CORPORATE PLAN

Rastriya Prasaran Grid Company Limited

January 2019

CONTENTS

LIST OF TABLES

LIST OF FIGURES

FOREWORD

As part of its efforts to reform the power sector the Government of Nepal established the Rastriya Prasaran Grid Co Ltd (RPGCL) on 28 Asad 2072 (17 June 2015) for developing, expanding and operating the country's transmission system. This was guided by its plan to unbundle the Nepal Electricity Authority (NEA)., The RPGCL has the mandate to function as an independent transmission system operator (TSO) that owns the transmission assets and provides open access services to all stakeholders. Its main stakeholders are the eight ministries of the GoN and NEA. The company has an authorized capital is NRs. 25 billion and paid up capital is NRs 10 billion. The Secretary of the Ministry of Energy, Water Resources and Irrigation chairs the company that has its corporate office at Buddhanagar, Kathmandu.

The company will function as grid owner and system operator. It owns the high voltage backbone transmission system and is responsible for maintaining adequate grid capacity in accordance with the provisions of the Grid Code that is in the process of finalization. As a system operator, RPGCL is responsible for generation dispatch, the provision of ancillary services, and operation and control to ensure safety, power quality, stability, reliability and security of grid

GoN has realized the economic growth of the country can be accelerated with the optimal development and use of the country's hydropower resources. Its hydropower development policy in a white paper envisages the development of 5 GW, 10 GW and 40 GW of hydropower in five, 10, and 20 years, respectively.

This Corporate Plan of RPGCL is anchored in its vision and mission and will provide it the strategic direction for five years. The company's strategic plan and are guided by its mission and the long-term strategic themes encompassing all business areas. This plan contains a situational analysis of the company and discusses its five-year strategic objectives under seven thematic areas.

- Theme 1: Transmission Infrastructure Development
- Theme 2: Transmission System Asset Acquisition
- Theme 3: System Operation Plan
- Theme 4: Technology Transfer and Internalization
- Theme 5: Human Resource Management
- Theme 6: Stakeholder Coordination Plan, and

- Theme 7: Financing the Transmission System.

The corporate plan also presents the revenue scheme of the infrastructure investments and portrays pathways for implementing the strategic plan against key performance indicators (KPIs). The corporate KPIs have been assigned to the performance contracts of senior executive that culminate in high priority KPIs to which the management is accountable. All the KPIs in the corporate performance contracts cascade to the relevant divisional and functional leaders and on to staff responsible for specialized contributions.

1. INTRODUCTION

1.1BACKGROUND

The Government of Nepal (GoN) aims to accelerate economic growth of the country through optimal development and use of the hydropower resources. Its hydropower development policy articulated in its white paper has envisaged attaining an annual economic growth of 7.2% by developing 5 GW, 10 GW and 40 GW of hydropower in five, 10, and 20 years, respectively. The optimal evacuation of power for domestic consumption and export requires secure and reliable transmission networks and therefore the need to develop both hydropower and transmission network as high priorities. The GoN has made significant policy reforms to support its growth objectives and the RPGCL represents its initiative to unbundle Nepal Electricity Authority (NEA) into autonomous entities such as a generation company, a transmission company, and a power trade company.

GoN established the Rastriya Prasaran Grid Co Ltd (RPGCL) (National Transmission Grid Co. Ltd.) on 28 Asad 2072 (17 June 2015). It is registered under the Companies Act (2063) and aims to develop, expand and operate transmission national system. The company has mandate to function as an independent transmission system operator (TSO) that owns the transmission assets and provides open access transmission services to all stakeholders. Its main shareholders are eight ministries of GoN and the NEA. The company's authorized capital is NRs. 25 billion and paid up capital NRs 10 billion. The company's corporate office is located at Buddhanagar, Kathmandu. The Secretary of the Ministry of Energy, Water Resources and Irrigation chairs the RPGCL.

Shareholders of RPGCL

- Finance and Planning: 11.0%
- Energy, Water Resources and Irrigation: 24.1%
- Defense: 2.8%
- Home: 2.8%
- Forest and Environment: 2.8%
- Education, Science and Technology: 2.8%
- Land Reform and Management: 2.8%
- Communication and Information Technology: 2.8%
- Nepal Electricity Authority: 48.3%

1.2NATIONAL TRANSMISSION GRID COMPANY

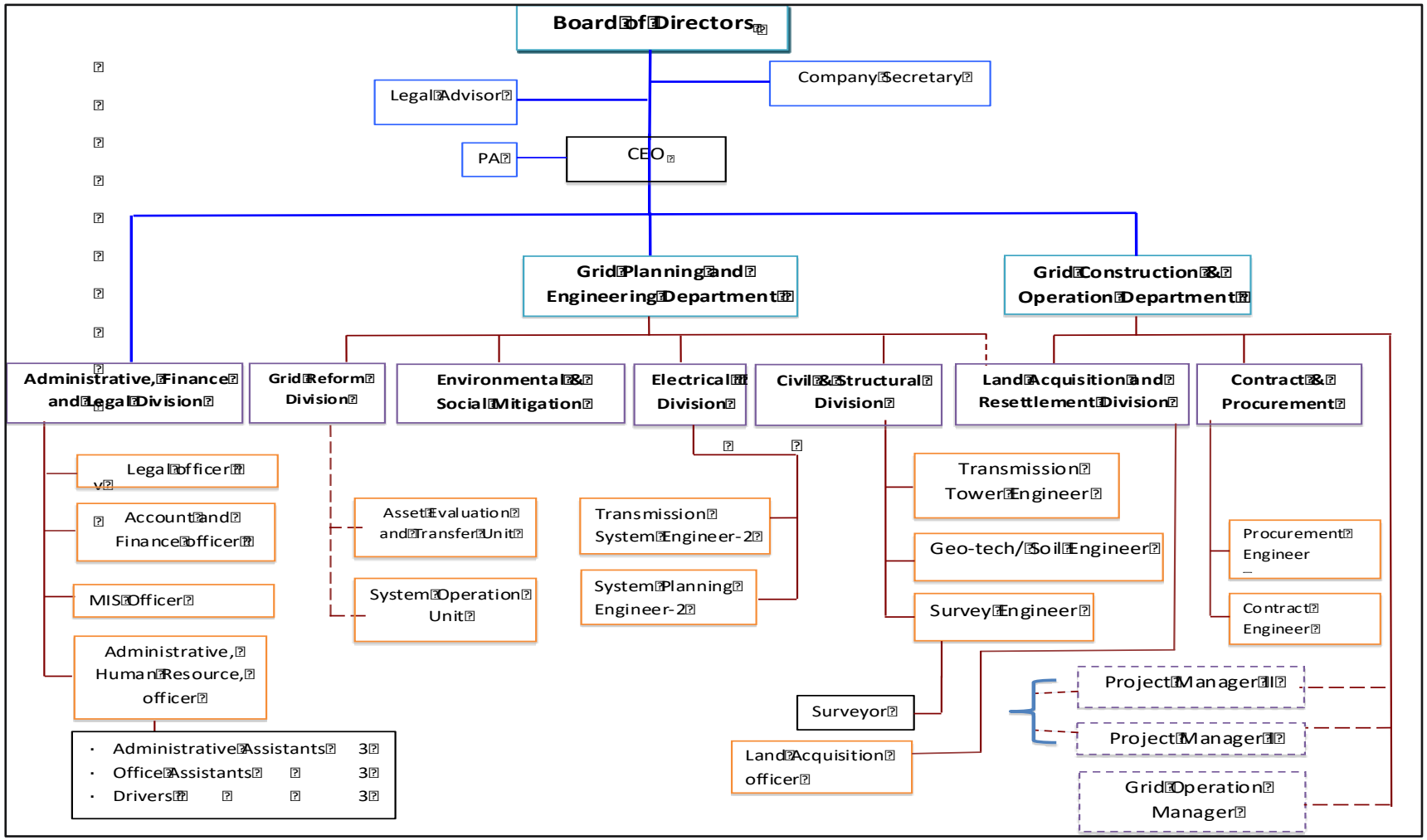
The cabinet decision forming the company has envisioned RPGCL as the national transmission company that will function as an autonomous TSO. It will function as,

Grid Owner: Owner of the high voltage backbone transmission systems and is responsible for maintaining adequate grid capacity in accordance with the provision of the Grid Code (to be formulated), and

System Operator: Entity responsible for generation dispatch, ancillary services, and operation and control to ensure safety, power quality, stability, reliability and security of grid (to be specified by the Grid Code).

