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PULCHOWK CAMPUS

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Evaluation of Wheeling Charge in Context of Nepalese Power Market

by

Prajwal Bhattarai

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DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING

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ABSTRACT

Today, the electric utility industry is undergoing significant changes as a result of restructuring in the power system. This restructuring primarily aims to introduce competition among various market participants. Consequently, it becomes imperative to devise an appropriate pricing strategy that ensures both reliability and secure operation of the power system. In instances where the power system operates within a deregulated environment, a transmission company emerges, tasked with the construction, ownership, and operation of the transmission system. Additionally, the Independent System Operator may take on the responsibilities of both the system operator and the transmission company. Upon transmitting power, fees are imposed on users utilizing the transmission lines. These fees enable the transmission company to recoup its capital and cover operational and maintenance costs. As a result, the transmission company levies a wheeling charge on those who utilize its transmission lines. Nonetheless, it's crucial to guarantee that the charges imposed on users for wheeling services are fair and accurately calculated.

The wheeling charge in context of Nepalese power market is evaluated considering the per mile cost of transmission line of three different voltage levels 132 kV, 220 kV, and 400 kV considered as transmission voltage in Nepal. The per mile cost of transmission line of different voltages is evaluated from the Transmission System Development Plan of Nepal prepared by Rastriya Prasaran Grid Company Limited. Annual operation and maintenance cost of 1% of capital cost is also considered to evaluate the wheeling charge.

To ensure equitable user charges, the calculation of wheeling charges in the Nepalese power market, considering the Integrated Nepal Power System projected for the year 2040, undergoes assessment through four different scenarios: (i) excluding transmission losses, (ii) factoring in transmission losses, (iii) incorporating a power factor of 0.8, and (iv) integrating a power factor of 0.9, with a reference power factor of 0.85. The study revealed that including transmission line losses resulted in higher wheeling charges compared to evaluations without considering these losses. The impact of varying power factors aims to either penalize or reward users operating loads at a lower or higher power factor than the

reference. This adjustment is reflected in adjusted wheeling charges, either higher or lower. The fairer evaluation of wheeling charges in the Nepalese power market is found when considering both transmission line losses and the effect of power factor adjustments.

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LIST OF ABBREVIATION

GW	: Giga Watt
INPS	: Integrated Nepal Power System
kV	: Kilo Volt
kVA	: Kilo Volt Ampere
kWh	: Kilo Watt Hour
MUSD	: Million US Dollar
MW	: Mega Watt
NEA	: Nepal Electricity Authority
Pf	: Power factor
RPGCL	: Rastriya Prasaran Grid Company Limited
WECS	: Water and Energy Commission Secretariat

CHAPTER ONE: INTRODUCTION

1.1. Background

In context of Nepal competitive market for electricity has developed for generation but for transmission and distribution sector there still remains a monopoly business. In Nepal transmission and distribution of electricity has been done by Nepal Electricity Authority (NEA).

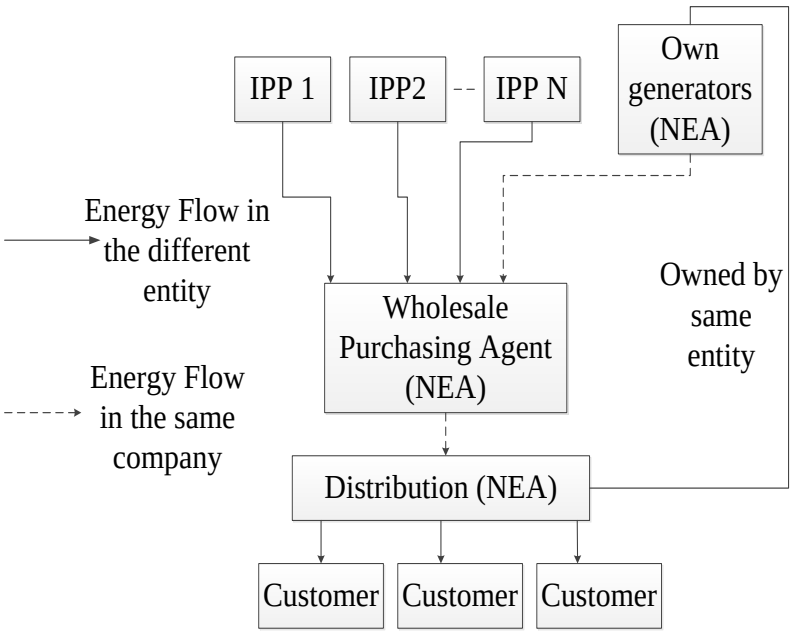


Figure 1-1: Vertically Integrated model of Nepalese power market

But on 15 July 2015 in the process of unbundling NEA, the Government of Nepal established a separate transmission company known as Rastriya Prasaran Grid Company to transmit and evacuate the power for the development and operation of the hydropower sector whereas distribution will be looked after by Nepal Electricity Authority (RPGCL, 2018). This transmission company facilitates the trading between generation sectors and distribution sectors and will play a vital role in the restructuring of the power industry in the country. Power transmission is an area where the economics of scale are quite significant and hence there are tendencies in the system to produce monopolies. The parameters that characterize the electric power transmission sector are (Rudnick & Raineri, 1997):

a. Substantial, fixed capital investments
b. Necessity for redundancies to fulfill security standards

c. Economics of scale in building expenses relative to the transmission line's capacity.
d. Economics of scope enabled by the integration of the electrical system.

Therefore, to avoid excessive charges by transmission utilities for their services, it is essential to have regulatory oversight over the transmission system. Regulation becomes especially crucial when the transmission grid serves as the central point of competition among generators spread across various locations. The transmission utility must recoup all expenses related to connections, transmission provision, and other essential associated services.

The Transmission System holds significant significance in transferring power from its generation source to the ultimate consumer. The investment made in generation is influenced by the pricing structure of the transmission. Consequently, ensuring a fair distribution of costs related to transmission usage becomes a pivotal concern. The primary determinant in assessing transmission usage costs is the imposition of wheeling charges. Wheeling transactions denote the transfer of both active and reactive power from a power generation facility to a recipient via the transmission network managed by the transmission company (Sahay, et al., 2018).

As per Schweppe "wheeling is a mongrel concept resulting from mating two inherently different economic concepts: an ideal world of regulated utilities, and an ideal deregulated competitive marketplace. Wheeling would not exist at either extreme".

1.2. Cost Components in Transmission

There are various cost components in transmission system which can be categorized as (Aryal & Karki, 2016):

1.2.1. Operating Cost

These represent the expenses linked to operating and maintaining current transmission systems. These expenditures are essential to ensure reliable power supply while adhering to criteria such as system voltage, reactive power support, and line flow limits.

1.2.2. Opportunity Cost

These expenses encompass the advantages that the transmission utility must give up in order to deliver transmission services.

1.2.3. Reinforcement Cost

This refers to the initial investment required for the construction and operation of new essential transmission facilities.

1.2.4. Existing Cost

This represents the expenses tied to the current facilities, reflecting the prior investments made in the system. Allocating these costs to transmission transactions must be done in a fair and logical manner.

The total cost of transmission transaction is the sum of the above given four costs.

1.3. Need of the Study

In Nepal, a monopoly persists within the transmission market, while competition exists in the generation sector. The transmission and distribution market remains under a monopoly. It is crucial to revamp Nepal's power market to enhance the reliability, efficiency, and affordability of the transmission system. To achieve this, the Government of Nepal has established the Rastriya Prasaran Grid Company Limited with the aim of unbundling the Nepal Electricity Authority. This move intends to create a distinct entity solely dedicated to managing transmission systems.

As the demand for electricity continues to rise steadily, it is being fulfilled by power generated from various hydroelectric sources and imported electricity from India. Consequently, the escalation in energy transactions underscores the necessity for an independent body to oversee the transmission system. Operating this entity requires effective management of funds for constructing and maintaining transmission lines. To ensure the sustainability of this entity, it must recuperate the invested costs, primarily through levying a wheeling charge, which stands as the primary source for cost recovery.

In case of Nepal, studies were done for the evaluation of wheeling charge using MW-mile method without considering the transmission line loss. But it is not fair to charge the user without considering the transmission line loss. For this consider the following three case:

a. Case I: When a user at the receiving end operates their load at the specified reference power factor, they will be charged based on the effect of power flow during the transaction, but any losses are not taken into account. To compensate for these losses, the generator must produce and deliver extra power equivalent to the losses, for which the generator receives no compensation.
b. Case II: If a user at the receiving end operates their load at a power factor below the designated reference level, they will be charged based on the influence of active power flow during the transaction. The transmission capacity diminishes due to increased loss, stemming from the need for additional reactive power supplied by the generator to offset the loss, which often goes unaccounted for.
c. Case III: When a capacitor bank compensates for the load at the receiving end, it enhances transmission capacity and reduces losses. This means the generator doesn't need to supply as much extra power compared to the previous scenario. In this situation, the user should receive recognition or benefits, which is often overlooked.

1.4. Objective

1.4.1. Main Objective

The main objective of this research is to evaluate the wheeling charge for the transmission system in context of Nepalese Power Market.

1.4.2. Specific Objectives

The specific objectives of this research are:

- To study the power flow of transmission network for scenario of 2040.
- To determine the transmission losses and the effects of change on power factor on evaluating the wheeling charge.
- To perform scenario analysis considering all the powers generated from Karnali River basin and Arun River basin exported to India
- To perform the scenario analysis considering different demand growth rate.

1.5. Scope

The scope of this study is to evaluate the wheeling charge in the context of Nepalese Power system model for year 2040. This study is further extended to evaluate the wheeling charge considering the transmission losses and the change in power factor in a deregulated environment. This pricing structure is more equitable in comparison to the assessment conducted without taking into account the transmission line loss and variations in power factor.

CHAPTER TWO: LITERATURE REVIEW

2.1. Earlier Research

Several research endeavors conducted in different nations have aimed to assess the wheeling charge. In South America an open access framework for the transmission pricing scheme was implemented (Rudnick & Raineri, 1997). Additionally, Shirmohammadi elucidated the fundamental technical principles integral to formulating cost-based transmission prices, providing an example of its implementation for pricing transmission services in Brazil (Shirmohammadi, et al., 1996).

Similarly, Sushil Aryal and Nava Raj Karki had proposed that Mega Watt Mile method can be used to determine the transmission pricing in context of deregulated market of Nepal (Aryal & Karki, 2016).

N. H. Radzi, K. Iskandar, M. N. Abdullah, M. S. Kamaruddin, S. A. Jumaat and R. Aziz had implemented a cost reflective network pricing and modified cost reflective network pricing methods for allocating the transmission service charges to the transmission user (Radzi, et al., 2017).

Research conducted by Hugh Rudnick, Rodrigo Palma, and Jose E. Fernandez demonstrates the implementation of Marginal Cost Based Pricing within the Chilean Power System, highlighting challenges encountered in distributing the surplus among the involved parties (Rudnick, et al., 1995).

Cost Reflective Network Pricing (CRNP) and Modified Cost Reflective Network Pricing (MCNRP) method for transmission services is studied for pricing the transmission charge for Australian National Electricity Market (Radzi, et al., 2011).

K.L. Lo and Mohammad Yusri Hassan employed a negative flow sharing method to distribute transmission transaction fees among users of transmission services (Lo & Hassan, 2007). This approach leverages the principles of the Mega Watt-Mile method but considers the economic advantages of both trading parties by examining their respective shares in negative power flow or counter flow.

A new methodology was proposed by A.R Abhyankar and S. A. Khaparde for the western regional grid of India, aiming to calculate the fixed cost distribution within the transmission network (Abhyankar, et al., 2005). This study advocates for a modified postage stamp allocation method compliant with tracing requirements. The method computes a traceable solution that minimizes the overall deviation from the postage stamp allocation.

E.T Fasina, B. Adebanji, A. Abe, and I. Ismail introduced a method to assess the wheeling charge within a deregulated power network (Fasina, et al., 2021). Their research suggested a hybrid approach combining the MVA-kilometer and the Short-Run Marginal Cost (SRMC) technique. This method utilized power flow and optimal power flow (OPF) analyses to ascertain how individual participants influence the transmission power flows for allocating the wheeling cost.

Shaik Riyaz, Ramanaiah Upputuri and Niranjan Kumar had proposed a Mega Watt – Mile Method that considering the transmission losses and load power factor variation so that the recipient who operates their load at improved power factor gets benefited and the recipient who operates their load at poor power factor gets penalized. This study has been done for IEEE 30 bus system (Riyaz, et al., 2020) .

R. Gnanadass and N.P Padhy (Gnanadass & Padhy, 2005) had proposed an improved approach for the allocation of the transmission service embedded cost using the average revenue requirement of the facility instead of the line length as used in the conventional approach. The study justified that the transmission pricing could be computed taking into account the cost of transmission facility due to the wheeling transactions instead of the length of the lines.

Shuvam Sahay, Niranjan Kumar, and Himani Joshi illustrated the impact of transmission losses and the power factor of loads on transmission pricing (Sahay, et al., 2018). Their research utilized the MW-mile method to investigate the influence on transmission fees within the IEEE 30 bus system. The study provides a contrast between transmission costs factoring in transmission losses and power factor against expenses that do not consider these elements, emphasizing their importance in determining the overall charges.

D. Avinash and B. Chalapathi had provided a new approach using Mega Watt- Mile Method that evaluates the transmission pricing considering the cost component of loss and power factor (D & Chalapathi, 2015) .

Similarly tracing based point-of-connection tariff structure (Roy, et al., 2006) is studied for Indian Power System which can be employed for both power exchange and bilateral trades.

Research conducted by Muhamad Zulkifil Meah, Azad Mohamed, and Salleh Serwan presents a comparative examination of transmission cost allocation within the Malaysian Power system using the MW-Mile Method (Meah, et al., 2003). The study evaluates the absolute, reverse, dominant, and extended methods in the context of the Malaysian Power system to gauge their influence on long-term transmission planning.

Research conducted by Syarifuddin Nojeng, Mohammad Yusri Hassan, Dalila Mat Said, Md. Pauzi Abdullah, and Faridah Hussin (Nojeng, et al., 2014) introduces an enhanced version of the MW-Mile Method that incorporates not only variations in MW flows but also considers the power factor of the load. The investigation was conducted using the IEEE 14 bus system.

Deep Kiran, A.R Abhyankar, and B. K. Panigrahi (Kiran , et al., 2016) introduced a noble idea to group nodes into zones based on close connectivity and comparable usage patterns. This concept was applied to equivalent bilateral exchange, marginal participation method, and hybrid methods of transmission pricing mechanisms. The research was conducted using the IEEE 118 bus system.

2.2. Load Flow Analysis

Load flow analysis is used to validate and check the operation of system under normal or outage conditions to see if the system is capable to supply the planned additional loads and compare new alternatives for system additions to supply the new loads or improve the system. Load flow analysis mainly deals with the four quantities of the power system. They are:

a) Voltage magnitude
b) Phase angle

c) Active power

d) Reactive Power

Load flow analysis is performed to validate whether the abovementioned power system quantities are within the limit or not.

2.3. Evaluating Pricing Methods

Among various methods postage stamp method and power flow-based megawatt - mile method will be used.

2.3.1. Postage Stamp method

This pricing approach determines the transmission transaction cost based on the quantity of power exchanged, typically measured during the system's peak period. It is the most straightforward method for assessing transmission pricing. However, this method doesn't account for the power flow path, specific supply or delivery locations, or the timing of the transactions

It is calculated as (Shirmohammadi, et al., 1996):

$$R_t = TC \frac{P_t}{P_{peak}} \qquad \text{Equation 1}$$

Where,

R_t is the transmission pricing for transaction

TC is the total transmission cost

P_t is the total power transacted at the time of system peak in MW

P_{peak} is the System Peak in MW

2.3.2. Contract Path Method

The contract path method has its roots in an era when the electricity supply industry was primarily composed of vertically integrated utilities, and energy exchanges were uncommon. Under this approach, a contract delineates a continuous electrical

route (referred to as the contract path) through which power is presumed to travel from the generator to the designated delivery point. In this arrangement, both the producer and the consumer commit to paying a wheeling charge throughout the contract duration, proportionate to the transmitted power volume. This charge contributes to the utility's revenue, aiding in the recovery of costs associated with the transmission assets encompassed within the specified contract path.

2.3.3. Megawatt (MW) Mile method

The MW-mile method addresses two limitations present in the postage stamp method: reliance on power flow in specific lines and the inclusion of transaction distance (factoring in losses). In the MW-mile approach, the power flow-mile for each transmission line is calculated by multiplying the power flow by the distance of that particular line. This process results in the total power flow-miles obtained by summing up all individual power flow-miles. This cumulative power flow-mile directly reflects transmission utilization, creating a pricing model that corresponds to the transmission usage linked with the transaction.

2.4. Digsilent Powerfactory

Digsilent Powerfactory is a leading power system analysis software used in analyzing generation, transmission, distribution and industrial systems. It is used in performing balanced load flow analysis as well as unbalanced load flow analysis, short circuit analysis, dynamics study, contingency analysis, optimal power flow, protection coordination etc.

CHAPTER THREE: RESEARCH METHODOLOGY

The research is conducted in following steps

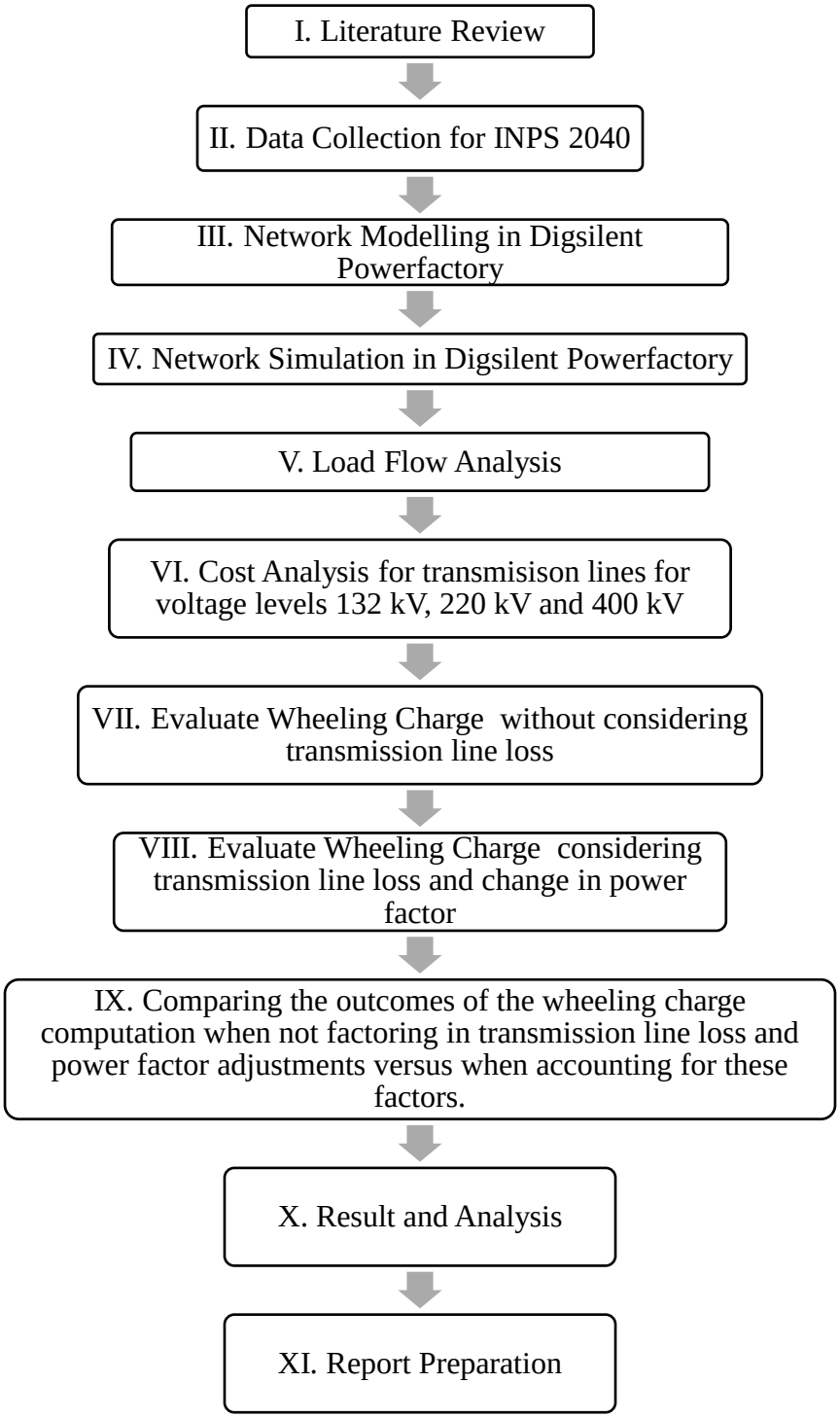
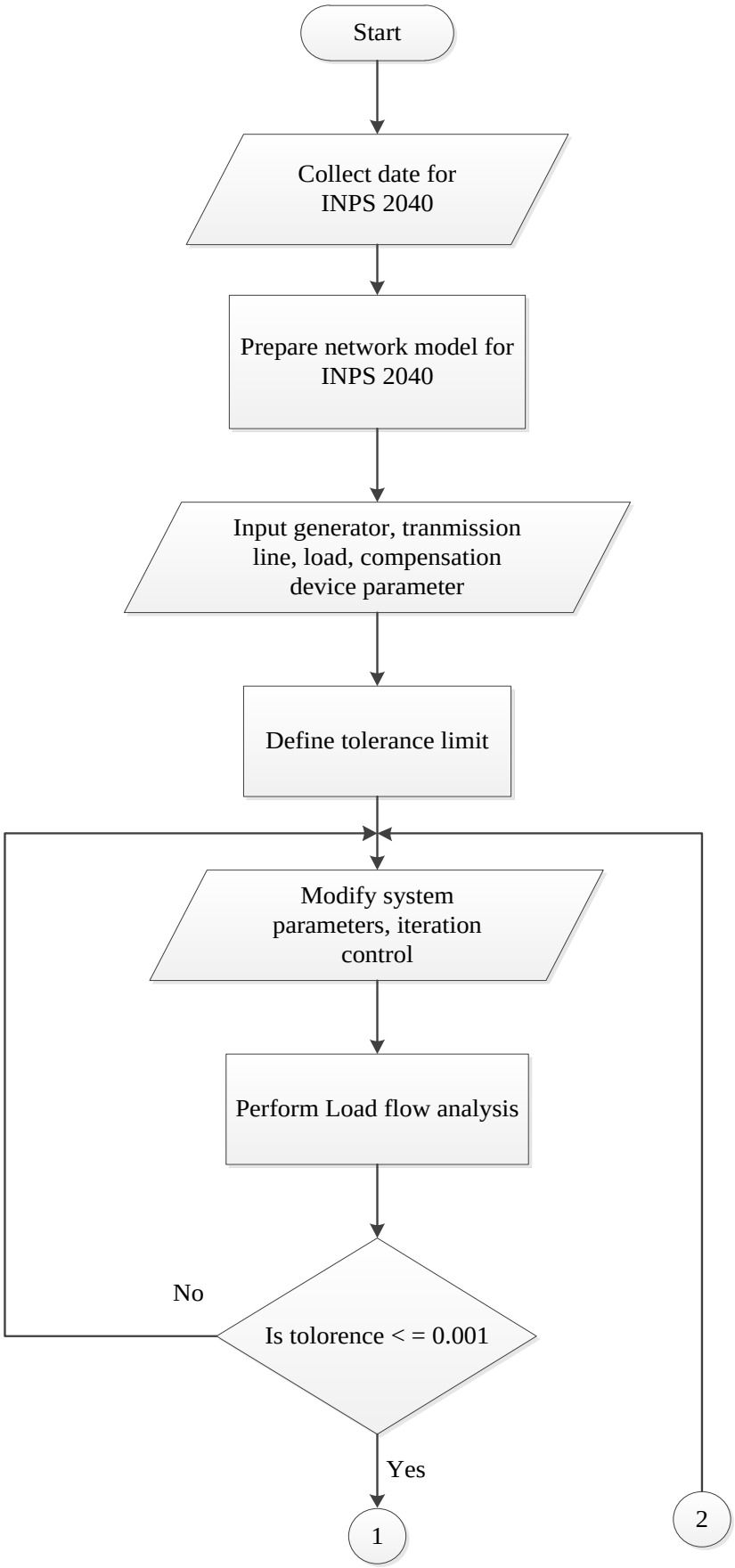
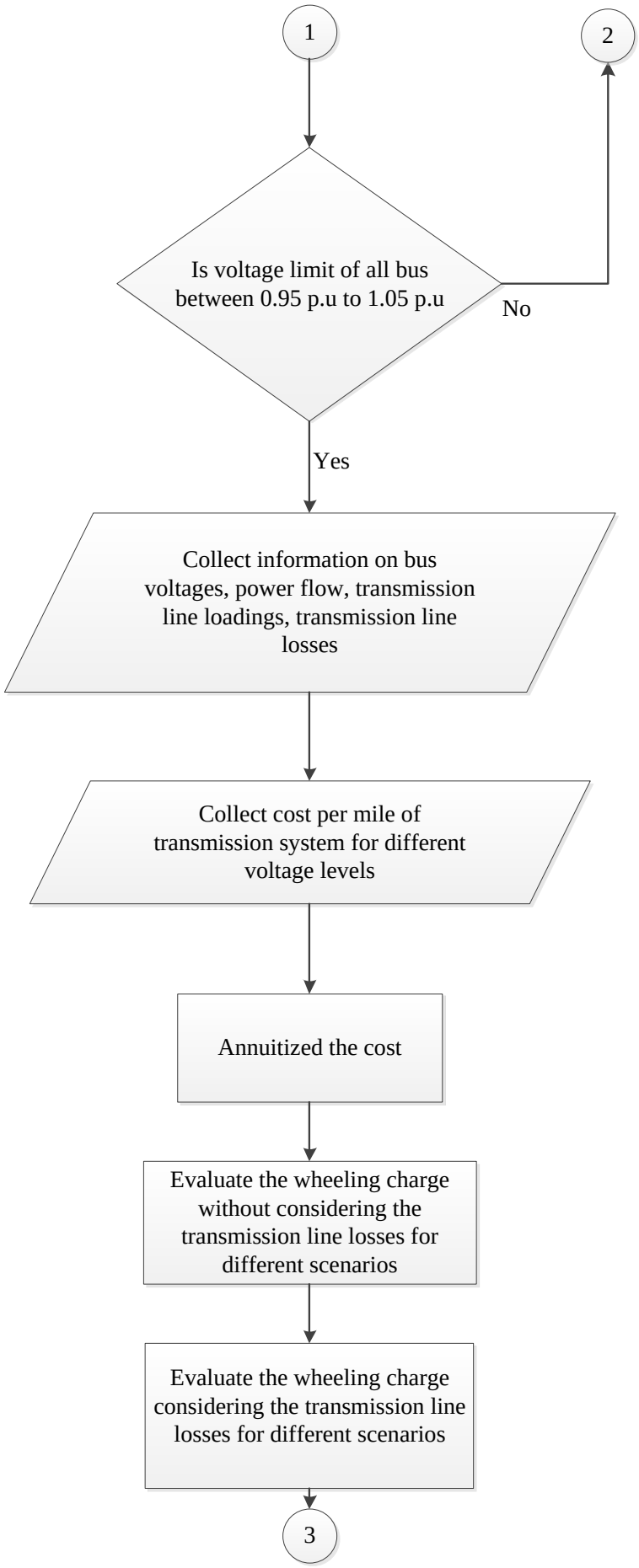


Figure 3-1: Steps of the conducted works

The flowchart of the study is shown in figure below:




1
2
Is voltage limit of all bus between 0.95 p.u to 1.05 p.u
No
Yes
Collect information on bus voltages, power flow, transmission line loadings, transmission line losses
Collect cost per mile of transmission system for different voltage levels
Annuitized the cost
Evaluate the wheeling charge without considering the transmission line losses for different scenarios
Evaluate the wheeling charge considering the transmission line losses for different scenarios
3

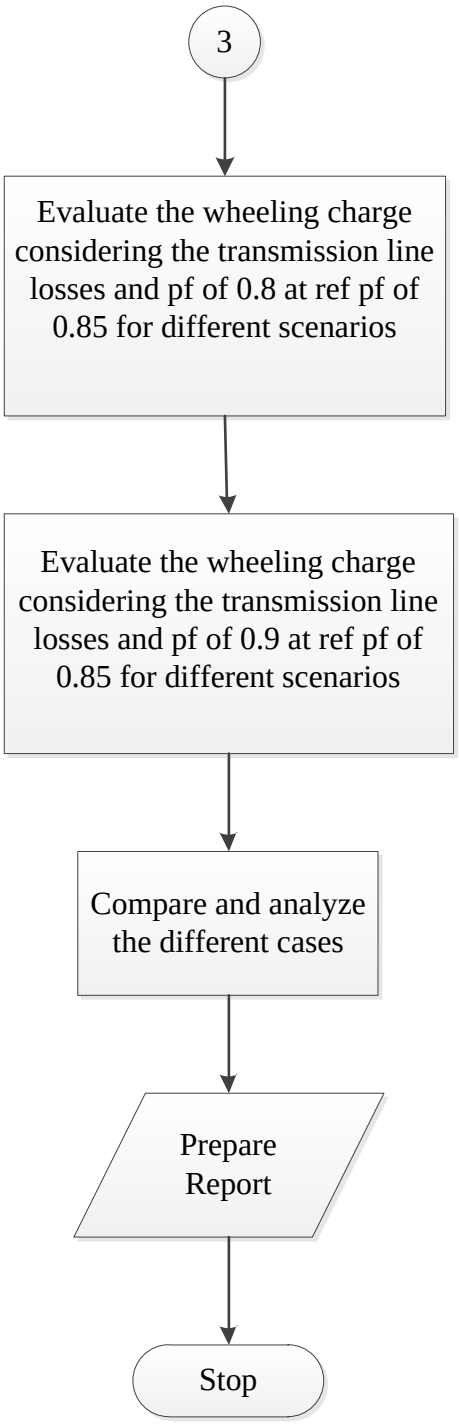


Figure 3-2: Flowchart of the study

3.1. Data Collection

The study is performed in the Integrated Nepal Power System of Nepal for year 2040. The data were collected from the Transmission System Development Plan report prepared and published by Rastriya Prasaran Grid Company Limited. The input parameters such as generator capacity, conductor parameters, and load parameters were taken from from the transmission system development plan.

System of 132 kV, 220 kV and 400 kV voltage levels were only taken for the study. The total cost required to construct the transmission lines are taken from the Transmission System Development Plan report. (Limited, 2018)

The report shows that the maximum installed capacity is about 38 GW, maximum domestic load is about 18 GW and maximum export capacity of 16 GW with 3 GW spinning reserve is predicted for the year 2040.

The transmission system of Nepal for year 2040 is divided into five zones. The total number length of transmission line and number of substations is given below (Limited, 2018):

Table 3-1: Zone wise Length of transmission lines and number of substations

Zone	Transmission Line (km)			Substation		
	400 kV	220 kV	132 kV	400 kV	220 kV	132 kV
Zone 1	801		361	8		1
Zone 2	515		344	8		1
Zone 3	525	626	728	4	10	4
Zone 4	642	323	454	9	4	6
Zone 5	710	210	627	11	5	2

Above table shows that total of 3193 km of 400 kV line, 1159 km of 220 kV line and 2514 km of 132 kV line will come into operation by year 2040**.**

Similarly, power flow analysis is performed in the INPS model for year 2040 considering the 4.5% load growth, 7.2 % load growth and 9.2% load growth (Secretariat, 2017).

3.2. Modelling in Digsilent Powerfactory

The Integrated Nepal Power System (INPS) of Nepal for the year 2040 will be modeled in Digsilent Powerfactory. This software is used to run the power flow and determine the contribution of hydropowers in meeting the demand of Nepal. From power flow analysis, utilization of the transmission line by various generators are known and also the transmission line losses are also known. Network modelled in digsilent power factory is shown in figure 3-3 below:

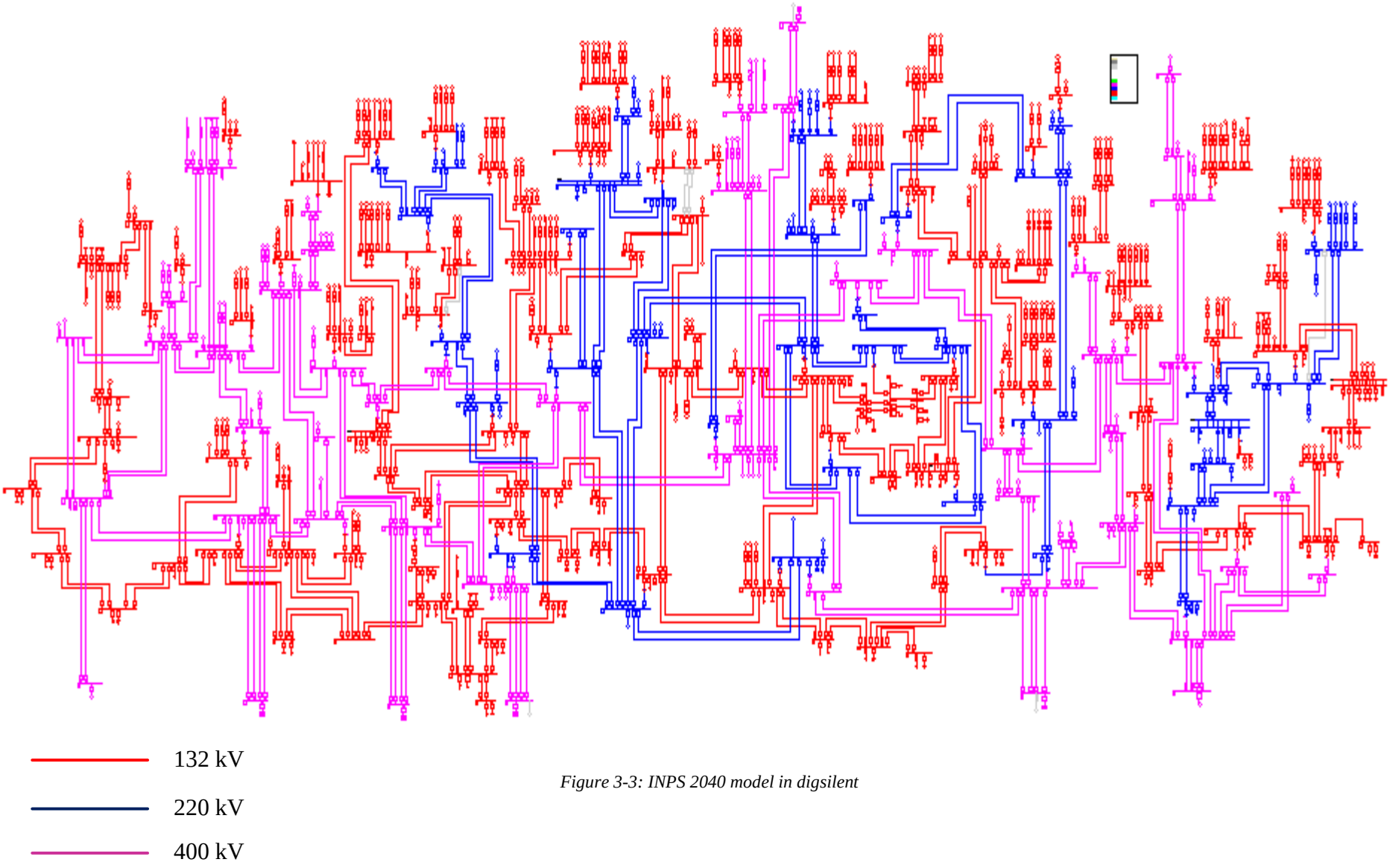


Figure 3-3: INPS 2040 model in digsilent

3.3.Wheeling Charge Evaluation Method

The method used for the evaluation of wheeling charge used in this study is the MW-Mile Method. The evaluation of wheeling charge is done for the following cases.

a. Without considering the transmission line losses
b. With considering the transmission line losses
c. Assuming the reference power factor of 0.85 and evaluating wheeling charge for power factor of 0.8
d. Assuming the reference power factor of 0.85 and evaluating wheeling charge for power factor of 0.9

Evaluation of wheeling charge without considering the transmission line lexpressed mathematically as (Sahay, et al., 2018);

$$C_k = \sum_{i=1}^{N} \frac{L_{ij} C_{ij} P_{ij}^k}{P^k} \qquad \text{Equation 2}$$

Where,

C_k is the price transmission cost to user k ($)

L_{ij} is the transmission line length in miles

C_{ij} is the unit cost of the transmission line ($/miles)

P_{ij}^k is the power flow in the transmission line due to transaction k (MW)

P^k is the capacity of the transmission line (MW)

In the above equations the transmission line loss and the effect of change in power factor is not considered. Considering the transmission line losses above equations can be modified as (Sahay, et al., 2018):

$$C_k = \sum_{i=1}^{N} \frac{L_{ij} C_{ij} (P_{ij}^k + P_{lij}^k)}{P^k} \qquad \text{Equation 3}$$

Where,

P_{lij}^{k} is the transmission line losses.

To account for the impact caused by fluctuations in the load's power factor, the equation 3 can be modified as (Sahay, et al., 2018):

$$C_k = C_{LF} \sum_{i=1}^{N} \frac{L_{ij} C_{ij} (P_{ij}^{k} + P_{lij}^{k})}{P^{k}} \qquad \text{Equation 4}$$

Where, C_{LF} is the term used for power factor adjustment which can be expressed as (Shuvam Sahay, 2018):

$$C_{LF} = 1 + \left(\frac{\cos\theta_{ref} - \cos\theta_{act}}{\cos\theta_{avg}} \right) \qquad \text{Equation 5}$$

Due to the fluctuations in power factor at different times, above Equation 5 can be modifies as (Shuvam Sahay, 2018):

$$C_{LF} = 1 + \left(\frac{\cos\theta_{ref} - \cos\theta_{avg}}{\cos\theta_{avg}} \right) \qquad \text{Equation 6}$$

Where, $\cos\theta_{ref}$ is the reference power factor

$\cos\theta_{avg}$ is the average power factor of the load.

