NEPAL ELECTRICITY AUTHORITY

CORPORATE DEVELOPMENT PLAN

2018/19 – 2022/23

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Nepal Electricity Authority serves 4 million customers, who count on us every day to provide safe, reliable and affordable energy. Just as important, the country looks to us to provide smart, sustainable long-term energy solutions to power Nepal's economic and social development. NEA has endured significant challenges in the past but our accomplishments in the last couple of years clearly demonstrates that we are committed and capable to meet these crucial challenges.

MESSAGE FROM MANAGING DIRECTOR

We have earned back the trust and confidence of our customers by eliminating load shedding across the country. We are aware that the debilitating load shedding caused numerous hardships to our customers not to speak of the significant economic and social loss to the country. At NEA we value our customers' trust and take our responsibility to meet their expectations seriously and are resolutely resolved to never to return to the dark days of the last decade.

The physics of electricity means that it is generated and consumed instantaneously but the process of delivering that electricity is anything but instantaneous. It is a result of meticulous planning that spans multiple years. The lack of an integrated long-term planning process at NEA is one of the important lessons we have learned from the crisis. This is why, my team and I have developed a 5-year Corporate Development Plan (CDP) to achieve our Vision of becoming "an efficient modern utility that provides reliable, quality and affordable electricity to its customers while being responsive to Government imperatives and creating value for its shareholders."

The CDP will provide the roadmap for NEA to deliver on its mission of developing the infrastructure for providing safe, reliable and affordable electricity to all and serve as the engine that powers economic and social development in Nepal. The CDP highlights our priority areas over the next five years which are structured around three strategic themes:

Theme 1: National Priorities
Theme 2: Capable, Modern and Smart Utility
Theme 3: Improve Customer Care

With all the planned measures and activities executed, we will achieve the following goals:

- A power system with an installed capacity of 5,000 MW and the transmission and distribution infrastructure to support this capacity
- Achieve per capita electricity consumption of 500 kWh
- Provide universal access to electricity through on-grid and off-grid solutions
- Connect 400,000 customers annually and have a customer base of over six million consumers

- Improve Nepal's Energy Security by generating 100% of the electricity domestically
- Reduce aggregate technical and commercial (AT&C) losses to less than 15%
- Modernize the grid to have 75% of the energy sold billed through Smart and/or automated meters
- 2 million customers use automated or online payment options
- At least double employee efficiency (sales/employee)
- Increase non-tariff revenue by monetizing surplus energy through trade and by leveraging NEA's assets and infrastructure to generate new sources of revenue

In addition to the three Strategic Themes, the CDP outlines the steps NEA will undertake in response to the changing political, regulatory and policy framework that governs the sector. Nepal is at a historical juncture, and so is its electricity market. The electricity sector has evolved from one in which NEA was solely responsible for transmission, generation and distribution to one where there are multiple actors in each of these verticals. Looking forward, NEA recognizes that big systemic changes are imminent even as the timing and extent of reform is uncertain. But we also understand that the constant through these changes will be the fact that NEA is more than just an electricity utility and will continue to play a pivotal role in the evolution of the energy sector in Nepal. NEA shoulders the responsibility of being a key agency through which the Government aims to achieve its policy goals for the energy sector including the development of a vibrant and dynamic energy sector in Nepal.

NEA takes these responsibilities with the gravity it merits. The CDP takes this into account and outlines a strategy that envisions a re-organization of its corporate structure to meet the new challenges and opportunities that will result from these changes. While the need for re-organizing its corporate structure is driven by political imperatives of the new form of government, there are also business-based reasons to embark on this path towards a more efficient and responsive NEA. The corporate re-organization will be undertaken to extract benefits of operational efficiency and competition while avoiding the pitfalls of increased administrative costs, reduced economies of scale, inadequate technical and administrative capacity and market disruption. That is why we will proceed with caution and through a consultative process with all stakeholders.

The CDP outlines and ambitious plan to transform NEA from an "old-school" utility to a modern, smart and capable utility. We have envisioned a quantum leap in the next five years that will see our system grow by more than four times the current size and more than double the per capita electricity consumption. We have a lot to work on, but we also have a lot to work with. If anything gives me faith that we will achieve these goals then it is the passion, commitment and dedication of our employees. Just as we will be making investment in our infrastructure to modernize our system, we will be investing in the development of our staff to meet these new challenges. I have a strong commitment to ensuring the welfare of my most valuable resource, our management and staff, and we will do so by re-tooling and upgrading their skills to meet the challenges we have ahead.

With the support and policy interventions of our Government and people, I am confident that NEA will be able to not only achieve, but even surpass the targets and play an important role in the economic and social development our great country.

KUL MAN GHISING
Managing Director
NEA

ACRONYMS

AEPC	Alternate Energy Promotion Center
AIIB	Asian Infrastructure Investment Bank
AT&C	Aggregate Technical & Commercial Losses
BT	Build Transfer
CDP	Corporate Development Plan
DAM	Day Ahead Market
DFID	Department of International Development
DoED	Department of Electricity Development
DSM	Demand Side Management
ERC	Energy Regulatory Commission
ETFC	Electricity Tariff Fixation Commission
FVAP	Financial Viability Action Plan
GDP	Gross Domestic Product
GTD	Generation, Transmission, Distribution
GoN	Government of Nepal
EIB	European Investment Bank
FDI	Foreign Direct Investment
GIS	Geographic Information System
HIDCL	Hydropower Investment Development Company Limited
ICT	Information Communication System
IDC	Interest During Construction
INPS	Integrated Nepal Power System
IPP	Independent Power Producers
IRG	Internal Revenue Generation
JICA	Japanese International Cooperation Agency
KPI	Key Performance Indicators
MDB	Multilateral Development Banks
MIS	Management Information System
MCC	Millennium Challenge Corporation
MoEN	Ministry of Energy
MoEWRI	Ministry of Energy, Water Resources and Irrigation
MoF	Ministry of Finance
NEA	Nepal Electricity Authority
NFRS	Nepal Financial Reporting Standards
NORAD	Norwegian Agency for Development Cooperation
NPTC	Nepal Power Trading Company
O&M	Operations and Maintenance
PPA	Power Purchase Agreement
PRoR	Peaking Run of River
RoR	Run of River
RoW	Right of Way
RPGCL	Rastriya Prasaran Grid Company Limited
SPV	Special Purpose Vehicle
TAM	Term Ahead Market
TOD	Time of Day
T&D	Transmission & Distribution
USAID	United States Agency for International Development
USD	United States Dollar
VUCL	Vidyut Utpadan Company Limited
WECS	Water and Energy Commission Secretariat

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MANDATE, MISSION, VISION, CORE VALUES AND POLICY OBJECTIVES

1.1 NEA'S MANDATE

Nepal Electricity Authority (NEA) came into existence on August 16, 1985 following the consolidation of the Department of Electricity (Ministry of Water Resources), Nepal Electricity Corporation and several Boards in the power sector. NEA derives its mandate from the Nepal Electricity Authority Act 1984 (The Act) and takes policy direction from the Government of Nepal (GoN).

The primary objective of NEA is to generate, transmit, and distribute adequate, reliable, quality, and affordable power by planning, constructing, operating, and maintaining power infrastructure facilities. Its roles and responsibilities range from recommending policies, serving as a center of excellence and developing skilled human resources on matters relating to the power sector. The Act also grants NEA the power to purchase electricity from Independent Power Producers (IPPs) and engage in cross border trade while introducing commercial orientation in its services. To fulfill its mandate, NEA can tap both domestic and foreign capital from both government and commercial entities.

1.2 VISION AND MISSION

The political, economic and social fabric of Nepal has undergone a massive transformation in the last four decades. Similarly, the electricity market within and outside Nepal has also evolved since NEA came into operation. To meet the aspirations of a growing nation and to address the challenges of a dynamic electricity market while remaining true to its mandate, NEA needs new tools to respond to a changing socio-political, environmental and market conditions. In this context, NEA's success is measured not just by its individual achievements but also by its role in establishing a vibrant energy market.

NEA's vision and mission represent the aspirations of a "Prosperous Nepal and Happy Nepali." This vision embodies NEA's ambition to provide world-class service to its customers and create value for its stakeholders - customers, government, private operators. Therefore, the following articulated vision and mission statement of NEA provides a framework and focus to achieve its institutional mandate.

VISION

An efficient modern utility that provides reliable, quality and affordable electricity to its customers while being responsive to Government imperatives and creating value for its shareholders.

