Water Resources and Irrigation within two months and after getting approval for land uses (forest areas) by the cabinet.

NEA is in close discussion with Asian Development Bank (ADB) for financing this transmission line project. It is expected that the loan agreement for this project will be commenced in 2024 and also the bid will be floated most likely by January of 2024.

II. Lamahi- Kohalpur - New Attariya 400 kV Transmission Line Study Project

As a part of development of East – West backbone network of 400kV transmission line, Nepal Electricity Authority, Project Management Directorate is conducting the detail survey, engineering and environmental studies of 400 kV transmission lines and substations in the remaining western part of the country from Lamahi (Rihar) to New Attariya (Daijee) with ADB Grant assistance under Project preparatory Facility for Energy.

The focus of Lamahi - Kohalpur - New Attariya 400 kV transmission line study is to prepare detail engineering, survey, environmental studies and bid documents Lamahi-Chhinchu-Dododhara-New Attariya (Daijee) 400 kV transmission lines and associated substations. Once completed the 400kV line in the western part, electric power from hydropower plants to the hubs to customers across the country will be eased and also bilateral power exchange with India.

Power Grid Corporation of India Limited has been awarded the job of the detail engineering and complete design of 400 kV TL and associated Substations along the route. As of now, the consultant has presented the detail survey report of the transmission line and associated substation design documents. The detail study on due diligence related activities and engineering design is targeted to be completed by October 2023. The proposed Transmission route and Substation under the scope of detail study and engineering design are as follows:

Transmission Lines:

- Lamahi (Rihar) - Chhinchu 400 kV Transmission Line (about 100 km);
- Chhinchu – Dododhara (New Lamki) 400kV Transmission Line (about 90 km);
- Dododhara (New Lamki) – New Attariya (Daijee) 400 kV Transmission Line (about 104 km);

Substations:

- Lamahi 400/132 kV Substation
- Motipur 400/132 kV Substation
- Chhinchu 400 kV substation;
- New Attariya 400kV Substation;

As of now, the consultant has presented the Detail survey Report of the transmission line and associated substation design documents. The detail study on due diligence related activities and engineering design is targeted to be completed by October 2023.

III. Engineering and Environmental studies of the Other Transmission Lines and Associated Substations

Under PPFE (Grant 0361 funded by ADB), three 400 kV Transmission lines and two 132 kV Transmission lines and associated substations are under study. Following three packages have been prepared for detail engineering and environmental studies of Transmission lines and associated substations:

Package-1 (CP-01):

- (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.

Proposed line and associated substation caters the evacuation of power generated in Zone 4 of the Transmission System Development plan of Nepal. 5.5 GW power is planned to be evacuated from this Line.



Package-2 (CP-02):

- (i) 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 bay expansion at Ratamate (Nuwakot District).

Total 2.3 GW power generated from the hydroelectric projects in the Budhigandaki Corridor is planned to be evacuated from this Line.

- (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

The 132 kV Transmission line from Kohalpur - Surkhet - Dailekh is being implemented by NEA. Kalikot and Jumla district are not covered yet by the grid substations. The proposed 132 kV Line and Substation will provide the easy access of national grid to these districts and adjacent districts, thus help in achieving the government target of rural electrification and provide electricity to all.

The Phukot-Kalikot 132 kV Transmission Line (approx. 30 km) is also under study in this package.

- (iii) 132 kV Double Circuit Lamosanghu - Kavre/Ramechhap (approx. 40 km) transmission line and associated substation at the border area of Kavre/Ramechhap and associated bay extension work at Lamosanghu Substation.

The area within the Kavre and Ramechhap district is currently being supplied by 66 kV network where power quality is very poor, less reliable and rural electrification expansion is halted due to limited transmission capacity of 66 kV line. So, the Lamosanghu-Kavre/Ramechhap 132 kV transmission line with substation at border area of Kavre and Ramechhap is proposed to strengthen the transmission and distribution capacity in these areas.

New Khimti-Kavre/Ramechhap 132 kV Transmission Line (approx. 35 km) is also under study by the Consultant.

Package-3 (CP-03):

- (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

This project caters for the evacuation of power generated in the Zone 3 of Transmission System

Development Plan of Nepal. Many small and medium capacity power plants are located in Zone- 3 including Kaligandaki Gorge (164 MW) and Kaligandaki Kowan (400MW). The 1.8 GW power is planned to be evacuated from this Line.

The Contracts for Consulting Services for Engineering and Environmental Study of Transmission Lines and associated Substations for three (3) packages were signed between NEA and Power Grid Corporation of India Limited, India in association with Jade Consult Pvt. Ltd., Nepal (the Consultant) on November 2019. The contracts became effective in February 2020. Desk Study, power evacuation study, walkover survey, detail survey, check survey, transmission line planning and profiling etc. have been completed. Detailed design of substation and transmission line and IEE are at the stage of completion.

IV. Power Transmission System Planning for Major Cities of Nepal

The existing capacity of transmission lines and substations in the city areas will be insufficient to meet the growing energy demand as well as peak demand. Therefore, there is no alternative to upgrading the capacity of existing transmission lines and substations as well as construction of new transmission lines and substations. The power transmission infrastructures require a lot of land and right of way along the line. It is very hard to find the land and RoW in the cities to construct transmission infrastructures which will be an evident problem in the future. Hence, NEA has decided to plan the transmission infrastructure considering the future demand of electricity till 2050 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 major cities of Nepal taking into account the future load growth till 2050 AD including feasibility study and project preparation. Cities under the scope are divided into 7 different clusters as:

- a) Kathmandu Valley (Kathmandu, Lalitpur and Bhaktapur Districts) including Banepa City of Kabhrepalanchowk District
- b) Pokhara Valley (Kaski District)

- c) Biratnagar, Itahari, Dharan, Biratnagar and adjacent Cities (in Morang, Sunsari and Jhapa Districts)
- d) Janakpur and Bardibas Cities (in Danusha and Mahottari Districts)
- e) Hetauda, Simara, Parwanipur and Birgunj Cities (in Makawanpur, Bara and Parsa Districts)
- f) Butawal, Bhairahawa and Sunawal Cities (in Rupandehi and Nawalparasi Districts)
- g) Nepalgunj and Kohalpur Cities (in Banke District)

The contract was signed on 2nd April 2021 between NEA and WAPCOS Limited, India which became effective on 21st April 2021. Project planning and preparation document and feasibility study reports have been submitted so far. IEE study and detailed design of some selected transmission lines and substations is under progress for the original scope of works under the Contract.

Following group of cities is included further as an additional scope in the Contract awarded to WAPCOS for the transmission system planning and feasibility study:

- a) Bharatpur Metropolitan City and Ratnanagar Municipality in Chitwan District
- b) Damak, Birtamod, Bhadrapur Cities in Jhapa District
- c) Dhangadhi, Mahendranagar, Attariya Cities in Kailali and Kanchanpur Districts
- d) Birendranagar City in Surkhet District

All the tasks under the scope including the additional scope of the works is planned to be completed in December 2023.

V. Nijgadh-Pokhariya 400 kV Transmission Line Project

PMD is also conducting the feasibility and engineering study works Nijgadh - Pokhariya 400 kV transmission line (approximately 65 km) along with the two substations at Nijgadh and Pokhariya through its own funds. The load in Birgunj, Parwanipur, Simara area is growing significantly due to growth in the industries and commercial activities in the corridor. The present transmission infrastructure would be insufficient to cater the future load. Hence, Nijgadh - Pokhariya 400 kV transmission line and the two substations at Nijgadh and Pokhariya are designed to address the future loads in the corridor.

Till now, the detailed and cadastral survey work has been completed by Engineering Directorate of NEA. IEE

is under way through NEA Environmental and Social Studies Department. Land acquisition works for the proposed Nijgadh substation and transmission tower pads have also been initiated. However, land for 400kV substation at Pokhariya has already been acquired.

D) Social Safeguard and Environmental Management Department (SSEMD)

Due to need of institutional structure under Project Management Directorate (PMD) and NEA's strong commitment to address environmental and social safeguard issues effectively, Social Safeguard and Environmental Management Department (SSEMD) within PMD has been approved by NEA's board on 23rd February 2021. The department is headed by a director and supported by Environmental Management Division head (Manager) and dedicated environmentalists and sociologist, civil engineer, and administrative and accounting and other support staff.

The roles and responsibilities of SSEMD are listed as:

1. Environmental studies and Monitoring (internal and external), Mitigation and Reporting of Safeguard activities of TL, SS and Distribution System Projects and implementation of CSR programs under the PMD.
2. Preparation of Quarterly and Semiannual Environmental and Social Monitoring reports and submission to ADB
3. Arrange meaningful public consultation, Public Hearing, Trainings and Awareness Programs,
4. Ensure information records and data base of the safeguard implementation activities,
5. Implementation to Gender Equality and Social inclusion (GESI) related activities for mainstreaming as per ADB Manual/ guidelines,
6. Grievance redress and management (issue identification, documentation and status),
7. Other Environmental and Social Issues with RAP and rehabilitation.

Works completed by the department

- Updated Initial Environmental Examination' of Kusma -New Butwal 220 kV Transmission Line Project
- Revised Environmental Management Plan (EMP) of New Butwal Bardaghat 220 kV Transmission Line of Kaligandaki Corridor
- IEE study of Chobhar-Patan 132kV Underground

Transmission Line of Electricity Grid Modernization Project (EGMP)

- Avian Protection (Vulture) Study of Ghorahi-Madichaur 132 kV TL under EGMP prepared and submitted to ADB
- Third party External Social Monitoring and Evaluation Reports of SASEC-PSEP(Fourth) and PTDEEP (Fifth) completed and submitted to ADB
- PSA on Social awareness and effective use of electricity broadcasted by Radio Nepal for 45 days under PTDEEP
- Central level Grievance Committee Formation for PTDEEP and Grievance Redress in coordination with the project
- Trainings on Occupational Health and Safety and Wildlife Awareness completed under Safeguard Implementation of Tanahun Rural Electrification Project
- Awareness on Gender Equality and Social Inclusion (GESI) and Electrical Safety conducted for remaining 14 newly constructed/under construction 33 kV Substations of Distribution System Augmentation and Expansion Project (DSAEP)
- Environmental and Social Due Diligence Reports of Hetauda-Kamane & Hetauda Pathlaiya 132 kV TL upgrading prepared and submitted to ADB
- Environment and Social Management Unit (ESMU) established at Beni- 8, Myagdi or safeguard implementation of Dadakhet-Rahughat 132 kV TL project

Works on pipeline

- Community Support Programs (CSP) and Skill development training of Tanahun REP
- Tender document preparation for procurement of experts for ESMU for different projects under EGMP
- Technical and financial proposals preparation for safeguard implementation for Ghorahi Madichaur 132 kV TL, Kohlpur Nepalgunj 132kV TL, Borang Lapang 132/220kV TL, Chovar Patan 132kV Underground TL projects under EGMP
- IEE of new building construction of PMD as per EPR 2077 and Working Guideline of Chandragiri Municipality 2079 TOR submitted to Chandragiri Municipality for approval

-
- Monitoring and supervision of Pangtang, Keraun, Dumkibas, Mulpani and other Substations under EGMP



Awareness program at Baksila, Khotang



OHS training at Ghiring, Tanahun



GESI Awareness Program at Darbang, Myagdi

SUMMARY OF UNDER CONSTRUCTION/PLANED & PROPOSED TRANSMISSION LINES / SUBSTATIONS

Transmission Line

S.N.	Description	Voltage Level	Transmission Directorate	Project Management Directorate	Total
1	Under construction Transmission Line (Circuit km)	132 kV	810	301	1111
		220 kV	496	492	988
		400 kV	576	178	754
	Total (Circuit km)		1881	971	2852
2	Planed and Proposed Transmission Line (Circuit km)	132 kV	851	290	1141
		220 kV	1752	0	1752
		400 kV	1938	1920	3858
	Total (Circuit km)		4541	2210	6751

Substation

S.N.	Description	Transmission Directorate	Project Management Directorate	Total
1	Under construction (MVA)	5346.50	5123.00	10469.50
2	Planed and Proposed (MVA)	9654.50	5910.00	15564.50



ANNEXURE A: LIST OF FIGURES

- Figure 1:** System Load Curve (Maximum Demand) Jestha 18, 2080 (June 01, 2023) Thursday
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- Figure 4:** Energy Balance in Gwh of FY 2079/80 (2022/23)
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- Figure 7:** Time-wise sold price and Volume through IEX with Upper Capping @ INR 12.00 per unit in FY 2079/80 (2022/23)
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- Figure 12:** Comparison of exported Energy to India in different FY

Figure 1: System Load Curve (Maximum Demand) Jestha 18, 2080 (June 01, 2023) Thursday

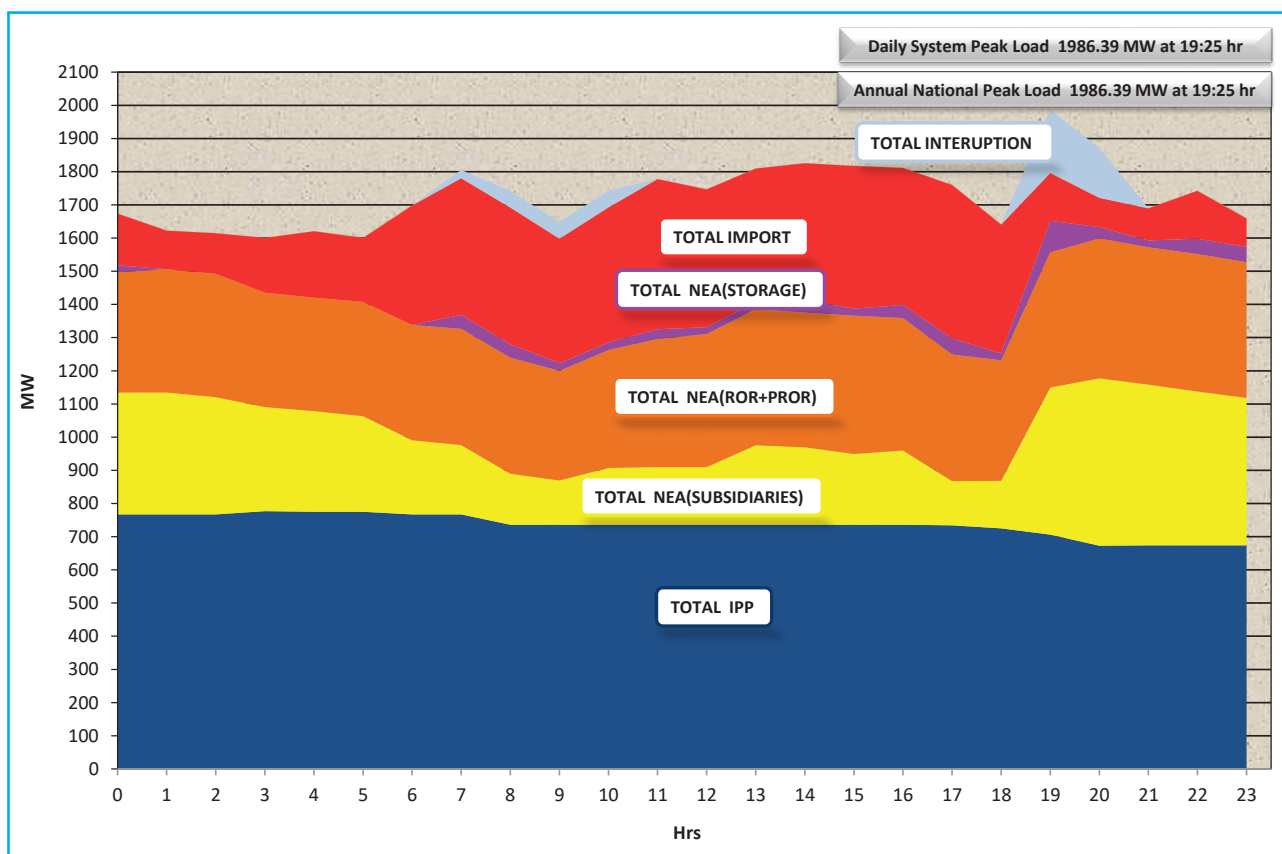


Figure 2: Annual System Peak Load Curve Asar 26, 2080 (July 11, 2023) Tuesday

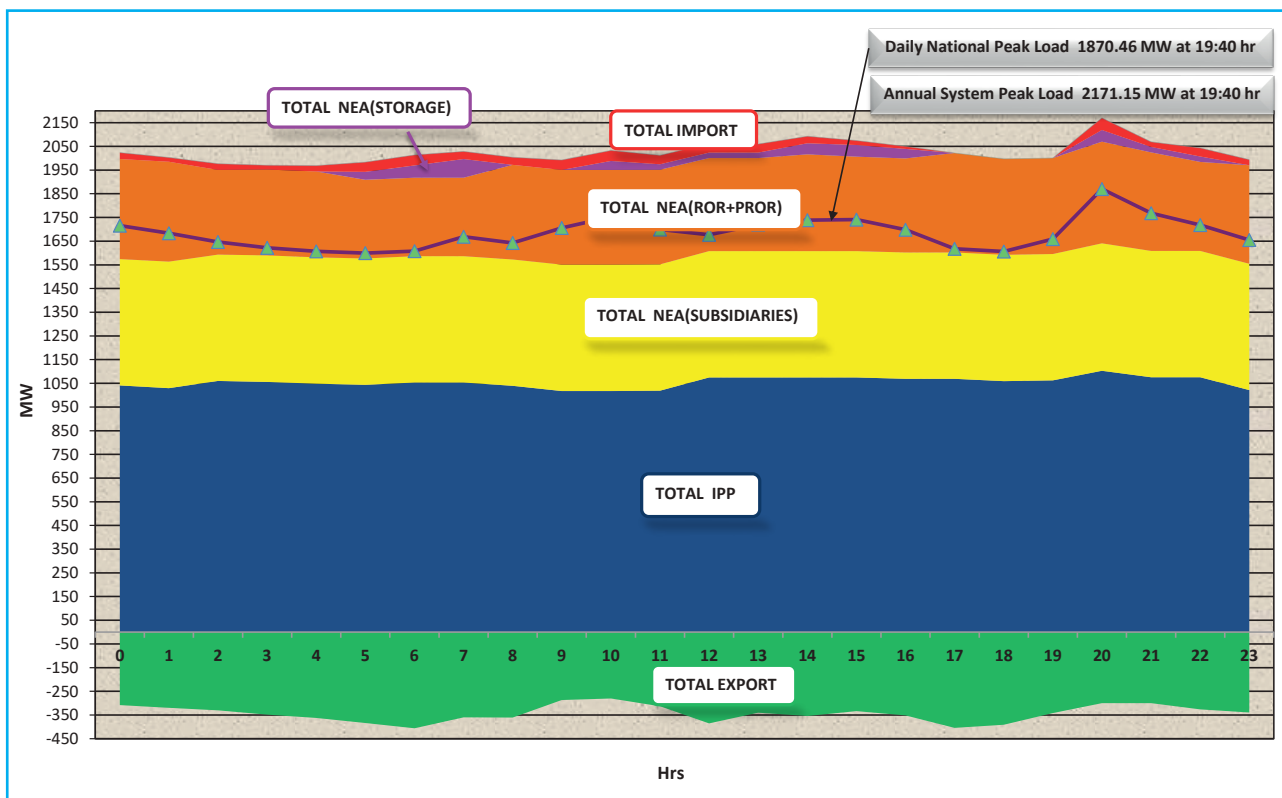
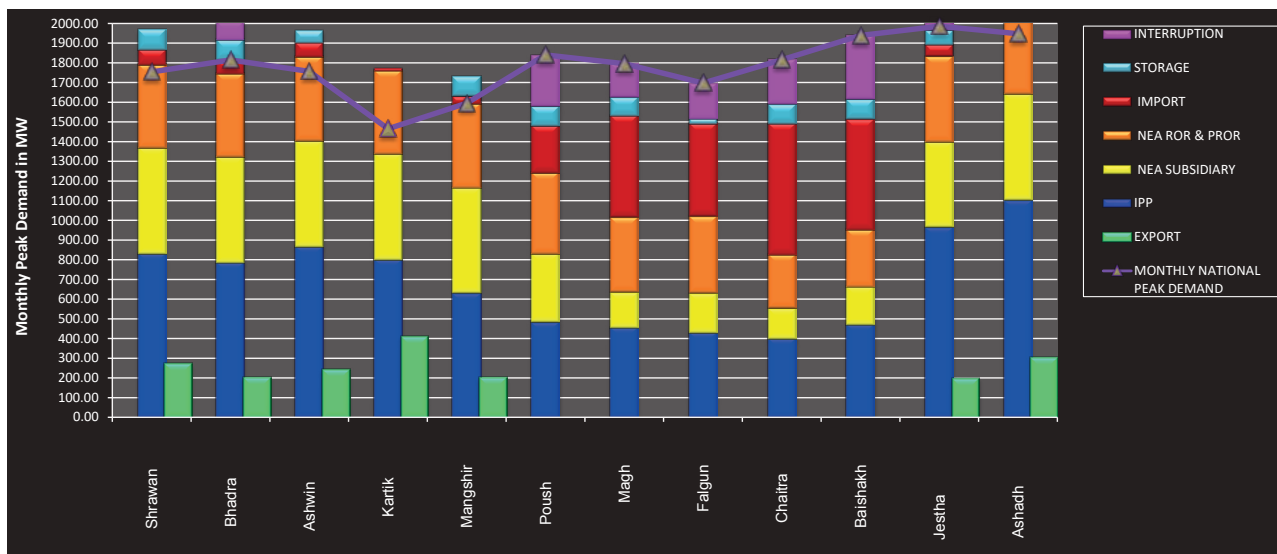


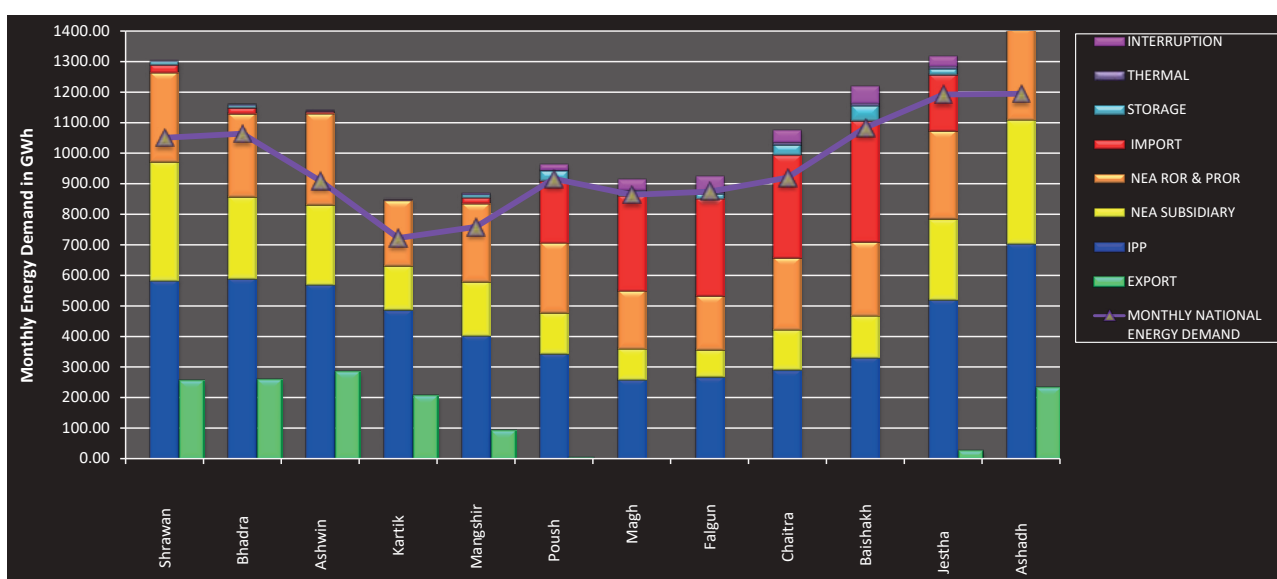
Figure 3: Capacity Balance (MW) in FY 2079/80(2022/23)



Capacity Balance in MW of FY 2079/80 (2022/23)

Source\Month	Shrawan	Bhadra	Ashwin	Kartik	Mangshir	Poush	Magh	Falgun	Chaitra	Baishakh	Jestha	Ashadh	Average
IPP	831.31	785.85	864.78	798.99	629.19	481.92	455.70	428.61	398.00	472.00	966.43	1103.39	684.68
NEA SUBSIDIARY	538.00	538.00	538.00	538.00	535.20	351.00	179.90	201.70	155.00	191.00	434.00	538.00	394.82
NEA ROR & PROR	421.11	421.55	428.37	422.74	428.21	408.99	379.83	390.47	272.84	289.43	433.02	428.86	393.79
IMPORT	76.70	72.80	70.20	14.30	39.10	239.69	515.70	470.00	665.00	562.00	57.00	51.00	236.12
STORAGE	101.20	99.20	60.00	0.00	97.00	98.40	94.70	26.30	98.90	100.00	75.30	49.60	75.05
INTERRUPTION	0.00	90.00	0.00	0.00	0.00	260.00	170.00	180.00	225.00	325.00	100.00	0.00	112.50
MONTHLY SYSTEM PEAK DEMAND	1968.33	2007.40	1961.35	1774.03	1728.81	1839.99	1795.83	1697.08	1815.05	1938.68	2065.65	2171.15	1896.94
EXPORT	267.80	200.00	241.00	408.00	199.00	0.00	0.00	0.00	0.00	0.00	195.00	300.00	150.90
MONTHLY NATIONAL PEAK DEMAND	1754.08	1814.65	1756.87	1464.63	1594.71	1839.99	1795.83	1697.08	1815.05	1938.68	1986.39	1947.80	1783.81

Figure 4: Energy Balance in GWh of FY 2079/80 (2022/23)



Energy Balance in GWh of FY 2079/80 (2022/23)													
	Shrawan	Bhadra	Ashwin	Kartik	Mangshir	Poush	Magh	Falgun	Chaitra	Baishakh	Jestha	Ashadh	Total
IPP	581.342	589.232	570.445	485.608	403.375	343.962	257.446	266.077	289.332	329.182	521.006	704.455	5341.462
NEA SUBSIDIARY	390.632	393.941	368.808	179.698	162.639	120.830	89.674	82.609	78.510	83.949	189.873	384.397	2525.560
NEA ROR & PROR	290.919	304.657	241.958	256.997	250.941	201.197	160.276	141.622	141.765	172.227	270.433	272.241	2705.234
IMPORT	25.462	20.856	6.120	0.519	18.687	202.881	310.988	318.471	335.537	395.728	184.401	34.876	1854.526
STORAGE	12.059	8.644	1.572	0.770	9.961	31.703	14.403	16.577	36.080	49.582	19.807	14.180	215.338
THERMAL	0.000	0.000	0.000	0.002	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.005
INTERRUPTION	1.660	2.255	1.285	0.820	1.015	15.916	30.926	48.590	38.280	52.575	30.740	14.370	238.432
MONTHLY SYSTEM ENERGY DEMAND	1302.074	1319.586	1190.188	924.414	846.621	916.489	863.713	873.946	919.505	1083.243	1216.260	1424.518	12880.557
EXPORT	251.558	255.670	280.973	202.254	87.804	0.590	0.000	0.000	0.000	0.000	24.205	230.067	1333.120
MONTHLY NATIONAL ENERGY DEMAND	1050.516	1063.916	909.215	722.161	758.817	915.899	863.713	873.946	919.505	1083.243	1192.055	1194.451	11547.437

Figure 5: Time-wise Purchased price and Volume through IEX with Upper Capping @ INR 12.00 Per unit in FY 2079/80 (2022/23)

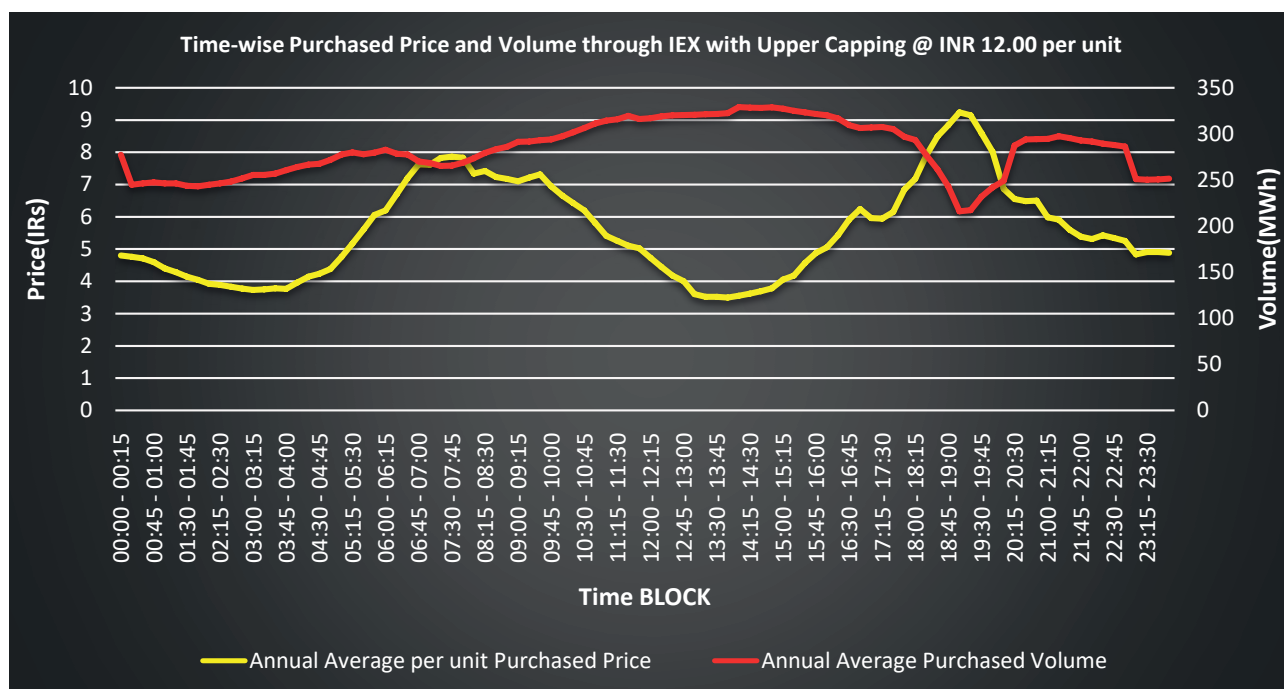


Figure 6: Time-wise Purchased price and Volume through IEX with Upper Capping @ INR 10.00 per unit in FY 2079/80 (2022/23)

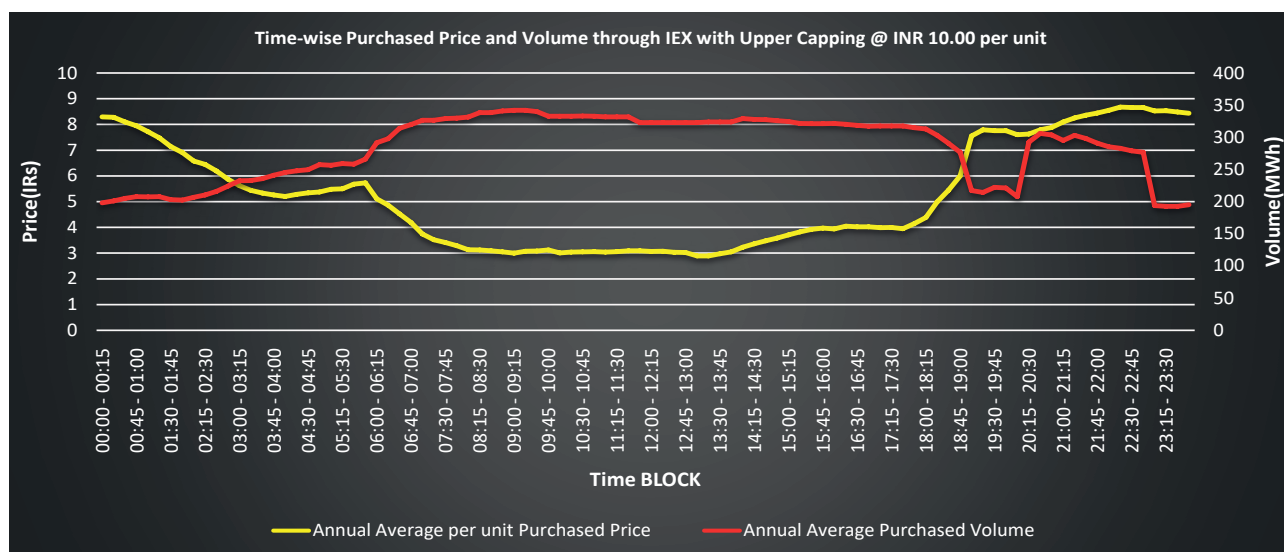


Figure 7: Time-wise sold price and Volume through IEX with Upper Capping @ INR 12.00 per unit in FY 2079/80 (2022/23)

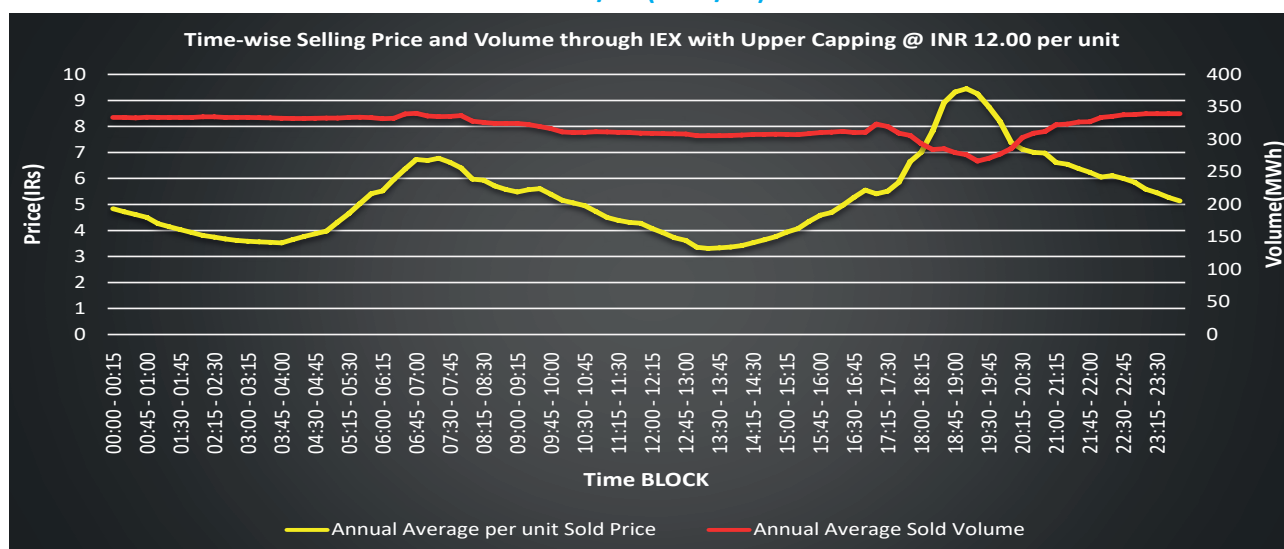


Figure 8: Time-wise sold price and Volume through IEX with Upper Capping @ INR 10.00 per unit in FY 2079/80 (2022/23)

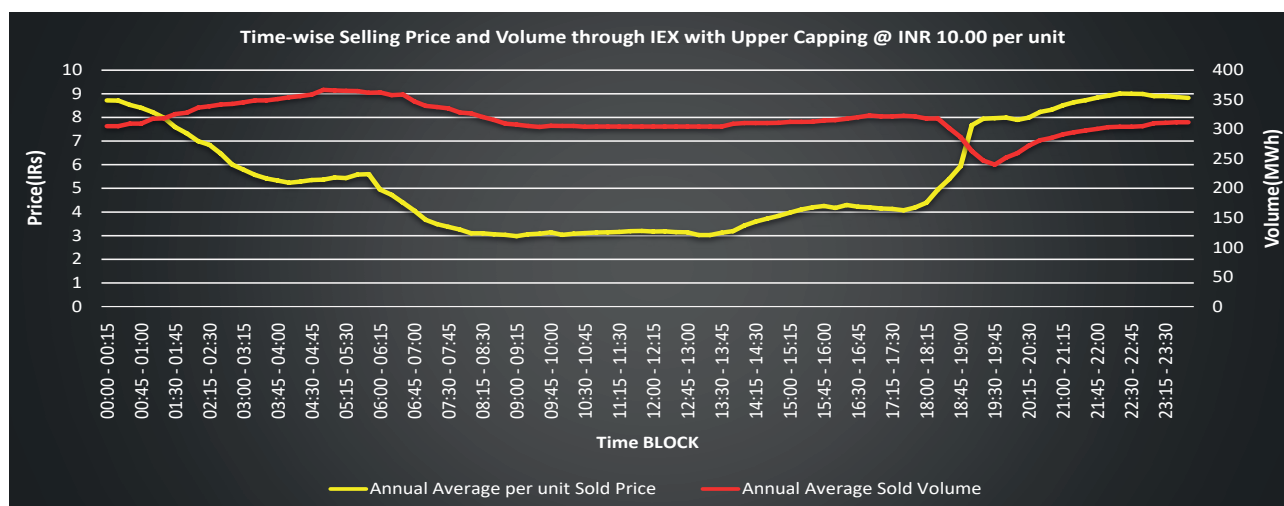


Figure 9: Comparison of Daily IEX (MCP) and NEA Power Purchase Price through IEX in FY 2079/80 (2022/23)

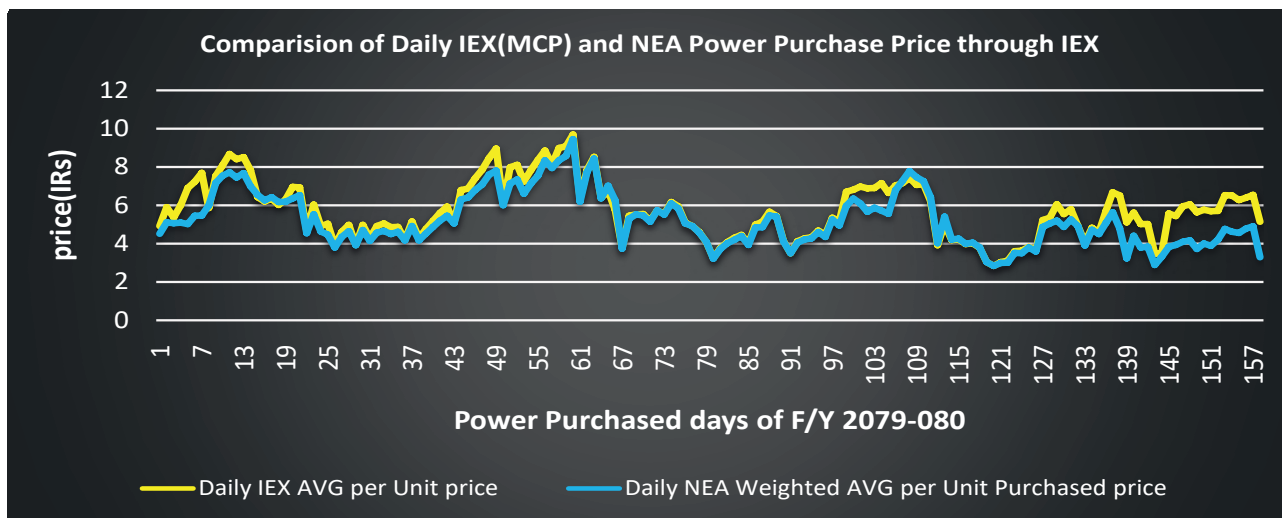


Figure10: Comparison of Daily IEX (MCP) and NEA Power selling Price through IEX in FY 2079/80 (2022/23)

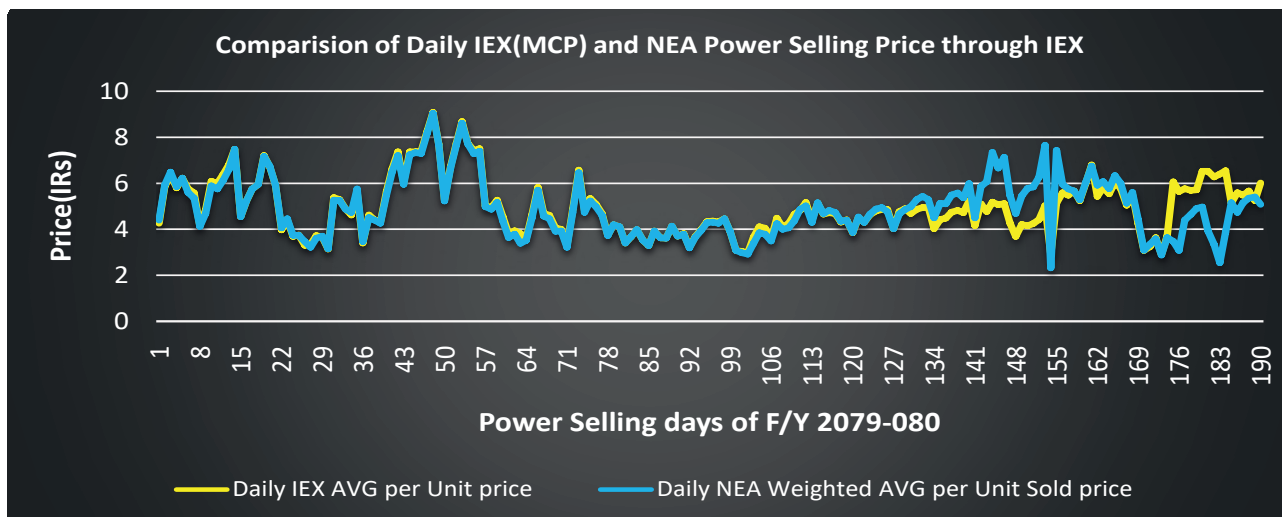
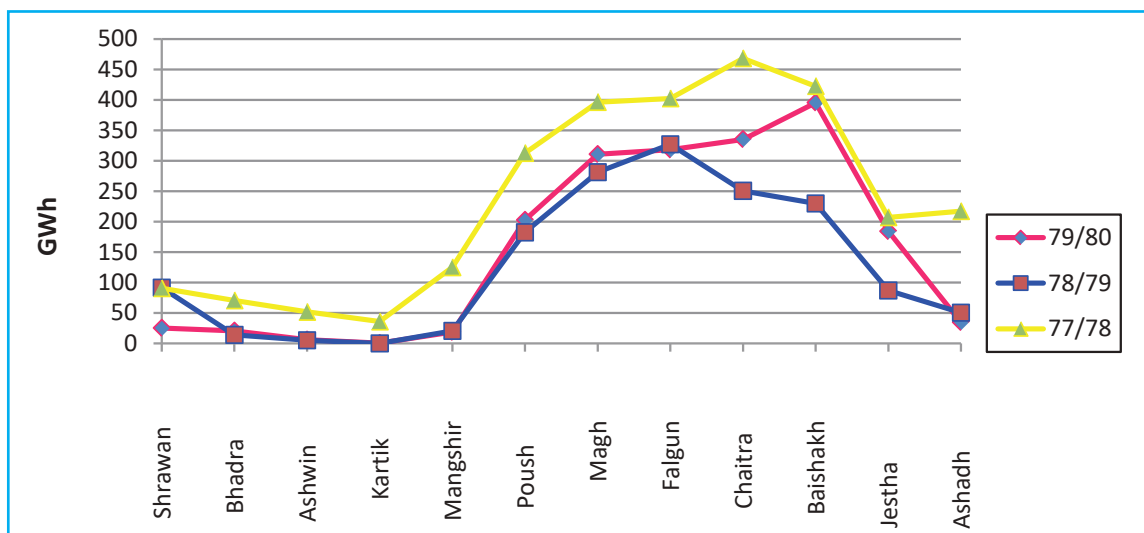
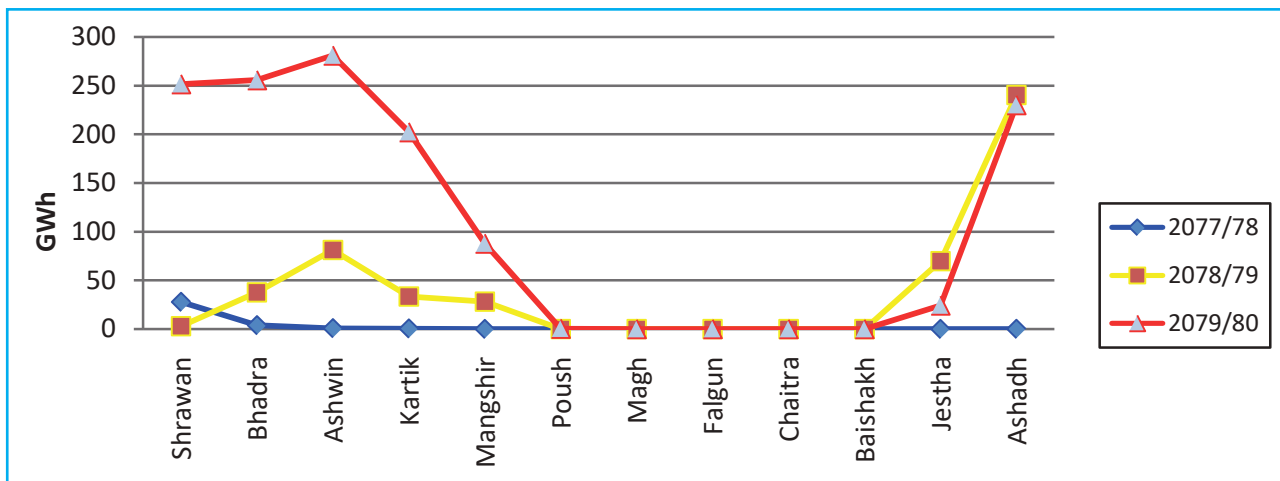


Figure 11: Imported Energy from different lines in FY 2077/78(2020/21), FY 2078/79 (2021/22) and FY 2079/80 (2022/23)