3.4. Evaluation of Unit Cost of Transmission Line

The total network cost of INPS upto year 2040 is evaluated summating the cost of transmission lines. The cost of transmission lines and substations are given below (RPGCL, 2018):

Table 3-2: Cost of Transmission Lines and Substation of individual voltage levels (in MUSD)

Zone	Transmission Line			Substation		
	400 kV	**220 kV**	**132 kV**	**400 kV**	**220 kV**	**132 kV**
Zone 1	$ 600.21		$ 87.91	$ 352.76		$ 8.55
Zone 2	$ 392.27		$ 88.38	$ 289.47		$ 10.50
Zone 3	$ 404.08	$ 337.78	$ 193.49	$ 211.23	$ 245.68	$ 66.22
Zone 4	$ 499.78	$ 177.37	$ 129.55	$ 80.55	$ 75.23	$ 66.46
Zone 5	$ 580.27	$ 115.66	$ 161.16	$ 449.41	$ 92.83	$ 20.88
Total	**$ 2,476.61**	**$ 630.81**	**$ 660.49**	**$ 1,683.42**	**$ 413.74**	**$ 172.61**

The total cost of the transmission system is assumed to be the present value of the network cost and then the present value will be annuitized for 17 years (i.e. up to year 2040) at an assumed discounted rate of 10% (Bank, 2023) per annum as given below:

$$A = \frac{P*(i*(1+i)^n}{(1+i)^n - 1} \qquad \text{Equation 6}$$

The annual operation and maintenance cost is assumed to be 1% of the capital investment. Then unit cost of transmission line is evaluated as the sum of the annuitized cost and annual operation and maintenance cost. The unit cost of transmission line was evaluated as:

Table 3-3: Average cost calculation of transmission line

	400 kV	**220 kV**	**132 kV**
Average cost (MUSD)/km	$0.78	$ 0.54	$ 0.26
Average cost (MUSD)/mile	$1.25	$ 0.88	$ 0.42

The average annuitized cost of 400 kV, 220 kV, and 132 kV was evaluated as 0.261 MUSD per mile, 0.181 MUSD per mile, and 0.066 MUSD per mile respectively. The annual cost of transmission line considering annual operation and maintenance cost of 1% capital cost is evaluated as 0.282 MUSD per mile, 0.195 MUSD per mile, and 0.072 MUSD per mile for 400 kV, 220 kV and 132 kV transmission line respectively.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1. Load flow Study

The power flow analysis of the INPS 2040 was performed. The load flow analysis was performed using Newton Raphson Method in Digsilent Powerfactory software. The acceptable tolerance of 0.001 was taken for the purpose of load flow. Thus, the network successfully converged with an error of 0.001. The voltage profiles for 132 kV, 220 kV and 400 kV were studied. The voltage profiles of different voltage levels are shown in the figures below:

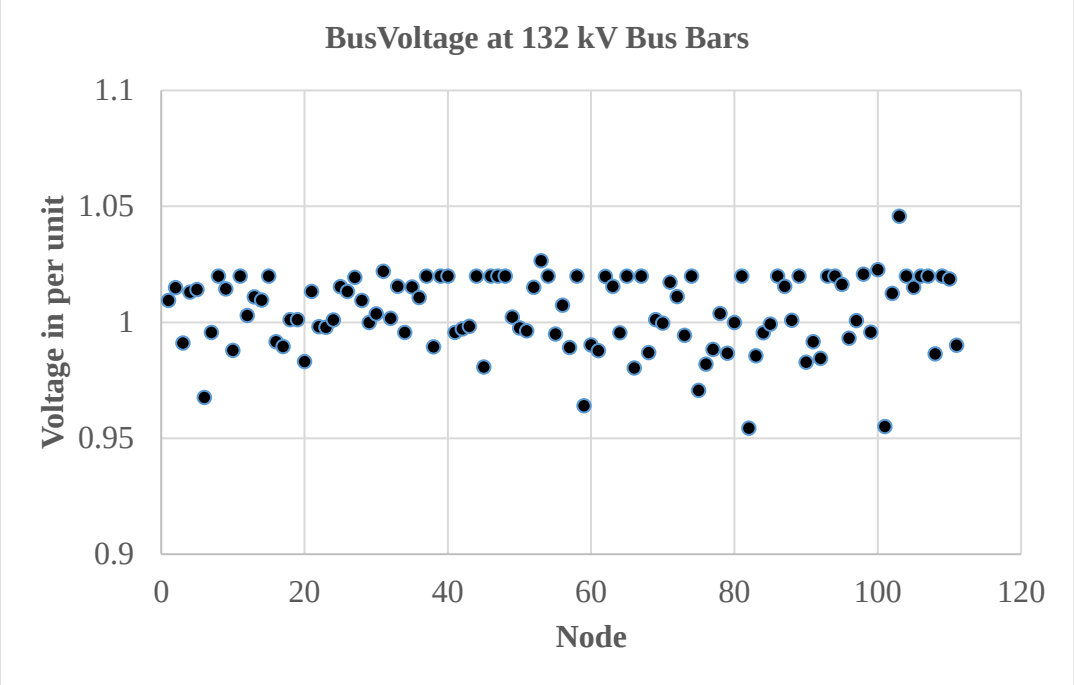


Figure 4-1: Bus Voltages at 132 kV Bus Bars

From the load flow analysis, it was found that the voltages in the 132 kV bus bars were within the prescribed limit i.e. between 0.95 per unit. to 1.05 per unit. The largest voltage level of 1.046 per unit was found in the Tumlingtar 132 kV Bus whereas lowest voltage level of 0.954 per unit was found in the Okhaldhunga 132 kV Bus in 132 kV bus bar.

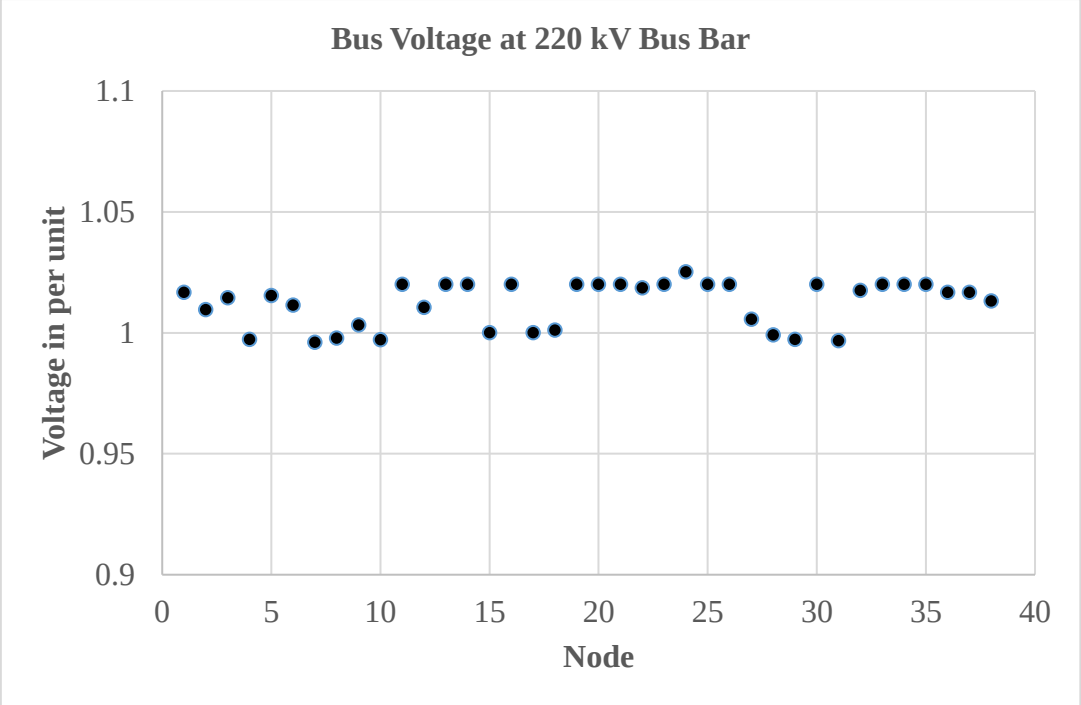


Figure 4-2: Bus Voltages at 220 kV Bus Bars

From the load flow analysis it was found the largest voltage level of 1.025 per unit was found in the Laphsephedi 220 kV Bus whereas lowest voltage level of 0.996 per unit was found in the Bhaktapur 220 kV Bus. Hence it can be concluded that the voltages in the 220 kV bus bars were within the prescribed limit i.e. between 0.95 per unit to 1.05 per unit.

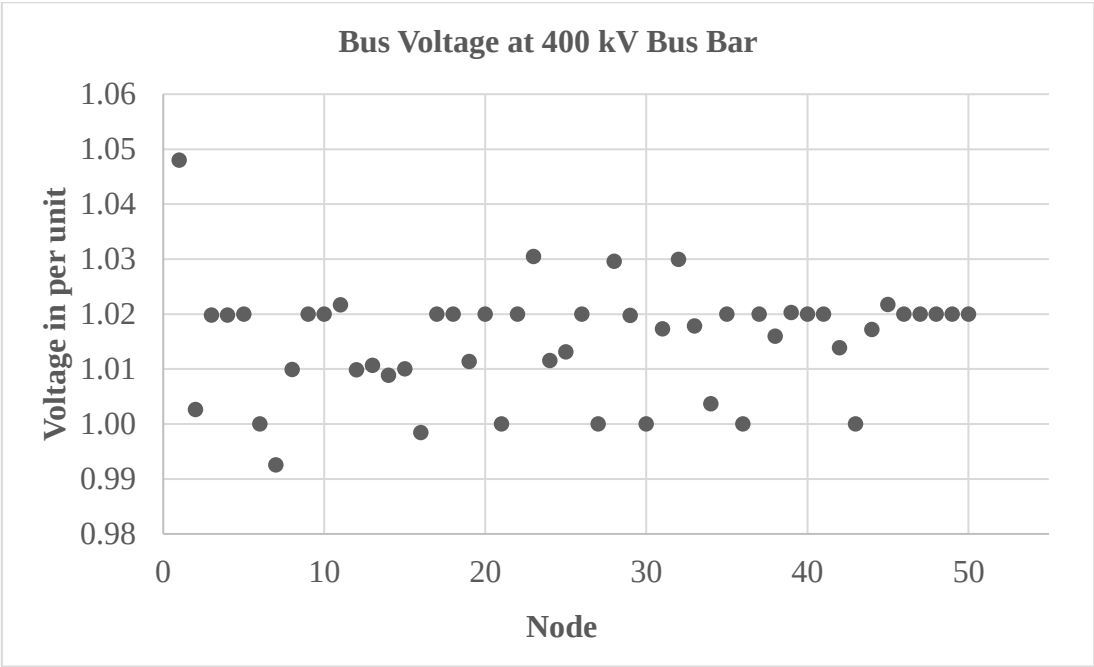


Figure 4-3: Bus Voltages at 400 kV Bus Bars

From the load flow analysis, it was found that the largest voltage level of 1.048 per unit was found in the Arun 3 Bus whereas lowest voltage level of 0.9985 per unit was found in the Dododhara Bus in case of 400 kV Bus bar. Hence, it was found that the voltages in the 400 kV bus bars were within the prescribed limit i.e., between 0.95 p.u. to 1.05 p.u.

The details of the voltage profile of bus bars of 132 kV, 220 kV, and 400 kV voltage level is given in annex 1.

4.2. Evaluation of Wheeling Charge

4.2.1. Considering the whole INPS for year 2040 with Load growth of 7.2%

In this case, whole INPS model for the year 2040 is considered for the study. In this case the overall system generation of 38 GW with maximum domestic load of 18 GW, maximum export of 16 GW and 3 GW of spinning reserve is considered and load flow analysis is performed. From the load flow analysis, the power flowing through the line and the percentage loading of the line is evaluated. The details of the power flow and the line loading is given in annex 2.

The wheeling charge is calculated without considering the transmission line losses, considering the transmission line losses and considering transmission line losses and the change in power factor.

Table 0-1:Comparison of evaluated wheeling charge

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/ mile)	Wheeling Charge with pf 0.9 (Cents/kWh /mile)
Attariy-Syaule_132	132 kV	13	8.077823	65.45767	1099.4688	156.29	238.7642884	$0.0035	$ 0.0036	$0.0038	$ 0.0034
Attariya-Dododhara_400	400 kV	68	42.253228	34.82405	9411.42	1753.29	5034.709633	$0.0006	$ 0.0006	$0.0007	$ 0.0006
Attariya-Mahendranagar_132	132 kV	37	22.990727	44.74214	1456.593	108.137	241.6891548	$0.0035	$ 0.0035	$0.0038	$ 0.0033
Attariya-N Attariya_132	132 kV	24.4	15.1614524	2.859246	16.33722	8.55641	299.2541041	$0.0028	$ 0.0028	$0.0030	$ 0.0027
Bafikot-Phulbari_400	400 kV	84.5	52.5058495	36.61576	12944.784	1874.78	5120.140617	$0.0006	$ 0.0006	$0.0007	$ 0.0006
Bafkot-Burtibang_400	400 kV	71.7	44.5523007	11.11267	981.8222	558.398	5024.880609	$0.0006	$ 0.0006	$0.0007	$ 0.0006
Bahrabise-Khimti_400	400 kV	46	28.583066	4.004035	78.51132	196.699	4912.521494	$0.0007	$ 0.0007	$0.0007	$ 0.0006
Bahrabise-Tamakoshi_220	220 kV	40	24.85484	22.36407	930.1242	246.295	1101.298646	$0.0020	$ 0.0020	$0.0022	$ 0.0019
Bajhang-West Seti_400	400 kV	60	37.28226	13.2967	617.5098	343.588	2584.009566	$0.0012	$ 0.0012	$0.0013	$ 0.0012
Balaju-Suichatar_132	132 kV	4.19	2.60354449	31.75537	83.19778	44.8972	141.384528	$0.0060	$ 0.0060	$0.0064	$ 0.0057
Balanch-U Kalangad_132	132 kV	26	16.155646	30.42168	670.5084	99.0782	325.682934	$0.0026	$ 0.0026	$0.0028	$ 0.0025
Baneshwor-Basantapur_220	220 kV	20	12.42742	5.306914	28.60006	40.0281	754.2639658	$0.0030	$ 0.0030	$0.0031	$ 0.0028

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Bardghat-Kawasoti_132	132 kV	76	47.224196	11.19221	181.7031	27.0496	241.6822057	$0.0035	$ 0.0035	$0.0037	$0.0033
Basantapur-Inaruwa_220	220 kV	77.1	47.9077041	28.45086	6994.502	792.841	2786.701703	$0.0008	$ 0.0008	$0.0009	$ 0.0008
Betan-Bhurigaon_132	132 kV	39.4	24.4820174	34.52429	1295.5344	104.284	302.0588113	$0.0028	$ 0.0028	$0.0030	$ 0.0027
Betan-Dododhara_400	400 kV	30	18.64113	25.31389	12042.49	2980.28	11773.29917	$0.0003	$ 0.0003	$0.0003	$ 0.0003
Bharatpur-Hetauda_220	220 kV	65	40.389115	33.38025	3349.974	357.206	1070.112417	$0.0021	$ 0.0021	$0.0022	$ 0.0020
Bhurigaon-Kohalpur_132	132 kV	55.3	34.3618163	31.04765	1027.5476	70.5251	227.1512981	$0.0037	$ 0.0038	$0.0040	$ 0.0036
Burtibang-Kusma_400	400 kV	50	31.06855	12.38838	870.8576	633.878	5116.715826	$0.0006	$ 0.0006	$0.0007	$ 0.0006
Burtibang-Tamgash_132	132 kV	20.3	12.6138313	85.70173	2944.398	210.308	245.3952797	$0.0034	$ 0.0035	$0.0037	$ 0.0033
Butwal-Bharatpur_220	220 kV	76	47.224196	15.46393	810.5866	158.906	1027.592598	$0.0022	$ 0.0022	$0.0023	$ 0.0021
Butwal-Lumbini_132	132 kV	63.44	39.41977624	12.26717	883.0544	77.383	630.8141161	$0.0013	$ 0.0014	$0.0014	$ 0.0013
Butwal-Motipur_132	132 kV	63.44	39.41977624	14.28114	1196.6716	89.7889	628.7236173	$0.0013	$ 0.0014	$0.0014	$ 0.0013

From the table above it is found that while considering the transmission line losses the wheeling charge is increased. It indicates that wheeling charge thus evaluated considers that corresponding loss delivered by the generator is addressed in the wheeling charge. Similarly, a power factor of 0.85 is taken as reference and the wheeling charge is evaluated for the change in power factor from 0.85 to 0.8 and 0.85 to 0.9. In the first case i.e., when user is operating its load at pf lower than the reference pf, he must be penalized as operating the below reference pf may cause the capacity of the transmission line to be reduced and also increases loss. Thus, it is found that when the user operates his load below the reference pf the wheeling charge is higher.

When the user operates his load at pf higher than the reference pf by use of various means such as capacitor bank, he must be rewarded because improving the pf leads to the decrease in the losses in the transmission lines. His reward can be seen with the decrease in the wheeling charge.

The average wheeling charge for 132 kV Transmission line without considering the transmission line losses is evaluated to be 0.00543 Cents/kWh/mile. considering the transmission line loss, it is evaluated as 0.00546 Cents/kWh/mile. When user operates the load at 0.8 pf at a reference pf of 0.85, the wheeling charge is evaluated as 0.0058 Cents/kWh/mile and when the user operates the load at 0.9 pf at a reference pf of 0.85, the wheeling charge is evaluated as 0.00515 Cents/kWh/mile.

The average wheeling charge for 220 kV Transmission line without considering the transmission line losses is evaluated to be 0.00243 Cents/kWh/mile. considering the transmission line loss, it is evaluated as 0.00244 Cents/kWh/mile. When user operates the load at 0.8 pf at a reference pf of 0.85, the wheeling charge is evaluated as 0.0026 Cents/kWh/mile and when the user operates the load at 0.9 pf at a reference pf of 0.85, the wheeling charge is evaluated as 0.00231 Cents/kWh/mile.

The average wheeling charge for 400 kV Transmission line without considering the transmission line losses is evaluated to be 0.00121 Cents/kWh/mile. considering the transmission line loss, it is evaluated as 0.00122 Cents/kWh/mile. When user operates the load at 0.8 pf at a reference pf of 0.85, the wheeling charge is evaluated as 0.00129 Cents/kWh/mile and when the user operates the load at 0.9 pf at a reference pf of 0.85, the wheeling charge is evaluated as 0.00115 Cents/kWh/mile.

4.2.2. Considering the power produced from Karnali river basin is exported to India

In this case the generation of electricity from Karnali river basin is considered. It is found that about 5700 MW of hydroelectricity is generated from the Karnali river basin and whole is exported to India. The power is transmitted through 400 kV transmission line originating from Mugu Karnali Substation and passes through the Phukot Substation, Betan Substation, Dododhara Substation which is then exported to Bareili substation of India. The evaluated wheeling charge for transmission line involved in the transaction i.e., 400 kV transmission line from Mugu karnali to Phukot, Phukot to Betan, Betan to Dododhara and Dododhara to Bareili of India is shown in Figure 4-4 below:

The details of the total power transmission, transmission line losses, line loading of this scenario when the powers generated from Karnali river basin is exported to India is given in annex.

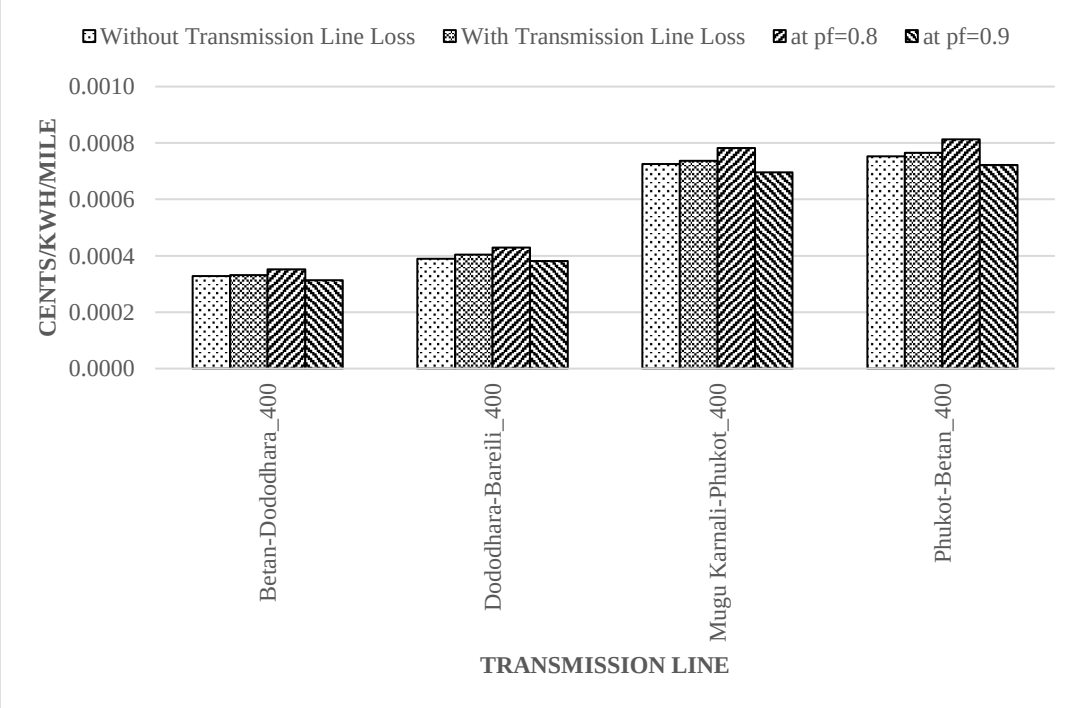


Figure 4-4: Wheeling charge evaluation for evacuating power from Karnali river basin to India

From the table above it is seen that while considering the transmission line losses the wheeling charge is increased. Similarly, a power factor of 0.85 is taken as

reference and the wheeling charge is evaluated for the change in power factor from 0.85 to 0.8 and 0.85 to 0.9. In the first case i.e., when user is operating its load at pf lower than the reference pf, the wheeling charge is higher.

When the user operates his load at pf higher than the reference pf, it is seen that the wheeling charge decreases.

4.2.3. Considering the power produced from Arun River basin is exported to India

In this case the generation of electricity from Arun River basin is considered. It is found that about 2600 MW of hydroelectricity is generated from the Arun River basin and whole is exported to India. The power is transmitted through 400 kV transmission line originating from Haitar Substation and passes through the Sitalpati Substation, Inaruwa Substation which is then exported to Purnea substation of India. The evaluated wheeling charge for transmission line involved in the transaction i.e., 400 kV transmission line from Haitar to Sitalpati, Sitalpati to Inaruwa, and Inaruwa to Purnea of India is shown in Figure 4-5 below:

Figure 4-5: Wheeling charge evaluation for evacuating power from Arun river basin to India

From the table above it is seen that while considering the transmission line losses the wheeling charge is increased. Similarly, a power factor of 0.85 is taken as reference and the wheeling charge is evaluated for the change in power factor from

0.85 to 0.8 and 0.85 to 0.9. In the first case i.e., when user is operating its load at pf lower than the reference pf, the wheeling charge is higher.

When the user operates his load at pf higher than the reference pf, it is seen that the wheeling charge decreases.

4.2.4. Considering the whole INPS for year 2040 with Load growth of 4.5%

In this case, whole INPS model for the year 2040 is considered for the study. In this case the overall system generation of 38 GW with maximum domestic load of 11.25 GW, maximum export of 23.75 GW and 3 GW of spinning reserve is considered and load flow analysis is performed. From the load flow analysis, the power flowing through the line and the percentage loading of the line is evaluated. The details of the power flow and the line loading is given in annex 5.

The wheeling charge is calculated without considering the transmission line losses, considering the transmission line losses and considering transmission line losses and the change in power factor.

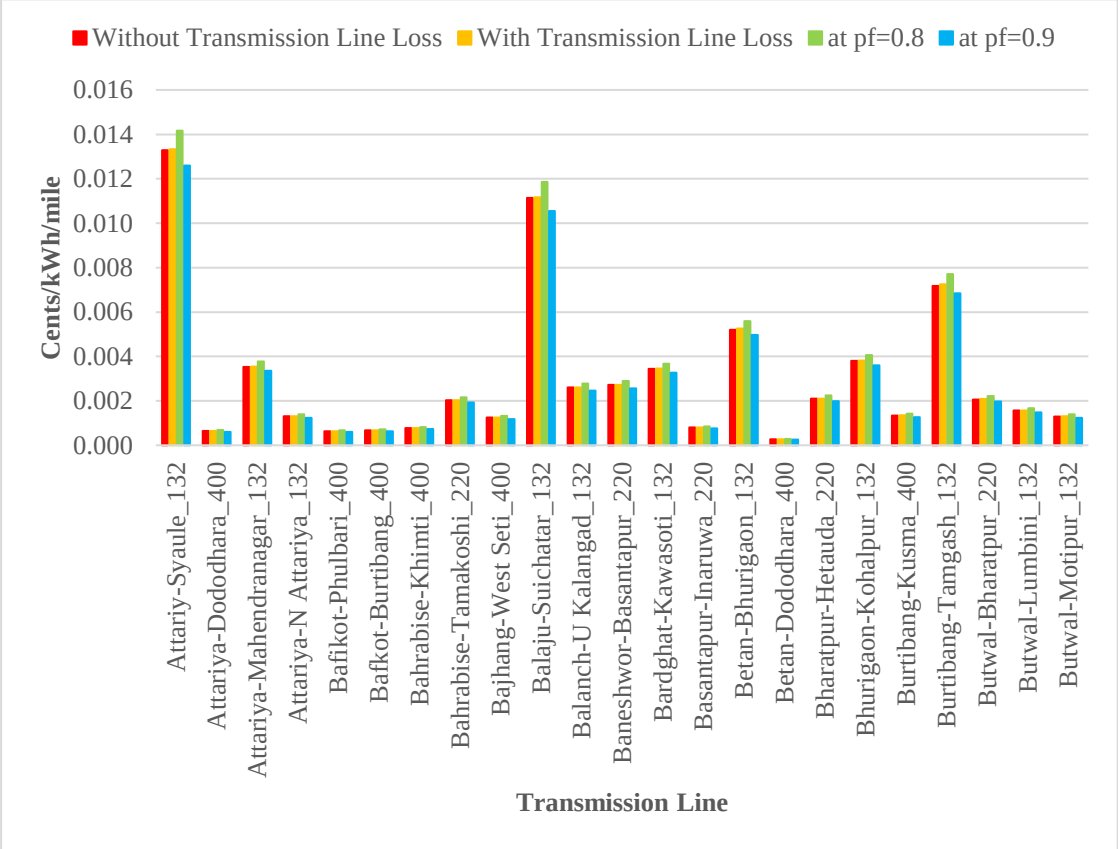


Figure 4-6: Wheeling Charge for some Lines of INPS 2040 considering load growth of 4.5%

From the figure above it is found that while considering the transmission line losses the wheeling charge is increased. It indicates that wheeling charge thus evaluated considers that corresponding loss delivered by the generator is addressed in the wheeling charge. Similarly, a power factor of 0.85 is taken as reference and the wheeling charge is evaluated for the change in power factor from 0.85 to 0.8 and 0.85 to 0.9. In the first case i.e., when user is operating its load at pf lower than the reference pf, he must be penalized as operating the below reference pf may cause the capacity of the transmission line to be reduced and also increases loss. Thus, it is found that when the user operates his load below the reference pf the wheeling charge is higher.

When the user operates his load at pf higher than the reference pf by use of various means such as capacitor bank, he must be rewarded because improving the pf leads to the decrease in the losses in the transmission lines. His reward can be seen with the decrease in the wheeling charge.

4.2.5. Considering the whole INPS for year 2040 with Load growth of 9.2 %

In this case, whole INPS model for the year 2040 is considered for the study. In this case the overall system generation of 38 GW with maximum domestic load of 23 GW, maximum export of 12 GW and 3 GW of spinning reserve is considered and load flow analysis is performed. From the load flow analysis, the power flowing through the line and the percentage loading of the line is evaluated. The details of the power flow and the line loading is given in annex 6.

The wheeling charge is calculated without considering the transmission line losses, considering the transmission line losses and considering transmission line losses and the change in power factor.

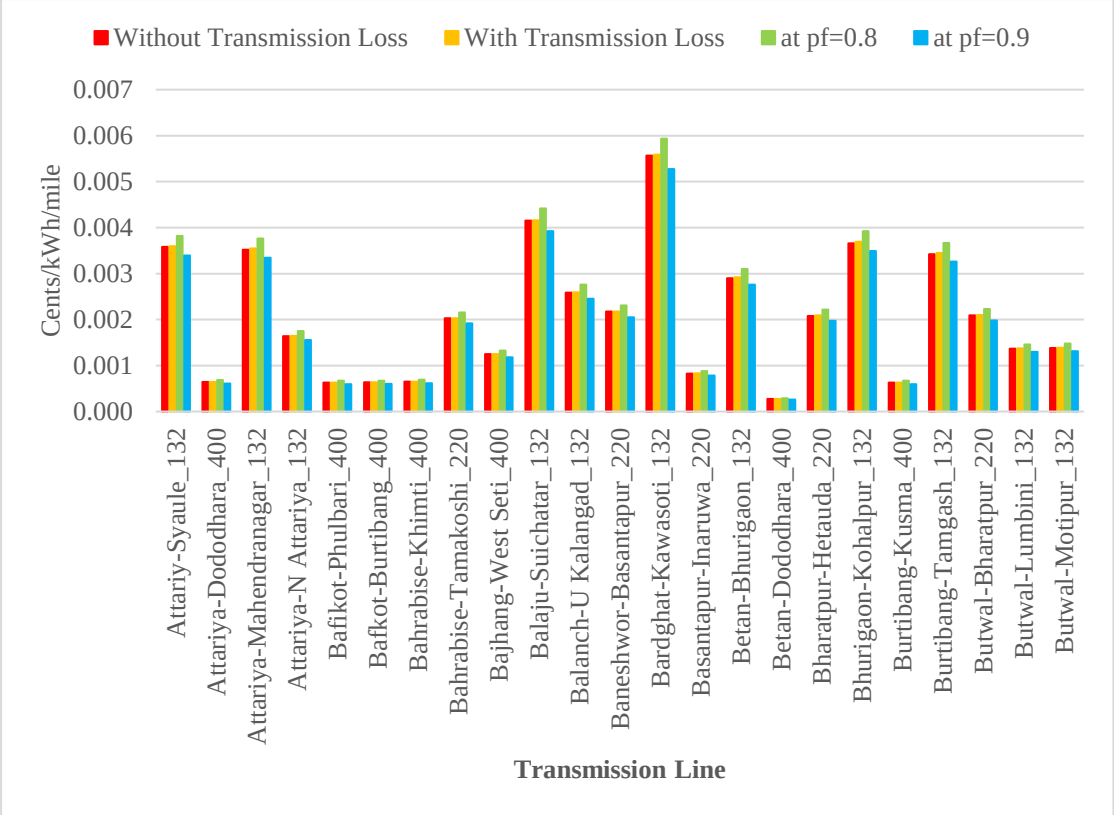


Figure 4-7: Wheeling Charge for some Lines of INPS 2040 considering load growth of 9.2%

From the figure above it is found that while considering the transmission line losses the wheeling charge is increased. It indicates that wheeling charge thus evaluated considers that corresponding loss delivered by the generator is addressed in the wheeling charge. Similarly, a power factor of 0.85 is taken as reference and the wheeling charge is evaluated for the change in power factor from 0.85 to 0.8 and 0.85 to 0.9. In the first case i.e., when user is operating its load at pf lower than the reference pf, he must be penalized as operating the below reference pf may cause the capacity of the transmission line to be reduced and also increases loss. Thus, it is found that when the user operates his load below the reference pf the wheeling charge is higher.

When the user operates his load at pf higher than the reference pf by use of various means such as capacitor bank, he must be rewarded because improving the pf leads to the decrease in the losses in the transmission lines. His reward can be seen with the decrease in the wheeling charge.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1. Conclusion

In a deregulated power system environment, there exists a transmission company responsible for constructing, owning, and managing the transmission system. Alternatively, the Independent System Operator (ISO) may take on the roles of both the system operator and the transmission company. The primary function of this transmission entity is to build, own, and oversee the transmission infrastructure essential for transferring power generated by generators to consumers. Upon transmitting this power, the company may levy charges on users utilizing these transmission lines to recoup capital, operational, and maintenance expenses. Consequently, the transmission company imposes a wheeling charge on those making use of its transmission lines. This charge aims to cover the costs incurred in the ownership and operation of these transmission lines.

In this study the wheeling charge in context on Nepalese Power Market is evaluated. The wheeling charge is evaluated considering the INPS of Nepal for 2040 in deregulated environment. The wheeling charge is evaluated without considering the transmission line losses, considering the transmission line losses and considering transmission line losses and the change in power factor. It is found that while considering the transmission line losses the wheeling charge increases. Similarly, a power factor of 0.85 is taken as reference and the wheeling charge is evaluated for the change in power factor from 0.85 to 0.8 and 0.85 to 0.9. In the first case i.e., when user is operating its load at power factor lower than the reference pf, his wheeling charge increases as a penalty for operating the load at a power factor below reference.

When the user operates his load at power factor higher than the reference power factor by use of various means such as capacitor bank, his wheeling charge is reduced as reward for operating the load at higher power factor.

5.2. Recommendation

Study for the evaluation of wheeling charge is done for the absolute power flow of the INPS model. Still the study needs to be done for the following cases in the INPS model.

i. Dominant power flow
ii. Reverse power flow

References

Abhyankar, A., Kharpade, S., Sonam, S. & Pentayya, P., 2005. A Transmission Pricing Mechanism Based on Power Tracing for Central Transmission Utility in India. *International Journal of Emerging Electric Power Systems,* 2(1).

Abhyankar, A., Soman, S. & Kharpade, S., 2006. Optimization Approach to Real Power Tracing: An Application to Transmission Fixed Cost Allocation. *IEEE Transactios on Power Systems,* 21(3).

Arriaga, I. P. et al., 1995. Marginal Pricing of Transmission Services: An Analysis of Cost Recovery. *IEEE Transactions on Power Systems,* 10(1).

Aryal, S. & Karki, N. R., 2016. *Evaluation of Transmission Pricing Methodologies for Nepalese Power System in Restructured Environment.* s.l., s.n.

Aryal, S. & Karki, N. R., n.d. *Evaluation of Transmission Pricing Methodologies for Nepalese Power System in Restructured Environment.* s.l., s.n.

Bank, N. I. M., 2023. *https://www.nimb.com.np/.* [Online] [Accessed 06 2023].

Caramanis, M., Roukos, N. & Schweppe, F., 1989. WRATES: A Tool for Evaluating the Marginal Cost of Wheeling. *IEEE Transactions on Power Systems,* 4(2).

Chen, Q., Xia, Q. & Kang, C., 2010. Novel Transmission Pricing Scheme Based on Point-to Point Tariff and Transaction Pair Matching for Pool Market. *Electric Power System Research,* Volume 80, pp. 481-488.

Conejo, A. J., Contreras, J. & Lima, D. A., 2007. Zbus Transmission Network Cost Allocation. *IEEE Transactions on Power Systems,* 22(1).

D, A. & Chalapathi, B., 2015. *MW-Mile Method Considering the Cost of Loss Allocation for Transmission Pricing.* Kurnool, Andhra Pradesh, Conference onn Power, Control, COmmunication and Computational Technologies for Sustainable Growth (PCCCTSG).

Fasina, E., Adebanji, B. & Ismail, I., 2021. An Approach For Evaluation of Wheeling Charges in a Deregulation Power Network. *International Journal of Scientific and Technology Research,* 10(4).

Galiana, F. D., Conejo, A. J. & Gil, H. A., 2003. Transmission Network Cost Allocation Based on Equivalent Bilateral Exchanges. *IEEE Transactions on Power Systems,* 18(4).

Garg, N., Palwalia, D. & Sharma, H., 2013. *Transmission Pricing Practices: A Review.* s.l., NirmaUniversity International Conference on Engineering.

Ghayeni, M. & Ghazi, R., 2011. Transmission Network Cost Allocation With Nodal Pricing Approach Based on Ramsey Pricing Concept. *IET Transmission, Transmission and Distribution,* 5(3), pp. 384-392.

Gil, H. A., Galiana, F. D. & da Silva, E. L., 2006. Nodal Price Control: A Mechanism for Transmission Network Cost Allocation. *IEEE Transactions on Power Systems,* 21(1).

Gnanadass, R. & Padhy, N., 2005. A New Approach for Transmission Embedded Cost Allocation in Restructured Power market. *Journal of Energy and Environment,* Volume 4, pp. 37-47.

Gubina, F., Grgic, D. & Banic, I., 2000. A Method for Determining the Generators' Share in a Consumer Load. *IEEE Transactions on Power Systems ,* 15(4).

Happ, H. H., 1994. Cost of Wheeling Methodologies. *IEEE Transactions on Power Systems ,* 9(1).

Hassan, M. et al., 2011. Wheeling Charges Methodology for Deregulated Electricity Markets Using Tracing-Based Postage Stamp Methods. *International Journal of Integrated Engineering ,* 3(2), pp. 39-46.

Jain, G., Singh, K. & Palwalia, D. K., 2012. *Transmission Wheeling Cost Evaluation Using MW-Mile Methodology.* s.l., Nirma University International Conference on Engineering.

Kiran , D., Abhyankar, A. & Panigrahi, B., 2016. *A Hierarchial Approach of Node Aggregation for Transmisison Usage Prices.* s.l., North American Power Symposium (NAPS).

Kovacs, R. R. & Leverett, A. L., 1994. A Load Flow Based Method For Calculating Embedded, Incremental and Marginal Cost of Transmission Capacity. *IEEE Transactions on Power Systems,* 9(1).

Kumar, A. & Srivastava, S., 2002. *AC Power Transfer Distribution Factors for Allocating Power Transactions in a Deregulated Market.* s.l., IEEE Power Engineering Review.

Lee, W., Lin, C. & Swift, L., 2000. *Wheeling Charge Under a Deregulated Environment.* s.l., IEEE Industrial and Commercial Power Systems Technical Conference.