MISSION

Develop infrastructure to provide electricity for all by constructing, maintaining, trading and operating a safe, optimally engineered generation, transmission and distribution power system and build a strong relationship with customers by balancing service quality, reliability and costs.

1.3 CORE VALUES

The ideals by which the organization will strive to carry out its business and conduct itself are embodied in the following core values:

FIGURE 1: Core Values

2.

CURRENT STATUS OF THE POWER SECTOR

2.1 ENERGY SUPPLY AND CONSUMPTION

Nepal's energy requirements are predominantly met by traditional sources of energy. Biomass, in the form of firewood, agricultural waste, and animal dung, is responsible for almost 76% of the total energy supply. Fossil fuels are responsible for 16% of the energy supply in the nation and its consumption is growing at a faster rate relative to other energy sources. Electricity meets only 3% of Nepal's total energy needs[1].

On the consumption side, 82% of the total energy demand is driven by the residential, commercial and agriculture sectors. Demand from the transport and industry sector stood at 10% and 5% respectively. The growth in energy demand from industry (4%) and transport (3%) are projected to increase faster than growth in Nepal's aggregate energy demand which is expected to grow at 1.9% through 2035[2]. These macro factors in the energy demand and supply scenario create strong tailwinds for Nepal to meet its energy requirements with electricity. Meeting our energy needs with electricity is not only more efficient and cleaner but will also ensure a more secure energy future.

2.2 NEA AND THE POWER SECTOR IN NEPAL

Despite its vast hydropower potential and long history in electricity (the first hydropower plant was established in Nepal more than 100 years ago), only 3% of the country's energy needs are met by electricity. Nepal's electrification rate (grid and off-grid) of about 91% is comparable to that of other countries in the region[3]. As of FY 2017/18 there are about 4 million customers across 76 districts of Nepal that NEA serves through the national grid. 93.83% of these are domestic consumers and account for 43.5% of the total electricity demand of 5557.3 GWh. Industrial consumers account for 37.53% of the total electricity demand. NEA's electricity demand forecast, driven by industrial growth, urbanization and grid expansion is expected to increase per capita electricity usage from 170 units/capita in 2017 to 500 units/capita by 2023. Meeting this demand will require an installed capacity of about 5000 MW.

The total installed capacity of the national grid is 1,074 MW with NEA hydro, IPP hydro and NEA thermal accounting for 507.9 MW, 512.7 MW and 53.4 MW respectively. A decade long political insurgency and underinvestment in the generation sector resulted in demand for electricity outstripping supply

[1] WECS 2017 Electricity Demand Forecast 2015-40
[2] ADB 2015 Energy Outlook for Asia and the Pacific. Manila
[3] Electrification rate in the region 2016: Bangladesh 76%, India 85%, Pakistan 99%, Sri Lanka 96%
Source http://data.worldbank.org/indicator/ED.ELC.ACCSS.ZS

resulting in years of debilitating load shedding. This situation has seen a dramatic turnaround in the last two years. Load shedding has ended in large part due to substantial reduction in system losses, proper system and load management by NEA and completion of the high voltage cross border Dhalkebar - Muzzafarpur transmission line enabling efficient import of power from India

Even though the national grid has an installed capacity 1074 MWs, 86% of total capacity comprises of RORs and PRoRs projects, and only about one third of the total installed capacity can be generated from these stations in the dry season. So, while load shedding has officially ended, the seasonal imbalances caused by the hydro dominated system means that the country still imports a third of its power requirements from India. On an average 380 MW of this power is imported from India through the Power Exchange and other trading mechanisms. Nepal is expected to be net surplus in electricity within the next two years, but the seasonal and diurnal system imbalances means trading of power with our neighbors will continue to be an essential part of our power narrative.

As the sole buyer of electricity in the sector, and a monopoly over transmission, system operation and distribution functions means that NEA occupies a central and dominant position in the electricity sector.

GENERATION

In generation, even though IPPs are increasingly contributing to the energy supply, NEA's own generation including its subsidiary generating companies are still an influential force. The establishment of GoN subsidiary companies Hydropower Investment Development Company Limited (HIDCL) and Vidyut Utpadan Company Limited (VUCL) is expected to further increase the government's influence in generation.

TRANSMISSION

Nepal's transmission system has grown into a network of more than 3,538 km of transmission lines from 66kV to 400kV level. The transmission system expansion and upgradation has prioritized two key areas:

1. **Development of a 200kV/400kV high voltage domestic transmission backbone along the east-west.** The 285 km 400kV Hetauda-Dhalkebar-Duhabi line is under construction in the center and east of the country. The Millennium Challenge Corporation (MCC) supported transmission line project will extend the 400kV line to Butwal and all the way to the border with India. Similarly, the Butwal-Attariya (400 km) 400kV line is under detail design phase and expected to be commissioned by 2025. Furthermore, 400kV transmission lines along the mid-hill highways and multiple river corridors are under study.

2. **Develop high voltage cross border interconnections.** Dhalkebar-Muzzafarpur, Nepal's first ever 400kV Nepal-India cross-border transmission link is currently charged at 220kV voltage level and imports up to 240MW power from India. It is expected to be charged at 400 kV by December 2019 enabling trading of a higher quantum between Nepal and India. A second cross-border interconnection with India is being developed from New Butwal (Nepal) to Gorakhpur (India). There are three other high voltage interconnections under study. Furthermore, the developers of export-oriented Arun 3 and Upper Karnali plan to build dedicated 400kV lines to evacuate their power to India. Cross-border interconnection with China is also gaining traction. The Galchi (Nepal) to Kerung (China) line is in study phase and discussions are already underway on the financing modality.

While NEA has been the sole institution responsible for the planning, development and management of the transmission system, the establishment of the Rastriya Prasaran Grid Company Limited (RPGCL) is expected to change this situation. RPGCL is expected to support and augment NEA's efforts in the development of Nepal's transmission system. Given the current challenges to transmission line development, private sector is not expected to engage in the development of transmission lines although alternative modalities such as Build Transfer (BT) are being considered.

DISTRIBUTION

NEA is the sole distributor of electricity. The power distribution function involves planning, expanding, operating, maintaining, and rehabilitating the power distribution networks, including substations up to the 33kV level, and providing consumer services such as new connections, meter reading, billing, and revenue collection. In the FY 2017/18 NEA served 4 million consumers, sold 5,526 GWh of energy earning gross revenue of Rs. 55,468 million. Industrial and commercial consumers had only 1.98% share of total customers but provided 44.91%% of the total revenue[4].

Ensuring universal access to electricity is a key government priority and NEA works closely with GoN to achieving this goal. To accelerate the pace of grid extension and manage rural distribution systems more efficiently and sustainably NEA has adopted community participatory models in rural electrification schemes. This model serves about 500,000 households. And yet, given Nepal's geography it is not economical to expand the grid to serve every citizen through the grid. Off grid solutions are the only viable alternative to reach the remotest areas and these are usually provided by the Alternate Energy Promotion Center (AEPC) and in some cases by NEA as well.

ELECTRICITY TRADE

Regional trade in electricity has been a long-cherished aspiration for the countries of South Asia. Progress had been slow but recent developments have been encouraging. The recently issued cross-border guidelines by the Ministry of Power in India creates the enabling framework and bodes well for the future of cross-border trading. There are however existing trading arrangements between Nepal and India. Electricity imports are governed by the Power Exchange Committee between Nepal and India, and trading arrangements between NEA and Indian power trading companies.

The energy banking mechanism allows Nepal to export power to India amid surplus generation and import the same amount of power during dry season. Furthermore, India has opened its power exchange market to its neighboring countries. Nepal can now trade power through Power Exchange markets for the day-ahead market (DAM) and term-ahead market (TAM).

In addition to enabling trade with India, the recently issued Cross-Border Power Trade guidelines by the Ministry of Power, India will enable trade with third countries such as Bangladesh and Bhutan by utilizing India's transmission network.

OTHER RENEWABLES AND ALTERNATIVE ENERGY

Nepal mostly relies on renewables for its off-grid electricity supply. Other than major hydropower operations, around 23MW of electricity generation came from micro hydro schemes, 12 MW from solar photovoltaic (PV) systems, and less than 20kW from

[4] *NEA a Year in Review – Fiscal Year 2017/2018*
[5] *ADB 2015 Energy Outlook for Asia and the Pacific. Manila*

wind energy[5]. GoN issued a subsidy scheme for renewable energy in 2013 that has helped to better the delivery of renewable energy services, technologies and supply to households, communities and businesses in rural areas.