1.3ORGANIZATION STRUCTURE

The Board of Directors of RPGCL functions in accordance with the following organizational structure.



1.4MISSION, VISION, CORE VALUES

Mission

RPGCL has the following mission, vision and core values:

Empowering economic development of the country by providing reliable transmission services through the development of robust and efficient power grid.

Vision

To be world class transmission company ensuring adequate power network with economic transmission access in the country.

Core values

The ideals by which the company strives to carry out its operations and conduct its business are embodied in statements in the chart below.

2. SITUATIONAL ANALYSIS

2.1PREVAILING DEVELOPMENT SITUATION

2.1.1 SITUATION OF COMPANY

The company was established under company act but it is not fully autonomous. In many cases, it has to rely on GON directives and as result its routine administration is often hampered by procedural delays. The company has had difficulties in doing away with nonfunctional procedures, directives and practices in procurement, contract management, hiring and remunerating human resources. High-level interventions are therefore necessary to prevent the company from become another department under the government.

2.1.2 POLITICAL STABILITY

Following elections of three levels of government and the end of the protracted political transition, Nepal has a stable and powerful government, capable to take quick decisions and introduce supportive laws /guidelines for a development-friendly environment. A strong government can also operational procedures and make them both efficient and functional. The areas that could be aided by such initiatives are contract management, public procurement, human resource management, investment policies, etc.

2.1.3 INVESTMENT AND FINANCIAL RESOURCES

A transmission system is capital-intensive, with high sunk costs and low rate of return. These are reasons why it does not attract private investors. The budget made available by the government and support provided by development partners is not adequate for building the required transmission system. There also are policy impediments that have hindered foreign investment for transmission projects.

2.1.4 CONSTRUCTION MANAGEMENT

The Public Procurement Act, 2063 (2007) guides contract management in Nepal. The law aims to introduce transparency and economy in the contractual process. However, the law does not always match the requirement of technology, equipment and technical advice of a developing country and has resulted in delays in contract execution.

2.1.5 LAND ACQUISITION AND ENVIRONMENTAL ISSUES

Land acquisition for building a transmission system and its right of way is a critical undertaking in Nepal. Lack of a clear land management policy has created difficulties in classification of private land, such as agricultural land (*khet-bari*), grazing land (*khoriya*) or building plots (*gharedi*). Further, the land valuation system is dated and largely unacceptable to local people and convincing them scientific and fair approaches in valuation remains a challenge. As a result, projects have had to pay amounts that are several-times the actual value during acquisition. The process of acquiring forest areas for development infrastructure is also time consuming, and has to comply to strict environmental safeguards that can delay project development.

2.1.6 MARKET OUTLOOK

The market outlook for an established transmission company is a natural monopoly for a product in high demand. But to reach the marketing stage the company has to obtain approval for identified transmission routes and also obtain rights to the necessary land, and address environmental concerns while also keeping into consideration the energy generation and demand in both the short and long run. The company would also need to determine an equitable approach for cost recovery for infrastructure. Another challenge is the uncertainty resulting from federalization and associated regulations that could impact the positioning of the company as a national TSO. The development of energy markets in Nepal would require preparation for preparation for overcoming challenges that remain to be resolved as there are both opportunities as well as impediments that could accelerate or impede company growth given the business environment and the regulatory provisions.

2.2SWOT ANALYSIS

The SWOT analysis below identifies the internal (strengths and challenges) and external factors (opportunities and threats) that are most relevant to the achievement of the company's goals, and is indicative about whether or not the goals are attainable. The analysis has provided the basis for understanding and capitalizing on the strengths and opportunities, and mitigating challenges and threats during strategy formulation.

Table 2-1 SWOT Analysis

SWOT	Details
Strength	• Government support (Company has equity and support from the Government of Nepal) • Ancillary support (stakeholders provide necessary support to the primary activities and operation of the company) • Financial capability (Authorized capital of NRs. 25 billion) • Strategic partnerships with GoN entities (Leverage strategic partnerships with shareholders and sponsored projects)
Weakness	• Inadequate transmission capacity (The transmission infrastructure is still being planned and the company has no revenue from operations) • Relatively new entity in the transmission grid market (RPGCL is yet to establish itself as a full-fledged TSO) • Human capital and training for personnel (Inadequate and untrained human capital) • Employee retention (Difficulty in retaining employees because of undetermined incentives) • Lack of coordination with stakeholders (Difficult to coordinate/communicate information to stakeholders because of lack of plan and systems)
Opportunities	• Regulatory reforms through Regulatory Commission (uniformity in grid and distribution code and operation and maintenance guidelines for transmission companies and distribution utilities and fixing of wheeling charge of transmission lines) • 7000 kilometers of the transmission line network (Potential transmission line network to be developed) • First transmission operator in the country (Company has been established as the first TSO) • Relations with bilateral/multilateral agencies (The company can collaborate with development partners)
Threats	• Procedural difficulties in obtaining forest ministry permits and land acquisition (Lengthy procedures) • Regulatory risks & inconsistencies (Lack of clear regulatory policies) • Private sector transmission licensees (Competition from private transmission licensees)

3. STRATEGIC PLAN

The RPGCL's strategic plan is aligned to mission, vision and overall thematic goals and will be supported by the short-, medium- and the long-term plans that are consistent and supportive of the power development plan of the GoN.

A visual representation of the overall Corporate Plan is provided in Figure 3.1. At a high level, the company's mission and long-term strategic themes that encompass all business areas guide the company, while the values would underpin the activities.

The RPGCL has prepared and launched the Transmission System Master Plan up to the year 2040, which includes the network required for serving hydropower plants that could generate 43 GW of power. The master plan has also recognized the power network that needs to be built in five years, 10, 15 and 20 years for fully developing the network that is the basis for its medium- and long-term corporate strategies.

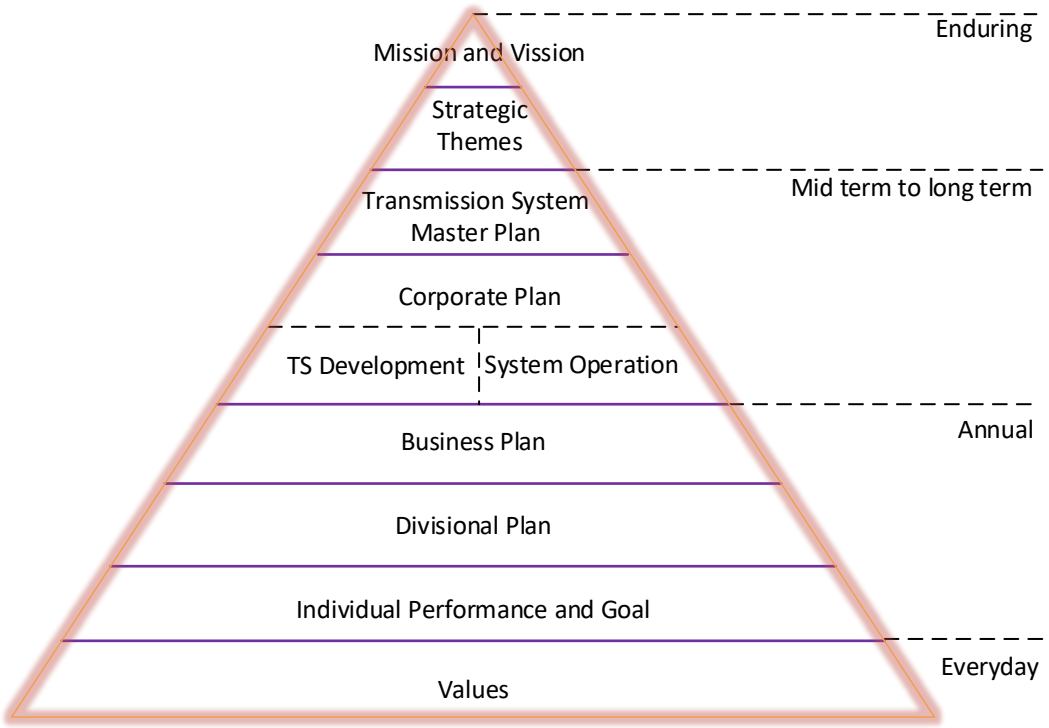


Fig. 3.1 Activities of RPGCL

The activities depicted in Figure 3.1 are expected to guide long-term transmission system development and system operation strategies. These planning processes will be revisited on an annual basis to set priorities, confirm targets and budgets. As a state-