Li, F., Padhay, P., Wang, J. & Kuri, B., 2005. *Development of a Novel MW+MVar-Mile Charging Methodology.* Dalian, China, IEEE/PES Transmissioin and Distribution Conference and Exhibition: Asia and Pacific.

Limited, R. P. G. C., 2018. *Transmission System Development Plan,* s.l.: s.n.

Limpasuwan, T., Bailek, J., Ongsakul, W. & Limmeechokchai, B., 2004. A Proposal for Transmission Pricing Methodology in Thailand Based on Electricity Tracing and Long-Run Average Incremental Cost. *Energy Policy,* Volume 32, pp. 301-308.

Li, Y. & David, A., 1994. Wheeling Rates of Reactive Power Flow under Marginal Cost Pricing. *IEEE Transactions on Power Systems,* 9(3).

Lo, K. & Hassan, M. Y., 2007. *Assessment pf MW-Mile Method for Pricing Transmission Services: A Negative Flow-Sharing Approach.* s.l., IET Generation, Transmission and Distribution.

Meah, M. Z., Mohamed, A. & Serwan, S., 2003. *Comparative Analysis of Using MW-Mile Methods in Transmission Cost Allocation for the Malaysia Power System.* s.l., s.n.

Merrill, H. M. & Erickson, B. W., 1989. Wheeling Rates Based on Marginal Cost Theory. *IEEE Transactions on Power Systems,* 4(4).

Nojeng, S. et al., 2014. Improving the MW-Mile Method Using the Power Factor-Based Approach for Pricing the Transmission Services. *IEEE Transactions on Power Systems,* 29(5).

Pantos, M. & Gubina, F., 2003. *Ex-ante Transmission Service Pricing Via Load Distribution Factors.* s.l., Power Engineering Society General Meeting.

Park, Y. M., Park, J. B., Lim, J. U. & Won, J. R., 1998. An Analytical Approach for Transaction Costs Allocation in Transmission System. *IEEE Transactions on Power Systems ,* 13(4).

Radzi, N., Dong, Z. & Hassan, M., 2011. *A New Transmission Charging Methodology for Australian National Electricity Market.* s.l., Innovative Smart Grid Technologies Asia (ISGT).

Radzi, N. et al., 2017. *Investigation on Cost Reflective Network Pricing and Modified Cost Reflective Network Pricing Methods for Transmission Service Charges.* s.l., International Conference on Sustainable and Renewable Energy Enfineering.

Riyaz, S., Upputuri, R. & Kumar, N., 2020. *Wheeling Charge Evaluation By Using ProposedMW-Mile Method Considering Transmission Losses and Load Power Factor Variation.* s.l., s.n.

Roy, A., Abhyankar, A., Pentayya, P. & Kharpade, S., 2006. *Electricity Transmission Pricing: Tracing Based Point-of-Connection Tariff for Indian Power System.* s.l., IEEE Power Engineering Society General Meeting.

Rudnick, H., Palma, R. & Fernandez, J. E., 1995. Marginal Pricing and Supplement Cost Allocation in Transmission Open Access. *IEEE Transactions on Power Systems,* 10(2).

Rudnick, H. & Raineri, R., 1997. Transmission Pricing Practices in South America. *Utilities Policy,* 6(3), pp. 211-218.

Sahay, S., Kumar, N. & Joshi, H., 2018. *Modified MW Mile Method For Pricing The Transmission Services By Including Transmission Losses And Variation In Load Power Factor.* s.l., s.n.

Schweppe, F., 1988. *Mandatory Wheeling: A Framework for Discussion.* Portland, Oregon, IEEE/PES Summer Meeting.

Secretariat, W. a. E. C., 2017. *Electricity Demand Report (2015-2040),* s.l.: s.n.

Sedaghati, A., 2006. Cost of Transmission System Usage Based on an Economic Measure. *IEEE Transactions on Power Systems,* 21(2).

Shirmohammadi, D., Filho, X. V., Gorenstin, B. & Pereira, M. V., 1996. Some Fundamental Technical Concepts About Cost Based Transmission Pricing. *IEEE Transactions on Power Systems,* 11(2).

Shirmohammadi, D. et al., 1989. Evaluation of Transmission Network Capacity Use for Wheeling Transactions. *IEEE Transactions on Power Systems,* 4(4).

Shirmohammadi, D., Rajagopalan, C., Alward, E. R. & Thomas, C. L., 1991. Cost of Transmission Transactions: An Introduction. *IEEE Transactions on Power Systems,* 6(3).

Strbac, G., Kirschen, D. & Ahmed, S., 1998. Allocating Transmission System Usage on the Basis of Traceable Contributions of Generators and Loads to Flows. *IEEE Transactions on Power Systems,* 13(2).

Tabors, R. D. & Caramanis, T., 1994. Transmission System Management and Pricing: New Paradigm and International Comparisons. *IEEE Transactions on Power Systems,* 9(1).

Tipmabutr, S. & Krurungrodrat, C., 2001. *Comparison Study of Transmission Pricing Techniques in Thailand.* s.l., International Conference on Power Industry Computer Applications.

Annex 1: Bus Voltage Data

Bus Bar	Nominal Voltage (kV)	Voltage (p.u.)
Anarmani	132	1.010
Andhi Khola_220	220	1.017
Ankhu Hub	132	1.015
AnkhuHub (220kV)	220	1.010
Arun 3	400	1.048
Attariya 400	400	1.003
Attariya_132	132	0.991
Bafikot 400	400	1.020
Bafikot132	132	1.013
Bahrabise_132	132	1.014
Bahrabise_220	220	1.014
Bahrabise_400	400	1.020
Bajhang132	132	0.968
Bajhang_400	400	1.020
Balaju	132	0.996
Balaju220	220	0.997
Balanch_132	132	1.020
Baneshwor_220	220	1.015
Banskot Hub	132	1.014
Bardhghat	132	0.988
Bareli_400	400	1.000
Bareli_400	400	0.993
Basantapur 220	220	1.012
Betan 400	400	1.010
Betan1	132	1.020
Bhakta-I	132	1.003
Bhaktapu-II	132	1.011
Bhaktapur_220	220	0.996
Bharat1	132	1.010
Bharatpur 220	220	0.998
Bheri-4	400	1.020
Bhotekoshi	132	1.020
Bhurigaon	132	0.992
Bhurigaon	132	0.990
Budhi Gandaki 400	400	1.020
Burtibang	400	1.022
Burtibang132	132	1.001

Bus Bar	Nominal Voltage (kV)	Voltage (p.u.)
Burtibang132(1)	132	1.001
Butwal 220	220	1.003
Butwal 400	400	1.010
Butwal1	132	0.983
Chandranigahpur	132	1.013
Chapagaun	132	0.998
Chapagaun_220	220	0.997
Chapali_132	132	0.998
Chilime Hub (220kV)	220	1.020
Chilime132	132	1.001
Chilime_400	400	1.011
Dailekh	132	1.015
Dam1	132	1.013
Damak	132	1.019
Damak 400	400	1.009
Damauli 220	220	1.010
Dana 220	220	1.020
Dana1	132	1.010
Dandakhet Hub	220	1.020
Dandakhet_132	132	1.000
Dhalke1	132	1.004
Dhalkebar 220	220	1.000
Dhalkebar 400	400	1.010
Dhungesangu 132	132	1.022
Dhungesangu S/S_220	220	1.020
Dodo132	132	1.002
Dododhara 400	400	0.998
Dudhkoshi 400	400	1.020
Dudhkoshi-4 400	400	1.020
Dudhkoshi-4 Hub	132	1.015
Duhabi	132	0.996
Duhabi 400	400	1.011
Dumre	132	1.015
Dunai	400	1.020
Dunai1	132	1.011
Garjyang	132	1.020
Ghorahi	132	0.989
Gorakhpur_400	400	1.000
Gumda	400	1.020
Gumda1	132	1.020

Bus Bar	Nominal Voltage (kV)	Voltage (p.u.)
Haitar 400	400	1.030
Haitar132	132	1.020
Hapure	132	0.996
Harisidhi_220	132	0.997
Hetauda 220	220	1.000
Hetauda-1	132	0.998
Hetauda_400	400	1.012
Illam-1	132	1.020
Inaurwa 400	400	1.013
Inaurwa220	220	1.001
Inkhu	132	0.981
Jagdulla	400	1.020
Jhimruk	132	1.020
Kabeli-1	132	1.020
Kabeli-2	132	1.020
Kali-1	132	1.002
Kamane	132	0.998
Kawasoti	132	0.996
Kerung	400	1.000
Khimti 220	220	1.020
Khimti_132	132	1.015
Khudi220-I	220	1.020
Khudi220-II	220	1.020
Khudi_132	132	1.027
Kimathanka	400	1.030
Kirtipur	132	1.020
Kohalpur132	132	0.995
Kusma 220	220	1.019
Kusma 400	400	1.020
Kusma1	132	1.007
Kusum132	132	0.989
L Balephi	132	1.020
Lahan	132	0.964
Lakhnow_400	400	1.000
Lamahi	132	0.990
Lamki	132	0.988
Lamosangu	132	1.020
Lapche_132	132	1.016
Lapche_220	220	1.020
Lapsephedi_400	400	1.017

Bus Bar	Nominal Voltage (kV)	Voltage (p.u.)
Lapsiphedi 220	220	1.025
Latse	400	1.030
Lekhnath 220	220	1.020
Lekhnath1	132	0.996
Likhu Hub	132	1.020
Lumbini	132	0.980
Madhya Marsy1	132	1.020
Mahendranagar_132	132	0.987
Maina Tara 400	400	1.018
Maintada	132	1.001
Manang 220	220	1.020
Manang132	132	1.000
Marsyangdi	132	1.017
Marsyangdi	132	1.011
Marsyangdi 220	220	1.006
Matatirtha132	132	0.994
Matatirtha_220	220	0.999
Mewa Hub	132	1.020
Mirchiya 132	132	0.971
Mirchiya_400	400	1.004
Motipur	132	0.982
Mugu Karnali 132	132	0.988
Mugu Karnali_400	400	1.020
Mulpani	132	1.004
Mulpani 220	220	0.997
Muzzaffarpur_400	400	1.000
NButwal1	132	0.987
Nalgadh	400	1.020
Nalgadh132	132	1.000
New Damauli 400	400	1.016
New Khimti_400	400	1.020
New Modi	132	1.020
Okhaldunga	132	0.954
Pahalmanpur	132	0.986
Pancheswor_400	400	1.020
Parwanipur	132	0.996
Pathliaya	132	0.999
Phidim	132	1.020
Phukhot 400	400	1.020
Phukot132	132	1.016

Bus Bar	Nominal Voltage (kV)	Voltage (p.u.)
Phulbari 400	400	1.014
Purnera_400	400	1.000
Rahughat 220	220	1.020
Ratmate2	220	0.997
Ratmate_400	400	1.017
Samundratar	132	1.020
Sandikharka	132	0.983
Sayule	132	0.992
Shivapuri	132	0.984
Singati	132	1.020
Sisne	132	1.020
Sitalpati-Hub	400	1.022
Sitalpati_132	132	1.016
Sitalpati_220	220	1.018
Suichatar	132	0.993
Sunkoshi-2_400	400	1.020
Surkhet132	132	1.001
Tamakoshi 220	220	1.020
Tamakoshi_132	132	1.021
Tamgash	132	0.996
Tamor Hub_220	220	1.020
Tamor LILO	400	1.020
Tamor1	132	1.023
Tingla 132	132	0.955
Tingla_400	400	1.020
Trishuli 220	220	1.020
Trishuli132	132	1.012
Tumlingtar 132	132	1.046
Tumlingtar I	220	1.017
Tumlingtar II	220	1.017
U Daraudi	132	1.020
U Kalangad	132	1.015
U-Balephi	132	1.020
U-Budhi400	400	1.020
U-Dudh Koshi	132	1.020
UMadi	132	1.020
Udipur	220	1.013
Udipur_132	132	1.019
West Seti_400	400	1.020

Annex 2: Power flow, Line loading and Wheeling Charges Considering INPS 2040 with Load growth of 7.2%

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Akhu Kh1-Ankhu_132	132 kV	4.4	2.7340324	30.8825	41.36434	32.80893	106.2379341	$0.00795	$0.00796	$0.00846	$0.00752
Akhu kh2-Ankhu_132	132 kV	11.8	7.3321778	14.60211	24.43253	15.29554	104.7488342	$0.00806	$0.00807	$0.00858	$0.00763
Andhi Khola 3-Hetauda_220	220 kV	68	42.253228	10.44772	302.8381	84.89024	812.5240722	$0.00274	$0.00275	$0.00293	$0.00260
Andhi Khola Hp-Andhi Khola_220	220 kV	10.74	6.67352454	15.23525	219.1528	137.6598	903.5611493	$0.00247	$0.00247	$0.00263	$0.00233
Andhi Khola_Butwal_220	220 kV	76	47.224196	36.3595	7181.978	600.2206	1650.794428	$0.00135	$0.00137	$0.00145	$0.00129
Ankhu-Ratmate_220	220 kV	30	18.64113	14.50011	544.2824	131.4408	906.4813991	$0.00246	$0.00247	$0.00262	$0.00233
ApsuwaKh-Sitalpati_132	132 kV	12	7.456452	16.7233	32.65742	17.58987	105.1818122	$0.00803	$0.00804	$0.00855	$0.00760
Arun 4-U Arun_400	400 kV	1.8	1.1184678	22.06661	26.20419	284.497	1289.26464	$0.00250	$0.00250	$0.00266	$0.00236
Arun3-Dhalkebar_400 kV	400 kV	300	186.4113	23.8828	18790.87	1207.5828	5056.286533	$0.00064	$0.00065	$0.00069	$0.00061
Attariy-Syaule_132	132 kV	13	8.077823	65.45767	1099.4688	156.28954	238.7642884	$0.02857	$0.02877	$0.00378	$0.00336
Attariya-Bareli_400	400 kV	200	124.2742	36.40295	30624.8	1830.6248	5028.781459	$0.00064	$0.00065	$0.00069	$0.00062
Attariya-Dododhara_400	400 kV	68	42.253228	34.82405	9411.42	1753.2898	5034.709633	$0.00064	$0.00064	$0.00068	$0.00061

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Attariya-Mahendranagar_132	132 kV	37	22.990727	44.74214	1456.593	108.1369	241.6891548	$0.08032	$0.08140	$0.00376	$0.00334
Attariya-N Attariya_132	132 kV	24.4	15.1614524	2.859246	16.33722	8.556411	299.2541041	$0.04278	$0.04286	$0.00300	$0.00267
Bafikot-Phulbari_400	400 kV	84.5	52.5058495	36.61576	12944.784	1874.7784	5120.140617	$0.00063	$0.00063	$0.00067	$0.00060
Bafkot-Burtibang_400	400 kV	71.7	44.5523007	11.11267	981.8222	558.3984	5024.880609	$0.00064	$0.00064	$0.00068	$0.00061
Bagmati Nadi-Hetauda_132	132 kV	24	14.912904	16.48917	62.44719	16.82509	102.0372159	$0.12340	$0.12386	$0.00882	$0.00784
Bahrabise-Khimti_400	400 kV	46	28.583066	4.004035	78.51132	196.69908	4912.521494	$0.00066	$0.00066	$0.00070	$0.00062
Bahrabise-Tamakoshi_220	220 kV	40	24.85484	22.36407	930.1242	246.2952	1101.298646	$0.05032	$0.05051	$0.00216	$0.00192
Bajhang U seti-Bajhang_132	132 kV	24	14.912904	27.71295	359.5046	61.18215	220.7709753	$0.05703	$0.05737	$0.00409	$0.00363
Bajhang-West Seti_400	400 kV	60	37.28226	13.2967	617.5098	343.588	2584.009566	$0.00125	$0.00125	$0.00133	$0.00118
Bajra Madi-Lekhnath_132	132 kV	8.02	4.98339542	16.75907	22.1066	18.96647	113.1713753	$0.03718	$0.03722	$0.00794	$0.00705
Balaju-Matathirtha_220	220 kV	4.4	2.7340324	39.13052	314.0292	416.5358	1064.47806	$0.00573	$0.00573	$0.00223	$0.00198
Balaju-Mulpani_220	220 kV	9	5.592339	11.3126	53.5718	121.52426	1074.238106	$0.01161	$0.01161	$0.00221	$0.00196
Balaju-Suichatar_132	132 kV	4.19	2.60354449	31.75537	83.19778	44.89718	141.384528	$0.01555	$0.01558	$0.00636	$0.00565
Balanch-U Kalangad_132	132 kV	26	16.155646	30.42168	670.5084	99.07822	325.682934	$0.04188	$0.04217	$0.00277	$0.00247

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Baneshwor-Basantapur_220	220 kV	20	12.42742	5.306914	28.60006	40.02814	754.2639658	$0.03674	$0.03676	$0.00314	$0.00279
Banskot-Lekhnath_132	132 kV	23.8	14.7886298	28.34513	525.9652	74.76884	263.7801979	$0.04734	$0.04767	$0.00342	$0.00304
Bardghat-Kawasoti_132	132 kV	76	47.224196	11.19221	181.7031	27.04958	241.6822057	$0.16498	$0.16609	$0.00374	$0.00332
Basantapur Cluster-Basantapur_132	132 kV	7	4.349597	21.32768	31.25069	23.32417	109.3610275	$0.03358	$0.03363	$0.00821	$0.00730
Basantapur-Inaruwa_220	220 kV	77.1	47.9077041	28.45086	6994.502	792.8406	2786.701703	$0.03833	$0.03867	$0.00086	$0.00076
Begnas Rupa-Lekhnath_132	132 kV	6.83	4.24396393	39.25727	293.3169	114.7165	292.2172123	$0.01226	$0.01229	$0.00308	$0.00274
Beni Kali-Kusma_132	132 kV	8.54	5.30650834	36.08307	109.38	38.23885	105.9744916	$0.04228	$0.04240	$0.00849	$0.00755
Betan-Bhurigaon_132	132 kV	39.4	24.4820174	34.52429	1295.5344	104.28366	302.0588113	$0.06843	$0.06928	$0.00301	$0.00267
Betan-Dododhara_400	400 kV	30	18.64113	25.31389	12042.49	2980.28	11773.29917	$0.00027	$0.00027	$0.00029	$0.00026
Bhaktapur-Harisiddhi_132	132 kV	9	5.592339	33.50376	198.88158	75.20322	224.4620305	$0.02104	$0.02109	$0.00401	$0.00356
Bhaktapur-Lamosangu_132	132 kV	60	37.28226	40.76206	1956.2656	101.95626	250.1253862	$0.12585	$0.12827	$0.00366	$0.00325
Bhaktapur-Mulpani_220	220 kV	8	4.970968	5.139526	9.500554	38.3405	745.9929184	$0.01486	$0.01486	$0.00318	$0.00282
Bharatpur-Hetauda_220	220 kV	65	40.389115	33.38025	3349.974	357.2062	1070.112417	$0.08415	$0.08494	$0.00223	$0.00199
Bheri 3 sto-Maintada_400	400 kV	23.14	14.37852494	33.3187	755.5714	367.0929	1101.762374	$0.00293	$0.00293	$0.00311	$0.00277

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Bheri Babai-Mainatada_132	132 kV	13.6	8.4506456	34.95237	162.9168	36.70929	105.0266119	$0.06794	$0.06824	$0.00858	$0.00763
Bheri-Maina Tara_400	400 kV	20.9	12.9866539	23.05716	259.0604	229.4331	995.0622713	$0.00324	$0.00324	$0.00345	$0.00306
Bheri1-Nalgadh_400	400 kV	15.8	9.8176618	8.133722	59.17604	206.4898	2538.6877	$0.00127	$0.00127	$0.00135	$0.00120
Bheri2-Nalgadh_400	400 kV	1.2	0.7456452	19.56075	10.76909	195.7829	1000.896694	$0.00322	$0.00322	$0.00342	$0.00304
Bhimgad Kh-Manang_132	132 kV	10.5	6.5243955	19.93152	41.12844	24.47286	122.7847149	$0.04487	$0.04494	$0.00732	$0.00651
Bhotekoshi 5-Lamosangu_132	132 kV	3	1.864113	42.90004	54.509	45.88662	106.9617185	$0.01472	$0.01473	$0.00840	$0.00746
Bhotekoshi 7-Inkhu_132	132 kV	15	9.320565	16.6073	40.11673	16.82509	101.3114112	$0.07768	$0.07786	$0.00888	$0.00789
Bhotekoshi 8-Inkhu_132	132 kV	4.1	2.5476211	22.53568	20.50953	23.09626	102.487522	$0.02099	$0.02101	$0.00876	$0.00779
Bhotekoshi1-Bhotekoshi_132	132 kV	3.4	2.1126614	26.78994	24.11333	33.65019	125.6075602	$0.01420	$0.01421	$0.00715	$0.00635
Bhurigaon-Dododhara_132	132 kV	29	18.019759	12.54745	82.25546	2.323484	18.51757927	$0.82165	$0.85074	$0.05016	$0.04459
Bhurigaon-Kohalpur_132	132 kV	55.3	34.3618163	31.04765	1027.5476	70.52514	227.1512981	$0.12773	$0.12959	$0.00401	$0.00356
Brahmayani-u Balephi_132	132 kV	6.66	4.13833086	24.30005	38.84331	30.59108	125.8889591	$0.02776	$0.02779	$0.00714	$0.00634
Budhi G Syar Kh2-U Budhigandaki_132	132 kV	2	1.242742	37.6562	28.03646	45.88662	121.856746	$0.00861	$0.00862	$0.00737	$0.00655

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Budhi G Syar Kh4-U Budhigandaki_132	132 kV	2	1.242742	47.06517	43.7989	57.35827	121.8698881	$0.00861	$0.00862	$0.00737	$0.00655
Budhi Gandaki-Ratmate_400	400 kV	25	15.534275	18.05871	925.6424	917.7324	5081.937746	$0.00063	$0.00063	$0.00067	$0.00060
Budhi Ganga-Betan_132	132 kV	48	29.825808	14.63325	94.36392	15.29554	104.5259255	$0.24093	$0.24242	$0.00864	$0.00768
Budhi gandaki-Gumda_400	400 kV	18	11.184678	15.46413	99.66475	155.2497	1003.934266	$0.00321	$0.00321	$0.00341	$0.00303
Budhigandak Prok kh2 -U Budhigandaki_400	400 kV	9.7	6.027287	7.002722	27.95841	183.5465	2621.073634	$0.00123	$0.00123	$0.00131	$0.00116
Budhigandak Prok-U Budhigandaki_400i	400 kV	9.7	6.027287	2.917823	4.850741	76.47769	2621.053093	$0.00123	$0.00123	$0.00131	$0.00116
Budhigandaki Nadi-U BUdhigandaki_132	132 kV	1.04	0.646225 84	28.61037	16.8427	69.70942	243.650886	$0.00224	$0.00224	$0.00368	$0.00327
Budhigandaki Syar-U Budhigandaki_400	400 kV	7.6	4.722419 6	20.59977	74.77744	206.4898	1002.388862	$0.00322	$0.00322	$0.00342	$0.00304
Budhigandaki kha-Gumda_400	400 kV	9.8	6.089435 8	19.78625	89.06065	198.8428	1004.954451	$0.00321	$0.00321	$0.00341	$0.00303
Burtibang-Kusma_400	400 kV	50	31.06855	12.38838	870.8576	633.8782	5116.715826	$0.00063	$0.00063	$0.00067	$0.00060
Burtibang-Tamgash_132	132 kV	20.3	12.6138 313	85.70173	2944.398	210.308	245.3952797	$0.04340	$0.04401	$0.00371	$0.00330
Butwal-Bharatpur_220	220 kV	76	47.224196	15.46393	810.5866	158.9062	1027.592598	$0.10247	$0.10299	$0.00232	$0.00206

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Butwal-Gorakhpur_400	400 kV	130	80.77823	25.89334	19915.208	2619.9152	10118.1045	$0.00032	$0.00032	$0.00034	$0.00030
Butwal-Lumbini_132	132 kV	63.44	39.41977624	12.26717	883.0544	77.38304	630.8141161	$0.05276	$0.05337	$0.00144	$0.00128
Butwal-Motipur_132	132 kV	63.44	39.41977624	14.28114	1196.6716	89.7889	628.7236173	$0.05294	$0.05364	$0.00145	$0.00129
Butwal-N Butwal_132	132 kV	25	15.534275	12.329	351.5146	74.02826	600.4401006	$0.02184	$0.02195	$0.00150	$0.00133
Chainpur Seti-Bajhang_400	400 kV	11.5	7.1457665	23.10703	95.40636	160.6032	695.0404271	$0.00464	$0.00464	$0.00493	$0.00438
Cham Catigad-Balanch_132	132 kV	21.14	13.13578294	25.90178	279.2685	65.00604	250.9713232	$0.04419	$0.04438	$0.00359	$0.00319
Chameliya-Balanch_132	132 kV	32	19.883872	21.32423	142.7773	26.76719	125.5247669	$0.13375	$0.13446	$0.00719	$0.00639
Chandranigapur-Dhalkebar_132	132 kV	69.5	43.1852845	15.84218	311.0354	31.40282	198.2228456	$0.18395	$0.18577	$0.00457	$0.00406
Chapagaun-Bhaktapur_220	220 kV	10	6.21371	11.49159	61.35644	122.8889	1069.381174	$0.01296	$0.01296	$0.00222	$0.00197
Chapagaun-Harisiddhi_132	132 kV	12	7.456452	43.58905	449.8572	105.44552	241.9082774	$0.02603	$0.02614	$0.00372	$0.00331
Chapagaun-Matathirtha_220	220 kV	10	6.21371	18.85314	165.25436	200.3178	1062.516907	$0.01304	$0.01305	$0.00223	$0.00198
Chapali-Balaju_132	132 kV	10	6.21371	26.2095	134.7573	54.76216	208.9401171	$0.02511	$0.02517	$0.00430	$0.00383
Chapali-Mulpani_132	132 kV	8	4.970968	41.40235	270.4276	95.64302	231.0086746	$0.01817	$0.01822	$0.00389	$0.00346
Chatigad-Balanch_132	132 kV	27.6	17.1498396	19.50865	103.109	24.47286	125.4461995	$0.11543	$0.11592	$0.00718	$0.00638

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Chera1-Nalgad_400	400 kV	24.6	15.2857266	18.01103	219.4962	227.4446	1262.807291	$0.00255	$0.00255	$0.00271	$0.00241
Chilime Hp-Chilime_132	132 kV	2.3	1.4291533	18.92396	8.126804	21.1	111.4988618	$0.01082	$0.01083	$0.00805	$0.00715
Chilime hub-Trishuli_220	220 kV	18.4	11.4332264	28.62579	701.4352	314.043	1097.063173	$0.02324	$0.02329	$0.00216	$0.00192
Chilime-Kerung_400	400 kV	80	49.70968	29.90073	8137.218	1508.1372	5043.81398	$0.00064	$0.00064	$0.00068	$0.00061
Chilime-Ratmate_400	400 kV	50	31.06855	21.87578	2712.074	1107.06	5060.665265	$0.00064	$0.00064	$0.00068	$0.00060
Chujung -Upper Arun_132	132 kV	12.06	7.49373426	34.33702	139.5195	36.70929	106.9087824	$0.05918	$0.05941	$0.00842	$0.00749
Dadagau Khalanga-Nalgad_132	132 kV	10.6	6.5865326	44.28542	409.3687	97.89145	221.0466786	$0.02516	$0.02526	$0.00408	$0.00362
Dailekh-Surkhet_132	132 kV	32.6	20.25669 46	20.14654	252.0424	40.73834	202.2101065	$0.08458	$0.08511	$0.00446	$0.00397
Damak-Anarmani_132	132 kV	30	18.64113	39.97092	473.9033	50.4739	126.2765531	$0.12464	$0.12581	$0.00717	$0.00637
Damak-Duhabi_132	132 kV	48.9	30.3850419	32.45824	1003.4504	78.19476	240.9088108	$0.10649	$0.10786	$0.00377	$0.00335
Damak-Duhabi_400	400 kV	50	31.06855	6.436963	79.45876	109.64406	1703.350788	$0.00189	$0.00189	$0.00201	$0.00179
Damauli-Bharatpur_220	220 kV	44.1	27.4024611	18.96099	3476.056	531.4752	2802.992882	$0.02180	$0.02194	$0.00085	$0.00076
Dana-Middle Kaligandaki_132	132 kV	6	3.728226	32.98149	64.47276	40.94616	124.148909	$0.02536	$0.02540	$0.00724	$0.00643
Dana-Mristi Khola_132	132 kV	4	2.485484	30.38059	36.40084	32.12063	105.7274727	$0.01985	$0.01987	$0.00849	$0.00755

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Dana-Nilgiri Khola1_132	132 kV	6.15	3.82143165	27.52179	45.83744	29.05311	105.5640276	$0.03057	$0.03061	$0.00851	$0.00757
Dana-Nilgiri Khola2_132	132 kV	2.3	1.4291533	38.01749	32.86225	47.41617	124.7219898	$0.00968	$0.00968	$0.00720	$0.00640
Dana-Rahughat_220	220 kV	20	12.42742	21.98243	2120.346	625.047	2843.393565	$0.00975	$0.00978	$0.00084	$0.00074
Dandakhet-Burtibang_132	132 kV	28	17.398388	38.9378	3959.572	249.1396	639.8399499	$0.02296	$0.02332	$0.00142	$0.00127
Dandakhet-Rahughat_220	220 kV	14	8.699194	6.273598	25.43228	34.24644	545.8819644	$0.03553	$0.03556	$0.00434	$0.00386
Dhalkebar-Hetauda_400	400 kV	127.7	79.3490767	5.889701	460.2216	285.6014	4849.166367	$0.00066	$0.00067	$0.00071	$0.00063
Dhalkebar-Muzzafarpur_400	400 kV	130	80.778233	39.95272	35720.28	3035.721	7598.283671	$0.00042	$0.00043	$0.00046	$0.00041
Dhungesangu-Basantapur_220	220 kV	27	16.777017	68.40375	5893.944	755.843	1104.973046	$0.03385	$0.03412	$0.00216	$0.00192
Dododhara-Bareli1_400	400 kV	200	124.2742	36.51483	61252.96	3661.2528	10026.7557	$0.00032	$0.00033	$0.00035	$0.00031
Dododhara-Bhuri_132	132 kV	34	21.126614	49.20397	1627.5084	122.15264	248.2576914	$0.07185	$0.07281	$0.00366	$0.00325
Dododhara-Maina Tara_400	400 kV	94	58.408874	6.522631	290.5944	35.95464	551.2290976	$0.00585	$0.00589	$0.00626	$0.00557
Dordi DhudhKh-Kirtipur_132	132 kV	14.35	8.91667385	15.14665	31.86364	15.90736	105.0222987	$0.07169	$0.07183	$0.00856	$0.00761
Dordi Kh-Udipur_132	132 kV	3.1	1.9262501	19.39265	11.48716	20.64898	106.4783823	$0.01527	$0.01528	$0.00843	$0.00749
Dudh Khola-Manang_132	132 kV	1.46	0.90720166	20.25429	11.8462	49.7105	245.4319554	$0.00312	$0.00312	$0.00366	$0.00325

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Dudhkoshi 10-U Dudhkoshi_132	132 kV	6.7	4.1631857	22.69887	68.26148	57.35827	252.6921825	$0.01391	$0.01393	$0.00355	$0.00316
Dudhkoshi 4-Inkhu_132	132 kV	4.1	2.5476211	34.244	47.41933	35.17974	102.7325663	$0.02094	$0.02097	$0.00874	$0.00777
Dudhkoshi 5-Dudhkoshi4_132	132 kV	7.4	4.5981454	29.17832	62.25913	36.70929	125.8101563	$0.03086	$0.03091	$0.00714	$0.00635
Dudhkoshi-Mirchiya_400	400 kV	80.5	50.0203655	24.80019	5575.208	1240.3958	5001.557649	$0.00064	$0.00065	$0.00069	$0.00061
Dudhkoshi6-U Dudhkoshi_132	132 kV	3.3	2.0505243	25.13172	41.22957	63.47649	252.5751918	$0.00685	$0.00686	$0.00355	$0.00316
Dudhkoshi9-U Dudhkoshi_132	132 kV	1.3	0.8077823	33.61858	29.07015	84.89024	252.5098919	$0.00270	$0.00270	$0.00355	$0.00316
Duhabi-Inaruwa_400	400 kV	30	18.64113	14.01723	349.5764	363.1924	2591.042595	$0.00124	$0.00125	$0.00132	$0.00118
Dumre-Damauli_132	132 kV	15	9.320565	36.46901	391.9928	84.38202	231.3800676	$0.03401	$0.03417	$0.00390	$0.00346
Dunai-Jagdulla_400	400 kV	50	31.06855	13.62343	543.776	353.1558	2592.26788	$0.00124	$0.00125	$0.00132	$0.00118
Durbang Myagdi-Dandakhet_132	132 kV	1.8	1.1184678	15.70597	4.38655	19.11942	121.7334555	$0.00776	$0.00776	$0.00737	$0.00655
Ghunsa Kh -Tamor_220	220 kV	13.34	8.28908914	10.14889	60.86025	54.71979	539.170195	$0.03428	$0.03432	$0.00440	$0.00391
Ghunsa Kh-Tamor_220	220 kV	5.9	3.6660889	10.14809	26.91702	54.68155	538.8358795	$0.01517	$0.01518	$0.00440	$0.00391
Ghunsa Tamor-Tamor_132	132 kV	3.4	2.1126614	25.9374	22.61404	32.88541	126.7876117	$0.01407	$0.01408	$0.00708	$0.00629
Ghunsa kh2-Tamor_220	220 kV	5.9	3.6660889	22.10461	127.7249	119.1675	539.1070008	$0.01516	$0.01518	$0.00440	$0.00391

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Ghunsa-Tamor_220	220 kV	7.22	4.48629862	11.06972	39.19195	59.65489	538.901526	$0.01856	$0.01857	$0.00440	$0.00391
Gumda-Ratmate_400	400 kV	75	46.602825	28.23755	6816.526	1446.049	5121.014394	$0.00063	$0.00063	$0.00067	$0.00060
Haitar-Sitalpati_400	400 kV	35	21.747985	42.02697	3680.296	1098.3122	2613.350903	$0.00123	$0.00124	$0.00131	$0.00117
Hangpang-Kabeli_132	132 kV	20	12.42742	44.1181	1082.2682	138.19518	313.2391921	$0.03350	$0.03376	$0.00289	$0.00257
Hapure-Kususm_132	132 kV	34	21.126614	18.97985	240.8496	46.5549	245.2859216	$0.07272	$0.07310	$0.00368	$0.00327
Hapure-Phulbari_132	132 kV	10	6.21371	37.00434	1280.553	240.3355	649.4792232	$0.00808	$0.00812	$0.00139	$0.00123
Hetauda-Bharatpur_132	132 kV	80	49.70968	36.89711	3021.224	118.54384	321.2821817	$0.13064	$0.13397	$0.00286	$0.00255
Hetauda-Kamane_132	132 kV	8	4.970968	61.33445	594.4636	148.01478	241.324052	$0.01739	$0.01746	$0.00373	$0.00332
Himchuli Dordi-Kirtiur_132	132 kV	10.01	6.21992371	36.38866	130.5953	43.59229	119.7963596	$0.04384	$0.04397	$0.00751	$0.00668
Hongu kh-Inkhu_132	132 kV	19	11.806049	16.57505	50.34196	16.72567	100.9087152	$0.09879	$0.09908	$0.00892	$0.00793
Humla Karnali 2-Mugu Karnali_400	400 kV	22.9	14.2293959	22.23881	349.2186	313.5585	1409.960785	$0.00229	$0.00229	$0.00243	$0.00216
Humla Karnali-Mugu Karnali_400	400 kV	19.8	12.3031458	10.45849	99.98108	209.5489	2003.624806	$0.00161	$0.00161	$0.00171	$0.00152
Humla Karnali-Mugu Karnali_400(1)	400 kV	29.5	18.3304445	26.72053	1238.301	700.5357	2621.713342	$0.00123	$0.00123	$0.00131	$0.00116
Ikhuwa Kh-U Arun_132	132 kV	4.5	2.7961695	21.5391	20.54812	22.94331	106.5193532	$0.02216	$0.02218	$0.00843	$0.00749

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Ilep Tatopani Kh-Ankhu_132	132 kV	12.17	7.56208507	18.17572	39.16713	19.11942	105.1920914	$0.06070	$0.06082	$0.00855	$0.00760
Illam-Damak_132	132 kV	31.5	19.5731865	25.47018	399.135	62.21778	244.2769545	$0.06765	$0.06809	$0.00370	$0.00329
Illam-Phidim_132	132 kV	23.2	14.4158072	9.479744	40.05302	22.77016	240.1980475	$0.05067	$0.05076	$0.00374	$0.00333
Inaruwa-Purnea_400	400 kV	110	68.35081	18.14041	8094.608	1808.0948	9967.221248	$0.00032	$0.00032	$0.00035	$0.00031
Inkhu Kh-Inkhu_132	132 kV	6.72	4.17561312	15.00647	14.82122	15.29554	101.9263025	$0.03459	$0.03462	$0.00881	$0.00783
Inkhu-Tingla_132	132 kV	14.3	8.8856053	34.18778	1556.7674	182.19738	532.9312988	$0.01408	$0.01420	$0.00170	$0.00151
IsuwaKh-Sitalpati_132(1)	132 kV	17	10.563307	52.62279	920.2723	74.33632	141.2625974	$0.06314	$0.06392	$0.00643	$0.00571
Jaldigad-Nalgad_132	132 kV	11.2	6.9593552	14.85427	24.11081	16.42741	110.5904901	$0.05313	$0.05321	$0.00812	$0.00722
Jhimruk-Lamahi_132	132 kV	47.6	29.5772596	38.56666	1962.2254	121.8265	315.8855343	$0.07906	$0.08033	$0.00289	$0.00257
Jumla Cluster-Phukot_132	132 kV	55.57	34.52958647	12.56397	160.5373	28.85503	229.6649069	$0.12695	$0.12765	$0.00393	$0.00349
Kaligandaki George-Dana_220	220 kV	1.63	1.01283473	11.73744	19.92525	125.4234	1068.57543	$0.00211	$0.00211	$0.00222	$0.00197
Kaligandaki Kowan_Dana_220	220 kV	7.68	4.77212928	21.89092	204.1293	305.9108	1397.43236	$0.00761	$0.00762	$0.00170	$0.00151
Kaligandaki-Butwal_132	132 kV	40	24.85484	89.50369	8941.122	287.0564	320.7201848	$0.06543	$0.06747	$0.00288	$0.00256