Solar power provides an attractive option to diversify Nepal's generation mix. Fall in price of photovoltaic solar panels in the international market and good power purchase rate offered by the NEA (Rs. 7.30 per unit) has been two key factors to attract investments in solar. NEA is currently developing its own 25 MW solar plant in Devighat and signed agreements with IPPs for 20 MW with Viability Gap Funding (VGF) support from ADB. Furthermore, NEA has also signed PPA for a total of 40 MW grid solar.

2.3 KEY PLAYERS IN THE ENERGY SECTOR

The Ministry of Energy, Water Resources and Irrigation is the key line Ministry that has oversight of the electricity sector in Nepal. There are several government institutions (independent and under the ministry) that derive their mandate and responsibilities from their specific Acts or sub-legislations.

The Electricity Act 1992 and the Electricity Regulation 1993 are the main laws governing the electricity sector in Nepal. The Electricity Act 1992 covers all issues regarding survey, generation and distribution of electricity along with the licensing terms and regulations. The Electricity Regulation 1993 supports the Act and sets out procedures for obtaining licenses for generation, transmission and distribution projects.

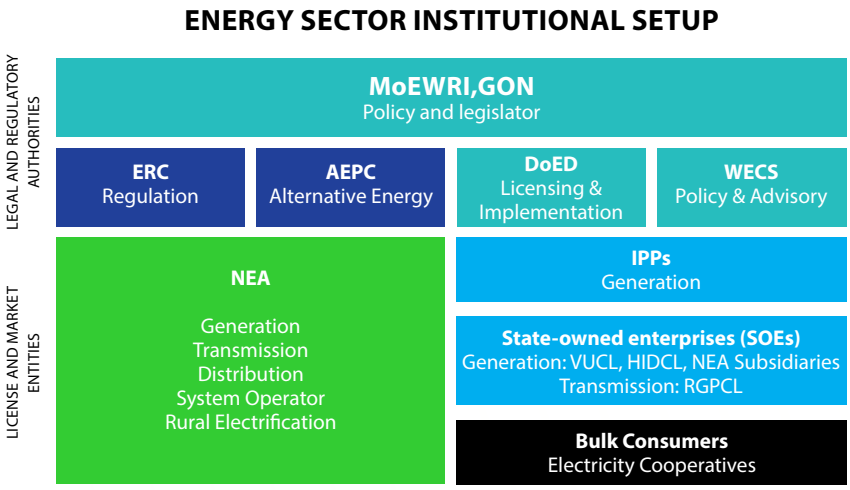
TABLE 1: The key legislative framework that governs the sector are as follows:

THE ELECTRICITY ACT OF 1992	THE NEA ACT 1984	THE HYDROPOWER DEVELOPMENT POLICY 2001	THE ELECTRICITY REGULATORY COMMISSION (ERC) ACT 2017
The Act aims to regulate the survey, generation, transmission and distribution of the electricity to foster development and management of the electricity while ensuring safety and standardizing electricity services.	Enacted to establish the vertically integrated state utility, the Nepal Electricity Authority that would supply power by generating, transmitting and distributing electricity.	Outlines the policies to engage and attract the private sector in the development of hydropower and provide the enabling legislative and regulatory framework.	The ERC Act paves the way for the establishment of an independent regulator for the electricity sector.

Due to the process of federalism and the dynamics of multi-layered governance, amendment to the Electricity Act 1992 is required. Clarity in project development, energy infrastructure governance and operation of inter-municipal and provincial markets will be required. Similarly, the Act does not sufficiently consider the dynamics of today's energy sector such as trade of electricity within and across the border.

The current power sector stakeholder framework is shown by the figure below:

FIGURE 2: Stakeholder Framework



MINISTRY OF ENERGY, WATER RESOURCES AND IRRIGATION (MOEWRI):

The ministry is responsible for formulating policies, regulations and standards for the sustainable long-term development, protection, usage and allocation of water resources and energy.

ELECTRICITY REGULATORY COMMISSION (ERC):

The ERC Act 2017, paved the way for the establishment of a regulator for the electricity sector. However, the Commission has not been operationalized due to a delay in the appointment of the Commissioners. The ERC has the mandate to develop and foster a transparent, competitive and financially viable electricity sector by:

1. Setting technical and performance standards such as Grid Code, Distribution Code, Operation & Maintenance Guidelines Determine whole and retail tariff for generation and distribution respectively, approve PPAs and wheeling charges for transmission
2. Protect consumer interest by ensuring affordable, quality and safe power to consumers
3. Resolve disputes and
4. Provide policy recommendations to the government

WATER AND ENERGY COMMISSION SECRETARIAT (WECS):

The primary responsibility of WECS is to study and plan the water and energy resources of the country in an integrated and accelerated manner. It has the mandate to formulate policies and plan water resources related projects.

DEPARTMENT OF ELECTRICITY DEVELOPMENT (DOED):

DoED is responsible for assisting MoEWRI in implementation of overall government policies related to electricity sector. DoED is GoN's licensing agency for all energy related services. It has the mandate to award Survey, Generation, Transmission and Distribution license. Licenses are generally issued on a first come first basis although some project licenses have been issued on a competitive basis.

ALTERNATIVE ENERGY PROMOTION CENTER (AEPC):

AEPC's main objective is to develop and promote renewable and alternative technologies in Nepal. It aims to mainstream renewable energy through increased access and knowledge of cleaner sources of energy to improve the living standards of people in Nepal. Its strategic objectives are the following:

1. To popularize and promote the use of alternative/renewable energy technology.
2. To raise the living standard of the rural people.
3. To protect the environment.
4. To develop the commercially viable alternative energy industries in the country.

NEPAL ELECTRICITY AUTHORITY (NEA):

NEA is the main electricity utility of Nepal. It is the sole purchaser and distributer of grid electricity in the country and also operates a majority of the transmission network. Though there are multiple generators in the country, NEA is still the largest generator and will continue to occupy an important role in electricity generation.

STATE OWNED ENTERPRISES (SOES):

Rastriya Prasaran Grid Co Ltd (RPGCL) was established by the Government of Nepal in July 2015 to transmit and evacuate power for the development and operation of the hydropower sector.

Hydroelectricity Investment and Development Company Ltd. (HIDCL) was formally established in July 2011 to mobilize funds from domestic and international resource-base to finance projects in middle to mega-sized generation, transmission and distribution projects.

Vidhyut Utpadan Company Limited (VUCL) was formally established in November 2016 to support the government in developing economically viable electricity projects and enhance the country's energy security.

INDEPENDENT POWER PRODUCERS (IPPS):

IPPs have been increasing their investment on the generation side. IPPs currently supply more than 30% of the power in Nepal. NEA has already signed PPAs with IPPs for more than 5500 MW. These are mostly ROR projects with a few exceptions.

DONORS AND DEVELOPMENT PARTNERS:

Multiple donors and development partners are involved in the power sector. Development partners such as the World Bank, Asian Development Bank, DFID, USAID, MCC, GIZ, KFW, JICA, NORAD, EU, EIB, AIIB and others support generation, transmission, distribution, rural electrification, clean cooking and energy efficiency in varying capacities.

2.4 POLICY OBJECTIVES

NEA was established by the Act, as a wholly government undertaking, and upholds its original charter mandate while fulfilling government policies and guidelines articulated and prioritized over various time horizons.

Nepal's transition to a federal democratic republic is expected to have a significant impact on the structure and operations of NEA. The scope and timing of these changes has to be ascertained, but the Constitution provides a framework and the MoEWRI White Paper 2018 provides a roadmap for implementing that framework. Some key elements of the White Paper, which will affect NEA's operations are outlined in Table 2 below:

TABLE 2: White Paper, Ministry of Energy Water Resources and Irrigation

MOEWRI WHITE PAPER – KEY ELEMENTS	
OBJECTIVES	**INITIATIVES**
Electricity for All	100% electrification through on-grid and off-grid solutions within 5 years
Encourage people's participation in generation. (Nepal ko pani, Janata ko lagani, harek nepali bidhyut ko share dhani)	Develop 3000 MW of generation projects with 49% equity participation from the public
Become self-sufficient in generation	Generate 3000 MW in 3 years, 5000 MW in 5 years and 15000 MW in 10 years, of which 5000 MW is for export
Increase consumption of electricity	A target of 700 units per capita within 5 years and 1500 in 10 years
Amend legislative framework	Amend the Electricity Act 1992 and the NEA Act 1984, implement a Renewable Energy Development Act, establish an independent regulator for the electricity sector
Diversify energy sources	Prioritize net metering for distributed generation, develop waste to energy projects, solar home systems and bio-mass (bagas)
Promote unbundling of the energy sector	Support the organizational development of other agencies such as HIDCL, NEA Engineering Company, VUCL, RPGCL, Nepal Power Trading Company and establish Distribution Companies
Foster energy trading markets	Promote and enable energy trading market domestically and regionally to help manage surplus energy
Competitive licensing and PPAs	Introduce and implement competitive licensing and PPA procedures
Mobilize capital	Mobilize concessional and commercial capital from domestic and international sources
Enhance transmission infrastructure	Introduce enabling policies to engage private sector in the development and construction of transmission infrastructure such as wheeling charge guidelines, build-transfer (BT) and EPCF modalities.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DANGER
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3.