owned enterprise, RPGCL will prepare a Statement of Corporate Intent each year to inform the public of planned activities.

3.1 STRATEGIC OBJECTIVES

The seven themes center on the desired state of the company as expressed in the following strategic objectives:

1. Construct adequate transmission network to cater the power demand as anticipated by the government plans;
2. Acquire transmission asset from NEA, as guided by government directives;
3. Provide reliable and efficient transmission services to customers;
4. Promote technology transfer and internalization;
5. Practice good corporate governance for enhanced efficiency and service through internal capacity enhancement and resource alignment;
6. Finance the construction of transmission system;
7. Collect reasonable return to operate, maintain and expand the transmission network; and
8. Ensure appropriate and systematic liaison with all relevant stakeholders.

3.2 THEME 1: TRANSMISSION INFRASTRUCTURE DEVELOPMENT

Per capita energy consumption is one indicator of economic development. Energy supply would have to increase as stated in the white paper for attaining the economic development targets of the government (above 7% growth). The white paper of the Ministry of Energy, Water Resources and Irrigation (MoEWI) outlines a plan to produce 5 GW of hydropower in five years and 10 GW by next 10 years to cater the projected load demand. This will result in building plants to generate 18 GW by year 2035, and 29 GW by year 2040 for meeting domestic demand. Considering the volume of electricity to be exported, Nepal needs to build power plants generating over 40 GW. This power can be generated by hydropower projects built in the following river basins (Table 4.1).

Table 3-1 Technical and economical hydropower potential of Nepal

Major River Basins	Theoretical Potential in MW			Technical Potential		Economical Potential	
	Major river courses having catchments areas above 1000 km²	Small river courses having catchments areas 300-1000 km²	Total	Number of Project Sites	Technical Potential in MW	Number of Project Sites	Economical Potential in MW
Sapta Koshi	18750	3600	22350	53	11400	40	10860
Sapta Gandaki	17950	2700	20650	18	6660	12	5270
Karnali and Mahakali	32680	3500	36180	34	26570	9	25125
Southern River	3070	1040	4110	9	980	5	878
Country Total	**72450**	**10840**	**83290**	**114**	**45610**	**66**	**42133**

A reliable transmission network is required to evacuate power from the river basins and take it to different load centers. RPGCL has developed Transmission System Master Plan, aligned with the national power development policy to facilitate this transfer. This would mean building 292 km of transmission lines and nine substations in five years (2025), 1800 km and 30 substations in 10 years (2030), and 7000 km transmission lines and 102 substations by the year 2040.

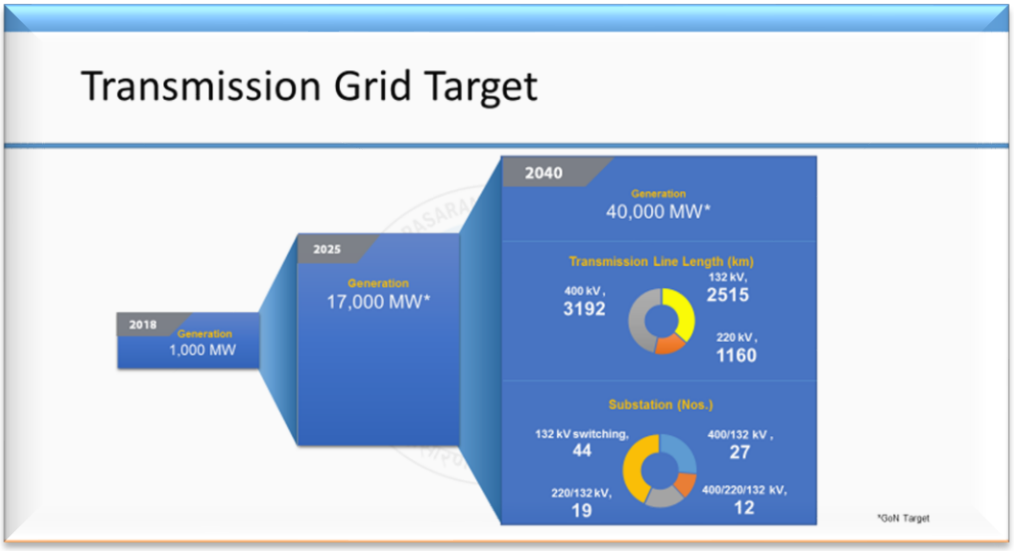


Fig. 3.2 Transmission Development Plan

Infrastructure development in the planning period is aimed at addressing three major strategic objectives:

- Update the Master Plan document and prioritize the network for plan period;
- Carry out detailed engineering designs and environmental studies for the transmission lines;
- Acquire land and right of way (RoW) clearance for substations and transmission lines;
- Arrange the fund and build and commission the transmission lines.

Table 3-2 Strategic infrastructure development objectives and performance indicators

Strategic Objectives	Strategic Initiatives	Key performance Indicators (target 2023)
Update the TSMP, prioritize the network for the plan period	• Update generation expansion plan, transmission hub substations and load centers • Conduct Grid Impact Studies (load flow, short circuit analysis, stability study and contingency analysis) • Identify the network	• Get GIS report • Network identifications a. Butwal-Attariya 400 kV line (..km, ..substations) b. Arun Corridor (30 km, 1 substations) c. Karnali Corridor (130 km, 3 substations) d. Seti Corridor (110 km, 2 substations) e. Bheri Corridor (115 km, 2 substations)
Perform the detailed engineering design and environmental studies for the transmission lines	• Standardization of route survey; transmission line design, tower & foundation design, and substation design; for various wind zones, terrain and geological conditions; based on latest technological innovations. • Conduct detailed engineering and environment studies for proposed transmission line and substations.	• Prepare standardized document for transmission line, towers, substation designs; and obtain approval from relevant authorities; • Prepare DPR and IEE/EIA reports
Acquire land and right of clearance for transmission lines and substations	• Acquire land for the substations and initiate activities to clear the transmission right of way.	• Land acquisition of substations • Land acquisition, forest clearance, and re-habilitation plan executed
Built the transmission system (292 km, 9 substations)	• Acquire land for tower footing, RoW clearance; • Undertake re-habilitation and compensation activities; • Manage fund under regular and alternative bidding procedures; • Perform effective contract management; • Prepare construction quality standards; • Conduct effective project executive plan; • Ensure effective transport and logistics for network development; • Provide adequate safety measures for the personnel	• Contactor awarded; • Design document finalized and material/equipment specified; • Material and equipment lab testing completed; • Material procured and transported • Tower erection and line stringing completed • Substation access road and civil work completed • Substation installed

3.3 THEME 2: TRANSMISSION SYSTEM ASSET ACQUISITION

In order to function as a TSO, RPGCL would need to evolve as the national transmission company that owns and operates high voltage transmission system assets. For differentiating the scopes of Generation Company, Transmission Company and Distribution Company the following terminologies will be used.