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Kaligandaki-Tamgash_132	132 kV	42.3	26.2839933	20.1588	325.4452	42.10816	208.8822747	$0.10625	$0.10707	$0.00433	$0.00385
Kamane-Pathlaiya_132	132 kV	29	18.019759	33.94934	653.8988	79.42032	233.9377437	$0.06504	$0.06557	$0.00387	$0.00344
Karnali Sto-Phukot_132	132 kV	55.57	34.529586647	19.3838	1931.121	126.1882	650.9982563	$0.04478	$0.04547	$0.00140	$0.00124
Karuwa Seti-Banskot_132	132 kV	11.8	7.3321778	23.16786	61.92842	24.47286	105.6328034	$0.05861	$0.05876	$0.00851	$0.00757
Kasuwa Kh 2-U Arun_132	132 kV	4.6	2.8583066	28.02136	35.65615	34.41496	122.8168797	$0.01965	$0.01967	$0.00731	$0.00650
Kasuwa Kh 3-U Arun_132	132 kV	4.6	2.8583066	39.33739	70.20295	42.06273	106.928116	$0.02257	$0.02261	$0.00840	$0.00747
Kawasoti-Bharatpur_132	132 kV	76	47.224196	26.5997	1057.3064	66.35688	249.4647684	$0.15984	$0.16238	$0.00365	$0.00325
Kerun-Kimanthanka_400	400 kV	80	49.70968	13.68377	1682.767	701.6828	5127.847077	$0.00063	$0.00063	$0.00067	$0.00060
Khadbari-Baneshwor_220	220 kV	10	6.21371	3.41914	6.021272	21.0879	616.7603549	$0.02246	$0.02247	$0.00384	$0.00342
Khani Khola-Singati_132	132 kV	19.13	11.88682723	24.46332	112.6622	30.59108	125.0487669	$0.08026	$0.08056	$0.00720	$0.00640
Khani Khola1-Singati_132	132 kV	13.69	8.50656899	18.36144	45.4299	22.94331	124.9537618	$0.05748	$0.05760	$0.00719	$0.00639
Khare-Singati_132	132 kV	7.58	4.70999218	14.75801	16.27202	18.43112	124.8889247	$0.03184	$0.03187	$0.00719	$0.00639
Khimti 1-Khimti_132	132 kV	1	0.621371	37.06299	13.57959	45.88662	123.8071186	$0.00424	$0.00424	$0.00725	$0.00644
Khimti 2-Khimti_132	132 kV	9.76	6.06458096	30.11838	87.33126	37.32111	123.9147325	$0.04132	$0.04142	$0.00726	$0.00645

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Khimti Shivalaya Sto-Khimti_220	132 kV	18	11.184678	27.49948	753.6483	382.3885	1390.52993	$0.00679	$0.00680	$0.00065	$0.00057
Khimti-Dhalkebar_220	220 kV	75	46.602825	84.45823	25002.88	932.1522	1103.684271	$0.09415	$0.09667	$0.00220	$0.00196
Khimti-Garjyang_132	132 kV	27.8	17.2741138	26.40263	382.4719	66.60093	252.2511204	$0.05782	$0.05815	$0.00358	$0.00318
Khimti-Sunkoshi_400	400 kV	22	13.670162	24.7763	1537.9018	1268.1192	5118.275126	$0.00063	$0.00063	$0.00067	$0.00060
Khimti-Tingla_400	400 kV	57	35.418147	5.477569	186.357	273.565	4994.277571	$0.00065	$0.00065	$0.00069	$0.00061
Khudi-Damauli_220	220 kV	60	37.28226	38.59894	4948.892	543.8082	1408.868223	$0.05900	$0.05954	$0.00170	$0.00151
Khudi-Manang_220	220 kV	26.5	16.4663315	20.15624	2361.28	573.1852	2843.71093	$0.01291	$0.01296	$0.00084	$0.00074
Khudi-Udipur_220	220 kV	15.8	9.8176618	28.74631	2453.1	732.2458	2547.268849	$0.00859	$0.00862	$0.00093	$0.00083
Khudi1-Nyadi Phidim_132	132 kV	17.37	10.79321427	15.06929	38.4803	18.35465	121.8016907	$0.07482	$0.07498	$0.00738	$0.00656
Kimanthanka-U Arun_400	400 kV	10	6.21371	13.6995	111.666	357.6448	2610.641264	$0.00123	$0.00124	$0.00131	$0.00117
Kirtipur-Udipur_132	132 kV	10.8	6.7108068	42.70383	549.0856	137.7768	322.6333563	$0.01756	$0.01763	$0.00279	$0.00248
Kohalpur-Kusum_132	132 kV	90	55.92339	38.72332	2623.002	93.37212	241.126329	$0.19583	$0.20133	$0.00383	$0.00340
Kulekhani 2-Hetauda_132	132 kV	9.6	5.9651616	24.18081	54.99868	24.47286	101.2077759	$0.04977	$0.04988	$0.00888	$0.00790
Kulekhani 3-Hetauda_132	132 kV	4.5	2.7961695	10.33125	4.704467	10.70688	103.6358621	$0.02278	$0.02279	$0.00866	$0.00770

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Kusma-Andhi Khola_220	132 kV	76	47.224196	18.47464	5689.222	526.179	2848.115038	$0.01400	$0.01415	$0.00032	$0.00028
Kusma-N Damauli_400	400 kV	69.3	43.0610103	20.63232	3361.06	1055.6024	5116.256437	$0.00063	$0.00063	$0.00067	$0.00060
Kusma-Rahughat_220	220 kV	29.9	18.5789929	27.26218	4876.226	776.2658	2847.409121	$0.01455	$0.01464	$0.00084	$0.00074
Kusum-Butwal_132	132 kV	228.9	142.2318219	10.37899	284.1368	18.083866	174.2353158	$0.68926	$0.70009	$0.00523	$0.00465
Kusum-Lamahi_132	132 kV	47.6	29.5772596	31.97541	946.4826	74.8629	234.1264741	$0.10667	$0.10802	$0.00388	$0.00345
L ApsuwaKh-Sitalpati_132	132 kV	3.5	2.1747985	40.20118	55.8235	42.82751	106.5329674	$0.01724	$0.01726	$0.00843	$0.00750
L Bagmati-Chandranigapur_132	132 kV	22.55	14.01191605	26.04962	148.4353	27.45549	105.3968925	$0.11225	$0.11286	$0.00856	$0.00761
L Balephi-Bahrabise_132	132 kV	16.65	10.345827 15	31.60009	1553.1982	209.063	661.5898879	$0.01320	$0.01330	$0.00137	$0.00121
L Balephi-Lamosangu_132	132 kV	7.36	4.57329056	14.44695	15.0183	15.29554	105.873835	$0.03647	$0.03651	$0.00848	$0.00754
L Balephi-U Balephi_132	132 kV	10.75	6.67973825	24.34729	594.7026	158.47382	650.888949	$0.00867	$0.00870	$0.00138	$0.00123
L Barun-U Barun_132	132 kV	14.4	8.9477424	19.91375	265.7677	132	662.8585776	$0.01140	$0.01142	$0.00136	$0.00121
L Chameliya-Balanch_132	132 kV	6.8	4.2253228	12.21767	10.00582	15.29554	125.1919556	$0.02850	$0.02852	$0.00717	$0.00637
L Isuwa-Sitalpati_132	132 kV	12	7.456452	27.65494	89.88336	29.45921	106.5242232	$0.05910	$0.05928	$0.00845	$0.00751
L Likhu-Khimti_132	132 kV	9.76	6.06458096	17.39844	29.08593	21.49023	123.518143	$0.04146	$0.04151	$0.00727	$0.00646

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
L Manang Mars-Manang_220	220 kV	16.23	10.08485133	19.5574	144.2423	107.0718	547.4746132	$0.04107	$0.04113	$0.00433	$0.00385
L Modi-Kusma_132	132 kV	15	9.320565	14.70911	31.36483	15.29554	103.986849	$0.07568	$0.07584	$0.00864	$0.00768
L Seti Sto-Marsyangdi_132	132 kV	16	9.941936	33.08351	342.3693	70.35948	212.6723555	$0.03947	$0.03966	$0.00424	$0.00377
Lahan-Duhabi_132	132 kV	86.4	53.6864544	20.40493	618.471	26.14952	128.1529513	$0.35372	$0.36208	$0.00717	$0.00637
Lahan-Mirchiya_132	132 kV	27.7	17.2119767	75.23665	3094.714	179.24424	238.2405915	$0.06100	$0.06205	$0.00383	$0.00340
Lamahi-Ghorahi_132	132 kV	20	12.42742	10.86526	65.40916	34.0654	313.5258613	$0.03347	$0.03353	$0.00287	$0.00255
Lamki-Bhurigaon_132	132 kV	35.2	21.8722592	4.463771	10.422696	5.229348	117.1509022	$0.15764	$0.15796	$0.00767	$0.00682
Lamki-Pahalmanpur_132	132 kV	35	21.747985	20.45817	282.4646	46.06354	225.1596306	$0.08155	$0.08205	$0.00401	$0.00356
Lamosangu-Bahrabise_132	132 kV	10.2	6.3379842	36.95902	1301.8828	244.4972	661.535939	$0.00809	$0.00813	$0.00136	$0.00121
Lamosangu-Bhotekoshi_220	220 kV	21.33	13.25384343	21.6749	466.3874	142.8724	659.1605959	$0.04483	$0.04498	$0.00361	$0.00321
Lamosangu-Khimti_132	132 kV	43.9	27.2781869	36.10278	1122.616	89.89178	248.9885266	$0.09250	$0.09366	$0.00365	$0.00324
Lamosangu-Singati_132	132 kV	33.37	20.735150 27	35.11193	3835.8	229.7794	654.4197371	$0.02675	$0.02720	$0.00139	$0.00124
Landruk Modi-N Modi_132	132 kV	18.15	11.27788365	28.41182	573.163	132.44406	466.1583102	$0.02043	$0.02052	$0.00193	$0.00172
Langtang khola Res-Chilime_220	220 kV	6.55	4.06998005	21.45478	141.0327	237.0808	1105.025547	$0.00821	$0.00822	$0.00215	$0.00191

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Lapche-Tamakoshi_220	220 kV	14.76	9.17143596	14.84783	179.42286	208.255	1402.595531	$0.01458	$0.01459	$0.00169	$0.00150
Lapsephedi-Bahrabise_400	400 kV	59.8	37.1579858	10.34748	721.1018	525.907	5082.464523	$0.00063	$0.00064	$0.00067	$0.00060
Lapsephedi-Mulpani_220	220 kV	70	43.49597	20.85745	1349.5296	198.88014	953.5208762	$0.10171	$0.10240	$0.00250	$0.00222
Lapsephedi-Ratmate_400	400 kV	27.5	17.0877025	6.647271	137.50534	338.1824	5087.537427	$0.00063	$0.00063	$0.00067	$0.00060
Lawan Saharta Bheri-Dunai_132	132 kV	11.2	6.9593552	40.46578	255.753	65.3043	161.3815426	$0.03641	$0.03655	$0.00558	$0.00496
Lekhnath-Damauli_132	132 kV	35	21.747985	33.88987	1101.1268	86.94494	256.551412	$0.07158	$0.07248	$0.00354	$0.00315
Lekhnath-Damauli_220	220 kV	40.3	25.0412513	25.68553	738.1906	176.4674	687.0304019	$0.08127	$0.08161	$0.00346	$0.00308
Lekhnath-Kaligandaki_132	132 kV	80	49.70968	36.57354	2936.014	112.22882	306.8579634	$0.13678	$0.14036	$0.00300	$0.00267
Likhu 2-Likhu_132	132 kV	5.42	3.36783082	33.64794	60.61481	42.06273	125.0083363	$0.02275	$0.02278	$0.00719	$0.00639
Likhu 4-Likhu_132	132 kV	14.7	9.1341537	32.13728	149.6144	40.07431	124.6972675	$0.06185	$0.06208	$0.00722	$0.00642
Likhu A-Likhu_132	132 kV	1.43	0.88856053	31.21583	13.77378	39.00362	124.9482074	$0.00600	$0.00601	$0.00718	$0.00638
Likhu Cluster-Likhu_132	132 kV	6.63	4.11968973	16.21612	17.1961	20.26659	124.9780465	$0.02783	$0.02786	$0.00718	$0.00639
Likhu Kh-Likhu_132	132 kV	6.7	4.1631857	18.35691	22.27449	22.94331	124.9845971	$0.02812	$0.02815	$0.00718	$0.00639
Likhu-Khimti_132	132 kV	27.5	17.0877025	33.79783	2931.922	222.7564	659.0849176	$0.02189	$0.02218	$0.00138	$0.00123

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Likhu1-Likhu_132	132 kV	11.8	7.3321778	36.45288	218.5034	58.88782	161.5450412	$0.03832	$0.03847	$0.00557	$0.00495
Lower Burbang Kh-Dunau_132	132 kV	15	9.320565	12.25531	22.18464	15.29554	124.8074508	$0.06306	$0.06315	$0.00720	$0.00640
Lower Lohore_Dailekh_132	132 kV	24.75	15.37893225	14.83318	51.8081	15.29554	103.1170659	$0.12593	$0.12635	$0.00873	$0.00776
Luja Khola-U Dudhkoshi_132	132 kV	4	2.485484	15.0208	8.918672	18.96647	126.2680416	$0.01662	$0.01663	$0.00711	$0.00632
M Bhotekoshi-Bhotekoshi_132	132 kV	3.4	2.1126614	24.35908	19.93459	30.59108	125.583889	$0.01420	$0.01421	$0.00715	$0.00635
M Hongu B-Inkhu_132	132 kV	9.93	6.17021403	17.20361	28.70338	17.51339	101.8006686	$0.05118	$0.05126	$0.00883	$0.00785
M Karnali-Phukot_132	132 kV	22.84	14.19211364	9.678244	40.89301	22.94331	237.0606693	$0.05055	$0.05064	$0.00379	$0.00337
M Marsyangdi-Dumre_132	132 kV	12	7.456452	30.98185	225.4616	58.99002	190.4018643	$0.03307	$0.03319	$0.00473	$0.00420
M Marsyangdi-Marsyangdi_132	132 kV	25	15.534275	58.25441	1672.0624	144.36082	247.8109726	$0.05293	$0.05354	$0.00366	$0.00326
M Tamor-Hangpang_132	132 kV	12.7	7.8914117	19.52296	94.20929	41.29795	211.5352897	$0.03150	$0.03157	$0.00425	$0.00378
Madi Seti-Lekhnath_132	132 kV	13.86	8.61220206	29.16852	231.3471	65.77082	225.4856263	$0.03225	$0.03236	$0.00399	$0.00355
Madme-U Madi_132	132 kV	6.43	3.99541553	15.38629	14.96718	18.35465	119.29224	$0.02828	$0.02830	$0.00753	$0.00669
Mainatada-Surkhet_132	132 kV	22.8	14.1672588	41.38717	768.1828	99.48522	240.3769574	$0.04976	$0.05015	$0.00376	$0.00334

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Marsyangdi 3 - M Marsyangdi_132	132 kV	6.6	4.1010486	30.07817	58.75706	32.12063	106.7905062	$0.03243	$0.03248	$0.00842	$0.00748
Marsyangdi besi-Uidpur_132	132 kV	3.3	2.0505243	35.83517	41.81713	38.23885	106.7076004	$0.01623	$0.01624	$0.00842	$0.00748
Marsyangdi-Bharatpur_132	220 kV	40	24.85484	56.73325	3585.264	183.60234	323.6238714	$0.17124	$0.17459	$0.00746	$0.00663
Marsyangdi-Bharatpur_220	220 kV	31.9	19.8217349	18.62659	2428.274	521.5528	2800.044453	$0.01578	$0.01586	$0.00085	$0.00076
Marsyangdi-Matathirtha_132	132 kV	50	31.06855	31.4491	2297.692	205.4154	653.1678172	$0.04016	$0.04061	$0.00139	$0.00123
Marsyangdi-Matathirtha_220	220 kV	70	43.49597	26.26039	2670.56	364.9722	1389.820182	$0.06978	$0.07029	$0.00172	$0.00153
Marsyangdi7-Manang_132	132 kV	8.84	5.49291964	16.81718	49.31557	41.29795	245.5700064	$0.01889	$0.01891	$0.00366	$0.00325
Matathirtha-Hetauda_132	132 kV	50	31.06855	23.61696	762.8404	71.13148	301.1881292	$0.08710	$0.08803	$0.00301	$0.00268
Matatirtha-Chapagaun_132	132 kV	10	6.21371	20.42211	81.18354	29.36516	143.7910187	$0.03649	$0.03659	$0.00626	$0.00556
Mathilo Langtang-Chilime_132	132 kV	19.12	11.88061352	18.05446	60.19523	18.62232	103.1452616	$0.09725	$0.09757	$0.00873	$0.00776
Mewa Kh-Hangpang_132	132 kV	10	6.21371	35.68277	125.1269	38.23885	107.1633452	$0.04896	$0.04912	$0.00840	$0.00747
Mewa-Dhungesangu_132	132 kV	20	12.42742	52.73625	1094.4894	126.05708	239.033075	$0.04390	$0.04428	$0.00379	$0.00337
Mirchiya-Dhalkebar_400	400 kV	32	19.883872	5.72019	102.07498	87.56028	1530.72328	$0.00211	$0.00211	$0.00224	$0.00199

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Mirchiya-Inaruwa_400	400 kV	120	74.56452	4.658865	160.35212	136.86924	2937.823697	$0.00110	$0.00110	$0.00117	$0.00104
Motipur-Shivapur_132	132 kV	23	14.291533	21.11067	198.9732	46.09224	218.3362252	$0.05527	$0.05551	$0.00413	$0.00367
Mugu Karnali-Phukot_400	400 kV	71.3	44.3037523	43.64098	15474.308	2234.922	5121.154475	$0.00063	$0.00063	$0.00067	$0.00060
Mugu karnali-West Seti_400	400 kV	150	93.20565	15.57665	4056.958	788.9312	5064.832297	$0.00064	$0.00064	$0.00068	$0.00060
Mulpani-Bhaktapur_132	132 kV	7	4.349597	12.31085	20.96314	30.59924	248.5550551	$0.01478	$0.01479	$0.00361	$0.00321
Myagdi Kh-Dandakhet_132	132 kV	20	12.42742	35.94584	254.4782	43.82172	121.9104074	$0.08607	$0.08657	$0.00740	$0.00658
Myagdi Kh-Raughat_132	132 kV	6.4	3.9767744	19.8414	24.88224	24.47286	123.3424053	$0.02722	$0.02725	$0.00728	$0.00647
Myagdi Khola A-Dandakhet_132	132 kV	27.33	16.98206943	14.87003	59.01236	18.12521	121.8908772	$0.11764	$0.11802	$0.00738	$0.00656
Myardi Khola-Manang_132	132 kV	9.4	5.8408874	22.02582	44.67686	22.94331	104.1655203	$0.04735	$0.04744	$0.00863	$0.00767
N Butwal-Bardghat_132	132 kV	63.44	39.41977624	1.458559	8.645142	7.140756	489.5760816	$0.06799	$0.06807	$0.00183	$0.00163
N Marsyangdi-Marsyangdi_132	132 kV	50	31.06855	24.81998	1431.5586	164.07728	661.0693482	$0.03968	$0.04003	$0.00137	$0.00122
N Modi-Kusma_132	132 kV	10	6.21371	60	698.4081	182.72385	304.53975	$0.01723	$0.01729	$0.00296	$0.00263
Nalgad-Bafikot_400	400 kV	26.3	16.3420573	14.41558	3424.212	1730.0696	12001.38739	$0.00027	$0.00027	$0.00029	$0.00025

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Nalgad-Jagadulla_400	400 kV	40	24.85484	27.22918	1763.6302	711.369	2612.524505	$0.00123	$0.00124	$0.00131	$0.00117
Nalgad-Maina Tara_400	400 kV	70.2	43.6202442	25.34901	5137.43	1297.7604	5119.57035	$0.00063	$0.00063	$0.00067	$0.00060
Nalgadh-Phukot_400	400 kV	94.3	58.5952853	26.87662	7740.086	1374.4128	5113.785885	$0.00063	$0.00063	$0.00067	$0.00060
Namlan-Mugu Karnali_400	400 kV	66.55	41.35224005	16.55512	551.6627	231.7274	1399.73253	$0.00230	$0.00231	$0.00245	$0.00218
Nar Khola2-Manang_132	132 kV	8.58	5.33136318	18.41025	56.88575	38.23885	207.7041322	$0.02167	$0.02170	$0.00433	$0.00385
Naumure Sto-Phulbari_400	400 kV	64	39.767744	15.80609	405.72	187.3703	1185.431059	$0.00272	$0.00272	$0.00290	$0.00257
New Damauli-Butwal_400	400 kV	74.8	46.4785508	31.60005	8526.824	1611.0268	5098.178009	$0.00063	$0.00064	$0.00068	$0.00060
New Daumauli-Ratmate_400	400 kV	79	49.088309	6.65299	388.0922	335.309	5039.974508	$0.00064	$0.00064	$0.00068	$0.00060
Nupche Likhu-Garjyang_132	132 kV	14.87	9.23978677	17.28311	87.62078	43.59229	252.2248021	$0.03093	$0.03099	$0.00356	$0.00317
Nyadi Khola-Khudi1_132	132 kV	5.46	3.39268566	18.70072	18.82035	22.94331	122.6867736	$0.02335	$0.02337	$0.00732	$0.00651
Okhaldhunga-Mirchiya_132	132 kV	70	43.49597	29.00215	5459.078	174.823	602.7932412	$0.06093	$0.06283	$0.00153	$0.00136
Pahalmanpur-Mahendranagar_132	132 kV	40	24.85484	37.75422	1116.776	89.68032	237.5372078	$0.08835	$0.08945	$0.00382	$0.00340
Palun Kh-Mewa_132	132 kV	11.4	7.0836294	14.11005	22.12854	16.06032	113.8218504	$0.05255	$0.05262	$0.00789	$0.00702
Pancheswor-New Attariya_400	400 kV	87.7	54.4942367	39.18467	15333.388	1987.1976	5071.364899	$0.00064	$0.00064	$0.00068	$0.00060

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Pathlaiya-Chandranigapur_132	132 kV	67.32	41.83069572	23.35206	722.2896	58.39884	250.0800358	$0.14123	$0.14298	$0.00363	$0.00323
Pathlaiya-Parwanipur_132	132 kV	29	18.019759	27.85865	442.953	68.44296	245.679385	$0.06193	$0.06233	$0.00368	$0.00327
Pelma 1-Sisne_132	132 kV	22.23	13.81307733	27.17517	324.0423	68.82992	253.2823898	$0.04605	$0.04626	$0.00356	$0.00316
Pelma2-Sisne_132	132 kV	12.2	7.5807262	28.11595	190.6102	71.12425	252.9676216	$0.02530	$0.02537	$0.00356	$0.00316
Phidim-Kabeli_132	132 kV	7.78	4.83426638	1.442588	0.2981412	3.389634	234.9689586	$0.01737	$0.01737	$0.00382	$0.00339
Phukot-Betan_400	400 kV	50	31.06855	48.62895	13475.572	2479.372	5098.551377	$0.00063	$0.00064	$0.00068	$0.00060
Phulbari-Butwal_400	400 kV	228.9	142.2318219	9.583275	2167.144	463.7526	4839.187021	$0.00067	$0.00067	$0.00071	$0.00063
Phulbari-Lakhnow_400	400 kV	200	124.2742	29.88157	41278.96	3041.2788	10177.77446	$0.00032	$0.00032	$0.00034	$0.00030
Phulbari-Maina Tara_400	400 kV	66	41.010486	33.42316	8412.742	1708.2916	5111.101404	$0.00063	$0.00063	$0.00067	$0.00060
Rahughat Mangale-Rahughat_132	132 kV	12.34	7.66771814	27.12686	88.91083	28.30286	104.3351866	$0.06205	$0.06225	$0.00863	$0.00767
Rasu Bhotekoshi-Chilime_220	220 kV	4	2.485484	16.61348	25.73784	91.77323	552.4022059	$0.01003	$0.01004	$0.00429	$0.00381
Rasuwagadhi-Chilime_132	132 kV	8.7	5.4059277	34.18212	201.0446	84.89024	248.3469135	$0.01838	$0.01842	$0.00362	$0.00322
Ratmate-Hetauda_400	400 kV	40.6	25.2276626	27.14162	3400.654	1378.7532	5079.848587	$0.00063	$0.00064	$0.00068	$0.00060

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Rolwaling Kh-Tamakoshi_132	132 kV	4.34	2.69675014	41.13304	102.4822	67.30037	163.6163289	$0.01392	$0.01394	$0.00549	$0.00488
Rolwaling Kh1-Tamakoshi_132	132 kV	5.38	3.34297598	15.10617	12.13749	19.11942	126.5669591	$0.02230	$0.02232	$0.00709	$0.00630
S Inkhu Kh-Dudhkoshi4_132	132 kV	10.72	6.66109712	14.59396	22.54243	18.35465	125.7688112	$0.04472	$0.04477	$0.00714	$0.00635
S Tamor-Tamor_220	220 kV	9.36	5.81603256	21.43006	100.2209	118.5404	553.1501078	$0.02344	$0.02346	$0.00429	$0.00381
S akhu Kh-Ankhu_132	132 kV	8.5	5.2816535	17.04752	24.15801	17.97226	105.424484	$0.04230	$0.04236	$0.00852	$0.00757
S dordi-Kirtipur_132	132 kV	5	3.106855	31.65481	49.43774	37.93293	119.833068	$0.02189	$0.02192	$0.00750	$0.00666
SR-Betan_400	400 kV	17.2	10.6875812	13.06416	130.5821	211.0784	1615.70587	$0.00199	$0.00200	$0.00212	$0.00189
Sagu Khola-Singati_132	132 kV	6.7	4.1631857	12.24611	9.901789	15.29554	124.9012135	$0.02814	$0.02816	$0.00719	$0.00639
Samundratar-Trishuli_132	132 kV	20	12.42742	22.40596	196.18822	53.07016	236.8573362	$0.04430	$0.04446	$0.00380	$0.00338
Sandikharka-Butwal_132	132 kV	28.3	17.5847993	35.80701	1007.3844	109.6761	306.297845	$0.04847	$0.04892	$0.00296	$0.00263
Sani Bheri-Sisne_132	132 kV	2.64	1.64041944	26.96086	18.97015	34.04787	126.2862906	$0.01097	$0.01097	$0.00711	$0.00632
Sani Bheri2-Bafikot_132	132 kV	8	4.970968	16.93331	22.44688	17.82695	105.2774088	$0.03987	$0.03992	$0.00853	$0.00758
Sani Bheri3-Bafikot_132	132 kV	2.1	1.3048791	35.74451	26.4958	37.92529	106.1010208	$0.01038	$0.01039	$0.00846	$0.00752

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Sani Bheri4-Bafikot_132	132 kV	11.05	6.86614955	29.38935	93.6011	31.13407	105.9365723	$0.05473	$0.05489	$0.00849	$0.00755
Sanjen Kh-Chilime_132	132 kV	8.4	5.2195164	24.0352	95.95752	59.6526	248.1884902	$0.01776	$0.01779	$0.00362	$0.00322
Sanjen-Chilime_132	132 kV	2.04	1.26759684	26.2294	13.87483	32.50302	123.9182749	$0.00864	$0.00864	$0.00724	$0.00644
Sankhuwa 1-Sitalpati_132	132 kV	8.5	5.2816535	25.46608	54.10854	27.02722	106.1302721	$0.04202	$0.04210	$0.00847	$0.00753
Sankhuwa-Sitalpati_132	132 kV	2.6	1.6155646	18.00595	8.308646	19.11942	106.1839003	$0.01285	$0.01285	$0.00845	$0.00751
Saru kh-Nalgad_132	132 kV	1	0.621371	4.010312	0.4474768	11.47165	286.0538033	$0.00183	$0.00183	$0.00314	$0.00279
Seti Khola-Banskot_132	132 kV	7.1	4.4117341	21.68795	32.7854	22.94331	105.7882834	$0.03521	$0.03526	$0.00849	$0.00755
Seti Khola-Lekhnath_132	132 kV	9.3	5.7787503	14.8599	20.10882	16.82509	113.2247862	$0.04309	$0.04315	$0.00793	$0.00705
Seti Nadi-Bajhang_400	400 kV	11.5	7.1457665	7.597786	20.44903	107.0688	1409.210525	$0.00229	$0.00229	$0.00243	$0.00216
Sharad Babai Sto-Mainatada_132	132 kV	21.8	13.5458878	33.96309	489.7847	71.12425	209.4163105	$0.05462	$0.05499	$0.00431	$0.00383
Shivapuri-Lamahi_132	132 kV	50.46	31.35438066	11.05131	108.56928	20.39328	184.5326934	$0.14346	$0.14423	$0.00489	$0.00434
Simbuwa Kh-Tamor_132	132 kV	14.77	9.17764967	27.08226	107.0747	34.41496	127.0756576	$0.06098	$0.06117	$0.00708	$0.00629
Simbuwa-Tamor_132	132 kV	2.39	1.48507669	32.3942	24.79688	41.06852	126.7773861	$0.00989	$0.00990	$0.00708	$0.00629
Sisne-Bafikot_132	132 kV	14.08	8.74890368	26.27936	908.2304	173.46842	660.093777	$0.01119	$0.01125	$0.00137	$0.00121

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Sitalpati-Dhungesangu_220	220 kV	46	28.583066	30.86963	2419.964	434.778	1408.432819	$0.04525	$0.04550	$0.00169	$0.00150
Sitalpati-Inaruwa_400	400 kV	120	74.56452	26.90532	9930.838	1378.6688	5124.149425	$0.00063	$0.00063	$0.00067	$0.00060
Sitalpati-Tumlingtar_220	220 kV	14.8	9.1962908	1.642856	1.739115	7.423986	451.8951144	$0.04538	$0.04539	$0.00524	$0.00466
Suichatar-Matathirtha_132	132 kV	4.62	2.87073402	61.09337	340.8682	149.35142	244.4642029	$0.00992	$0.00994	$0.00368	$0.00327
Sunkoshi-Dhalkebar_400	400 kV	38	23.612098	50.0523	10841.696	2546.514	5087.706259	$0.00063	$0.00064	$0.00068	$0.00060
Super Budhigandaki-U Budhigandaki_132	132 kV	20.61	12.80645631	32.5213	215.1436	39.7684	122.2841645	$0.08843	$0.08890	$0.00738	$0.00656
Super Madi-U Madi_132	132 kV	6.4	3.9767744	28.09878	49.81388	33.65019	119.7567652	$0.02804	$0.02808	$0.00750	$0.00667
Super Nyadi-Khudi1_132	132 kV	10.5	6.5243955	25.07756	64.99551	30.79754	122.8091569	$0.04486	$0.04495	$0.00732	$0.00651
Super Trishuli-Marsyangdi_132	132 kV	10.5	6.5243955	35.89415	265.7516	76.47769	213.0644966	$0.02586	$0.02595	$0.00423	$0.00376
Surkhet-Dododhara_132	132 kV	89	55.302019	33.65412	1943.2592	80.57844	239.4311306	$0.19502	$0.19972	$0.00384	$0.00341
Surkhet-Kohalpur_132	132 kV	42.5	26.4082675	10.09521	82.20344	23.95672	237.3077925	$0.09396	$0.09428	$0.00379	$0.00337
Suti Khola-Manang_132	132 kV	8.2	5.0952422	12.45908	12.5425	15.29401	122.7539273	$0.03505	$0.03508	$0.00731	$0.00650
Syar khola-U Budhgandaki_132	132 kV	7.4	4.5981454	37.29894	101.7321	45.50423	121.9987217	$0.03182	$0.03189	$0.00737	$0.00655
Syaule-Balanch_132	132 kV	115	71.457665	74.52173	12588.986	187.96506	252.2285245	$0.23921	$0.25523	$0.00379	$0.00337

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
T Bheri 1-Dunai_132	132 kV	16.2	10.0662102	33.64064	362.04	84.12546	250.0709261	$0.03399	$0.03413	$0.00360	$0.00320
Tadakhani Cl-Dandakhet_132	132 kV	15	9.320565	24.17798	86.31223	29.45921	121.8431399	$0.06459	$0.06478	$0.00738	$0.00656
Tadekhani Cl-Dandakhet_132	132 kV	15	9.320565	12.68391	23.66366	15.44849	121.7959604	$0.06461	$0.06471	$0.00738	$0.00656
Tamakoshi 5-Singati_132	132 kV	2.42	1.50371782	47.40902	75.89387	76.47769	161.3146401	$0.00787	$0.00788	$0.00557	$0.00495
Tamakoshi-Khimti_220	220 kV	46	28.583066	28.16827	2010.96	395.6206	1404.49023	$0.04538	$0.04561	$0.00170	$0.00151
Tamgash-Sandikharka_132	132 kV	60.8	37.7793568	52.01403	4579.424	165.25552	317.7133554	$0.10040	$0.10318	$0.00290	$0.00258
Tamor Hub-Hangpang_220	220 kV	30.5	18.9518155	43.02515	3116.922	604.8948	1405.909799	$0.03006	$0.03021	$0.00169	$0.00151
Tamor Kh 5-Tamor_132	132 kV	3.4	2.1126614	24.12888	19.57026	30.59108	126.7820139	$0.01407	$0.01408	$0.00708	$0.00629
Tamor LILO-Inaruwa_400	400 kV	50	31.06855	5.100791	791.3556	585.0544	11469.87595	$0.00028	$0.00028	$0.00030	$0.00027
Tamor Mewa-Hangpang_132	132 kV	7	4.349597	45.62735	287.2672	97.89145	214.5455522	$0.01712	$0.01717	$0.00419	$0.00373
Tanahu-Damauli_132	132 kV	6.6	4.1010486	37.42913	257.4092	102.8319	274.7376175	$0.01260	$0.01264	$0.00327	$0.00291
Tatopani-Ankhu_132	132 kV	17.03	10.58194813	17.75347	51.94476	18.58408	104.6785783	$0.08535	$0.08559	$0.00859	$0.00764
Thuli Bheri-Dunai_132	132 kV	5.6	3.4796776	18.39249	18.70977	22.94331	124.7428162	$0.02355	$0.02357	$0.00720	$0.00640
Thulibheri 2-Dunai_132	132 kV	5.6	3.4796776	23.99837	31.86791	29.99999	125.0084485	$0.02350	$0.02353	$0.00718	$0.00639

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
ThuloKh-Raughat_132	132 kV	19.4	12.0545974	13.25899	33.47791	16.28975	122.8581513	$0.08285	$0.08302	$0.00732	$0.00650
Tila 1-Phukot_400	400 kV	5.54	3.44239534	13.25749	57.16644	336.5019	2538.202179	$0.00127	$0.00127	$0.00135	$0.00120
Tila 2-Phukot_400	400 kV	15.2	9.4448392	12.76143	143.8979	321.2086	2517.026697	$0.00128	$0.00128	$0.00136	$0.00121
Tingla-Dudhkoshi4_400	400 kV	20	12.42742	22.37351	596.8132	584.8458	2614.01005	$0.00123	$0.00123	$0.00131	$0.00117
Tingla-Dudhkoshi_400	400 kV	44.9	27.8995579	16.08629	1317.8098	821.1628	5104.737015	$0.00063	$0.00063	$0.00067	$0.00060
Tingla-Okhaldhunga_132	132 kV	14	8.699194	30.73294	1234.3398	188.3145	612.7448269	$0.01199	$0.01207	$0.00147	$0.00131
Tingla-U Arun_400	400 kV	62	38.525002	3.77008	88.92738	180.19866	4779.703879	$0.00067	$0.00067	$0.00072	$0.00064
Tiplyang Kali-Rahughat_132	132 kV	7.85	4.87776235	17.99183	50.18275	44.35706	246.5400129	$0.01671	$0.01672	$0.00364	$0.00324
Trishuli-Matathirtha_220	220 kV	42.4	26.3461304	51.46794	6196.638	713.759	1386.803124	$0.04236	$0.04273	$0.00172	$0.00153
U Akhu Kh-Ankhu_132	132 kV	1.86	1.15575006	25.20637	11.66619	26.76719	106.1921649	$0.00919	$0.00919	$0.00845	$0.00751
U Apsuwa-Sitalpati_132	132 kV	12	7.456452	17.43551	35.5223	18.35465	105.2716554	$0.05981	$0.05992	$0.00854	$0.00759
U Arun Hp-U Arun_400	400 kV	8.7	5.4059277	16.16976	250.922	811.2754	5017.238351	$0.00064	$0.00064	$0.00068	$0.00061
U Budhi-Gumda_400	400 kV	23	14.291533	14.24021	530.1306	727.442	5108.365677	$0.00063	$0.00063	$0.00067	$0.00060
U Budhigandaki-Gumda_400	400 kV	10.8	6.7108068	15.44901	59.8259	155.2497	1004.91682	$0.00321	$0.00321	$0.00341	$0.00303