Comparison of Imported Energy (GWh) to India in different FY.													
FY	Shrawan	Bhadra	Ashwin	Kartik	Mangshir	Poush	Magh	Falgun	Chaitra	Baishakh	Jestha	Ashadh	Total
2077/78	91.10	71.15	52.25	36.38	125.45	313.06	396.77	402.79	468.61	422.99	207.60	217.64	1714.20
2078/79	92.00	14.32	5.37	0.39	20.82	182.76	281.34	327.19	250.85	230.16	87.23	50.87	1543.28
2079/80	25.46	20.86	6.12	0.52	18.69	202.88	310.99	318.47	335.54	395.73	184.40	34.88	1854.53

Figure 12: Comparison of exported Energy to India in different FY



Comparison of Exported Energy (GWh) to India in different FY.													
FY	Shrawan	Bhadra	Ashwin	Kartik	Mangshir	Poush	Magh	Falgun	Chaitra	Baishakh	Jestha	Ashadh	Total
2077/78	27.98	3.90	0.81	0.49	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.10	33.31
2078/79	3.02	37.67	81.23	33.38	28.18	0.00	0.00	0.00	0.00	0.00	69.66	240.47	493.61
2079/80	251.56	255.67	280.97	202.25	87.80	0.39	0.00	0.00	0.00	0.00	24.20	230.07	1332.92



ANNEXURE B: LIST OF TABLES

Table 1: Existing high voltage transmission lines

Table 2: Under construction high voltage transmission lines

Table 3: Planned and proposed high voltage transmission lines

Table 4: Existing high voltage grid substations

Table 5: Under construction high voltage grid substations

Table 6: Planned and proposed high voltage grid substations

Table 7: Major completed up gradation and reinforcement works of grid substations in FY 2079/080

Table 8: Major ongoing upgradation and reinforcement works of grid substations

Table 9: Major upgradation and reinforcement works of grid substations under Plan

Table 10: Details of Approved Position and Working Employees under Transmission Directorate



Table 1: Existing high voltage transmission lines

S.N.	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	ACCC Copenhagan	150
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	Double	176.66	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	Double	262.00	BEAR	250
33	Raxual-Parwanipur (Cross Border-Nepal Portion)	Single	16.00	BEAR	250
34	Kusaha-Kataiya (Cross Border-Nepal Portion)	Double	26.00	BEAR	250
35	Dumre Damauli	Double	46.00	BEAR	250

S.N.	Description	Type of Ckts	Length Circuit km	Conductor Type	Nominal Aluminium Cross Section Area (Sq.mm)
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
42	Solu Corridor (Tingla-Mirchaiya)	Double	180.00	CARDINAL	420
43	New Modi -Lahachwok -Lekhnath	Double	84.00	BEAR	250
44	Motipur-Sandhikharka	Double	74.00	BEAR	250
45	Butwal-Lumbini	Double	32.00	BEAR	250
		Double UG	4.00	1C, XLPE Cu Cable	500
46	Dordi (Kirtipur-Udipur)	Double	20.00	CARDINAL	420
47	Ramechap-Garjyang-Khimti	Double	62.00	BEAR	250
48	Mainahiya Sampatiya (Cross Border-Nepal Portion)	Double	56.00	BEAR	250
Total (132 kV)			3873.87		
B. 400/220 kV Transmission Line					
1	Dhalkebar-Muzzaffarpur 400 kV Cross Border Line	Double	78.00	MOOSE	500
2	Khimti- Dhalkebar 220 kV Transmission Line	Double	150.00	BISON	350
3	Trishuli 3B Hub-Matatirtha 220 kV Transmission Line	Double	98.00	BISON	350
4	Marsyandi (Markichwok)-Matatirtha 220 kV Transmission Line	Double	164.00	MOOSE	500
5	Matatirtha- Matatirtha Substation 220 kV Transmission Line	Double Ckt, Underground	2.50	1C, XLPE Cu Cable	1200
		Double Ckt, Underground	2.50	1C, XLPE Cu Cable	1600
6	Dana-Kushma 220 kV Line	Double	79.6	MOOSE	500
7	Koshi Corridor (Inaruwa-Basantapur-Baneshwor-Tumlingtar)	Single	106	MOOSE	500
8	New Bharatpur-Old Hetauda	Single	72.5		
Total (220 kV)			675.10		
C. 66 kV Transmission Line					
1	Chilime P/S-Trishuli P/S	Single	39.00	WOLF	150
2	Trisuli P/S-Balaju	Double	58.00	DOG	100
3	Trisuli P/S-Devighat P/S	Single	4.56	WOLF	150
4	Devighat P/S-Okhaltar	Double	53.00	DOG	100
5	Okhaltar-Chapali	Double	5.60	XLPE Cable	500
6	Chapali-New Chabel	Double	10.00	ACCC Silvasa	100
7	New Chabel-Lainchaur	Single	7.00	XLPE Cable	500
8	Balaju-Lainchor	Single	2.00	PANTHER	200



S.N.	Description	Type of Ckts	Length Circuit km	Conductor Type	Nominal Aluminium Cross Section Area (Sq.mm)
9	Balaju-Siuchatar-KL1 P/S	Double	72.00	WOLF	150
10	KL 1 P/S-Hetauda-Simara	Double	104.00	WOLF	150
11	Simara-Parwanipur-Birgunj	Double	40.00	HTLS INVAR	150
12	Suichatar-Teku	Double	8.20	BEAR	250
13	Suichatar-New Patan	Double	13.00	ACCC Copenhegan	150
14	Teku-K3 (underground)	Double, Single Core	5.60	XLPE Cable	400/500
15	Bhaktapur- Baneshwor-Patan	Single	16.50	ACCC Silvasa	123
16	Bhaktapur-Banepa-Panchkhal-Sunkoshi P/S	Single	48.00	LJ 120	120
17	Indrawati- Panchkhal	Single	28.00	PANTHER	200
Total (66 kV)			514.46		

Table 2: 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 79-80	Constructed in FY 79-80 only			
I. Transmission Directorate								
A. 132 kV Transmission Line								
1	Singati-Lamosangu 2 nd Circuit	Single	40	40	5	BEAR	250	2023/24
2	Bardaghat-Sardi	Double	40	33	5	BEAR	250	2023/24
3	Thankot-Chapagaon	Double	56	16		BEAR	250	
4	Raxual-Parwanipur Second Circuit (Cross Border-Nepal Portion)	Single	16	16		BEAR	250	2023/24
5	Burtibang-Paudi Amarai-Tamghas-Sandhikharka	Double	96			BEAR	250	2023/24
6	Kushaha- Biratnagar	Double	46			BEAR	250	2023/24
7	Dhalkebar-Loharpatti	Double	40			CARDINAL	420	2023/24
8	Kohalpur-Surkhet-Dailekh	Double	168			BEAR	250	2024/25
9	Balefi Corridor	Double	40			CARDINAL	420	2023/24
10	Dhalkebar- Balganga	Double	48			CARDINAL	420	2024/25
11	Kaligandaki- Ridi	Double	44			BEAR	250	2024/25
12	Nawalpur (Lalbandi) Salimpur	Double	40			BEAR	250	2024/25
13	Bhumahi-Hakui	Double	32			BEAR	250	2024/25
14	Kabeli (Amarpur) Dhungesangu	Double	40			BEAR	250	2024/25
15	Godak Soyak	Double	16.00			BEAR	250	2025/26

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 79-80	Constructed in FY 79-80 only			
16	Kushma -Lower Modi -Modi	Double	30.00			BEAR	250	2025/26
17	Birgunj-Parsauni UG	Double	5.60			1C, XLPE Cu Cable		2024/25
18	Barhabise Lamosaghu 2 nd Circuit (Sunkoshi 132 kV SS)	Single	12.00			BEAR	250	2023/24
Total			809.6	105	10			
B. 220 kV Transmission Line								
1	Bharatpur-Bardghat	Double	148	148	10	BISON	350	2023/24
2	Hetauda-Bharatpur	Single	79.5	79.5	3.5	BISON	350	2023/24
3	Chilime-Trishuli	Double	72	14	14	BISON	350	2023/24
4	Koshi Corridor (Basantapur-Dhungesangu)	Double	70	14	14	MOOSE	500	2023/24
5	Tumlingtar-Sitalpati	Double	36			MOOSE	500	2025/26
6	Lekhnath-Damauli	Double	90.00			MOOSE	500	2025/26
Total			496	256	42			
C. 400 kV Transmission Line								
1	Hetauda-Dhalkebar-Inaruwa	Double	576			MOOSE	500	2023/24
Total			576					
A. 132 kV Transmission Line								
1	Lapsifedi - Changunarayan - Duwakot	Double	28	0	0	BEAR	250	2024/25
2	Parwanipur - Pokhariya **	Double	42	0	0	ACCC Amsterdam	376	2024/25
3	Bhaktapur - Thimi - Balkumari**	Double	24	0	0	Single Core XLPE	800 sq. MM Cu	2024/25
5	Dandakhet - Rahughat	Double	50	0	0	CARDINAL	420	2024/25
6	Ghorahi - Madichaur	Double	80	0	0	CARDINAL	420	2024/25
7	Borang - Lapang	Double	48	0	0	BEAR	250	2024/25
8	Chobhar Patan **	Double	9	0	0	Single Core XLPE	800 sq. MM Cu	2024/25
9	Kohalpur Nepalgunj	Double	20	0	0	BEAR	250	2024/25
Total			301					
B. 220 kV Transmission Line								
1	Kushma - New Butwal TL	Double	176	164	104	ACCC Drake	519.7	2023/24
2	New Butwal - Bardaghat TL	Double	42	0	0	BISON	350	2023/24
3	Dharapani - Khudi TL	Double	56	0	0	Moose	500	2024/25
4	Khudi - Udipur TL	Double	36	0	0	ACCC Drake	519.7	2024/25
5	Udipur - Bharatpur TL	Double	134	6	0	ACCC Drake	519.7	2024/25



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 79-80	Constructed in FY 79-80 only			
6	Lapang - Ratmate TL**	Double	48	0	0	Twin Moose	500	2024/25
Total			492	170.0	104.0			
C. 400 kV Transmission Line								
1	New Khimti - Barhabise	Double	85.76	42	30	MOOSE	500	2023/24
2	Barhabise - Kathmandu	Double	92	28	16	MOOSE	500	2023/24
Total			178	70	46			
(Note : ** - In the process of Procurement)								

Table 3: 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
7	Nijgadh -Harniya	Multi	140.00	MOOSE	500
8	Harnaiya-Bodebarsain	Multi	708.00	MOOSE	500
Total			1938.00		
B. 220 kV Transmission Line					
1	Koshi Corridor (Inaruwa-Basantapur-Baneshwor-Tumlingtar)	Single	106	MOOSE	500
2	Galchhi - Ratmate	Double	34.00	MOOSE	500
3	Dhaubadi Iron Mine	Double	16.00	BISON	350
4	Gandak Nepalgunj	Multi	1276.00	MOOSE	500
5	Kathmandu Valley Transmission System Expansion	Multi, Double	320.00		
Total			1752.00		
C. 132 kV Transmission Line					
1	Godak -Anarmani	Double	70.00	BEAR	250
2	Kamane-Faparbari (Jhurjhure)	Double	90.00	BEAR	250
3	Shyaule-Safebagar	Double	160.00	BEAR	250
4	Attariya- Dhangadi	Double	36.00	BEAR	250
5	Auraha-Simara	Double	12.00	BEAR	250
6	Dhaubadi-Meghauli	Double	30.00	BEAR	250

S.N.	Description	Type of Ckts	Length Circuit km	Conductor Type	Nominal Aluminium Cross Section Area (Sq.mm)
7	Damak-Keraun-Biratnagar (Barju)	Double	130.00	BEAR	250
8	Rupani-Bodebarsain	Double	36.00		
9	Lahan Sukhipur	Double	34.00		
10	"Chandrapur-Sukhdevchaur (Rajpur)"	Double	70.00		
11	Nepalgunj-Nanpara Cross Border	Double	33.00		
12	Bafikot-Madichaur (Khungri)	Double	150		
Total			851.00		
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
Total			290.00		



Table 4: Existing high voltage grid substations

S.N.	Substation	Voltage	Capacity FY 078-79	Capacity FY 079-80	Total Increment in FY 079-80
		Ratio			
		kV	MVA	MVA	(MVA)
A. Kathmandu Grid Division					
1	Balaju	132/66	45	45	0
		66/11	22.5	22.5	0
		66/11	22.5	22.5	0
		66/11	22.5	22.5	0
2	Chapali	132/11	45	45	0
		132/66	49.5	49.5	0
		132/66	49.5	49.5	0
3	Siuchatar	132/66	37.8	37.8	0
		132/66	37.8	37.8	0
		132/66	37.8	37.8	0
		132/11	30	30	0
		66/11	18	18	0
		66/11	18	18	0
4	New Chabel	66/11	22.5	22.5	0
		66/11	22.5	22.5	0
		66/11		22.5	22.5
		66/11	22.5	22.5	0
5	Lainchour	66/11	22.5	22.5	0
		66/11	22.5	22.5	0
6	New Patan	66/11	18	18	0
		66/11	18	18	0
		66/11	18	18	0
		66/11	22.5	30	7.5
7	Teku	66/11	22.5	22.5	0
		66/11	22.5	22.5	0
8	K3	66/11	22.5	22.5	0
		66/11	22.5	22.5	0
9	Baneshwor	66/11	30	30	0
		66/11	30	30	0
10	Bhaktapur	132/66	49.5	49.5	0
		132/66	49.5	49.5	0
		132/11	22.5	45	22.5
		132/11	22.5	22.5	0
		132/11	22.5	22.5	0

S.N.	Substation	Voltage	Capacity FY 078-79	Capacity FY 079-80	Total Increment in FY 079-80
		Ratio			
		kV	MVA	MVA	(MVA)
11	Banepa	66/11	22.5	22.5	0
		66/11			0
12	Panchkhal	66/11	10	10	0
13	Lamosanghu	132/33	30	30	0
14	Matatirtha	132/33	30	30	0
		132/11	22.5	22.5	0
15	Indrawati	66/11	10	10	0
16	Bagmati	66/33	10	10	0
		66/11	6	6	0
17	Samundratar	132/33	30	30	0
		132/33	30	30	0
		33/11	8	8	0
		33/11	8	8	0
18	Singati	132/33	30	30	0
19	Garjyang	132/33	30	30	0
		33/11		8	8
B. Hetauda Grid Division					
20	Hetauda	132/66	45	45	0
		132/66	20	20	0
		66/11	10	10	0
		66/11	10	30	20
21	Kamane	132/33	63	63	0
		132/33	30	30	0
		33/11		24	24
		33/11	16.6	16.6	0
22	Bharatpur	132/33	30	30	0
		132/33	30	30	0
		132/11	22.5	22.5	0
		132/11	22.5	22.5	0
23	New Bharatpur	220/132		160	160
		220/132		160	160
		132/11	30.0	30.0	0
24	Birgunj	66/33	30	30	0
		66/33	12.5	12.5	0
		66/11	30	30	0
		66/11	30	30	0



S.N.	Substation	Voltage	Capacity FY 078-79	Capacity FY 079-80	Total Increment in FY 079-80
		Ratio			
		kV	MVA	MVA	(MVA)
25	Parwanipur	132/11	22.5	22.5	0
		132/11	22.5	22.5	0
		132/11	22.5	22.5	0
		132/66	63	63	0
		132/66	63	63	0
		132/66	63	63	0
		132/33		63	63
26	Simra	66/11	15	15	0
		66/11	15	15	0
27	Amlekhgunj	66/11	7.5	10	2.5
28	Pathlaiya	132/11	22.5	22.5	0
		132/33	30	30	0
29	Purbi Chitwan	132/33	30	30	0
		132/33	30	30	0
		33/11	16.6	16.6	0
C. Dhalkebar Grid Branch					
30	Lahan	132/33			0
		132/33	63	63	0
		33/11	16.6	16.6	0
		33/11	16.6	16.6	0
31	Chapur	132/33	30	30	0
		132/33	30	30	0
		33/11	16.6	16.6	0
32	Dhalkebar	400/220	315	315	0
		400/220	315	315	0
		400/220	315	315	0
		220/132	315	315	0
		220/132	315	315	0
		220/132	160	160	0
		220/132	160	160	0
		132/33	63	63	0
		132/33	63	63	0
		33/11	16.6	16.6	0
		33/11	16.6	16.6	0
33	Mirchaiya	132/33	30	30	0
		33/11	16.6	16.6	0

S.N.	Substation	Voltage	Capacity FY 078-79	Capacity FY 079-80	Total Increment in FY 079-80
		Ratio			
		kV	MVA	MVA	(MVA)
34	Nawalpur	132/33	63	63	0
		33/11	16	16	0
35	Rupani	132/33	63	63	0
36	Tingla	132/33	30	30	0
		33/11	8	8	0
37	New Khimti	220/132	100	100	0
		132/33		30	30
D	Duhabi Grid Branch				0
38	Duhabi	132/33	63	63	0
		132/33	63	63	0
		132/33	63	63	0
		132/33	63	63	0
		33/11	16.6	16.6	0
		33/11	16.6	16.6	0
39	Anarmani	132/33	30	30	0
		132/33		63	63
		132/33	30	30	0
		33/11	16.6	24	7.4
		33/11	16.6	16.6	0
40	Damak	132/33	63	63	0
		132/33		63	63
		33/11	16.6	16.6	0
41	Godak	132/33	63	63	0
		33/11	8	8	0
42	Phidim	132/33	20	20	0
		33/11	3	3	0
43	Amarpur (Kabeli)	132/33	30	30	0
		33/11	3	3	0
44	Kushaha	132/11		22.5	22.5
45	Inaruwa	220/132		160	160
		220/132		160	160
		220/33		63	63
		220/33		63	63
46	Tumlingtar	220/132		100	100
		220/132		100	100
		132/33		30	30
		132/33		30	30



S.N.	Substation	Voltage	Capacity FY 078-79	Capacity FY 079-80	Total Increment in FY 079-80
		Ratio			
		kV	MVA	MVA	(MVA)
47	Baneshwor	220/33		30	30
		220/33		30	30
E. Butwal Grid Division					
48	Butwal	132/33	63	63	0
		132/33	63	63	0
		132/33	63	63	0
		33/11	24.0	24.0	0
		33/11	16.6	16.6	0
		33/11	16.6	16.6	0
49	Bardghat	132/11	22.5	22.5	0
		132/11	22.5	22.5	0
50	Chanauta	132/33	30	30	0
		132/33	30	30	0
		33/11	16.6	16.6	0
		33/11	8	8	0
51	Lamahi	132/33	63	63	0
		132/33			0
		33/11	16.6	16.6	0
		33/11	8	8	0
52	Ghorahi	132/33	63	63	0
		132/33	30	30	0
		33/11	16.6	16.6	0
53	Kawasoti	132/33	30	30	0
		132/33	30	30	0
		33/11	16.6	16.6	0
54	Gandak	132/33	30	30	0
		132/33		30	30
		33/11	16.6	16.6	0
		33/11	16.6	16.6	0
55	Motipur	132/33	30	30	0
		33/11	16	16	0
56	Sandhikharka	132/33	30	30	0
		33/11	16	16	0
57	Mainahiya	132/33	45	45	0
		132/33		45	45
		33/11		16	16
58	New Butwal	220/132	100	100	0

S.N.	Substation	Voltage	Capacity FY 078-79	Capacity FY 079-80	Total Increment in FY 079-80
		Ratio			
		kV	MVA	MVA	(MVA)
59	Sunwal	132/33		63	63
		132/33		63	63
		132/11		22.5	22.5
F. Pokhara Grid Branch					
60	Damauli	132/33		30	30
		132/33	15	15	0
		33/11	16.6	16.6	0
		33/11	3	3	0
61	Pokhara	132/11	30	30	0
		132/11	30	30	0
62	Lekhnath	132/33	30	30	0
		132/11	22.5	22.5	0
		132/11			0
63	Markichowk	132/33	30	12	-18
64	Syangja	132/33	30	30	0
		33/11	8	8	0
65	Dana	220/132	100	100	0
		132/33	25	25	0
66	Kushma	220/132	100	100	0
67	Lahachowk	132/33	30	30	0
		33/11	8	8	0
68	Kirtipur	132/11		10	10
G. Attaria Grid Branch					
69	Kusum	132/11	12.5	12.5	0
70	Hapure	132/33	30	30	0
		33/11	8	8	0
71	Attaria	132/33	30.0	30.0	0
		132/33	30.0	30.0	0
		33/11	16.6	16.6	0
72	Kohalpur	132/33	63	63	0
		132/33	63	63	0
		33/11	16.6	16.6	0
		33/11	16.6	16.6	0
73	Lamki	132/33	15	15	0
		132/33	15	15	0
		33/11	16.6	16.6	0



S.N.	Substation	Voltage	Capacity FY 078-79	Capacity FY 079-80	Total Increment in FY 079-80
		Ratio			
		kV	MVA	MVA	(MVA)
74	Mahendranagar	132/33	30	30	0
		132/33	15	30	15
		33/11	16.6	16.6	0
75	Bhurigaon	132/33	30	30	0
		33/11	8	8	0
76	Pahalmanpur	132/33	30	30	0
		33/11	8	8	0
77	Syaule	132/33	30	30	0
		33/11	8	8	0

S.No	Voltage Rating (kV)	Transformer No.	Total Capacity FY 078-79 (MVA)	Total Capacity FY 079-80 (MVA)	Total Increment (MVA)
1	400/220	3	945	945	0
2	220/132	14	1350	2190	840
3	220/33	4		186	186
4	132/66	13	610.40	610.40	0
5	132/33	77	2487.00	2994.00	507
6	132/11	23	470.00	547.50	77.5
7	66/33	3	52.50	52.50	0
8	66/11	33	608.50	661.00	52.5
9	33/11	49	625.2	680.6	55.4
Total		219	7148.60	8867.00	1718.4

Table 5: Under construction high voltage grid substations

S.N.	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	2023/24
2	Trishuli 3B Hub Substation	Trishuli 3 B Hub	220/132 132/33	1 Ø, 7x53.33 Bank 3 Ø, 50	370	2023/24
3	Ramechhap Garjyang Khimti 132 kV Transmission Line	New Khimti	220/132	1 Ø, 4x66.67 Bank	200	2023/24
4	Koshi Corridor 220 kV Transmission Line	Basantapur	220/132 132/33	1 Ø 7x33.33 Bank 3 Ø, 30	230	2023/24
5	Burtibang Paudi Amarai Tamghas Sandhikharka Gorusinghe 132 kV Transmission Line	Burtibang	132/33 33/11	3 Ø, 30 16	46	2023/24
		Paudi Amarai	132/33 33/11	3 Ø, 30 16	46	2023/24
		Tamghas	132/33 33/11	3 Ø, 30 16	46	2023/24
6	Kushaha Biratnagar 132 kV Transmission Line	Biratnagar	132/33 33/11	3 Ø, 2x63 3 Ø, 16	142	2023/24
7	Hetauda- Dhalkebar-Inaruwa 400 kV Substation Expansion Project	Hetauda	400/220	1 Ø, 4x167 Bank	500	2023/24
		Inaruwa	400/220	3 Ø, 3x315	945	2023/24
8	Nepal India Electricity Transmission and Trade Project (Hetauda-Dhalkebar-Inaruwa 400 kV Transmission Line)	Hetauda	220/132 132/11	3 Ø, 2x160 3 Ø, 10	330	2023/24
9	Koshi Corridor 220 kV Transmission Line	Dhungesanghu	132/33	1 Ø, 7x5 Bank	30	2023/24
10	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	2023/24
11	Tumlingtar Sitalpati 220 kV Transmission Line	Sitalpati	220/132 132/33	1 Ø, 7x33.33 Bank 1 Ø, 4x8 Bank	224	2024/25
12	Dharan 220/33 kV substation	Dharan	220/33 33/11	3 Ø, 63 3 Ø, 10	73	2026/27
13	Kaligandaki Ridi132 kV Transmission Line	Ridi	132/33 33/11	3 Ø, 30 3 Ø, 8	38	2024/25
14	Lalbandi Salimpur 132 kV Transmission Line	Salimpur	132/33 33/11	3 Ø, 2x30 3 Ø, 1x24	84	2024/25
15	Dhalkebar Balganga 132 kV Transmission Line	Balganga	132/33	3 Ø, 2x63	126	2024/25
16	Bhumahi Hakui132 kV Transmission Line	Hakui	132/33	3 Ø, 2x100	200	2024/25
17	Malekhu 132 kV Substation Expansion	Malekhu	132/33	3 Ø, 2x30	60	2023/24
18	Lekhnath Damauli 220 kV Transmission Line	Lekhnath	220/132	1 Ø, 7x100 Bank	600	2025/26
		Damauli	220/132	3 Ø, 2x63	126	2025/26
			132/33	3 Ø, 2x30	60	2025/26
			33/11	3 Ø, 2x8	16	



S.N.	Name of Project	Substation	Voltage Level (Ratio)	Capacity	Total Capacity	Expected Completion Year
			kV	MVA	MVA	AD
19	Birgunj Parsauni 132 kV UG Transmission Line	Parsauni	132/33	3 Ø, 2x63	126	2024/25
20	New Khimti - Lamosanghu Kathmandu Transmission Line Upgradation	New Khimti	220/132	1 Ø, 3x66.67 Bank	200	2024/25
21	Surkhet 132 kV Substation	Surkhet	132/33	3 Ø, 2x30	60	2024/25
Total					5,346.50	
II. Under Project Management Directorate						
1	220 kV Bahrabise Substation	Barhabise	220/132	1 Ø, 4x53.33	165	2023/24
			132/11	3 Ø, 1x5		
2	Kathmandu Valley Transmission Capacity Reinforcement Project	Chobhar	132/11	3 Ø, 2x45	90	2023/24
		Futung	132/11	3 Ø, 2x45	90	2023/24
		Thimi	132/11	3 Ø, 2x45	90	2023/24
3	Marsyangdi-Kathmandu 220 kV TL Project	Markichowk	220/132	1 Ø, 7x53.33	320	2022/23
		Matatirtha	220/132	1 Ø, 7x53.33	320	2022/23
4	Marsyangdi Corridor 220 kV TL Project	Udipur	220/132	1 Ø, 4x53.33	210	2023/24
			132/33	3 Ø, 1x50		
		Khudi	220/132	1 Ø, 4x53.33	210	2023/24
			132/33	3 Ø, 1x50		
		Dharapani	132/33	1 Ø, 4x33.33	130	2023/24
			132/33	3 Ø, 1x30		
5	Lapsiphedi and Changuarayan SS Project	Lapsiphedi	220/132	1 Ø, 4x53.33	182.5	2023/24
			132/11	3 Ø, 1x22.5		
		Changuarayan	132/11	3 Ø, 1x45	45	2023/24
		Teku	132/11	3 Ø, 2x45	90	
			132/66	3 Ø, 1x63	63	
6	New Khimti - Barhabise - Lapsiphedi 400 kV SS Project	New Khimti	400/220	1 Ø, 7x105	630	2023/24
		Barhabise	400/220	1 Ø, 7x53.33	320	2023/24
		Lapsiphedi	400/220	1 Ø, 4x105	315	2023/24
7	Parwanipur - Pokhariya 132 kV TL Project**	Pokhariya	132/33	3 Ø, 2x63	171	2024/25
			132/11	3 Ø, 1x45		
8	Kathmandu Valley Transmission Capacity Reinforcement Project (Phase II)**	Balkumari	132/66	3 Ø, 2x63	216	2024/25
			132/11	3 Ø, 2x45		
9	Borang-Lapang 132 kV and Lapang-Ratmate 220 kV Transmission Line and Substation project	Borang	132/33	3 Ø, 30	30	2024/25
		Lapang	220/132 132/33	1 Ø, 7x33.33 3 Ø, 30	230	
10	Ghorahi Madichaur 132 kV Transmission Line	Madichaur	132/33	3 Ø, 30	30	2024/25
11	Dadakheth Rahughat 132 kV Transmission Line	Dadakheth	132/33	3 Ø, 30	30	2023/24
		Rahughat	220/132 132/33	1 Ø, 7x33.33 3 Ø, 30	230	
12	132 kV Pangtang Substation	Pangtang	132/33	3 Ø, 30	30	2023/24

S.N.	Name of Project	Substation	Voltage Level (Ratio)	Capacity	Total Capacity	Expected Completion Year
			kV	MVA	MVA	AD
13	132 kV Keraun Substation	Keraun	132/33	3 Ø, 2x63	148.5	2023/24
			132/11	3 Ø, 22.5		
14	132 kV Mulpani Substation	Mulpani	132/11	3 Ø, 2x45	90	2023/24
15	132 kV Dumkibas Substation	Dumkibas	132/33	3 Ø, 2x30	60	2024/25
16	132 kV Amlkehgunj Substation	Amlekhgunj	132/66	3 Ø, 2x100	200	2024/25
17	132 kV Bakaspur Substation	Bakaspur, Nepalgunj	132/33	3 Ø, 2x63	126	2024/25
16	132 kV New Patan substation **	New Patan	132/66	3 Ø, 2x63	261	2024/25
			132/11	3 Ø, 3x45		
Total					5123	
** Under procurement process						

Table 6: Planned and proposed construction high voltage grid substations

S.N.	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	Dhaubadi Iron Mine 220 kV Transmission Line	Dhaubadi	220/132 132/33	3 Ø, 2x160 3 Ø, 2x63	446
3	Palpa 220 kV Substation	Palpa	220/132 132/33 33/11	1 Ø, 7x53.33 3 Ø, 2x63 3 Ø, 2x16	478
4	Godak Anarmani 132 kV Transmission Line	Anarmani	132/33	3 Ø, 2x63	126
6	Lahan - Sukhipur 132 kV Transmission Line	Sukhipur	132/33	3 Ø, 2x30	60
7	Rupani - Bodebarsain 132 kV Transmission Line	Bodebarsain	132/33	3 Ø, 2x30	60
8	Chandrapur - Sukhdevchaur 132 kV Transmission Line	Sukhdevchaur	132/33	3 Ø, 2x63 3 Ø, 25	151
9	Birauta 132 kV Substation	Birauta	132/11	3 Ø, 2x30	60
10	Syaule-Safebagar 132 kV Transmission Line	Safebagar	132/33 33/11	3 Ø, 2x30 3 Ø, 1x16	76
11	Khimti- Rakathung (Ramechhap) 132 kV Transmission Line	Rakathung	132/33 33/11	3 Ø, 2x30 3 Ø, 1x16	76
12	Jhurjhure 132 kV Transmission Line	Faparbari	132/33 33/11	3 Ø, 1x63 3 Ø, 1x16	79
13	Bafikot-Khungri (Madichaur) 132 kV Transmission Line	Ghartigaun	132/33 33/11	3 Ø, 1x30 3 Ø, 1x16	46
14	Kathmandu Valley System Reinforcement	Thapathali	132/11	3 Ø, 2x45	90
		Raj Durbar	132/11	3 Ø, 2x45	90
		Maharajgunj	132/11	3 Ø, 2x45	90
		Sirutar	132/11	3 Ø, 2x30	60
15	Attariya Dhangadhi 132 kV Transmission Line	Dhangadhi	132/33 33/11	3 Ø, 2x63 3 Ø, 1x22.5	148.5



S.N.	Name of Project	Substation	Voltage Level (Ratio)	Capacity	Total Capacity
			kV	MVA	MVA
16	Auraha Simara 132 kV Transmission Line	Auraha	132/33 33/11	3 Ø,2x63 3 Ø,2x22.5	171
17	Dhaubadi-Megghauli 132kV Transmission Line	Gaidakot	132/33 33/11	3 Ø,2x30 3 Ø,1x22.5	82.5
		Megghauli	132/33 33/11	3 Ø,2x63 3 Ø,1x22.5	148.5
18	Kohalpur - Surkhet-Dailekh 132 kV Transmission Line	Dailekh	132/33 33/11	3 Ø,2x30 3 Ø,2x22.5	105
19	Kathmandu Valley Transmission System Expansion	Agreegate	220, 132 and 66 kV		4129
20	Nijgadh 400 kV Substation	Nijgadh	400/220 220/132 132/33	3 Ø,2x500 3 Ø,2x200 3 Ø,2x63	1526
21	Nijgadh-Harnaiya 400 kV Transmission Line	Harnaiya	220/132 132/33	3 Ø,2x200 3 Ø,2x63	526
22	Harnaiya-Bodhebarsain 400 kV Transmission Line	Bodebarsain	400/132	3 Ø,2x315	630
Total					9654.5
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

Table 7: Major completed upgradation and reinforcement works of grid substations in FY 2079/080

S.N.	Substation	Voltage Ratio kV	Previous Capacity MVA	New Capacity MVA	Remarks
1	Mahendranagar	132/33	45	60	15 MVA transformer was replaced by new 30 MVA transformer.
2	Gandak	132/33	30	60	A 30 MVA transformer with associated bay was added.
3	Hetauda	66/11	20	40	10 MVA transformer was replaced by new 30 MVA transformer.
4	Amlekhgunj	66/11	7.5	10	7.5 MVA transformer was replaced by new 10 MVA transformer.
5	Kamane	33/11	16.6	40.6	A 24 MVA transformer with associated bay was added.
6	Patan	66/11	76.5	84	22.5 MVA transformer was replaced by new 30 MVA transformer.
7	Chabail	66/11	67.5	90	A 22.5 MVA transformer with associated bay was added.
8	Anarmani	132/33	60	123	30 MVA transformer was replaced by new 63 MVA transformer.
9	Anarmani	33/11	33.2	40.6	16.6 MVA transformer was replaced by 24 MVA transformer.
10	Damak	132/33	63	126	A 63 MVA transformer with associated bay was added.
11	Bhaktapur	132/11	67.5	90	22.5 MVA transformer was replaced by new 45 MVA transformer.
12	Parwanipur	132/33		63	Bus bar upgradation with 63MVA transformer added
13	Damauli	132/33	15	45	A new 30 MVA transformer with associated bay was added.
14	Marchichwok	132/33	30	12	30 MVA damaged transformer was replaced by new 12 MVA transformer

Capacitor Banks (New)

1	Gandak	Installation of 33 kV, 2x12.5 MVAR Capacitor Bank
2	Bharatpur	Installation of 33 kV, 1x12.5 MVAR Capacitor Bank
3	Kohalpur	Installation of 33 kV, 2x12.5 MVAR Capacitor Bank

Replacement of burnt Capacitor Units and brought into Operation

1	Anarmani	33 kV, 7.5 MVAR Capacitor Bank
2	Butwal	33 kV, 20 MVAR Capacitor Bank
3	Bardaghat	11 kV, 10 MVAR Capacitor Bank
4	Chandranigapur	33 kV, 12.5 MVAR Capacitor Bank
5	Damak	33 kV, 10 MVAR Capacitor Bank
6	Dhalkebar	33 kV, 10 MVAR and 12.5MVAR Capacitor Bank
7	Duhabi	33 kV, 6.072 MVAR Capacitor Bank
8	Kohalpur	132kV, 20MVAR and 33 kV, 12.5 MVAR Capacitor Bank
9	Lahan	132 kV, 20 MVAR and 33 kV, 20 MVAR Capacitor Bank
10	Mirchaiya	33 kV, 10 MVAR Capacitor Bank

Total Transformer Capacity Increment in F/Y 2079/080 :352.4 MVA
Total Capacitor Bank Capacity Increment in F/Y 2079/080: 62.5 MVAR



Table 8: Major- Ongoing upgradation and reinforcement works of grid substations

S.N.	Substation	Voltage Ratio, kV	Existing Capacity, MVA	New Capacity, MVA	Remarks
1	Parwanipur	132/11	67.5	90	A new 22.5MVA transformer with associated Bay.
2	Duhabi	33/11	33.2	48	2x16.6 MVA to be replaced by new 2x24 MVA
3	Anarmani	33/11	40.6	48	2x16.6MVA to be replaced by new 2x24MVA
4	Chapur	132/33	60	126	2x30MVA to be replaced by new 2x63MVA
5	Lamosanghu	132/33	30	63	30MVA to be replaced by new 63MVA
6	Chapali	132/11	45	67.5	A new 22.5MVA transformer with associated Bay.
7	Attaria	132/33	60	126	2x30MVA to be replaced by new 2x63MVA
		33/11	16.6	33.2	A new 16.6MVA transformer with associated Bay.
8	Lamahi	132/33	63	126	A new 63MVA to be installed in the spare Bay
9	Damak	33/11	16.6	33.2	A new 16.6MVA transformer with associated Bay.
10	Lainchaur	66/11	45	60	2x22.5 MVA to be replaced by new 2x30 MVA
11	Patan	66/11	84	120	3x18 MVA to be replaced by new 3x30 MVA
12	Bhaktapur	132/11	67.5	135	2x22.5 MVA to be replaced by new 2x45 MVA
13	Birgunj	66/33	42.5	60	1x12.5 MVA to be replaced by new 1x30 MVA
14	Lahan	132/33	63	93	1x30 MVA to be installed in the spare bay.
15	Mirchaiya	132/33	30	60	1x30 MVA to be installed in a new bay.
16	Matatirtha	132/11	22.5	67.5	1x45 MVA to be installed in a new bay.
17	Mahendranagar	33/11	7.5	16.6	1x7.5 MVA to be replaced by new 1x16.6 MVA
Capacitor Banks					
1	Butwal	Installation of 132 kV, 2x30MVar Capacitor Bank			
2	Ghorahi	Installation of 33 kV, 1x12.5 MVar + 33 kV, 1x20 MVar Capacitor bank			
3	Chanauta	Installation of 33 kV, 1x12.5 MVar Capacitor bank			
4	Kawasoti	Installation of 33 kV, 1x20 MVar Capacitor bank			
5	Anarmani	Installation of 132 kV, 1x30MVar Capacitor Bank			
6	Duhabi	Installation of 33kV, 1x12.5MVar Capacitor Bank			
7	Damak	Installation of 33kV, 1x12.5MVar Capacitor Bank			
8	Simara	Installation of 66 kV, 1x30MVar Capacitor Bank			
9	Parwanipur	Installation of 66 kV, 1x30MVar Capacitor Bank			
10	Hardi	Installation of 11 kV, 1x10MVar Capacitor Bank			
11	Kamane	Installation of 11 kV, 1x10MVar Capacitor Bank			
12	Kohalpur	Installation of 33kV, 1x20 MVar Capacitor Bank			
13	Mahendranagar	Installation of 33kV, 1x12.5MVar Capacitor Bank			
14	Dhalkebar	Installation of 33kV, 1x20 MVar Capacitor Bank			
15	Mirchaiya	Installation of 33kV, 1x12.5MVar Capacitor Bank			
16	Lahan	Installation of 33kV, 1x20 MVar Capacitor Bank			
17	Nawalpur	Installation of 33kV, 1x12.5MVar Capacitor Bank			

Total Transformer Capacity Increment under progress : 578.5 MVA

Total Capacitor Bank Capacity Increment under progress : 357.5 MVar

Table 9: Major upgradation and reinforcement works of grid substations under Plan

S.N.	Substation	Voltage Ratio, kV	Existing Capacity, MVA	New Capacity, MVA	Remarks
1	Bharatpur	132/11	67.5	82.5	2x22.5 MVA to be replaced by 2x30 MVA (shift from Pokhara).
2	New Bharatpur	132/11	22.5	112.5	2*45 MVA transformer to be installed in new bay
3	Chapur	33/11	16.6	33.2	1x16.6 MVA to be installed in new bay (shift from Lahan)
4	Kohalpur	132/33	126	200	2x63 MVA to be replaced by new 2x100 MVA
		33/11	33.2	48	2x16.6 MVA to be replaced by new 2x24 MVA
5	Lamki	132/33	30	60	2x15 MVA to be replaced by 2x30 MVA (shift from Attaria)
		33/11	16.6	33.2	16.6MVA transformer to be added
6	Pokhara	132/11	60	135	2x30 MVA to be replaced by new 2x45 MVA and 1*45 MVA to be added
7	Damauli	33/11	16.6	33.2	1x16.6 MVA to be installed in a new bay.
8	Lekhnath	132/33	30	60	1x30 MVA to be installed (Shift from Chapur)
		132/11	22.5	45	1x22.5 MVA to be installed at spare bay (shift from Bharatpur)
9	Syangja	33/11	16.6	33.2	New1*16.6 MVA to be installed
10	Lahan	132/33	93	126	30MVA to be replaced by 63MVA
		33/11	33.2	48	2x16.6MVA to be replaced by new 2x24MVA
11	Mirchaiya	132/33	60	126	2x30 MVA transformer to be replaced by new 2x63 MVA transformer
12	Dhalkebar	132/33	126	200	2x63 MVA to be replaced by new 2x100 MVA
13	Chanauta	132/33	60	93	30MVA to be replaced by 63MVA (shift from Kohalpur)
14	Butwal	33/11	57.2	72	2x16.6 MVA to be replaced by new 2x24 MVA
15	Gandak	132/33	60	126	2x30 MVA to be replaced by a new 2x63 MVA.
16	Kawasoti	132/33	60	93	1x30 MVA to be replaced by 1x63 MVA (shift from Kohalpur)
		33/11	16.6	33.2	1x16.6 MVA to be installed in new bay (shift from Butwal)
17	Pathalaiya (Piluwa)	132/33	30	226	1x30 MVA to be replaced by 1x63 MVA and another 1x63 MVA to be installed in a new bay under ongoing upgradation work. 1x100 MVA to be installed in a new bay
18	Kamane	132/11	0	45	2x22.5 MVA to be installed in new bay (shift from Bhaktapur/ Bharatpur)
19	Simara	66/11	30	60	New 1x30 MVA to be installed
20	Balaju	132/11	0	135	New 3x45MVA transformers with associated bays
21	Hetauda	132/66	65	135	New 1x45MVA transformer with associated bay and new 1x45MVA transformer will replace 132/66kV, 20MVA
22	Parwanipur	132/66	189	378	New 3x63MVA transformers with associated bays
		132/33	63	126	New 1x63MVA transformers with associated bays
		132/11	67.5	135	3x22.5 MVA to be replaced by 3*45 MVA



S.N.	Substation	Voltage Ratio, kV	Existing Capacity, MVA	New Capacity, MVA	Remarks
23	Nawalpur	132/33	60	123	New 1x63MVA transformer with associated bay
		33/11	16.6	33.2	1x16.6MVA transformer with associated bay (Shift from Lahan)
24	Rupani	132/33	63	126	New 1x63MVA transformer with associated bay
25	Mainahiya	132/33	90	190	New 1x100MVA transformer with associated bay
26	Sandhikharka	132/33	30	60	1x30 MVA to be installed in a new bay (Shift from Chanauta)
27	Motipur	132/33	30	60	1x30 MVA to be installed in a new bay (Shift from Chapur)
		33/11	16.6	33.2	1x16.6 MVA transformer with associated bay (Shift from Anarmani)
28	Kohalpur	132/33	126	200	2x63 MVA transformer to be replaced by new 2x100 MVA transformer
		33/11	33.2	48	2x16.6 MVA transformer to be replaced by new 2x24 MVA transformer
29	Mahendranagar	132/33	60	126	2x30 MVA transformer to be replaced by new 2x63 MVA transformer
30	Birgunj	66/11	60	90	1x30 MVA to be installed in a new bay.
31	Bhurigau	33/11	8	24.6	16.6MVA transformer to be added
32	Syaule	132/33	30	60	1x30 MVA to be installed in a new bay (Shift from Piluwa)
		33/11	16.6	33.2	1x16.6 MVA to be installed in a new bay (Shift from Kohalpur)
33	Hapure	132/33	30	60	1x30 MVA to be installed in a new bay (Shift from Kawasowti)
		33/11	16.6	33.2	1x16.6 MVA to be installed in a new bay (Shift from Duhabi)
34	Lamahi	33/11	16.6	33.2	1x8 MVA to be replaced by 1*16.6 MVA (Shift from Kohalpur)
35	Ghorai	33/11	16.6	33.2	1x16.6 MVA to be installed in a new bay (Shift from Duhabi)
36	Pahalmapur	33/11	8	24.6	1x16.6 MVA to be installed in a new bay
Capacitor Banks					
1	Pathalaiya (Piluwa)	Installation of 132 kV, 30 MVAR Capacitor Bank			

Total Transformer Capacity Increment under plan : 2228 MVA

Total Capacitor Bank Capacity Increment under plan : 30 MVA

Table 10: Details of Approved Position and Working Employees under Transmission Directorate

S.N.	Position	Level	Service	Group	Approved Position	Working Employee
1	Deputy Managing Director	12	Technical	–	1	1
2	Director	11	Technical	–	5	4
3	Joint Director	10	Administration	Administration	1	0
4	Joint Director	10	Administration	Finance	1	1
5	Manager	10	Technical	Electrical	7	7
6	Deputy Director	9	Administration	Administration	0	1
7	Deputy Director	9	Administration	Finance	0	2
8	Deputy Manager	9	Technical	Electrical	8	20
9	Deputy Manager	9	Technical	Electronics	1	1
10	Deputy Manager	9	Technical	Civil	1	6
11	Assistant Director	8	Administration	Administration	1	0
12	Assistant Director	8	Administration	Finance	1	3
13	Assistant Manager	8	Technical	Electrical	16	17
14	Assistant Manager	8	Technical	Electronics	3	3
15	Assistant Manager	8	Technical	Mechanical	1	1
16	Assistant Manager	8	Technical	Civil	3	8
17	Assistant Manager	8	Technical	Computer Engineering	1	2
18	Administration Officer	7	Administration	Administration	6	6
19	Finance Officer	7	Administration	Finance	5	13
20	Engineer	7	Technical	Electrical	46	69
21	Engineer	7	Technical	Electronics	3	2
22	Engineer	7	Technical	Civil	21	37
23	Survey Officer	7	Technical	Survey	2	2
24	Assistant Administration Officer	6	Administration	Administration	5	16
25	Assistant Finance Officer	6	Administration	Finance	5	15
26	Assistant Computer Officer	6	Administration	Computer	0	4
27	Assistant Engineer	6	Technical	Electrical	39	37
28	Assistant Engineer	6	Technical	Mechanical	0	1
29	Assistant Engineer	6	Technical	Civil	3	8
30	Senior Assistant (Mi.Ri.Su.Bha)	5	Administration	Administration	10	33
31	Accountant/Store Keeper	5	Administration	Finance	11	24
32	Computer Operator	5	Administration	Computer Operation	0	1
33	Supervisor	5	Technical	Electrical	128	163
34	Supervisor	5	Technical	Mechanical	0	1
35	Supervisor (Draft Man)	5	Technical	Civil	7	6
36	Senior Communication Equipment Operator	5	Technical	Electronic	1	1
37	Senior Heavy Equipment Operator	5	Technical	Vehicle Driver	10	9
38	Office Assistant/Si.Mi.Ri.	4	Administration	Administration	5	17



S.N.	Position	Level	Service	Group	Approved Position	Working Employee
39	Assistant Accountant/ Assistant Store Keeper	4	Administration	Finance	10	26
40	Guard Commander	4	Administration	Security	0	1
41	Foreman	4	Technical	Electrical	58	102
42	Foreman	4	Technical	Mechanical	2	3
43	Foreman Driver	4	Technical	Vehical Driver	13	9
44	Clerk (Mi.Ri.)	3	Administration	Administration	0	0
45	Clerk	3	Administration	Finance	0	1
46	Electrician	3	Technical	Electrical	173	149
47	Driver	3	Technical	Vehical Driver	16	18
48	Office Helper - 2	2	Administration	Administration	35	18
49	Helper	2	Technical	Electrical	67	69
50	Office Helper - 1	1	Administration	Administration	21	7
51	Junior Helper	1	Technical	Electrical	18	8
Total					771	953

* Note:

No.of working employees are more than the approved position because the temporary positions in projects are not included in the approved position.