- Hub substations: Substation used for evacuation of power from different power generation plants
- Grid substation: substation inter connecting other substations through high voltage lines
- Load substation or load centers: substation for transferring the bulk load to load centers or distribution companies

Transmission Lines:

- Khimti - Dhalkebar: 75 km
- Hetauda – Bharatpur: 75 km
- Chilime-Trishuli: 27 km
- Inaruwa-Basantpur: 74 km
- Inaruwa-Baneshwor-Tumlingtar: 31 km
- Basantpar-Hangpang: 33 km
- Lekhnath-Damauli: 39 km
- Marsyandi Corridor: 110 km
- Marsyangdi-KTM : 78 km
- Dana-Kusma-New Butwal: 130 km

Substations:

- Trisuli 3B: (220/132/33 kV) GIS
- Basantpur: (220/132 kV) GIS
- Basantpaur: (132/33 kV) AIS
- Baneshwor: (220/33 KV) AIS
- Tumlingtar: (220/132 kV) GIS
- Tumlingtar: (132/33 kV) AIS
- Hangpang: (132/33 kV) AIS
- Damuali: (220/132/33 kV) GIS

Box 1: 220 kV Transmission Asset of NEA

The substation and transmission or sub-transmission line before the Hub substation will be under the scope of the Generation Company while the transmission line or sub-transmission and substations beyond grid substations will be under the scope of the Distribution Company. The transmission grid will include all high voltage lines with 220 kV and above. This includes all hub and grid substations; network connecting hub to grid substations and grid-to-grid substations. For the 132 kV network, the grid will only include hub substations and incoming network connected to the grid- substations. Under this framework, most of the NEA's 132 kV network will not be the part the national transmission company and this will simplify the unbundling process as the existing 132 kV grid will remain under the NEA. The assets of the 220 kV and above transmission network, now under construction can be valued with relatively more ease than the 132 kV network. Under this

Transmission Lines:

- Hetauda-Dhalkebar-Duhabi: 285 km
- Tamakoshi –Kathmandu: 95 km

Substations:

- Dhalkewar (400/220 kV) GIS
- Dhalkewar (220/132kV) AIS
- Inaruwa (400/220 kV) GIS
- Inaruwa (220/132 kV) AIS
- Inaruwa (220/33 kV) AIS
- Hetauda (400/220kV) GIS)

Box 2: 400 kV Transmission Asset of NEA

scenario, NEA can transfer assets of the high voltage network to the RPGCL and facilitate its growth as a national transmission company, with the assets transferred recorded as NEA's share in the company. Box 1 and 2 show the list of the transmission assets under NEA that are under construction. The strategic objectives, strategic initiatives and the KPIs for this theme are discussed in Table 4-3.

Table 3-3 Strategic transmission system asset acquisition objectives and performance indicators

Strategic Objectives	Strategic Initiatives	Key performance Indicators (target 2023)
Transfer the high voltage asset (220 kV and above) to RPGCL	• Identify the relevant network that falls under the transmission grid • Undertake asset valuation • Prepare the asset transfer plan • Prepare plan for accommodating human resources involved with the network	• Transmission network identified • Asset transfer plan prepared • Asset transfer initiated

3.4 THEME 3: SYSTEM OPERATION PLAN

A substantial transmission infrastructure will come under RPGCL following asset transfer from NEA. The layout of the transmission grid is shown in Fig. 3.3 below.

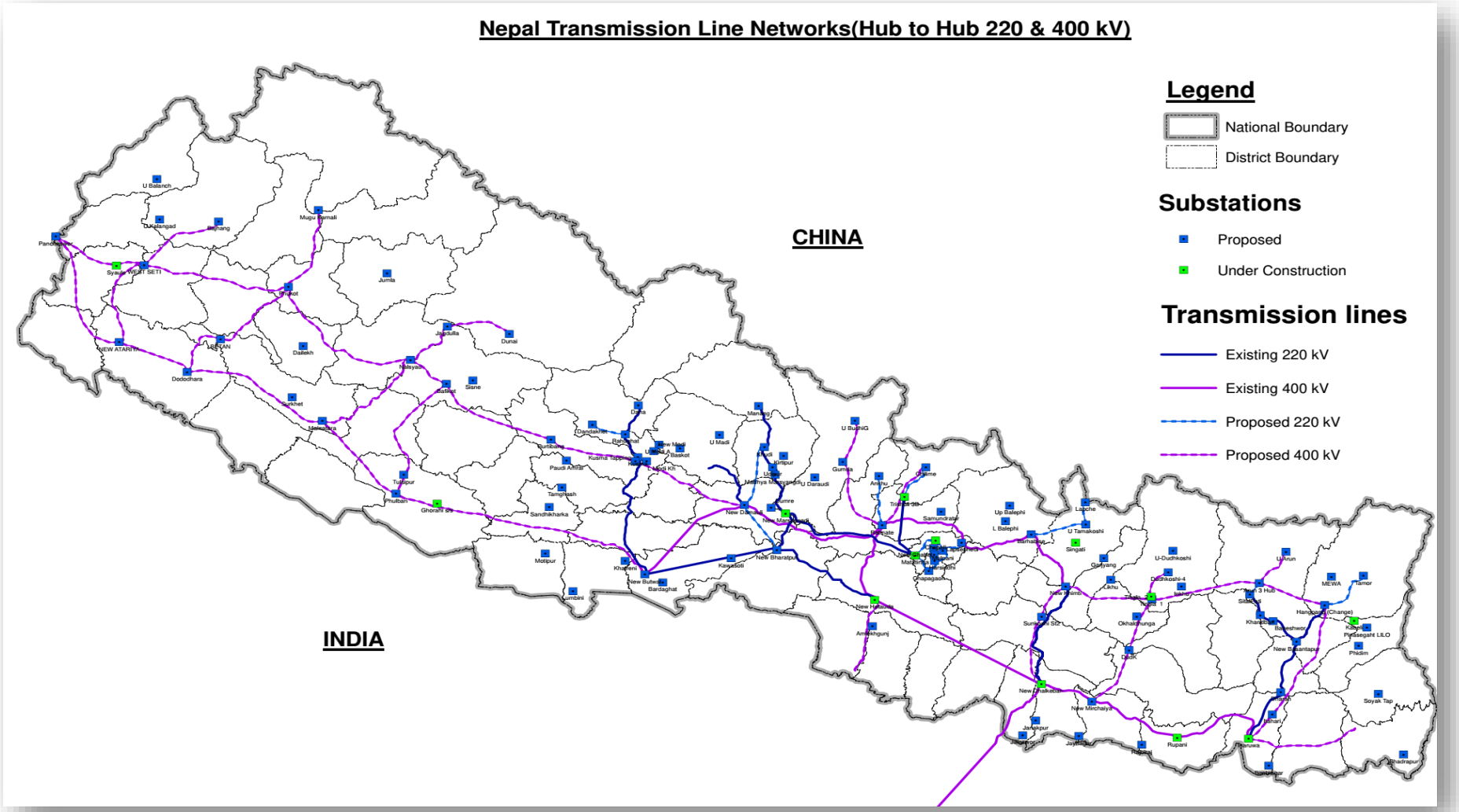


Fig. 3.3 Layout of Transmission Grid of Nepal

Eight generic tasks have to be performed to provide reliable transmission services. The major task of the system operator is to operate transmission facilities to keep the generation and use of electrical energy in balance at all times. It needs to ensure stability of the interconnected system so that bulk power can be transported from those who produce it to distribution networks. The operator needs to provide open access to the transmission system, monitor and controls system operations to ensure energy balance at all times, manage congestion, schedule generation, acquire ancillary services such as operating reserves and voltage support, and plan or approve requests for maintenance of transmission and generation facilities. A separate load dispatch center equipped with state of art communication and automation technologies connecting all generation units and bulk load centers would be required to perform these functions. The strategic objectives for this theme are discussed below.