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
U Daraudi-Marsyangdi-132	132 kV	23	14.291533	32.04419	465.0202	80.02626	249.737191	$0.04832	$0.04860	$0.00361	$0.00321
U Dudhkh-Manang_132	132 kV	16.23	10.08485133	13.1759	27.68815	16.18268	122.8203007	$0.06933	$0.06945	$0.00732	$0.00650
U Dudhkoshi 2-Dudhkoshi4_132	132 kV	13.76	8.55006496	33.96733	741.4948	112.272	330.5293645	$0.02184	$0.02199	$0.00273	$0.00243
U Dudhkoshi-Dudhkoshi4_132	132 kV	13.76	8.55006496	33.96733	741.4948	112.272	330.5293645	$0.02184	$0.02199	$0.00273	$0.00243
U Inkhu Kh-Dudhkoshi4_132	132 kV	8.4	5.2195164	14.73107	18.00247	18.5229	125.7403569	$0.03505	$0.03508	$0.00714	$0.00635
U Isuwa-U Arun_132	132 kV	17.7	10.9982667	17.68111	53.49077	18.58408	105.1069757	$0.08835	$0.08861	$0.00856	$0.00761
U Jhimruk Sto-Jhimruk_132	132 kV	10.74	6.67352454	11.83223	140.1267	76.47769	646.3506034	$0.00872	$0.00873	$0.00139	$0.00124
U Kalangad HEP-U Kalangad_132	132 kV	4.7	2.9204437	27.68298	35.48253	29.41332	106.2505554	$0.02321	$0.02324	$0.00845	$0.00751
U Kalangad-West Seti_132	132 kV	35	21.747985	48.36931	2278.294	153.81086	317.9926693	$0.05775	$0.05860	$0.00286	$0.00254
U Kaligandaki-Rahughat_132	132 kV	2.083	1.294315793	22.4777	20.81685	55.44633	246.6726133	$0.00443	$0.00443	$0.00364	$0.00323
U Karnali-Betan_132	132 kV	24.75	15.37893225	31.15898	466.9751	68.82992	220.8991437	$0.05878	$0.05918	$0.00409	$0.00363
U KarnaliB-Betan_132	132 kV	24.4	15.1614524	21.05749	208.3598	45.88662	217.9111566	$0.05875	$0.05901	$0.00414	$0.00368
U Khudi-Khudi1_132	132 kV	9.3	5.7787503	17.35522	27.53416	21.2608	122.503777	$0.03983	$0.03988	$0.00733	$0.00652

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
U Lapche-Lapche_132	132 kV	6.7	4.1631857	31.63714	66.26908	39.7684	125.7016279	$0.02796	$0.02801	$0.00715	$0.00635
U Loti Karnali-M Karnali_132	132 kV	38.7	24.0470577	13.72645	71.69504	16.82509	122.5742271	$0.16565	$0.16635	$0.00735	$0.00653
U Madi HP-Lekhnath_132	132 kV	9.3	5.7787503	16.88757	26.00104	19.11942	113.2159334	$0.04310	$0.04316	$0.00793	$0.00705
U Madi-Lekhnath_132	132 kV	23.1	14.3536701	51.17846	1681.2056	155.6897	304.2094272	$0.03984	$0.04027	$0.00298	$0.00265
U Marsyangdi A-Khudi1_132	132 kV	1.73	1.07497183	30.17119	15.56791	38.24191	126.749757	$0.00716	$0.00716	$0.00708	$0.00629
U Marsyangdi1-Khudi1_132	132 kV	5.46	3.39268566	42.86683	198.2252	105.5369	246.1971179	$0.01164	$0.01166	$0.00365	$0.00325
U Mewa Kh A-Mewa_132	132 kV	7.04	4.37445184	18.95938	24.85931	21.582	113.8328363	$0.03245	$0.03248	$0.00789	$0.00701
U Modi-N Modi_132	132 kV	8.8	5.4680648	27.38197	64.91988	32.12063	117.3057673	$0.03936	$0.03944	$0.00766	$0.00681
U Myagdi-Dandakhet_132	132 kV	15	9.320565	12.56146	23.20586	15.29554	121.7656228	$0.06463	$0.06473	$0.00738	$0.00656
U Myagdi1-Dandakhet_132	132 kV	8	4.970968	16.79912	44.49828	40.91557	243.5578173	$0.01723	$0.01725	$0.00369	$0.00328
U Nar Khola-Manang_132	132 kV	16.23	10.08485133	19.77461	62.48623	24.29696	122.8694776	$0.06930	$0.06948	$0.00732	$0.00651
U Nyasim-U Balephi_132	132 kV	4.5	2.7961695	26.1286	30.35579	32.88542	125.8598624	$0.01876	$0.01878	$0.00713	$0.00634
U Set 1i- Banskot_132	132 kV	6.7	4.1631857	13.27339	11.52338	13.00121	97.94943116	$0.03589	$0.03592	$0.00917	$0.00815
U Seti-Banskot_132	132 kV	16.21	10.07242391	14.68975	33.73543	15.29554	104.1238959	$0.08168	$0.08186	$0.00863	$0.00768

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
U Simbuwa Kh-Tamor_132	132 kV	10.14	6.30070194	27.70769	76.95239	35.17974	126.9674231	$0.04190	$0.04199	$0.00708	$0.00629
U Tamor A-Tamor_220	220 kV	19.66	12.21615386	10.20706	90.722	55.06394	539.4691517	$0.05049	$0.05057	$0.00440	$0.00391
U Tamor Hep-Tamor_132	132 kV	6.8	4.2253228	19.59715	25.81563	24.85525	126.8309423	$0.02813	$0.02816	$0.00708	$0.00629
U Tamor-Hangpang_220	220 kV	19.4	12.0545974	17.69166	332.5273	217.9614	1232.000841	$0.02182	$0.02185	$0.00193	$0.00171
U Trishuli2-Chilime_220	220 kV	3.7	2.2990727	15.34242	77.40795	165.1918	1076.699764	$0.00476	$0.00476	$0.00220	$0.00196
Udipur-Marsyangdi_220	220 kV	30.8	19.1382268	31.10043	6544.706	880.2858	2830.46183	$0.01508	$0.01519	$0.00084	$0.00075
Upper Brahmayeni-U Balephi_132	132 kV	12.2	7.5807262	12.1926	17.86833	15.34907	125.8884077	$0.05084	$0.05090	$0.00713	$0.00634
Upper Chaku-Bhotekoshi_132	132 kV	4.5	2.7961695	13.52055	8.121317	16.97805	125.5721846	$0.01880	$0.01881	$0.00715	$0.00635
Upper Chameliya-Balanch_132	132 kV	14.6	9.0720166	24.40876	85.72656	30.59108	125.3282838	$0.06112	$0.06129	$0.00718	$0.00638
Upper Khudi-Khudi1_132	132 kV	5	3.106855	16.21528	12.95553	19.8842	122.626313	$0.02139	$0.02141	$0.00732	$0.00651
Upper Mugu Karnali-Mugu Karnali_400	400 kV	22.9	14.2293959	8.926295	107.0394	234.0217	2621.711472	$0.00123	$0.00123	$0.00131	$0.00116
Upper Rahughat-Rahughat_132	132 kV	7.7	4.7845567	30.03132	68.60151	37.09168	123.5099889	$0.03271	$0.03277	$0.00728	$0.00647
Uttar Ganga-Bafikot_400	400 kV	30.8	19.1382268	17.55285	556.0231	458.8662	2614.197694	$0.00123	$0.00123	$0.00131	$0.00117
West Seti-Pancheswor_400	400 kV	55.8	34.6725018	15.02022	1424.814	765.9994	5099.788152	$0.00063	$0.00063	$0.00067	$0.00060

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
West Seti-Phukot_400	400 kV	86.8	53.9350028	9.370437	844.0938	472.7052	5044.644129	$0.00064	$0.00064	$0.00068	$0.00060
West Seti_Dododhara_400	400 kV	65	40.389115	40.31894	12007.18	2035.588	5048.714078	$0.00064	$0.00064	$0.00068	$0.00061

Annex 3: Power Generated from Karnali River Basin Exported to India

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh /mile)	Wheeling Charge with pf 0.9 (Cents/kWh /mile)
Betan-Dododhara_400	400 kV	30	18.64113	61.0468	70132.92	6003.006	9833.449092	$0.00033	$0.00033	$0.00035	$0.00031
Dododhara-Bareili_400	400 kV	200	124.2742	71.59186	232873.76	5932.872	8287.076212	$0.00039	$0.00040	$0.00043	$0.00038
Mugu Karnali-Phukot_400	400 kV	71.3	44.303752 3	85.84217	59524.32	3815.15	4444.377396	$0.00073	$0.00074	$0.00078	$0.00070
Phukot-Betan_400	400 kV	50	31.06855	122.0375	84809.24	5225.85	4282.167367	$0.00075	$0.00076	$0.00081	$0.00072

Annex 4: Power Generated from Arun River Basin Exported to India

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh /mile)	Wheeling Charge with pf 0.9 (Cents/kWh /mile)
Haitar_Sitalpati_400	400 kV	35	21.747985	96.39052	19407.986	2447.342	2538.986199	$0.00127	$0.00128	$0.00136	$0.00121
Inaruwa-Purnea_400	400 kV	110	68.35081	27.30934	18716.26	2618.7164	9589.087104	$0.00034	$0.00034	$0.00036	$0.00032
Sitalpati_Inaruwa_400	400 kV	120	74.56452	54.61867	40891.54	2659.608	4869.41187	$0.00066	$0.00067	$0.00071	$0.00063

Annex 5: Power flow, Line loading and Wheeling Charges Considering INPS 2040 with Load growth of 4.5%

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Akhu Kh1-Ankhu_132	132 kV	4.4	2.7340324	30.98036	41.62775	32.88355	106.1432146	$0.00795	$0.00796	$0.00846	$0.00752
Akhu kh2-Ankhu_132	132 kV	11.8	7.3321778	14.64696	24.58566	15.33033	104.6656098	$0.00807	$0.00808	$0.00859	$0.00763
Andhi Khola 3-Hetauda_220	220 kV	68	42.253228	10.46068	303.7053	85.08331	813.3630892	$0.00274	$0.00275	$0.00292	$0.00260
Andhi Khola Hp-Andhi Khola_220	220 kV	10.74	6.67352454	15.32319	221.7156	137.9729	900.4189076	$0.00248	$0.00248	$0.00264	$0.00234
Andhi Khola_Butwal_220	220 kV	76	47.224196	39.47904	4227.807	646.1136	1636.599066	$0.00136	$0.00137	$0.00146	$0.00130
Ankhu-Ratmate_220	220 kV	30	18.64113	14.54331	273.8234	131.74976	905.9131656	$0.00246	$0.00247	$0.00262	$0.00233
ApsuwaKh-Sitalpati_132	132 kV	12	7.456452	16.7333	32.69707	17.62988	105.3580585	$0.00801	$0.00803	$0.00853	$0.00758
Arun 4-U Arun_400	400 kV	1.8	1.1184678	22.06097	26.19204	285.1441	1292.527482	$0.00249	$0.00249	$0.00265	$0.00236
Arun3-Dhalkebar_400 kV	400 kV	300	186.4113	24.471	9547.218	1210.3294	4945.974419	$0.00065	$0.00066	$0.00070	$0.00062
Attariy-Syaule_132	400 kV	13	8.077823	69.4157	618.1906	168.43014	242.6398351	$0.01328	$0.01333	$0.01417	$0.01259
Attariya-Bareli_400	400 kV	200	124.2742	36.36611	15279.79	1830.5596	5033.696483	$0.00064	$0.00065	$0.00069	$0.00061

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Attariya-Dododhara_400	400 kV	68	42.253228	37.72603	5523.486	1901.0446	5039.079384	$0.00064	$0.00064	$0.00068	$0.00061
Attariya-Mahendranagar_132	132 kV	37	22.990727	39.73096	571.2393	95.11822	239.4057934	$0.00353	$0.00355	$0.00377	$0.00335
Attariya-N Attariya_132	132 kV	24.4	15.1614524	6.312626	90.06805	40.87869	647.5702822	$0.00130	$0.00131	$0.00139	$0.00123
Bafikot-Phulbari_400	400 kV	84.5	52.5058495	45.26708	9888.568	2303.584	5088.872532	$0.00063	$0.00064	$0.00068	$0.00060
Bafkot-Burtibang_400	400 kV	71.7	44.5523007	3.660243	48.90026	176.52228	4822.69292	$0.00067	$0.00067	$0.00071	$0.00063
Bagmati Nadi-Hetauda_132	132 kV	24	14.912904	16.50933	62.60504	16.86336	102.1444238	$0.00827	$0.00830	$0.00882	$0.00784
Bahrabise-Khimti_400	400 kV	46	28.583066	2.29316	10.32241	95.545	4166.521307	$0.00077	$0.00077	$0.00082	$0.00073
Bahrabise-Tamakoshi_220	220 kV	40	24.85484	26.93607	674.3446	295.8618	1098.385176	$0.00203	$0.00203	$0.00216	$0.00192
Bajhang U seti-Bajhang_132	132 kV	24	14.912904	27.76723	360.9338	61.32131	220.8405736	$0.00382	$0.00385	$0.00409	$0.00363
Bajhang-West Seti_400	400 kV	60	37.28226	13.32637	310.1623	344.3708	2584.130562	$0.00125	$0.00125	$0.00133	$0.00118
Bajra Madi-Lekhnath_132	132 kV	8.02	4.98339542	16.42524	21.24636	19.0096	115.7340776	$0.00730	$0.00730	$0.00776	$0.00690
Balaju-Matathirtha_220	220 kV	4.4	2.7340324	29.06743	86.64323	316.7682	1089.770234	$0.00205	$0.00205	$0.00217	$0.00193
Balaju-Mulpani_220	220 kV	9	5.592339	11.72495	28.81044	128.45122	1095.537465	$0.00204	$0.00204	$0.00216	$0.00192
Balaju-Suichatar_132	132 kV	4.19	2.60354449	38.29143	60.4875	29.01236	75.76724087	$0.01114	$0.01117	$0.01187	$0.01055

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Balanch-U Kalangad_132	132 kV	26	16.155646	35.0427	444.5436	113.752	324.6096905	$0.00260	$0.00261	$0.00277	$0.00247
Baneshwor-Basantapur_220	220 kV	20	12.42742	6.050169	18.8368	49.66808	820.937068	$0.00272	$0.00272	$0.00289	$0.00257
Banskot-Lekhnath_132	132 kV	23.8	14.7886298	30.0251	295.6298	82.49276	274.7459959	$0.00307	$0.00308	$0.00328	$0.00291
Bardghat-Kawasoti_132	132 kV	76	47.224196	18.95048	262.9707	46.53496	245.5608512	$0.00344	$0.00346	$0.00367	$0.00327
Basantapur Cluster-Basantapur_132	132 kV	7	4.349597	21.32212	31.23425	23.37721	109.6383005	$0.00770	$0.00771	$0.00819	$0.00728
Basantapur-Inaruwa_220	220 kV	77.1	47.9077041	24.4872	2588.335	683.3334	2790.573851	$0.00080	$0.00080	$0.00085	$0.00076
Begnas Rupa-Lekhnath_132	132 kV	6.83	4.24396393	38.46813	281.6922	114.9775	298.8902762	$0.00282	$0.00283	$0.00301	$0.00267
Beni Kali-Kusma_132	132 kV	8.54	5.30650834	36.2425	110.3538	38.32582	105.748279	$0.00798	$0.00801	$0.00851	$0.00756
Betan-Bhurigaon_132	132 kV	39.4	24.4820174	35.31256	684.4328	57.3369	162.3697064	$0.00520	$0.00526	$0.00559	$0.00497
Betan-Dododhara_400	400 kV	30	18.64113	25.52839	6124.253	3008.702	11785.70995	$0.00027	$0.00027	$0.00029	$0.00026
Bhaktapur-Harisiddhi_132	132 kV	9	5.592339	19.01625	32.05482	47.087	247.6145402	$0.00341	$0.00341	$0.00363	$0.00322
Bhaktapur-Lamosangu_132	132 kV	60	37.28226	25.48498	379.3133	63.25862	248.2192256	$0.00340	$0.00342	$0.00364	$0.00323
Bhaktapur-Mulpani_220	220 kV	8	4.970968	3.425926	2.023801	1.8875596	55.09633308	$0.04047	$0.04051	$0.04304	$0.03826
Bharatpur-Hetauda_220	220 kV	65	40.389115	23.1905	802.6127	246.1092	1061.250081	$0.00210	$0.00211	$0.00224	$0.00199

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Bheri 3 sto-Maintada_400	400 kV	23.14	14.37852494	33.44844	761.5763	367.9278	1099.984932	$0.00293	$0.00294	$0.00312	$0.00277
Bheri Babai-Mainatada_132	132 kV	13.6	8.4506456	34.79761	161.4646	36.79278	105.7336409	$0.00799	$0.00802	$0.00852	$0.00758
Bheri-Maina Tara_400	400 kV	20.9	12.9866539	24.6966	293.7928	229.9549	931.1196683	$0.00346	$0.00347	$0.00368	$0.00327
Bheri1-Nalgadh_400	400 kV	15.8	9.8176618	8.555552	64.80761	206.9594	2419.006979	$0.00133	$0.00133	$0.00142	$0.00126
Bheri2-Nalgadh_400	400 kV	1.2	0.7456452	20.39632	11.70073	196.2282	962.0764922	$0.00335	$0.00335	$0.00356	$0.00316
Bhimgad Kh-Manang_132	132 kV	10.5	6.5243955	19.97577	41.31181	24.52852	122.7913617	$0.00688	$0.00689	$0.00732	$0.00651
Bhotekoshi 5-Lamosangu_132	132 kV	3	1.864113	42.98411	54.72315	45.99098	106.9953059	$0.00789	$0.00790	$0.00839	$0.00746
Bhotekoshi 7-Inkhu_132	132 kV	15	9.320565	16.37731	38.99005	16.86336	102.9678256	$0.00820	$0.00822	$0.00873	$0.00776
Bhotekoshi 8-Inkhu_132	132 kV	4.1	2.5476211	22.2107	19.91997	23.14879	104.2235949	$0.00810	$0.00811	$0.00862	$0.00766
Bhotekoshi1-Bhotekoshi_132	132 kV	3.4	2.1126614	26.81183	24.15438	33.72672	125.790444	$0.00671	$0.00672	$0.00714	$0.00634
Bhurigaon-Dododhara_132	132 kV	29	18.019759	30.56511	265.8125	74.33822	243.2126696	$0.00347	$0.00348	$0.00370	$0.00329
Bhurigaon-Kohalpur_132	132 kV	55.3	34.3618163	21.16519	234.4327	47.0491	222.2947207	$0.00380	$0.00382	$0.00406	$0.00361
Brahmayani-u Balephi_132	132 kV	6.66	4.1383308 6	24.45123	39.31421	30.66065	125.3951233	$0.00673	$0.00674	$0.00716	$0.00637
Budhi G Syar Kh2-U	132 kV	2	1.242742	37.70981	28.11662	45.99098	121.9602538	$0.00692	$0.00693	$0.00736	$0.00654

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Budhigandaki_132											
Budhi G Syar Kh4-U Budhigandaki_132	132 kV	2	1.242742	47.13204	43.9238	57.48873	121.9737783	$0.00692	$0.00693	$0.00736	$0.00654
Budhi Gandaki-Ratmate_400	400 kV	25	15.534275	18.42629	480.0441	919.8196	4991.887135	$0.00065	$0.00065	$0.00069	$0.00061
Budhi Ganga-Betan_132	132 kV	48	29.825808	12.89064	75.12514	15.33033	118.926058	$0.00710	$0.00713	$0.00758	$0.00674
Budhi gandaki-Gumda_400	400 kV	18	11.184678	15.54439	100.3342	155.6028	1001.022234	$0.00322	$0.00322	$0.00342	$0.00304
Budhigandak Prok kh2 -U Budhigandaki_400	400 kV	9.7	6.0272987	7.016086	28.07343	183.9639	2622.030289	$0.00123	$0.00123	$0.00131	$0.00116
Budhigandak Prok-U Budhigandaki_400	400 kV	9.7	6.0272987	2.923405	4.872659	76.65163	2621.99832	$0.00123	$0.00123	$0.00131	$0.00116
Budhigandaki Nadi-U BUdhigandaki_132	132 kV	1.04	0.64622584	28.6513	16.89105	69.86797	243.856195	$0.00346	$0.00346	$0.00368	$0.00327
Budhigandaki Syar-U Budhigandaki_400	400 kV	7.6	4.7224196	20.63905	75.07445	206.9594	1002.756425	$0.00321	$0.00322	$0.00342	$0.00304

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Budhigandakikha-Gumda_400	400 kV	9.8	6.0894358	19.83449	89.47525	199.295	1004.790141	$0.00321	$0.00321	$0.00341	$0.00303
Burtibang-Kusma_400	400 kV	50	31.06855	6.880685	126.9838	165.1287	2399.887511	$0.00134	$0.00134	$0.00143	$0.00127
Burtibang-Tamgash_132	132 kV	20.3	12.6138313	55.15081	607.663	64.84011	117.5687356	$0.00718	$0.00725	$0.00770	$0.00685
Butwal-Bharatpur_220	220 kV	76	47.224196	49.89712	4404.385	538.8634	1079.948903	$0.00206	$0.00208	$0.00221	$0.00197
Butwal-Gorakhpur_400	400 kV	130	80.77823	40.40644	12115.24	4048.46	10019.34345	$0.00032	$0.00032	$0.00034	$0.00030
Butwal-Lumbini_132	132 kV	63.44	39.41977624	8.952136	223.6774	48.25984	539.0874312	$0.00157	$0.00157	$0.00167	$0.00149
Butwal-Motipur_132	132 kV	63.44	39.41977624	9.79982	282.3272	63.6145	649.139474	$0.00130	$0.00131	$0.00139	$0.00123
Butwal-N Butwal_132	132 kV	25	15.534275	18.03866	380.0094	117.76134	652.8275382	$0.00129	$0.00130	$0.00138	$0.00123
Chainpur Seti-Bajhang_400	400 kV	11.5	7.1457665	23.15816	95.83114	160.9684	695.0828563	$0.00464	$0.00464	$0.00493	$0.00438
Cham Catigad-Balanch_132	132 kV	21.14	13.13578294	26.55184	292.3542	65.15389	245.3837098	$0.00344	$0.00346	$0.00367	$0.00326
Chameliya-Balanch_132	132 kV	32	19.883872	21.87556	149.3354	26.82807	122.6394661	$0.00688	$0.00692	$0.00736	$0.00654
Chandranigapur-Dhalkebar_132	132 kV	69.5	43.1852845	21.7327	296.9121	38.58598	177.5480267	$0.00476	$0.00479	$0.00509	$0.00453
Chapagaun-Bhaktapur_220	220 kV	10	6.21371	9.401579	20.51366	102.04376	1085.389593	$0.00205	$0.00205	$0.00218	$0.00194
Chapagaun-Harisiddhi_132	132 kV	12	7.456452	26.34821	82.11309	65.64134	249.1301686	$0.00339	$0.00339	$0.00361	$0.00320

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh /mile)	Wheeling Charge with pf 0.9 (Cents/kWh/ mile)
Chapagaun-Matathirtha_220	220 kV	10	6.21371	14.01339	45.60318	151.27246	1079.485121	$0.00207	$0.00207	$0.00220	$0.00195
Chapali-Balaju_132	132 kV	10	6.21371	16.20698	25.73204	38.12728	235.2522185	$0.00359	$0.00359	$0.00382	$0.00339
Chapali-Mulpani_132	132 kV	8	4.970968	23.67743	44.12167	55.76242	235.5087524	$0.00359	$0.00359	$0.00381	$0.00339
Chatigad-Balanch_132	132 kV	27.6	17.1498396	20.00405	107.786	24.52852	122.6177699	$0.00689	$0.00692	$0.00735	$0.00653
Chera1-Nalgad_400	400 kV	24.6	15.2857266	19.08057	121.0538	113.981	597.3668502	$0.00540	$0.00540	$0.00574	$0.00510
Chilime Hp-Chilime_132	132 kV	2.3	1.4291533	18.87846	8.087684	21.1	111.7675912	$0.00755	$0.00756	$0.00803	$0.00714
Chilime hub-Trishuli_220	220 kV	18.4	11.4332264	11.10651	52.54148	121.4728	1093.708105	$0.00204	$0.00204	$0.00217	$0.00193
Chilime-Kerung_400	400 kV	80	49.70968	39.85334	7262.253	2014.524	5054.843584	$0.00064	$0.00064	$0.00068	$0.00060
Chilime-Ratmate_400	400 kV	50	31.06855	28.18063	2255.162	1425.1636	5057.245349	$0.00064	$0.00064	$0.00068	$0.00060
Chujung -Upper Arun_132	132 kV	12.06	7.49373426	34.39172	139.9678	36.79278	106.981506	$0.00789	$0.00792	$0.00842	$0.00748
Dadagau Khalanga-Nalgad_400	400 kV	10.6	6.5865326	44.37438	411.0211	98.11409	221.1052639	$0.01458	$0.01464	$0.01555	$0.01383
Dailekh-Surkhet_132	132 kV	32.6	20.2566946	20.11676	125.63	40.83128	202.9714527	$0.00416	$0.00417	$0.00443	$0.00394
Damak-Anarmani_132	132 kV	30	18.64113	26.08083	199.2433	31.44924	120.5837391	$0.00700	$0.00705	$0.00749	$0.00666

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Damak-Duhabi_132	132 kV	48.9	30.3850419	33.40421	539.0614	84.32114	252.4266851	$0.00334	$0.00337	$0.00358	$0.00318
Damak-Duhabi_400	400 kV	50	31.06855	3.807789	6.529256	8.305304	218.1135562	$0.01478	$0.01479	$0.01571	$0.01397
Damauli-Bharatpur_220	220 kV	44.1	27.4024611	15.29345	1129.907	427.658	2796.347456	$0.00080	$0.00080	$0.00085	$0.00076
Dana-Middle Kaligandaki_132	132 kV	6	3.728226	33.05501	64.76079	41.03929	124.154523	$0.00680	$0.00681	$0.00724	$0.00643
Dana-Mristi Khola_132	132 kV	4	2.485484	30.42968	36.5189	32.19369	105.7970048	$0.00798	$0.00799	$0.00849	$0.00755
Dana-Nilgiri Khola1_132	132 kV	6.15	3.82143165	27.56601	45.98558	29.11919	105.6344027	$0.00799	$0.00801	$0.00851	$0.00756
Dana-Nilgiri Khola2_132	132 kV	2.3	1.4291533	38.10404	33.01207	47.52401	124.7217093	$0.00677	$0.00677	$0.00720	$0.00640
Dana-Rahughat_220	220 kV	20	12.42742	22.0325	1065.012	626.4736	2843.406785	$0.00078	$0.00079	$0.00083	$0.00074
Dandakhet-Burtibang_132	132 kV	28	17.398388	38.57735	1942.998	246.1434	638.0516028	$0.00132	$0.00133	$0.00142	$0.00126
Dandakhet-Rahughat_220	220 kV	14	8.699194	5.961384	11.47472	65.0631	1091.40931	$0.00204	$0.00204	$0.00217	$0.00193
Dhalkebar-Hetauda_400	400 kV	127.7	79.3490767	3.984089	89.86756	178.37326	4477.140445	$0.00072	$0.00072	$0.00077	$0.00068
Dhalkebar-Muzzafarpur_400	400 kV	130	80.77823	50.17981	18787.35	5075.148	10113.92431	$0.00032	$0.00032	$0.00034	$0.00030
Dhungesangu-Basantapur_220	220 kV	27	16.777017	65.84199	2729.941	728.0176	1105.704126	$0.00202	$0.00202	$0.00215	$0.00191
Dododhara-Bareli1_400	400 kV	200	124.2742	40.65443	19029.32	4076.116	10026.25298	$0.00032	$0.00032	$0.00034	$0.00031

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh /mile)	Wheeling Charge with pf 0.9 (Cents/kWh/ mile)
Dododhara-Bhuri_132	132 kV	34	21.126614	32.09308	344.3826	78.98786	246.1211576	$0.00343	$0.00345	$0.00366	$0.00325
Dododhara-Maina Tara_400	400 kV	94	58.408874	7.626665	237.939	245.4886	3218.819759	$0.00100	$0.00100	$0.00106	$0.00095
Dordi DhudhKh-Kirtipur_132	132 kV	14.35	8.91667385	15.17017	31.96483	15.94354	105.0979653	$0.00803	$0.00805	$0.00855	$0.00760
Dordi Kh-Udipur_132	132 kV	3.1	1.9262501	19.409	11.5066	20.69594	106.6306353	$0.00792	$0.00792	$0.00842	$0.00748
Dudh Khola-Manang_132	132 kV	1.46	0.90720166	20.29934	11.89898	49.82356	245.4442361	$0.00344	$0.00344	$0.00366	$0.00325
Dudhkoshi 10-U Dudhkoshi_132	132 kV	6.7	4.1631857	22.7503	68.57135	57.48873	252.6943821	$0.00334	$0.00335	$0.00355	$0.00316
Dudhkoshi 4-Inkhu_132	132 kV	4.1	2.5476211	33.74997	46.05752	35.25975	104.4734262	$0.00808	$0.00809	$0.00860	$0.00764
Dudhkoshi 5-Dudhkoshi4_132	132 kV	7.4	4.5981454	29.24447	62.54197	36.79278	125.8110679	$0.00671	$0.00672	$0.00714	$0.00635
Dudhkoshi-Mirchiya_400	400 kV	80.5	50.0203655	25.48645	2960.876	1290.1098	5061.943896	$0.00064	$0.00064	$0.00068	$0.00060
Dudhkoshi6-U Dudhkoshi_132	132 kV	3.3	2.0505243	25.18869	41.41677	63.62086	252.5770892	$0.00334	$0.00335	$0.00355	$0.00316
Dudhkoshi9-U Dudhkoshi_132	132 kV	1.3	0.8077823	33.69482	29.20215	85.08331	252.5115433	$0.00334	$0.00334	$0.00355	$0.00316
Duhabi-Inaruwa_400	400 kV	30	18.64113	4.479622	16.97435	112.844	2519.051831	$0.00128	$0.00128	$0.00136	$0.00121
Dumre-Damauli_132	132 kV	15	9.320565	23.97037	84.28225	54.12772	225.8109491	$0.00374	$0.00374	$0.00398	$0.00354
Dunai-Jagdulla_400	400 kV	50	31.06855	13.64925	272.9346	353.8354	2592.343169	$0.00124	$0.00124	$0.00132	$0.00118

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh /mile)	Wheeling Charge with pf 0.9 (Cents/kWh/ mile)
Durbang Myagdi-Dandakhet_132	132 kV	1.8	1.1184678	15.81007	4.444545	19.16291	121.2069902	$0.00697	$0.00697	$0.00740	$0.00658
Ghunsa Kh - Tamor_220	220 kV	13.34	8.28908914	10.17706	61.16749	54.84425	538.9007238	$0.00414	$0.00414	$0.00440	$0.00391
Ghunsa Kh-Tamor_220	220 kV	5.9	3.6660889	10.17577	27.05796	54.80592	538.5923621	$0.00414	$0.00414	$0.00440	$0.00391
Ghunsa Tamor-Tamor_132	132 kV	3.4	2.1126614	25.84901	22.45835	32.9602	127.5104927	$0.00662	$0.00663	$0.00704	$0.00626
Ghunsa kh2-Tamor_220	220 kV	5.9	3.6660889	22.1659	128.421	119.4386	538.8393884	$0.00414	$0.00414	$0.00440	$0.00391
Ghunsa-Tamor_220	220 kV	7.22	4.48629862	11.10026	39.39862	59.79057	538.641167	$0.00414	$0.00414	$0.00440	$0.00391
Gumda-Ratmate_400	400 kV	75	46.602825	28.29812	3428.618	1449.4234	5121.977714	$0.00063	$0.00063	$0.00067	$0.00060
Haitar-Sitalpati_400	400 kV	35	21.747985	42.37346	1871.742	1109.6186	2618.664136	$0.00123	$0.00123	$0.00131	$0.00116
Hangpang-Kabeli_132	132 kV	20	12.42742	43.67088	530.5423	138.5095	317.1667253	$0.00266	$0.00267	$0.00284	$0.00252
Hapure-Kususm_132	132 kV	34	21.126614	20.42913	137.8488	48.81486	238.9473267	$0.00353	$0.00354	$0.00377	$0.00335
Hapure-Phulbari_132	132 kV	10	6.21371	11.04948	114.065	71.8874	650.5953221	$0.00130	$0.00130	$0.00138	$0.00123
Hetauda-Bharatpur_132	132 kV	80	49.70968	22.99345	586.6798	74.09416	322.2402902	$0.00262	$0.00264	$0.00281	$0.00249
Hetauda-Kamane_132	132 kV	8	4.970968	39.33136	121.6193	63.77264	162.1419651	$0.00521	$0.00522	$0.00554	$0.00493
Himchuli Dordi-Kirtiur_132	132 kV	10.01	6.21992371	37.1605	136.134	43.69143	117.574925	$0.00718	$0.00720	$0.00765	$0.00680

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Hongu kh-Inkhu_132	132 kV	19	11.806049	16.34893	48.94022	16.76371	102.5370468	$0.00823	$0.00826	$0.00877	$0.00780
Humla Karnali 2-Mugu Karnali_400	400 kV	22.9	14.2293959	22.2981	350.9873	314.2717	1409.410219	$0.00229	$0.00229	$0.00243	$0.00216
Humla Karnali-Mugu Karnali_400	400 kV	19.8	12.3031458	10.4862	100.4651	210.0255	2002.875207	$0.00161	$0.00161	$0.00171	$0.00152
Humla Karnali-Mugu Karnali_400	400 kV	29.5	18.3304445	26.79326	1244.797	702.129	2620.543375	$0.00123	$0.00123	$0.00131	$0.00116
Ikhuwa Kh-U Arun_132	132 kV	4.5	2.7961695	21.57372	20.61455	22.99549	106.5902867	$0.00792	$0.00793	$0.00842	$0.00749
Ilep Tatopani Kh-Ankhu_132	132 kV	12.17	7.56208507	18.23183	39.41309	19.16291	105.1068927	$0.00803	$0.00805	$0.00855	$0.00760
Illam-Damak_132	132 kV	31.5	19.5731865	56.64461	993.7335	138.48074	244.472934	$0.00345	$0.00348	$0.00370	$0.00329
Illam-Phidim_132	132 kV	23.2	14.4158072	25.31266	145.5082	61.46684	242.8304256	$0.00348	$0.00349	$0.00370	$0.00329
Inaruwa-Purnea_400	400 kV	110	68.35081	18.17847	2027.709	1808.1108	9946.441037	$0.00032	$0.00032	$0.00034	$0.00031
Inkhu Kh-Inkhu_132	132 kV	6.72	4.17561312	14.79267	14.39778	15.33033	103.634638	$0.00815	$0.00815	$0.00866	$0.00770
Inkhu-Tingla_132	132 kV	14.3	8.8856053	33.70194	756.3393	182.61796	541.8618631	$0.00156	$0.00156	$0.00166	$0.00148
IsuwaKh-Sitalpati_132	132 kV	17	10.563307	52.66083	921.6196	74.50539	141.4816098	$0.00597	$0.00604	$0.00642	$0.00571

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh /mile)	Wheeling Charge with pf 0.9 (Cents/kWh/ mile)
Jaldigad-Nalgad_132	132 kV	11.2	6.9593552	14.88411	24.20876	16.46477	110.6197818	$0.00763	$0.00764	$0.00812	$0.00722
Jhimruk-Lamahi_132	132 kV	47.6	29.5772596	37.57828	936.8198	122.10922	324.9462722	$0.00260	$0.00262	$0.00278	$0.00247
Jumla Cluster-Phukot_132	132 kV	55.57	34.52958647	12.60019	161.4426	28.92066	229.5255865	$0.00368	$0.00370	$0.00393	$0.00349
Kaligandaki George-Dana_220	220 kV	1.63	1.01283473	11.76364	20.01434	125.7087	1068.620767	$0.00209	$0.00209	$0.00222	$0.00197
Kaligandaki Kowan_Dana_220	220 kV	7.68	4.77212928	21.93974	205.0418	306.6065	1397.493772	$0.00160	$0.00160	$0.00170	$0.00151
Kaligandaki-Butwal_132	132 kV	40	24.85484	78.87174	3466	253.5624	321.4870117	$0.00263	$0.00266	$0.00283	$0.00251
Kaligandaki-Tamgash_132	132 kV	42.3	26.2839933	8.594701	25.19217	3.396054	39.51334665	$0.02137	$0.02153	$0.02287	$0.02033
Kamane-Pathlaiya_132	132 kV	29	18.019759	21.6512	127.8865	21.0294	97.12810375	$0.00869	$0.00875	$0.00929	$0.00826
Karnali Sto-Phukot_132	132 kV	55.57	34.52958647	19.43415	1941.014	126.4752	650.7884317	$0.00130	$0.00132	$0.00140	$0.00124
Karuwa Seti-Banskot_132	132 kV	11.8	7.3321778	22.61915	59.04561	24.52852	108.4413871	$0.00779	$0.00780	$0.00829	$0.00737
Kasuwa Kh 2-U Arun_132	132 kV	4.6	2.8583066	27.99925	35.60279	34.49324	123.1934427	$0.00685	$0.00686	$0.00729	$0.00648
Kasuwa Kh 3-U Arun_132	132 kV	4.6	2.8583066	39.40084	70.43018	42.1584	106.998734	$0.00789	$0.00790	$0.00840	$0.00747
Kawasoti-Bharatpur_132	132 kV	76	47.224196	29.98595	657.1572	71.75552	239.2971375	$0.00353	$0.00356	$0.00378	$0.00336

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Kerun-Kimanthanka_400	400 kV	80	49.70968	13.6907	842.2746	701.6846	5125.264596	$0.00063	$0.00063	$0.00067	$0.00059
Khadbari-Baneshwor_220	220 kV	10	6.21371	6.28176	10.67742	76.16526	1212.482807	$0.00184	$0.00184	$0.00195	$0.00174
Khani Khola-Singati_132	132 kV	19.13	11.88682723	24.50232	113.0366	30.66065	125.1336608	$0.00675	$0.00677	$0.00720	$0.00640
Khani Khola1-Singati_132	132 kV	13.69	8.50656899	18.39119	45.58298	22.99549	125.0353566	$0.00675	$0.00677	$0.00719	$0.00639
Khare-Singati_132	132 kV	7.58	4.70999218	14.78217	16.32675	18.47304	124.968391	$0.00676	$0.00676	$0.00719	$0.00639
Khimti 1-Khimti_132	132 kV	1	0.621371	37.02663	13.5532	45.99098	124.2105479	$0.00680	$0.00680	$0.00722	$0.00642
Khimti 2-Khimti_132	132 kV	9.76	6.06458096	30.0858	87.16112	37.406	124.3310798	$0.00679	$0.00681	$0.00723	$0.00643
Khimti Shivalaya Sto-Khimti_220	220 kV	18	11.184678	27.48345	752.9839	383.2582	1394.505421	$0.00160	$0.00160	$0.00170	$0.00151
Khimti-Dhalkebar_220	220 kV	75	46.602825	65.27318	7468.36	720.9118	1104.453315	$0.00202	$0.00204	$0.00217	$0.00193
Khimti-Garjyang_132	132 kV	27.8	17.2741138	26.50081	384.9656	66.75192	251.8863386	$0.00335	$0.00337	$0.00358	$0.00318
Khimti-Sunkoshi_400	400 kV	22	13.670162	28.98369	1051.894	1480.6612	5108.601424	$0.00063	$0.00063	$0.00067	$0.00060
Khimti-Tingla_400	400 kV	57	35.418147	11.80648	448.7444	601.705	5096.396216	$0.00063	$0.00063	$0.00067	$0.00060
Khudi-Damauli_220	220 kV	60	37.28226	44.67836	3314.322	628.6176	1406.9845	$0.00158	$0.00159	$0.00169	$0.00150