SITUATIONAL ANALYSIS

3.1 OVERVIEW OF THE OPERATING ENVIRONMENT

The environment within which NEA operates has a significant impact on the utility's ability to meet its goals and targets. The following analysis assesses and identifies factors that may affect the execution of the CDP. Awareness of such factors will help NEA to manage associate risks better.

3.1.1 POLITICAL FACTORS

a. The promulgation of the new Constitution, which established a three-tier government structure with Central, Provincial and Local governments, will have an impact on the electricity sector. The mandate for distributing electricity has devolved to Provincial governments, and generation licensing authority of up to a certain threshold may also be devolved to Provincial and Local governments. NEA's network development plans and service delivery will have to be reoriented along these demarcations.

b. NEA must balance twin mandates, being responsive to government imperatives while also operating as a financially sustainable entity. Election cycles and public opinion can raise pressure for decision-making that might be skewed towards social obligations such as irrational tariffs at the expense of optimum commercial viability.

c. International relations, especially with neighboring countries like India and China, will have an important bearing on NEA's operations. The supply demand mismatch, due to the dominance of RoR and limited PRoR and storage projects in the system means power trade with regional countries will be crucial in balancing supply and demand, and in optimizing the cost of power. While commercial considerations are expected to drive the contractual arrangements that underline the cross-border power trade, Nepal's regional dynamics is likely to be a dominant factor in the type of trading regimes that will materialize as a result.

d. Financial, economic and taxation policies adopted by the government will influence energy demand and consumption patterns during the Plan period. Dramatic changes in regional and global political factors may also change the price and demand of domestic electricity.

3.1.2 ECONOMIC FACTORS

a. Although Nepal remains a Least Developed Country, its core economic vision is to achieve Middle Income Country status by 2030. To get there Nepal requires a growth rate of 8.5% and a Gross Domestic Product (GDP) of 90 billion in current USD.[6] NEA has adopted a load forecast based on an annual GDP growth rate of 7.2% which will

[6] *National Planning Commission (2016). Envisioning Nepal 2030*

require an installed capacity of 5,199 MW by the end of the Plan period FY 2022/23. Electricity demand and use is highly correlated with rising income levels and economic growth. High GDP growth rates will increase the demand for electricity whereas lower than expected growth may result in a greater surplus in the system.

b. Nepal's economic growth in the last few years has been affected by political transitions, the devastating earthquake of 2015 that cost the country over USD 7 billion in damages[7] and the economic blockade that ensued. The completion of the political transition with the election of a stable government has created a conducive environment for economic growth to take off, as evidenced by the economic growth rate of 7.5% in 2016-17.[8]

c. In terms of usage, access to the grid and mechanization of household activities is expected to increase with rising incomes and global exposures of returning migrant workers. Similarly, displacement of traditional forms of energy consumption (biomass), substitution of fossil fuel imports in transportation and cooking; and rising industrialization are expected to contribute to an increased demand for electricity.

d. Economic shocks, both local and global, are invariably expected with consequences for the company's business outlook. Access to finance, exchange rate risks and contractors' ability to implement projects in the country will affect the cost of doing business.

3.1.3 SOCIAL FACTORS

a. Heightened awareness of one's rights and community activism have brought about positive changes in Nepali society, but it has also created significant challenges for the construction of power infrastructure. Power projects require acquisition of land and right of way access for transmission lines. Displaced and affected populations need to be resettled and rehabilitated to ensure their livelihoods are not disrupted and their lives not made worse off. However, social cost mitigation measures and implementing challenges have become bottlenecks resulting in higher project costs and time over-runs.

b. Corruption and theft of electricity are ongoing challenges for NEA resulting in substantial revenue loss for the company. Furthermore, lax attitude and societal norms exacerbate these challenges. Though significant progress has been made in the past few years, NEA will need to continue its work with stakeholders through community engagement and set stricter penalties and robust governance practices to tackle this social ill.

c. Favorable trends in development indexes for Nepal such as rising levels of literacy, education and income implies greater demand for electricity. Changing lifestyles from the traditional to the modern is expected to result in a greater percentage of the population seeking access to grid connections. During this Plan period, NEA's social objective of providing electricity access to all will result in an estimated two million new electricity connections and will likely result in increased electricity demand.

3.1.4 TECHNOLOGICAL FACTORS

a. Introduction of new technologies provides many potential benefits to NEA that include reduction in technical and commercial losses, operational cost savings, increase in productivity, increased energy efficiency, new or increased revenue streams and improved customer satisfaction. These ultimately result in better long-term growth prospects.

b. NEA recognizes that the digital revolution is coming to the power industry and new business models are rapidly emerging. Net metering, distributed generation, smart grids and the Internet of things are creating both opportunities and challenges for NEA. The utility will embrace this digital revolution and modernize itself and reap the dividends that come with it.

c. Automating its metering and grid operations can enhance NEA's operational efficiency and transform itself from a traditional to a modern utility.

d. Installation of fiber optic cables on power lines in the "last mile" will not only facilitate communications for smart grid operations but also result in new revenue streams through partnerships with telecommunication companies and internet service providers.

3.1.5 LEGAL AND REGULATORY FACTORS

a. The legal and regulatory framework is expected to undergo significant reforms during the Plan period. Electricity is a concurrent subject in the Constitution and the Electricity Act 1992 needs amendment to ensure consistency with the new federal constitution.

[7] *"Post Disaster Needs Assessment", National Planning Commission (2015). Also see Simkhada, Shambhu Ram "Disaster Diplomacy", MyRepublica, Kathmandu May 05, 2015*

[8] *World Bank Statistics 2017*

b. The setup of the Electricity Regulatory Commission, pursuant to the ERC Act, is expected to result in a well-regulated and transparent tariff-setting process and a cost reflective tariff. However, NEA must consider and manage possible delays in operationalizing the ERC, the risk of political expediency taking precedence over cost reflective tariff and scheduled reviews to accommodate revenue requirements.

c. The three tiers of government in federal Nepal may have their own imperatives and expectations of the energy sector. New rules and levies could affect the plans of both NEA and private producers.

d. The operationalization of Regional Offices as individual companies, under provincial government, the establishment of independent Generation and Transmission Companies by the GoN, and other institutions such as HIDCL are supporting the transformation of Nepal's current energy market into a more dynamic and complex one. The operationalization of the Nepal Power Trading Company will create a market for trading electricity and captive generation, which will require a framework for open access and wheeling charges. NEA will be required to operate through these changes in market structure, and at times, lead from a single buyer, single supplier model to a multiple buyer multiple supplier model.

3.1.6 ENVIRONMENTAL FACTORS

a. The impact of climate change on hydropower projects is inevitable. Extreme weather patterns and its effect on power systems that rely on nature is well documented. Given Nepal's hydro dominated power system, the power infrastructures are vulnerable to floods, glacial bursts, and landslides.

b. Hydrological changes can affect existing as well as under construction generation plants by changing their expected output schedules with consequences for project developers and power system planners.

c. Large storage projects are important for energy security and for maintaining a healthy generation mix to balance seasonal and temporal variations in load; but are associated with significant environmental and social disruptions. The inundation of land and existing infrastructure, displacement of people and their livelihoods, impact on flora and fauna caused by the change in the ecology are some of the adverse impacts that need to be mitigated and balanced against the need for these types of projects.

d. Nepal's strong push for maintaining a high percentage of forest coverage often conflicts with its ambition for development. These conflicting objectives have created challenges to implementing projects that require forest clearances. A more coherent and consistent policy is needed to meet these twin objectives without compromising either one.