Table 3-4 Strategic system operation plan objectives and performance indicators

Strategic Objectives	Strategic Initiatives	Key performance Indicators (target 2023)
Establish infrastructure for the Central Load Dispatch Center	• Identify the location • Identify communication and automation infrastructure for data transfer protocol • Prepare standard contract document for constructing load dispatch center • Prepare construction plan	• Location identified • Communication infrastructure for monitoring, control and automation of data transfer is documented. • Construction plan prepared
Function as an TSO	To be implemented within the next five year corporate plan cycle	

4.1THEME 4: TECHNOLOGY TRANSFER AND INTERNALIZATION

The transmission system development, operation and maintenance is possible by internalizing technology. That can be achieved by establishing manufacturing companies for equipment related to the transmission system and technology transferred to and internalized by human resources.

The transmission system involves various types of equipment and devices. Broadly, the requirements include material for tower construction, conductor, insulating material for conductor stringing, transformer, and switching gear material, etc. Manufacturing the equipment in the country can ensure cost effectiveness and timely availability for

construction and maintenance. A manufacturing facility in the country can facilitate technology transfer and internalization. The strategic objectives and KPIs for this theme are discussed below.

Table 3-5 Strategic technology transfer and internalization objectives and KPIs

Strategic Objectives	Strategic Initiatives	Key performance Indicators (target 2023)
Facilitate establishment of equipment manufacturing company	• Negotiate with international companies to introduce manufacturing units • Identify the facilitating approach • Identify the scope of JV to establish the industries	Manufacturing schemes identified, prioritized and initiated for: • Tower • Conductor • Insulating material • Switch gears

3.5 THEME 5: HUMAN RESOURCE MANAGEMENT

Development and operation of transmission system requires highly specialized experts with knowledge of state-of-art technology. The staff of the company also needs to be motivated to work in remote areas, including high-risk situations. The Company would be required to increase its human resource pool and strengthen staff capacities. The company is therefore committed to attract, recruit and retain skilled human resources with attractive remuneration packages. Towards this end, the company will strive to achieve the following strategic objectives.

- Recruit and retain highly skilled human resources;
- Talent management.

The strategic objectives and KPIs for this theme are discussed in Table 4-6.

Table 3-6 Human Resource Management Strategic Objectives and Performance Indicator

Strategic Objectives	Strategic Initiatives	Key performance Indicators (target 2023)
Recruit and retain high skilled human resources to execute the strategic themes in the corporate plan	• Introduce relevant salary structure and benefits for employees • Implement performance-based incentives and remuneration schemes • Provide suitable work environment and facilities	• Determination of and approval of salary structure from the BoD/MoEN/MoF • Determination of performance-based incentives for employees and approval from the BoD/MoEN/MoF • Maintenance, refurnishing of existing facilities • Asset management • Expansion and refurbishment of existing facilities • Securing existing facilities • Replacement, rationalization and disposal of obsolete furniture and equipment
Talent management	• Identification of critical roles and critical talent • Developing a comprehensive human resource plan • Implementing needs-based training programmes • Develop leadership skills • Improve employee productivity	• Organization Management Plan prepared • Training Need Assessment Plan (*) prepared • 100 % of employees trained as per the needs assessment report • Competence mapping report prepared

Staff Projections by 2023

Number and growth of the Company staff will be determined by number of projects and the work delivery required to attain the desired outputs. As a new company, the growth rate for the coming five years will be high - about three times over the present state. Table 3.7 below depicts the number staff that would be required to execute the proposed activities. Short term hiring and consulting inputs are not included.

Table 3-7 Projected Staffs for five years

SN	Position	Level	Number	Remarks
1	CEO	12	1	Regular
2	Director	11	2	Regular
3	Manager	10	2	Regular
4	Manager/Deputy Manager	9,10	4	Regular
5	Deputy Manager	9	2	Regular
6	Senior Engineer/Officer	8	18	Regular
7	Engineer/Officer	7	18	Regular
8	Assistant Staff	4,5,6	5	Regular
9	Driver		5	Regular
10	Office Assistant		3	Regular
11	Experts		7	Non Regular
	Total		**67**	

Further, a significant number of the human resources will be added as part of asset acquisition from NEA.

3.6 THEME 6: STAKEHOLDERS COORDINATION PLAN

The RPGCL is a public entity backed by following entities

- Ministry of Energy, Water Resources and Irrigation
- Ministry of Finance
- Ministry of Defense
- Ministry of Home Affairs
- Ministry of Forest and Environment
- Ministry of Education Science and Technology
- Ministry of Land Management, Cooperatives and Poverty Alleviation
- Ministry of Communication and Information Technology, and
- Nepal Electricity Authority

The investments by these shareholders would ensure full participation of stakeholders for resolving major problems like land acquisition, Right of Way and forest clearances. As per the Article of Association of the Company, the investments in RPGCL are of strategic importance to the GoN. Because grid infrastructure is sensitive it cannot be separated from the state but also requires autonomy for institutional development. The Article of Association also suggests that electricity transmission systems/assets of NEA will gradually be transferred to RPGCL. Besides, the RPGCL also needs to regularly coordinate with the local governments, administrative offices and power producers

where the transmission project sites are located because their support is vital for the company's success. Table 4-9 discusses the strategic objectives, initiatives and the KPIs this theme.

Table 3-8 Strategic stakeholders coordination plan objectives and performance indicators

Strategic Objectives	Strategic Initiatives	Key performance Indicators (target 2023)
Ensure appropriate and systematic consultation with all relevant stakeholders to obtain optimum results	• MoF for regular budget • MoFE for EIA and forest clearance • MoH and MoLR to acquire the land • NEA to share the technology and for design documents	• Annual budget planning and requests made • EIA prepared and forest clearances done • Land acquisition done, Appropriate compensations paid • Acquisition of technology and related design documents

3.7 THEME 7: FINANCING THE TRANSMISSION SYSTEM

As part of the transmission system development plan, RPGCL has prepared a Transmission System Master Plan that provides a system development roadmap in line with the short-, medium- and long-term objectives. Theme 1 has summarized the tasks to be carried out, as part of the strategic objectives for the next five years and that would require high investment. Table 3-9 summarizes the capital need for the next five year (2023) and 22 years (2040).

Table 3-9 Summary of capital need for up to 2012 and 2040

Items	Cost (year 2023), million USD	Cost (2040), million USD
Transmission Line	382.0	3,767.9
Substations	416.7	2,269.8
Total	798.7	6,037.7

The company is largely reliant on the shareholders' equity and therefore requires capital injections to build and operate projects. It will not have a revenue stream before projects are completed and debts can be serviced only after operation of the grid. This means that RPGCL will have to take on significant risks during the construction phase while determining the anticipated revenue from completed projects.

The RPGCL has been seeking funds from external sources for capital investments that it anticipates to be in the form of grants and loans from the GoN, development partners and alternative financing mechanisms. It is also important for the company to plan and foresee the servicing of the principal amortization and interest charges from its earnings. All capital investment projects will therefore be pre-assessed in terms of their impact on the RPGCL's overall profitability, in terms of cash-inflows and outflows. As of now, investment on the transmission system is through support, both grants and soft loans, from the development partners (ADB, World Bank, EXIM Banks, etc). The company will seek alternative financing through Build and Transfer (BT) and Engineering Procurement Construction and Finance (EPC&F) contract model, after the government provides the required policy leverages.

Wheeling charges will be the only way to obtain revenue from investment. Since CAPEX has to be recovered from only wheeling charges, it should be designed accordingly. The wheeling charge is to be set by the Nepal Electricity Regulation Commission (NERC) and the company will suggest scientific wheeling charges to support cost recovery and seek funding from government for bridging any gaps that may remain. The strategic objectives, initiatives and the KPIs for this theme are discussed below.