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Khudi-Manang_220	220 kV	26.5	16.4663315	20.20223	1186.038	574.496	2843.725668	$0.00078	$0.00079	$0.00083	$0.00074
Khudi-Udipur_220	220 kV	15.8	9.8176618	25.85813	992.6414	660.7216	2555.179358	$0.00087	$0.00087	$0.00093	$0.00083
Khudi1-Nyadi Phidim_132	132 kV	17.37	10.79321427	15.04886	38.40417	18.39639	122.2444092	$0.00691	$0.00692	$0.00735	$0.00654
Kimanthanka-U Arun_400	400 kV	10	6.21371	13.67894	55.66367	356.8636	2608.854195	$0.00124	$0.00124	$0.00131	$0.00117
Kirtipur-Udipur_132	132 kV	10.8	6.7108068	43.14788	280.186	138.08294	320.0225364	$0.00264	$0.00264	$0.00281	$0.00250
Kohalpur-Kusum_132	132 kV	90	55.92339	28.1799	682.1885	66.77434	236.9573348	$0.00356	$0.00360	$0.00382	$0.00340
Kulekhani 2-Hetauda_132	132 kV	9.6	5.9651616	24.20967	55.13128	24.52852	101.3170357	$0.00833	$0.00835	$0.00887	$0.00789
Kulekhani 3-Hetauda_132	132 kV	4.5	2.7961695	10.34448	4.716639	10.73123	103.738709	$0.00814	$0.00814	$0.00865	$0.00769
Kusma-Andhi Khola_220	220 kV	76	47.224196	18.21681	2767.672	517.6622	2841.673158	$0.00078	$0.00079	$0.00084	$0.00075
Kusma-N Damauli_400	400 kV	69.3	43.0610103	16.02857	998.8814	801.3768	4999.677451	$0.00064	$0.00065	$0.00069	$0.00061
Kusma-Rahughat_220	220 kV	29.9	18.5789929	27.81115	2538.633	792.8838	2850.956541	$0.00078	$0.00078	$0.00083	$0.00074
Kusum-Butwal_132	132 kV	228.9	142.2318219	12.88016	280.1967	27.14916	210.7827853	$0.00401	$0.00405	$0.00430	$0.00382
Kusum-Lamahi_132	132 kV	47.6	29.5772596	5.103196	8.845362	6.833836	133.9128656	$0.00631	$0.00631	$0.00671	$0.00596
L ApsuwaKh-Sitalpati_132	132 kV	3.5	2.1747985	40.22581	55.89205	42.92492	106.709896	$0.00791	$0.00792	$0.00842	$0.00748

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
L Bagmati-Chandranigapur_132	132 kV	22.55	14.01191605	25.88959	146.5787	27.51794	106.2895936	$0.00794	$0.00799	$0.00849	$0.00754
L Balephi-Bahrabise_132	132 kV	16.65	10.34582715	33.93227	895.6101	224.5694	661.8166129	$0.00128	$0.00128	$0.00136	$0.00121
L Balephi-Lamosangu_132	132 kV	7.36	4.57329056	14.47472	15.07675	15.33033	105.9110643	$0.00797	$0.00798	$0.00848	$0.00754
L Balephi-U Balephi_132	132 kV	10.75	6.67973825	25.55874	327.6985	166.37892	650.9668317	$0.00130	$0.00130	$0.00138	$0.00123
L Barun-U Barun_132	132 kV	14.4	8.9477424	19.89694	265.3878	132	663.418596	$0.00127	$0.00128	$0.00135	$0.00120
L Chameliya-Balanch_132	132 kV	6.8	4.2253228	12.5102	10.46698	15.33033	122.5426452	$0.00689	$0.00689	$0.00733	$0.00651
L Isuwa-Sitalpati_132	132 kV	12	7.456452	27.69886	90.17187	29.52621	106.5972029	$0.00792	$0.00795	$0.00844	$0.00750
L Likhu-Khimti_132	132 kV	9.76	6.06458096	17.3763	29.02262	21.53911	123.9568263	$0.00681	$0.00682	$0.00725	$0.00644
L Manang Mars-Manang_132	132 kV	16.23	10.08485133	19.60085	144.8865	107.3154	547.5038072	$0.00154	$0.00154	$0.00164	$0.00146
L Modi-Kusma_132	132 kV	15	9.320565	14.77197	31.64	15.33033	103.7798615	$0.00814	$0.00815	$0.00866	$0.00770
L Seti Sto-Marsyangdi_132	132 kV	16	9.941936	33.0471	341.6061	70.5195	213.3908876	$0.00396	$0.00398	$0.00422	$0.00376
Lahan-Duhabi_132	132 kV	86.4	53.6864544	9.926723	68.2137	19.01984	191.6024049	$0.00441	$0.00442	$0.00470	$0.00418
Lahan-Mirchiya_132	132 kV	27.7	17.2119767	50.1286	682.5621	114.13496	227.6843159	$0.00371	$0.00373	$0.00396	$0.00352

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Lamahi-Ghorahi_132	132 kV	20	12.42742	6.742993	12.51749	21.27502	315.5130074	$0.00268	$0.00268	$0.00285	$0.00253
Lamki-Bhurigaon_132	132 kV	35.2	21.8722592	11.32738	41.77216	23.61684	208.4934027	$0.00405	$0.00406	$0.00431	$0.00383
Lamki-Pahalmanpur_132	132 kV	35	21.747985	22.65093	175.5356	55.8429	246.5368972	$0.00342	$0.00344	$0.00365	$0.00324
Lamosangu-Bahrabise_132	132 kV	10.2	6.3379842	43.00931	881.518	284.4204	661.2996116	$0.00128	$0.00128	$0.00136	$0.00121
Lamosangu-Bhotekoshi_220	220 kV	21.33	13.25384343	21.69391	233.6629	143.19738	660.0810089	$0.00338	$0.00338	$0.00359	$0.00320
Lamosangu-Khimti_132	132 kV	43.9	27.2781869	36.11791	561.3703	89.65392	248.2256587	$0.00340	$0.00342	$0.00364	$0.00323
Lamosangu-Singati_132	132 kV	33.37	20.73515027	35.17097	1924.475	230.3018	654.8065066	$0.00129	$0.00130	$0.00138	$0.00123
Landruk Modi-N Modi_132	132 kV	18.15	11.27788365	27.6278	271.5083	66.37265	240.2386364	$0.00351	$0.00353	$0.00375	$0.00333
Langtang khola Res-Chilime_220	220 kV	6.55	4.06998005	21.48202	141.4253	237.6201	1106.134805	$0.00202	$0.00202	$0.00214	$0.00190
Lapche-Tamakoshi_220	220 kV	14.76	9.17143596	14.88162	90.12074	208.7296	1402.599986	$0.00159	$0.00159	$0.00169	$0.00150
Lapsephedi-Bahrabise_400	400 kV	59.8	37.1579858	18.4095	1154.485	940.8936	5110.913387	$0.00063	$0.00063	$0.00067	$0.00060
Lapsephedi-Mulpani_220	220 kV	70	43.49597	8.916316	101.2988	41.18184	461.8705752	$0.00483	$0.00484	$0.00514	$0.00457
Lapsephedi-Ratmate_400	400 kV	27.5	17.0877025	17.84535	498.5248	909.6924	5097.643924	$0.00063	$0.00063	$0.00067	$0.00060

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Lawan Saharta Bheri-Dunai_132	132 kV	11.2	6.9593552	40.55578	256.8932	65.45283	161.3896466	$0.00523	$0.00525	$0.00558	$0.00496
Lekhnath-Damauli_132	132 kV	35	21.747985	25.74927	315.6785	65.35664	253.8193898	$0.00333	$0.00334	$0.00355	$0.00316
Lekhnath-Damauli_220	220 kV	40.3	25.0412513	31.15328	543.5812	212.9386	683.5190388	$0.00326	$0.00327	$0.00347	$0.00309
Lekhnath-Kaligandaki_132	132 kV	80	49.70968	50.79669	2847.058	157.46152	309.9838198	$0.00272	$0.00277	$0.00295	$0.00262
Likhu 2-Likhu_132	132 kV	5.42	3.3678308 2	33.73663	60.93404	42.1584	124.9632818	$0.00676	$0.00677	$0.00719	$0.00639
Likhu 4-Likhu_132	132 kV	14.7	9.1341537	32.11381	149.442	40.16546	125.0722353	$0.00675	$0.00678	$0.00720	$0.00640
Likhu A-Likhu_132	132 kV	1.43	0.8885605 3	31.29786	13.84623	39.09233	124.9041628	$0.00676	$0.00676	$0.00718	$0.00639
Likhu Cluster-Likhu_132	132 kV	6.63	4.1196897 3	16.2588	17.28619	20.31268	124.9334514	$0.00676	$0.00676	$0.00719	$0.00639
Likhu Kh-Likhu_132	132 kV	6.7	4.1631857	18.40523	22.39131	22.99549	124.9399763	$0.00676	$0.00676	$0.00719	$0.00639
Likhu-Khimti_132	132 kV	27.5	17.0877025	33.89058	1473.93	223.2626	658.7747982	$0.00128	$0.00129	$0.00137	$0.00122
Likhu1-Likhu_132	132 kV	11.8	7.3321778	36.5498	219.6628	59.02176	161.4831271	$0.00523	$0.00525	$0.00558	$0.00496
Lower Burbang Kh-Dunau_132	132 kV	15	9.320565	12.28265	22.28433	15.33033	124.8128865	$0.00676	$0.00677	$0.00720	$0.00640
Lower Lohore_Dailekh_132	132 kV	24.75	15.37893225	14.81082	51.64461	15.33033	103.5076383	$0.00816	$0.00818	$0.00870	$0.00773

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Luja Khola-U Dudhkoshi_132	132 kV	4	2.485484	15.05486	8.959181	19.0096	126.2688594	$0.00669	$0.00669	$0.00711	$0.00632
M Bhotekoshi-Bhotekoshi_132	132 kV	3.4	2.1126614	24.37866	19.96812	30.66065	125.7683974	$0.00671	$0.00672	$0.00714	$0.00634
M Hongu B-Inkhu_132	132 kV	9.93	6.17021403	16.96076	27.88831	17.55322	103.4931218	$0.00816	$0.00817	$0.00868	$0.00772
M Karnali-Phukot_132	132 kV	22.84	14.19211364	9.705838	41.12156	22.99549	236.924313	$0.00356	$0.00357	$0.00379	$0.00337
M Marsyangdi-Dumre_132	132 kV	12	7.456452	20.68357	49.95914	38.33416	185.3362838	$0.00456	$0.00456	$0.00485	$0.00431
M Marsyangdi-Marsyangdi_132	132 kV	25	15.534275	50.90038	637.0911	124.02512	243.6624638	$0.00347	$0.00348	$0.00370	$0.00329
M Tamor-Hangpang_132	132 kV	12.7	7.8914117	18.15815	81.70985	41.39188	227.9520766	$0.00370	$0.00371	$0.00394	$0.00351
Madi Seti-Lekhnath_132	132 kV	13.86	8.61220206	28.57195	222.1146	65.92041	230.7172244	$0.00366	$0.00367	$0.00390	$0.00347
Madme-U Madi_132	132 kV	6.43	3.99541553	14.83138	13.93785	18.39639	124.0369406	$0.00681	$0.00681	$0.00724	$0.00643
Mainatada-Surkhet_132	132 kV	22.8	14.1672588	19.75671	87.90866	49.30594	249.56554	$0.00338	$0.00339	$0.00360	$0.00320
Marsyangdi 3 - M Marsyangdi_132	132 kV	6.6	4.1010486	30.12652	58.94701	32.19369	106.8616289	$0.00790	$0.00792	$0.00841	$0.00748
Marsyangdi besi-Uidpur_132	132 kV	3.3	2.0505243	35.86543	41.88793	38.32582	106.86006	$0.00790	$0.00791	$0.00840	$0.00747
Marsyangdi-Bharatpur_132	132 kV	40	24.85484	63.65864	2258.423	207.0118	325.1904219	$0.00260	$0.00262	$0.00279	$0.00248
Marsyangdi-Bharatpur_220	220 kV	31.9	19.8217349	22.36342	1749.378	625.3786	2796.435429	$0.00080	$0.00080	$0.00085	$0.00076

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Marsyangdi-Matathirtha_132	132 kV	50	31.06855	23.96935	665.5492	158.19876	660.0043806	$0.00128	$0.00128	$0.00136	$0.00121
Marsyangdi-Matathirtha_220	220 kV	70	43.49597	16.75683	532.1511	228.3562	1362.764914	$0.00164	$0.00164	$0.00174	$0.00155
Marsyangdi7-Manang_132	132 kV	8.84	5.49291964	16.85455	49.53571	41.39188	245.5828248	$0.00344	$0.00344	$0.00366	$0.00325
Matathirtha-Hetauda_132	132 kV	50	31.06855	30.11406	629.3193	96.8079	321.4707681	$0.00263	$0.00264	$0.00281	$0.00250
Matatirtha-Chapagaun_132	132 kV	10	6.21371	12.62624	15.34359	17.471848	138.3772841	$0.00610	$0.00611	$0.00649	$0.00577
Mathilo Langtang-Chilime_132	132 kV	19.12	11.88061352	18.04129	60.10498	18.66467	103.4552962	$0.00816	$0.00819	$0.00870	$0.00773
Mewa Kh-Hangpang_132	132 kV	10	6.21371	33.26087	108.8305	38.32582	115.227954	$0.00733	$0.00735	$0.00781	$0.00694
Mewa-Dhungesangu_132	132 kV	20	12.42742	52.03652	533.177	126.34556	242.8017093	$0.00348	$0.00349	$0.00371	$0.00330
Mirchiya-Dhalkebar_400	400 kV	32	19.883872	17.57158	558.7942	877.7292	4995.163782	$0.00065	$0.00065	$0.00069	$0.00061
Mirchiya-Inaruwa_400	400 kV	120	74.56452	4.446378	90.46052	176.22818	3963.409769	$0.00081	$0.00081	$0.00086	$0.00077
Motipur-Shivapur_132	132 kV	23	14.291533	15.23945	52.02971	36.48734	239.4268822	$0.00353	$0.00353	$0.00375	$0.00334
Mugu Karnali-Phukot_400	400 kV	71.3	44.3037523	44.67904	8110.316	2288.162	5121.332061	$0.00063	$0.00063	$0.00067	$0.00060
Mugu karnali-West Seti_400 kV	400 kV	150	93.20565	15.2297	1936.654	770.859	5061.550786	$0.00064	$0.00064	$0.00068	$0.00060

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Mulpani-Bhaktapur_132	132 kV	7	4.349597	7.421465	3.772628	18.057816	243.3187518	$0.00347	$0.00347	$0.00369	$0.00328
Myagdi Kh-Dandakhet_132	132 kV	20	12.42742	36.19861	257.9722	43.92139	121.3344656	$0.00696	$0.00700	$0.00744	$0.00661
Myagdi Kh-Raughat_132	132 kV	6.4	3.9767744	20.06546	25.41537	24.52852	122.2425003	$0.00691	$0.00691	$0.00735	$0.00653
Myagdi Khola A-Dandakhet_132	132 kV	27.33	16.98206943	14.97168	59.74548	18.16644	121.3386874	$0.00696	$0.00698	$0.00742	$0.00659
Myardi Khola-Manang_132	132 kV	9.4	5.8408874	22.06085	44.82039	22.99549	104.2366455	$0.00810	$0.00812	$0.00862	$0.00767
N Butwal-Bardghat_132	132 kV	63.44	39.41977624	3.884083	43.12334	24.75902	637.4482729	$0.00132	$0.00133	$0.00141	$0.00125
N Marsyangdi-Marsyangdi_132	132 kV	50	31.06855	17.07755	336.6066	112.23236	657.1923959	$0.00128	$0.00129	$0.00137	$0.00122
N Modi-Kusma_132	132 kV	10	6.21371	59.71532	496.836	183.15864	306.7196827	$0.00275	$0.00276	$0.00293	$0.00261
Nalgad-Bafikot_400	400 kV	26.3	16.3420573	14.69129	1779.884	1764.2964	12009.13194	$0.00027	$0.00027	$0.00029	$0.00025
Nalgad-Jagadulla_400	400 kV	40	24.85484	27.28604	885.5176	712.8624	2612.553526	$0.00123	$0.00124	$0.00131	$0.00117
Nalgad-Maina Tara_400	400 kV	70.2	43.6202442	27.48319	3025.679	1407.2948	5120.565699	$0.00063	$0.00063	$0.00067	$0.00060
Nalgadh-Phukot_400	400 kV	94.3	58.5952853	29.63437	4709.627	1516.2136	5116.40234	$0.00063	$0.00063	$0.00067	$0.00060
Namlan-Mugu Karnali_400	400 kV	66.55	41.35224005	16.58013	554.0308	232.2545	1400.800235	$0.00230	$0.00231	$0.00245	$0.00218
Nar Khola2-Manang_132	132 kV	8.58	5.3313631 8	18.43944	57.06839	38.32582	207.8469845	$0.00406	$0.00407	$0.00432	$0.00384

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Naumure Sto-Phulbari_400	400 kV	64	39.767744	20.04765	616.0598	187.7965	936.7506915	$0.00344	$0.00345	$0.00367	$0.00326
New Damauli-Butwal_400	400 kV	74.8	46.4785508	50.78642	11024.76	2561.51	5043.690813	$0.00064	$0.00064	$0.00068	$0.00061
New Daumauli-Ratmate_400	400 kV	79	49.088309	25.6076	2941.574	1296.5516	5063.151564	$0.00064	$0.00064	$0.00068	$0.00060
Nupche Likhu-Garjyang_132	132 kV	14.87	9.23978677	17.35652	88.30124	43.69143	251.7292061	$0.00335	$0.00336	$0.00357	$0.00317
Nyadi Khola-Khudi1_132	132 kV	5.46	3.39268566	18.68419	18.79063	22.99549	123.0745887	$0.00686	$0.00687	$0.00730	$0.00648
Okhaldhunga-Mirchiya_132	132 kV	70	43.49597	26.63497	2295.962	161.75534	607.3043822	$0.00139	$0.00141	$0.00150	$0.00133
Pahalmanpur-Mahendranagar_132	132 kV	40	24.85484	34.80524	472.6697	83.35074	239.4775614	$0.00353	$0.00355	$0.00377	$0.00335
Palun Kh-Mewa_132	132 kV	11.4	7.0836294	13.85179	21.35012	16.09684	116.2076526	$0.00727	$0.00728	$0.00773	$0.00687
Pancheswor-New Attariya_400	400 kV	87.7	54.4942367	38.85929	7542.282	1972.6862	5076.485443	$0.00063	$0.00064	$0.00068	$0.00060
Pathlaiya-Chandranigapur_132	132 kV	67.32	41.83069572	26.46584	456.8171	65.3635	246.9730793	$0.00342	$0.00344	$0.00366	$0.00325
Pathlaiya-Parwanipur_132	132 kV	29	18.019759	20.04908	111.7411	42.72348	213.0944662	$0.00396	$0.00397	$0.00422	$0.00375
Pelma 1-Sisne_132	132 kV	22.23	13.81307733	27.24519	325.6659	68.98647	253.2060522	$0.00333	$0.00335	$0.00356	$0.00316
Pelma2-Sisne_132	132 kV	12.2	7.5807262	28.18732	191.5638	71.28602	252.9010207	$0.00334	$0.00335	$0.00356	$0.00316

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Phidim-Kabeli_132	132 kV	7.78	4.83426638	13.05418	13.02247	31.69292	242.7798606	$0.00348	$0.00348	$0.00370	$0.00329
Phukot-Betan_400	400 kV	50	31.06855	48.74774	6771.493	2486.376	5100.494915	$0.00063	$0.00063	$0.00067	$0.00060
Phulbari-Butwal_400	400 kV	228.9	142.2318219	8.006003	688.1926	365.1606	4561.084976	$0.00071	$0.00071	$0.00075	$0.00067
Phulbari-Lakhnow_400	400 kV	200	124.2742	41.48093	19865.28	4179.46	10075.61788	$0.00032	$0.00032	$0.00034	$0.00030
Phulbari-Maina Tara_400	400 kV	66	41.010486	42.55638	6815.581	2161.352	5078.796646	$0.00063	$0.00064	$0.00068	$0.00060
Rahughat Mangale-Rahughat_132	132 kV	12.34	7.66771814	27.01527	88.17327	28.36724	105.004466	$0.00804	$0.00807	$0.00857	$0.00762
Rasu Bhotekoshi-Chilime_220	220 kV	4	2.485484	16.63672	25.81477	91.98196	552.8851841	$0.00403	$0.00403	$0.00429	$0.00381
Rasuwagadhi-Chilime_132	132 kV	8.7	5.4059277	34.13839	200.5887	85.08331	249.2305876	$0.00339	$0.00340	$0.00361	$0.00321
Ratmate-Hetauda_400	400 kV	40.6	25.2276626	14.04011	451.595	706.8718	5034.659985	$0.00064	$0.00064	$0.00068	$0.00061
Rolwaling Kh-Tamakoshi_132	132 kV	4.34	2.69675014	41.13567	102.4864	67.45344	163.9779782	$0.00515	$0.00516	$0.00548	$0.00487
Rolwaling Kh1-Tamakoshi_132	132 kV	5.38	3.34297598	15.11532	12.14653	19.16291	126.7780636	$0.00666	$0.00666	$0.00708	$0.00629
S Inkhu Kh-Dudhkoshi4_132	132 kV	10.72	6.66109712	14.62706	22.64505	18.39639	125.7695668	$0.00671	$0.00672	$0.00714	$0.00635
S Tamor-Tamor_220	220 kV	9.36	5.81603256	21.48984	100.7589	118.81	552.8659124	$0.00403	$0.00404	$0.00429	$0.00381

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
S akhu Kh-Ankhu_132	132 kV	8.5	5.2816535	17.10068	24.3106	18.01313	105.3357527	$0.00802	$0.00803	$0.00853	$0.00758
S dordi-Kirtipur_132	132 kV	5	3.106855	32.31608	51.51173	38.01921	117.6479635	$0.00718	$0.00719	$0.00764	$0.00679
SR-Betan_400	400 kV	17.2	10.6875812	13.07975	130.9074	211.5585	1617.450639	$0.00199	$0.00199	$0.00212	$0.00188
Sagu Khola-Singati_132	132 kV	6.7	4.1631857	12.26627	9.935331	15.33033	124.9795578	$0.00676	$0.00676	$0.00718	$0.00638
Samundratar-Trishuli_132	132 kV	20	12.42742	25.64416	127.8734	53.19088	207.4190771	$0.00407	$0.00408	$0.00434	$0.00385
Sandikharka-Butwal_132	132 kV	28.3	17.5847993	29.91391	350.054	90.54204	302.6753774	$0.00279	$0.00280	$0.00298	$0.00264
Sani Bheri-Sisne_132	132 kV	2.64	1.64041944	27.02844	19.06507	34.12531	126.2570463	$0.00669	$0.00669	$0.00711	$0.00632
Sani Bheri2-Bafikot_132	132 kV	8	4.970968	16.96234	22.52474	17.8675	105.336292	$0.00802	$0.00803	$0.00853	$0.00758
Sani Bheri3-Bafikot_132	132 kV	2.1	1.3048791	35.80698	26.5886	38.01155	106.1568164	$0.00795	$0.00796	$0.00846	$0.00752
Sani Bheri4-Bafikot_132	132 kV	11.05	6.86614955	29.43985	93.92574	31.20488	105.995377	$0.00797	$0.00799	$0.00849	$0.00755
Sanjen Kh-Chilime_132	132 kV	8.4	5.2195164	24.01102	95.79246	59.78828	249.0034992	$0.00339	$0.00340	$0.00361	$0.00321
Sanjen-Chilime_132	132 kV	2.04	1.26759684	26.18882	13.83375	32.57694	124.3925461	$0.00679	$0.00679	$0.00722	$0.00641
Sankhuwa 1-Sitalpati_132	132 kV	8.5	5.2816535	25.48157	54.17485	27.08869	106.3069897	$0.00794	$0.00796	$0.00846	$0.00752
Sankhuwa-Sitalpati_132	132 kV	2.6	1.6155646	18.01691	8.318791	19.16291	106.3606912	$0.00794	$0.00794	$0.00844	$0.00750

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Saru kh-Nalgad_132	132 kV	1	0.621371	4.018377	0.4492837	11.49775	286.1292009	$0.00295	$0.00295	$0.00314	$0.00279
Seti Khola-Banskot_132	132 kV	7.1	4.4117341	21.16125	31.21804	22.99549	108.667919	$0.00777	$0.00778	$0.00827	$0.00735
Seti Khola-Lekhnath_132	132 kV	9.3	5.7787503	14.5644	19.33101	16.86336	115.7847903	$0.00729	$0.00730	$0.00776	$0.00690
Seti Nadi-Bajhang_400	400 kV	11.5	7.1457665	7.615	20.54212	107.3123	1409.222587	$0.00229	$0.00229	$0.00243	$0.00216
Sharad Babai Sto-Mainatada_132	132 kV	21.8	13.5458878	33.81674	485.4992	71.28602	210.800982	$0.00401	$0.00403	$0.00428	$0.00381
Shivapuri-Lamahi_132	132 kV	50.46	31.35438066	8.833239	36.24963	20.44578	231.4641322	$0.00365	$0.00365	$0.00388	$0.00345
Simbuwa Kh-Tamor_132	132 kV	14.77	9.17764967	26.99453	106.3461	34.49324	127.7786277	$0.00661	$0.00663	$0.00704	$0.00626
Simbuwa-Tamor_132	132 kV	2.39	1.48507669	32.28364	24.62678	41.16193	127.5008952	$0.00662	$0.00663	$0.00704	$0.00626
Sisne-Bafikot_132	132 kV	14.08	8.74890368	26.34717	456.447	173.8615	659.8868114	$0.00128	$0.00128	$0.00136	$0.00121
Sitalpati-Dhungesangu_220	220 kV	46	28.583066	36.42772	1684.429	512.7362	1407.544035	$0.00158	$0.00159	$0.00169	$0.00150
Sitalpati-Inaruwa_400	400 kV	120	74.56452	25.07605	4312.785	1285.55	5126.604868	$0.00063	$0.00063	$0.00067	$0.00060
Sitalpati-Tumlingtar_220	220 kV	14.8	9.1962908	8.089376	26.56593	112.26614	1387.822003	$0.00161	$0.00161	$0.00171	$0.00152
Suichatar-Matathirtha_132	132 kV	4.62	2.87073402	33.33897	50.65781	76.8727	230.5791091	$0.00366	$0.00366	$0.00389	$0.00346

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Sunkoshi-Dhalkebar_400	400 kV	38	23.612098	54.22569	6364.714	2761.402	5092.423905	$0.00063	$0.00063	$0.00067	$0.00060
Super Budhigandaki-U Budhigandaki_132	132 kV	20.61	12.80645631	32.56481	215.7453	39.85885	122.3985339	$0.00690	$0.00694	$0.00737	$0.00655
Super Madi-U Madi_132	132 kV	6.4	3.9767744	27.12144	46.46536	33.72673	124.3544959	$0.00679	$0.00680	$0.00722	$0.00642
Super Nyadi-Khudi1_132	132 kV	10.5	6.5243955	25.05492	64.89575	30.86758	123.199675	$0.00685	$0.00687	$0.00730	$0.00649
Super Trishuli-Marsyangdi_132	132 kV	10.5	6.5243955	35.85373	265.1489	76.65163	213.7898344	$0.00395	$0.00396	$0.00421	$0.00374
Surkhet-Dododhara_132	132 kV	89	55.302019	21.49865	386.4359	50.1825	233.4216335	$0.00362	$0.00365	$0.00387	$0.00344
Surkhet-Kohalpur_132	132 kV	42.5	26.4082675	8.496201	28.89375	20.2519	238.3641818	$0.00354	$0.00355	$0.00377	$0.00335
Suti Khola-Manang_132	132 kV	8.2	5.0952422	12.48678	12.59853	15.32879	122.7601511	$0.00688	$0.00688	$0.00731	$0.00650
Syar khola-U Budhgandaki_132	132 kV	7.4	4.5981454	37.35095	102.0198	45.60772	122.105917	$0.00691	$0.00693	$0.00736	$0.00655
Syaule-Balanch_132	132 kV	115	71.457665	74.76897	6304.611	186.9647	250.0565408	$0.00338	$0.00349	$0.00371	$0.00330
T Bheri 1-Dunai_132	132 kV	16.2	10.0662102	33.71542	363.6558	84.3168	250.0837896	$0.00338	$0.00339	$0.00360	$0.00320
Tadakhani Cl-Dandakhet_132	132 kV	15	9.320565	24.34268	87.45511	29.52621	121.2939989	$0.00696	$0.00698	$0.00742	$0.00659

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Tadekhani Cl-Dandakhet_132	132 kV	15	9.320565	12.76911	23.96305	15.48363	121.2584902	$0.00696	$0.00697	$0.00741	$0.00659
Tamakoshi 5-Singati_132	132 kV	2.42	1.50371782	47.48668	76.14325	76.65163	161.4171174	$0.00523	$0.00524	$0.00556	$0.00495
Tamakoshi-Khimti_220	220 kV	46	28.583066	24.75718	776.1679	347.5152	1403.694605	$0.00159	$0.00159	$0.00169	$0.00150
Tamgash-Sandikharka_132	132 kV	60.8	37.7793568	39.70451	1325.899	125.06884	314.9990769	$0.00268	$0.00271	$0.00288	$0.00256
Tamor Hub-Hangpang_220	220 kV	30.5	18.9518155	44.43448	1662.332	624.764	1406.034233	$0.00159	$0.00159	$0.00169	$0.00150
Tamor Kh 5-Tamor_132	132 kV	3.4	2.1126614	24.04658	19.43528	30.66065	127.5052419	$0.00662	$0.00663	$0.00704	$0.00626
Tamor LILO-Inaruwa_400	400 kV	50	31.06855	5.049407	389.6029	586.385	11612.94782	$0.00028	$0.00028	$0.00030	$0.00026
Tamor Mewa-Hangpang_132	132 kV	7	4.349597	42.5349	249.8089	98.11409	230.6672638	$0.00366	$0.00367	$0.00390	$0.00347
Tanahu-Damauli_132	132 kV	6.6	4.1010486	35.23633	228.2298	103.0658	292.4986796	$0.00289	$0.00289	$0.00307	$0.00273
Tatopani-Ankhu_132	132 kV	17.03	10.58194813	17.80743	52.26812	18.62635	104.5987546	$0.00807	$0.00809	$0.00860	$0.00765
Thuli Bheri-Dunai_132	132 kV	5.6	3.4796776	18.43355	18.79354	22.99549	124.7480274	$0.00677	$0.00677	$0.00720	$0.00640
Thulibheri 2-Dunai_132	132 kV	5.6	3.4796776	23.99807	31.86713	29.99999	125.0100112	$0.00675	$0.00676	$0.00718	$0.00639
ThuloKh-Raughat_132	132 kV	19.4	12.0545974	13.46324	34.32411	16.3268	121.2694715	$0.00696	$0.00698	$0.00741	$0.00659
Tila 1-Phukot_400	400 kV	5.54	3.4423953 4	13.29579	57.49558	337.2672	2536.646563	$0.00127	$0.00127	$0.00135	$0.00120

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Tila 2-Phukot_400	400 kV	15.2	9.4448392	12.79875	144.7308	321.9392	2515.395644	$0.00128	$0.00128	$0.00136	$0.00121
Tingla-Dudhkoshi4_400	400 kV	20	12.42742	22.42428	299.7655	586.1766	2614.026404	$0.00123	$0.00123	$0.00131	$0.00117
Tingla-Dudhkoshi_400	400 kV	44.9	27.8995579	17.04033	739.6967	870.0818	5106.014966	$0.00063	$0.00063	$0.00067	$0.00060
Tingla-Okhaldhunga_132	132 kV	14	8.699194	26.81975	469.5643	163.6613	610.2267918	$0.00138	$0.00139	$0.00147	$0.00131
Tingla-U Arun_400	400 kV	62	38.525002	10.20159	365.2868	521.491	5111.860014	$0.00063	$0.00063	$0.00067	$0.00060
Tiplyang Kali-Rahughat_132	132 kV	7.85	4.87776235	18.20738	51.29328	44.45795	244.1754388	$0.00346	$0.00346	$0.00368	$0.00327
Trishuli-Matathirtha_220	220 kV	42.4	26.3461304	37.88491	1683.059	533.9982	1409.527435	$0.00158	$0.00159	$0.00169	$0.00150
U Akhu Kh-Ankhu_132	132 kV	1.86	1.15575006	25.28667	11.74076	26.82807	106.0957018	$0.00796	$0.00796	$0.00846	$0.00752
U Apsuwa-Sitalpati_132	132 kV	12	7.456452	17.44596	35.56549	18.39639	105.4478515	$0.00801	$0.00802	$0.00852	$0.00758
U Arun Hp-U Arun_400	400 kV	8.7	5.4059277	16.16433	250.7999	813.1206	5030.339024	$0.00064	$0.00064	$0.00068	$0.00061
U Budhi-Gumda_400	400 kV	23	14.291533	14.27245	266.2691	729.0924	5108.38994	$0.00063	$0.00063	$0.00067	$0.00060
U Budhigandaki-Gumda_400	400 kV	10.8	6.7108068	15.50106	60.14504	155.6028	1003.820384	$0.00321	$0.00321	$0.00341	$0.00303
U Daraudi-Marsyangdi-132	132 kV	23	14.291533	33.06435	246.6941	80.20828	242.5823583	$0.00348	$0.00349	$0.00371	$0.00330

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
U Dudhkh-Manang_132	132 kV	16.23	10.08485133	13.20517	27.81209	16.21949	122.8268171	$0.00687	$0.00689	$0.00732	$0.00650
U Dudhkoshi 2-Dudhkoshi4_132	132 kV	13.76	8.55006496	34.04437	744.8635	112.5272	330.53101	$0.00255	$0.00257	$0.00273	$0.00243
U Dudhkoshi-Dudhkoshi4_132	132 kV	13.76	8.55006496	34.04437	744.8635	112.5272	330.53101	$0.00255	$0.00257	$0.00273	$0.00243
U Inkhu Kh-Dudhkoshi4_132	132 kV	8.4	5.2195164	14.76449	18.0844	18.56503	125.7410855	$0.00671	$0.00672	$0.00714	$0.00635
U Isuwa-U Arun_132	132 kV	17.7	10.9982667	17.70847	53.66028	18.62635	105.1832824	$0.00803	$0.00805	$0.00855	$0.00760
U Jhimruk Sto-Jhimruk_132	132 kV	10.74	6.67352454	11.59169	134.8104	76.65163	661.2636294	$0.00128	$0.00128	$0.00136	$0.00121
U Kalangad HEP-U Kalangad_132	132 kV	4.7	2.9204437	27.7093	35.55029	29.48022	106.3910673	$0.00794	$0.00795	$0.00844	$0.00750
U Kalangad-West Seti_132	132 kV	35	21.747985	52.39557	1338.632	168.39208	321.3861019	$0.00263	$0.00265	$0.00281	$0.00250
U Kaligandaki-Rahughat_132	132 kV	2.083	1.294315793	22.71761	21.25483	55.57244	244.6227398	$0.00345	$0.00345	$0.00367	$0.00326
U Karnali-Betan_132	132 kV	24.75	15.37893225	28.00541	380.3938	68.98647	246.332655	$0.00343	$0.00345	$0.00366	$0.00326
U KarnaliB-Betan_132	132 kV	24.4	15.1614524	18.82471	168.4842	45.99098	244.3117583	$0.00346	$0.00347	$0.00369	$0.00328
U Khudi-Khudi1_132	132 kV	9.3	5.7787503	17.33789	27.48865	21.30915	122.905094	$0.00687	$0.00688	$0.00731	$0.00650
U Lapche-Lapche_132	132 kV	6.7	4.1631857	31.70899	66.57058	39.85885	125.7020485	$0.00672	$0.00673	$0.00715	$0.00635