ANNEXURE C: LIST OF EXISTING SUBSTATION SINGLE LINE DIAGRAM (SLD)

S.N.	Name of Substation
1	Amarpur (Kabeli)
2	Phidim
3	Godak
4	Damak
5	Anarmani
6	Duhabi
7	Kushaha
8	Inaruwa
9	Baneshwar
10	Tumlingtar
11	Rupani
12	Lahan
13	Mirchaiya
14	Tingla
15	Dhalkebar
16	Chandranigahapur
17	Nawalpur
18	Garjyang
19	New Khimti
20	Pathlaiya
21	New Parwanipur
22	Birgunj
23	Simra
24	Amlekhgunj
25	Kamane
26	Hetauda
27	Bharatpur

S.N.	Name of Substation
28	Purbi Chitwan
29	New Bharatpur
30	Balaju
31	Chapali
32	Siuchatar
33	New Chabel
34	Lainchour
35	Patan
36	Teku
37	K3
38	Baneswor
39	Bhaktapur
40	Banepa
41	Panchkhal
42	Lamosanghu
43	Matatirtha
44	Indrawati
45	Samundratar
46	Singati
47	Damauli
48	Pokhara
49	Lekhnath
50	Markichowk
51	Syangja
52	Dana
53	Kushma
54	New Modi Switching Station



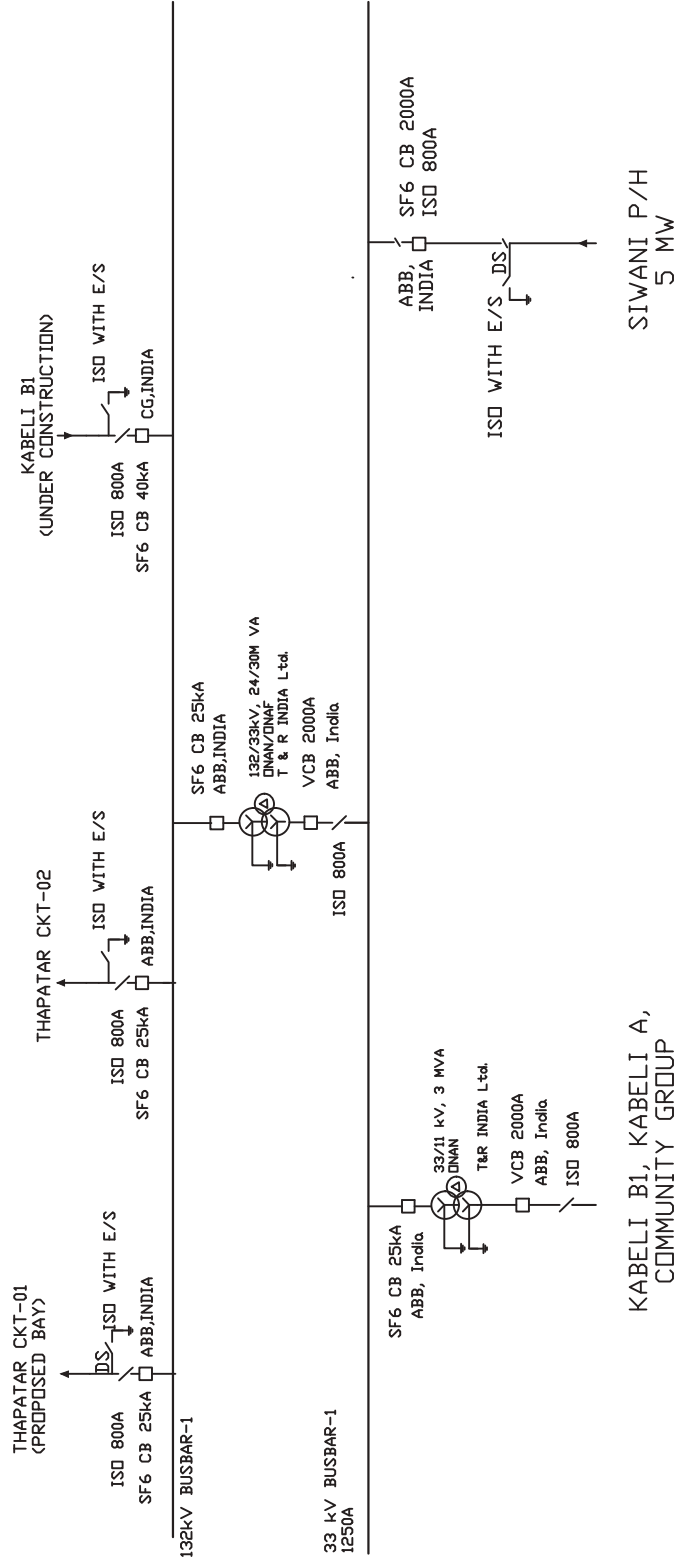
S.N.	Name of Substation
55	Lahachowk
56	Kirtipur
57	Butwal
58	Bardghat
59	Gandak
60	Chanauta
61	Lamahi
62	Ghorahi
63	Kawasoti
64	Motipur
65	Sandhikharka
66	Mainahiya

S.N.	Name of Substation
67	New Butwal
68	Sunwal
69	Kusum
70	Hapure
71	Attaria
72	Kohalpur
73	Lamki
74	Mahendranagar
75	Bhurigaon
76	Pahalmanpur
77	Syaule

1. AMARPUR SUBSTATION

Amarpur substation with Double Bus bar system, located at Amarpur of Panchthar district of Mechi Zone and connected to Thapatar 132 kV Sub Stations. This substation receives power from Siwani Hydro (5MW) via 33 kV single circuit line. This substation was commissioned in 2015 with 132/33 kV, 24/30 MVA capacity. It also consists of 33/11 kV, 3 MVA capacity transformer supplying to local feeder kabeli B1, kabeli A and a community group.

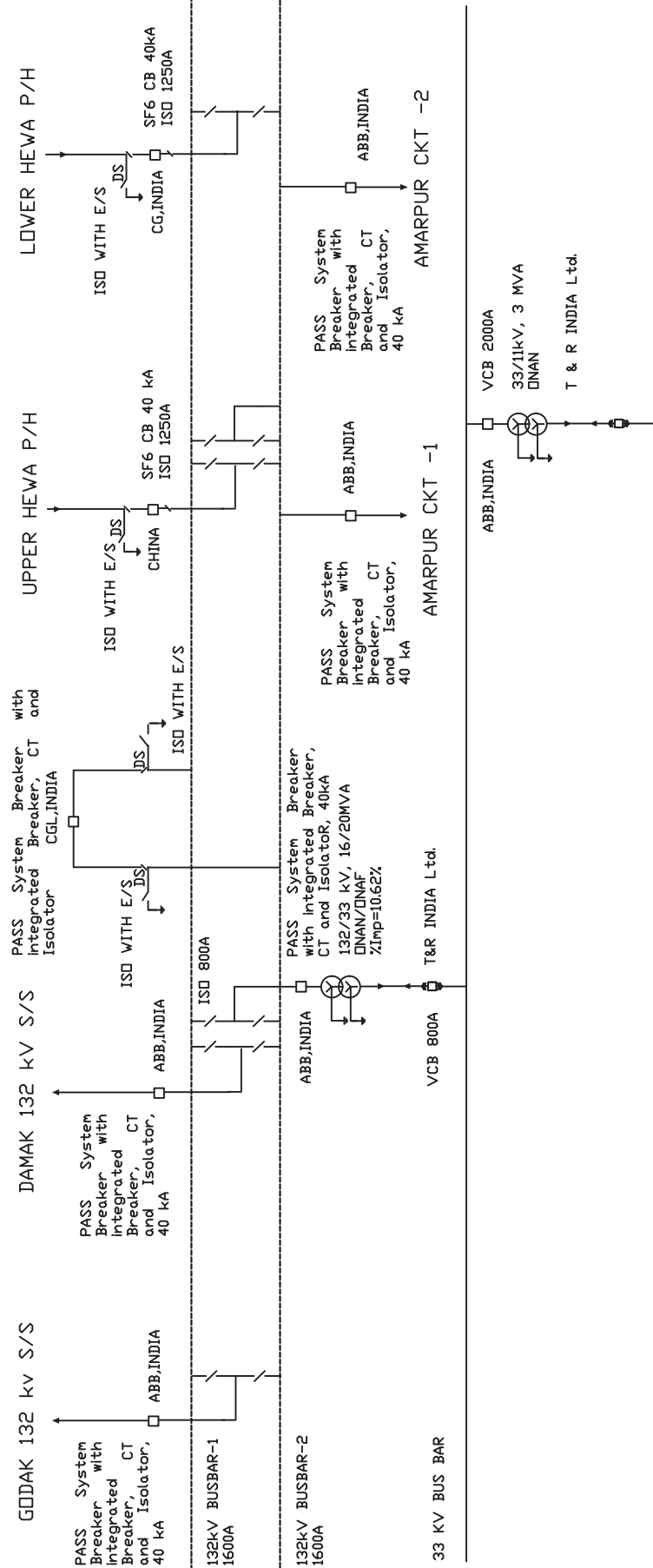
Installed Capacity : 132/33kV, 24/30 MVA
Maximum Demand : 6.63 MVA



2. PHIDIM (THAPATAR) SUBSTATION

Thapatar substation with Double Bus bar system, located at Thapatar, Phidim of Panchthar district of Mechi Zone and connected to Godak and Damak Sub Stations. This substation receives power from Upper Hewa (15MW) and Lower Hewa (22.5MW) by 132kV single circuit line. It is also connected to Amarpur substation by 132kV double circuit line. This substation was commissioned in 2015 with 132/33 kV, 20 MVA capacity. It also consists of 33/11 kV, 3 MVA capacity transformer supplying to local feeder Yasok.

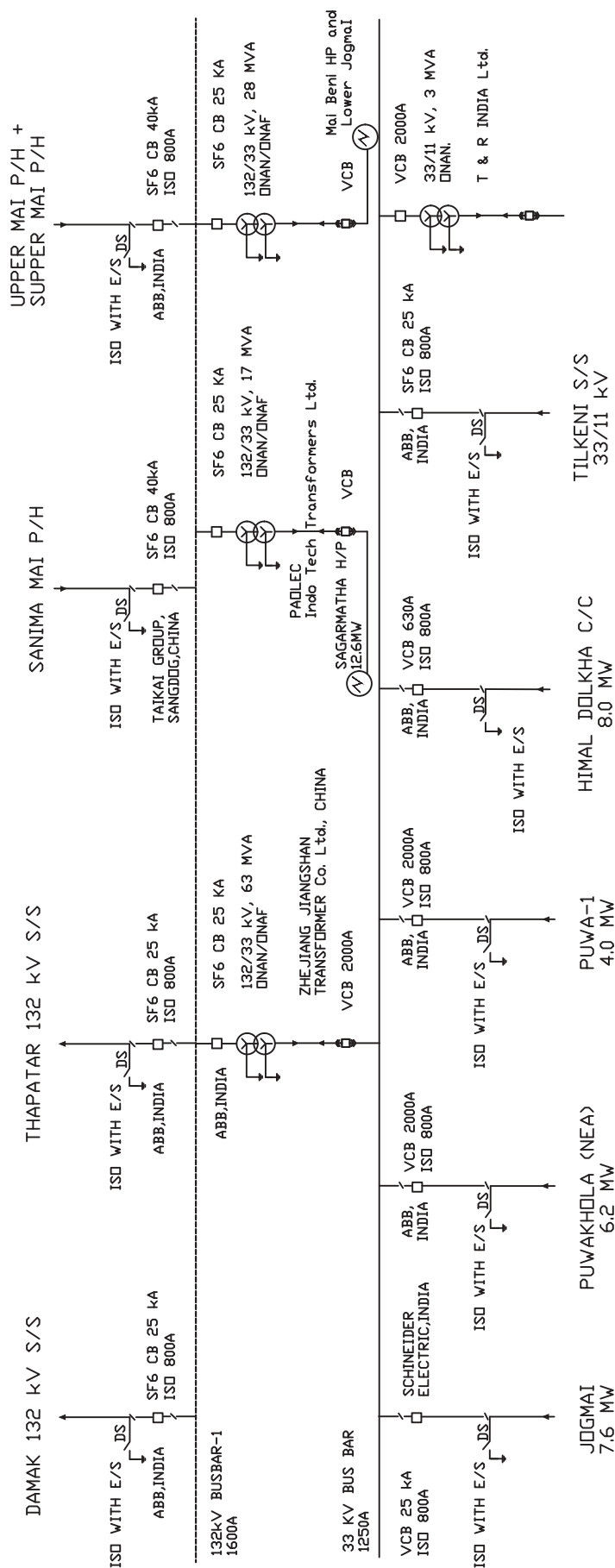
Installed Capacity : 132/33 kV, 16/20 MVA
Maximum Demand : 4.57 MVA



3. GODAK (ILAM) SUBSTATION

Godak substation with Single Bus bar system, located at Godak of Ilam district of Mechi Zone and connected to Damak and Thapatar 132 kV Sub Stations. This substation receives power from Sanima Mai (18.1MW), Upper Mai (7.8MW), Supper Mai (7.8MW) by 132 kV single circuit line and Himal Dolkha C/C (8MW), Himal Dolkha (4.5MW), Puwakhola NEA (6.2MW), Puwa-1 (4MW) by 33 kV single circuit line and Jogmai (7.6MW) by 33 kV double circuit line and 33/11 kV, 8MVA Tlkeni Substation by 33 kV single circuit line. This substation was commissioned and charged in 2015 with 132/33 kV, 30 MVA capacity and later on 2018 the capacity is upgraded to 63MVA. It also consists of 33/11 kV, 3 MVA capacity transformer supplying to Saktim local feeder.

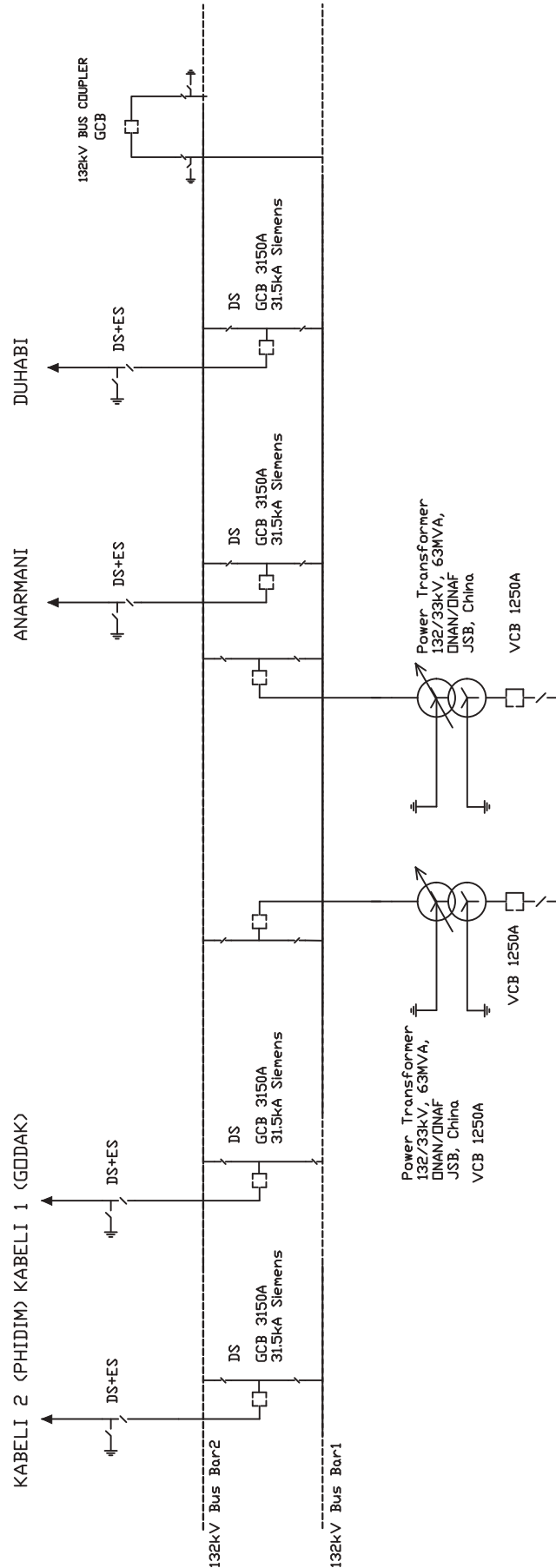
Installed Capacity : 132/33 kV, 63 MVA
Maximum Demand : 19.95 MVA



4. DAMAK SUBSTATION

Damak substation located at Damak of Jhapa District, Mechi Zone, feeds power to Damak, Panchgachi, Kerkha and Padajungi area. This Substation is connected to Duhabi and Anarmani by 132 kV single circuit line and Kabeli Corridor through double circuit line. This Substation was commissioned in 2015 with 132/33kV, 30MVA capacity. New 132/33kV, 63MVA Transformer Bay was installed in 2020 and 30MVA was put out of service. In 2023 another 132/33kV, 63MVA power transformer was installed in 2023.

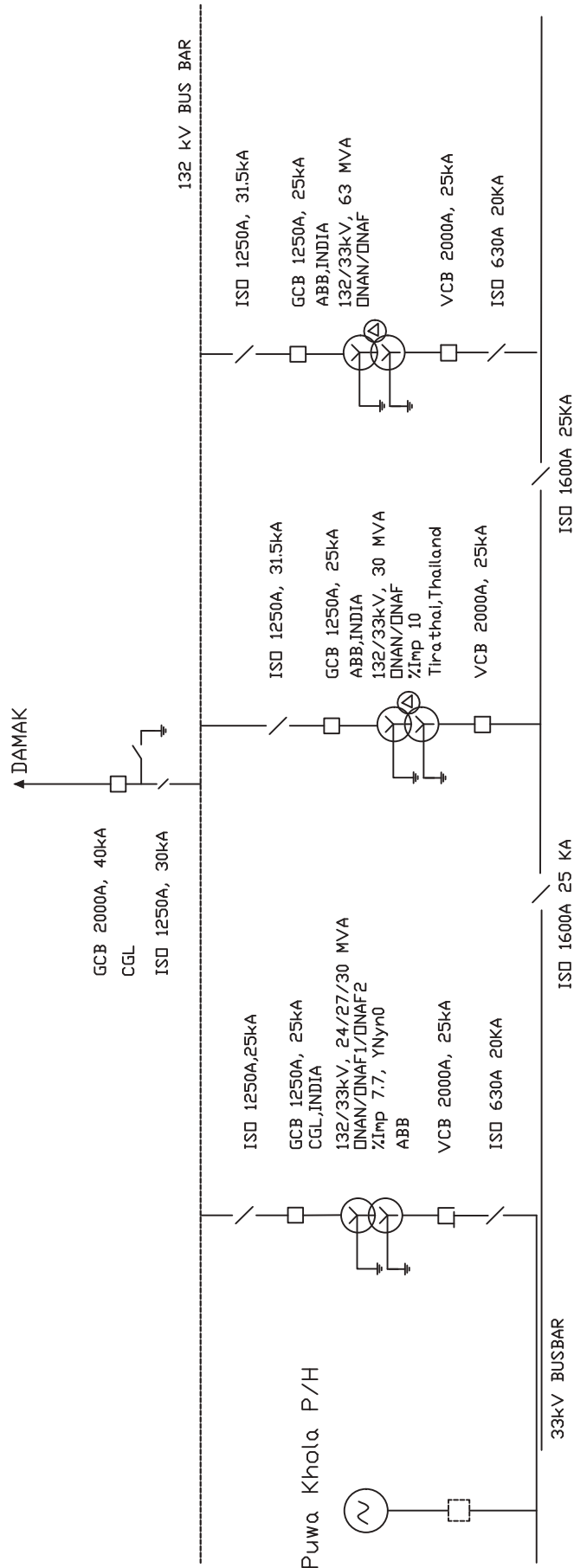
Installed Capacity : 132/33kV, 126MVA
Maximum Demand : 51.44MVA



5. ANARMANI SUBSTATION

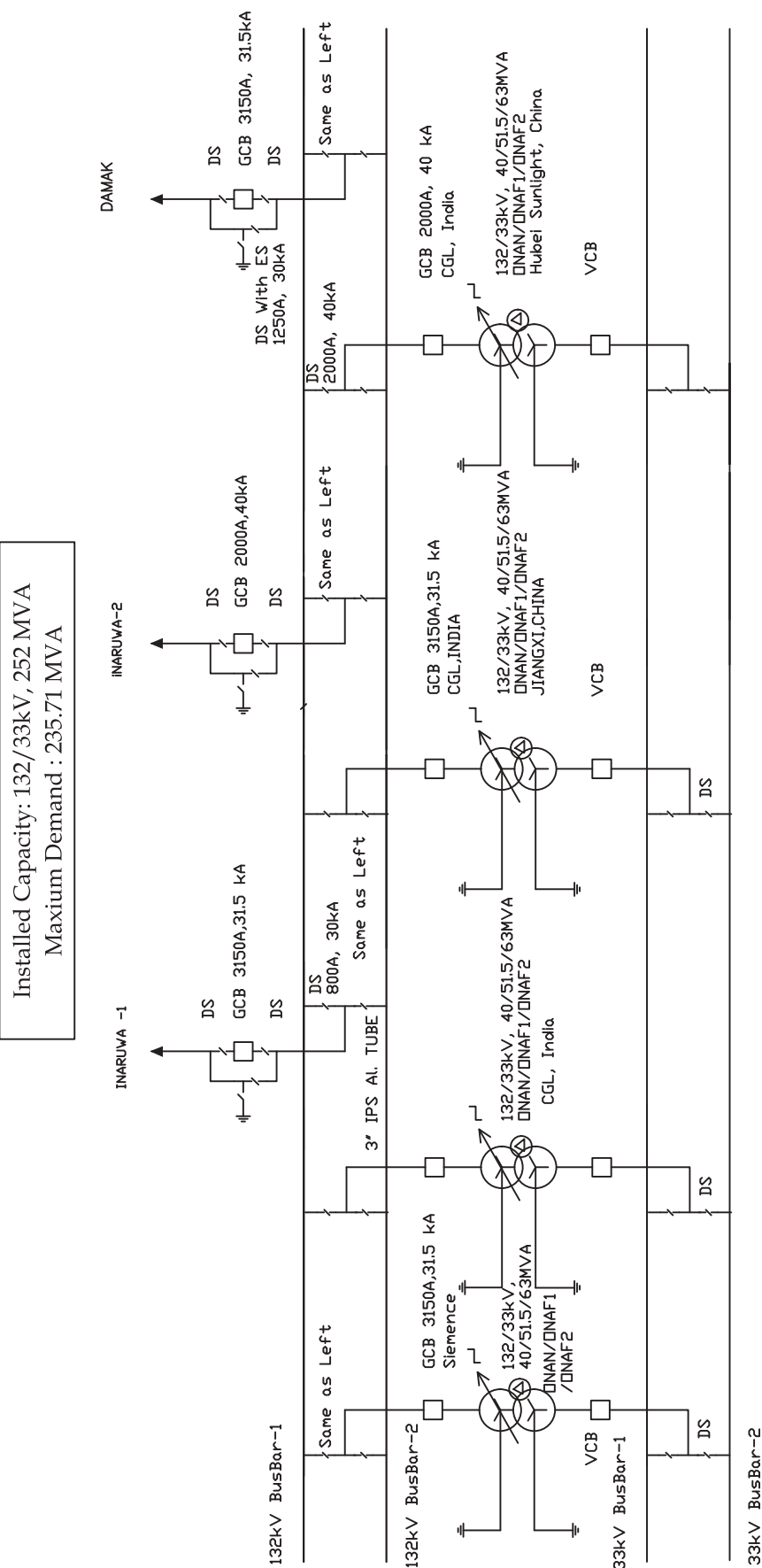
Anarmani substation with single bus system, located at Anarmani of Jhapa district Mechi Zone feeds power to Dhulabari, Damak, Ilam, Chandragadhi, Suranga and Garamani. This substation is connected to Duhabi Substation by 132kV single circuit line. Puwakhola Power Station, 5.3 MW, is connected to this substation by 33kV transmission Line. This substation was commissioned in 1992 with 132/33 kV two numbers of 7.5 MVA transformers and was upgraded to 2x15 MVA in 2003 and 2004. In 2007, one of 2x15MVA transformers was upgraded to 30MVA. Further existing 15 MVA Transformer was replaced by 30 MVA in 2009. Also 132/33kV, 63MVA new transformer with associated was installed in 2023.

Installed Capacity: 132/33kV, 123 MVA
Maximum Demand : 102.82 MVA



6. DUHABI SUBSTATION

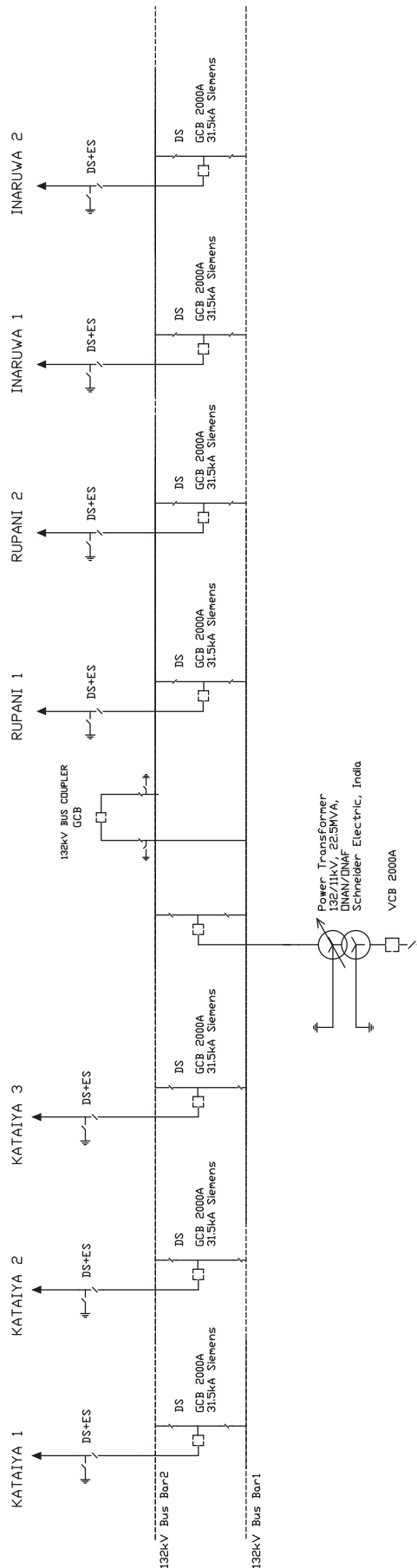
Duhabi substation with double bus system, located at Duhabi of Sunsari district of Koshi Zone feeds power to Biratnagar, Inaruwa, Dharan and Duhabi. This substation is connected to Lahan and Kushaha substations by 132kV double circuit and with Anarmani by Single Circuit Line. This substation was commissioned in 1985 with 132/33 kV, 30 MVA capacity. This substation was upgraded to 60 MVA, with additional installation of 30 MVA transformer in 1995. In 2004, one 30MVA transformer was replaced by 63MVA. Replacement of another 30 MVA transformer with 40/51.5/63 MVA transformer was completed in 2009. Capacitor banks with capacity of 2x6.07 MVAR were installed in 1996 and 3x10MVAR in 2003 for voltage improvement. Multifuel Power station, 39MW, is connected to this substation by 4 km double circuit transmission line. Kataiya Power Station in India is also connected by double circuit 33kV line. Further two new 132/33kV, 63MVA Transformer Bays was installed in 2017 and 2021 respectively.



7. KUSHAHA SUB STATION

Kushaha substation with Double Bus System is located at Kushaha of Sunsari District, Koshi Zone offers the Loop In Loop Out (LILO) for Dhalkebar-Duhabi 132 kV double circuit line. Furthermore, this substation connects with the cross border line (Kushaha Kataiya 132 kV Transmission Line) for import/ export of power from India. This substation consist of 1 no. of 132/11kV, 22.5 MVA power transformer. There are total 7 nos. of line bays i.e. 3 nos. of line bays from Kataiya substation India, 2 nos. of line bays from Rupani Substation and 2 nos. of line bays from Inaruwa Substation. Also, there are 5 nos. of 11 kV outgoing feeders. This Substation was commissioned in 2023.

Installed Capacity : 132/11kV, 22.5MVA

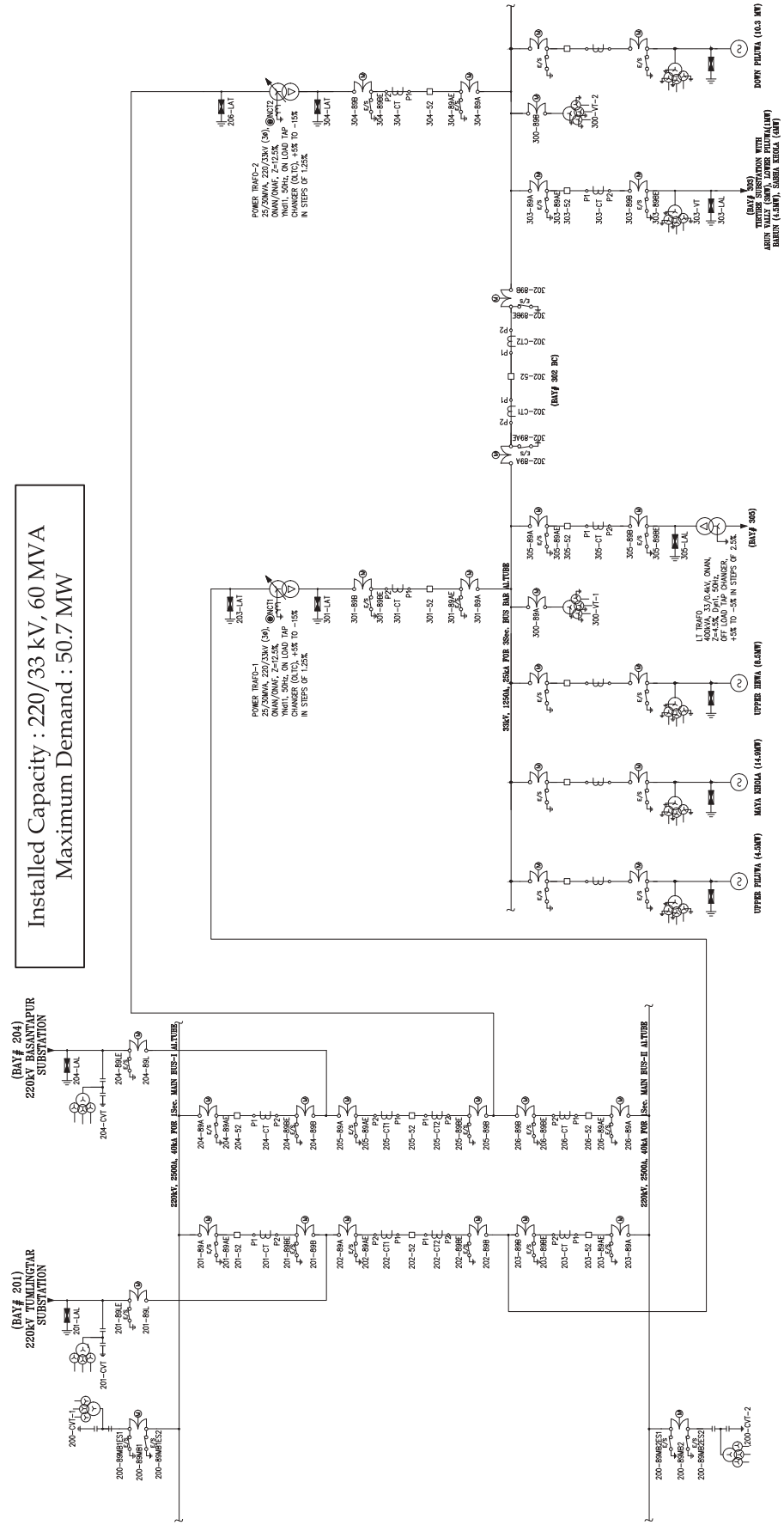


Inaruwa substation with Double Busbar with Transfer bus system in 220kV voltage level and Double Busbar system in 132kV voltage level, located at Inaruwa of Sunsari district of Koshi Province is connected to Koshi Corridor through single circuit 220kV line and Rupani (via Kushaha) and Duhabi substation through 132kV double circuit line. This substation was commissioned in 2022 with 220/132/33 kV, 446 MVA capacity. It also supply power to 33/11kV Inaruwa substation through one 33kV line.

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9. BANESHWOR SUBSTATION

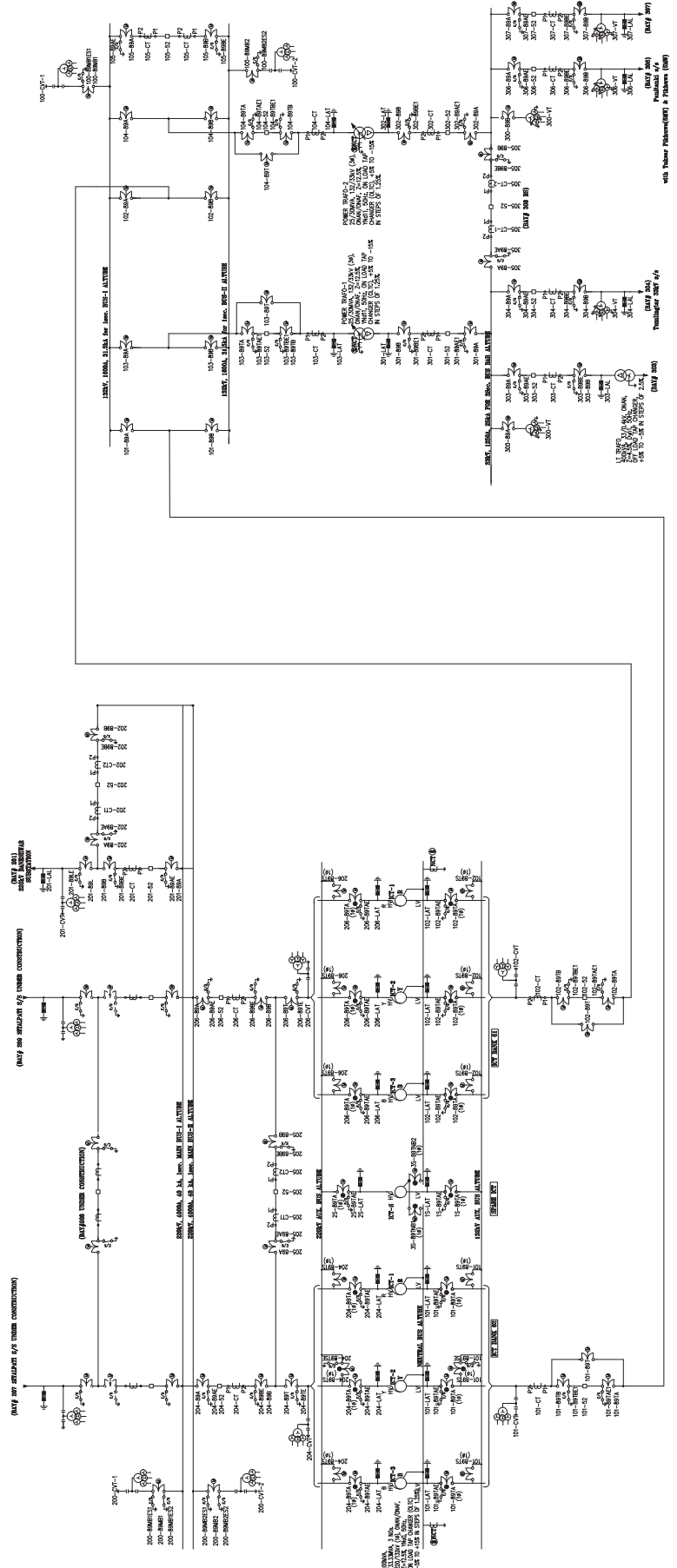
Baneshwor substation with one & half breaker 220 kV bus bar system, located at Baneshwor of Sankhuwasabha district of Koshi Province is connected to Tumlingtar substation and Basantapur substations by 220kV line. This substation receives power from Maya khola (14.9MW), Down Puluwa (10.3MW), Upper Hewa (8.5MW), Upper Puluwa (4.5MW) and power from Tirtire substation. It was commissioned in 2022 AD with two nos. of 220/33kV, 30MVA transformers.



10. TUMLINGTAR SUBSTATION

Tumlingtar substation with One and half breaker scheme in 220kV, Double Bus bar system in 132kV, located at Tumlingtar of Sankhuwasabha district of Koshi Province is connected to Baneshwor 220kV substation, Panitanki 33kV substation and Tumlingtar DCS 33kV substation. This substation receives power from Tuksar Pikuwa (8MW) & Pikuwa (5MW) via 33 kV Panitanki substation line. This substation was commissioned in 2022 AD with seven 220/132kV single phase transformer to form two banks each of 100MVA and two numbers of 132/33kV, 30MVA transformers.

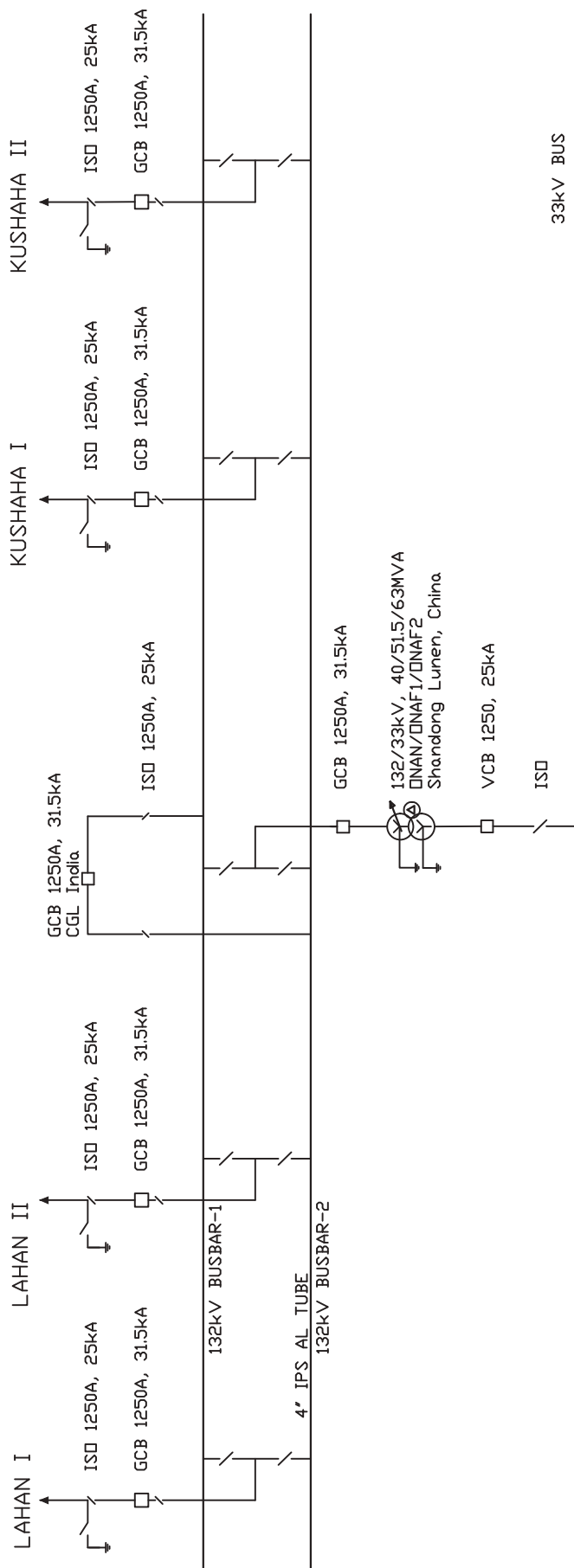
Installed Capacity : 220/132, 200MVA & 132/33kV, 60 MVA
Maximum Demand : 21 MVA



11. RUPANI SUBSTATION

Rupani Substation with Double Bus System located at Rupani of Saptari district, Sagarmatha zone feeds power to Rajbiraj, Bodebarsain, Balardah and Rupani. This Substation is connected with Duhabi Sustation and Lahan Substation through Double Circuit 132kV line The line 2 is connected to Duhabi Substation through Kusaha switching station. This Substation was commissioned in 2019 with 132/33kV, 63MVA capacity.

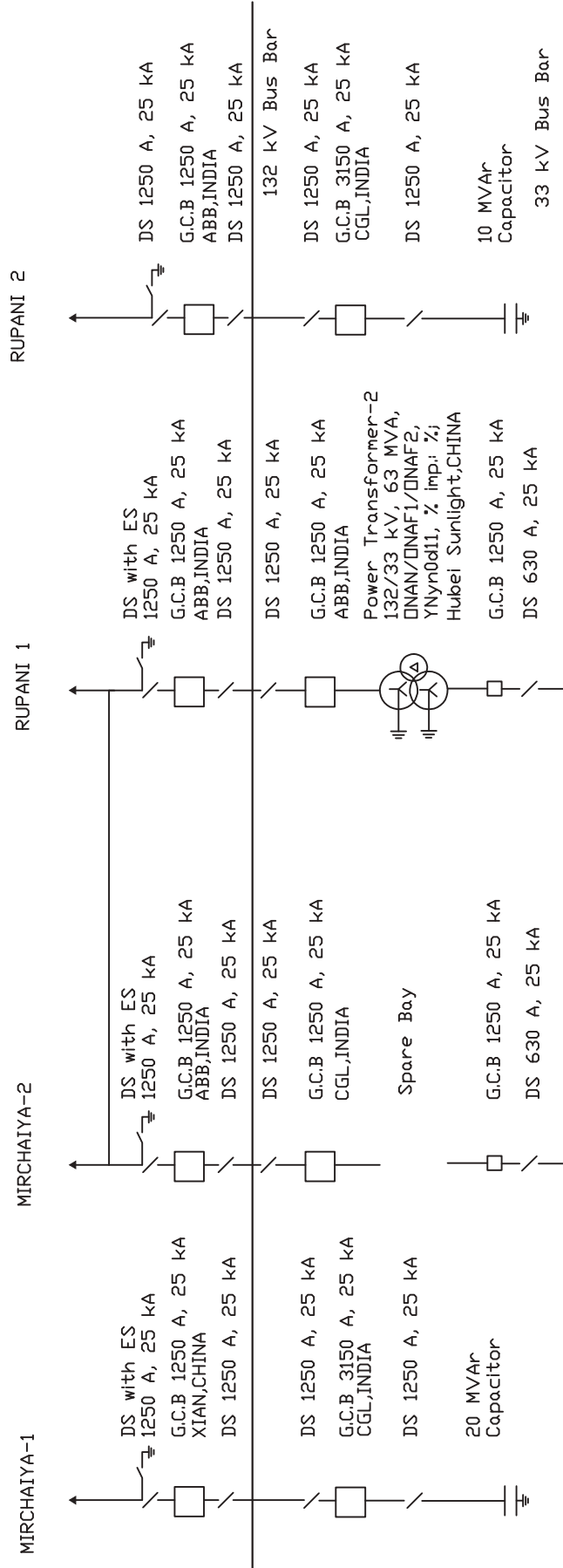
Installed Capacity : 132/33kV, 63MVA
Maximum Demand : 36.58MVA



12. LAHAN SUBSTATION

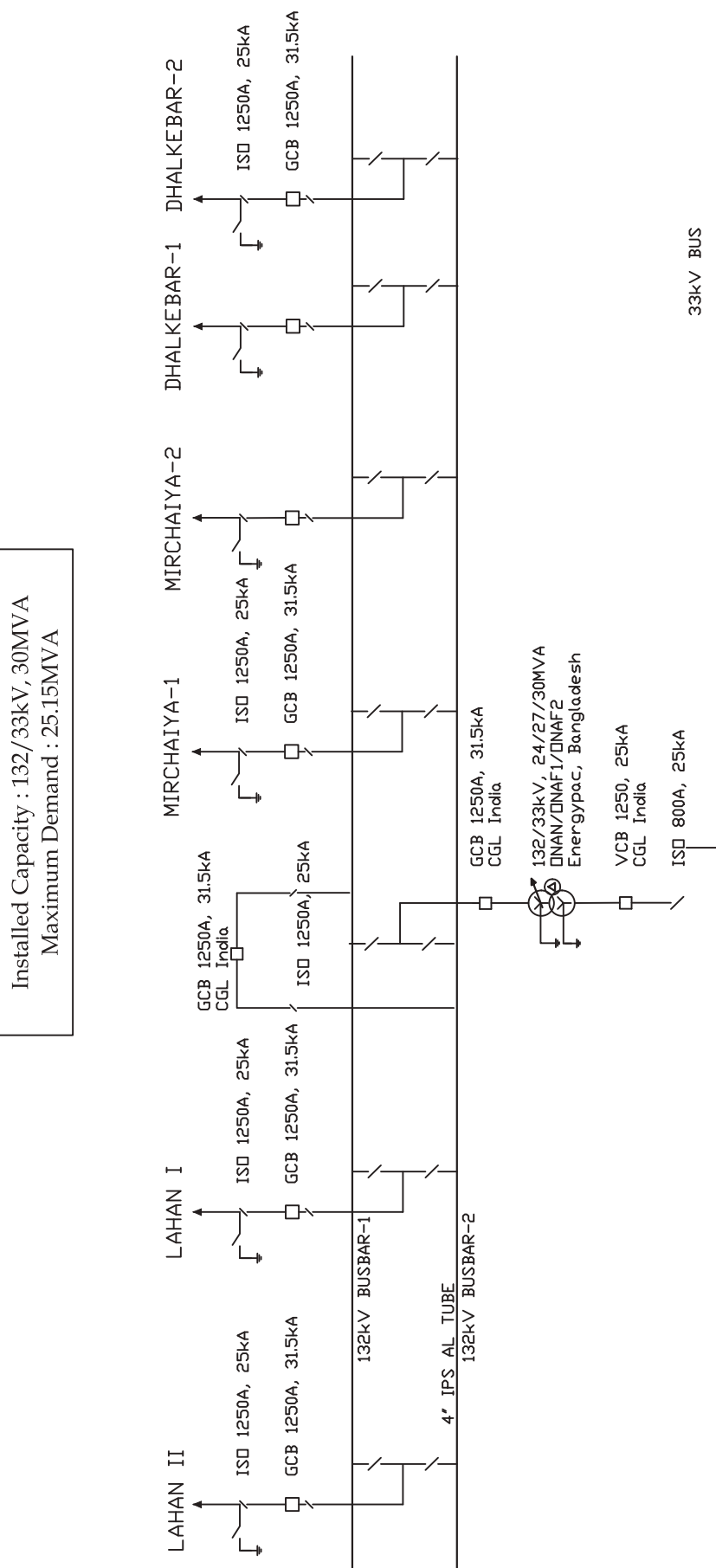
Lahan Substation with single busbar system, located at Lahan of Siraha district of Sagarmatha zone feeds power to Rajbiraj, Rupani, Jaljale and Bastipur. This substation is connected to Dhalkebar and Duhabi by 132kV double circuit line. This substation was commissioned in 1992 with 132/33 kV two numbers of 12.5 MVA transformers. The Kusaha and Dhalkebar-II bays were constructed in 1999. The line 2 is connected to Duhabi substation through Kusaha switching station. In 2004, one 12.5MVA transformer got damaged and was replaced by 10 MVA. The 10MVA Transformer was further upgraded to 20MVA in 2006. The existing 12.5 MVA was replaced by new 63MVA Transformer in 2011.