Table 3-10 Financing the Transmission System Strategic Objectives and Performance Indicator

Strategic Objectives	Strategic Initiatives	Key performance Indicators (target 2023)
Financing the transmission project	• Negotiate with the development partners for loan or grant • Lobby with government agencies to get policy leverage on BT and EPCF bidding • Negotiate with national/international contactors to participate of the BT and EPCF bidding • Borrow from banks and financial institutions with or without collateral. • Make insurance for securing infrastructures • Make capital investments in commercially and technically feasible transmission project proposals based on in-depth analysis. • Borrow and receive grants in foreign currency from individuals and institutions, including non-resident Nepalese, and international financial	• Negotiations with development partners done • Preparation of BT and EPCF documents for TL Projects (including working procedure recommendation) • Negotiations with national/international contactors done • Negotiations with banks and financial institutions done. • Insurance for security of the infrastructures done • Capital investments in commercially and technically feasible projects identified in Theme 1

Strategic Objectives	Strategic Initiatives	Key performance Indicators (target 2023)
	institutions like export-import banks, and foreign institutions. • Invest jointly with local or foreign institutions as promoter of transmission projects. • Manage loan portfolio and lend the amount received from GoN or from other local and foreign institutions to promote transmission line projects. • Determine of other royalties fixed by the regulator.	• Relations established with institution, including non-resident Nepalese, international financial institutions like export-import banks, and foreign institutions. • Endorsement of other royalties fixed by the regulator.
Revenue collection	• Identify, formulate and suggest appropriate wheeling charge to recover the capital investment on transmission system	Wheeling scheme for transmission grid is formulated and proposal is forwarded to NERC: • Postage stamp (Main Grid): X1 • MW-km method for radial line: X2 • Penalty (reward) for the loss increase (reduction):X3

3.7.1 FUNDING REQUIREMENTS TO IMPLEMENT THE STRATEGIC PLAN

Transmission projects are capital intensive and will therefore require intensive financing more so now because a majority of the projects planned for implementation are geared towards expanding and refurbishing the grid network. It is estimated that a total of NRs. 81 billion will be required over the next five years for financing the strategic plan as shown below.

Table 3-11 Total investment required

SN	Themes	Budget (NRs, crore)	Year 1	Year 2	Year 3	Year 4	Year 5
1	Infrastructure development	7,986.7	798.7	2,396.0	2,396.0	1,597.3	798.7
2	Transmission system asset acquisition	24.4	4.0	4.4	4.8	5.3	5.8
3	System operation plan	24.4	4.0	4.4	4.8	5.3	5.8
4	Technology transfer and internalization	1.5	0.2	0.3	0.3	0.3	0.4
5	Human resource management	30.3	4.8	5.4	6.0	6.7	7.4
6	Stakeholders coordination plan	24.4	4.0	4.4	4.8	5.3	5.8

SN	Themes	Budget (NRs, crore)	Year 1	Year 2	Year 3	Year 4	Year 5
	Total	**8,091.6**	**815.7**	**2,414.8**	**2,416.8**	**1,620.3**	**824.0**

3.7.2 REVENUE SCHEME

The major source of the revenue of the project would come from power wheeling charges. Assuming that the project will be completed in five years, PRGCL will start collecting revenue from the sixth year. RPGCL has prepared a wheeling charge scheme constituting of three components:

- Wheeling charge of the backbone grid, which is a mess network and shared by all the generators and load. The component is termed as X1 and it is formulated based on the postage stamp base. The wheeling charge, X1, will be collected from the load.
- Wheeling charge of radial line formulated as X2. It is the portion of transmission network shared by specific HPPs. The charge is formulated using the MW-km method.
- Penalty (reward) for the load which contributes the loss increase (reduction), denoted as X3

Thus, total revenue (X)=X1+X2+X3

Box 3: Assumptions for Wheeling Charge

DR:	**3.0%**
O & M	**1.0%**
Interest rate	**7.0%**
Annual Adjustment	**5.0%**
Project Life	**40**

Preliminary wheeling schemes for some of the transmission sections, against the given assumptions, are depicted in Table 3-12 below.

Table 3-12 Revenue scheme

SN	Project Name	Transmission System			Project Cost (mUSD)	Wheeling Charge (@ 8% IRR)
		kV	Length (d/c, km)	SS		
1	Phukot-Karmaiya	400	130	2	199.5	0.4
2	Bajhang-Attariya	400	170	2	172.7	0.4
3	Tribeni-Maintara	400	110	2	316.9	0.25
4	Kimathanka-Sitalpati	400	38	1	50.7	0.13
5	Tamor - Dhungesaghu	220	25	1	40.6	0.15
6	Mewa - Dhungesaghu	132	25	1	18.3	0.35
	Total		**498**	**9**	**798.7**	

Apart from the wheeling charge, the company will also collect revenue by leasing the communication infrastructures.

4. IMPLEMENTING THE STRATEGIC PLAN

4.1 IMPLEMENTATION STRATEGY

The Board of Directors of RPGCL will provide guidance for ensuring effective implementation of this strategic plan. The implementation matrix (presented below) provides a framework to guide the Directors and top management for translating the strategic objectives into actions, and reporting performance. The matrix will be operationalized within the five-year period through annual performance contracts of the Board members, management and the staff.

Specifically, management shall:

- Adopt a comprehensive implementation program that will involve awareness creation to all staff for effective cascading of the plan;
- Link the strategic plan to the performance targets. Activities in the strategic plan implementation matrix will be implemented through annual performance contracts of the CEO and top management to ensure compliance alongside ISO and other quality management standards and practices;
- Prepare and submit relevant monthly, quarterly and annual reports based on the various functions and informed by best practice;
- Undertake a mid-term review of the strategic plan to ensure continued alignment to Government's plans and policies;
- Undertake end-of-term review of the plan to measure success but document lessons learnt; and
- Automate monitoring and evaluation of implementation of the strategic plan to improve efficiency in reporting, analysis and follow up.

4.2 PERFORMANCE REPORTING STRUCTURE

Accountability for performance will be cascaded in line with the organization structure as follows:

- Corporate KPIs and targets are set at the Board level in the context of the annual performance contract. This contract will contain a combination of KPIs reflecting the company's objectives.

- The Corporate KPIs are all assigned to the CEO's performance contract which is expanded to include other high priority KPIs to which the CEO is accountable.
- All the KPIs in the corporate and CEO's performance contracts are cascaded to the relevant divisional and functional heads and drilled down to staff with reference to their specialized contributions.

4.3 KEY CORPORATE PERFORMANCE INDICATORS

The KPIs considered most reflective of the strategic themes as shown in Table 5.1. These KPIs will be tracked and evaluated against yearly targets to determine the success in achievement of the medium-term objectives.

Table 4-1 : Theme 1 Implementation Plan

Strategic Objectives	Strategic Initiatives	Key performance Indicator	Resource (MUSD)	Assumption	Who	Time frame				
						1	2	3	4	5
Update the TSMP document, prioritize the network for the planning period	Update generation expansion plan, transmission hub substations and load centers	Get GIS report	799	Funding available; IEE/EIA matter in time; RoW and Land acquistion on time	CEO	×	×	×	×	×
	Conduct Grid Impact Studies (load flow, short circuit analysis, stability study and contingency analysis)	Network identifications				×	×	×	×	×
	Identify the network	Karnali Corridor (130 km, 3 substations)				×				
		Seti Corridor (115 km, 2 substations)				×				
		Bheri Corridor (110km, 2 substations)				×				
		Hangpang-Mewa (25km, 1 ss)				×				
		Tamor Corridor (25 km, 1ss)				×				
Perform the Detailed Engineering Design and Environmental Study Report for the transmission Lines	Standardization of route survey, Transmission line design, Tower & Foundation design, and substation designs; for various wind Zones, Terrain and geological conditions; based on latest technological innovations.	Prepare standardized document for Line, Tower, Substation design; and get approval it from the relevant authorities;				×				
	Conduct detailed engineering and environment study of above mentioned transmission line and substations.	Get DPR and IEE/EIA reports				×	×			
Land Acquire and Right of Clearance for SS and TL	Acquire land for the substations and initiate to clear the transmission right of way (RoW).	Land acquisition of substations				×	×			
		Land acquisition, forest clearance, and re-habitation plan executed			CEO, CDO of relevent districts; MoForest		×	×		
Construct the Transmission System (292 km, 9 substations)	Acquire Land for tower footing, RoW clearance; execution of re-habitation and compensation activities;	Contactor awarded;			CEO			×	×	
	Manage Fund under regular and alternative bidding procedures;	Design document finalized and material/equipment specified;						×		
	Perform effective contract management under relevant Act and bylaws;	Material and equipment lab testing completed;					×	×		
	Prepare contractors construction quality standards;	Material procured and transported						×		
	Conduct effective project executive plan;	Tower erection and line stringing completed								×
	Conduct effective transport and logistics for network development;	Substation access road and civil work completed						×		
	Provide safety measures for the personnel avoiding any mishaps.	Substation installed								×