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh /mile)	Wheeling Charge with pf 0.9 (Cents/kWh/ mile)
U Loti Karnali-M Karnali_132	132 kV	38.7	24.0470577	13.76914	72.10727	16.86336	122.472137	$0.00689	$0.00692	$0.00736	$0.00654
U Madi HP-Lekhnath_132	132 kV	9.3	5.7787503	16.55134	24.99188	19.16291	115.7786016	$0.00729	$0.00730	$0.00776	$0.00690
U Madi-Lekhnath_132	132 kV	23.1	14.3536701	49.31657	781.753	156.04832	316.4216814	$0.00267	$0.00268	$0.00285	$0.00253
U Marsyangdi A-Khudi1_132	132 kV	1.73	1.07497183	30.23431	15.63374	38.32888	126.7727955	$0.00666	$0.00666	$0.00708	$0.00629
U Marsyangdi1-Khudi1_132	132 kV	5.46	3.39268566	42.83477	197.9473	105.777	246.9419119	$0.00342	$0.00343	$0.00364	$0.00324
U Mewa Kh A-Mewa_132	132 kV	7.04	4.37445184	18.61307	23.97179	21.63109	116.2145202	$0.00727	$0.00727	$0.00773	$0.00687
U Modi-N Modi_132	132 kV	8.8	5.4680648	26.66256	61.60792	32.19369	120.7449322	$0.00699	$0.00701	$0.00744	$0.00662
U Myagdi-Dandakhet_132	132 kV	15	9.320565	12.6461	23.50029	15.33033	121.2257534	$0.00697	$0.00698	$0.00741	$0.00659
U Myagdi1-Dandakhet_132	132 kV	8	4.970968	16.9113	45.07787	41.00862	242.4924163	$0.00348	$0.00349	$0.00370	$0.00329
U Nar Khola-Manang_132	132 kV	16.23	10.08485133	19.81848	62.7651	24.35222	122.8763255	$0.00687	$0.00689	$0.00732	$0.00651
U Nyasim-U Balephi_132	132 kV	4.5	2.7961695	26.2901	30.72534	32.96022	125.3712234	$0.00673	$0.00674	$0.00716	$0.00637
U Set 1i-Banskot_132	132 kV	6.7	4.1631857	12.0719	9.541951	13.03078	107.9430744	$0.00782	$0.00783	$0.00832	$0.00739
U Seti-Banskot_132	132 kV	16.21	10.07242391	14.32881	32.11522	15.33033	106.9895546	$0.00789	$0.00791	$0.00840	$0.00747
U Simbuwa Kh-Tamor_132	132 kV	10.14	6.30070194	27.61583	76.42565	35.25975	127.6794867	$0.00661	$0.00663	$0.00704	$0.00626

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
U Tamor A-Tamor_220	220 kV	19.66	12.21615386	10.2356	91.16596	55.18918	539.1885185	$0.00414	$0.00414	$0.00440	$0.00391
U Tamor Hep-Tamor_132	132 kV	6.8	4.2253228	19.53079	25.63558	24.91178	127.5513177	$0.00662	$0.00663	$0.00704	$0.00626
U Tamor-Hangpang_220	220 kV	19.4	12.0545974	17.11769	311.7269	218.4572	1276.207245	$0.00175	$0.00175	$0.00186	$0.00165
U Trishuli2-Chilime_220	220 kV	3.7	2.2990727	15.36295	77.62753	165.5675	1077.70643	$0.00207	$0.00207	$0.00220	$0.00195
Udipur-Marsyangdi_220	220 kV	30.8	19.1382268	29.26835	2897.511	830.2418	2836.653928	$0.00079	$0.00079	$0.00084	$0.00074
Upper Brahmayeni-U Balephi_132	132 kV	12.2	7.5807262	12.26831	18.06737	15.38398	125.3960814	$0.00673	$0.00674	$0.00716	$0.00637
Upper Chaku-Bhotekoshi_132	132 kV	4.5	2.7961695	13.53152	8.135942	17.01666	125.755717	$0.00671	$0.00672	$0.00714	$0.00634
Upper Chameliya-Balanch_132	132 kV	14.6	9.0720166	25.0144	89.81517	30.66065	122.5719985	$0.00689	$0.00691	$0.00734	$0.00652
Upper Khudi-Khudi1_132	132 kV	5	3.106855	16.20065	12.93472	19.92943	123.016237	$0.00686	$0.00687	$0.00730	$0.00649
Upper Mugu Karnali-Mugu Karnali_400	400 kV	22.9	14.2293959	8.949941	107.5548	234.554	2620.73236	$0.00123	$0.00123	$0.00131	$0.00116
Upper Rahughat-Rahughat_132	132 kV	7.7	4.7845567	30.35392	70.0129	37.17604	122.475252	$0.00689	$0.00691	$0.00734	$0.00652
Uttar Ganga-Bafikot_400	400 kV	30.8	19.1382268	17.6306	560.5937	459.9098	2608.588477	$0.00124	$0.00124	$0.00131	$0.00117

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
West Seti-Pancheswor_400	400 kV	55.8	34.6725018	15.42491	751.5442	786.7726	5100.6625	$0.00063	$0.00063	$0.00067	$0.00060
West Seti-Phukot_400	400 kV	86.8	53.9350028	10.82173	566.6227	547.772	5061.778477	$0.00064	$0.00064	$0.00068	$0.00060
West Seti_Dododhara_400	400 kV	65	40.389115	39.52586	5770.577	1997.83	5054.488378	$0.00064	$0.00064	$0.00068	$0.00060

Annex 6: Power flow, Line loading and Wheeling Charges Considering INPS 2040 with Load growth of 9.2%

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Akhu Kh1-Ankhu_132	132 kV	4.4	2.7340324	30.94758	41.53941	32.85398	106.1600939	$0.00795	$0.00796	$0.00846	$0.00752
Akhu kh2-Ankhu_132	132 kV	11.8	7.3321778	14.63193	24.53429	15.31654	104.6788769	$0.00807	$0.00808	$0.00858	$0.00763
Andhi Khola 3-Hetauda_220	220 kV	68	42.253228	10.52579	308.296	85.00681	807.6050349	$0.00276	$0.00277	$0.00294	$0.00262
Andhi Khola Hp-Andhi Khola_220	220 kV	10.74	6.67352454	15.34704	222.4135	137.8489	898.2116421	$0.00248	$0.00249	$0.00264	$0.00235
Andhi Khola_Butwal_220	220 kV	76	47.224196	33.77582	3094.08	552.5204	1635.845999	$0.00136	$0.00137	$0.00146	$0.00129
Ankhu-Ratmate_220	220 kV	30	18.64113	14.52886	273.2603	131.62794	905.9756925	$0.00246	$0.00247	$0.00262	$0.00233
ApsuwaKh-Sitalpati_132	132 kV	12	7.456452	16.82262	33.05303	17.61402	104.7043802	$0.00806	$0.00808	$0.00858	$0.00763
Arun 4-U Arun_400	400 kV	1.8	1.1184678	22.22691	26.58445	284.8877	1281.724 27	$0.00251	$0.00252	$0.00267	$0.00238
Arun3-Dhalkebar_400 kV	400 kV	300	186.4113	23.75918	9425.054	1209.241	5089.573798	$0.00063	$0.00064	$0.00068	$0.00060
Attariy-Syaule_132	132 kV	13	8.077823	62.54066	501.9069	147.43166	235.7372947	$0.00358	$0.00359	$0.00382	$0.00339
Attariya-Bareli_400	400 kV	200	124.2742	36.49889	15397.46	1830.795	5016.029255	$0.00064	$0.00065	$0.00069	$0.00061

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Attariya-Dododhara_400	400 kV	68	42.253228	32.14146	4001.389	1613.8734	5021.15772	$0.00064	$0.00064	$0.00068	$0.00061
Attariya-Mahendranagar_132	132 kV	37	22.990727	48.84854	870.9322	117.2411	240.0094251	$0.00352	$0.00354	$0.00377	$0.00335
Attariya-N Attariya_132	132 kV	24.4	15.1614524	8.673178	167.0157	44.61615	514.4152466	$0.00164	$0.00165	$0.00175	$0.00156
Bafikot-Phulbari_400	400 kV	84.5	52.5058495	32.7006	5155.616	1674.9106	5121.956784	$0.00063	$0.00063	$0.00067	$0.00060
Bafkot-Burtibang_400	400 kV	71.7	44.5523007	16.78995	1139.12	853.5976	5083.979404	$0.00063	$0.00063	$0.00067	$0.00060
Bagmati Nadi-Hetauda_132	132 kV	24	14.912904	16.76489	64.62989	16.8482	100.4969314	$0.00840	$0.00843	$0.00896	$0.00797
Bahrabise-Khimti_400	400 kV	46	28.583066	5.89715	86.84698	290.785	4930.941217	$0.00065	$0.00065	$0.00069	$0.00062
Bahrabise-Tamakoshi_220	220 kV	40	24.85484	19.71962	361.2203	217.0204	1100.530335	$0.00203	$0.00203	$0.00216	$0.00192
Bajhang U seti-Bajhang_132	132 kV	24	14.912904	27.74572	360.3671	61.26617	220.8130479	$0.00382	$0.00385	$0.00409	$0.00363
Bajhang-West Seti_400	400 kV	60	37.28226	13.31461	309.6042	344.0608	2584.084701	$0.00125	$0.00125	$0.00133	$0.00118
Bajra Madi-Lekhnath_132	132 kV	8.02	4.98339542	15.59007	19.20827	18.99251	121.8244049	$0.00693	$0.00694	$0.00737	$0.00655
Balaju-Matathirtha_220	220 kV	4.4	2.7340324	48.26775	238.8527	482.6306	999.9028337	$0.00223	$0.00223	$0.00237	$0.00211
Balaju-Mulpani_220	220 kV	9	5.592339	10.53919	23.25815	109.89548	1042.731747	$0.00214	$0.00214	$0.00227	$0.00202
Balaju-Suichatar_132	132 kV	4.19	2.60354449	30.99415	39.69677	62.99236	203.2395146	$0.00415	$0.00416	$0.00442	$0.00393

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Balanch-U Kalangad_132	132 kV	26	16.155646	27.19133	268.1214	88.73834	326.3479205	$0.00259	$0.00260	$0.00276	$0.00245
Baneshwor-Basantapur_220	220 kV	20	12.42742	9.754213	50.73963	100.13442	1026.576106	$0.00217	$0.00217	$0.00231	$0.00205
Banskot-Lekhnath_132	132 kV	23.8	14.7886298	26.35691	227.0964	69.3435	263.0941943	$0.00321	$0.00322	$0.00342	$0.00304
Bardghat-Kawasoti_132	132 kV	76	47.224196	9.600447	54.53362	14.563496	151.69602	$0.00557	$0.00559	$0.00594	$0.00528
Basantapur Cluster-Basantapur_132	132 kV	7	4.349597	21.56572	31.95751	23.35619	108.3023892	$0.00780	$0.00781	$0.00829	$0.00737
Basantapur-Inaruwa_220	220 kV	77.1	47.9077041	32.08575	4429.429	866.212	2699.678206	$0.00083	$0.00083	$0.00088	$0.00078
Begnas Rupa-Lekhnath_132	132 kV	6.83	4.24396393	36.48493	253.6819	114.8741	314.8535573	$0.00268	$0.00269	$0.00286	$0.00254
Beni Kali-Kusma_132	132 kV	8.54	5.30650834	36.27667	110.5631	38.29135	105.553652	$0.00800	$0.00802	$0.00852	$0.00758
Betan-Bhurigaon_132	132 kV	39.4	24.4820174	33.02622	591.4206	96.09038	290.9517953	$0.00290	$0.00292	$0.00310	$0.00276
Betan-Dododhara_400	400 kV	30	18.64113	24.54273	5659.257	2888.552	11769.48123	$0.00027	$0.00027	$0.00029	$0.00026
Bhaktapur-Harisiddhi_132	132 kV	9	5.592339	43.07946	164.6118	92.31578	214.291869	$0.00394	$0.00395	$0.00419	$0.00373
Bhaktapur-Lamosangu_132	132 kV	60	37.28226	51.8995	1595.768	130.96932	252.3517953	$0.00335	$0.00339	$0.00360	$0.00320
Bhaktapur-Mulpani_220	220 kV	8	4.970968	8.070231	11.93451	68.96604	854.5733078	$0.00261	$0.00261	$0.00277	$0.00246
Bharatpur-Hetauda_220	220 kV	65	40.389115	40.64899	2496.708	436.4464	1073.695558	$0.00208	$0.00209	$0.00222	$0.00197

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Bheri 3 sto-Maintada_400	400 kV	23.14	14.37852494	33.32526	755.8734	367.597	1103.058161	$0.00292	$0.00293	$0.00311	$0.00277
Bheri Babai-Mainatada_132	132 kV	13.6	8.4506456	34.86477	162.094	36.7597	105.4350853	$0.00801	$0.00804	$0.00855	$0.00760
Bheri-Maina Tara_400	400 kV	20.9	12.9866539	22.89787	256.6568	229.7481	1003.360138	$0.00321	$0.00322	$0.00342	$0.00304
Bheri1-Nalgadh_400	400 kV	15.8	9.8176618	8.118795	59.04555	206.7733	2546.847161	$0.00127	$0.00127	$0.00135	$0.00120
Bheri2-Nalgadh_400	400 kV	1.2	0.7456452	19.54943	10.75767	196.0517	1002.851234	$0.00321	$0.00321	$0.00342	$0.00304
Bhimgad Kh-Manang_132	132 kV	10.5	6.5243955	19.95823	41.2391	24.5064 7	122.7887944	$0.00688	$0.00689	$0.00732	$0.00651
Bhotekoshi 5-Lamosangu_132	132 kV	3	1.864113	42.97289	54.69456	45.94963	106.9270184	$0.00790	$0.00791	$0.00840	$0.00747
Bhotekoshi 7-Inkhu_132	132 kV	15	9.320565	16.43685	39.28027	16.8482	102.5026085	$0.00824	$0.00826	$0.00877	$0.00780
Bhotekoshi 8-Inkhu_132	132 kV	4.1	2.5476211	22.29488	20.07187	23.12798	103.7367324	$0.00814	$0.00815	$0.00866	$0.00769
Bhotekoshi1-Bhotekoshi_132	132 kV	3.4	2.1126614	26.74967	24.04427	33.69639	125.9693671	$0.00670	$0.00671	$0.00713	$0.00633
Bhurigaon-Dododhara_132	132 kV	29	18.019759	35.31682	349.6199	60.91732	172.4881232	$0.00490	$0.00492	$0.00523	$0.00465
Bhurigaon-Kohalpur_132	132 kV	55.3	34.3618163	41.39538	921.7955	95.55652	230.8386105	$0.00366	$0.00369	$0.00392	$0.00349
Brahmayani-u Balephi_132	132 kV	6.66	4.13833086	24.27967	38.78862	30.63308	126.1676127	$0.00669	$0.00670	$0.00712	$0.00633

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Budhi G Syar Kh2-U Budhigandaki_132	132 kV	2	1.242742	37.67609	28.06636	45.94963	121.9596566	$0.00692	$0.00693	$0.00736	$0.00654
Budhi G Syar Kh4-U Budhigandaki_132	132 kV	2	1.242742	47.08991	43.8453	57.43703	121.9731148	$0.00692	$0.00693	$0.00736	$0.00654
Budhi Gandaki-Ratmate_400	400 kV	25	15.534275	18.30547	474.2232	918.9926	5020.316878	$0.00064	$0.00064	$0.00068	$0.00061
Budhi Ganga-Betan_132	132 kV	48	29.825808	15.41346	104.5892	15.31654	99.37119894	$0.00850	$0.00855	$0.00909	$0.00808
Budhi gandaki-Gumda_400	400 kV	18	11.184678	15.51375	100.0556	155.4629	1002.097494	$0.00322	$0.00322	$0.00342	$0.00304
Budhigandak Prok kh2 -U Budhigandaki_400	400 kV	9.7	6.027298 7	7.00983	28.02317	183.7985	2622.010805	$0.00123	$0.00123	$0.00131	$0.00116
Budhigandak Prok-U Budhigandaki_400i	400 kV	9.7	6.027298 7	2.920799	4.863917	76.58271	2621.978096	$0.00123	$0.00123	$0.00131	$0.00116
Budhigandaki Nadi-U BUdhigandaki_132	132 kV	1.04	0.646225 84	28.62568	16.86085	69.80514	243.8549582	$0.00346	$0.00346	$0.00368	$0.00327
Budhigandaki Syar-U	400 kV	7.6	4.722419 6	20.62065	74.94031	206.7733	1002.748701	$0.00321	$0.00322	$0.00342	$0.00304

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Budhigandaki_400											
Budhigandaki kha-Gumda_400	400 kV	9.8	6.089435 8	19.80843	89.28524	199.1158	1005.207 379	$0.00321	$0.00321	$0.00341	$0.00303
Burtibang-Kusma_400	400 kV	50	31.06855	17.06234	828.1432	874.3122	5124.222 117	$0.00063	$0.00063	$0.00067	$0.00059
Burtibang-Tamgash_132	132 kV	20.3	12.6138 313	108.881	2378.683	268.841	246.9126 845	$0.00342	$0.00345	$0.00367	$0.00326
Butwal-Bharatpur_220	220 kV	76	47.224196	13.12361	299.0939	139.8308	1065.490 364	$0.00209	$0.00210	$0.00223	$0.00198
Butwal-Gorakhpur_400	400 kV	130	80.77823	15.77887	1780.361	1557.1216	9868.397 42	$0.00033	$0.00033	$0.00035	$0.00031
Butwal-Lumbini_132	132 kV	63.44	39.41977624	16.04121	759.0141	99.268	618.8311 231	$0.00136	$0.00137	$0.00146	$0.00130
Butwal-Motipur_132	132 kV	63.44	39.41977624	18.12819	966.077	111.0301	612.4720 67	$0.00138	$0.00139	$0.00148	$0.00131
Butwal-N Butwal_132	132 kV	25	15.534275	6.836152	53.4047	38.61708	564.8949 877	$0.00149	$0.00150	$0.00159	$0.00141
Chainpur Seti-Bajhang_400	400 kV	11.5	7.1457665	23.1379	95.6627	160.8237	695.0661 037	$0.00464	$0.00464	$0.00493	$0.00438
Cham Catigad-Balanch_132	132 kV	21.14	13.13578294	25.68	275.4749	65.0953	253.4863 707	$0.00333	$0.00335	$0.00355	$0.00316
Chameliya-Balanch_132	132 kV	32	19.883872	21.12832	140.969	26.80395	126.8626 658	$0.00666	$0.00669	$0.00711	$0.00632
Chandranigapur-Dhalkebar_132	132 kV	69.5	43.1852845	13.95777	130.7331	34.21332	245.1202 449	$0.00344	$0.00346	$0.00367	$0.00327

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Chapagaun-Bhaktapur_220	220 kV	10	6.21371	13.42452	41.74985	134.49912	1001.891464	$0.00223	$0.00223	$0.00237	$0.00210
Chapagaun-Harisiddhi_132	132 kV	12	7.456452	58.83923	410.7334	138.8349	235.9563509	$0.00358	$0.00359	$0.00381	$0.00339
Chapagaun-Matathirtha_220	220 kV	10	6.21371	23.25328	125.5734	231.8418	997.0283762	$0.00224	$0.00224	$0.00238	$0.00211
Chapali-Balaju_132	132 kV	10	6.21371	31.12953	95.5809	71.62212	230.0777429	$0.00367	$0.00367	$0.00390	$0.00347
Chapali-Mulpani_132	132 kV	8	4.970968	54.46534	234.2071	120.70414	221.6164262	$0.00381	$0.00382	$0.00406	$0.00361
Chatigad-Balanch_132	132 kV	27.6	17.1498396	19.33672	101.8462	24.50647	126.7354029	$0.00666	$0.00669	$0.00711	$0.00632
Chera1-Nalgad_400	400 kV	24.6	15.2857266	17.95894	109.3925	113.8785	634.1047968	$0.00508	$0.00509	$0.00541	$0.00481
Chilime Hp-Chilime_132	132 kV	2.3	1.4291533	18.80304	8.023053	21.1	112.215897	$0.00752	$0.00753	$0.00800	$0.00711
Chilime hub-Trishuli_220	220 kV	18.4	11.4332264	39.85043	679.855	433.596	1088.058523	$0.00205	$0.00205	$0.00218	$0.00194
Chilime-Kerung_400	400 kV	80	49.70968	27.92227	3544.821	1407.0896	5039.309483	$0.00064	$0.00064	$0.00068	$0.00061
Chilime-Ratmate_400	400 kV	50	31.06855	22.14222	1391.803	1123.0168	5071.834712	$0.00064	$0.00064	$0.00068	$0.00060
Chujung -Upper Arun_132	132 kV	12.06	7.49373426	34.37004	139.79	36.7597	106.9527414	$0.00789	$0.00792	$0.00842	$0.00748
Dadagau Khalanga-Nalgad_400	132 kV	10.6	6.5865326	44.33913	410.3659	98.02587	221.0820781	$0.00382	$0.00384	$0.00407	$0.00362

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Dailekh-Surkhet_132	132 kV	32.6	20.2566946	20.14413	125.9885	40.79436	202.5123944	$0.00417	$0.00418	$0.00444	$0.00395
Damak-Anarmani_132	132 kV	30	18.64113	52.92011	827.8534	64.71674	122.2913936	$0.00690	$0.00699	$0.00743	$0.00660
Damak-Duhabi_132	132 kV	48.9	30.3850419	33.75943	537.0966	73.2636	217.0166973	$0.00389	$0.00392	$0.00416	$0.00370
Damak-Duhabi_400	400 kV	50	31.06855	10.75876	124.6202	197.33586	1834.187769	$0.00176	$0.00176	$0.00187	$0.00166
Damauli-Bharatpur_220	220 kV	44.1	27.4024611	21.60721	2256.353	602.6396	2789.067168	$0.00080	$0.00080	$0.00085	$0.00076
Dana-Middle Kaligandaki_132	132 kV	6	3.728226	33.02587	64.64657	41.00238	124.1523085	$0.00680	$0.00681	$0.00724	$0.00643
Dana-Mristi Khola_132	132 kV	4	2.485484	30.41022	36.47208	32.16474	105.7695078	$0.00798	$0.00799	$0.00849	$0.00755
Dana-Nilgiri Khola1_132	132 kV	6.15	3.82143165	27.54848	45.92684	29.09301	105.6065888	$0.00800	$0.00801	$0.00851	$0.00756
Dana-Nilgiri Khola2_132	132 kV	2.3	1.4291533	38.06975	32.95266	47.48128	124.7218067	$0.00677	$0.00677	$0.00720	$0.00640
Dana-Rahughat_220	220 kV	20	12.42742	22.01266	1063.093	625.9082	2843.401025	$0.00078	$0.00079	$0.00083	$0.00074
Dandakhet-Burtibang_132	132 kV	28	17.398388	39.38445	2026.668	254.0978	645.1729045	$0.00131	$0.00132	$0.00140	$0.00125
Dandakhet-Rahughat_220	220 kV	14	8.699194	6.704661	14.53476	73.22798	1092.195116	$0.00204	$0.00204	$0.00217	$0.00193
Dhalkebar-Hetauda_400	400 kV	127.7	79.3490767	5.172932	150.2917	226.4298	4377.204262	$0.00074	$0.00074	$0.00078	$0.00070
Dhalkebar-Muzzafarpur_400	400 kV	130	80.77823	29.87258	6644.605	3026.5784	10131.62706	$0.00032	$0.00032	$0.00034	$0.00030

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Dhungesangu-Basantapur_220	220 kV	27	16.777017	71.27673	3194.906	775.1964	1087.586931	$0.00205	$0.00206	$0.00219	$0.00194
Dododhara-Bareli1_400	400 kV	200	124.2742	30.34331	10525.23	3042.1008	10025.6063	$0.00032	$0.00032	$0.00034	$0.00030
Dododhara-Bhuri_132	132 kV	34	21.126614	65.39029	1437.47	162.32036	248.2331245	$0.00340	$0.00343	$0.00365	$0.00324
Dododhara-Maina Tara_400	400 kV	94	58.408874	6.815787	163.8153	74.34188	1090.730682	$0.00296	$0.00296	$0.00315	$0.00280
Dordi DhudhKh-Kirtipur_132	132 kV	14.35	8.91667385	15.16085	31.92471	15.9292	105.0679876	$0.00804	$0.00805	$0.00856	$0.00760
Dordi Kh-Udipur_132	132 kV	3.1	1.9262501	19.43191	11.53388	20.67733	106.4091487	$0.00793	$0.00794	$0.00844	$0.00750
Dudh Khola-Manang_132	132 kV	1.46	0.90720166	20.28149	11.87805	49.77876	245.4393637	$0.00344	$0.00344	$0.00366	$0.00325
Dudhkoshi 10-U Dudhkoshi_132	132 kV	6.7	4.1631857	22.72992	68.44848	57.43703	252.6934983	$0.00334	$0.00335	$0.00355	$0.00316
Dudhkoshi 4-Inkhu_132	132 kV	4.1	2.5476211	33.87794	46.40837	35.22805	103.9852187	$0.00812	$0.00813	$0.00864	$0.00768
Dudhkoshi 5-Dudhkoshi4_132	132 kV	7.4	4.5981454	29.21825	62.42982	36.7597	125.8107518	$0.00671	$0.00672	$0.00714	$0.00635
Dudhkoshi-Mirchiya_400	400 kV	80.5	50.0203655	24.00768	2599.529	1186.6262	4942.694171	$0.00065	$0.00065	$0.00069	$0.00062
Dudhkoshi6-U Dudhkoshi_132	132 kV	3.3	2.0505243	25.16612	41.34254	63.56365	252.5762811	$0.00334	$0.00335	$0.00355	$0.00316
Dudhkoshi9-U Dudhkoshi_132	132 kV	1.3	0.8077823	33.66461	29.14981	85.00681	252.5109009	$0.00334	$0.00334	$0.00355	$0.00316

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Duhabi-Inaruwa_400	400 kV	30	18.64113	21.4606	408.9132	547.0916	2549.283804	$0.00126	$0.00127	$0.00134	$0.00120
Dumre-Damauli_132	132 kV	15	9.320565	46.30221	316.465	108.10972	233.4871705	$0.00362	$0.00363	$0.00385	$0.00343
Dunai-Jagdulla_400	400 kV	50	31.06855	13.63902	272.5197	353.5662	2592.313817	$0.00124	$0.00124	$0.00132	$0.00118
Durbang Myagdi-Dandakhet_132	132 kV	1.8	1.1184678	15.5333	4.292089	19.14568	123.2557151	$0.00685	$0.00685	$0.00728	$0.00647
Ghunsa Kh - Tamor_220	220 kV	13.34	8.28908914	10.18084	61.15395	54.79493	538.2161983	$0.00414	$0.00415	$0.00441	$0.00392
Ghunsa Kh-Tamor_220	220 kV	5.9	3.6660889	10.17119	27.02843	54.75664	538.3503798	$0.00414	$0.00414	$0.00440	$0.00391
Ghunsa Tamor-Tamor_132	132 kV	3.4	2.1126614	25.99158	22.70643	32.93056	126.6970303	$0.00666	$0.00667	$0.00709	$0.00630
Ghunsa kh2-Tamor_220	220 kV	5.9	3.6660889	22.14271	128.1511	119.3312	538.9186778	$0.00414	$0.00414	$0.00440	$0.00391
Ghunsa-Tamor_220	220 kV	7.22	4.48629862	11.09426	39.34867	59.73681	538.4479001	$0.00414	$0.00414	$0.00440	$0.00391
Gumda-Ratmate_400	400 kV	75	46.602825	28.27276	3420.958	1448.12	5121.961917	$0.00063	$0.00063	$0.00067	$0.00060
Haitar-Sitalpati_400	400 kV	35	21.747985	42.12324	1846.939	1095.1202	2599.80049	$0.00124	$0.00124	$0.00132	$0.00117
Dhungesangu-Kabeli_132	132 kV	20	12.42742	43.58452	528.4759	69.19248	158.7547138	$0.00532	$0.00536	$0.00569	$0.00506
Hapure-Kususm_132	132 kV	34	21.126614	44.43296	662.6495	107.60076	242.1642853	$0.00349	$0.00351	$0.00373	$0.00331
Hapure-Phulbari_132	132 kV	10	6.21371	55.69432	2900.61	356.4736	640.0537793	$0.00132	$0.00133	$0.00141	$0.00126

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Hetauda-Bharatpur_132	132 kV	80	49.70968	48.07853	2584.436	155.47696	323.3812681	$0.00261	$0.00265	$0.00282	$0.00251
Hetauda-Kamane_132	132 kV	8	4.970968	83.66351	553.6692	203.4862	243.2197741	$0.00347	$0.00348	$0.00370	$0.00329
Himchuli Dordi-Kirtiur_132	132 kV	10.01	6.21992371	35.65135	125.4454	43.65214	122.4417589	$0.00690	$0.00692	$0.00735	$0.00653
Hongu kh-Inkhu_132	132 kV	19	11.806049	16.40746	49.30126	16.74864	102.07942	$0.00827	$0.00830	$0.00881	$0.00783
Humla Karnali 2-Mugu Karnali_400	400 kV	22.9	14.2293959	22.26196	350.0347	313.9891	1410.428821	$0.00229	$0.00229	$0.00243	$0.00216
Humla Karnali-Mugu Karnali_400	400 kV	19.8	12.3031458	10.46954	100.2344	209.8366	2004.258067	$0.00161	$0.00161	$0.00171	$0.00152
Humla Karnali-Mugu Karnali_400(1)	400 kV	29.5	18.3304445	26.74708	1241	701.4976	2622.707226	$0.00123	$0.00123	$0.00131	$0.00116
Ikhuwa Kh-U Arun_132	132 kV	4.5	2.7961695	21.56	20.58821	22.97481	106.5621985	$0.00792	$0.00793	$0.00843	$0.00749
Ilep Tatopani Kh-Ankhu_132	132 kV	12.17	7.56208507	18.21303	39.33058	19.14568	105.1207844	$0.00803	$0.00805	$0.00855	$0.00760
Illam-Damak_132	132 kV	31.5	19.5731865	6.465936	10.80555	6.359888	98.35989716	$0.00858	$0.00860	$0.00914	$0.00812
Illam-Phidim_132	132 kV	23.2	14.4158072	2.258408	1.118499	5.541536	245.3735552	$0.00344	$0.00344	$0.00366	$0.00325
Inaruwa-Purnea_400	400 kV	110	68.35081	18.04506	2015.732	1808.0628	10019.71066	$0.00032	$0.00032	$0.00034	$0.00030

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Inkhu Kh-Inkhu_132	132 kV	6.72	4.17561312	14.84805	14.50687	15.31654	103.1552291	$0.00819	$0.00819	$0.00871	$0.00774
Inkhu-Tingla_132	132 kV	14.3	8.8856053	33.82778	762.0187	182.4521	539.3558194	$0.00157	$0.00157	$0.00167	$0.00148
IsuwaKh-Sitalpati_132	132 kV	17	10.563307	52.64575	921.0854	74.43839	141.3948704	$0.00597	$0.00605	$0.00642	$0.00571
Jaldigad-Nalgad_132	132 kV	11.2	6.9593552	14.87229	24.16992	16.44997	110.6081848	$0.00763	$0.00764	$0.00812	$0.00722
Jhimruk-Lamahi_132	132 kV	47.6	29.5772596	43.17184	1220.003	121.96176	282.503039	$0.00299	$0.00302	$0.00321	$0.00285
Jumla Cluster-Phukot_132	132 kV	55.57	34.52958647	12.55315	160.4263	28.89466	230.1785608	$0.00367	$0.00369	$0.00392	$0.00348
Kaligandaki George-Dana_220	220 kV	1.63	1.01283473	11.75325	19.97901	125.5956	1068.603152	$0.00209	$0.00209	$0.00222	$0.00197
Kaligandaki Kowan_Dana_220	220 kV	7.68	4.77212928	21.92039	204.68	306.3308	1397.469662	$0.00160	$0.00160	$0.00170	$0.00151
Kaligandaki-Butwal_132	132 kV	40	24.85484	99.20257	5497.269	313.8756	316.3986578	$0.00267	$0.00272	$0.00289	$0.00256
Kaligandaki-Tamgash_132	132 kV	42.3	26.2839933	30.84956	389.9928	69.35558	224.8187008	$0.00376	$0.00378	$0.00401	$0.00357
Kamane-Pathlaiya_132	132 kV	29	18.019759	47.90681	656.863	115.48988	241.0719478	$0.00350	$0.00352	$0.00374	$0.00333
Karnali Sto-Phukot_132	132 kV	55.57	34.52958647	19.38807	1932.548	126.3615	651.74873	$0.00130	$0.00132	$0.00140	$0.00124
Karuwa Seti-Banskot_132	132 kV	11.8	7.3321778	23.17805	61.98349	24.50647	105.7313708	$0.00799	$0.00801	$0.00851	$0.00756
Kasuwa Kh 2-U Arun_132	132 kV	4.6	2.8583066	28.21151	36.13723	34.46222	122.156595	$0.00691	$0.00692	$0.00735	$0.00653

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Kasuwa Kh 3-U Arun_132	132 kV	4.6	2.858306	39.3757	70.34007	42.12049	106.9707713	$0.00789	$0.00791	$0.00840	$0.00747
Kawasoti-Bharatpur_132	132 kV	76	47.224196	27.18899	540.3321	64.51914	237.2987742	$0.00356	$0.00359	$0.00381	$0.00339
Kerun-Kimanthanka_400	400 kV	80	49.70968	13.68992	842.175	701.6844	5125.555153	$0.00063	$0.00063	$0.00067	$0.00059
Khadbari-Baneshwor_220	220 kV	10	6.21371	8.262327	18.47805	86.7272	1049.670389	$0.00212	$0.00212	$0.00226	$0.00201
Khani Khola-Singati_132	132 kV	19.13	11.88682723	24.46315	112.6898	30.63308	125.2213227	$0.00674	$0.00677	$0.00719	$0.00639
Khani Khola1-Singati_132	132 kV	13.69	8.50656899	18.36226	45.44519	22.97481	125.1197293	$0.00675	$0.00676	$0.00718	$0.00639
Khare-Singati_132	132 kV	7.58	4.70999218	14.75916	16.27731	18.45643	125.0506804	$0.00675	$0.00676	$0.00718	$0.00638
Khimti 1-Khimti_132	132 kV	1	0.621371	37.38199	13.81386	45.94963	122.9191651	$0.00687	$0.00687	$0.00730	$0.00649
Khimti 2-Khimti_132	132 kV	9.76	6.06458096	30.38274	88.83334	37.37236	123.0052326	$0.00686	$0.00688	$0.00731	$0.00650
Khimti Shivalaya Sto-Khimti_220	220 kV	18	11.184678	27.72565	765.6679	382.9135	1381.080335	$0.00161	$0.00162	$0.00172	$0.00153
Khimti-Dhalkebar_220	220 kV	75	46.602825	99.0114	17184.25	1091.1836	1102.078751	$0.00202	$0.00206	$0.00218	$0.00194
Khimti-Garjyang_132	132 kV	27.8	17.2741138	26.42163	383.2253	66.69239	252.4158805	$0.00335	$0.00336	$0.00357	$0.00318
Khimti-Sunkoshi_400	400 kV	22	13.670162	19.9075	496.2925	1018.7762	5117.549667	$0.00063	$0.00063	$0.00067	$0.00060

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Khimti-Tingla_400	400 kV	57	35.418147	1.65736	5.70762	67.17038	4052.853936	$0.00080	$0.00080	$0.00085	$0.00075
Khudi-Damauli_220	220 kV	60	37.28226	34.46069	1970.147	484.7824	1406.769278	$0.00158	$0.00159	$0.00169	$0.00150
Khudi-Manang_220	220 kV	26.5	16.4663315	20.184	1183.898	573.9766	2843.720769	$0.00078	$0.00079	$0.00083	$0.00074
Khudi-Udipur_220	220 kV	15.8	9.8176618	31.16657	1441.131	785.345	2519.831345	$0.00088	$0.00089	$0.00094	$0.00084
Khudi1-Nyadi Phidim_132	132 kV	17.37	10.79321427	15.44072	40.26093	18.37985	119.0349284	$0.00709	$0.00711	$0.00755	$0.00671
Kimanthanka-U Arun_400	400 kV	10	6.21371	13.6895	55.75022	357.1736	2609.106249	$0.00124	$0.00124	$0.00131	$0.00117
Kirtipur-Udipur_132	132 kV	10.8	6.7108068	42.43579	271.2412	137.9733	325.1342793	$0.00260	$0.00260	$0.00276	$0.00246
Kohalpur-Kusum_132	132 kV	90	55.92339	50.59192	2264.157	123.26064	243.6370076	$0.00347	$0.00353	$0.00375	$0.00333
Kulekhani 2-Hetauda_132	132 kV	9.6	5.9651616	24.6073	56.97432	24.50647	99.59024355	$0.00848	$0.00850	$0.00903	$0.00803
Kulekhani 3-Hetauda_132	132 kV	4.5	2.7961695	10.51544	4.875354	10.72158	101.9603554	$0.00828	$0.00828	$0.00880	$0.00782
Kusma-Andhi Khola_220	220 kV	76	47.224196	18.30877	2799.319	520.7586	2844.312316	$0.00078	$0.00079	$0.00084	$0.00074
Kusma-N Damauli_400	400 kV	69.3	43.0610103	24.83825	2433.301	1271.3088	5118.350931	$0.00063	$0.00063	$0.00067	$0.00060
Kusma-Rahughat_220	220 kV	29.9	18.5789929	26.81736	2360.105	764.4018	2850.399144	$0.00078	$0.00078	$0.00083	$0.00074
Kusum-Butwal_132	132 kV	228.9	142.2318219	9.253929	88.37057	12.818512	138.5196709	$0.00610	$0.00614	$0.00652	$0.00580

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Kusum-Lamahi_132	132 kV	47.6	29.5772596	57.98225	1570.835	135.42734	233.5668933	$0.00362	$0.00366	$0.00389	$0.00345
L ApsuwaKh-Sitalpati_132	132 kV	3.5	2.1747985	40.44748	56.51093	42.88632	106.0296463	$0.00796	$0.00797	$0.00847	$0.00753
L Bagmati-Chandranigapur_132	132 kV	22.55	14.01191605	26.45342	153.1693	27.49319	103.9305693	$0.00812	$0.00817	$0.00868	$0.00772
L Balephi-Bahrabise_132	132 kV	16.65	10.34582715	29.97547	698.8153	198.3341	661.6546796	$0.00128	$0.00128	$0.00136	$0.00121
L Balephi-Lamosangu_132	132 kV	7.36	4.57329056	14.47101	15.06895	15.31654	105.8429232	$0.00798	$0.00799	$0.00848	$0.00754
L Balephi-U Balephi_132	132 kV	10.75	6.67973825	23.53338	277.7906	153.16358	650.8354516	$0.00130	$0.00130	$0.00138	$0.00123
L Barun-U Barun_132	132 kV	14.4	8.9477424	19.95255	266.6842	132	661.5695738	$0.00128	$0.00128	$0.00136	$0.00121
L Chameliya-Balanch_132	132 kV	6.8	4.2253228	12.12448	9.874529	15.31654	126.3273971	$0.00668	$0.00669	$0.00711	$0.00632
L Isuwa-Sitalpati_132	132 kV	12	7.456452	27.68145	90.05747	29.49966	106.5683337	$0.00792	$0.00795	$0.00844	$0.00751
L Likhu-Khimti_132	132 kV	9.76	6.06458096	17.55805	29.60047	21.51974	122.5633826	$0.00689	$0.00690	$0.00733	$0.00652
L Manang Mars-Manang_132	220 kV	16.23	10.08485133	19.58363	144.6311	107.2189	547.492472	$0.00407	$0.00408	$0.00433	$0.00385
L Modi-Kusma_132	132 kV	15	9.320565	14.78545	31.69924	15.31654	103.5919772	$0.00815	$0.00817	$0.00868	$0.00771
L Seti Sto-Marsyangdi_132	132 kV	16	9.941936	33.3103	347.1395	70.45609	211.5144265	$0.00399	$0.00401	$0.00426	$0.00379