Installed Capacity: 132/33kV, 63MVA
Maximum Demand: 34.29MVA



13. MIRCHAIYA SUBSTATION

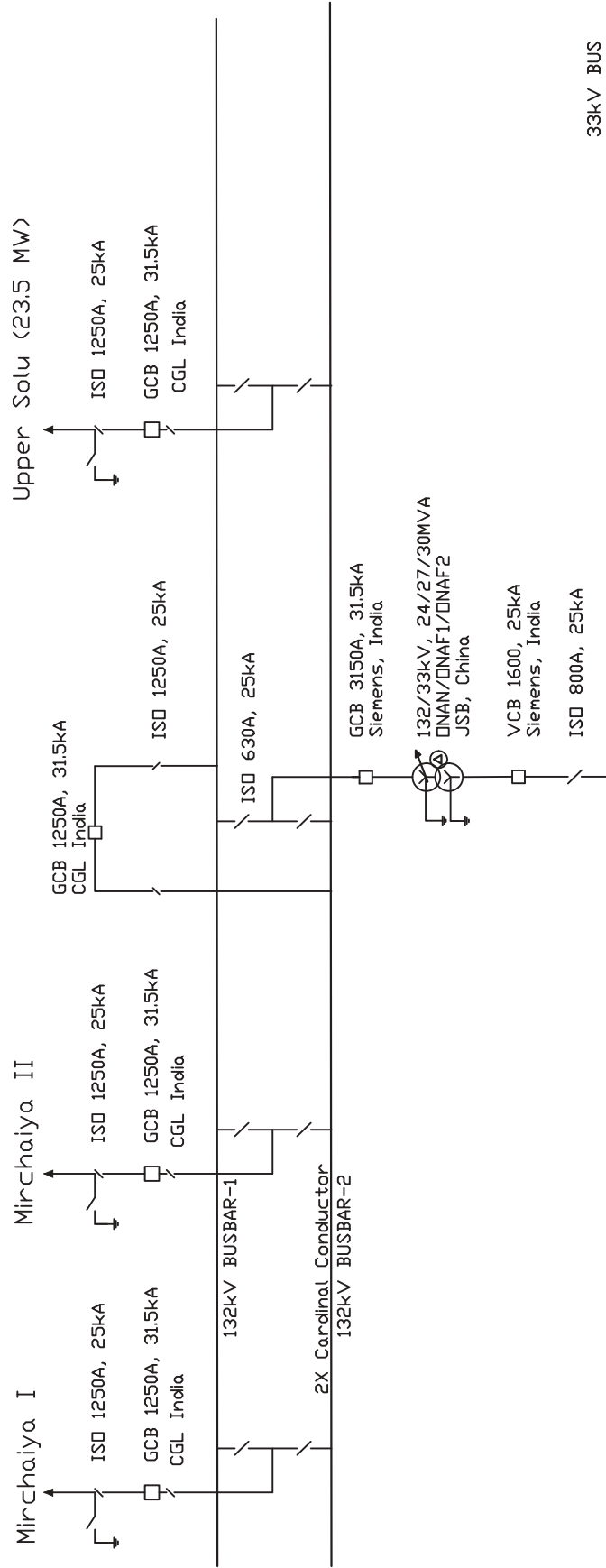
Mirchaiya Substation with Double Bus System located at Mirchaiya of Siraha district, Sagarmatha zone feeds power to Katari and Mirchaiya. This Substation is connected with Dhalkebar Sustation and Lahan Substation through Double Circuit 132kV line. This Substation was commissioned in 2017 with 132/33kV, 30MVA capacity.



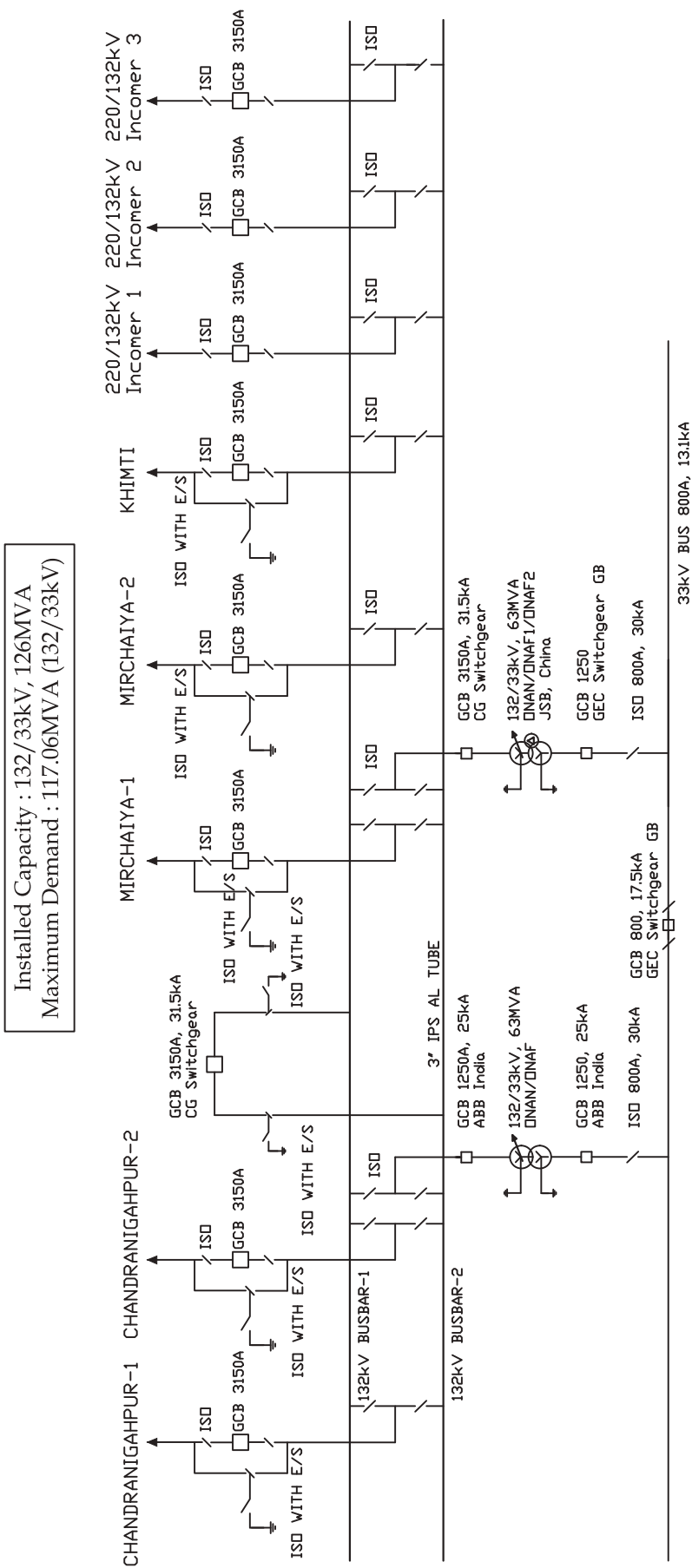
14. TINGLA SUBSTATION

Tingla Substation with Double Bus System located at Tingla (Solu-Dudhkunda Nagarpalika) of Solukumbu District, Janakpur zone feeds power to Solukumbu and Okhaldunga Districts and to evacuate Hydropower generated Tingla Areas. Tingla Substation will be connected with Michaiya Substation and 23.5 MW Upper Solu Hydropower.

Installed Capacity : 132/33kV, 30MVA
33/11 kV, 8 MVA
Maximum Demand : 26.75 MVA



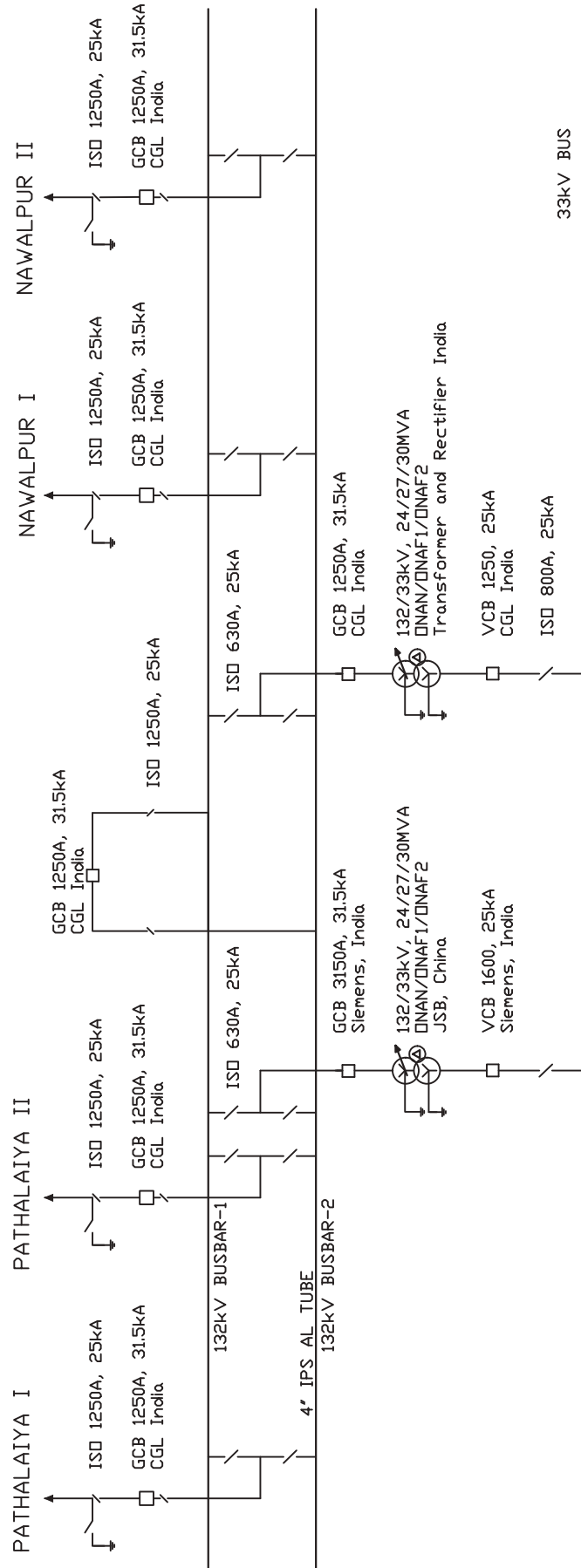
Dhalkebar substation with Double Bus System located at Dhalkebar of Dhanusha district, Janakpur zone feeds power to Janakpur, Sindhuli, Malangwa, Mahendranagar, Godar and Lalghad. Dhalkebar Substation is connected with Chandranigahpur and Lahan Sustation through Double Circuit 132kV lines. Dhalkebar Substation was initially commissioned in 1984 with 132/33/11kV, 10MVA capacity. Later the substation was upgraded by addition of 132/33kV, 15MVA Transformer in 1999. Again in 2001 the existing 10MVA Transformer was replaced by 15MVA Transformer which was again upgraded to 30MVA Transformer in 2003. Existing 132/33kV, 15MVA Transformer was replaced by 30MVA Power Transformer in 2010. In 2017 the existing 20MVA was further upgraded to 63MVA making the total capacity of the Substation to 93MVA. The 132kV incomer of the 220/132kV Substation at was also connected in this Substation. In 2021, existing 132/33kV, 30 MVA Transformer is repalced by 132/33kV, 63 MVA Transformer for addressing 33 kV Load.



16. CHANDRANIGAHPUR SUBSTATION

Chandranigahpur Substation with Double Bus System located at Chandranigahpur of Rautahat district, Narayani zone feeds power to Haripur, Gaur, Nizgad and Malangwa. Chandranigahpur Substation is connected with Nawalpur Substation and Pathlaiya Substation through Double Circuit 132kV line. Chandranigahpur Substation was commissioned in 2008 with 132/33/11kV, 30MVA capacity. The Substation was further upgraded by addition of new 132/33kV, 30MVA Transformer Bay.

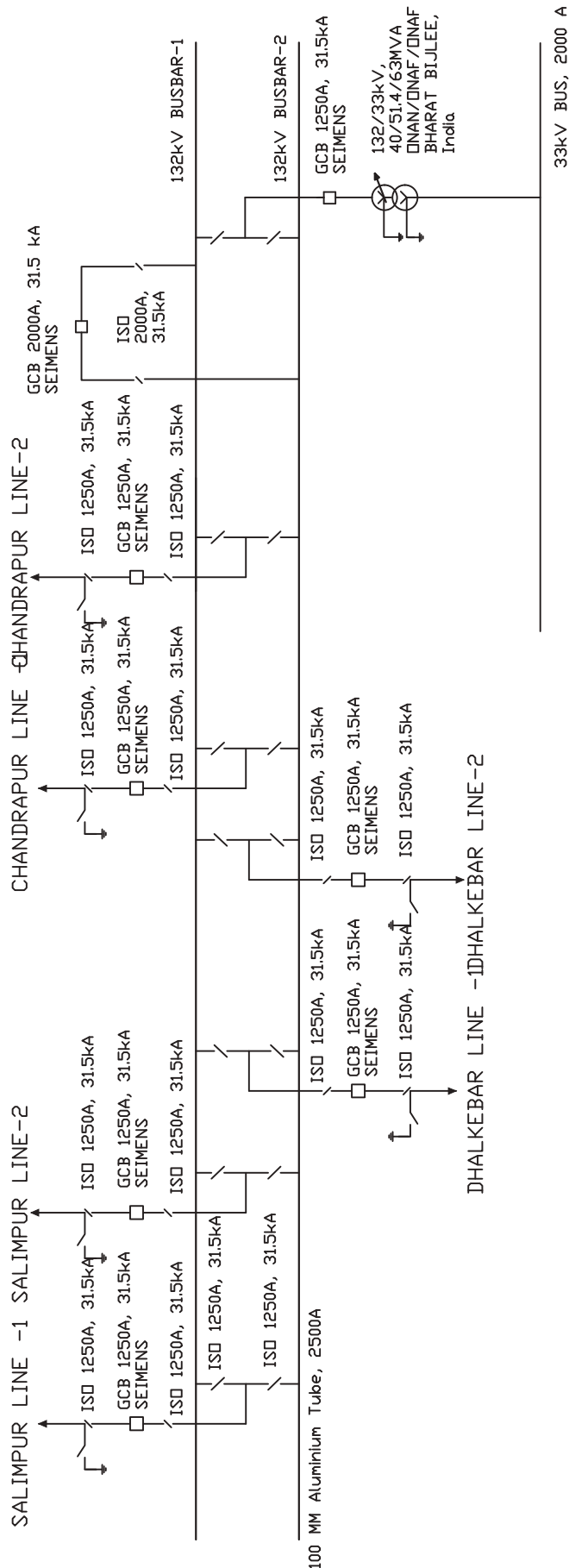
Installed Capacity : 132/33kV, 60MVA
Maximum Demand : 49.38MVA



17. NAWALPUR SUBSTATION

Nawalpur Substation with Double Busbar System located at Lalbandi municipality-1, Sarlahi district offers the loop in loop out (LILO) for the Dhalkebar-Chandrapur 132 kV double circuit line. This substation consist of 1 no. of 132/33 kV, 63 MVA power transformer and 1 no. of 33/11 kV, 16 MVA power transformer. There are total 8 nos. of 132 kV bays including 2 nos. of bays for Nawalpur-Salimpur double circuit line. There are 4 nos. of 33 kV bays including 2 nos. of 33 kV outgoing feeders which ends the low voltage problems mostly in Malangwa & Lalbandi regions. There are also 3 nos. of 11 kV feeders for local distribution.

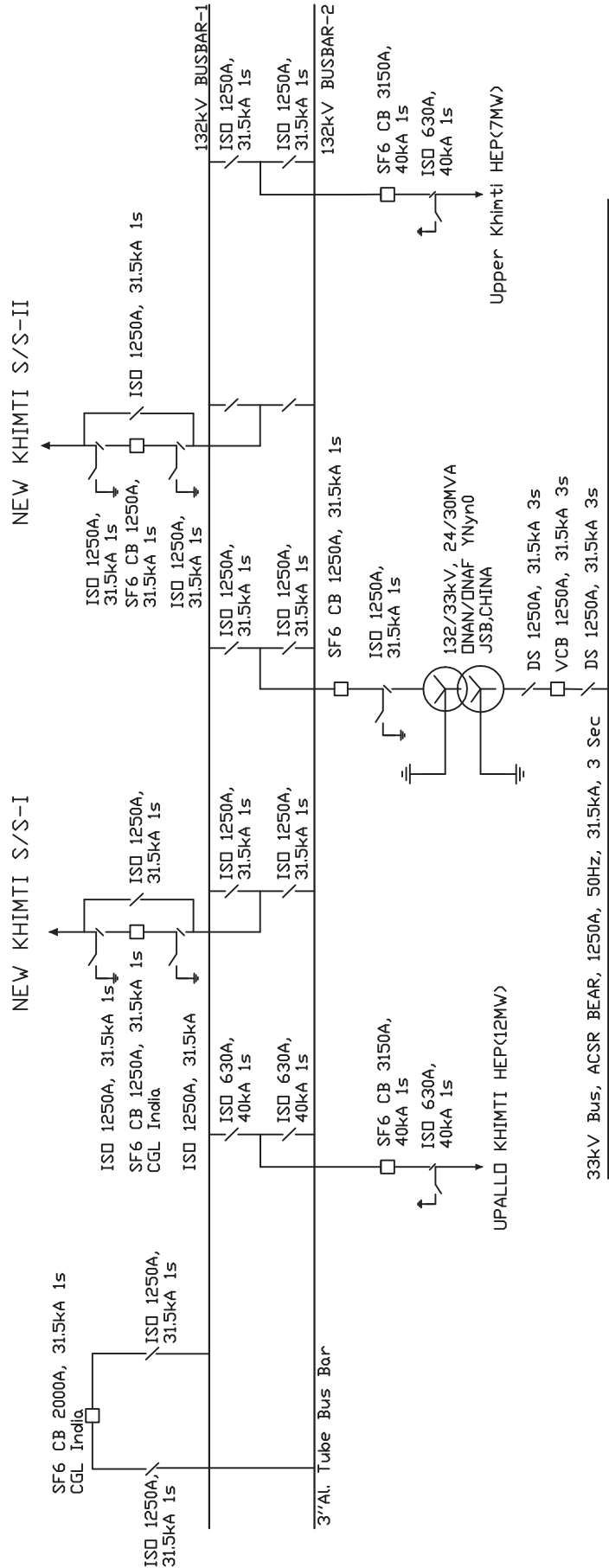
Installed Capacity : 132/33kV,
1*40/51.4/63 MVA
Max Demand 39.09MVA



18. GARJYANG SUBSTATION

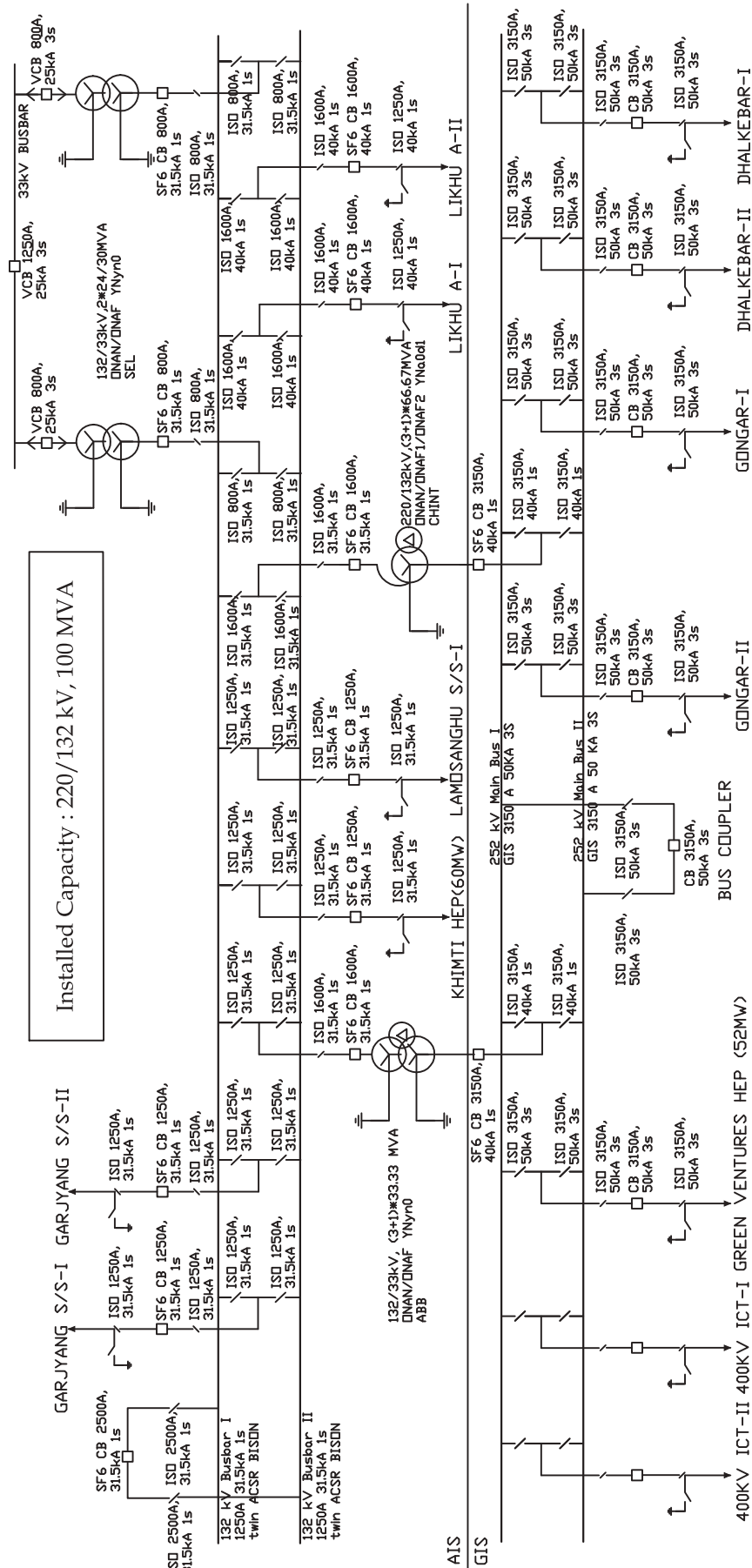
Garjyang Substation with Double Bus System located at Gokulganga RM-1, Chuhure Garjyang S/S evacuates POWER from hydropower projects located at Khimti river, Garjyang river, and Likhu river. This Substation was pre-commissioned on April 28, 2022 as per N-1 contingency plan. The Substation has 3+1 No. of 132/33kV, 8/10 MVA and 1 No. of 33/11kV, 6/8 MVA Power Transformer. Four 11kV local feeders are distributed from this Substation to supply mainly RM loads. Existing hydropower like Upper Khimti HPP (12 MW) & Upallo Khimti HPP (12 MW) have commissioned 132kV bays. Nupche Likhu HPP (57.5MW) are constructing their 132 kV bays to be connected in this substation in near future. Chaka Khola HPP (2.8MW) is already connected in 33kV bay.

Installed Capacity : 132/33 kV, 24/30 MVA



19. NEW KHMITI SUBSTATION

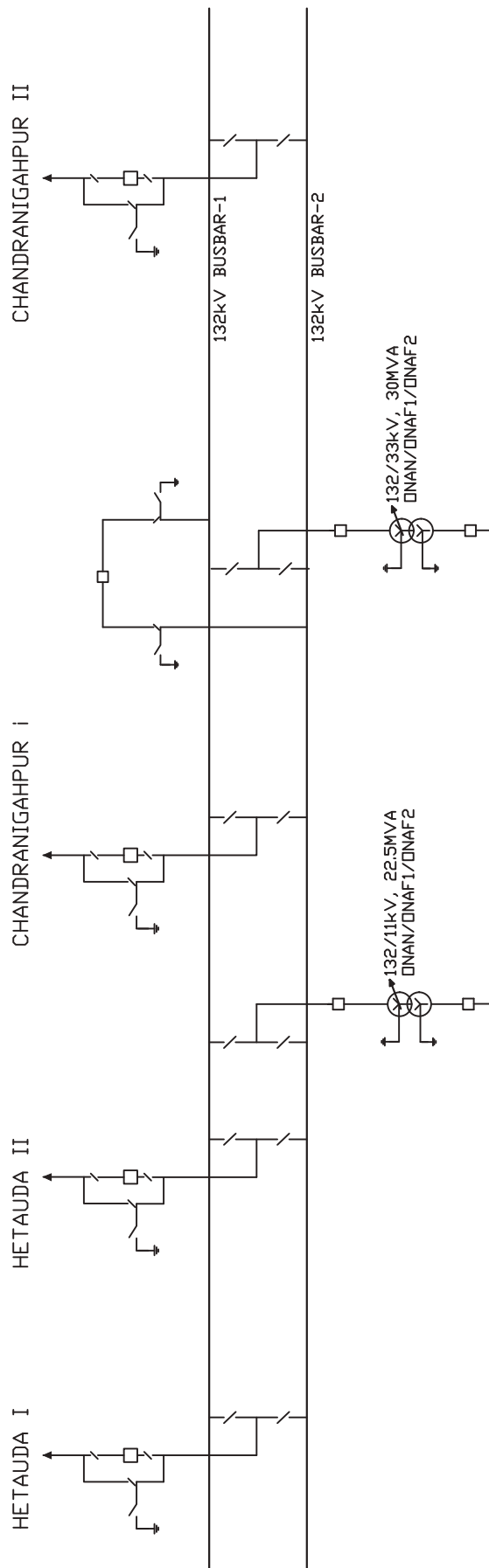
New Khimti Substation with Double Bus System located at Manthali Municipality-13, Devitar New Khimti S/S evacuates POWER from hydropower projects located at Khimti river, Gariyang river, Tamakoshi river and Likhu river. This Substation was commissioned at 220 kV voltage level on October 12, 2021. The Substation has 3+1 Nos. of 220/132kV, 33.33 MVA Power Transformer 3+1 Nos. of 220/132kV 66.67MVA Autotransformer 2 Nos of 132/33kV 24/30 MVA power transformer and 1 No. of 33/11kV, 6/8 MVA Power Transformer. Five 33kV local feeders and three 11kV local feeders are distributed from this Substation to supply mainly RM loads.



20. PATHLAIYA SUBSTATION

Pathlaiya Substation with Double Bus System located at Piluwa of Bara district, Narayani zone feeds power to Pathlaiya, Piluwa and Badhaharwa. Pathlaiya Substation is connected with Hetauda and Chandranigahpur Substation through 132kV Lines. Pathlaiya Substation was commissioned in 2012 with one no. of 132/11kV, 22.5MVA capacity. In 2021, one set of three phase 132/ 33kV 30 MVA Transformer is installed to cater increasing load in 33 kV.

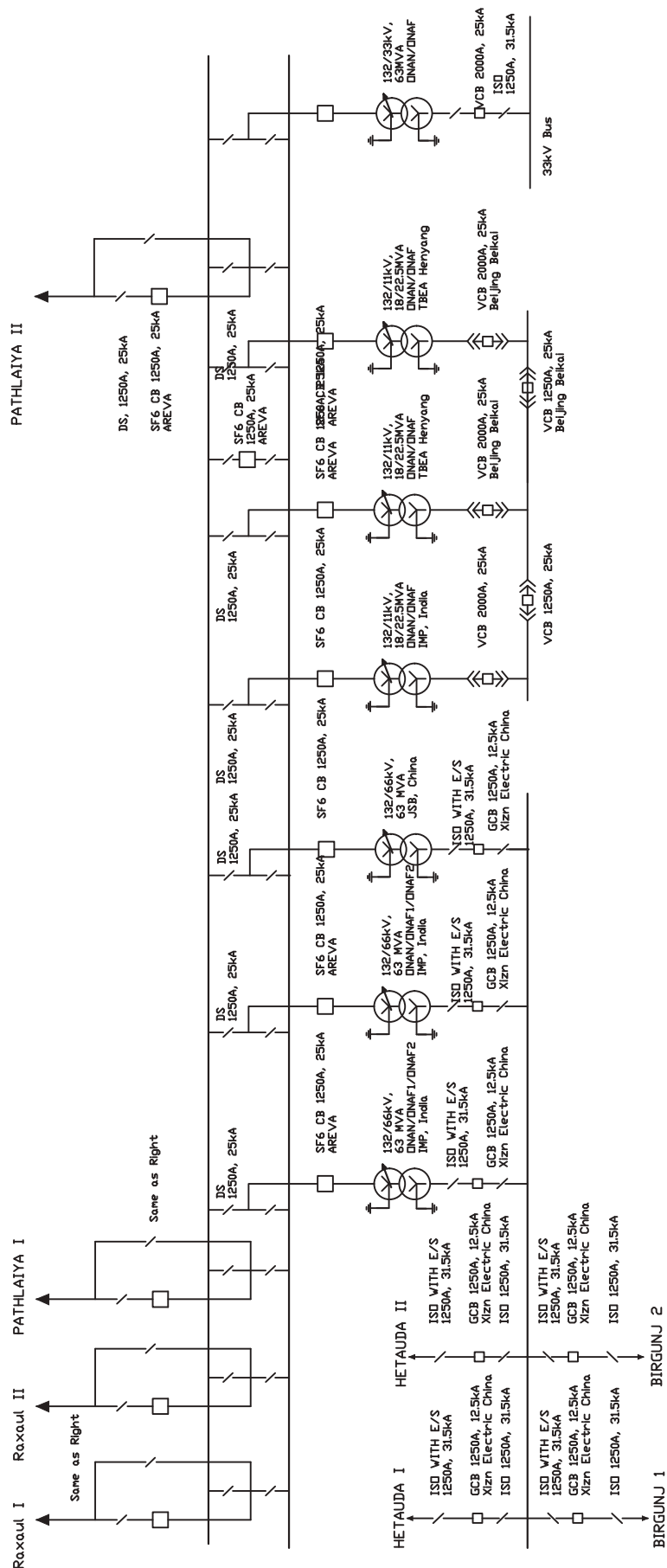
Installed Capacity : 132/11kV, 22.5MVA , 132/33kV, 30MVA,
Maximum Demand : 7.09 MVA



21. NEW PARWANIPUR SUBSTATION

New Parwanipur Substation with Double Bus System located at Parwanipur of Parsa district, Narayani zone feeds power to Jitpur, Parwanipur, Nitapur and Birgunj. New Parwanipur Substation is connected with Chandranigahpur and Hetauda Substation through 132kV Lines. New Parwanipur Substation was commissioned in 2007 with two nos of 132/11kV, 22.5MVA capacity. 66/11kV Old Parwanipur Substation was replaced by 132/11kV New Parwanipur Substation. 132/66kV, 45MVA interconnection Power Transformer was commissioned in the beginning of F/Y 2008/09 and a new 132/66kV, 45MVA Bay added in 2012. Further the 132/33kV, 2x45MVA was upgraded to 2x63MVA in the year 2015. Similarly, a new 132/11kV, 22.5MVA Transformer Bay was added in 2015 and 132/66kV, 63MVA Transformer Bay was added in 2021. This substation is also connected to Raxaul (India) via double circuit 132 kV line. Also, new 132/33kV, 63MVA Transformer was installed in 2023.

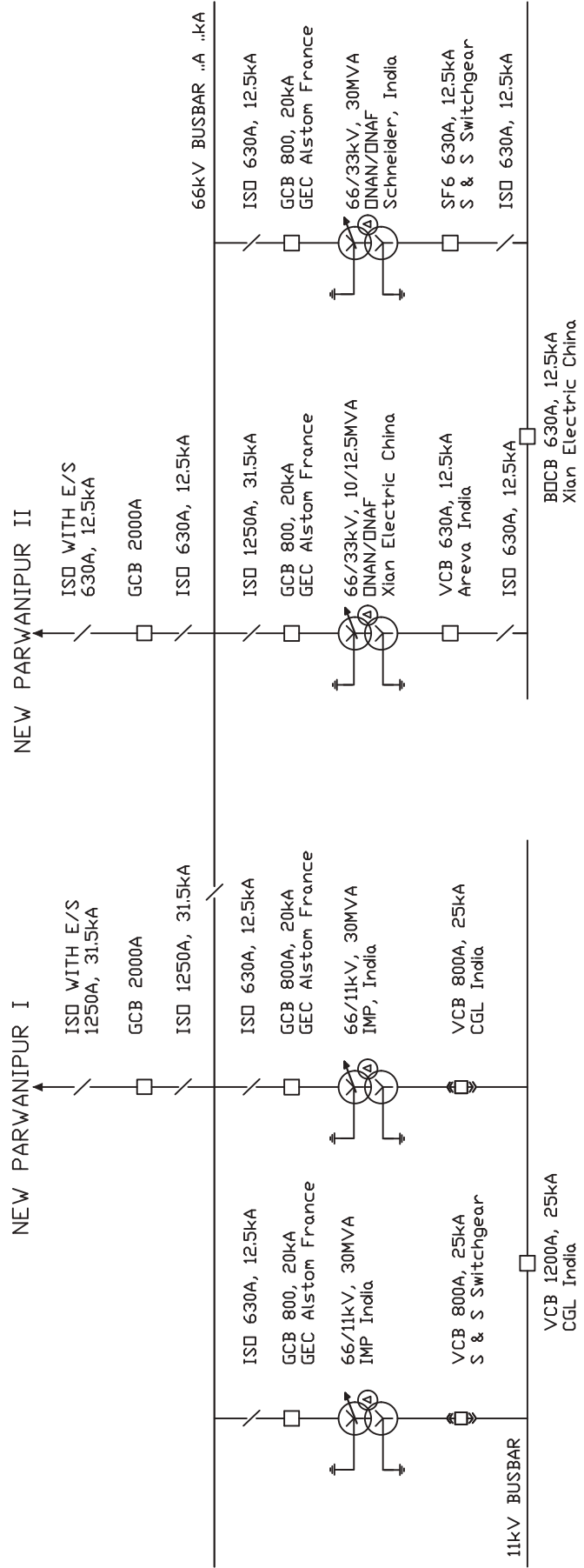
Installed Capacity : 132/66kV, 189MVA, 132/33kV, 63MVA & 132/11kV, 67.5MVA
Maximum Demand : 186.57MVA (13/66kV) & 56.94MVA(132/11kV)



22. BIRGUNJ SUBSTATION

Birgunj substation located at Birgunj Sub metropolitan city of Parsa district, Narayani zone feeds power to Pokhariya, Raxaul, Kalaiya and Birgunj city. Birgunj substation is connected with Hetauda substation through 66kV Double Circuit Transmission Line. Birgunj Substation was commissioned in 1972 with 66/11kV, 1.5MVA capacity, which was later upgraded to 6MVA.. In 1989 the new Transformer Bay with two nos of 66/33kV, 12.5MVA was added to in the existing system. The existing 6MVA Transformer was replaced in 2005 with two nos of 66/11kV, 7.5MVA capacity, which was further upgraded to two nos of 66/11kV, 15MVA capacity. Due to the severe voltage problem and the high demand of reactive VAR in this area a 33kV, 5MVAR and 11kV, 5MVAR Capacitor Banks has been placed. Due to increasing demand of industrial load this area is facing problems of low voltage so an additional 33kV, 10MVAR and 11kV, 10MVAR Capacitor Banks with new bay were installed in April 2009. Further the existing 66/11kV, 2x15MVA was upgraded to 2x30MVA in 2014. One of the 66/33kV, 12.5MVA was upgraded to 30MVA in 2019.

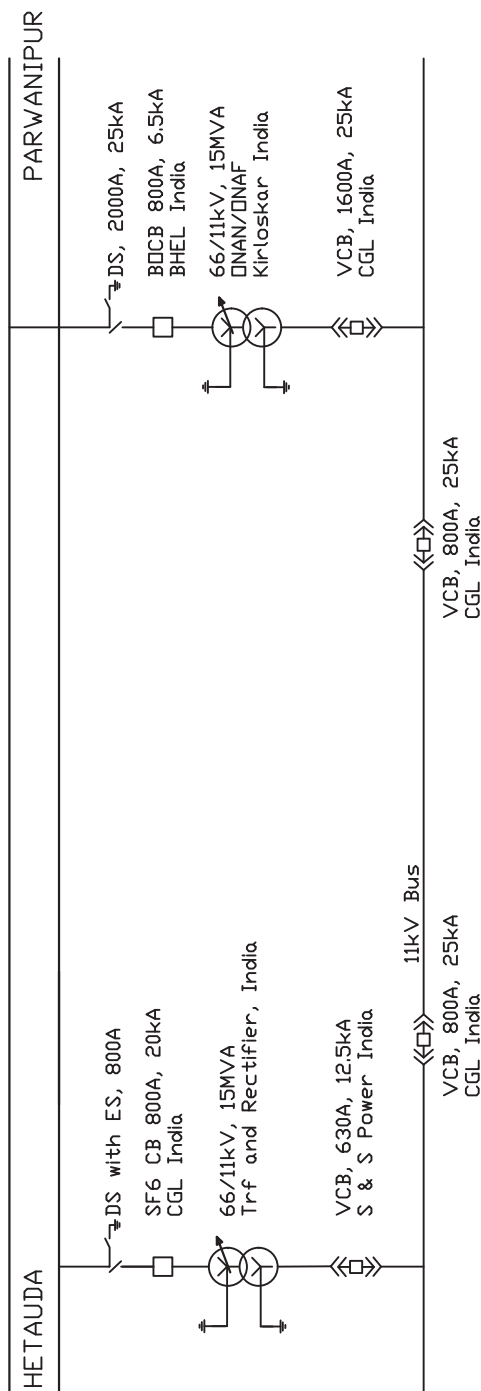
Installed Capacity : 66/33kV, 42.5MVA & 66/11kV, 60MVA
Maximum Demand : 33.26MVA & 45.72 MVA



23. SIMRA SUBSTATION

Simra Substation located at Simra of Bara district, Narayani zone feeds power to Jitpur, Simra, Dumarwana and Narwasti. Simra Substation receives power from Hetauda - Birgunj 66kV Double Circuit line through T - connection. Simra Substation was commissioned in 1972 with 66/11kV, 1.5MVA capacity. In 1993 the existing 1.5MVA Transformer was replaced by 66/11kV, 6MVA Transformer. Subsequently in 1995 the Substation was upgraded by addition of 66/11kV, 7.5MVA Transformer. Again in 2007 a New Transformer Bay with 66/11kV, 6.3MVA Transformer was added. In 2016 the existing 7.5MVA and 6.3 MVA Transformers were replace by 2x15MVA Transformers. 6MVA Transformer has been out of service since 2015.

Installed Capacity : 66/11kV, 30MVA
Maximum Demand : 15.05 MVA

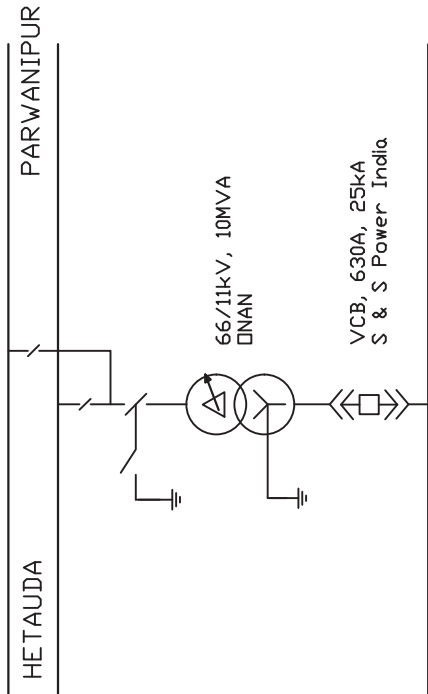




24. AMLEKHGUNJ SUBSTATION

Amlekhgunj Substation located at Amlekhgunj of Bara district, Narayani zone feeds power to Amlekhgunj area. Amlekhgunj Substation receives power from Hetauda - Birgunj 66kV Double Circuit line through T connection. Amlekhgunj Substation was commissioned in 1972 with 66/11kV, 1.5MVA capacity which was upgraded to 3.15MVA in 2005. Further the 31.15MVA Transformer was upgraded to 7.5MVA in 2017, which was again upgraded to 10MVA in 2023.