Theme 2:

Table 4-2 : Theme 2 Implementation Plan

Strategic Objectives	Strategic Initiatives	Key performance Indicator	Resource kUSD	Assumption	Who	Time frame				
						1	2	3	4	5
Transfer the high voltage asset (220 kV and above) to RPGCL	Identify the relevant network that falls under the Transmission Grid	Transmission Network identified	2.4	Favorable Policy and proper coordination from all stakeholders	MoE, CEO, NEA, Board		×			
	Valuation of asset	Asset Transfer Plan prepared						×		
	Prepare the asset transfer plan	Asset transfer initiated						×		
	Accommodation plan of human resources involved with the network	Asset transfer completed								×

Theme 3:

Table 4-3 : Theme 3 Implementation Plan

Strategic Objectives	Strategic Initiatives	Key performance Indicator	Resource kUSD	Assumption	Who	Time frame				
						1	2	3	4	5
Establish infrastructure for the Central Load Dispatch Center	Identify the location	Location identified	24	Favorable Policy and proper coordination from all stakeholders	CEO		×			
	Identify communication and automation infrastructure for data transfer protocal	Communication infrastructure for monitoring, control and automation of data transfer is documented.							×	
	Prepare standard contract document for constructing NLDC	Construction plan prepared								×
	Prepare construction plan									×
Function as an TSO	To be implemented in next five year corporate plan cycle									

Theme 4:

Table 4-4 : Theme 4 Implementation Plan

Strategic Objectives	Strategic Initiatives	Key performance Indicator	Resource kUSD	Assumption	Who	Time frame				
						1	2	3	4	5
	negotiation with the international companies to introduce manufacturing units	One of the follwing industries is established: Tower, conductor, insulator, switchgear	1.5	Favorable Policy and proper coordination from all stakeholders	CEO	×	×			
Facilitate to establish equipment manufacturing company	Identify the facilitating approach							×		
	Identify the scope of JV to establish the industries									×

Theme 5:

Table 4-5 : Theme 5 Implementation Plan

Strategic Objectives	Strategic Initiatives	Key performance Indicator	Resource	Assumption	Who	Time				
						1	2	3	4	5
Recruit and retain high skilled manpower to execute the strategic themes in the corporate plan	Introduce relevant salary structure social benefits to employees	Determination of and Approval of Salary structure from the BoD/MoEN/MoF	30.3	Favorable Policy and proper coperation from all stakeholders	CEO	×				
	implement performance based incentives and renumeration to employees	Determination of performance based incentives to the employees and Approval from the BoD/MoEN/MoF				×				
	provide suitable working environment and facilities	Maintenance, redecoration of existing facilities Asset management Expansion and refurbishment of existing facilities Securing of existing facilities Replacement,rationalization and disposal of obsolete furniture and equipment			General Administration Division	×				
Talent Management	Identification of critical roles and critical talent	Organization Management Plan		Training Need Assessment Plan shall be made in Year 1 and trainings to employees shall be imparted to employees on recurrent basis	General Administration Division	×	×	×	×	×
	Developing a comprehensive manpower plan	Organization Management Plan				×	×	×	×	×
	Implementing needs-based training programmes	Training Need Assessment Plan (*) 100 % of employees trained as per the needs assessment report				×	×	×	×	×
	Developing leadership skills	Competence mapping report				×	×	×	×	×
	Improve employee productivity	Competence mapping report				×	×	×	×	×

Theme 6:

Table 4-6 : Theme 6 Implementation Plan

Strategic Objectives	Strategic Initiatives	Key performance Indicator	Resource kUSD	Assumption	Who	Time				
						1	2	3	4	5
Ensure appropriate and systematic consultation with all relevant stakeholders to get optimum result	MoF for regular Budget	Budget Planning and Request recurrent every year	24.4	External coordination with the locals/local government; Favorable Policy and proper coperation from all stakeholders	CEO/Grid Planning and Engineering Department/General Administration Division	×	×	×	×	×
	MoFE for EIA and forest clearance	EIA prepared and Forest Clerances Done				×	×	×	×	×
	MoH and MoLR to acquire the land	Land Acquistion Done,Apropriate Compensations Paid			CEO/Grid Planing And Engineering Department/General Administration Division/Grid Construction And Operation Department (GCOD)	×	×	×	×	×
	NEA to share the technology and get designed document	Acqusition of Technology and Related Design Documents			CEO/Grid Planning and Engineering Department	×	×	×	×	×

Theme 7:

Table 4-7 : Theme 7 Implementation Plan

Strategic Objectives	Strategic Initiatives	Key performance Indicator	Assumption	Who	Time frame				
					1	2	3	4	5
Financing the Transmission Project	Negotiation with the development partner for loan or grant	Negotiations with development partners done	External coordination with the locals/local government; Favorable Policy and proper coperation from all stakeholders	CEO	×				
	Lobby with government agencies to get policy leverage on BT and EPCF bidding	Preparation of BT and EPCF Documents for TL Projects (including working procedure recommendation)			×				
	negotiate national/international contactor to participate of the BT and EPCF bidding	Negotiations with national/international contactor done				×			
	Borrow loans from banks and financial institutions with or without collateral.	Negotiations with banks and financial institutions done.				×	×		
	Make insurance against the security of the infrastructures	Insurance against the security of the infrastructures done					×		
	Make capital investments in commercially and technically feasible transmission project proposals based on in-depth analysis.	Capital investments in commercially and technically feasibleprojects identified in Theme 1					×		
	Borrow loan and receive grant in foreign currency from individuals and institution, including non-resident Nepalese, international financial institutions like export-import banks, and foreign institutions.	Liaise with institution, including non-resident Nepalese, international financial institutions like export-import banks, and foreign institutions.					×		
	Invest jointly with local or foreign institutions as promoter in transmission projects.						×	×	×
	Manage loan portfolio and lend the amount received from GoN or from other local and foreign institutions to promote transmission line projects.						×	×	×
	Determination of other royalties fixed by the regulator.	Endorsement of other royalties fixed by the regulator.					×	×	×
Revenue collection	Prepare wheeling charge scheme	wheeling charge scheme is formulated and shared with NERC					×	×	×