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Lahan-Duhabi_132	132 kV	86.4	53.6864544	22.98969	404.964	34.63614	150.6594478	$0.00560	$0.00567	$0.00602	$0.00535
Lahan-Mirchiya_132	132 kV	27.7	17.2119767	97.18597	2586.436	231.4756	238.1780004	$0.00355	$0.00358	$0.00381	$0.00339
Lamahi-Ghorahi_132	132 kV	20	12.42742	15.67658	67.45492	43.57934	277.9900973	$0.00304	$0.00304	$0.00323	$0.00287
Lamki-Bhurigaon_132	132 kV	35.2	21.8722592	15.46362	78.4597	27.34782	176.8526386	$0.00477	$0.00479	$0.00509	$0.00452
Lamki-Pahalmanpur_132	132 kV	35	21.747985	19.01917	120.64	38.21704	200.9395783	$0.00420	$0.00422	$0.00448	$0.00398
Lamosangu-Bahrabise_132	132 kV	10.2	6.3379842	32.89	515.5183	217.466	661.1918516	$0.00128	$0.00128	$0.00136	$0.00121
Lamosangu-Bhotekoshi_220	220 kV	21.33	13.25384343	21.64502	232.6766	143.0688	660.9779062	$0.00337	$0.00338	$0.00359	$0.00319
Lamosangu-Khimti_132	132 kV	43.9	27.2781869	35.64401	546.7945	88.51466	248.3296913	$0.00340	$0.00342	$0.00363	$0.00323
Lamosangu-Singati_132	132 kV	33.37	20.735150 27	35.11772	1918.765	230.0952	655.2111014	$0.00129	$0.00130	$0.00138	$0.00123
Landruk Modi-N Modi_132	132 kV	18.15	11.27788365	28.4203	286.7733	66.31296	233.3295567	$0.00362	$0.00363	$0.00386	$0.00343
Langtang khola Res-Chilime_220	220 kV	6.55	4.06998005	21.61829	143.0819	237.4064	1098.173815	$0.00203	$0.00203	$0.00216	$0.00192
Lapche-Tamakoshi_220	220 kV	14.76	9.17143596	14.86823	89.95844	208.5416	1402.598695	$0.00159	$0.00159	$0.00169	$0.00150
Lapsephedi-Bahrabise_400	400 kV	59.8	37.1579858	7.208056	167.1827	351.4242	4875.436595	$0.00066	$0.00066	$0.00070	$0.00062
Lapsephedi-Mulpani_220	220 kV	70	43.49597	33.5834	1790.074	319.7746	952.1805416	$0.00234	$0.00235	$0.00250	$0.00222

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Lapsephedi-Ratmate_400	400 kV	27.5	17.0877025	1.442168	2.050599	42.54962	2950.392742	$0.00109	$0.00109	$0.00116	$0.00103
Lawan Saharta Bheri-Dunai_132	132 kV	11.2	6.959355 2	40.52011	256.4411	65.39397	161.3864572	$0.00523	$0.00525	$0.00558	$0.00496
Lekhnath-Damauli_132	132 kV	35	21.747985	37.58323	680.168	103.84882	276.3169105	$0.00306	$0.00308	$0.00327	$0.00290
Lekhnath-Damauli_220	220 kV	40.3	25.0412513	22.25611	274.7504	148.97524	669.3678275	$0.00333	$0.00334	$0.00355	$0.00315
Lekhnath-Kaligandaki_132	132 kV	80	49.70968	25.35183	709.5201	80.13546	316.0933944	$0.00267	$0.00269	$0.00286	$0.00255
Likhu 2-Likhu_132	132 kV	5.42	3.36783082	33.71703	60.86243	42.12049	124.9234882	$0.00676	$0.00677	$0.00719	$0.00639
Likhu 4-Likhu_132	132 kV	14.7	9.1341537	32.41148	152.0864	40.12934	123.8121184	$0.00682	$0.00685	$0.00727	$0.00647
Likhu A-Likhu_132	132 kV	1.43	0.88856053	31.27942	13.82986	39.05718	124.8654227	$0.00676	$0.00676	$0.00719	$0.00639
Likhu Cluster-Likhu_132	132 kV	6.63	4.11968973	16.24928	17.26537	20.29442	124.8942722	$0.00676	$0.00677	$0.00719	$0.00639
Likhu Kh-Likhu_132	132 kV	6.7	4.1631857	18.39447	22.36446	22.97481	124.9006359	$0.00676	$0.00677	$0.00719	$0.00639
Likhu-Khimti_132	132 kV	27.5	17.0877025	33.83488	1469.233	223.0592	659.2581383	$0.00128	$0.00129	$0.00137	$0.00122
Likhu1-Likhu_132	132 kV	11.8	7.3321778	36.52933	219.4123	58.96869	161.4283372	$0.00523	$0.00525	$0.00558	$0.00496
Lower Burbang Kh-Dunau_132	132 kV	15	9.320565	12.27181	22.2448	15.31654	124.8107655	$0.00677	$0.00677	$0.00720	$0.00640

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Lower Lohore_Dailekh_132	132 kV	24.75	15.37893225	14.83141	51.79485	15.31654	103.2709634	$0.00818	$0.00820	$0.00872	$0.00775
Luja Khola-U Dudhkoshi_132	132 kV	4	2.485484	15.04136	8.943118	18.99251	126.2685688	$0.00669	$0.00669	$0.00711	$0.00632
M Bhotekoshi-Bhotekoshi_132	132 kV	3.4	2.1126614	24.32178	19.87665	30.63308	125.9491698	$0.00670	$0.00671	$0.00713	$0.00634
M Hongu B-Inkhu_132	132 kV	9.93	6.17021403	17.02365	28.0983	17.53744	103.0180954	$0.00820	$0.00821	$0.00872	$0.00775
M Karnali-Phukot_132	132 kV	22.84	14.19211364	9.674379	40.88423	22.97481	237.4809794	$0.00356	$0.00356	$0.00378	$0.00336
M Marsyangdi-Dumre_132	132 kV	12	7.456452	39.1248	180.1907	75.53234	193.054891	$0.00437	$0.00438	$0.00466	$0.00414
M Marsyangdi-Marsyangdi_132	132 kV	25	15.534275	63.79457	1004.961	160.88572	252.193439	$0.00335	$0.00337	$0.00358	$0.00318
M Tamor-Hangpang_132	132 kV	12.7	7.8914117	19.57276	94.6988	41.35466	211.2868088	$0.00400	$0.00401	$0.00426	$0.00378
Madi Seti-Lekhnath_132	132 kV	13.86	8.61220206	27.04687	199.8199	65.86113	243.5074003	$0.00347	$0.00348	$0.00370	$0.00328
Madme-U Madi_132	132 kV	6.43	3.99541553	15.17829	14.57514	18.37985	121.0930217	$0.00697	$0.00698	$0.00741	$0.00659
Mainatada-Surkhet_132	132 kV	22.8	14.1672588	54.26036	661.7617	132.91168	244.9517106	$0.00345	$0.00346	$0.00368	$0.00327
Marsyangdi 3 - M Marsyangdi_132	132 kV	6.6	4.1010486	30.10735	58.87169	32.16474	106.8335141	$0.00790	$0.00792	$0.00841	$0.00748
Marsyangdi besi-Uidpur_132	132 kV	3.3	2.0505243	35.90777	41.98708	38.29135	106.6380619	$0.00792	$0.00793	$0.00842	$0.00749

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Marsyangdi-Bharatpur_132	132 kV	40	24.85484	51.9036	1497.094	164.77132	317.4564385	$0.00266	$0.00268	$0.00285	$0.00253
Marsyangdi-Bharatpur_220	220 kV	31.9	19.8217349	15.75039	868.9071	438.7756	2785.807843	$0.00080	$0.00080	$0.00085	$0.00076
Marsyangdi-Matathirtha_132	132 kV	50	31.06855	39.24743	1784.807	243.6814	620.8849853	$0.00136	$0.00137	$0.00146	$0.00129
Marsyangdi-Matathirtha_220	220 kV	70	43.49597	35.23674	2387.425	472.6354	1341.314208	$0.00166	$0.00167	$0.00178	$0.00158
Marsyangdi7-Manang_132	132 kV	8.84	5.49291964	16.83974	49.44842	41.35466	245.5777821	$0.00344	$0.00344	$0.00366	$0.00325
Matathirtha-Hetauda_132	132 kV	50	31.06855	23.50169	365.439	38.58342	164.1729595	$0.00514	$0.00519	$0.00552	$0.00490
Matatirtha-Chapagaun_132	132 kV	10	6.21371	20.83143	42.53705	43.12182	207.0036479	$0.00408	$0.00408	$0.00434	$0.00386
Mathilo Langtang-Chilime_132	132 kV	19.12	11.88061352	17.9623	59.56644	18.64789	103.8168275	$0.00813	$0.00816	$0.00867	$0.00771
Mewa Kh-Hangpang_132	132 kV	10	6.21371	35.77539	125.7814	38.29135	107.0326557	$0.00789	$0.00791	$0.00841	$0.00747
Mewa-Dhungesangu_132	132 kV	20	12.42742	51.91852	530.7948	126.23214	243.1350894	$0.00347	$0.00349	$0.00371	$0.00329
Mirchiya-Dhalkebar_400	400 kV	32	19.883872	12.52759	275.1496	524.5008	4186.765371	$0.00077	$0.00077	$0.00082	$0.00073
Mirchiya-Inaruwa_400	400 kV	120	74.56452	8.466614	419.7673	377.9796	4464.353755	$0.00072	$0.00072	$0.00077	$0.00068
Motipur-Shivapur_132	132 kV	23	14.291533	25.39581	144.589	54.79242	215.7537799	$0.00391	$0.00392	$0.00417	$0.00371

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Mugu Karnali-Phukot_400	400 kV	71.3	44.3037523	43.24477	7597.039	2214.6	5121.081694	$0.00063	$0.00063	$0.00067	$0.00060
Mugu karnali-West Seti_400 kV	400 kV	150	93.20565	15.64853	2047.761	792.6738	5065.484106	$0.00064	$0.00064	$0.00068	$0.00060
Mulpani-Bhaktapur_132	132 kV	7	4.349597	16.83664	19.57575	39.41434	234.0986087	$0.00361	$0.00361	$0.00383	$0.00341
Myagdi Kh-Dandakhet_132	132 kV	20	12.42742	35.49316	248.5199	43.88189	123.6347792	$0.00683	$0.00687	$0.00730	$0.00649
Myagdi Kh-Raughat_132	132 kV	6.4	3.9767744	20.12506	25.56375	24.50647	121.7709165	$0.00693	$0.00694	$0.00737	$0.00656
Myagdi Khola A-Dandakhet_132	132 kV	27.33	16.98206943	14.69429	57.9459	18.1501	123.5180468	$0.00684	$0.00686	$0.00729	$0.00648
Myardi Khola-Manang_132	132 kV	9.4	5.8408874	22.04696	44.76347	22.97481	104.2085167	$0.00810	$0.00812	$0.00863	$0.00767
N Butwal-Bardghat_132	132 kV	63.44	39.41977624	4.980412	69.39719	29.1288	584.867276	$0.00144	$0.00145	$0.00154	$0.00137
N Marsyangdi-Marsyangdi_132	132 kV	50	31.06855	32.16366	1197.523	206.012	640.5116831	$0.00132	$0.00133	$0.00141	$0.00125
N Modi-Kusma_132	132 kV	10	6.21371	61.3134	523.6386	182.975	298.4257927	$0.00283	$0.00284	$0.00301	$0.00268
Nalgad-Bafikot_400	400 kV	26.3	16.3420573	15.27626	1922.605	1833.0908	11999.60462	$0.00027	$0.00027	$0.00029	$0.00025
Nalgad-Jagadulla_400	400 kV	40	24.85484	27.26351	884.0495	712.2706	2612.541819	$0.00123	$0.00124	$0.00131	$0.00117
Nalgad-Maina Tara_400	400 kV	70.2	43.6202442	23.85412	2271.978	1220.5474	5116.715268	$0.00063	$0.00063	$0.00067	$0.00060
Nalgadh-Phukot_400	400 kV	94.3	58.5952853	27.34077	4005.6	1398.2834	5114.279517	$0.00063	$0.00063	$0.00067	$0.00060

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Namlan-Mugu Karnali_400	400 kV	66.55	41.35224005	16.58684	553.3	232.0456	1398.974126	$0.00230	$0.00231	$0.00245	$0.00218
Nar Khola2-Manang_132	132 kV	8.58	5.33136318	18.42787	56.99597	38.29135	207.7904283	$0.00406	$0.00407	$0.00432	$0.00384
Naumure Sto-Phulbari_400	400 kV	64	39.767744	15.15638	386.1689	187.6276	1237.944681	$0.00260	$0.00261	$0.00277	$0.00246
New Damauli-Butwal_400	400 kV	74.8	46.4785508	18.57433	1469.904	949.2092	5110.328071	$0.00063	$0.00063	$0.00067	$0.00060
New Daumauli-Ratmate_400	400 kV	79	49.088309	7.267607	229.036	363.9576	5007.942078	$0.00064	$0.00064	$0.00068	$0.00061
Nupche Likhu-Garjyang_132	132 kV	14.87	9.23978677	17.29022	87.73088	43.65214	252.4672329	$0.00334	$0.00335	$0.00356	$0.00316
Nyadi Khola-Khudi1_132	132 kV	5.46	3.39268566	19.11995	19.65591	22.97481	120.1614544	$0.00703	$0.00703	$0.00747	$0.00664
Okhaldhunga-Mirchiya_132	132 kV	70	43.49597	30.42316	3015.703	188.45672	619.4514968	$0.00136	$0.00138	$0.00147	$0.00131
Pahalmanpur-Mahendranagar_132	132 kV	40	24.85484	39.95392	627.207	93.77702	234.7129393	$0.00360	$0.00362	$0.00385	$0.00342
Palun Kh-Mewa_132	132 kV	11.4	7.0836294	13.81401	21.2359	16.08237	116.4207207	$0.00725	$0.00726	$0.00772	$0.00686
Pancheswor-New Attariya_400	400 kV	87.7	54.4942367	39.36522	7729.459	1990.3006	5055.987494	$0.00064	$0.00064	$0.00068	$0.00060
Pathlaiya-Chandranigapur_132	132 kV	67.32	41.830695572	26.6488	458.5512	61.29186	229.998574	$0.00367	$0.00370	$0.00393	$0.00349
Pathlaiya-Parwanipur_132	132 kV	29	18.019759	36.7634	386.5622	87.66202	238.4491641	$0.00354	$0.00356	$0.00378	$0.00336

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Pelma 1-Sisne_132	132 kV	22.23	13.81307733	27.75971	336.4318	68.92444	248.2894814	$0.00340	$0.00342	$0.00363	$0.00323
Pelma2-Sisne_132	132 kV	12.2	7.5807262	28.67833	197.7798	71.22192	248.3475154	$0.00340	$0.00341	$0.00362	$0.00322
Phidim-Kabeli_132	132 kV	7.78	4.83426638	7.954472	4.774683	17.34561	218.0611108	$0.00387	$0.00387	$0.00412	$0.00366
Phukot-Betan_400	400 kV	50	31.068555	47.07009	6312.341	2400.156	5099.110709	$0.00063	$0.00063	$0.00067	$0.00060
Phulbari-Butwal_400	400 kV	228.9	142.2318219	10.90458	1409.753	530.4074	4864.07913	$0.00066	$0.00066	$0.00071	$0.00063
Phulbari-Lakhnow_400	400 kV	200	124.2742	24.90937	7104.874	2528.4196	10150.47591	$0.00032	$0.00032	$0.00034	$0.00030
Phulbari-Maina Tara_400	400 kV	66	41.010486	30.80243	3568.916	1575.4064	5114.552326	$0.00063	$0.00063	$0.00067	$0.00060
Rahughat Mangale-Rahughat_132	132 kV	12.34	7.66771814	27.04699	88.38263	28.34173	104.7870022	$0.00806	$0.00808	$0.00859	$0.00763
Rasu Bhotekoshi-Chilime_220	220 kV	4	2.485484	16.74348	26.12611	91.89925	548.8658869	$0.00406	$0.00406	$0.00432	$0.00384
Rasuwagadhi-Chilime_132	132 kV	8.7	5.4059277	34.21475	201.2506	85.00681	248.4507705	$0.00340	$0.00341	$0.00362	$0.00322
Ratmate-Hetauda_400	400 kV	40.6	25.2276626	34.56772	2757.658	1746.7688	5053.179093	$0.00064	$0.00064	$0.00068	$0.00060
Rolwaling Kh-Tamakoshi_132	132 kV	4.34	2.69675014	41.21026	102.8654	67.39278	163.533984	$0.00516	$0.00517	$0.00549	$0.00488
Rolwaling Kh1-Tamakoshi_132	132 kV	5.38	3.34297598	15.13289	12.18145	19.14568	126.5170103	$0.00667	$0.00668	$0.00710	$0.00631

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
S Inkhu Kh-Dudhkoshi4_132	132 kV	10.72	6.66109712	14.61394	22.60436	18.37985	125.7692997	$0.00671	$0.00672	$0.00714	$0.00635
S Tamor-Tamor_220	220 kV	9.36	5.81603256	21.47268	100.5863	118.7032	552.8103618	$0.00403	$0.00404	$0.00429	$0.00381
S akhu Kh-Ankhu_132	132 kV	8.5	5.2816535	17.08287	24.25942	17.99694	105.3507988	$0.00801	$0.00803	$0.00853	$0.00758
S dordi-Kirtipur_132	132 kV	5	3.106855	31.02665	47.51447	37.98502	122.4270748	$0.00690	$0.00691	$0.00734	$0.00652
SR-Betan_400	400 kV	17.2	10.6875812	13.07216	130.7489	211.3683	1616.934768	$0.00199	$0.00199	$0.00212	$0.00188
Sagu Khola-Singati_132	132 kV	6.7	4.1631857	12.24728	9.905472	15.31654	125.0607482	$0.00675	$0.00676	$0.00718	$0.00638
Samundratar-Trishuli_132	132 kV	20	12.42742	21.81656	93.25769	53.14304	243.5903736	$0.00347	$0.00347	$0.00369	$0.00328
Sandikharka-Butwal_132	132 kV	28.3	17.5847993	40.86037	656.8634	123.0831	301.2285498	$0.00280	$0.00282	$0.00299	$0.00266
Sani Bheri-Sisne_132	132 kV	2.64	1.64041944	27.46613	19.67732	34.09462	124.1333235	$0.00680	$0.00681	$0.00723	$0.00643
Sani Bheri2-Bafikot_132	132 kV	8	4.970968	15.25038	18.26135	17.85143	117.0556406	$0.00721	$0.00722	$0.00767	$0.00682
Sani Bheri3-Bafikot_132	132 kV	2.1	1.3048791	32.2788	21.61515	37.97737	117.6542189	$0.00718	$0.00718	$0.00763	$0.00678
Sani Bheri4-Bafikot_132	132 kV	11.05	6.86614955	26.52647	76.43732	31.17682	117.5309794	$0.00718	$0.00720	$0.00765	$0.00680
Sanjen Kh-Chilime_132	132 kV	8.4	5.2195164	24.08087	96.19573	59.73451	248.0579398	$0.00340	$0.00341	$0.00362	$0.00322
Sanjen-Chilime_132	132 kV	2.04	1.26759684	26.22062	13.86298	32.54765	124.1299786	$0.00680	$0.00681	$0.00723	$0.00643

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Sankhuwa 1-Sitalpati_132	132 kV	8.5	5.2816535	25.61996	54.76935	27.06433	105.6376747	$0.00799	$0.00801	$0.00851	$0.00756
Sankhuwa-Sitalpati_132	132 kV	2.6	1.6155646	18.11639	8.411198	19.14568	105.6815403	$0.00799	$0.00799	$0.00849	$0.00755
Saru kh-Nalgad_132	132 kV	1	0.621371	4.015181	0.4485672	11.48741	286.0994311	$0.00295	$0.00295	$0.00314	$0.00279
Seti Khola-Banskot_132	132 kV	7.1	4.4117341	21.69753	32.81456	22.97481	105.886753	$0.00797	$0.00799	$0.00848	$0.00754
Seti Khola-Lekhnath_132	132 kV	9.3	5.7787503	13.82653	17.50273	16.8482	121.8541456	$0.00693	$0.00694	$0.00737	$0.00655
Seti Nadi-Bajhang_400	400 kV	11.5	7.1457665	7.608179	20.50521	107.2158	1409.217633	$0.00229	$0.00229	$0.00243	$0.00216
Sharad Babai Sto-Mainatada_132	132 kV	21.8	13.5458878	33.88027	487.3572	71.22192	210.2165065	$0.00402	$0.00404	$0.00430	$0.00382
Shivapuri-Lamahi_132	132 kV	50.46	31.35438066	12.83138	73.98853	21.9199	170.8304173	$0.00494	$0.00496	$0.00527	$0.00468
Simbuwa Kh-Tamor_132	132 kV	14.77	9.17764967	27.14225	107.4931	34.46222	126.9689138	$0.00665	$0.00667	$0.00709	$0.00630
Simbuwa-Tamor_132	132 kV	2.39	1.48507669	32.45953	24.89581	41.12492	126.6959811	$0.00666	$0.00667	$0.00709	$0.00630
Sisne-Bafikot_132	132 kV	14.08	8.74890368	26.84389	473.3124	173.6871	647.0265673	$0.00130	$0.00131	$0.00139	$0.00124
Sitalpati-Dhungesangu_220	220 kV	46	28.583066	27.20824	941.5281	382.3536	1405.286046	$0.00159	$0.00159	$0.00169	$0.00150
Sitalpati-Inaruwa_400	400 kV	120	74.56452	28.28332	5483.345	1445.3612	5110.295397	$0.00063	$0.00063	$0.00067	$0.00060
Sitalpati-Tumlingtar_220	220 kV	14.8	9.1962908	6.183605	14.99091	63.72844	1030.603345	$0.00216	$0.00216	$0.00230	$0.00204

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Suichatar-Matathirtha_132	132 kV	4.62	2.87073402	88.954	361.4341	209.4322	235.4387661	$0.00359	$0.00359	$0.00382	$0.00339
Sunkoshi-Dhalkebar_400	400 kV	38	23.612098	45.26335	4430.794	2299.474	5080.211694	$0.00063	$0.00064	$0.00068	$0.00060
Super Budhigandaki-U Budhigandaki_132	132 kV	20.61	12.80645631	32.53585	215.3608	39.82301	122.3973248	$0.00690	$0.00694	$0.00737	$0.00655
Super Madi-U Madi_132	132 kV	6.4	3.9767744	27.73044	48.53457	33.6964	121.5141195	$0.00695	$0.00696	$0.00739	$0.00657
Super Nyadi-Khudi1_132	132 kV	10.5	6.5243955	25.64049	67.85842	30.8398 3	120.2778496	$0.00702	$0.00704	$0.00748	$0.00664
Super Trishuli-Marsyangdi_132	132 kV	10.5	6.5243955	36.14401	269.4923	76.58271	211.8821625	$0.00398	$0.00400	$0.00425	$0.00378
Surkhet-Dododhara_132	132 kV	89	55.302019	45.79812	1814.656	110.64874	241.6010526	$0.00349	$0.00355	$0.00377	$0.00335
Surkhet-Kohalpur_132	132 kV	42.5	26.4082675	14.83174	86.66956	29.72104	200.3880866	$0.00421	$0.00423	$0.00449	$0.00399
Suti Khola-Manang_132	132 kV	8.2	5.0952422	12.4758	12.57631	15.31501	122.757739	$0.00688	$0.00688	$0.00731	$0.00650
Syar khola-U Budhgandaki_132	132 kV	7.4	4.5981454	37.31762	101.8377	45.56671	122.1050807	$0.00691	$0.00693	$0.00736	$0.00655
Syaule-Balanch_132	132 kV	115	71.457665	74.74205	6360.458	188.93948	252.7887314	$0.00334	$0.00345	$0.00367	$0.00326
T Bheri 1-Dunai_132	132 kV	16.2	10.0662102	33.68579	363.0151	84.24098	250.078683	$0.00338	$0.00339	$0.00360	$0.00320
Tadakhani Cl-Dandakhet_132	132 kV	15	9.320565	23.89454	84.45651	29.49966	123.4577439	$0.00684	$0.00686	$0.00729	$0.00648

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Tadekhani Cl-Dandakhet_132	132 kV	15	9.320565	12.53998	23.21184	15.46971	123.3631154	$0.00684	$0.00685	$0.00728	$0.00647
Tamakoshi 5-Singati_132	132 kV	2.42	1.50371782	47.4128	75.90697	76.58271	161.5232806	$0.00523	$0.00523	$0.00556	$0.00494
Tamakoshi-Khimti_220	220 kV	46	28.583066	30.30618	1164.303	425.7778	1404.920713	$0.00159	$0.00159	$0.00169	$0.00150
Tamgash-Sandikharka_132	132 kV	60.8	37.7793568	61.77237	3239.131	194.72802	315.234821	$0.00268	$0.00272	$0.00289	$0.00257
Tamor Hub-Hangpang_220	220 kV	30.5	18.9518155	42.02119	1487.941	592.1892	1409.263279	$0.00158	$0.00159	$0.00169	$0.00150
Tamor Kh 5-Tamor_132	132 kV	3.4	2.1126614	24.1799	19.65102	30.63308	126.6881997	$0.00666	$0.00667	$0.00709	$0.00630
Tamor LILO-Inaruwa_400	400 kV	50	31.06855	5.3407	428.7503	585.8578	10969.68188	$0.00029	$0.00029	$0.00031	$0.00028
Tamor Mewa-Hangpang_132	132 kV	7	4.349597	45.74655	288.776	98.02587	214.2803556	$0.00394	$0.00395	$0.00420	$0.00373
Tanahu-Damauli_132	132 kV	6.6	4.1010486	37.50782	258.4964	102.9731	274.5376831	$0.00308	$0.00308	$0.00328	$0.00291
Tatopani-Ankhu_132	132 kV	17.03	10.58194813	17.78934	52.15961	18.6096	104.6109636	$0.00807	$0.00809	$0.00860	$0.00764
Thuli Bheri-Dunai_132	132 kV	5.6	3.4796776	18.41728	18.76032	22.97481	124.7459451	$0.00677	$0.00677	$0.00720	$0.00640
Thulibheri 2-Dunai_132	132 kV	5.6	3.4796776	23.99819	31.86744	29.99999	125.0093861	$0.00675	$0.00676	$0.00718	$0.00639
ThuloKh-Raughat_132	132 kV	19.4	12.0545974	13.50773	34.53504	16.31212	120.7613715	$0.00699	$0.00701	$0.00744	$0.00662
Tila 1-Phukot_400	400 kV	5.54	3.44239534	13.25548	57.15489	336.9639	2542.072411	$0.00127	$0.00127	$0.00135	$0.00120

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
Tila 2-Phukot_400	400 kV	15.2	9.4448392	12.75734	143.8463	321.6497	2521.291272	$0.00128	$0.00128	$0.00136	$0.00121
Tingla-Dudhkoshi4_400	400 kV	20	12.42742	22.40417	299.2266	585.6492	2614.01873	$0.00123	$0.00123	$0.00131	$0.00117
Tingla-Dudhkoshi_400	400 kV	44.9	27.8995579	15.02313	574.3671	766.6466	5103.10834	$0.00063	$0.00063	$0.00067	$0.00060
Tingla-Okhaldhunga_132	132 kV	14	8.699194	33.55029	736.164	210.4952	627.4020284	$0.00135	$0.00135	$0.00143	$0.00128
Tingla-U Arun_400	400 kV	62	38.525002	1.501284	3.969943	53.4415	3559.719547	$0.00091	$0.00091	$0.00096	$0.00086
Tiplyang Kali-Rahughat_132	132 kV	7.85	4.87776235	18.26253	51.59582	44.41797	243.2191487	$0.00347	$0.00348	$0.00369	$0.00328
Trishuli-Matathirtha_220	220 kV	42.4	26.3461304	62.75017	4595.52	824.9334	1314.631339	$0.00170	$0.00171	$0.00181	$0.00161
U Akhu Kh-Ankhu_132	132 kV	1.86	1.15575006	25.25978	11.71576	26.80395	106.113157	$0.00796	$0.00796	$0.00846	$0.00752
U Apsuwa-Sitalpati_132	132 kV	12	7.456452	17.53918	35.95278	18.37985	104.7930975	$0.00806	$0.00807	$0.00858	$0.00762
U Arun Hp-U Arun_400	400 kV	8.7	5.4059277	16.28878	254.5605	812.3894	4987.417106	$0.00065	$0.00065	$0.00069	$0.00061
U Budhi-Gumda_400	400 kV	23	14.291533	14.25964	265.7904	728.4366	5108.380015	$0.00063	$0.00063	$0.00067	$0.00060
U Budhigandaki-Gumda_400	400 kV	10.8	6.7108068	15.47744	60.00434	155.4629	1004.44841	$0.00321	$0.00321	$0.00341	$0.00303
U Daraudi-Marsyangdi-132	132 kV	23	14.291533	32.14704	234.0617	80.13614	249.2799959	$0.00339	$0.00340	$0.00361	$0.00321
U Dudhkh-Manang_132	132 kV	16.23	10.08485133	13.19357	27.76294	16.2049	122.8242242	$0.00687	$0.00689	$0.00732	$0.00650

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
U Dudhkoshi 2-Dudhkoshi4_132	132 kV	13.76	8.55006496	34.01384	743.5277	112.4261	330.5304547	$0.00255	$0.00257	$0.00273	$0.00243
U Dudhkoshi-Dudhkoshi4_132	132 kV	13.76	8.55006496	34.01384	743.5277	112.4261	330.5304547	$0.00255	$0.00257	$0.00273	$0.00243
U Inkhu Kh-Dudhkoshi4_132	132 kV	8.4	5.2195164	14.75125	18.05191	18.54833	125.7407338	$0.00671	$0.00672	$0.00714	$0.00635
U Isuwa-U Arun_132	132 kV	17.7	10.9982667	17.69762	53.59306	18.6096	105.1531223	$0.00803	$0.00805	$0.00856	$0.00761
U Jhimruk Sto-Jhimruk_132	132 kV	10.74	6.67352454	13.14416	172.3448	76.58271	582.6367756	$0.00145	$0.00145	$0.00154	$0.00137
U Kalangad HEP-U Kalangad_132	132 kV	4.7	2.9204437	27.72773	35.59779	29.45371	106.2247432	$0.00795	$0.00796	$0.00846	$0.00752
U Kalangad-West Seti_132	132 kV	35	21.747985	45.72074	1016.425	143.68126	314.2583869	$0.00269	$0.00271	$0.00287	$0.00256
U Kaligandaki-Rahughat_132	132 kV	2.083	1.294315793	22.78402	21.37849	55.52246	243.6903584	$0.00346	$0.00347	$0.00368	$0.00327
U Karnali-Betan_132	132 kV	24.75	15.37893225	32.78574	516.6584	68.92444	210.2268852	$0.00402	$0.00405	$0.00430	$0.00382
U KarnaliB-Betan_132	132 kV	24.4	15.1614524	22.17532	230.8724	45.94963	207.2106738	$0.00407	$0.00410	$0.00435	$0.00387
U Khudi-Khudi1_132	132 kV	9.3	5.7787503	17.75369	28.76565	21.28999	119.9186761	$0.00704	$0.00705	$0.00749	$0.00666
U Lapche-Lapche_132	132 kV	6.7	4.1631857	31.68052	66.45103	39.82301	125.7018824	$0.00672	$0.00673	$0.00715	$0.00635
U Loti Karnali-M Karnali_132	132 kV	38.7	24.0470577	13.73581	71.82391	16.8482	122.6589477	$0.00688	$0.00691	$0.00735	$0.00653

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
U Madi HP-Lekhnath_132	132 kV	9.3	5.7787503	15.71116	22.61077	19.14568	121.8603846	$0.00693	$0.00694	$0.00737	$0.00655
U Madi-Lekhnath_132	132 kV	23.1	14.3536701	50.50909	819.1439	155.90524	308.6676873	$0.00274	$0.00275	$0.00292	$0.00260
U Marsyangdi A-Khudi1_132	132 kV	1.73	1.07497183	30.39444	15.79578	38.29442	125.99153	$0.00670	$0.00670	$0.00712	$0.00633
U Marsyangdi1-Khudi1_132	132 kV	5.46	3.39268566	43.79737	206.8313	105.6818	241.2971372	$0.00350	$0.00351	$0.00373	$0.00331
U Mewa Kh A-Mewa_132	132 kV	7.04	4.37445184	18.56236	23.84243	21.61164	116.4272215	$0.00725	$0.00726	$0.00771	$0.00686
U Modi-N Modi_132	132 kV	8.8	5.4680648	27.39173	64.96826	32.16474	117.4250038	$0.00719	$0.00721	$0.00766	$0.00680
U Myagdi-Dandakhet_132	132 kV	15	9.320565	12.4178	22.75938	15.31654	123.3434264	$0.00685	$0.00686	$0.00728	$0.00647
U Myagdi1-Dandakhet_132	132 kV	8	4.970968	16.61109	43.57799	40.97175	246.6529891	$0.00342	$0.00343	$0.00364	$0.00324
U Nar Khola-Manang_132	132 kV	16.23	10.08485133	19.8011	62.65452	24.33033	122.8736282	$0.00687	$0.00689	$0.00732	$0.00651
U Nyasim-U Balephi_132	132 kV	4.5	2.7961695	26.10748	30.31185	32.93058	126.1346557	$0.00669	$0.00670	$0.00712	$0.00633
U Seti 1 - Banskot_132	132 kV	6.7	4.1631857	13.27752	11.53064	13.01906	98.05340154	$0.00861	$0.00862	$0.00916	$0.00814
U Seti-Banskot_132	132 kV	16.21	10.072423 91	14.69604	33.765	15.31654	104.2222259	$0.00810	$0.00812	$0.00863	$0.00767
U Simbuwa Kh-Tamor_132	132 kV	10.14	6.30070194	27.76785	77.26133	35.22805	126.866322	$0.00666	$0.00667	$0.00709	$0.00630
U Tamor A-Tamor_220	220 kV	19.66	12.21615386	10.24866	91.21093	55.13955	538.0171652	$0.00414	$0.00415	$0.00441	$0.00392

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
U Tamor Hep-Tamor_132	132 kV	6.8	4.2253228	19.64409	25.93009	24.88938	126.7016187	$0.00666	$0.00667	$0.00709	$0.00630
U Tamor-Hangpang_220	220 kV	19.4	12.0545974	21.15351	474.2654	218.2607	1031.794251	$0.00216	$0.00217	$0.00230	$0.00205
U Trishuli2-Chilime_220	220 kV	3.7	2.2990727	15.45814	78.54405	165.4187	1070.1074	$0.00208	$0.00208	$0.00221	$0.00197
Udipur-Marsyangdi_220	220 kV	30.8	19.1382268	32.70192	3615.442	918.0258	2807.253519	$0.00079	$0.00080	$0.00085	$0.00075
Upper Brahmayeni-U Balephi_132	132 kV	12.2	7.5807262	12.18249	17.85627	15.37015	126.1659152	$0.00669	$0.00670	$0.00712	$0.00633
Upper Chaku-Bhotekoshi_132	132 kV	4.5	2.7961695	13.50007	8.099722	17.00136	125.935347	$0.00670	$0.00671	$0.00713	$0.00634
Upper Chameliya-Balanch_132	132 kV	14.6	9.0720166	24.20519	84.49374	30.63308	126.5558337	$0.00667	$0.00669	$0.00711	$0.00632
Upper Khudi-Khudi1_132	132 kV	5	3.106855	16.58042	13.5327	19.9115	120.090444	$0.00703	$0.00704	$0.00748	$0.00664
Upper Mugu Karnali-Mugu Karnali_400	400 kV	22.9	14.2293959	8.935734	107.3131	234.3431	2622.538898	$0.00123	$0.00123	$0.00131	$0.00116
Upper Rahughat-Rahughat_132	132 kV	7.7	4.7845567	30.44236	70.4153	37.14261	122.0096274	$0.00692	$0.00693	$0.00737	$0.00655
Uttar Ganga-Bafikot_400	400 kV	30.8	19.1382268	17.6008	558.5514	459.4963	2610.655766	$0.00123	$0.00124	$0.00131	$0.00117
West Seti-Pancheswor_400	400 kV	55.8	34.6725018	15.03342	713.6671	766.677	5099.817606	$0.00063	$0.00063	$0.00067	$0.00060

Line Name	Voltage Level	Length (km)	Length (Miles)	Loading (%)	Losses (kW)	Power flow (MW)	Line Capacity (MW)	Wheeling Charge (Cents/kWh/mile)		At ref pf=0.85	
								Without transmission loss	With transmission loss	Wheeling Charge with pf 0.8 (Cents/kWh/mile)	Wheeling Charge with pf 0.9 (Cents/kWh/mile)
West Seti-Phukot_400	400 kV	86.8	53.9350028	8.922701	381.669	449.5104	5037.828792	$0.00064	$0.00064	$0.00068	$0.00060
West Seti-Dododhara_400	400 kV	65	40.389115	40.59633	6080.7	2040.778	5027.001209	$0.00064	$0.00064	$0.00068	$0.00061

Publications

Paper entitled “Evaluation of Wheeling Charge in Context of Nepalese Power Market” has been accepted for the Journal of Advanced College of Engineering and Management (JACEM) for Vol 9, 2024.

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14	"Regulation of the Power Sector", Springer Science and Business Media LLC, 2013 Crossref	22 words — < 1%
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