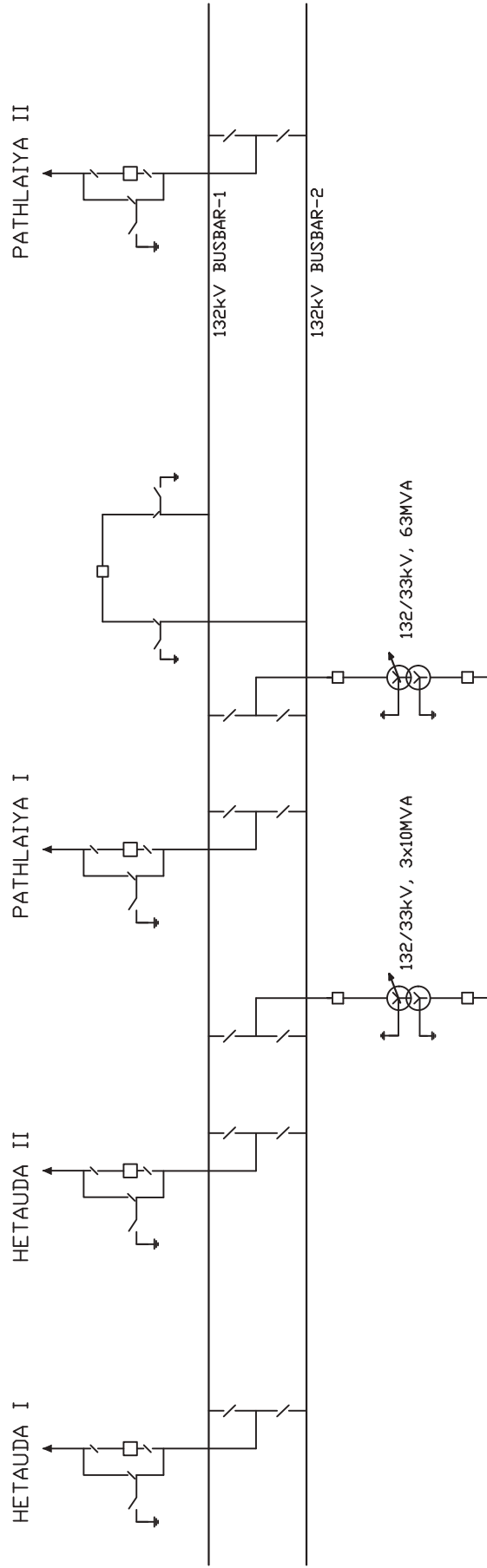
Installed Capacity : 66/11kV, 10MVA
Maximum Demand : 0.91MVA



25. KAMANE SUBSTATION

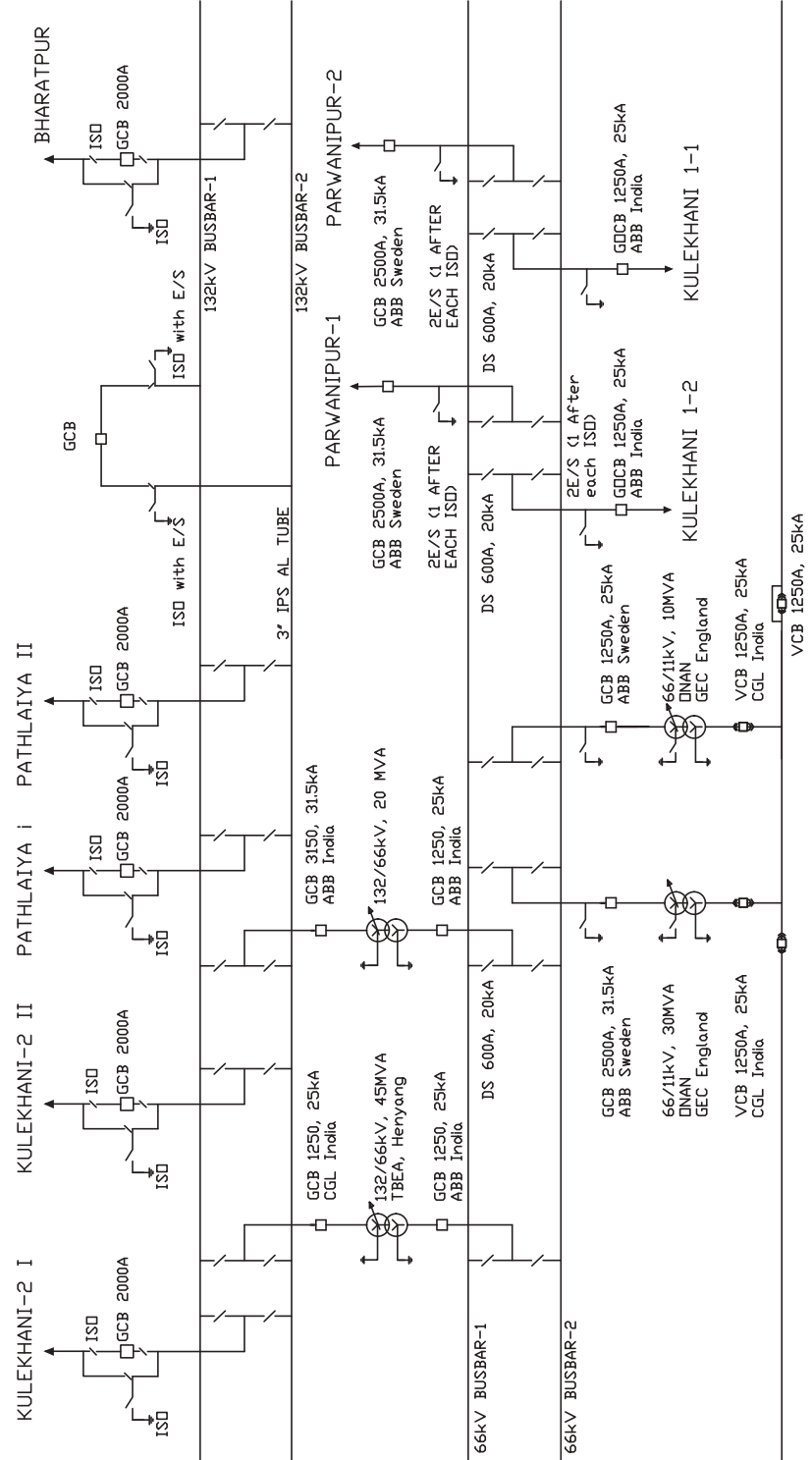
Kamane Substation with Double Bus System located at Kamane of Makwanpur district, Narayani zone feeds power to Shivam Cement and Hetauda Industrial District. Kamane Substation is connected with Hetauda and Pathlaiya Substation through 132kV Lines. Kamane Substation was commissioned in 2015 with one set of single phase 132/33kV, 3x10MVA capacity. The substation was further upgraded with the 132/33kV, 63MVA Bay.

Installed Capacity : 132/33kV, 93MVA
Maximum Demand : 46.87MVA



26. HETAUDA SUBSTATION

Hetauda Substation with Double Bus System in both 132kV and 66kV Voltage level located at Hetauda municipality of Makwanpur district, Narayani zone feeds power to Chaughada, HID and Bhainse. Hetauda Substation is fed by Kulekhani II Power House through 132kV Single Circuit Line and Kulekhani I Power House through 66kV Double Circuit Line. Hetauda Substation is also fed by Hetauda Diesel Plant through 11kV System. Hetauda Substation is connected to New Parwanipur, Chandranigahpur and Bharatpur through 132kV Lines. Hetauda Substation is also connected to Birgunj Substation through 66kV Double Circuit Line along with some Bulk Consumers in the Birgunj Corridor. Hetauda Substation was commissioned in 1972 with 66/11kV, 1.5MVA capacity. The substation was upgraded with 132/11kV, 3 x 3.35MVA capacity in 1984 and later with 132/66kV, 20MVA. In 1985, 132 kV Dhalkebar I bay was added. In 1989, 132kV Kulekhani II was connected with the Substation. To cope with the increasing demand new 132/66kV, 20MVA Transformer with New Transformer Bay was added in 1999. In 2002, New 132kV Dhalkebar II line was added to the Substation. Further the existing two 66/11kV, 6MVA Transformers were replaced by two 10MVA Transformers by 2009. The existing 132/66 kV, 2x20MVA was further upgraded to 2x45MVA in 2015. In 2023, one of the 132/66 kV 10MVA Transformer is replaced by 30 MVA Transformer.

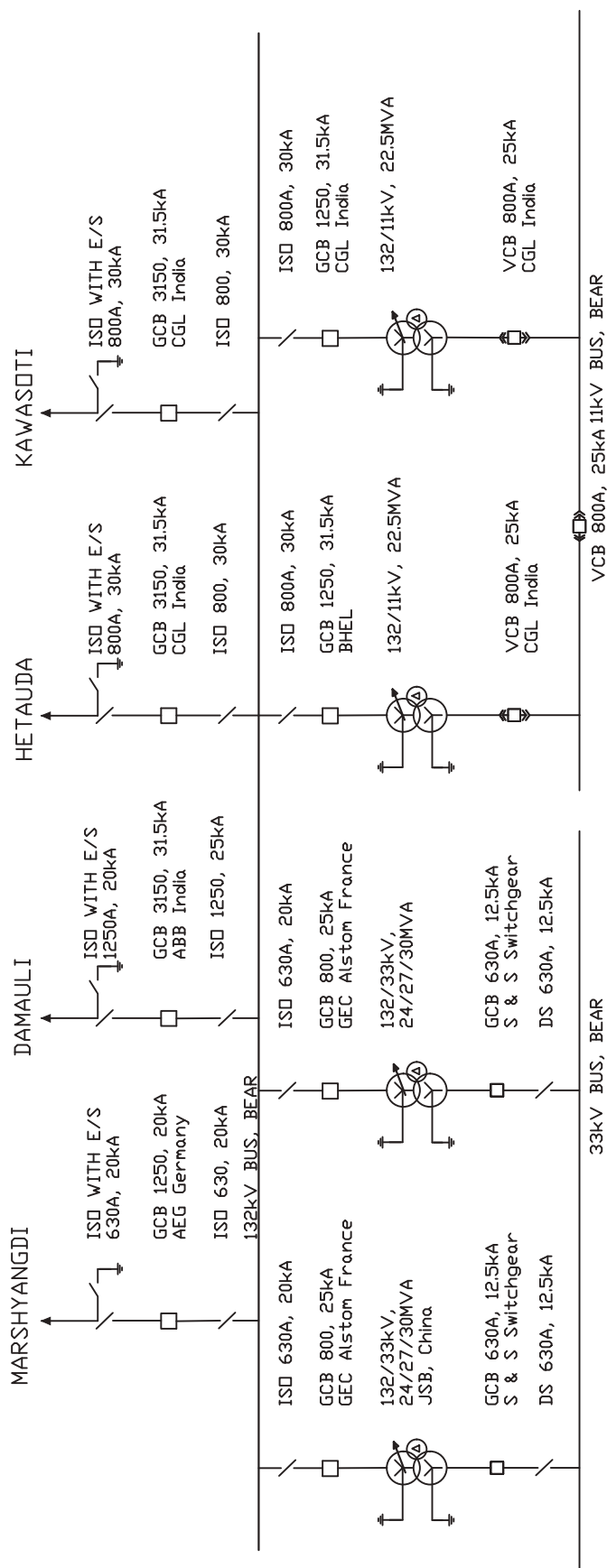


Installed Capacity : 132/66kV, 65MVA & 66/11kV, 40MVA
Maximum Demand : 61.5MVA & 25.15MVA

27. BHARATPUR SUBSTATION

Bharatpur Substation located at Bharatpur of Chitwan district, Narayani zone feeds power to Kawasoti, Parsa, Chanauli, Narayanghat, Bharatpur and Gaidakot. Bharatpur Substation is fed by Marshyangdi Power House through 132kV Single Circuit Line. Bharatpur Substation is connected with Damauli, Hetauda and Bardghat Substations through 132kV Single Circuit Lines. Bharatpur Substation was commissioned in 1979 with 132/11kV, 3 x 3.35MVA capacity. The Substation capacity was upgraded by addition of 132/66kV, 3x3.35MVA and 66/11kV, 6.3MVA Transformers in cascade. The Substation was upgraded in 1995 with the addition of 132/33kV, 15MVA Transformer with New Transformer Bay and three 33kV Line Bays supplying to 33kV Kawasoti, Parsa, Chanauli Substations. The 132/33kV, 15MVA Transformer was replaced by 132/33kV, 30MVA Transformer in 2000 and 132/66kV and 66/11kV Transformers were replaced by 132/11kV, 15MVA Transformer in 2004. Further 132/11kV, 22.5MVA Transformer Bay was added in 2011. Again 132/33kV, 30MVA Transformer Bay was added in 2017.

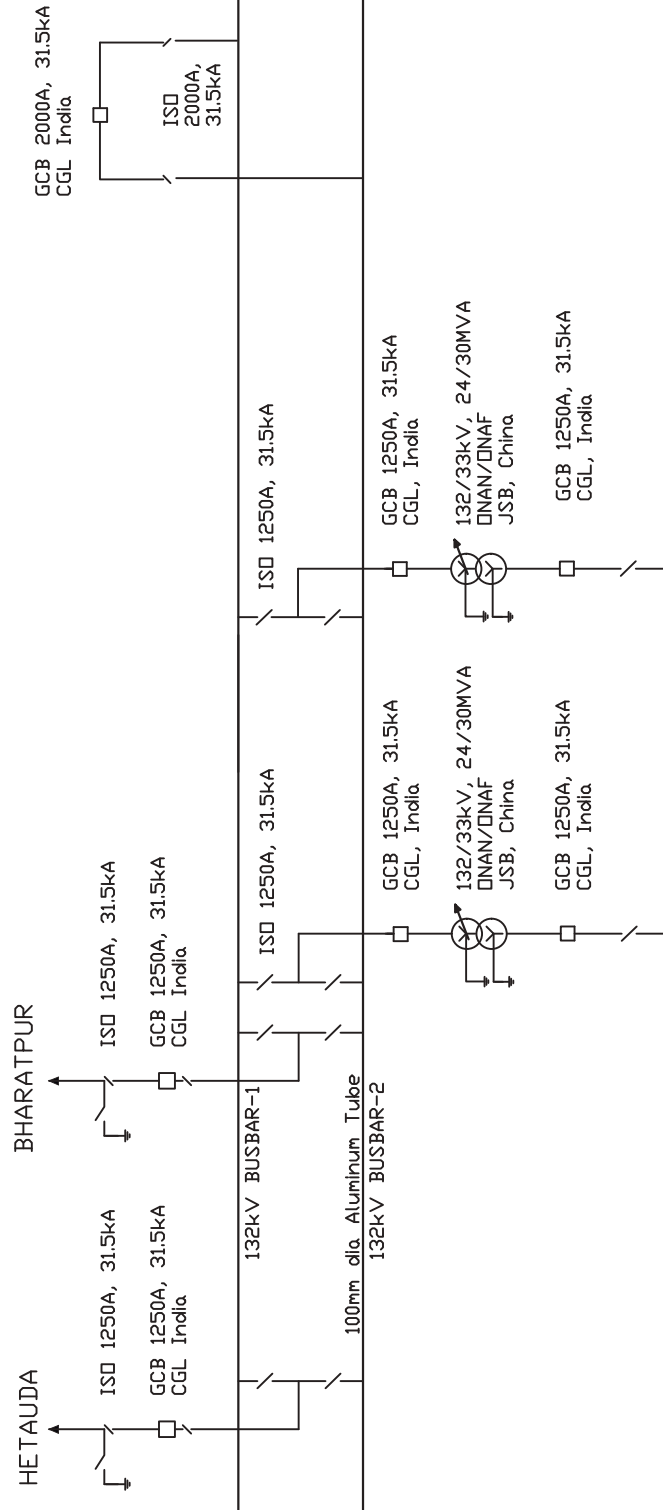
Installed Capacity :132/33kV, 60MVA & 132/11kV, 45MVA
Maximum Demand : 40.01MVA & 42.75MVA



28. PURBI CHITWAN SUBSTATION

Purbi Chitwan Substation with Double Bus System located at Rapti M.P-06, Hardi, Chitwan feeds power to existing 33/11 kV Parsa Substation via 33kV double circuit sub-transmission line and to the area nearby substation via 11kV feeders. Purbi Chitwan Substation has Loop in Loop out of Hetauda-Bharatpur 132kV Transmission Line.

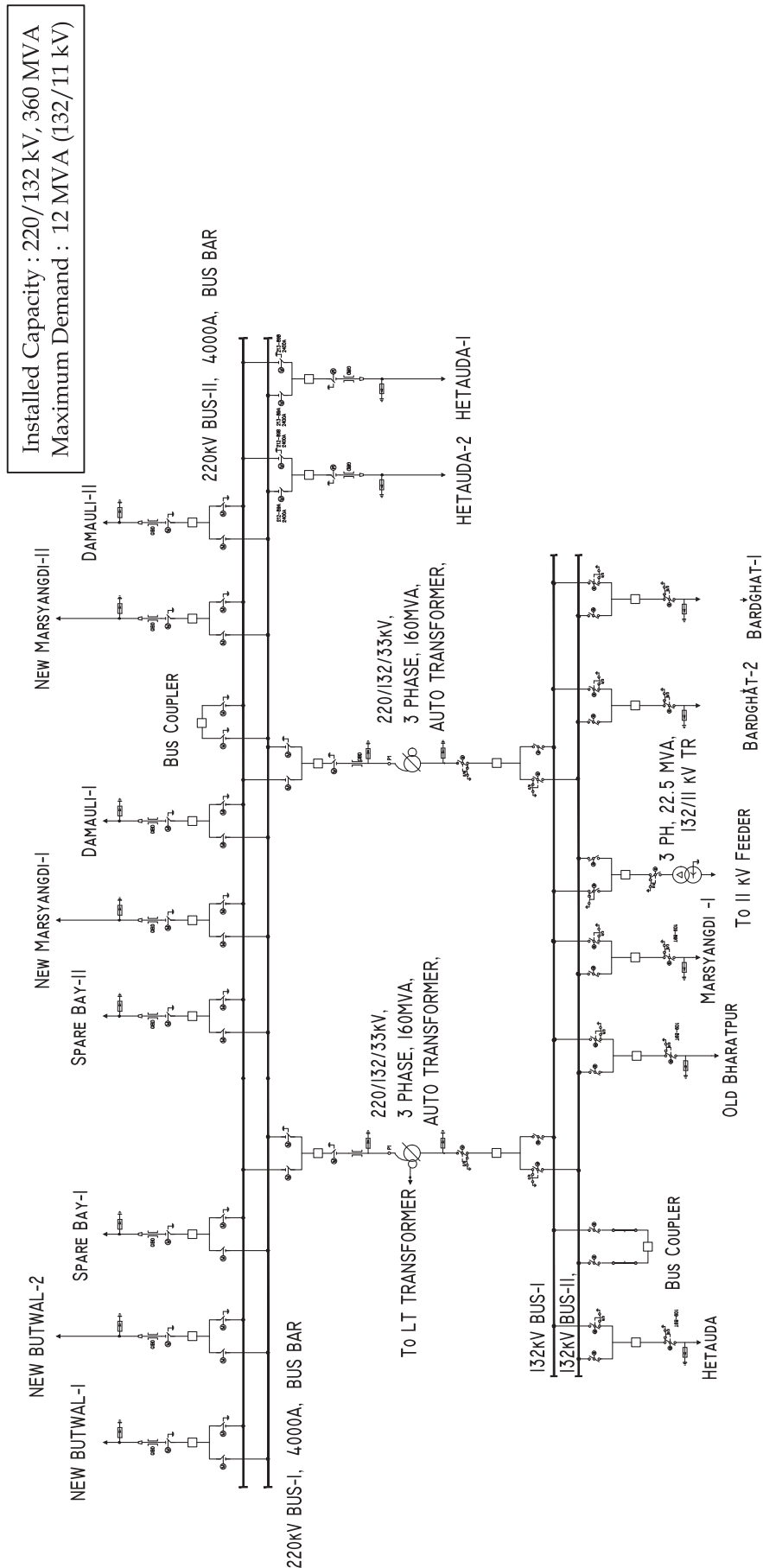
Installed Capacity : 132/33kV,
2*24/30MVA
& 33/11kV 16.6MVA
Max Demand 23.91MVA



33kV BUS

29. NEW BHARATPUR SUBSTATION

New Bharatpur substation with Double Busbar system in 220kV voltage level and in 132kV voltage level, located at Aaptari of Bharatpur in Chitwan district of Bagmati Province will be connected to New Marsyangdi substations, New Butwal Substation, Tanahun Hydro Electric Power Plant and Hetauda Substation through Double circuit twin bundled 220kV line and to Lower Marsyangdi Hydro Electric Power Plant, Old Bharatpur Substation through 132kV single circuit lines. The 132 kV portion of this substation was charged on 13 Nov 2021. Bharatpur-Bardaghat Line was connected and charged in 132 kV on 26 June 2022 and one Circuit of Hetauda-Bharatpur Line was charged in 132 kV in 2023. Test charge of Two Number of 160 MVA, 220/132 kV transformer alongwith 10 Numbers of 220 kV Line Bays are charged in 2023. It also supply power to 11 kV local feeders via 132/11 kV transformer.



30. BALAJU SUBSTATION

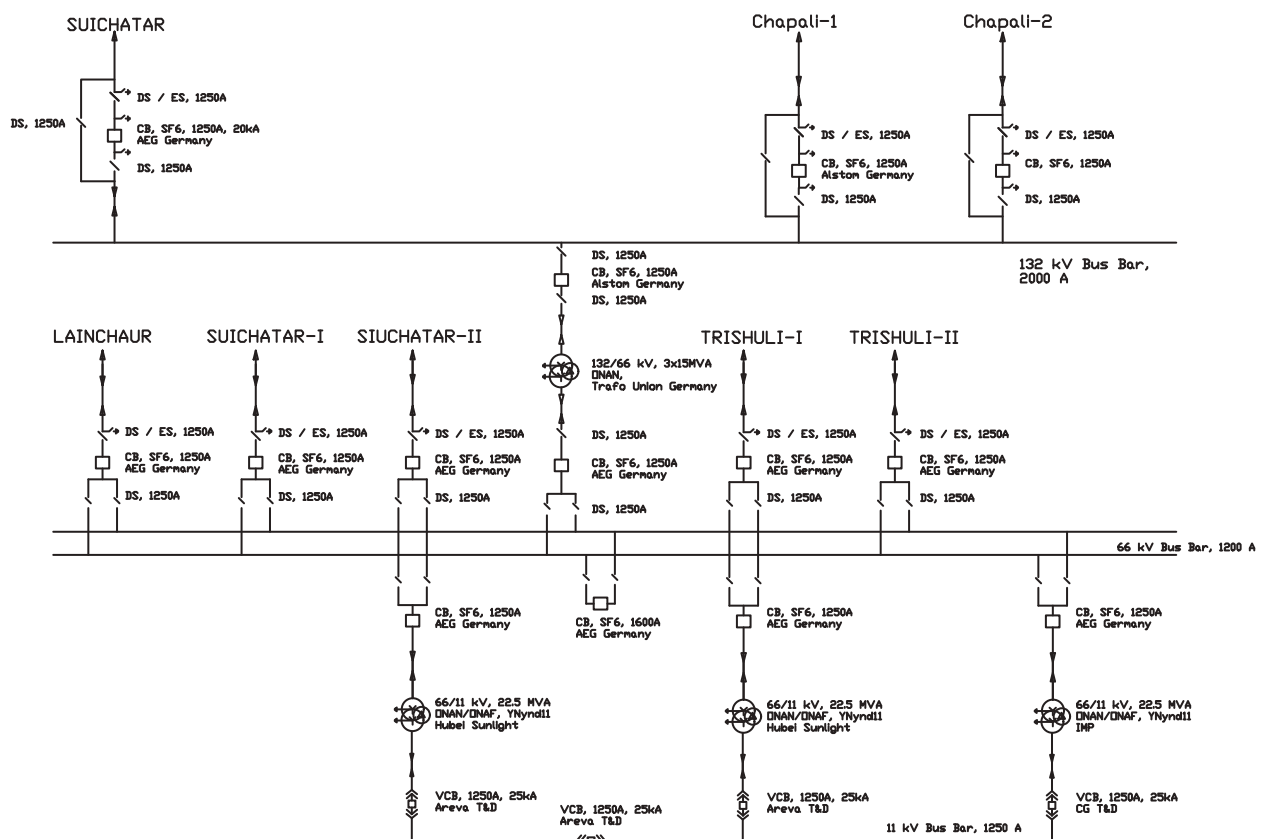
Balaju Substation with Single Circuit located at the Balaju of Kathmandu district, Bagmati zone feeds power to Nagarjuna, Swayambhu, Maharajgunj, Bishnumati, BID, Nayabazar and Dharmasthali. This substation is connected to Siuchatar with 132 Single Circuit & Chapali Substation with 132kV Double Circuit Transmission Line. It is also linked with Lainchaur Substation by 66kV Single Circuit and Siuchatar Substation by double circuit 66kV Transmission System. Trishuli Power Plant to this Substation with Double Circuit and to contribute in load demand of Kathmandu Valley. This Substation was built with two numbers of 66/11kV, 3x3.75MVA Capacity in the year 1967 along with construction of Trishuli Power House. Addition of 132kV Transformer Bay with 3x15MVA Capacity, 132kV single Bay for Siuchatar, double 66kV line bays for Siuchatar, single 66kV Bay for Lainchaur and replacement of old 66/11 Transformer with new 2x10MVA Power Transformer were augmented with complete GIS system in the Year 1989. In 2009 the two 66/11kV, 10MVA Transformers were replaced by new 22.5MVA Transformers. In 2017 Construction of Chapali 132kV Bay for evacuating Power of Khimti and Bhotekoshi was carried out. A bay of 66/11 kV, 22.5 MVA Transformer is added in 2019.

SUBSTATION CAPACITY 132/66kV: 45MVA

PEAK LOAD 132/66kV: 40.01MVA

SUBSTATION CAPACITY 66/11kV: 67.5MVA

PEAK LOAD 66/11kV: 55.66MVA

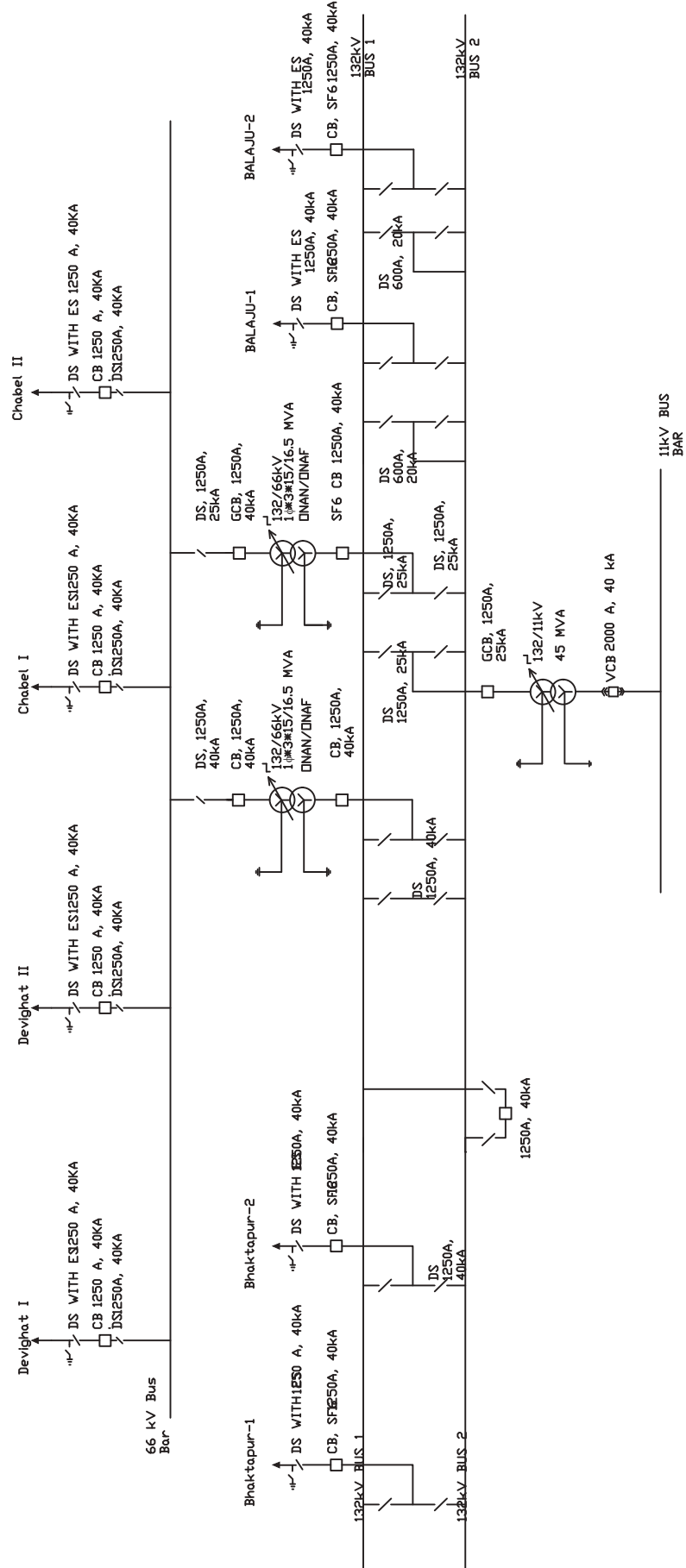


31. CHAPALI SUBSTATION

Chapali Substation having double bus system at 132 kV and single Bus System at 66kV voltage level located at Chapali , near Budanilkantha of Kathmandu district. This Substation was constructed with 132 kV double Busbar System to connect with Balaju and Bhaktapur. Two number of 66kV Bay for Devighat Circuit-I & II and two number of bays for 66 kV Chabel-I and II circuit. It has 2 Set of 132/66 kV Single Phase Transformer having Capacity of 3x15/16.5 MV. There is upgradation of one set of single phase 10 MVA Transformer with three phase 45 MVA in 2022 .

SUBSTATION CAPACITY 132/66kV: 99 MVA
PEAK LOAD 132/66kV: 81.39MVA

SUBSTATION CAPACITY 132/11kV: 45 MVA
PEAK LOAD 66/11kV: 30.86MVA

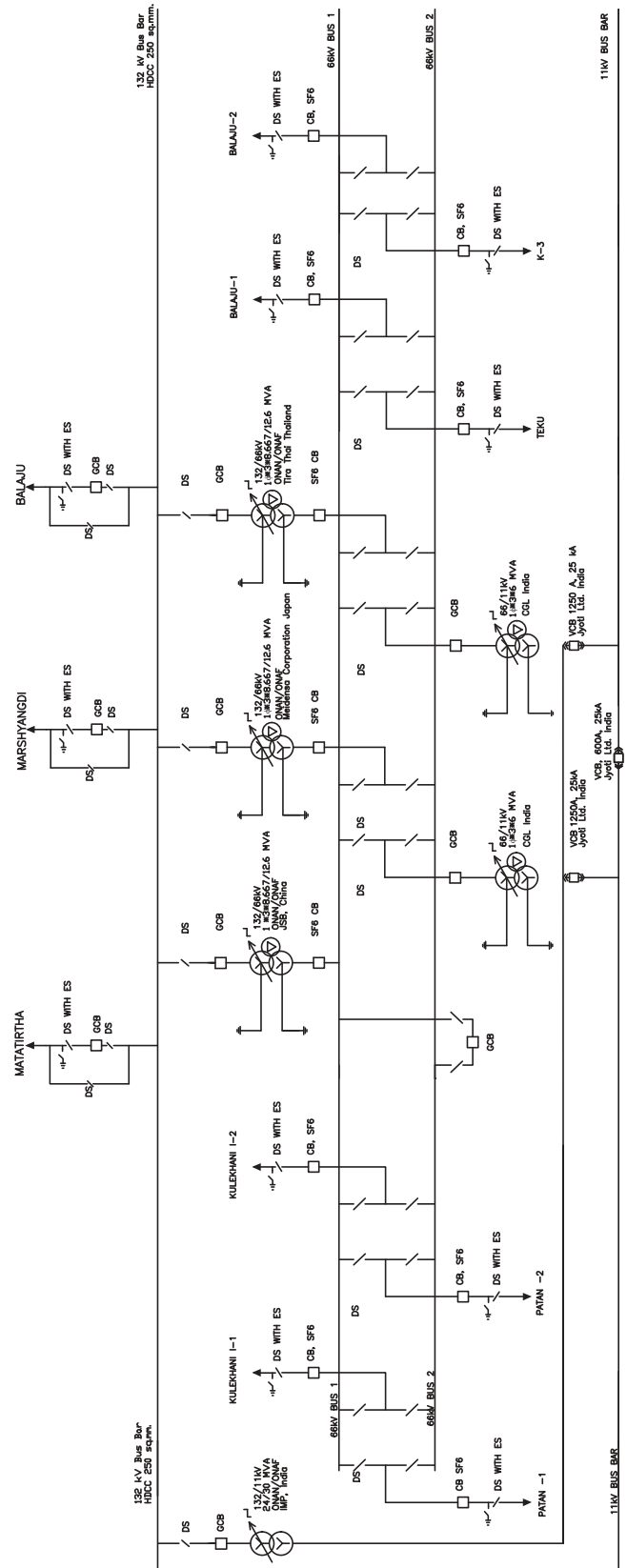


32. SIUCHATAR SUBSTATION

Siuchatar Substation having double bus system at 66kV and single Bus System at 132kV voltage level located at Siuchatar, near Kalanki of Kathmandu district feeds power to Teku, Kalimati, Kalanki, Swayambhu, Thankot, Balambu and Tahachal. This Substation was constructed with 66kV double Busbar System to connect with Balaju and Hetauda Substation in 1966. One number of 66kV Bay for Patan Circuit-I and two number of bays for 66/11kV Transformer with Capacity 3x6MVA were constructed with grant aid of Japanese Government. During construction of Kulekhani-II Power House, one 66kV bay for Kulekhani-II and one 66kV bay for Transformer with Capacity 3x8.667/12.6MVA was constructed in 1979 with Japanese grant. This substation was upgraded in 1984 with addition of three 132kV line bays (Kulekhani-II, Balaju and Marshyangdi) and one Transformer bay for 132/66kV, 3 x 12.6MVA Transformer. Similarly Kathmandu Valley Reinforcement Project had constructed 66kV Line Bays for Patan-II and Teku along with 132kV Bays in 1984. Interconnection of Siuchatar Substation with K3 Substation by 66kV Power Cable was completed in 2004 with grant aid of Japanese Government. Grid Substation Re-inforcement project has recently added one 132/66kV Transformer Bay with Capacity 3x8.667/12.6MVA to upgrade Transformation capability of the Substation in 2008. Office Complex of System Operation Department along with Load Dispatch Centre is located within this Substation area. A new 132/66kV, 30MVA Transformer is installed in 2019. Now all 11 kV feeders feed via 132/11 kV Transformer, to reduce the overload in 66 kV Transmission lines.

SUBSTATION CAPACITY 132/66kV: 113.4MVA
PEAK LOAD 132/66kV: 105.4MVA

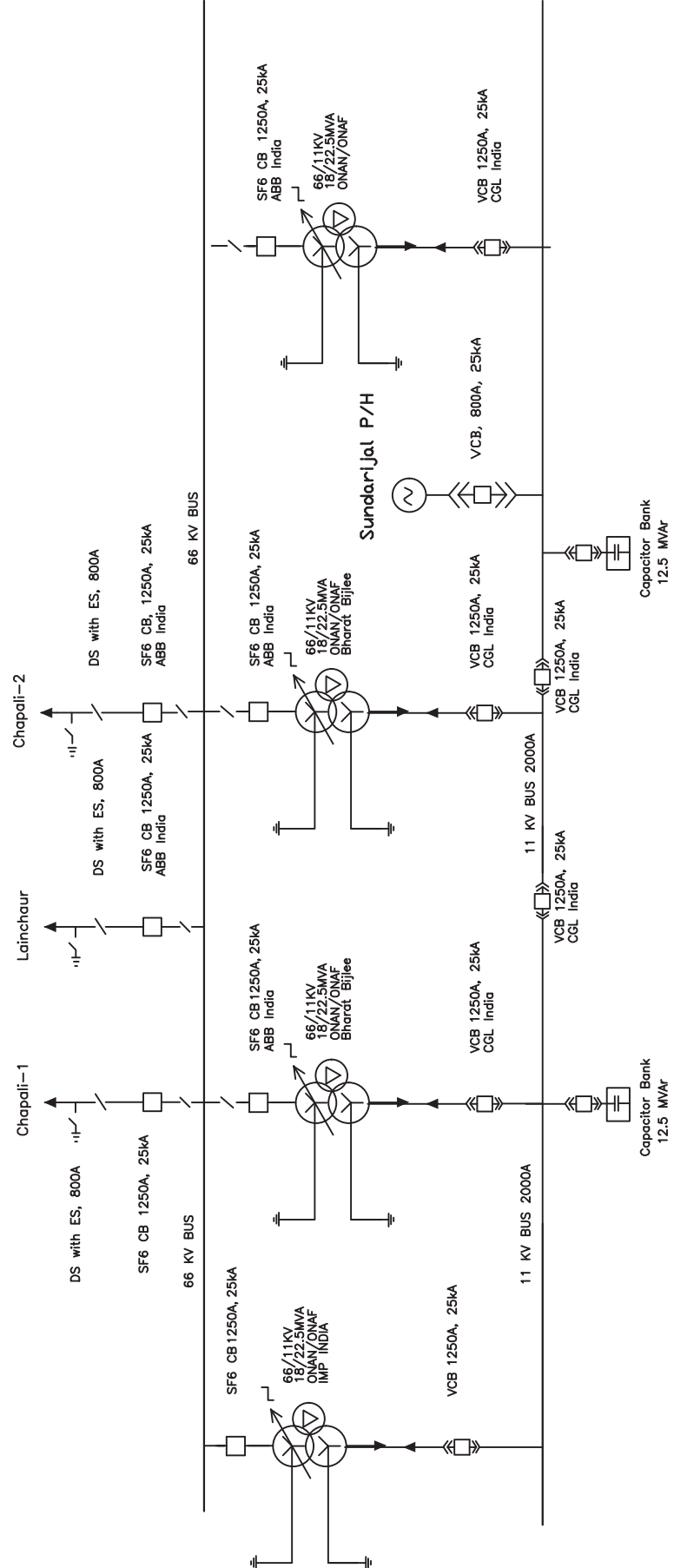
SUBSTATION CAPACITY 66/11kV: 36MVA
132/11 kV: 30 MVA
PEAK LOAD 66/11kV: 32.12MVA, 132/11kV, 27.21 MVA



33. NEW CHABEL SUBSTATION

Chabel substation with Single Busbar System located at Chabel of Kathmandu district feeds power to Om Hospital, Sankhu, Maharajgunj Chabel, Mahankal and Sundarijal. This Substation was built in the year 1982 with three 66kV Transformer bays of 66/11kV, 6.3 MVA capacity and two 66kV line bays to evacuate power from Devghat Power Plant. Out of two circuits, one circuit was diverted to Bhaktapur and new 66kV line was constructed from Chabel to Bhaktapur in the Year 1995. Old 12kV OCB Switchgears were replaced with 12kV VCB Switchgears in FY 2001. With the increased load, three numbers of 66/11kV, 6.3MVA Power Transformers were replaced by two numbers of 66/11kV, 22.5MVA capacity in the year 2003. Another 22.5MVA Transformer Bays were added in the year 2013 and 2023. Now, There are Four numbers of 66/11 kV 22.5MVA Power Transformers.

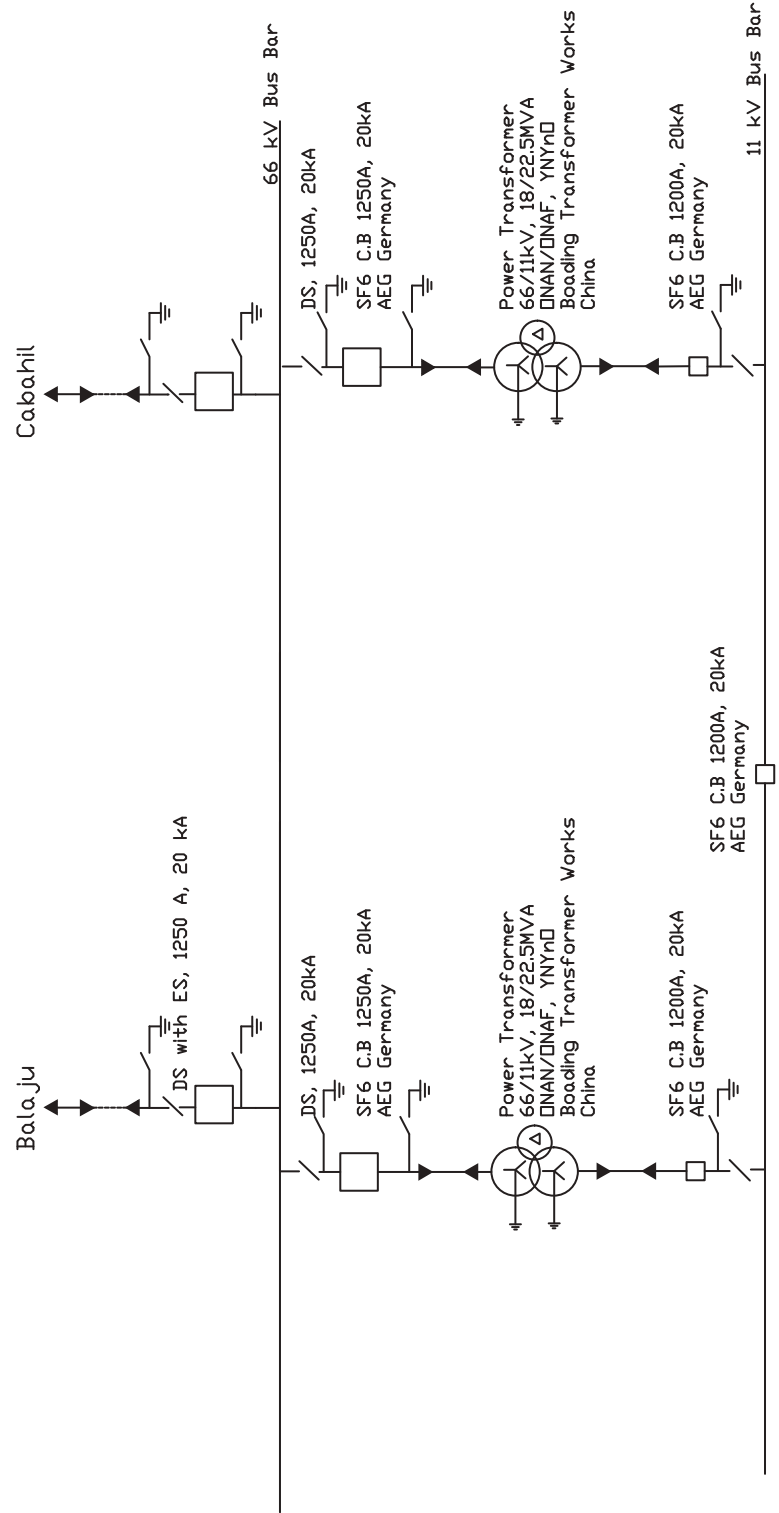
SUBSTATION CAPACITY: 66/11kV, 90MVA
PEAK LOAD: 77.85 MVA



34. LAINCHAUR SUBSTATION

Lainchaur Substation with Single Busbar Sytem located at Lainchaur, Kathmandu feeds power to Keshar Mahal, Samakhushi, Lazimpat, Gairidhara, Kingsway, Thamel, Royal Palace and K2 switching station. This GIS Substation was built in the year 1989 with two numbers of 66/11kV, 10MVA capacity with the grant aid of German Government. After an accident occurred, indoor 12kV Vacuum type Switchgears were temporarily commissioned on July 1990 to supply the emergency loads. Ater 3 years of operation 12 kV VCB Switchgears were replaced with GIS system. In the year 1996, two numbers of 66/11kV, 10MVA Power Transformers were shifted to Bhaktapur Substation whereas two numbers of 66/11kV, 22.5MVA new Transformers were installed in Lainchaur Substation by Kathmandu Valley Reinforcement Project, NEA.

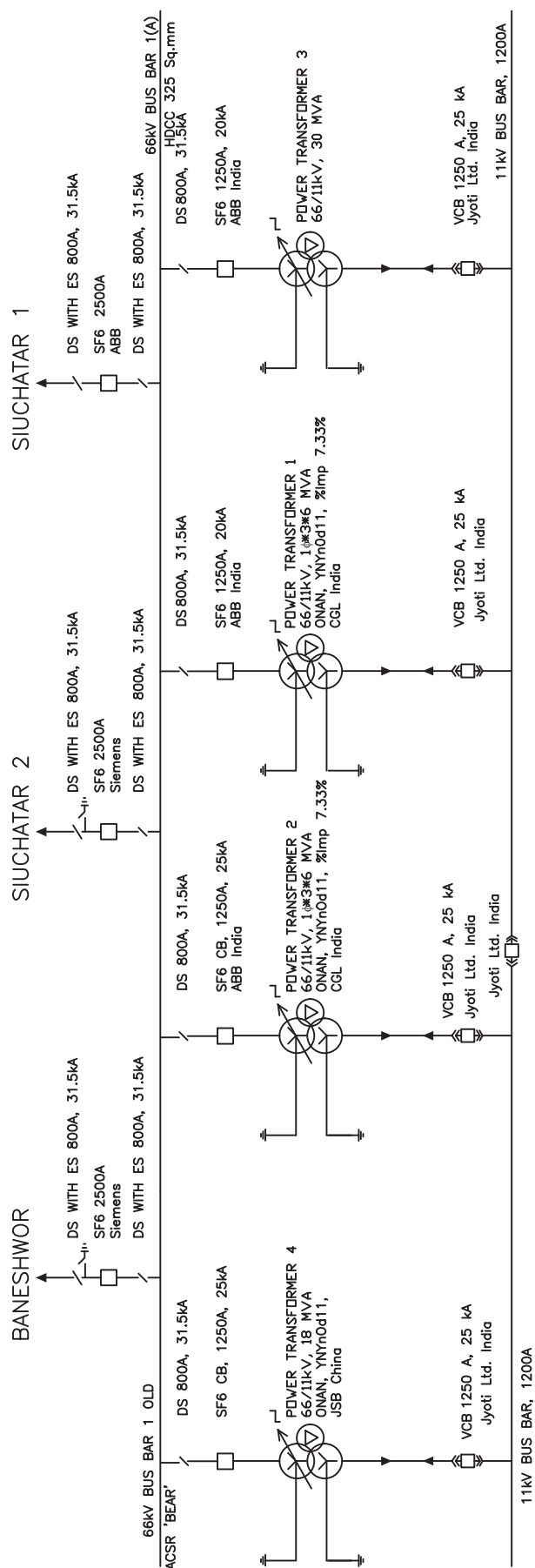
SUBSTATION CAPACITY: 66/11kV, 45MVA
PEAK LOAD :66/11kV: 37.72MVA



35. PATAN SUBSTATION

Patan Substation with Single Busbar System located near Patan Hospital at Lagankhel of Lalitpur district is connected through 11kV Ring Main with Thimi, K3, Teku and Old Patan Substations. When Kulekhani-I, 60MW Power Plant was under construction, 66kV single circuit Line (SIUCHATAR-1) and 66/11kV Transformer Bays with two numbers of Transformer capacity 3x6MVA were commissioned in the year 1979. Old 12kV BOCBs were replaced with 12kV VCB Switchgears with the grant aid of Japanese Government in the Year 1994. To upgrade the Power Transfer capacity in 66kV System, 66kV Line Bays for 66kV Baneshwor Line and 66kV Suichatar-II Line were added by Kathmandu Valley Reinforcement Project during the year 1997. New 66/11kV, 18MVA Transformer Bay was added in 2014. The substation was further upgraded with the 66/11kV, 22.5 MVA Bay, which was recently upgraded to 30MVA capacity.