3.1.7 FINANCIAL FACTORS

a. NEA has been incurring financial losses over the last 15 years due to chronic financial underperformance that can be attributed to internal and external factors. External factors include non-adjustment of retail tariffs on periodic basis, political meddling in its corporate affairs, foreign exchange losses and the high cost of power purchase from domestic IPPs and India. These factors are beyond NEA's control. Internal factors include high system losses, bloated operating costs, cost and time overruns on key projects that contributed to NEA's losses.

b. Going forward, there are huge expectations on NEA to deliver quality, reliable and affordable power to drive Nepal's economic growth. Galvanizing billions of dollars to finance this ambitious expansion and modernization plan will not only require NEA to demonstrate better financial health, but also tap financing from domestic and international sources from both public and private sectors.

c. Tapping international sources of financing is a matter of necessity, not choice. Managing the foreign exchange risk variation will become critical than it has been. In the past, these exposures were assumed by NEA without proper tools to manage and mitigate associated risks. NEA requires active engagement with GoN, financial institutions and development partners to develop a comprehensive strategy to manage these risks.

3.2 ELECTRICITY DEMAND AND LOAD FORECAST

The load forecast adopted by NEA is based on GoN's energy demand forecast prepared by the Water and Energy Commission Secretariat (WECS). The forecast assumes a GDP growth rate of 7.2% during the CDP period. In the NEA adopted load forecast, the following parameters have been used for deriving the installed capacity from the forecast energy requirement.

52%
LOAD FACTOR

25%
T&D LOSSES

30%
RESERVE MARGIN AND OUTAGE

The NEA adopted load forecast is presented in the table below:

TABLE 3: Load Forecast

YEAR	PEAK DEMAND (MW)	INSTALLED CAPACITY (MW)
2018/19	1,842	1,307
2019/20	2,225	2,454
2020/21	2,638	3,478
2021/22	3,062	4,119
2022/23	3,366	5,199

The following table shows the load forecast and the generation profile on a seasonal level. Monthly energy demand, generation, deficit and surpluses have been aggregated to compute seasonal demand, seasonal generation, seasonal surplus and seasonal deficit. Energy Available (e/E) in the system is the sum of Energy Generation (b/B) and Imports (c/C). In the event that energy available is inadequate to meet demand due to temporal variations in demand and supply, Additional Import for balancing (d/D) will be made to balance such supply shortfalls. As evidenced from the table, such shortfalls, albeit minor, do persist during the Dry Season throughout the Plan period. Energy generation not required for consumption in the domestic market will be exported to regional markets as Energy Surplus/Export (f/F). The amount of energy exported during the Wet season grows substantially during the plan period.

TABLE 4: Energy Balance Table

		2018/19	2019/20	2020/21	2021/22	2022/23
Dry Season: December to May (GWh)						
Projected Demand	a	4,130	4,990	5,915	6,866	7,546
Energy Generation (IPP+NEA)	b	2,709	3,960	5,358	7,186	8,202
Import	c	1,136	1,001	802	519	468
Additional Import for Balancing	d	285	210	198	117	158
Energy Available	**e=b+c+d**	**4,130**	**5,171**	**6,358**	**7,822**	**8,828**
Energy Surplus/Export	f	-	181	443	956	1,282
T&D Loss	g	18.85%	17.00%	16.00%	15.00%	14.40%
T&D Loss	h = e*g	778	879	1,017	1,173	1,271
Sales	**i=e-f-h**	**3,352**	**4,111**	**4,898**	**5,693**	**6,275**
Wet Season: June to November (GWh)						
Projected Demand	A	4,262	5,149	6,104	7,086	7,787
Energy Generation (IPP+NEA)	B	3,985	5,355	9,365	12,941	14,906
Import	C	286	253	24	8	6
Additional Import for Balancing	D	112	133	1	-	-
Energy Available	**E=B+C+D**	**4,383**	**5,741**	**9,390**	**12,949**	**14,912**
Energy Surplus/Export	F	121	592	3,286	5,863	7,125
T&D Loss	G	18.85%	17.00%	16.00%	15.00%	14.40%
T&D Loss	H=E*G	826	976	1,502	1,942	2,147
Sales	**I=E-F-H**	**3,436**	**4,173**	**4,602**	**5,144**	**5,640**

3.3 STRENGTHS CHALLENGES OPPORTUNITIES AND THREATS (SCOT) ANALYSIS

The SCOT analysis is an important exercise for assessing the most relevant internal (Strengths and Challenges) and external (Opportunities and Threats) factors. The analysis is a diagnosis of the company to capitalize on strengths and opportunities and mitigate weaknesses and threats in order to achieve NEA's goals and objectives.

TABLE 5: NEA SCOT Analysis

	NEA SCOT ANALYSIS
Strengths	■ Monopoly and monopsony market of an essential service ■ High demand for electricity and energy services ■ Presence across the entire country ■ Ability to access relatively cheaper sources of capital from public and international sources ■ Network of 4 million customers ■ Improved brand name and public good will ■ Strong skilled technical human resources
Challenges	■ Insufficient and inefficient transmission and distribution network ■ Poor and unsatisfactory quality of power particularly in rural areas ■ Lack of focus on customer service and customer experience ■ Weak Project management, procurement and contract management capacity ■ High internal construction and operation costs ■ Lack of automated data collection and analysis of its operations ■ Mismatch between demand and supply ■ Traditional operating and management system ■ Lack of energy storage capacity ■ Limited transmission interconnection capacity with neighboring countries ■ Rural Electrification – expensive to expand network into remote, distant and disperse locations
Opportunities	■ Long term growth for demand of electricity ■ Reduce cost of energy through trade and economies of scale as the power system expands ■ Export and trade of power ■ Energy banking to meet deficit demand in dry season ■ Improve utility efficiency through automation, digitization and use of centrally integrated software ■ Improve profits and reduce cost of supply via decrease in AT&C losses ■ Make energy system more efficient through demand side management tools ■ Expand market by adding 2 million new customers ■ Increased operational and financial efficiency through restructuring ■ Expand and upgrade transmission and distribution operations
Threats	■ High cost of capital to finance capital expenditure plans ■ Adverse effects of climate change and extreme weather patterns on hydrology and structures ■ New regulatory regime and delays in tariff reviews ■ Distributed and self-generation by customers reduces quantum and increases variability of demand ■ Economic slowdown or failure of economy to grow as projected in the demand forecast will result in excess capacity ■ Inability to absorb all new generation that NEA has signed take-or-pay contracts for ■ New levies and taxes imposed by local, provincial and federal governments ■ Potential complications due to Federal restructuring ■ Adverse movement in dollar and other foreign currencies ■ Inability to engage in trade of electricity with neighboring countries due to political and economic reasons ■ Theft and leakage of electricity and collection losses ■ Delay in construction of projects due to social and/or legal issues such as resettlement, Right of Way and local shares

3.4 LESSONS FROM THE PAST

In the last decade, NEA faced numerous challenges including chronic load shedding, electricity theft and leakage which resulted in unreliable service to its customers, financial loss to the company and economic loss to the nation. There are numerous interrelated factors that contributed to this scenario, such as lack of long-term planning, underinvestment in the sector, the lost decade due to conflict and political turmoil, escalating losses due to project construction delays, and social issues relating to land acquisition and benefit sharing.

The silver lining to this difficult period has been that it culminated with the end of load shedding due to a confluence of several positive factors - a management team committed to serving the needs of the customers first, appropriate and optimal allocation of supply, ability to manage the system, enhancement of network capacity to import power from India and distribute it to the load centers. But more importantly, the lessons learned have been invaluable and they will be brought to bear as NEA provides a platform for economic development of Nepal and looks to a period of self-transformation, growth and success.

- **Proactive and long-term planning:** Power sector projects have long gestation periods and require long-term planning. The long gestation period of power projects is further complicated by Nepal's socio-political context – an evolving political landscape, heightened social activism and weak governance. NEA network and infrastructure expansion plans will require stipulating provision for contingencies and redundancies. Similarly, the expansion of infrastructure needs to be based on realistic demand projections. Imbalances in supply and demand are damaging for both the economy and NEA's financial well-being. Uncoordinated development such as power plants coming online before the transmission infrastructure is in place to evacuate power must be managed properly. Load centers should receive distribution upgrades to keep up with growing demand without overloading the system.

- **Timely decision-making and delegation of authority:** Delayed decision-making has caused huge financial losses to NEA in the form of penalties, increased construction costs and lost revenues. The success of the Chilime model has highlighted the benefits of adopting the private company development model which has enabled efficient decision-making through delegation of authority, and deployment of capital. NEA has since used this SPV model to develop other generation projects and will explore the model for other types of power infrastructure development. Learnings from this model will be integrated into the management and governance of NEA, especially in the delegation of authority.

- **Enhancing energy security:** The bitter experience of the economic blockade following the devastating 2015 earthquake has had a debilitating effect on the Nepali psyche. The adverse impact was most felt due to the short supply of energy products such as petroleum and cooking gas. Although electricity trading with India has been instrumental in ending load shedding, enhancing energy security still remains a top priority for Nepal.