4.4 FIVE YEARS' PROJECT PLAN

Table 4-8 : Project Development plan for next five years

SN	Project Name	Corridor	Location	Transmission System			Power Evacuation (MW)	Major Hydropower	Estimated Project Cost (MUSD)	Commissioning Schedule
				kV	Length (d/c, km)	SS				
1	Phukot-Karmaiya	Karnali	Kailali, Surkhet, Accham, Dailekh, Kalikot	400	130	2	5,000	Phukot Karnali (420 MW), Tila-1(420 MW), Tila-2 (440 MW), Betan Karnali (688 MW),	199.5	2025 Feb
2	Bajhang-Attariya	Seti	Kailali, Doti, Dadheldhura, Baitadi, Bajhang	400	170	2	1,200	West Seti (750 MW), Chainpur Seti (210 MW)	172.7	2025 Feb
3	Tribeni-Maintara	Bheri	West Rukum, Jajarkot, Salyan, Surkhet	400	110	3	3,000	Nalgad(410MW), Bheri-1(617MW),Bheri-2(256 MW)	316.9	2025 Feb
4	Kimathanka-Sitalpati	Arun	Sankuwasabha	400	38	1	1,500	Kimanthanka Arun (434 MW), Upper Arun (335 MW)	50.7	2025 Feb
5	Tamor - Dhungesaghu	Tamor	Taplejung	220	25	1	700	Super Tamor (155 MW), Tamor Mewa (101 MW)	40.6	2025 Feb
6	Mewa - Dhungesaghu	Mewa (Tamor)	Taplejung	132	25	1	180	Middle Mewa (49 MW), Upper Mewa (28 MW), Union Mewa (23 MW), Siwa Khola (23 MW)	18.3	2025 Feb
	Total				**498**	**10**	**11580**		**798.7**	

5. ENTERPRISE RISK MANAGEMENT

Enterprise risk management is an integral part of strategic management for ensuring long-term viability and sustainability of the company. RPGCL recognizes the presence of risks; both within the organization and externally that will continually affect the implementation of its strategy. In this regard, the company has prepared a Corporate Risk Profile to assess risks and take necessary measures.

5.1LEGAL AND REGULATORY ENVIRONMENT:

- The company has to abide by and follow the regulatory framework and directions of the regulatory commission. The company also has to abide by prevailing laws and regulations regarding infrastructure development and social mitigation. Further, the company has conceptualized alternative financing mechanisms to fund transmission line projects that requires GoN endorsement.

5.2FINANCIAL AND MARKET RISKS

- Ensuring funds for grid infrastructure development and consequentially creating a strong balance sheet for mobilization of funds to meet the huge investment requirements in transmission sector, including financing unviable projects in certain areas is also a major challenge.
- Transmission pricing system also poses a major issue because there is no prescription for wheeling charges. RPGCL anticipates that such provisions will be accommodated in the regulatory provisions, or be covered by appropriate tariff structures as allowed by policy provisions.

5.3CONTRACTUAL/THIRD PARTY LIABILITIES

- To ensure compliance to contractual or service level requirements the company has to maintain strong oversight and control on its contractual obligation

5.4LOW PRODUCTIVITY/STAFF MORALE

- RPGCL needs to ensure that each employee has a job description linked to indicators to measure performance for each position. The company has to seek appropriate

management qualifications in its recruitment and selection of new engineers and other professional staff. The company also needs to put in place an incentive-based payment and progressive human resources policy and rules for promotions based on merit

- Identifying high-performing professionals and implementing leadership development programs to develop staff members is also a challenge.

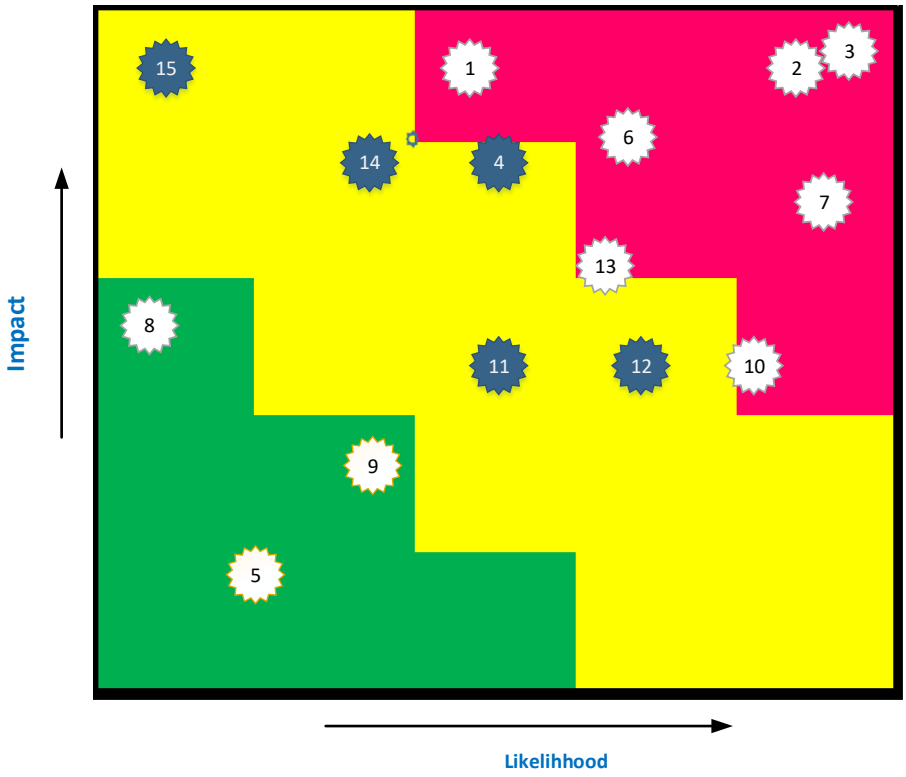


Fig. 5.1 Heat Map of Corporate Risks

1	Procedural delay in GoN repated task
2	RoW clearance risk
3	Land acquisition risk
4	Availibity of Fund to Invest
5	Revenue collection
6	Legal and Regulatory Environment
7	Inadequate succession planning and talent Management
8	Political risk & uncertainties
9	Financial and market risks
10	Cash flow/liquidity risk
11	Contractual/third party liability
12	Logistics, distribution and supply chain failure
13	Contractor and contracts management
14	Low productivity/staff morale
15	Natural disasters such as lnd slide, flood etc

6. AFTERWORD

This Corporate Plan will be further detailed from time to time and will also be subject to periodic review in line with the evolving business environment. The company will also need to adapt and abide by the regulatory framework and directions issued from time to time. It would also need to adapt to the dynamic environment while also being focused on delivering the strategic, competitive, financial, commercial and organizational perspectives for attaining the mission and vision of the company.

Since the plan is a dynamic document, RPGCL anticipates factual updates that would mostly comprise minor changes in specific data, such as numerical or other factual information. At the higher level, there may be conceptual update dictated by market shifts, changes in the competitive environment, legislative reforms, political influence and other factors. RPGCL will accommodate changes as they emerge and update the plan accordingly.

7. ANNEXES

Summary of Cost for Transmission Line and Associated Substations

(Source: Transmission System Master Plan, 2018)

Summary of Cost																	
Zone	Transmission line								Substation								Total Cost (MUSD)
	400 kV		220 kV		132 kV		Length of Line (km)	Cost Transmission line (MUSD)	400 kV		220 kV		132kV		No of Substation	Cost of Substation	
	length (km)	Cost (MUSD)	Length (Km))	Cost (MUSD)	Length (Km))	Cost (MUSD)			Nos	Cost (MUSD)	Nos	Cost (MUSD)	Nos	Cost (MUSD)			
Zone -1	713	536.36	-	-	361	87.91	1,074	624.26	8	352.76	0	0	1	8.55	9	361.31	985.57
Zone-2	471	536.36	-	-	226	56.26	698	592.62	8	289.47	0	0	1	10.50	9	299.97	892.59
Zone-3	420	320.51	149	88.76	442	118.50	1,011	527.77	4	211.23	10	245.68	4	66.22	18	523.13	1,050.90
Zone-4	208	166.98	93	38.06	329	94.89	630	299.94	9	380.55	4	75.23	6	66.46	19	522.24	822.18
Zone-5	510	379.18	32	18.51	387	102.23	929	499.91	11	449.41	5	92.83	2	20.88	18	563.12	1,063.03
Total	**2,322**	**1,939.38**	**274**	**145.33**	**1,746**	**459.79**	**4,341**	**2,544.51**	**40**	**1,683.42**	**19**	**413.74**	**14**	**172.60**	**73**	**2,269.76**	**4,814.27**