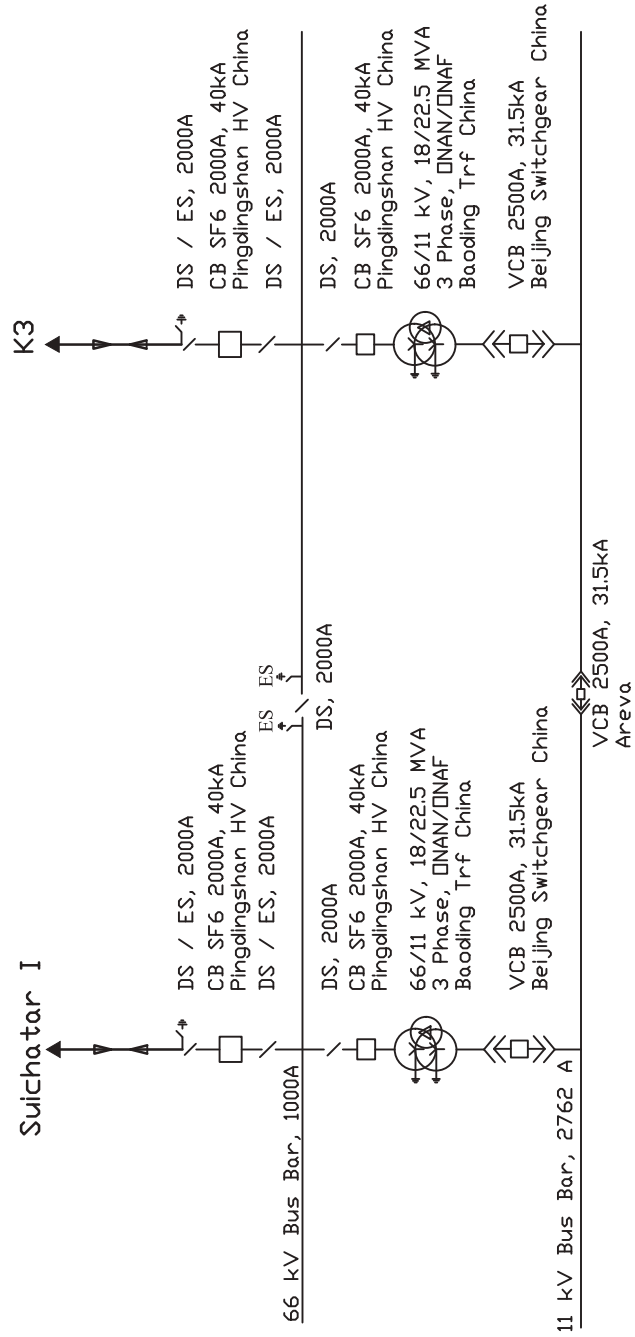
SUBSTATION CAPACITY: 84MVA
PEAK LOAD : 71.91MVA



36. TEKU SUBSTATION

Teku Substation located with Single Bus System in Teku, Kathmandu feeds power to Sundhara, Pulchowk, Thankot, Kirtipur, Tripureshwor, Thapathali, Bhimsenshan, Tahachal, Kalimati. This GIS Substation was built by Kathmandu Valley Reinforcement Project in 1995 with two numbers of 66/11kV bays of 18/22.5MVA capacity. 132kV Line Bay was constructed to link with Siuchatar Substation in the same period. With the grant of Japanese Government, one 66kV Line Bay was constructed and linked by 66kV Power Cable to K3 Substation in 2006.

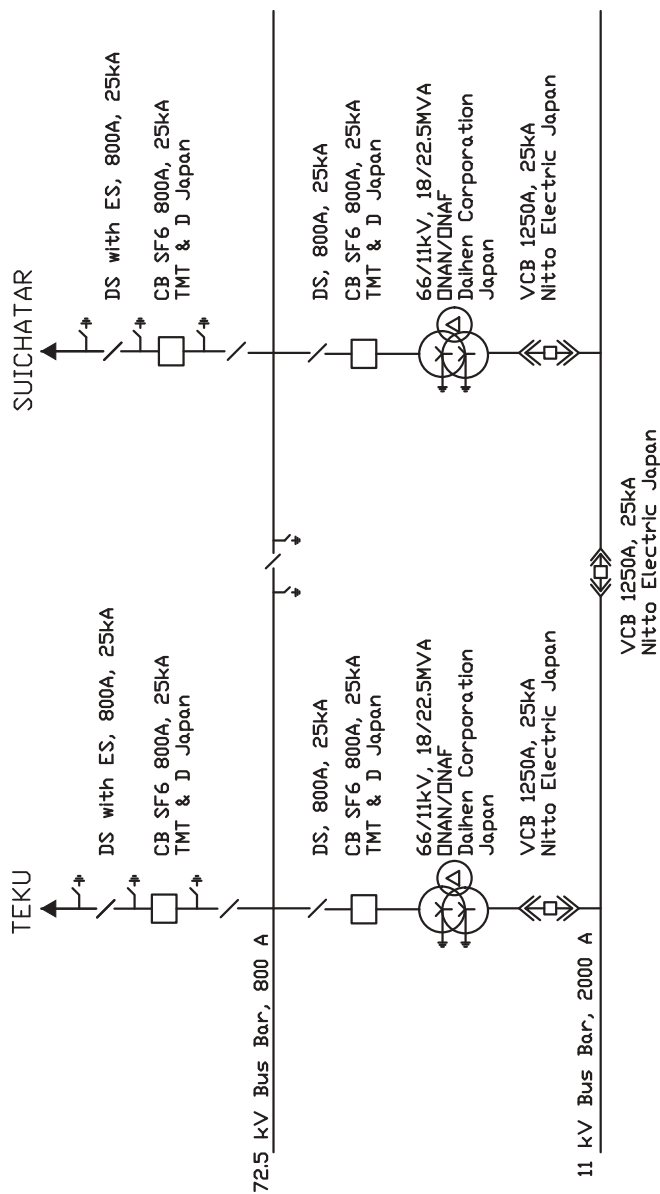
SUBSTATION CAPACITY: 45MVA
PEAK LOAD: 43.78MVA



37. K-3 SUBSTATION

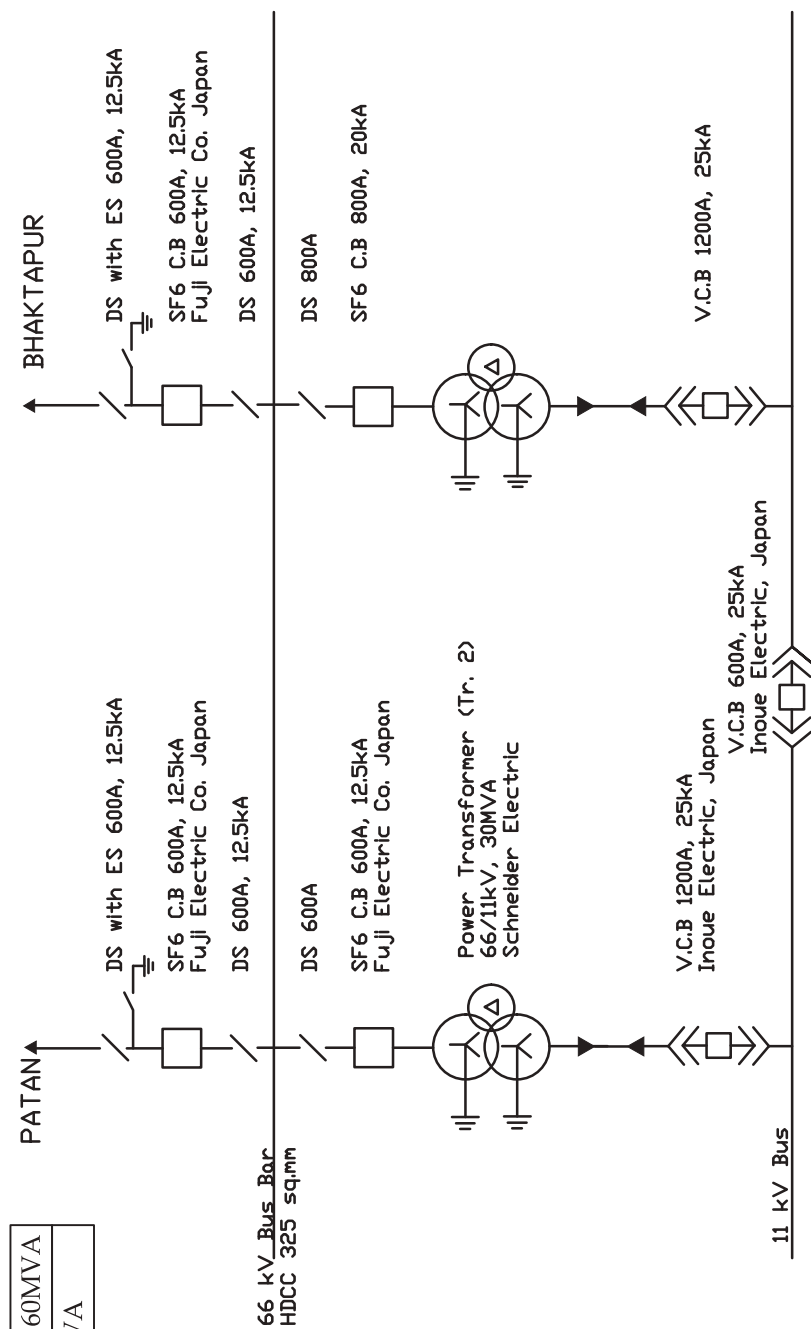
K3 substation with single Bus System located at Singhadurbar Area, Kathmandu feeds power to Bhrikutimandap, Putalisadak, Anamnagar, Singhadurbar, Kalikasthan and K2 switching Station. This GIS Substation was built in the year 2006 with two numbers of 66/11kV, 22.5MVA capacity, with the grant aid of Japanese Government. This 66/11kV Substation is interconnected with Teku Substation and Siuchatar Substation by 66kV under ground High Voltage Power Cable. Two numbers of 66/11kV, 22.5MVA Transformers under operation are sludgeless Transformers. Remote Control Panel with switching and metering facilities at 1st Floor for 15 numbers of 12kV VCB Switchgear Panels located at ground floor has been installed in year 2008.

SUBSTATION CAPACITY: 66/11kV/45MVA
PEAK LOAD: 39.69MVA



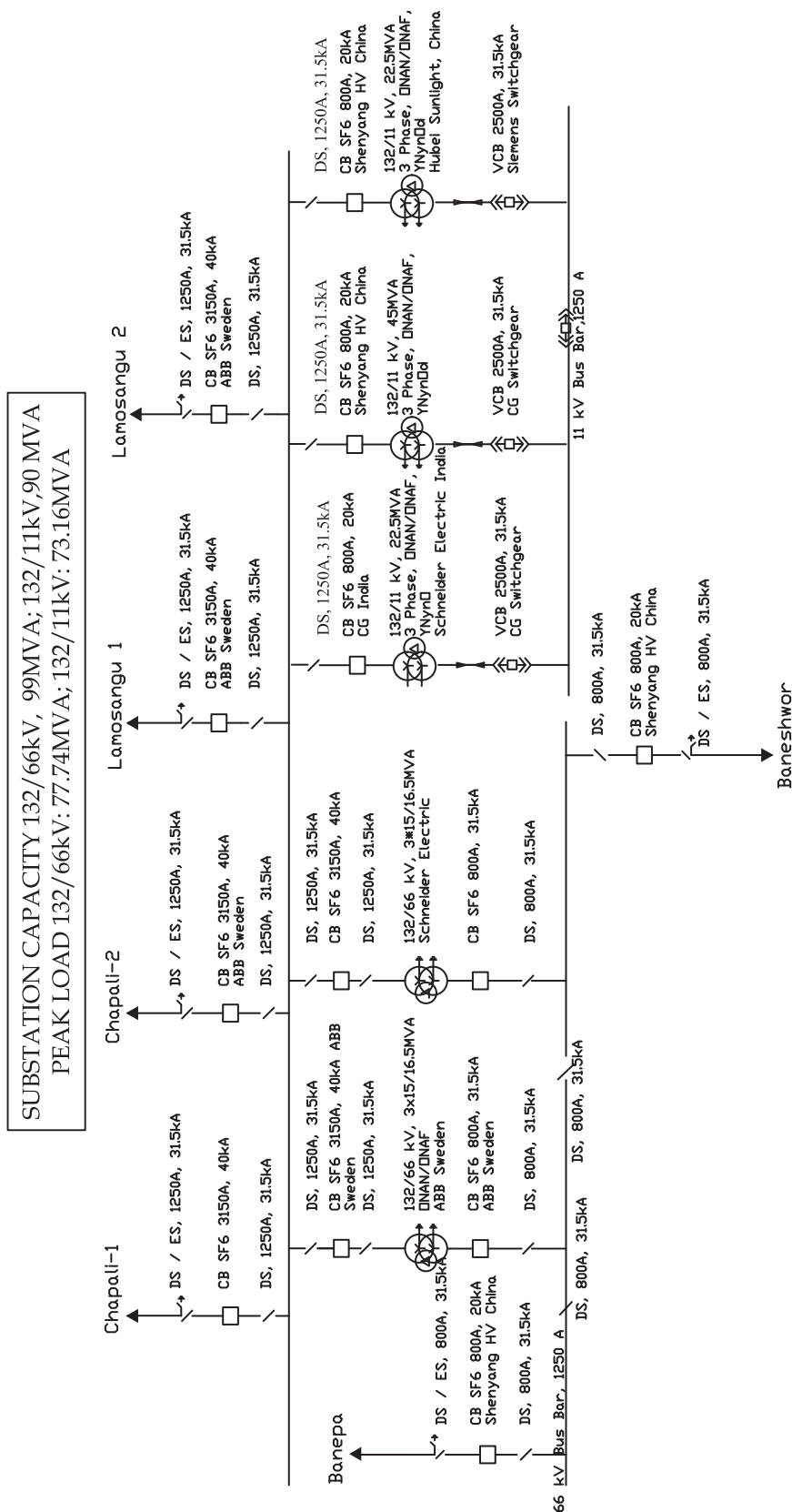
38. BANESHWOR SUBSTATION

Baneshwor substation with Single Busbar System located at Min Bhawan of Kathmandu district, Bagmati zone feeds power to Gothatar, Sankhamul, IC Hall, Imadol, Lubhu, Airport, Baneshwor, Koteshwor, Bagmati and Dhobikhola. This substation is connected to Bhaktapur and Patan substation through 66kV Transmission line. This Substation was built in the year 1987 with the grant aid of Japan Government with single Bay of 66/11kV, three 6 MVA capacity. This substation was upgraded to two number of 66/11kV, 3 x 6MVA capacity with addition of new 66/11kV Transformer Bay by Kathmandu Valley Reinforcement Project with ADB Loan in the second phase, year 1996. 12kV Vacuum Switchgear Panels were installed in two tier System (one above other) due to limited space inside control Building. Office Building for Grid Operation Department and Kathmandu Grid Division is also located in this substation area. One of the 18MVA Transformer was upgraded to 30MVA in the year 2020.



39. BHAKTAPUR SUBSTATION

Bhaktapur Substation with Single Busbar System located near to Bhaktapur Industrial Area of Bhaktapur district, feeds power to Thimi, Nagarkot, Byasi, Katunje and Nalinchowk, Khopasi, BID, Bode, Brick. This Substation was constructed with 2 Transformer Bays in the year 1995 with 2 x 10 MVA Transformer shifted from Lainchaur Substation. To evacuate the Power from two IPPs (Khimti Hydro Power Project & Bhotekoshi Hydro Power Project), 132/66kV Substation with Capacity 3x15/16.5MVA was constructed in the year 1999 with the grant aid of Finnida. Now, There are Three number of 132/11kV Transformer Bays with total capacity 90MVA after upgrading one of 22.5MVA transformer to 45MVA transformer and two nos. of 132/66 kV of 3x15/16.5 MVA transformers .



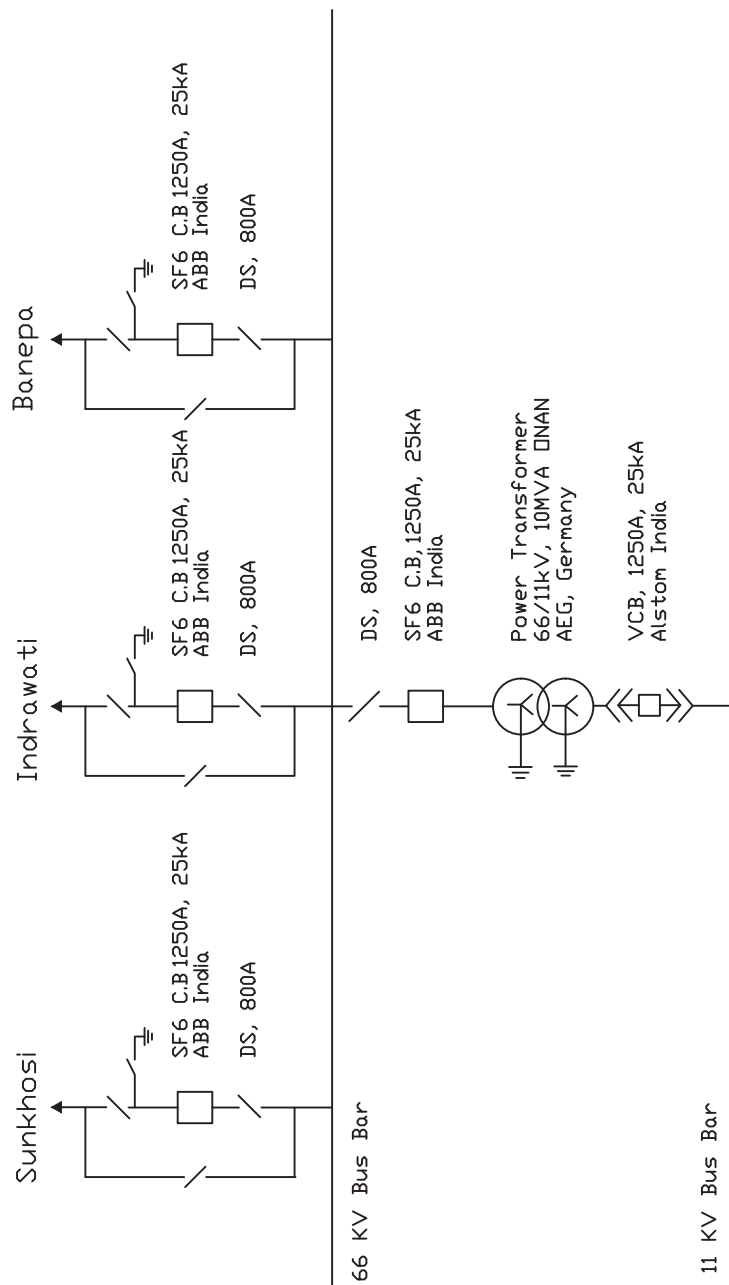
Banepa Substation located at Bhurungkhel of Dhulikhel Municipality, Kavre feeds power to Banepa area, Panauti, Sanga, Khawa, Dhulikhel, and Nala. Initially Banepa area was fed from Bhaktapur-Khopasi 33kV Line and Nalinchowk 11kV Feeder originated from Bhaktapur Substation. To supply growing load of Banepa Area, new Substation was proposed at Banepa and was built in Year 2001 with 66/11kV, 10/12.5MVA capacity. Banepa Substation is also interconnected with Panauti Power House via 11kV Distribution line. 10MVA Transformer Bay was added in the year 2009. Further both the Transformers were upgraded to 2x22.5MVA in the year 2017. One of the 22.5MVA Transformer was later shifted to Balaju Substation.



41. PAANCHKHAL SUBSTATION

Paanchkhal Substation located at Paanchkhal of Kavre District feeds power to Melamchi, Tinipale, Paanchkhal and Palanchowk. Paanchkhal Substation was connected in T-Mode with 66kV Bhaktapur-Sunkoshi Line in 1972 and was supplying local power through 66/11kV, 1.5MVA Transformer. During construction of Banepa Substation, Paanchkhal Substation was upgraded to 5MVA Capacity with new 66kV Bay in π -Connection in the Year 2003. 66kV C&R Panels along with new 12kV VCB Panels were installed in new Control Building. After commissioning of Indrawati-III Power Plant, built by IPP (National Hydro Power Company), the plant was interconnected with Paanchkhal Substation. The existing 5MVA Transformer was replaced by 10MVA in the year 2011 June.

SUBSTATION CAPACITY: 66/11kV, 10MVA
PEAK LOAD: 6.71MVA



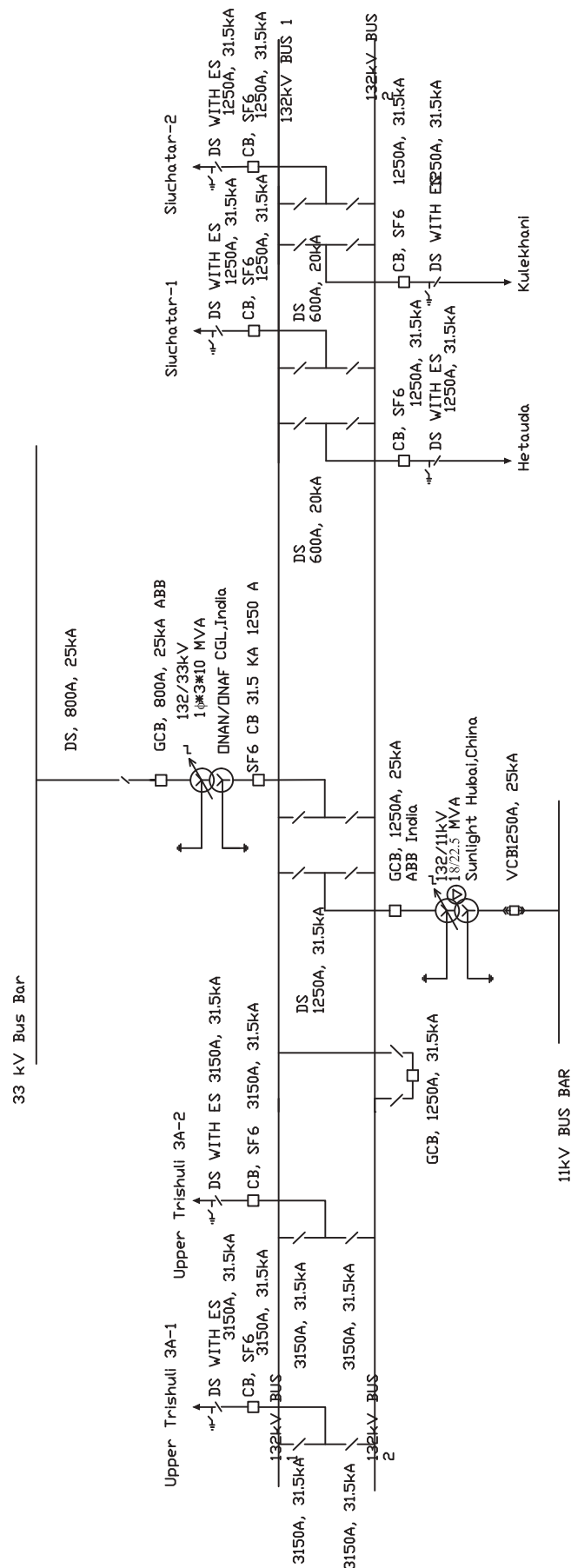
2012 for evacuating more Power from 33kV.



43. MATATIRTHA SUBSTATION

Matatritha Substation having double bus system at 132kV level located at Matatritha, Western part of Kathmandu This Substation is connected with 132 kV double Busbar System to connect with Siuchatar with double circuit transmission line, Hetauda with Single Circuit Line, Kulekhani Powerhouse with single circuit line and upper Trushuli 3A power house with Double Circuit. There are two number of Power Transformers one of 132/11 kV,22.5 MVA and other 132/33 kV,3x10 MVA

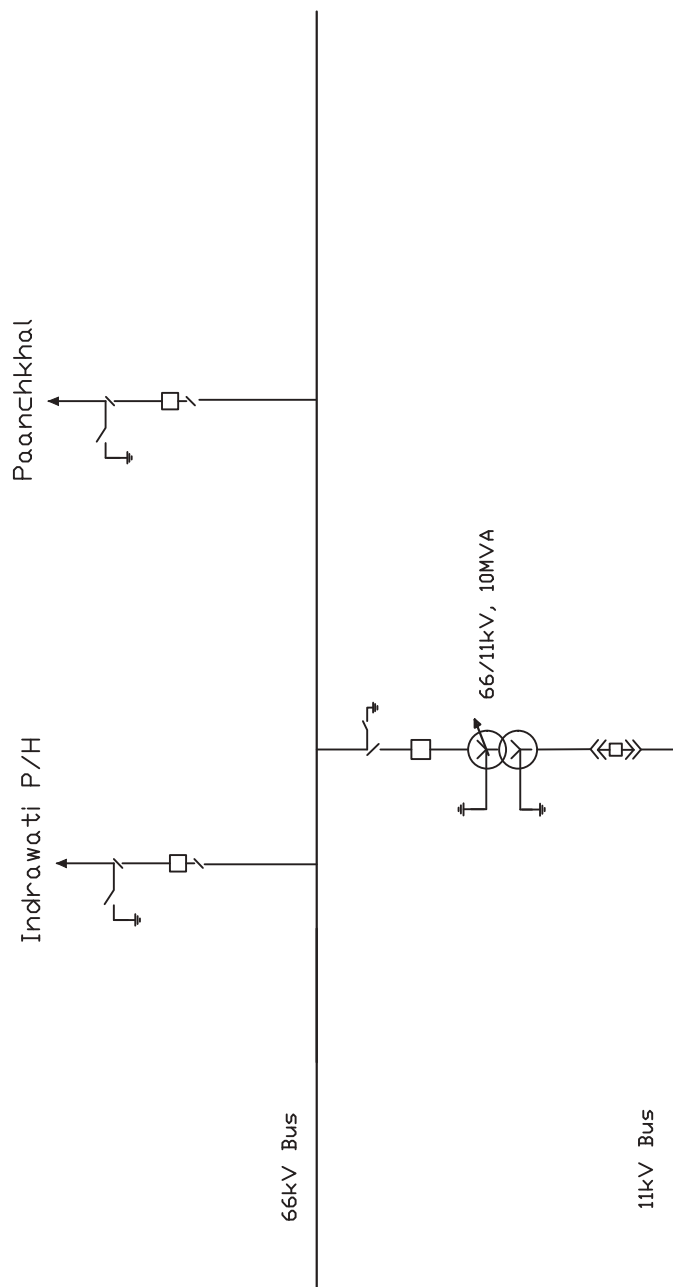
SUBSTATION CAPACITY 132/11kV: 22.5MVA
SUBSTATION CAPACITY 132/33kV: 30MVA
PEAK LOAD 132/33kV: 14.4MVA, 132/11kV, 16.46MVA



44. INDRAWATI SUBSTATION

Indrawati Substation located at Indrawati Sindhupalchok district, Bagmati zone was constructed to evacuate the power from Indrawati power house and to feeds the power to Melamchi area. The installed capacity of Indrawati substation is 10MVA.

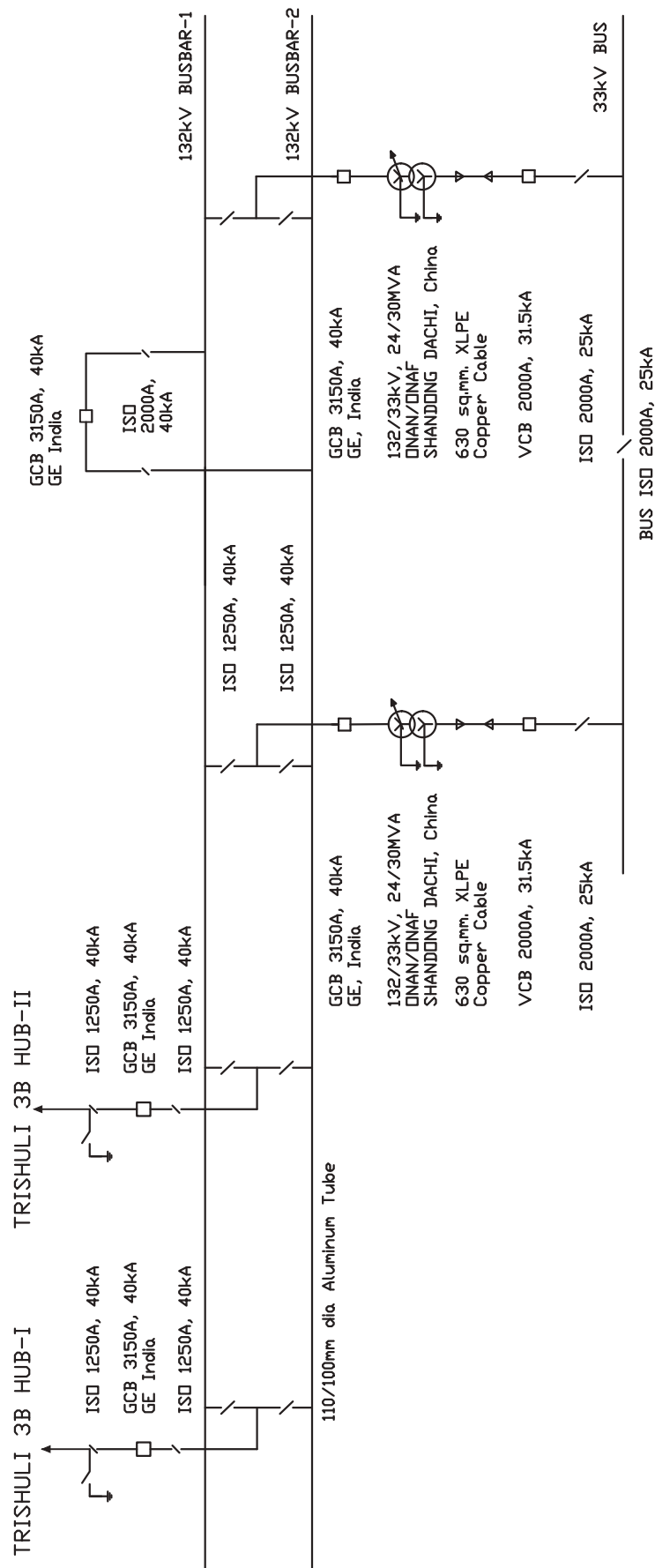
Installed Capacity : 66/11kV, 10MVA
Maximum Demand : 4.8 MVA



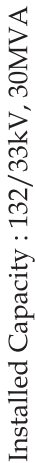
45. SAMUNDRATAR SUBSTATION

Samundratar Substation with Double Bus System located at Dupcheswor RM-6, Samundratar evacuates POWER from more than 10 hydropower projects located at Tadi river corridor and being developed by IPPS by 26km long 132kV double circuit transmission line to Trishuli 3B Hub Substation. 220/132kV Trishuli 3B Hub Substation is to be linked to Matatirha Substation (presently Matatirha-Upper Trishuli 220kV Transmission Line is charged at 132kV level. This substation also feeds power to eastern part of Nuwakot with 3 different 11kV feeders and 2 spare switchgears are provided for future connections.

Installed Capacity : 132/33kV,
2*24/30MVA
& 33/11kV, 2x6/8MVA

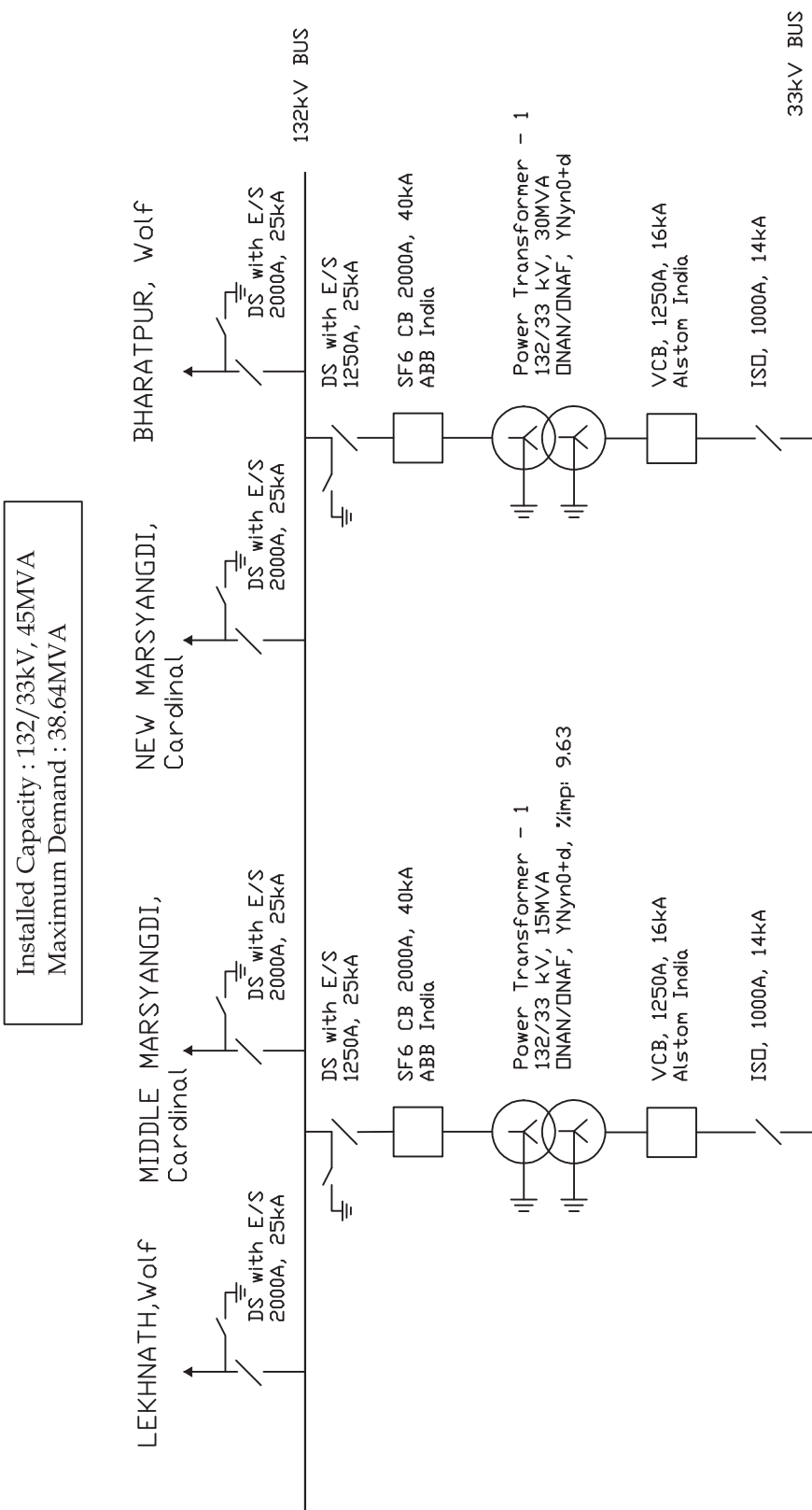


Singati Substation with Single Bus System located at Singati evacuates POWER from more than 12 hydropower projects located at Singati and Tamakoshi river corridor and being developed by IPPS to Singati Hub Substation. 132/33 kV Singati Substation is to be linked to existing Jamosangu Substation.



47. DAMAULI SUBSTATION

This substation with Single Bus System located at Damauli Municipality in Tanahun district, Gandaki zone feeds power to Aabu Khaireni, Gorkha, Kurintar, Lamjung, Tharpu and Damauli. Damauli Substation is connected by Disconnecting Switches with Lekhnath and Bharatpur Substations through 132kV Single Circuit Lines. This Substation was commissioned in 1983 with 132/33kV, 5MVA capacity. Later on the Transformer was upgraded to 20MVA Transformer in 2000. In 2012 3MVA, 33/11 KV was replaced by 16.6MVA Transformer. Existing 132/ 33 kV 30 MVA Transformer is replaced by 15 MVA Transformer another 132/33 kV 30 MVA has been installed in 2023.



A Year of Book-Fiscal Year 2022/2023 (2079/2080 BS)

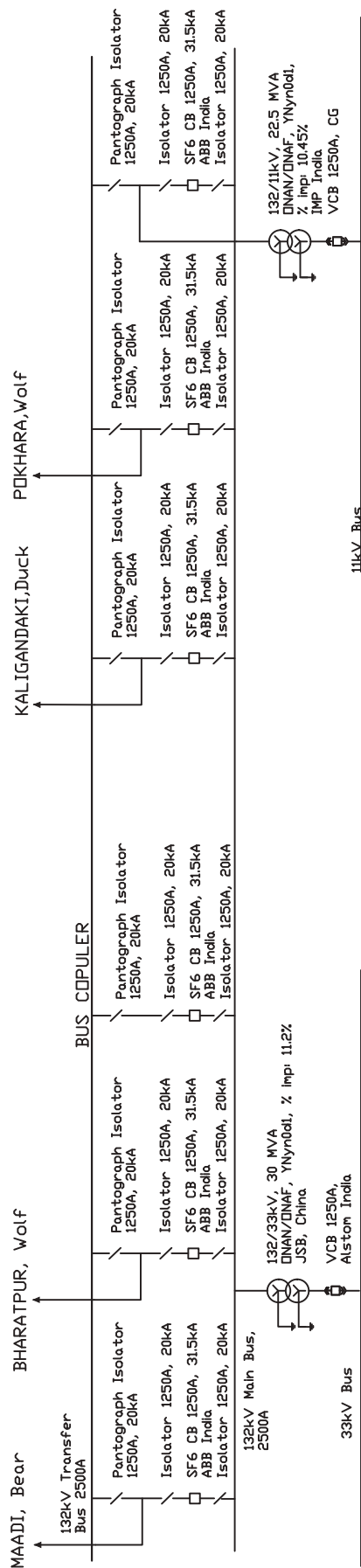
Nepal Electricity Authority 155



49. LEKHNATH SUBSTATION

Lekhnath Substation with Main and Transfer Bus System located at Lekhnath Municipality of Kaski district, Gandaki zone feeds power to Budibazar, Bijaypur, Begnash and Khairani. Lekhnath Substation is fed by Kaligandaki Power House through 132kV Single Circuit Line. This Substation is connected with Pokhara and Damauli Substations through 132kV Lines. This Substation was commissioned in 2002 with 132/11kV, 22.5MVA capacity.

Installed Capacity : 132/33kV, 30MVA
Installed Capacity : 132/11kV, 22.5MVA
(Max Load 14.55MVA)

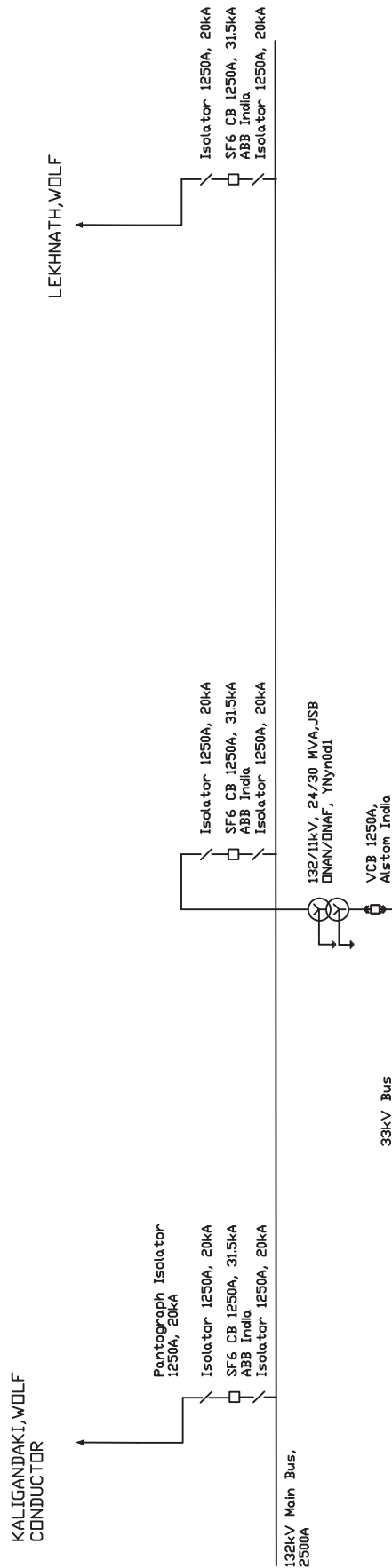


New Marsyangdi substation is a double bus bar system. This Substation is located at Markichowk of Tanahu district of Gandaki zone feeds power to Anbookharen (TANAHU) and Gorkha DISTRICT. The availability of 132 kV at this SS is used for stepping up to 220 kV for Marsyangdi-Kathmandu 220kV TLP. This substation is connected to Damauli SS Middle Marsyangdi HEP and Lower Marsyangdi HEP. At this SS double ckt gets loop in from damauli and middle HEP and double ckt gets loop out to lower marsyangdi HEP. There are 4 bays of 132 kV, 1 bay of 132 kV buscoupler, 1 bay of 132 kV of transfer bay and 2 bays of 33 kV bays for distribution. 132/33 kV, 30 mVA Capacity power transformer has been installed. The whole work was completed, tested, commissioned and charged on fy 2075/76 DATED: 2075.12.21 B.S.

51. SYANGJA SUBSTATION

Syangja Substation with Single Bus System located at Rangkhola of Syangja district, Gandaki zone feeds power to Badkhola and Galyan area. Syangja Substation is fed by Kaligandaki Power House and Lekhnath Substation through 132kV Single Circuit Lines. The Substation was commissioned in 2013 with 132/33kV, 30MVA and 33/11kV, 8MVA Capacities.

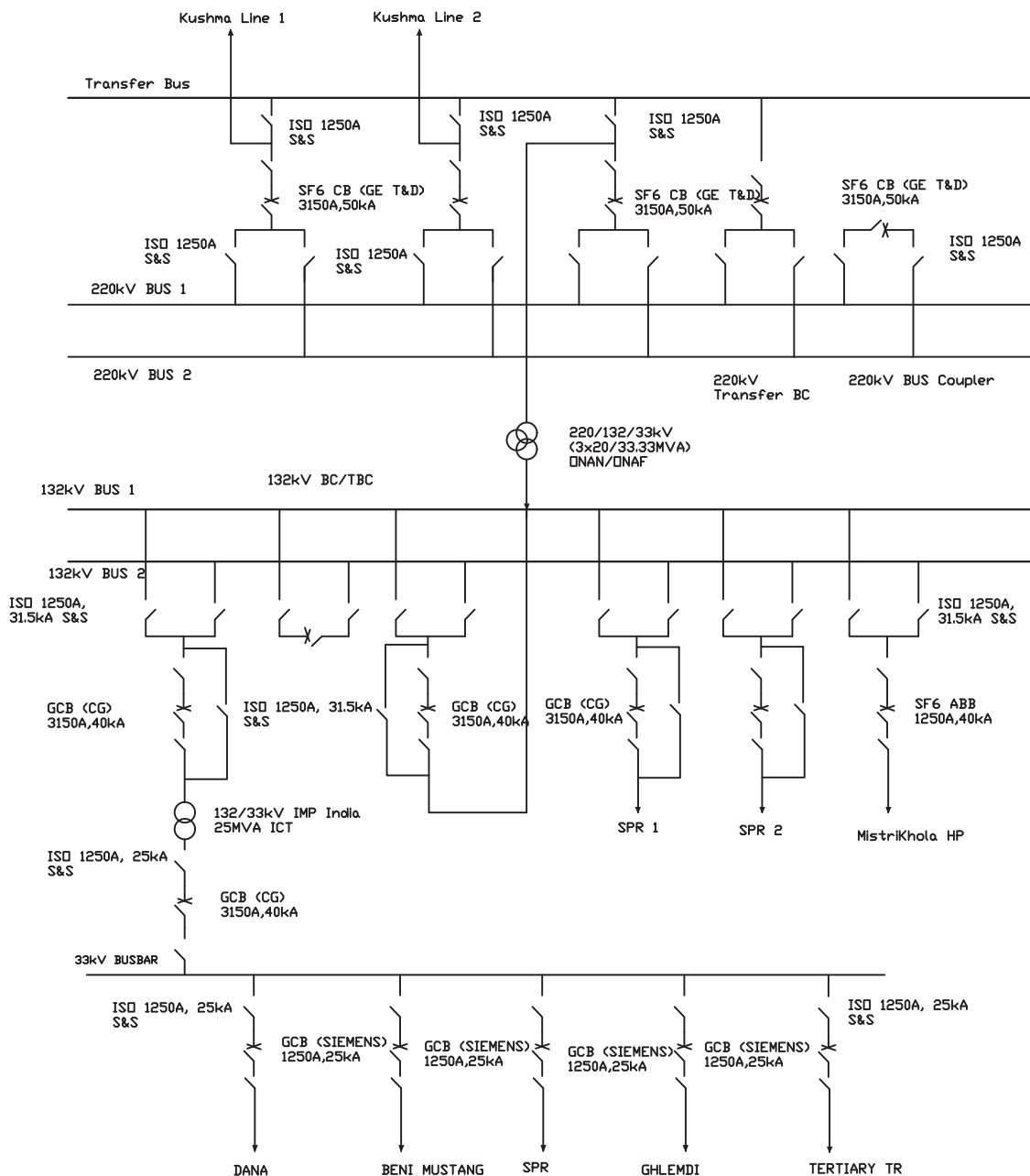
Installed Capacity : 132/33kV, 30MVA
Maximum Demand: 11.26 MVA



52. DANA SUBSTATION

Dana substation with Double Bus with a transfer system, located at Dana of Myagdi district of Dhawalagiri Zone receives power from Mistrikhola HP, Ghalemdi & Thapa Khola. It is connected to Kushma substation by 220kV double circuit line. This substation was commissioned in 2020.