- **Timely adjustments of tariff:** Lack of timely adjustment of tariff was a major contributor of NEA's poor financial health. Timely tariff adjustments were held hostage due to a philosophical divergence between the Electricity Tariff Fixation Commission (ETFC) and NEA even as both parties had the same objective of providing reliable and affordable power for consumers. ETFC demanded NEA improve on operational efficiency and cost transparency before approving tariff adjustments. But NEA lacked capital to invest in its network and systems to reduce losses and provide transparent cost accounting structure. This lack of timely adjustment of tariff ultimately cost the consumers reliable power supply. Realizing the need for better communication, transparency and engagement with stakeholders, NEA plans to increase activities in this regard while preparing to engage with the newly established Electricity Regulatory Commission.

- **Demand side management:** Given the demand profile of INPS with smaller morning peaks and larger evening peaks, NEA has underutilized demand side management tools to shift the morning and evening loads to day and night time hours. Policies like time-of-day (TOD) tariffs can be used to flatten the load curve in the future while promoting the use of energy efficient appliances will help reduce peak hour demand.

- **Manual processes impeding efficiency and transparency:** NEA is heavily dependent on human communication, decision-making and action. Majority of NEA's data is gathered manually and is not digitized, which makes the process prone to human errors. It has affected the availability of reliable and updated data across departments. There is an urgent need to develop an overall system to automate data collection and availability in real-time. Availability of such data will help NEA to make informed investment decisions for improving its network.

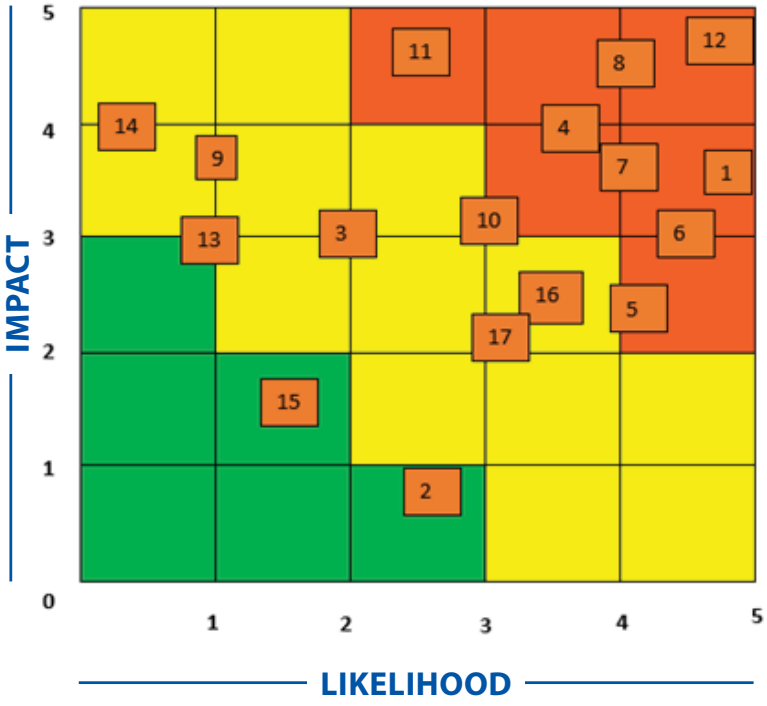
3.5 CORPORATE RISK MANAGEMENT

The execution of the Corporate Development Plan over the next five years is contingent on a variety of external factors that NEA has either limited or no control over. Identification of the risks, the likelihood of their occurrence and the impact it will have on the organization have been listed below. Knowledge of the potential risks will help NEA be mindful of them and prepare strategies to mitigate the risks should they occur.

FIGURE 3: Risks

	KEY VARIABLES IMPACTING CORPORATE DEVELOPMENT PLAN
1.	Legal and Regulatory Environment
2.	Competition
3.	Reputational Risk
4.	Employee Productivity
5.	Restructuring
6.	Surplus Power
7.	Power Trade with India
8.	Cost Reflective Tariff
9.	Inadequate Succession Planning
10.	Politicization of Work Force
11.	Loss Reduction Targets not Achieved
12.	Foreign Exchange Risk
13.	Liquidity/Cash Flow Risk
14.	Technology/System Failure Risk
15.	Financial and Market Risk
16.	Natural Disasters
17.	Climate Change

FIGURE 4: Impacts & Likelihood



4.

STRATEGIC THEMES AND GOALS

Development of hydropower resources is the cornerstone of Nepal's economic development. Years of unserved demand led to a deterioration of Nepal's economy and the standard of living of its citizens. NEA is at the heart of the electricity sector, and its transformation into a modern capable entity is vital to the rapid development of a reliable electricity sector. The primary objective of the CDP is to transform NEA into a modern and efficient utility and make electricity safe, reliable and available.

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The CDP captures NEA's strategic vision and priorities along three Themes. The strategic priorities will be achieved through 17 Goals, each comprising of activities described in Sections 4.1 to 4.3 below. The vertically integrated utility has a dual identity. It is not only a corporate body but is also fully owned by the government. As such, it has the added obligation of implementing the government's vision and plans of sector development and providing electricity to all Nepali homes and businesses.

The CDP comprises of these three strategic Themes:

1. **National Priorities**
2. **Capable, Modern and Smart Utility**
3. **Improve Customer Care**

The identified 17 Goals are Specific, Measurable, Achievable, Realistic and Time-bound (SMART). Each goal has associated Key Performance Indicator (KPI) targets. The SMART goals will help NEA build its capability to implement government policies while functioning as a modern corporate entity that provides reliable service to its customers. An Activity Matrix with Goals and annual KPIs is provided in Section 8 of this document.

4.1 THEME 1 - NATIONAL PRIORITIES

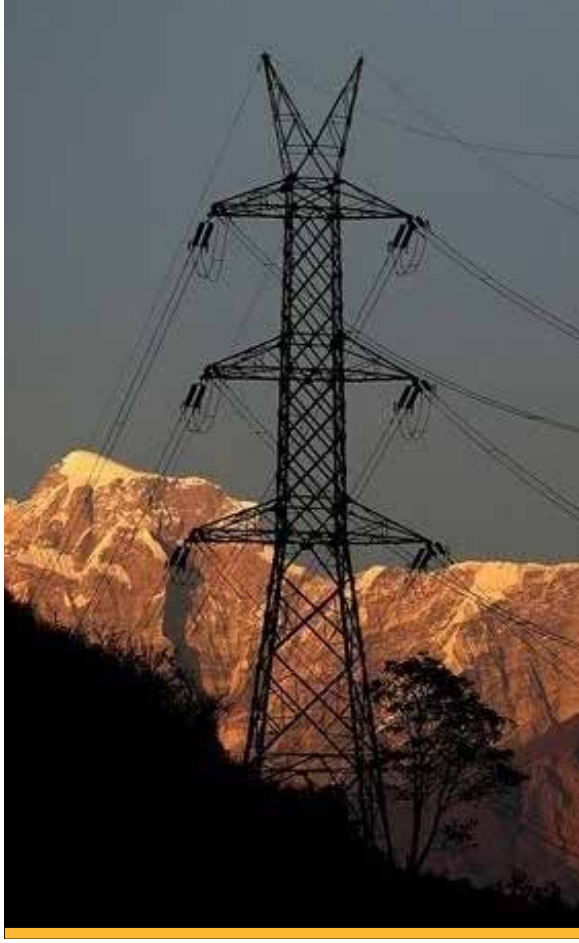
The CDP is not only guided by NEA's desire to become an efficient modern utility but also by the fact that NEA is at present 100% government-owned and as such, is the designated agency for implementing the government's vision and plans.

The White Paper issued in May 2018 by the Honorable Minister Barsha Man Pun details the plans of the government for the sector. The Goals under this Theme have been guided by the vision and plans laid out in the White Paper. The following table lists specific Activities along the four thematic Goals:

TABLE 6: National Priorities

SN	GOALS	#	ACTIVITIES
1.	Expand and upgrade system capacity to generate, transmit and distribute 5000 MW	1.	Increase domestic generation capacity
		2.	Increase and enhance transmission capacity
		3.	Increase and enhance distribution capacity
		4.	Increase and enhance cross-border infrastructure
2.	Increase per capita electricity consumption to 700 kWh	1.	Build institutional capacity to increase per capita electricity usage
		2.	Prepare time-of-day and seasonal tariff strategies
		3.	Liaise with government agencies to electrify the economy and increase electricity usage
3.	Electricity for All	1.	Build institutional knowledge and capacity on electrification needs
		2.	Continue campaign to add new customers to the grid
4.	Improve Nepal's Energy Security	1.	Increase Nepal's electricity generation capacity with special focus on PRoR and Storage projects
		2.	Prioritize the development of new projects: PRoR, Storage, Pump-storage and Battery stations
		3.	Ensure a healthy generation mix as per the White Paper
		4.	Market Integration

NEA considers it an honor to be the primary institution to implement these four nation-building Goals that will have significant implications for the development of Nepal, the success of its businesses, and the welfare of its citizens. NEA also realizes that it alone cannot accomplish these Goals and looks forward for the support of MoEWRI, other Ministries and all stakeholders in this important endeavor.



4.1.1 GOAL 1 - EXPAND AND UPGRADE SYSTEM CAPACITY TO GENERATE, TRANSMIT AND DISTRIBUTE 5000 MW

As of FY 2017/18 INPS has a generation capacity of 1074 MW of which 1021 MW is hydro-based. The system is supplemented by 53 MW of thermal power. The transmission and distribution systems are capable of evacuating and distributing Nepal's domestic generation and electricity imported from the 12 cross-border interconnections.

The White Paper lays a bold vision for increasing Nepal's generation capacity to 5,000 MW within the stipulated CDP timeframe. The government also envisions increasing per capita consumption of electricity to 700 kWh. An aggressive upgradation and expansion of infrastructure is required for NEA to meet the targets set by the White Paper. A system that struggles to evacuate and distribute less than 1500 MW will need to be augmented to transmit and distribute 5000 MW in less than 5 years. Nepal's cross-border infrastructure will also require substantial capacity enhancements to import when in deficit and export when in excess.

Activity 1: Increase domestic generation capacity

Domestic generation capacity is expected to reach close to 5000 MW in the next five years. Construction of hydro power projects totaling a generation capacity of 4125 MW is in full swing and slated for commercial operation. NEA is constructing projects worth 74 MW whereas NEA subsidiary companies and IPPs are constructing projects worth 808 MW and 2743 MW, respectively.

> The White Paper also envisions electricity generation through solar projects. A total of 500 MW of solar is expected to come online in the next five years.

The Planning, Monitoring & IT Directorate, the Generation Directorate and the NEA Subsidiary Company Monitoring Directorate will be the three primary Directorates responsible for meeting KPIs of Activity 1.

Activity 2: Increase and enhance transmission capacity

Evacuation of power has been a major implementation challenge in Nepal due to reasons such as timely forest clearances, compensation policies related to land acquisition and RoWs and weak enforcement of existing laws. These challenges have made it difficult for many transmission projects to be completed on time and within budget. NEA plans to build the transmission infrastructure required to evacuate 5000 MW of power despite these challenges.

The first aspect of estimating evacuation capacity is to conduct a detailed investigation of transmission requirements between generation points and load centers. Nepal's Five-year Transmission System Plan provides valuable information on the exact transmission requirements for the coming years.

To enhance evacuation capacity, NEA plans to build new 400 kV, 220 kV and 132 kV transmission lines that covers a distance of 570 circuit kilometer (c-km), 735 c-km and 2357c-km, respectively. Similarly, substations with a total of 6385 MVA will be added to the transmission system in the given time frame.

System Operation Department, Transmission Directorate and the Project Management Directorate will be responsible for meeting the KPIs of Activity 2.

Activity 3: Increase and enhance distribution capacity

The distribution network requires major upgrades since overloading of conductors and transformers occur during peak hours. There is an urgent need to upgrade the existing system and expand the distribution network to enable per capita consumption increase, and addition of new connections.

> To enhance distribution network, current distribution capacity needs to be improved, which requires a detailed investigation and long-term Distribution Master Plan. The plan should identify the infrastructure required to distribute 5000 MW of power to the projected 6 million NEA customers by the fiscal year 2023/24.

As Nepal progresses its implementation of a Federal structure and division of responsibilities between Federal and Provincial entities, NEA plans to establish seven provincial distribution companies. These companies may be 100% subsidiaries of NEA or owned and operated by the Provinces or may be a mixture of the two. The Activity Matrix details the exact circuit kilometers of 132kV, 66 kV, 33 kV and 11 kV lines, substation MVA capacity and transformers to be added per Province in the next five years.

The Distribution & Customer Services Directorate will be responsible for meeting the KPIs of this Activity.

The first major interconnection, Dhalkebar - Muzaffarpur, is currently charged at 220 kV and will be upgraded to 400 kV in the near future.

Activity 4: Increase and enhance cross-border infrastructure

There are currently 12 transmission interconnections with India; six are 33 kV lines and five are 132 kV lines. The first major interconnection, Dhalkebar - Muzaffarpur, is currently charged at 220 kV and will be upgraded to 400 kV in the near future. Nepal's present cross-border transmission capacity, around 500 MW, will need vast upgrades to cater to the growing electricity needs of the country as well as to export large quanta of excess power in the coming years.

In addition to the Dhalkebar-Muzaffarpur interconnection upgrade, the second cross-border interconnection, New Butwal – Sunauli – Gorakhpur, with 400 kV capacity is expected to start commercial operation during the Plan period. Three additional 400 kV interconnections have been planned: Inaruwa – Jogbani – Purniya in the East, new Dhalkebar-Muzzaffarpur line in the Center and Attariya – Bareilly in the West. Furthermore, developers of the Upper Karnali 900 MW export-oriented project plans to build a 400 kV Upper Karnali – Lamki – Bareilly line and SJVN Arun-3 900 MW export-oriented project plans to build a 400 kV Arun-3 – Dhalkebar – Muzaffarpur line. The SJVN Arun-3 cross-border line is expected to be commissioned during the Plan period.

The Transmission Directorate will be responsible for meeting the KPIs of this Activity.

4.1.2 GOAL 2 - INCREASE PER CAPITA ELECTRICITY CONSUMPTION TO 700 KWH

Electricity per capita consumption in Nepal is among the lowest in the world. Given the country's abundance of hydro resources and the direct linkage between the level of development of a country and its per capita electricity usage, the White Paper aims to significantly increase electricity usage.

The quest for increasing this high quantum of electricity usage is a new undertaking for NEA and Nepal which has historically faced severe supply shortages. As a result, citizens had learnt to consume less. The utility needs to develop policies that systematically encourage higher consumption as well as revise the practice of charging customers higher rates for more consumption. NEA thus plans to implement seasonal and time-of-day (TOD) tariff to encourage higher consumption and will work with other government agencies to devise a plan to increase the use of electricity in Nepali homes and businesses.

Activity 1: Build institutional capacity to increase per capita electricity usage

Nepal faced severe electricity shortage for about two decades due to an imbalance in demand and supply of electricity. NEA has been able to meet domestic electricity demand only in the last two years. In this context, developing policies and programs to promote electricity usage is a new phenomenon for NEA and will require the development of new strategies.

A new directorate called the Business Development Directorate (BDD) will be established in the second year of the Plan period. The responsibilities of the existing NEA Subsidiary Company Management Directorate will be taken over by BDD. In addition, it will be responsible for exploring and developing new business avenues for NEA. Since NEA's primary business is the sale of electricity, one of BDD's main tasks will be to promote and increase the use of electricity in the country. An Office and Management Survey (O&M) will be carried out to identify the resource requirements of the new directorate and departments within it. Management will ensure that sufficient resources are invested and the directorate is operationalized within the second year of the Plan.

BDD will develop a Demand Stimulation Action Plan that will identify concrete steps to be taken by NEA to increase domestic consumption of electricity.

BDD and MDS (Managing Director's Secretariat) will be responsible for meeting the KPIs of this Activity.

Activity 2: Prepare TOD and seasonal tariff strategies

Although Nepal has a hydro-based system, there is a mismatch between the electricity generation and consumption profile due to seasonal variation in the amount of water that flows in the rivers. Given that the generation capacity of most hydro power projects is designed at Q-40 and that most projects are simple run-off-river projects, more electricity is generated during the monsoon months. The amount of electricity generated is also mostly constant during day and at night.

On the consumption side, the demand for electricity does not fluctuate as much between monsoon and winter months. However, within a given day, demand for electricity is higher in the

mornings and evenings than during the night. Electricity demand during night off-peak hours are almost half of peak demand.

The disparity in the supply and demand pattern poses a challenge for NEA. It is magnified by the fact that most domestic generation assets are run-off-river projects that do not have any storage capacity. It is therefore important to design and develop TOD and seasonal electricity tariffs to encourage more electricity usage in the monsoon season, and during off-peak hours. The new tariff strategy that will be developed by NEA during the Plan period is expected to play an important role in promoting greater electricity usage during off-peak hours and summer months while also ensuring efficient use of electricity.