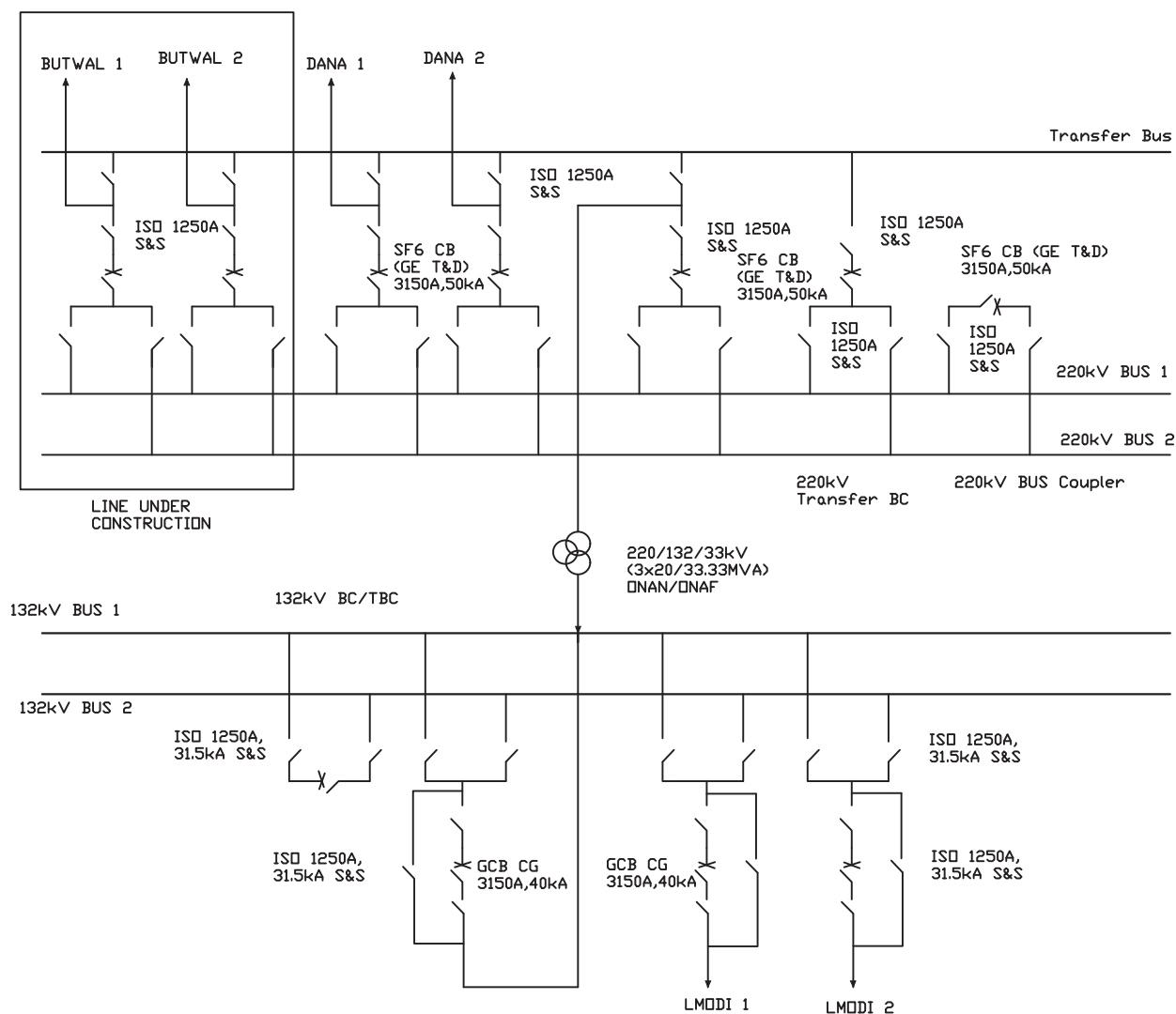
Installed Capacity : 220/132/33kV, 100 MVA



53. KUSHMA SUBSTATION

Kushma substation with Double Bus with a transfer system, located at Dana of Parbat district of Dhaulagiri Zone. It is connected to Dana substation by 220kV double circuit line and by 132kV single circuit, it is connected to Lower Modi HP. This substation was commissioned in 2020.

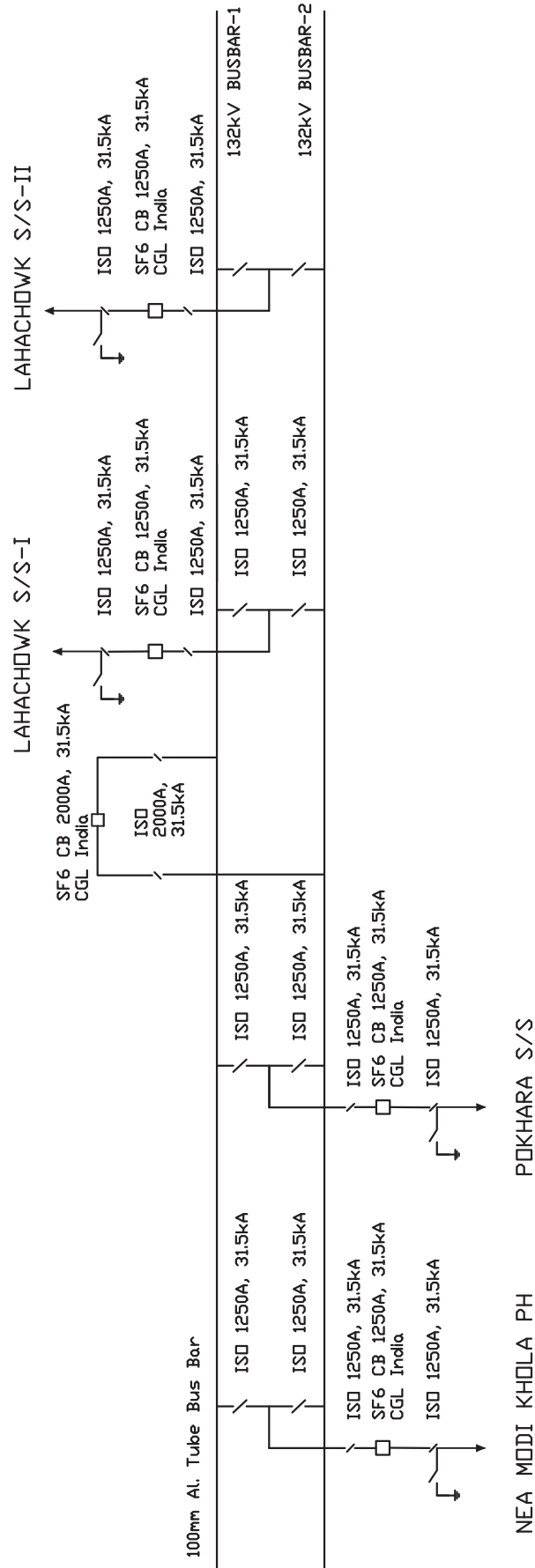
Installed Capacity : 220/132kV, 100 MVA



54. NEW MODI SUBSTATION

New Modi Substation is a 132kV Switching Station with Double Bus System located at Modi RM-2, New Modi evacuates POWER from hydropower projects located at Modi river basin. and connects NEA Modi Powerhouse and Pokhara Substation. This Substation was charged on October 31, 2021. Hydropower projects like Middle Modi (18MW) Upper Modi A (42 MW), Upper Modi (14 MW), Gandruk Modi (111 MW) will be connected to this substation.

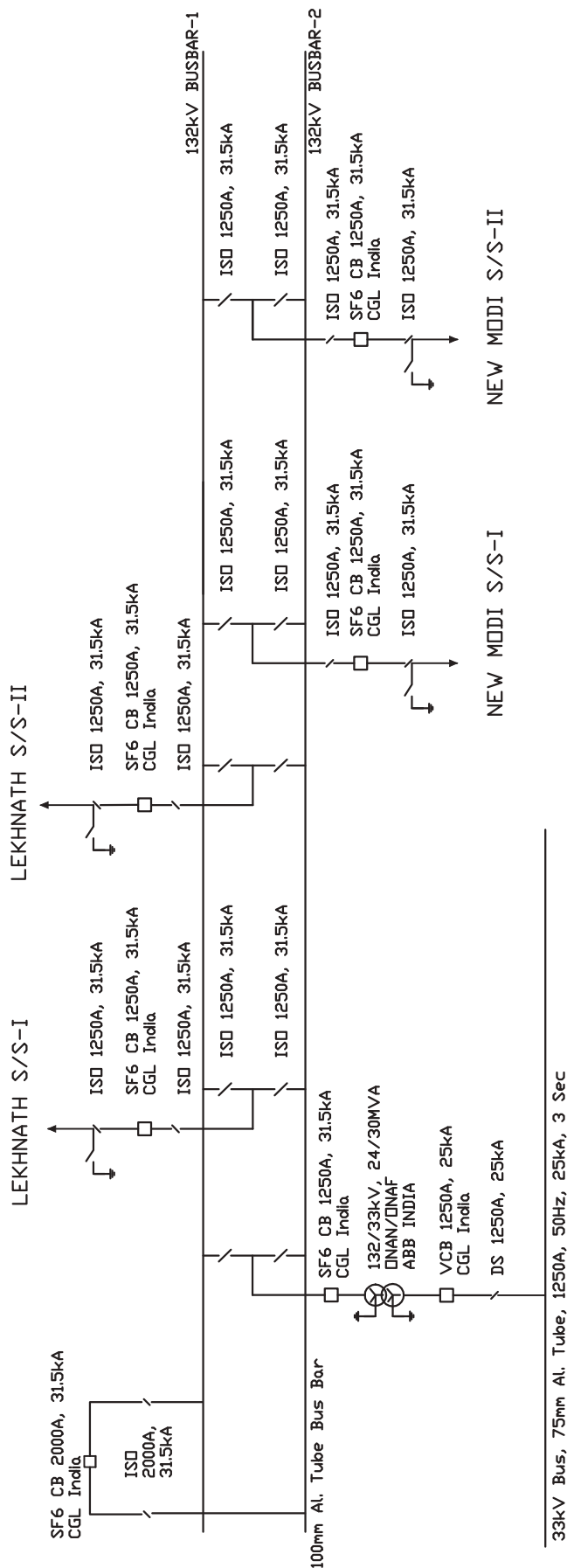
Installed Capacity : 132 kV Switching Station



55. LAHACHOWK SUBSTATION

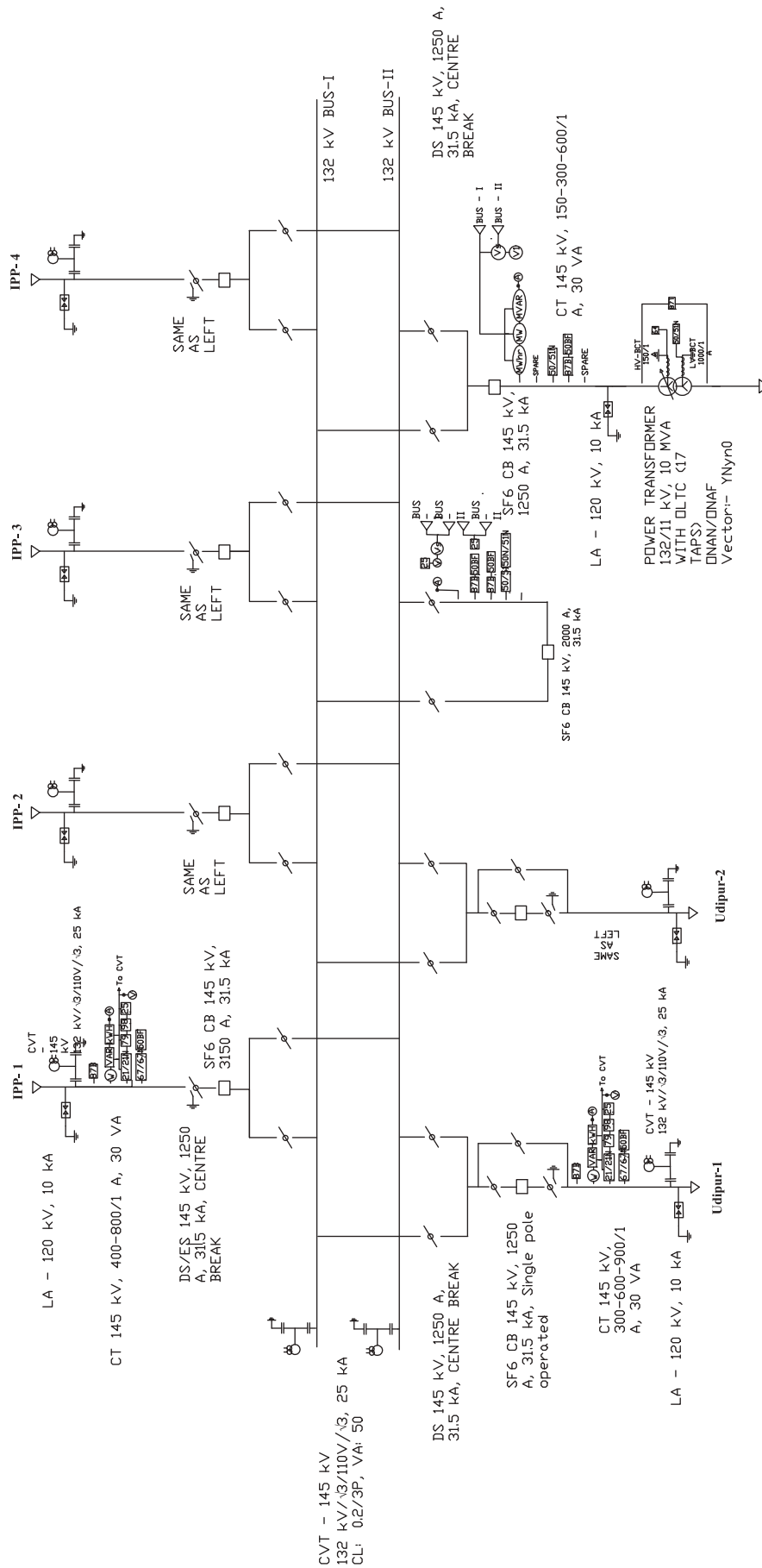
Lahachowk Substation with Double Bus System located at Machapurchhre RM-4, Lahachowk S/S evacuates POWER from hydropower projects located at Seti river, Mardi river, Sardi river and Madi river. This Substation was commissioned on December 29, 2021 and charged with load on January, 2022. The Substation has 1 No. of 132/33kV, 24/30 MVA and 1 No. of 33/11kV, 6/8 MVA Power Transformer. Four 11kV local feeders are distributed from this Substation to supply mainly RM loads. Existing hydropower like Sardi Khola (4MW), Mardi Khola (4.8MW), Idi Mardi (7.1MW) are constructing their 33kV bays to be connected in this substation. Seti Nadi (25 MW), Karuwa Seti (32 MW), Upper Seti (20 MW) will be connected in 132kV in near future.

Installed Capacity : 132/33 kV, 24/30 MVA
&
33/11kV, 6/8 MVA
Maximum Demand: 13 MVA



56. KIRTIPUR SUBSTATION

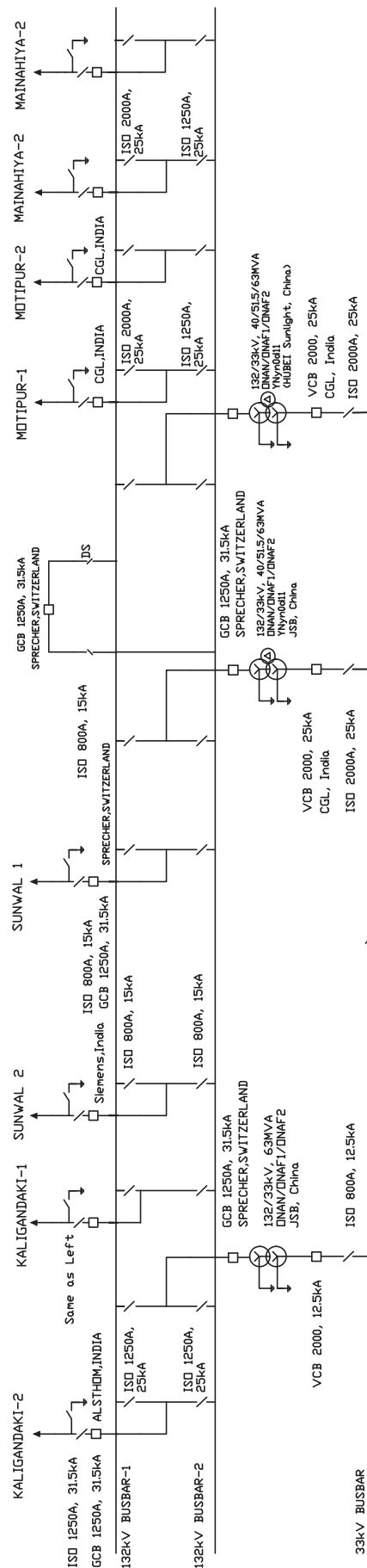
Kirtipur 132/11 kV substation, with double Busbar system located at Kirtipur, Dordi Rural Municipality-06 Lamjung, evacuates power from IPP projects of Dordi river and its tributaries in Lamjung district. This substation was charged on Asar 21 2079 B.S. (July 5, 2023). The substation has 1 no. of 132/11 kV, 10 MVA power transformer. Existing Hydropower like Dordi-1 HEP (12 MW), Dordi Khola HEP (27 MW), Upper Dordi 'A' HEP (25 MW), Super Dordi 'Kha' HEP (54 MW) and Chepekhola HEP (8.63 MW) are evacuating their power to this substation.



57. BUTWAL SUBSTATION

Butwal substation with main and Transfer bus system was recently converted into double bus system. This Substation is located at Jogikuti of Rupendehi district of Lumbini zone feeds power to Butwal, Palpa, Lumbini and Bhairahawa. This substation is connected to Kaligandaki Power house and New Butwal substation by 132kV double circuit line. It is also connected to Motipur substation by 132kV Double circuit line. This substation was commissioned in 1985 with 132/33 kV two numbers of 10 MVA transformers. One of the 10MVA transformer was replaced with 132/33kV 30MVA in 2002 and other 10MVA was replaced with 30MVA in 2005. Two line bays are constructed in 2002 to evacuate the power from Kaligandaki Power House. Replacement of one 132/33 kV 30 MVA transformer with 63 MVA transformer will shortly be completed before October 2009. Upgradation of 33/11 kV 8MVA with 16.6 MVA was completed on November 2008. Another 132/33kV, 63MVA Power Transformer has replaced 30MVA Power Transformer in 2010. 33/11kV, 8MVA was upgraded to 16.6MVA in 2015. A new 132/33kV, 63MVA Transformer Bay was added in 2017 and further 33/11kV, 16.6MVA Transformer bay was added in 2019. In 2021, 33/11kV, 16.6MVA Transformer is replaced by 33/11kV, 24MVA

Installed Capacity : 132/33kV, 189MVA
Maximum Demand : 165.53 MVA



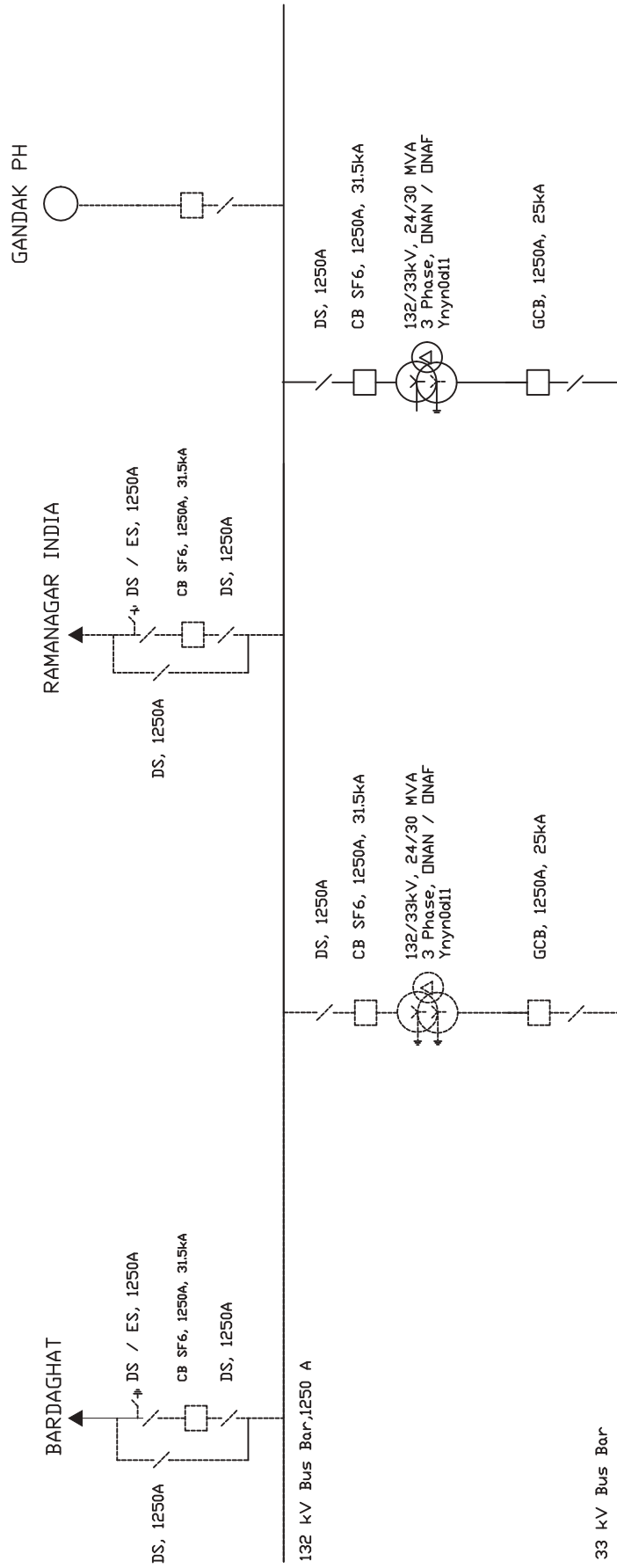
Bardaghat substation with Double Bus system, located at Bardaghat of Nawalparasi district of Lumbini Zone feeds power to Bardaghat, Sunawal, Pratappur and Dumkibas. This substation is connected to Gandak Power House and New Bharatpur substation by 132kV single circuit line. It is also connected to New Butwal substation by 132kV double circuit line. This substation was commissioned in 1985 with 132/11 kV, 5 MVA capacity. This substation was upgraded to 6 MVA, replacing old 5 MVA in 2002. In 2006, new transformer bay was constructed and 132/11 kV 5 MVA Transformer was installed to upgrade the substation capacity to 11MVA. The 5MVA transformer was damaged which was replaced by 7.5MVA in 2008. 6MVA Transformer was upgraded to 15MVA in 2015 which was further upgraded to 22.5MVA making the total capacity to 30 MVA in 2017. Further the existing 7.5MVA was upgraded to 22.5MVA in 2020. This substation is feeding power to Hongshi Cement at Sardi via 132 kV line.

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59. GANDAK SUBSTATION

Gandak Substation with single bus system located at Surajpura of Parasi District, feeds power to Parasi and Surajpura area. This substation was built in 2018 A.D. with 132/33 kV, 30 MVA Transformer. This Substation is connected with Bardghat S/S and Ramnagar (India) through 132kV Single Circuits. Gandak Power House is also connected in this Substation at 132kV Voltage level. New 132/33, 30MVA transformer bay was added in 2023.

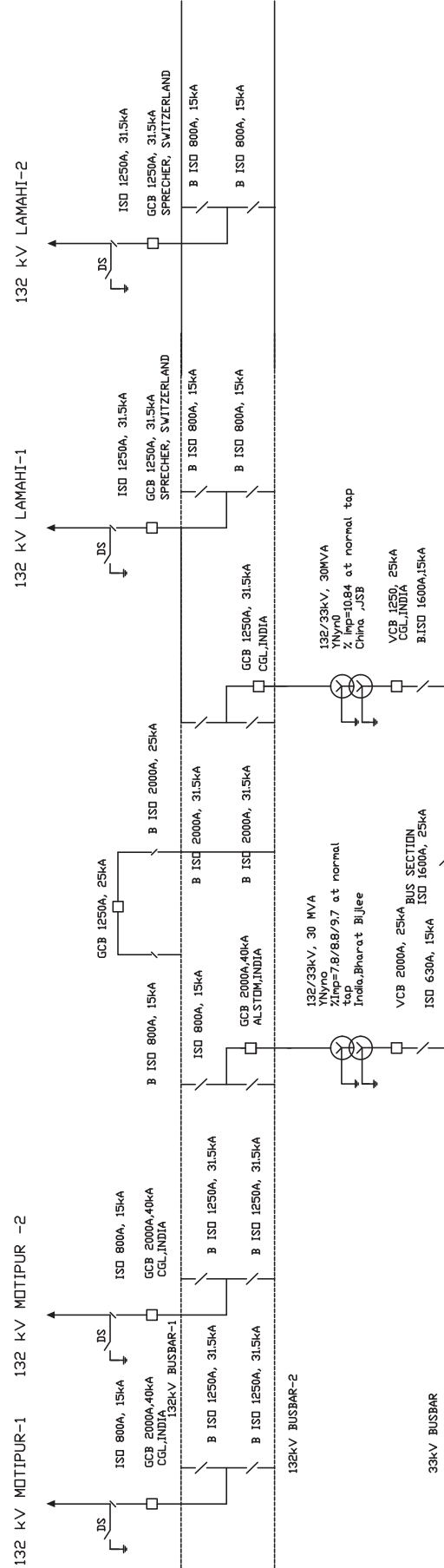
Installed Capacity : 132/33kV, 60MVA
Maximum Demand : 48.69MVA



60. CHANAUTA SUBSTATION

Chanauta substation with double busbar system is located at Chanauta of Kapilvastu district of Lumbini zone and feeds power to Krishnanagar, Pipra, Bahadurgunj and Shivpur. This substation is connected to Motipu and Lamahi substations by 132kV double circuit line. This substation was commissioned in 1986 by Butwal Nepalgunj Project with 132/33 kV, 5 MVA capacity. This substation was upgraded to 10 MVA by construction of new 5MVA transformer bay in 2004. One of the 5MVA was upgraded to 30MVA in 2010 and the other 5 MVA was upgraded to 12.5MVA in 2018 & 12.5 MVA Transformer was upgraded to 24/30 MVA in 2020.

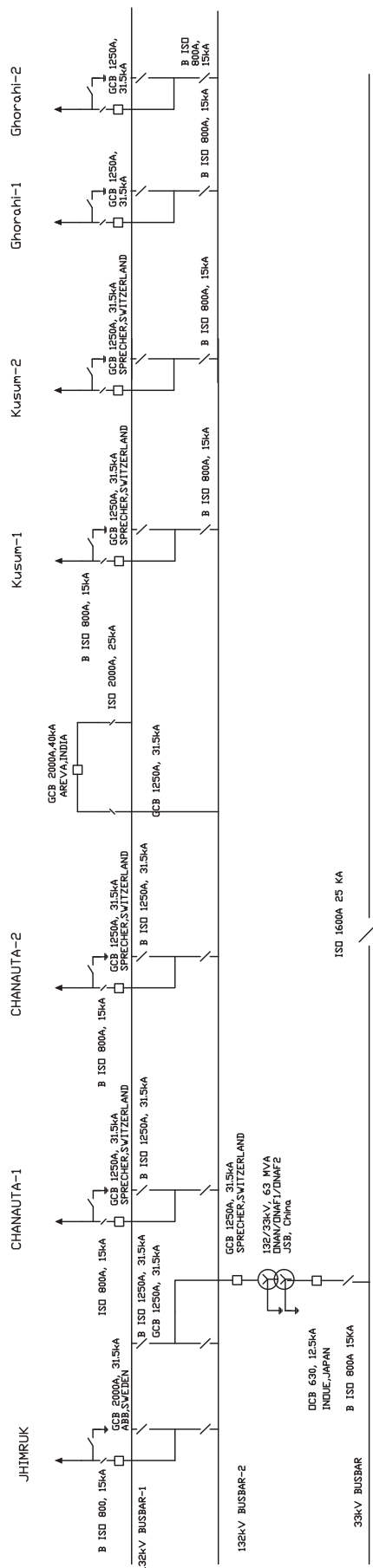
Installed Capacity : 132/33kV, 60MVA
Maximum Demand : 44.35 MVA



61. LAMAHI SUBSTATION

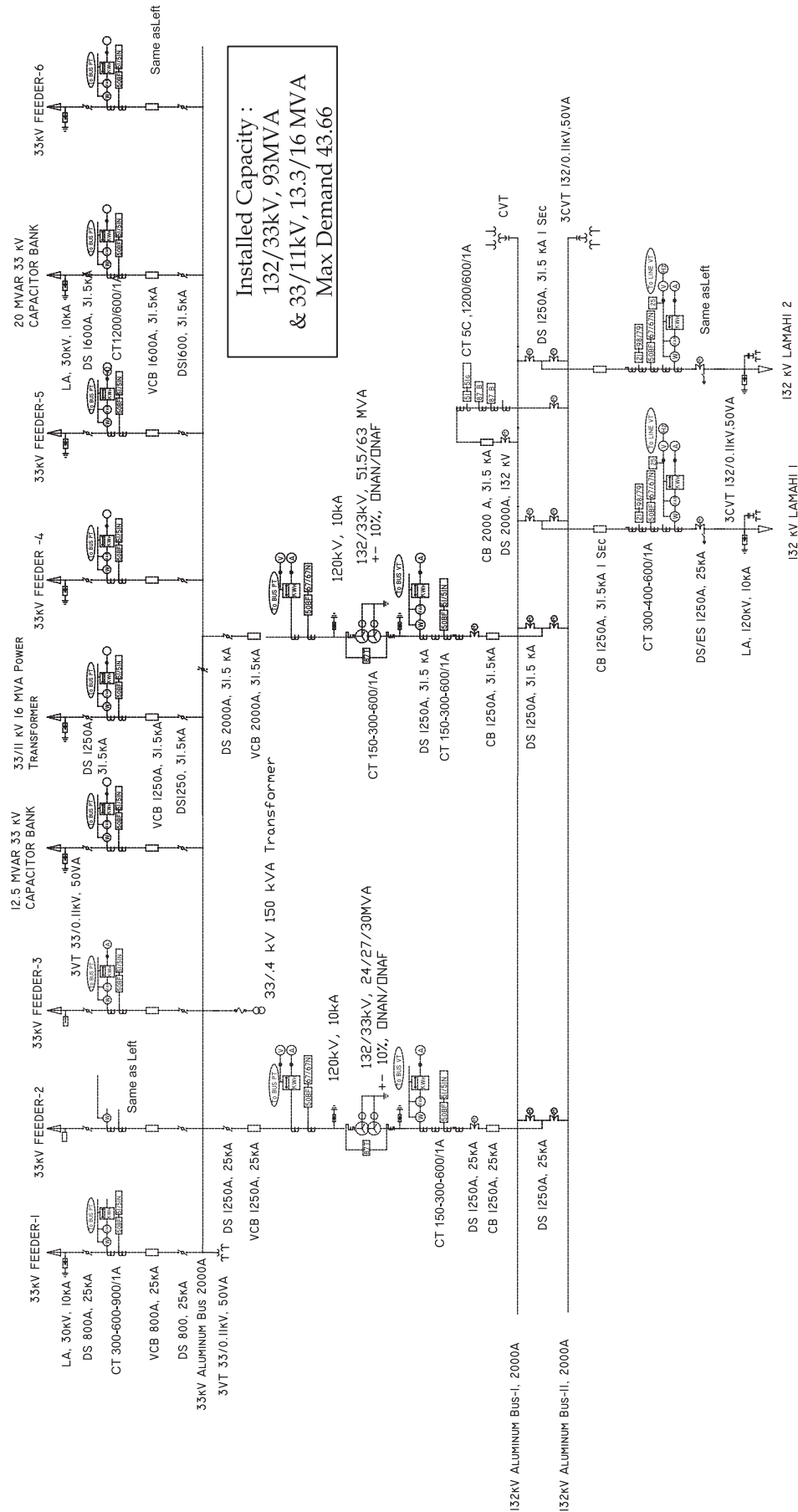
Lamahi substation with double bus system, located at Lamahi of Dang district of Rapti zone feeds power to Lamahi, Ghorahi, Satvariya and Bhalubang. This substation is connected to Jhimruk power house by 132kv single circuit line to import the IPP's power to NEA grid. This substation is also connected to Chanauta and Kohalpur substations by 132kv Double circuit line. Recently the Substation was connected also to Ghorahi Substation through 132kv Single Circuit. This substation was commissioned in 1986 with 132/33 kV, 5 MVA capacity. In 1988 10MVA reactor was installed to control the over voltage. This substation was upgraded with replacement of 5MVA by 7.5MVA in 2004 and construction of 7.5MVA transformer bay in 2006. The substation, originally with single bus system, was converted to double bus system in 2006. One of the 7.5MVA Transformer was upgraded to 30MVA in the year 2012 and another 7.5MVA was upgraded to 30 in the year 2016. That 30MVA was further upgraded to 63MVA in the year 2018. Existing 132/33kV 30MVA Transformer is moved to another existing grid substation under Grid Operation Department.

Installed Capacity : 132/33kV, 63MVA
Maximum Demand : 30.86MVA



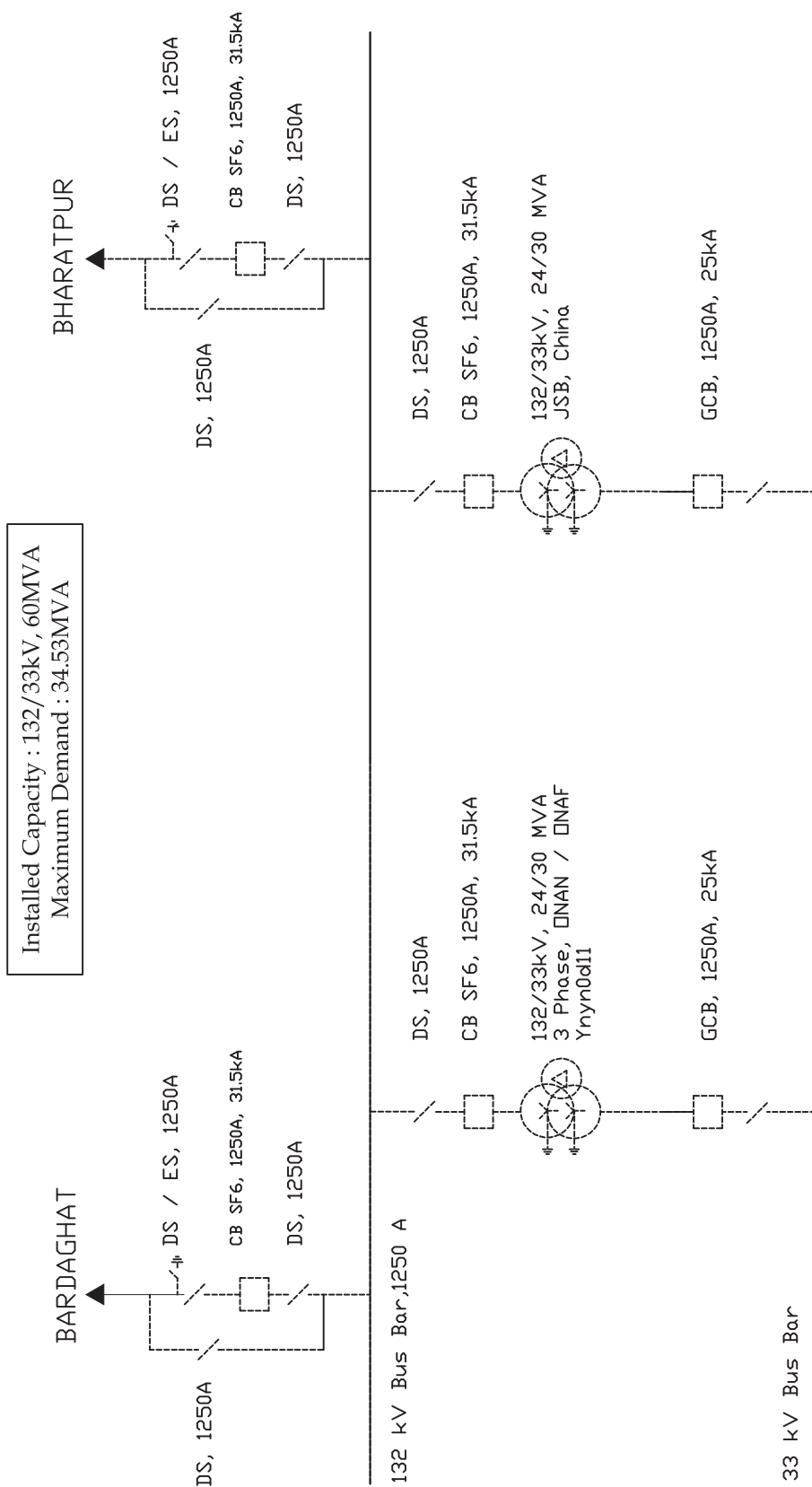
62. GHORAHAI SUBSTATION

Ghorahi Substation with Double Bus System located at Jhingani, Ghorahi submetro Municipality-3 for supply of industrial, commercial and domestic consumers. The Substation is connected with Lamahi 132 kV Substation by 12.5 km long 132kV double circuit transmission line.



63. KAWASOTI SUBSTATION

Kawasoti Substation with single bus system located at Nawalparasi District, feeds power to Kwasoti, Mukundapur and local surrounding area. This substation was built in 2009 A.D. with 132/11 kV, 24/30 MVA and 33/11 kV, 6/8 MVA Transformers with the grant aid of Japanese Government. This Substation is interconnected with Bardaghat and Bharatpur S/S to facilitate smooth power flow and to supply increasing power demand of local area. The 33/11kV, 8MVA Transformer was upgraded to 16.6MVA in the year 2017. The substation was further upgraded to 2*30MVA.

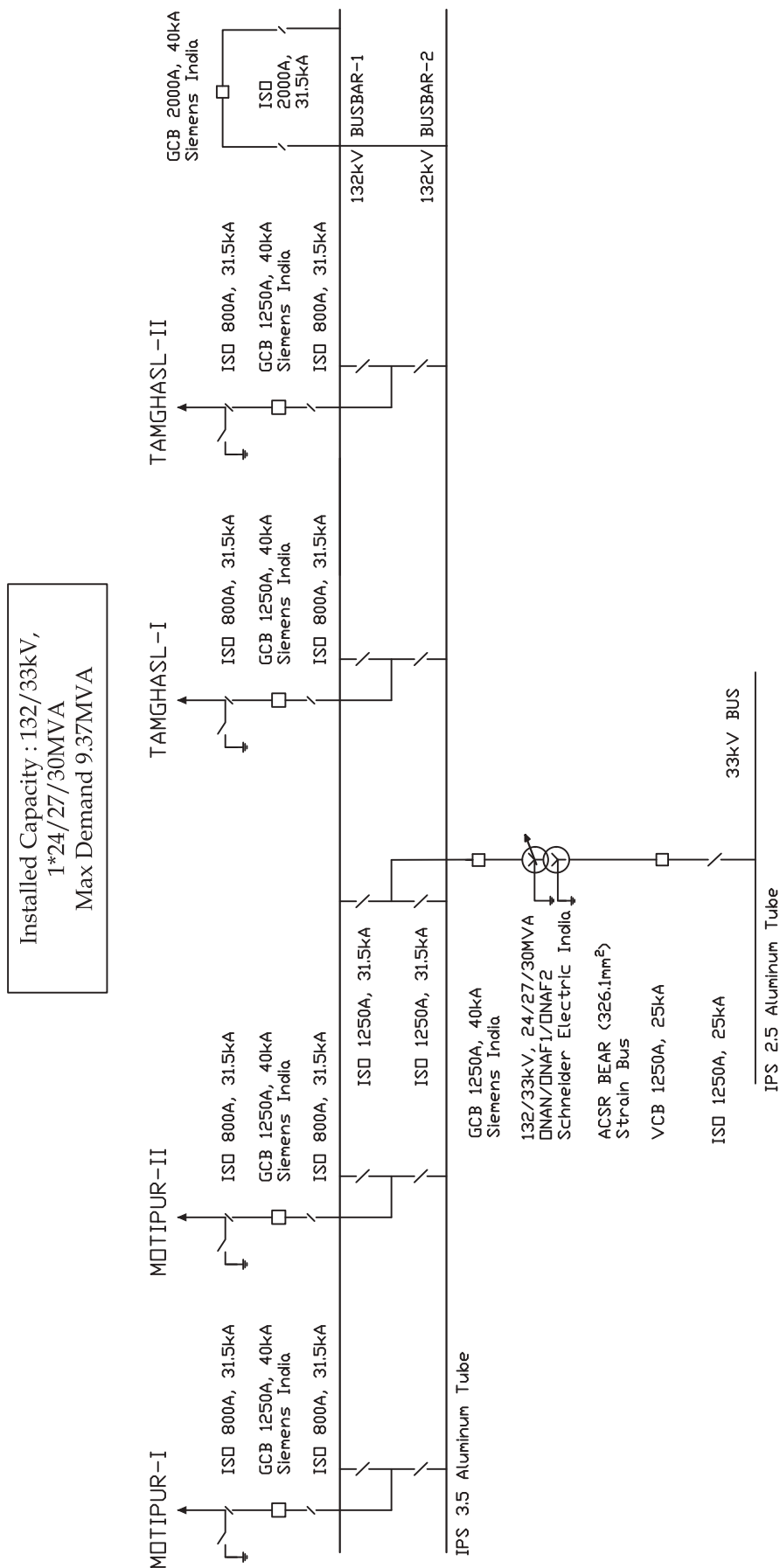


Motipur Substation with Double Bus System located at Kapilvastu Jitpur-7, Motipur Danda is commissioned to upgrade the quality of the electricity in Kapilvastu district as well as to extend 132kV transmission line to Arghakhachi, Gulmi and western part of Baglung district. Motipur substation is linked to Butwal substation in the east, Shivapur (Chanauta) substation in the west and Sandhikharka substation in the north. The substation is designed to distribute the power from four 33kV feeders and three 11 kV feeders.



65. SANDHIKHARKA SUBSTATION

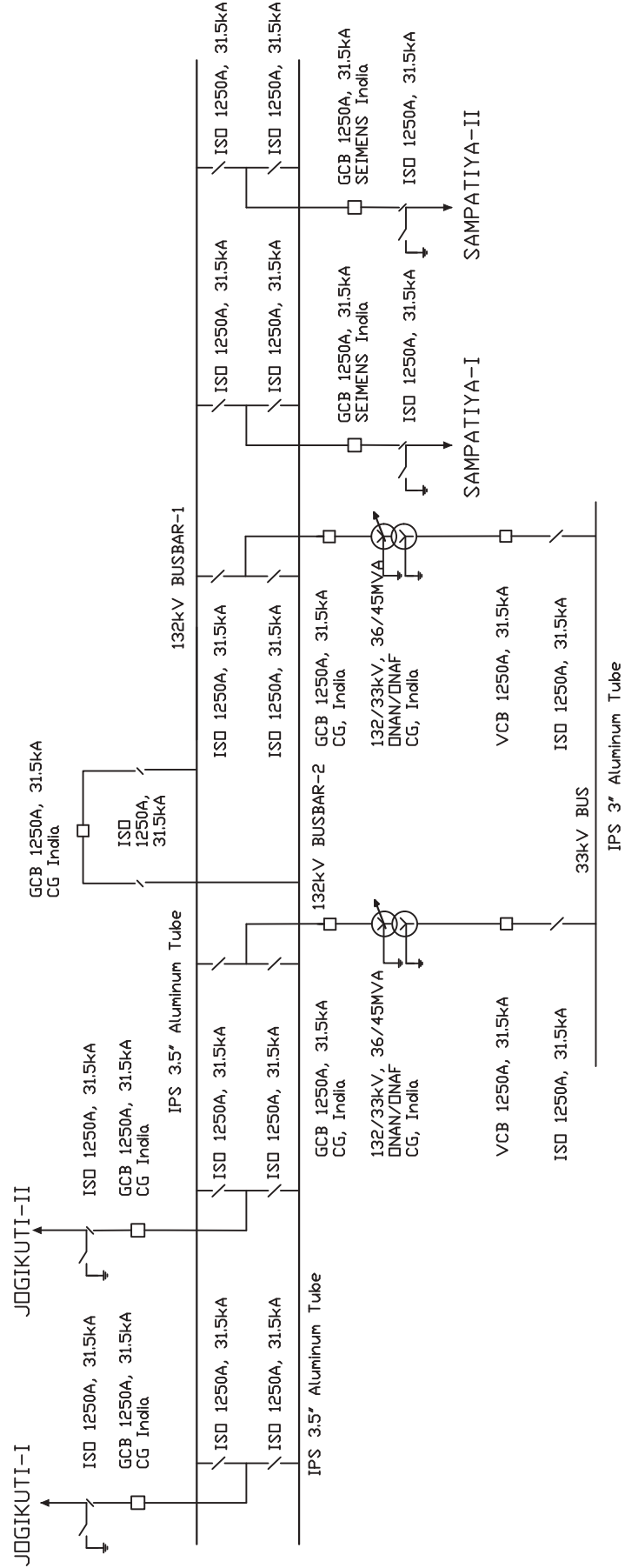
Sandhikharka Substation with Double Bus System located at Arghakhachi, Sandhikharka-6, Fudbang and is the first substation with 132kV voltage class of the district. This substation was constructed to upgrade the power quality and reliability of the electricity in Arghakhachi district as well as to extend 132kV transmission line to, Gulmi and western part of Baglung district. Sandhikharka substation is linked to Motipur substation in the south and Tamghas substation (under-construction) in the north. The substation is also designed to distribute the power from four 33kV feeders and three 11 kV feeders.



66. MAINAHIYA SUBSTATION

Mainahiya Substation with Double Bus System is located at Mainahiya, Siyari RM-2, Rupandehi. Mainahiya Substation helps to improve supply quality, reliability, voltage and line loss in Rupandehi district by construction of 18 kM double circuit 132 kV Transmission Line linked with existing Jogikuti 132/33/11 kV Substation. Mainahiya 132/33/11 kV Substation has been charged and has feeds power to the industrial load with 4 different 33 kV feeders. The substation has 6 Nos. of additional 33 kV line bays required for the future connections.

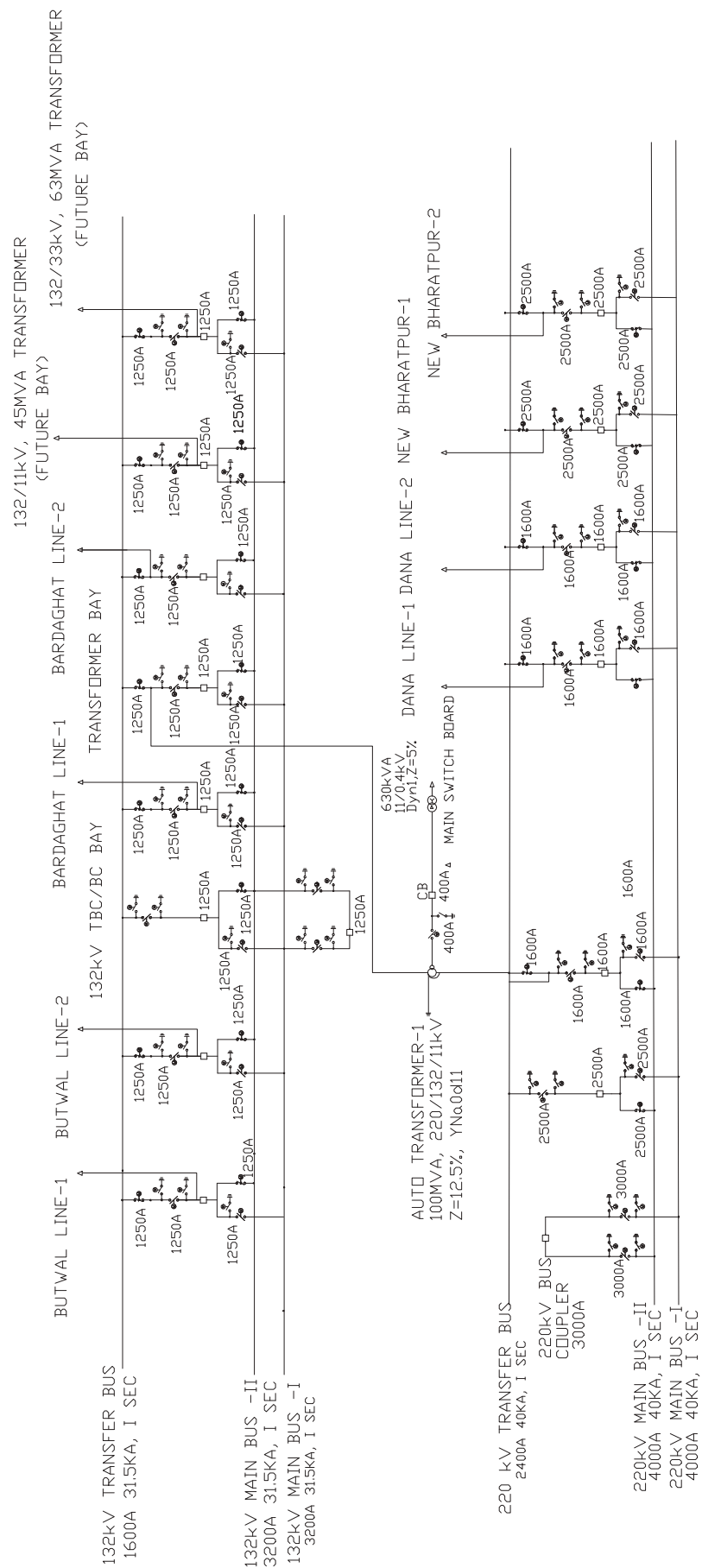
Installed Capacity : 132/33kV,
2*36/45MVA
& 33/11kV, 12.8/16MVA



67. NEW BUTWAL SUBSTATION

New Butwal Substaion with Doulbe Bus Bar and One Transfer Bus situated at sunwal Municipality -13 currently charged from LILO of Butwal Bardaghat 132 kV Transmission Line with Capacity of 100MVA

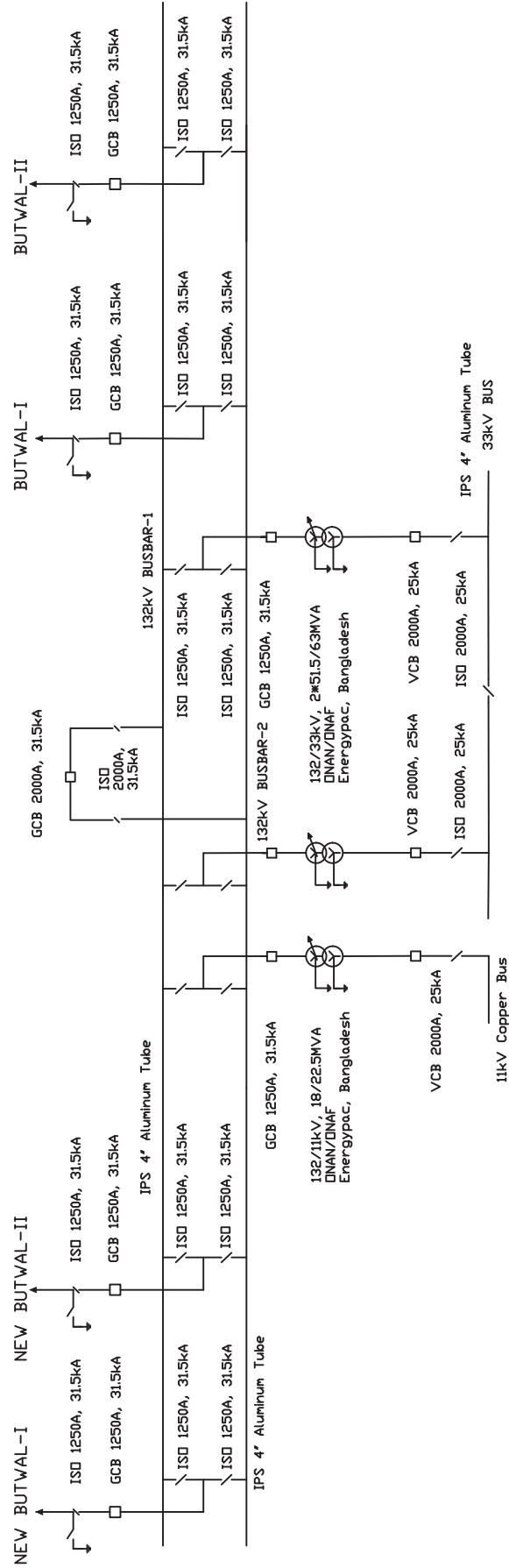
Installed Capacity : 220/132 MVA



68. SUNWAL SUBSTATION

Sunwal Substation with Double Bus System is located at Sunwal Municipality -7, Charpala Nawalparasi (West). Sunwal Substation helps to supply adequate power to the nearby industries through 33kV feeder and 11kV local distribution feeders. It helps in reliable, quality and uninterrupted supply of 33 kV and 11 kV voltage level. Sunwal Substation has been charged and feeds power with 7 different 33 kV feeders and 3 different 11kV feeders.

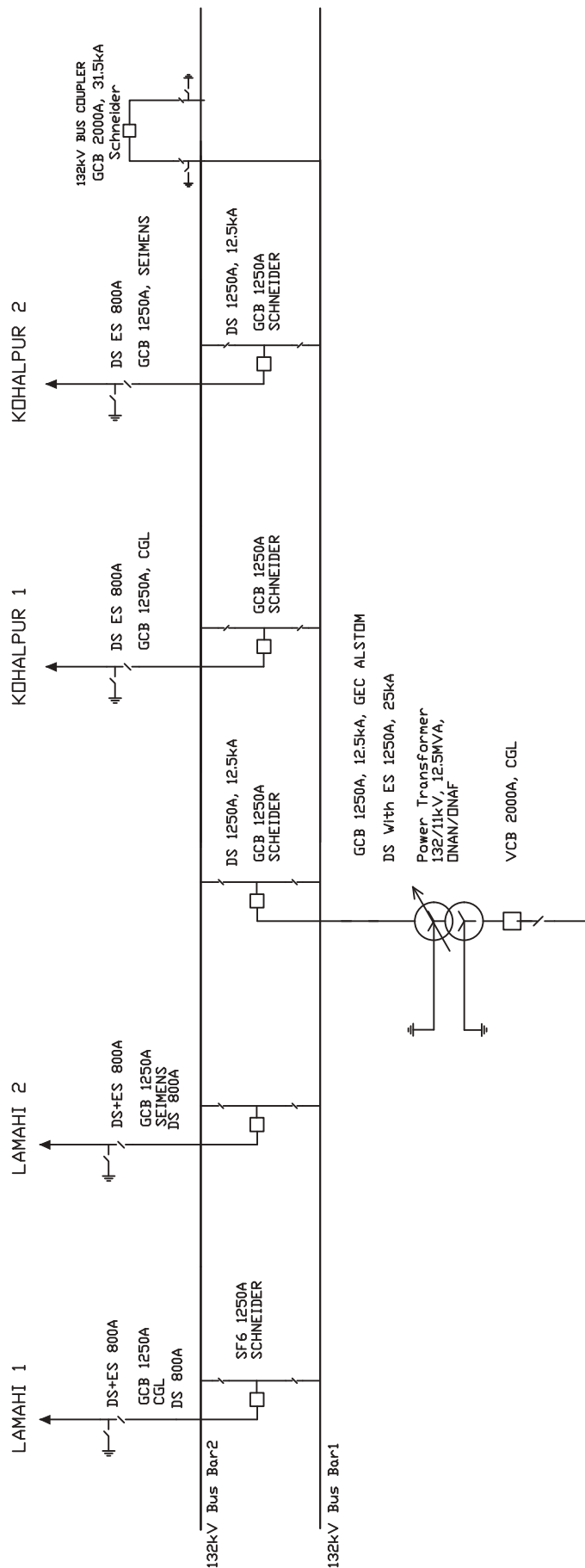
Installed Capacity : 132/33kV, 2*51.5/63 MVA
& 132/11kV, 1*18.5/22 MVA



69. KUSUM SUBSTATION

Kusum substation is located at Kusum of Banke District, Seti Zone. This Substation was Build Between the Existing Lamahi Kohalpur 132 KV Double circuit line. This Substation was commissioned in 2016 with 132/11kV, 30MVA capacity. The 30MVA Transformer was replaced by 12.5MVA in 2017.

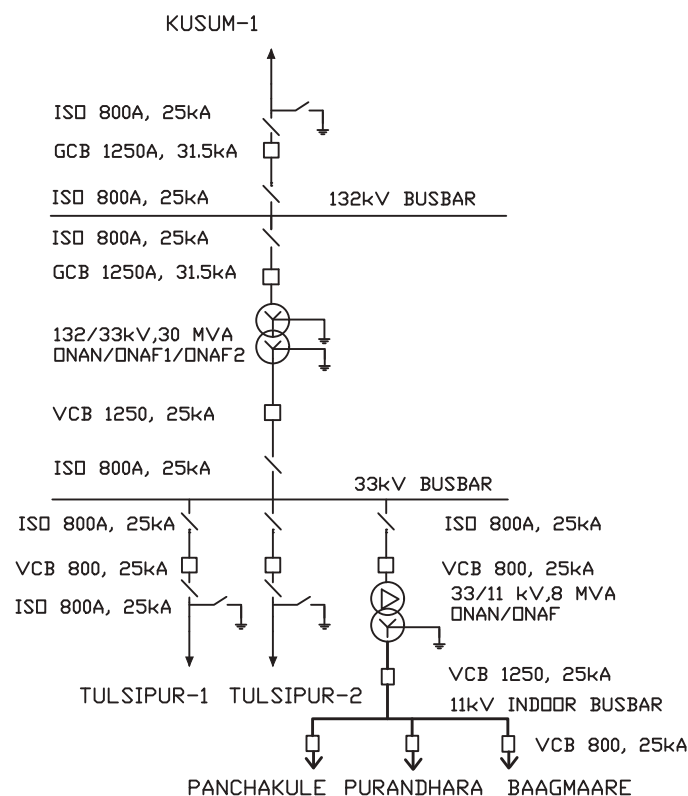
Installed Capacity : 132/33kV, 12.5MVA
Maximum Demand : 2 MVA



70. HAPURE SUBSTATION

Hapure Substation is located at Babaai Rural Municipality of the Dang District. The Project was initiated for the power supply to the Dang Cement Industries Pvt. Ltd. but now is the main supply of quality Power in Tulsipur Sub-Metropolitan City with two 33 kV feeders and the Babaai Rural Municipality from Panchakule, Purandhara and Baaghmaare 11 kV feeders. The substation is constructed as a Single Bus bar system both for 132 kV and 33 kV and indoor bus bar of 11 kV. The substation receives Power from Kusum Substation via single Circuit 132 kV Bear Conductor in a Double Circuit Tower. The substation was Commissioned partly on 29/08/2017 for the 132/33 kV and 25/12/2018 for the 33/11 kV Substation. The 132/33 kV Substation consists of one 132 kV incoming line, one 132/33 kV, 30 MVA Power Transformer and two 33 kV outgoing line. The substation was constructed by the Contractor TBEA Deyang Cable Co. Ltd. The 33 kV Busbar was extended to construct one 33/11 kV, 8 MVA Transformer Bay with three 11 kV Outgoing Feeders. The 33/11 kV Substation was constructed by Ms. Mudbhary & Joshi Construction Pvt. Ltd. The two 33 kV line feeds the Tulsipur 33/11 kV Substation while three 11 kV feeder distributes power to the Western Region of the Dang valley.

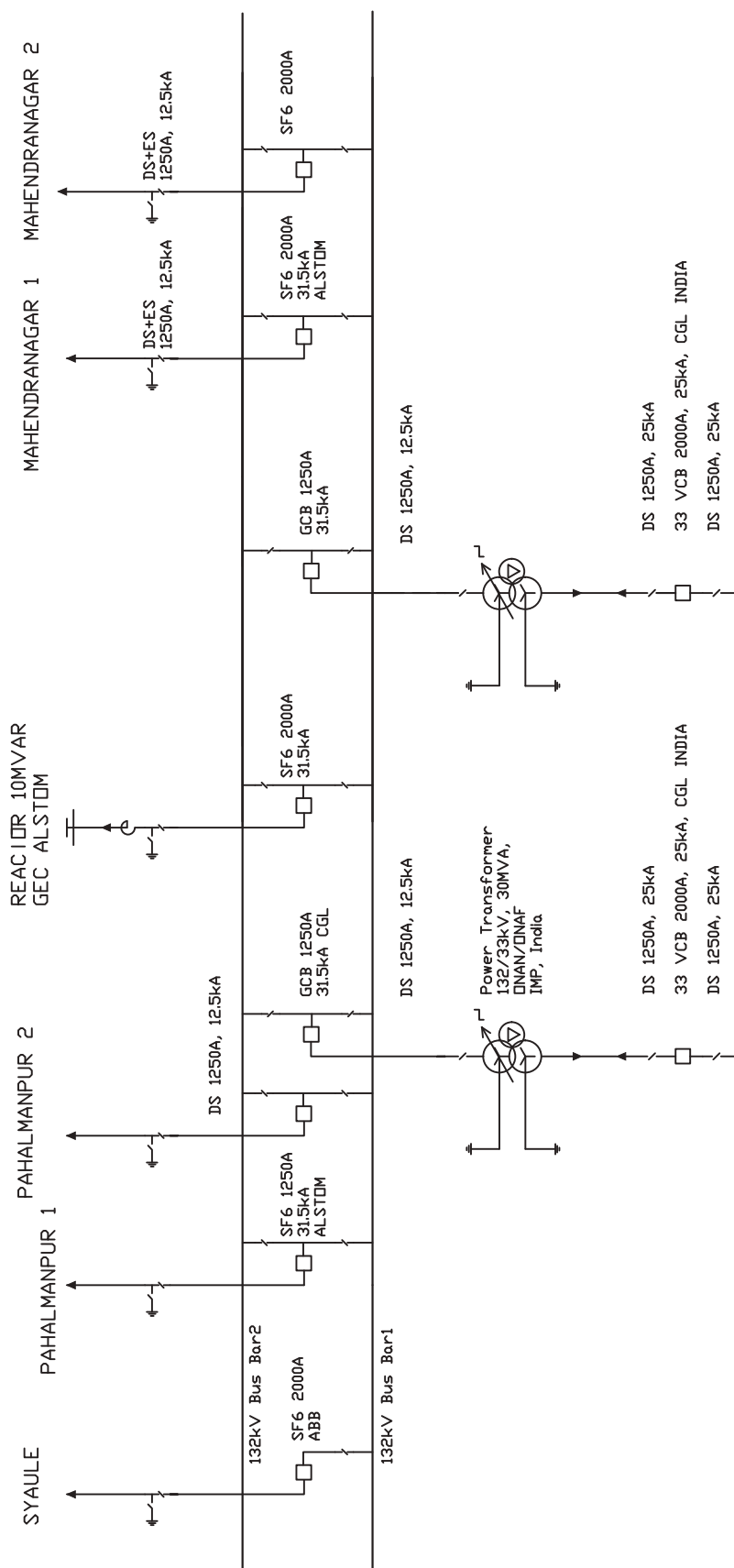
Installed Capacity : 132/33kV, 30MVA
Maximum Demand : 19MVA



71. ATTARIA SUBSTATION

Attaria substation with single bus system, located at Attariya of Kailali district of Seti zone feeds power to Dhangadi, Dipayal, Attariya, Krishnapur, Chaumala and Geta. This substation is connected to Mahendranagar and Pahalmanpur substations by 132 kV double circuit line and Syaule Substation by 132kV Single Circuit Line. This Substation was built in 1992 with the grant aid of French Government with 132/33kV, two numbers of 7.5 MVA transformers. Later, the KKREP installed the 33/11kV, 3MVA transformer. One of the 7.5MVA Transformer was upgraded to 15MVA in 2009 while the other 7.5MVA was upgraded to 15MVA in 2014. Those Transformers were further upgraded to 2x30MVA in 2016.

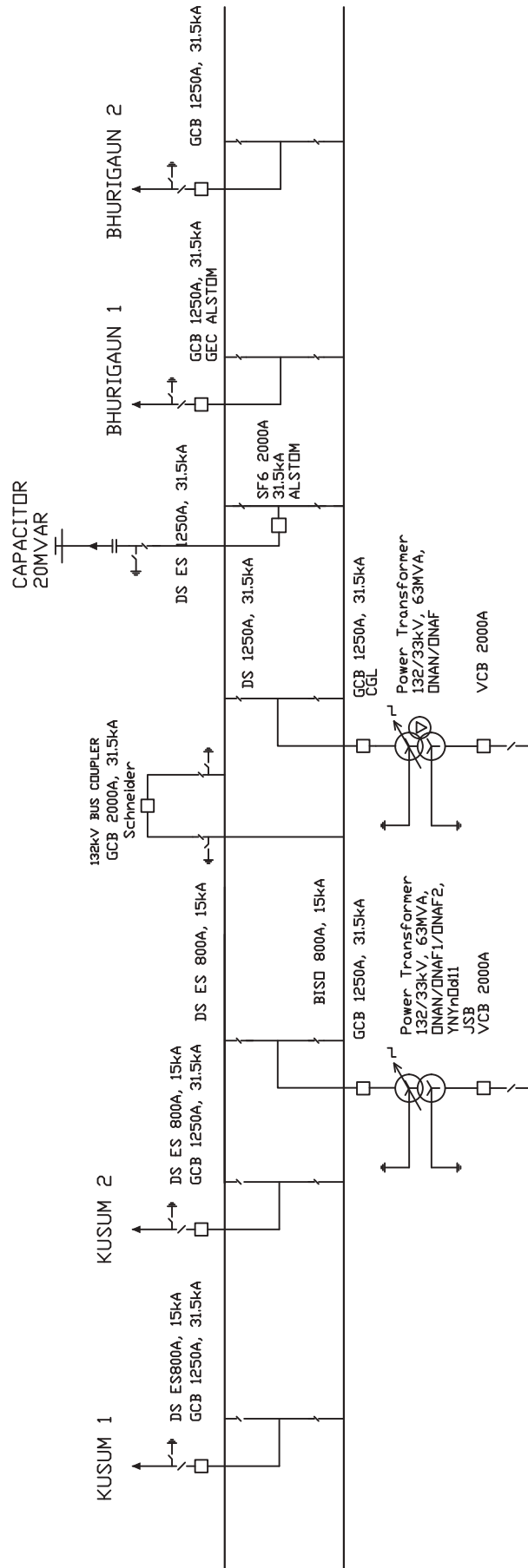
Installed Capacity : 132/33kV, 60 MVA
Maximum Demand : 23.09MVA



72. KOHALPUR SUBSTATION

Kohalpur substation with double bus system, located at Kohalpur of Banke District feeds power to Surkhet, Gulariya, Nepalgunj, Raniha and Kohalpur. This substation is connected to Lamahi and Lamki substations by 132kV double circuit line. This Substation was commissioned in 1987 with 132/33kV, two numbers of 5MVA transformers. The main and transfer bus system in 2002. One of the 5MVA Transformer was replaced by 10MVA Transformer in 2002, which was again replaced by 15MVA single phase transformer after 10MVA was damaged in 2004. Further upgradation was made in 2007 when another 5MVA Transformer was replaced by a 10MVA transformer. The 10MVA was upgraded to 30MVA in 2015 while the 15MVA was also upgraded to 30MVA in 2017. One of the 30MVA was further upgraded to 63MVA in 2019. Another 30MVA was further upgraded to 63MVA in 2022.

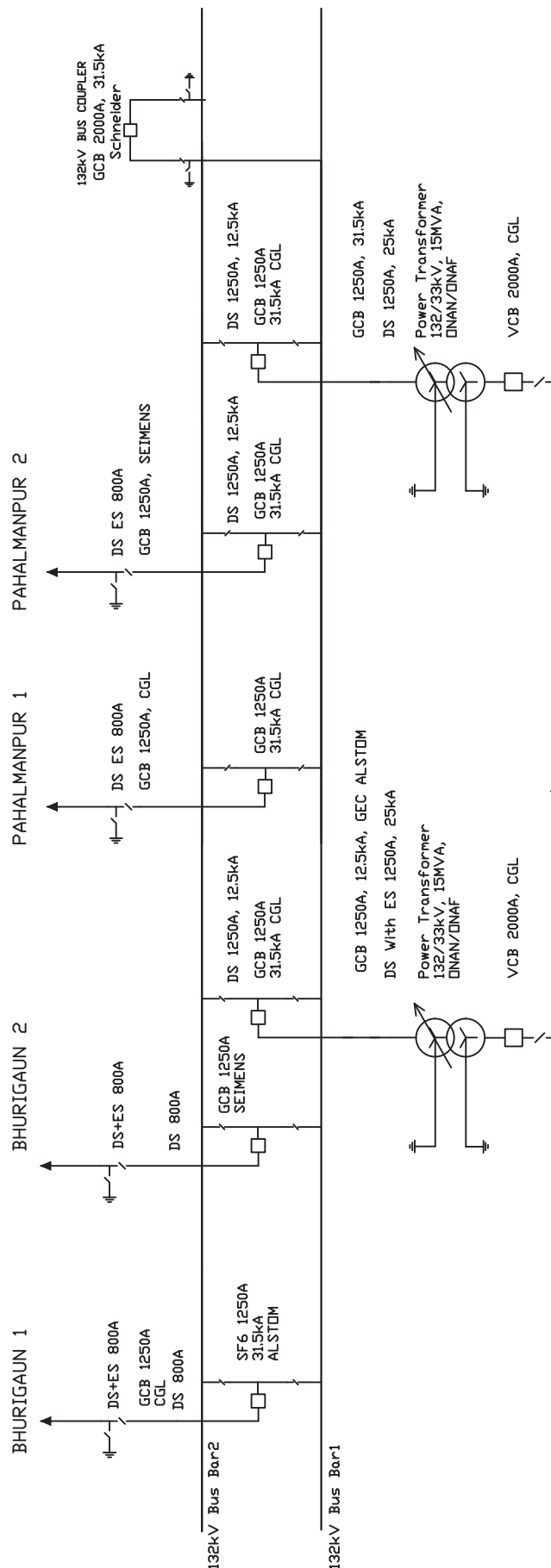
Installed Capacity : 132/33kV, 126MVA
Maximum Demand : 54.19 MVA



73. LAMKI SUBSTATION

Lamki substation located at Lamki of Kailali District, Seti Zone, feeds power to Lamki, Tikapur, Chuha Lamki, Chisapani and Baliya. This Substation is connected to Bhurigaun and Pahalanpur by 132 kV double circuit line. This Substation was commissioned in 1992 with the grant aid of French Government with 132/33kV, 7.5MVA capacity. Another 132/33kV, 7.5MVA Transformer bay was added in 2014. The 2x 7.5 MVA Transformers were further upgraded to 2x15MVA one in 2016 and another in 2018.

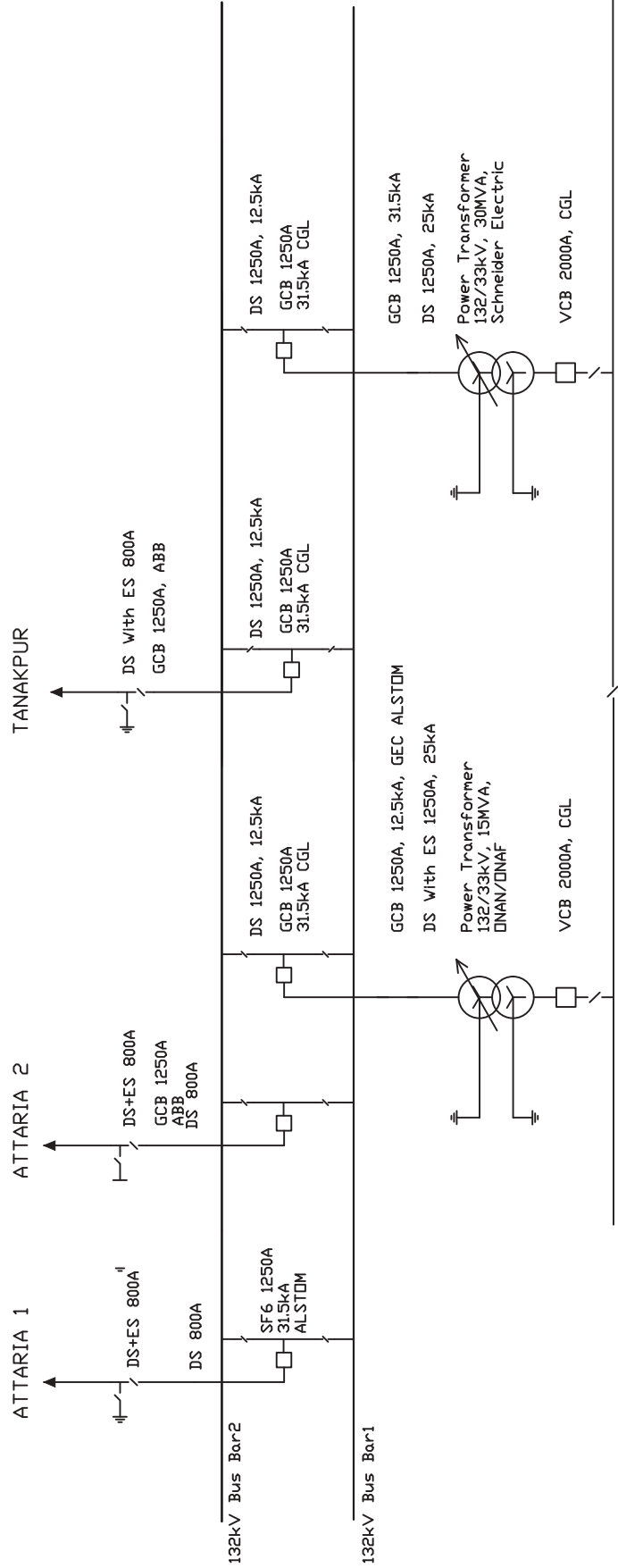
Installed Capacity : 132/33kV, 30MVA
Maximum Demand : 17.83 MVA



74. MAHENDRANAGAR SUBSTATION

Mahendranagar substation located at Lalpur of Kanchanpur district of Mahakali zone feeds power to Gaddachowki and Jhalari. This substation is connected to Tanakpur Powerhouse to import the power as per contract agreement between Indian and Nepalese Government, which is subsequently connected to Attaria substation by 132 kV double circuit line. This Substation was built in 1992 with the grant aid of French Government with 132/33kV, 7.5MVA capacity. This substation was upgraded in 1999 when the Tanakpur Line bay was added. In 2009 additional 132/33kV, 5MVA Transformer bay with 33kV Feeder was constructed. KKREP has also added one number of 33kV Jhalary Feeder to provide local loads for Jalary and Sripur in FY 2009/10. The 5MVA Transformer was upgraded to 10MVA in 2011. Whereas the 7.5MVA was upgraded to 15MVA in 2017. The 10MVA Transformer was further upgraded to 15MVA in 2019.

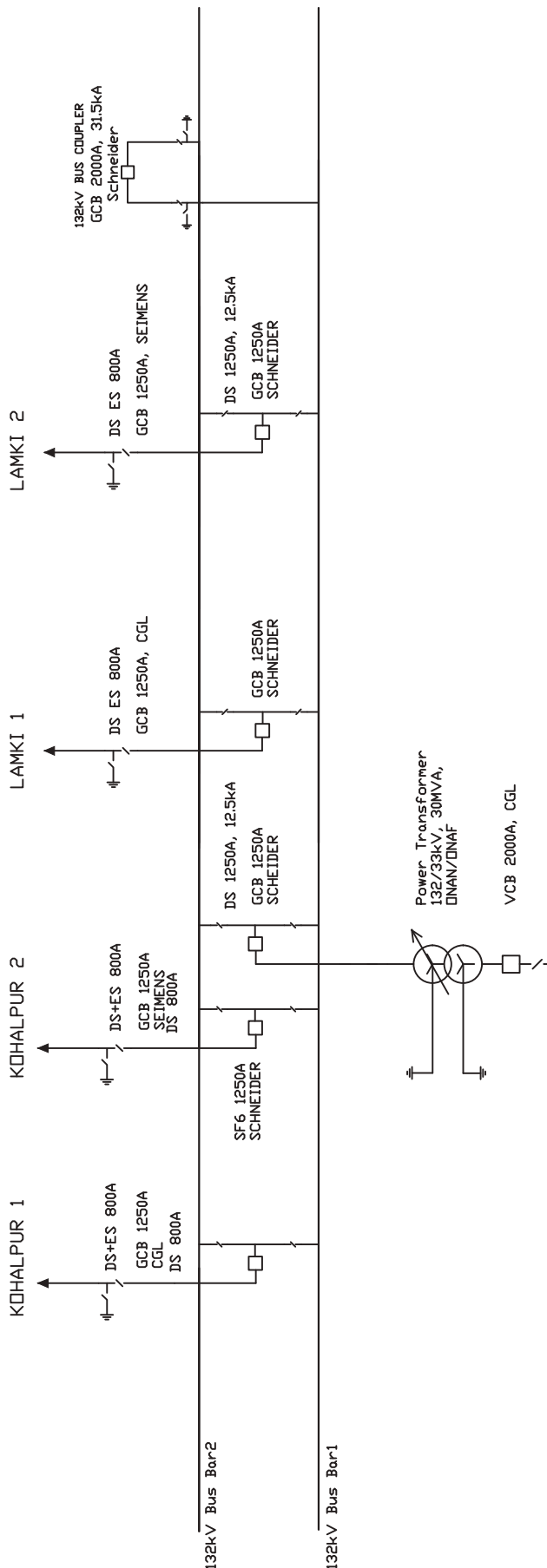
Installed Capacity : 132/33kV, 45MVA
Maximum Demand : 23.29MVA



75. BHURIGAUN SUBSTATION

Bhurigaun substation is located at Bhurigaun of Bardiya District, Bheri Zone, feeds power to Bhurigaun and Thakurdwara area. This Substation is was Build Between the Existing Lamki Attaria 132 KV Double circuit line by Kohalpur Mahendranagar Double Circuit Project. This Substation was commissioned in 2018 with 132/33kV, 30MVA capacity and 33/11, 8 MVA.

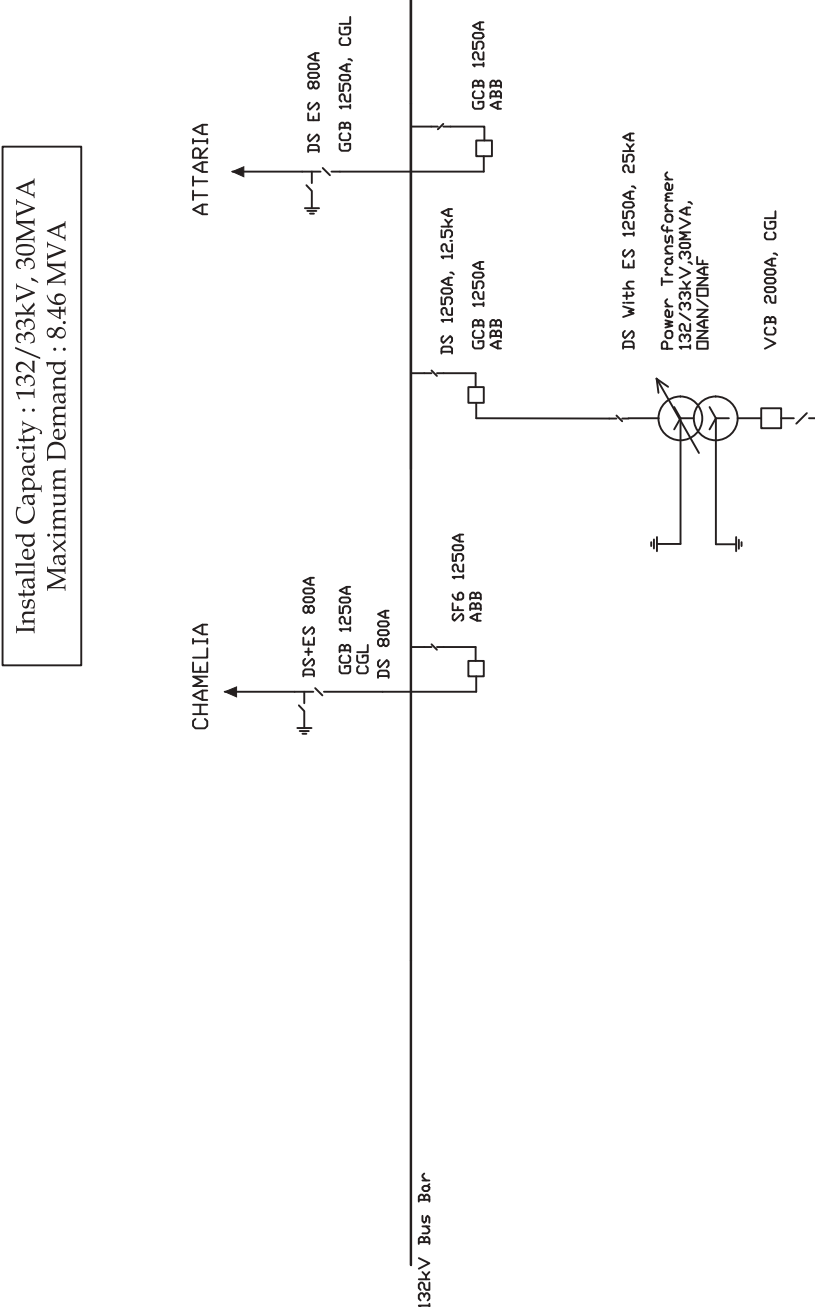
Installed Capacity : 132/33kV, 30MVA
Maximum Demand : 2.11 MVA



Pahalmanpur substation is located at Pahalmanpur, Chaumala, Hasulia, Masuria and Sukhad area. This Substation is was Build Between the Existing Lamki Attaria 132 KV Double circuit line by Kohalpur Mahendranagar Double Circuit Project. This Substation was commissioned in 2018 with 132/33kV, 30MVA capacity and 33/11, 8 MVA.

77. SYAULE SUBSTATION

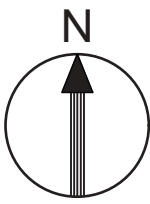
Syaule substation is located at Syaule of Dadeldhura District, Mahakali Zone, feeds power to Budar, Doti, Bagarkot, Dadeldhura, Bhatkanda, Doti Ghatal and Sakayal area. This Substation was built Between the Existing Chamelia Attaria 132 KV Single circuit line. This Substation was commissioned in 2018 with 132/33kV, 30MVA capacity and 33/11, 6/8 MVA.



POWER DEVELOPMENT MAP OF NEPAL

EXISTING / UNDER CONSTRUCTION TRANSMISSION LINES / SUBSTATIONS

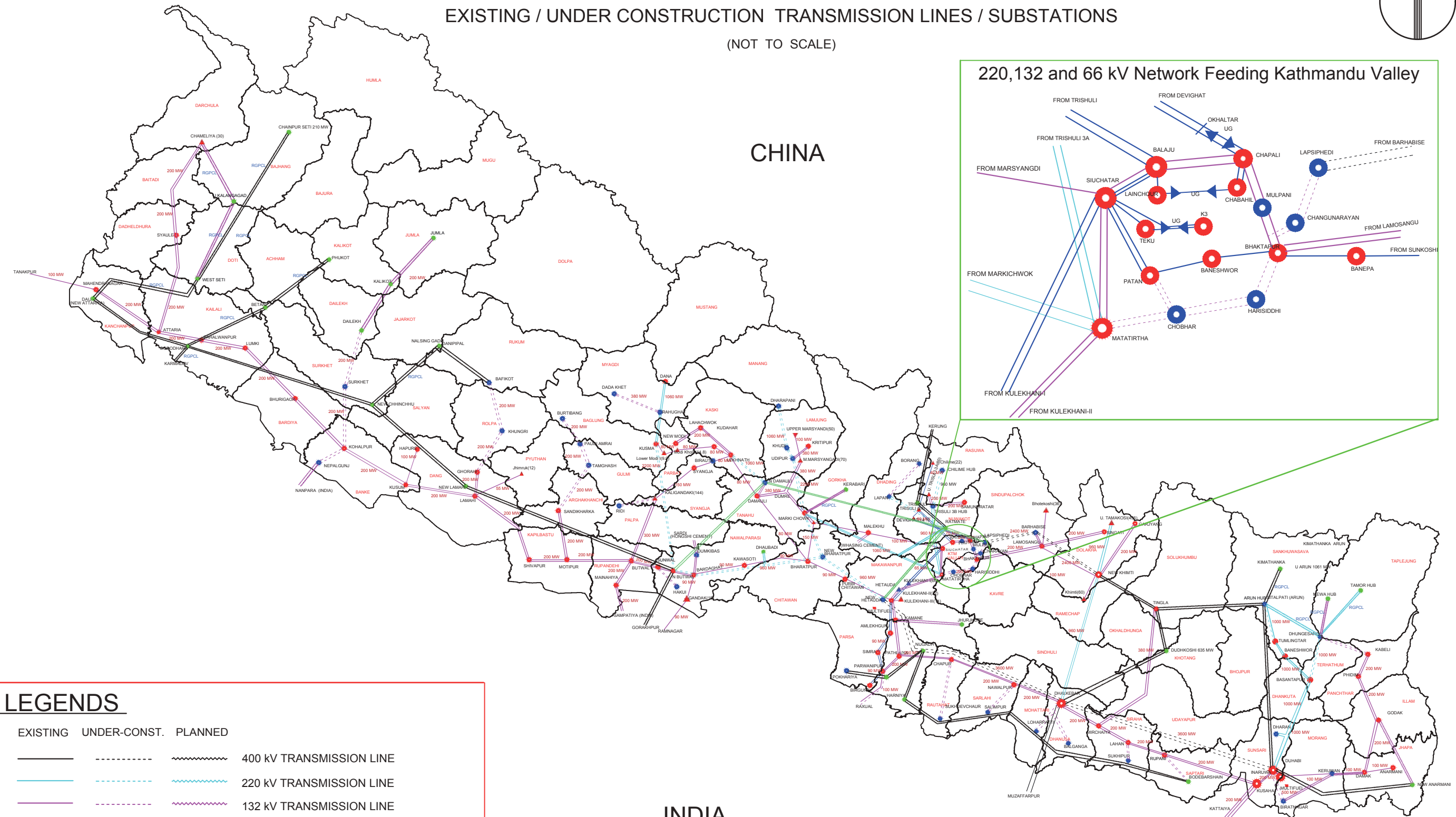
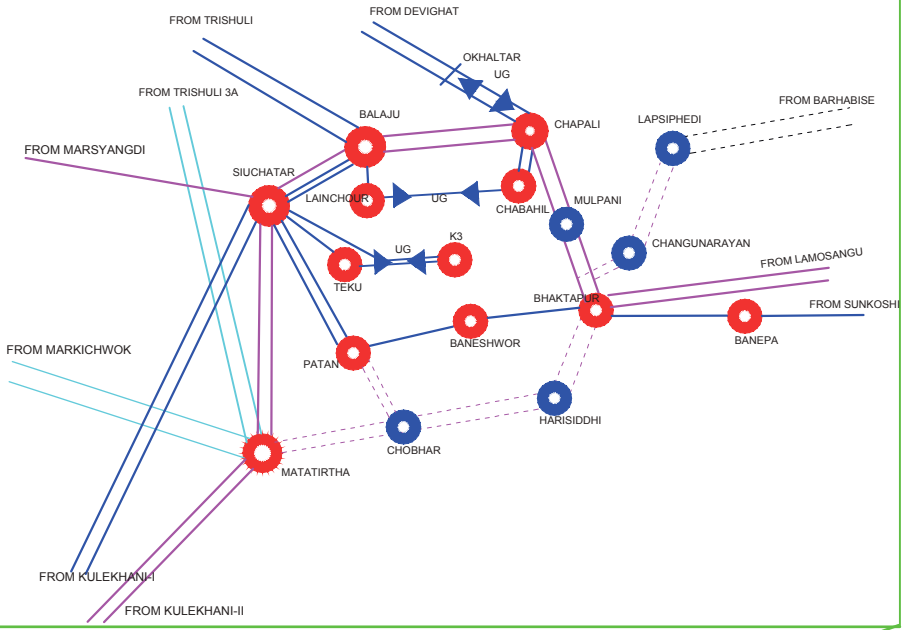
(NOT TO SCALE)



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

Legend:

Existing	Under Construction	Voltage Level
		400kV
		220kV
		132kV
		66kV
		33kV
		11kV

Length, Conductor Size

		4.56km, 0.15 sq in
		4.56km, 0.15 sq in

132kV Substation

220kV Substation

400kV Substation

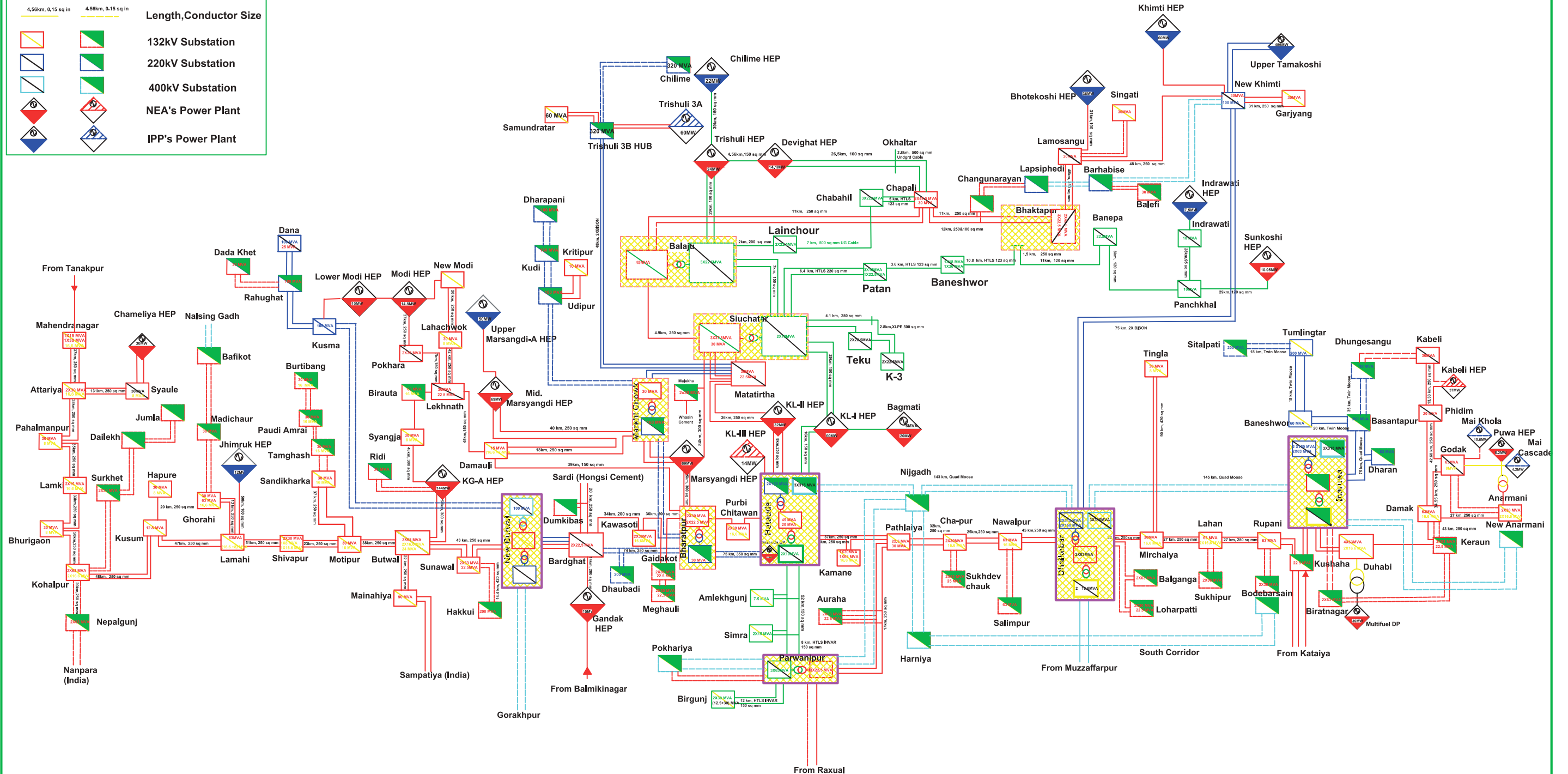
NEA's Power Plant

IPP's Power Plant

INTEGRATED NEPAL POWER SYSTEM

(Existing & Under Construction Transmission Line Projects)

(Last Revision: July 2023)





Gariyang 132 kV Substation



New Khimti 400/220/132 kV Substation Underconstruction



New Bharatpur 220/132 kV Substation



Basantapur-Dhungesanghu 220 kV Transmission Line Section

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Email: transmission@nea.org.np
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Project Management Directorate
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Email: pmd@nea.org.np
Website: www.nea.org.np