The Economic Analysis Department (EAD) and Planning, Monitoring & IT Directorate will be responsible meeting the KPIs of this Activity.

Activity 3: Liaise with government agencies to electrify the economy and increase electricity usage

A nation's per capita electricity usage is directly correlated with its per capita income. Hence, electricity use increases with increasing income levels. Nepal's 2017 per capita electricity usage was around 170 kWh, which is among the lowest in the world. NEA strives to change this reality.

One of the possible ways to increase electricity usage is by increasing the number of electrical appliances citizens use in their daily lives. NEA will conduct an assessment to identify electrical appliances that can be used in Nepali homes. Similarly, the study will also identify the possibilities of increasing the usage of electricity in Nepali offices and factories. Based on the results of the study, NEA will make policy recommendations to GoN on fiscal policies to adopt to promote the use of energy-efficient electrical appliances.

Fiscal incentives may be required to make electrical appliances more affordable. Likewise, fiscal policies that make non-electric machineries more expensive may also be required.

> Electricity can replace petroleum products. The substitution of cooking gas by electricity has the potential to be a game changer in terms of moving towards an electric economy. Fossil fuels still provide 16% of total energy consumed in Nepal. As much as NPR 200 Billion worth petroleum products are imported annually.

Imported Liquid Petroleum Gas (LPG) can be substituted by domestically generated and environment-friendly electricity as long as the distribution network is upgraded to supply larger quantum of power to Nepali homes and INPS has sufficient peaking capacity. Similarly, moving from a petroleum-based transport system to an electric one will provide ample demand for electricity. Establishment of a network of electrical charging stations and lower night off-peak tariff will be required for the promotion of electric vehicles. Furthermore, mass use of irrigation pumps during night hours has the potential to significantly increase electricity consumption.

NEA will work with MoEWRI, MoF, MoICS and MoPIT to promote appropriate policies to increase electricity consumption. EAD-PMITD and BDD will be responsible for implementing this Activity.

4.1.3 GOAL 3 – ELECTRICITY FOR ALL

The White Paper has an ambitious but justifiable goal of providing electricity for all in the next five years. NEA and AEPC are entrusted with the implementation mandate for ensuring all Nepali homes have grid and off-grid electricity. NEA currently has about 4 million customers and will serve an additional 2 million customers to fulfil the universal access mandate.

The development of a coherent Plan that incorporates activities with budget required to achieve this ambitious goal is necessary at the outset. Given that a majority of urban and semi-urban areas already have access to electricity, remote and sparse communities will be a priority for electrification during the Plan period. There are financial implications to availing electricity to geographically distant areas where consumption is lower than urban areas. Additional financial support will be required from GoN to meet the goal of electricity for all. Nevertheless, NEA is dedicated to implementing this policy objective with full vigor and commitment.

The massive electricity expansion drive will be headed by the Community Rural Electrification Department (CRED) and NEA's Regional Offices under the Distribution and Customer Service Directorate (DCSD). A separate implementation office may be established for the achievement of this Goal.

Activity 1: Build institutional knowledge and capacity on electrification needs

A detailed research to identify areas and regions that require electricity access will be beneficial for NEA and its mission to provide electricity for all. The Electricity For All Action Plan will identify areas where expansion is required which will help develop a holistic strategy and allocate resources required to meet this grand endeavor.

This bottom-up approach will require all Regional Offices and Distribution Centers to generate up to date data on the requirements of their regions.

It may not be economical for the central grid to supply electricity to extremely remote and geographically challenging areas. Off grid solutions will be sought for these areas in coordination and collaboration with AEPC. The two organizations will work together to ensure that all sections of society have access to electricity in an optimal and cost-effective manner.

DCSD will coordinate to analyze and develop a holistic document that captures valuable knowledge to guide the project at hand - attaining electricity for all within the Plan period.

Activity 2: Continue campaign to add new customers to the grid
In the past years, availability of electric meters was an issue that limited the number of new customer connections. NEA will resolve this management issue in the first year of the Plan period. Furthermore, ordering and stock keeping of meters will be properly managed to ensure the availability of meters in all Distribution Centers. Additionally, DCSD will develop a system to continuously track the purchasing and availability of meters.

The planned activities of the Electricity For All Action Plan will be implemented by the Regional Offices. It is vital for sufficient budget be made available to carry out all activities. In keeping with the new local government delineation in the Federal Structure, grid and customer expansion activities will be local government area based.

The goal of providing electricity for all in five years is an extremely ambitious plan that requires significant increase in funding from what has historically been provided by GoN to NEA for rural electrification. NEA plans to add 400,000 customers per year for the next five years to meet this goal and hopes for successful collaboration with all tiers of government in this effort. More than 95% of the Nepali population will be provided electricity by the central grid. The remaining population, due to the geographic remoteness, will be provided electricity using off-grid solutions through AEPC.

DCSD will be responsible for meeting the KPIs of this Activity.

4.1.4 GOAL 4 - IMPROVE ENERGY SECURITY

Improving Nepal's energy security is a high priority for GoN. The more Nepal is reliant on domestically generated electricity, the more secure it is. Usually, hydro power projects have a long gestation period and large storage projects take even longer to construct. Nonetheless, NEA is committed to continuously improve Nepal's energy security and has long term plans to replace imported fossil fuels with domestically generated hydro power.

Given the wide variation of availability of water in Nepali rivers between seasons, it is important to have a generation mix of different types of hydro power projects. PRoR projects have a small reservoir and are capable of storing enough water to generate at maximum installed capacity for 4 to 6 hours on a given day. Additionally, reservoir projects can store monsoon water for use in dry months. The White Paper calls for a mixed generation capacity consisting of 30-35% storage projects, 25-30% PRoR projects, 30-35% of RoR projects and 5-10% alternative energy sources. NEA is working towards achieving this generation mix target.

Activity 1: Increase Nepal's electricity generation capacity with special focus on PRoR and Storage projects
Hydro power projects with a combined installed capacity of 4125 MW are at various stages of construction and will begin commercial operation within the Plan's timeframe. It took Nepal more than a century to develop 1074 MWs. The next five years will see an increase in installed capacity by more than 400%. This is a remarkable achievement for Nepal. During the CDP term, the total generation capacity will be further supported by solar power plants. 63% of the electricity consumed in Nepal was domestically generated in FY

2017/18. By end of Year 5 of the Plan, NEA expects domestic generation to meet 100% of demand.

Given the importance of PRoR and storage projects to Nepal's energy security, NEA has been focusing its efforts to develop such projects. Kulekhani III storage project (14 MW) is expected to begin commercial operations in the first year of the Plan period. Nepal will have a combined storage capacity of 106 MW with three cascading Kulekhani projects once Kulekhani III begins generating electricity. Similarly, Upper Tamakoshi (456 MW), the largest hydro project currently under construction, is a PRoR with a 6-hour peaking capacity. The addition of Upper Tamakoshi to INPS is a major milestone for Nepal's hydro power development because it demonstrates the county's ability to finance and build large hydro power projects. Completion of this project will also enable electricity export to India during the monsoon season, and through a banking or trading mechanism, Nepal can take back electricity during the dry season. Furthermore, along with Kaligandaki (144 MW), Middle Marsyangdi (70 MW), Marsyangdi (69 MW) and Chilime (22.1 MW), the total installed capacity of PRoR projects will increase to 955 MW during the Plan period. Upper Tamakoshi (456 MW), Upper Sanjen (14.8 MW), Sanjen (42.5 MW), Kabeli (37.6 MW) and Lapche Khola (99.4 MW) are under-construction PRoR projects slated for commercial operation within the Plan period.

NEA, through NEA-owned subsidiary companies, is also rapidly developing multiple PRoR and storage projects. Tanahu Storage (140 MW) is already in construction and will provide much needed reservoir capacity. Likewise, Dudh Koshi Storage (635 MW), Tamakoshi V PRoR (95 MW), Chainpur Seti PRoR (210 MW) and Upper Arun PRoR (725 MW) are in advanced stages of preparation. Financial close and construction of all four projects is expected to happen within the Plan period.

The Generation Directorate is responsible for the timely completion of Kulekhani III where-as the Business Development Directorate will ensure that all planned activities of the other five projects are conducted on time and within budget.

Activity 2: Prioritize the evelopment of new projects: PRoR, Storage, Pump-storage and Battery stations

The vision for 15,000 MW generation capacity in the next ten years, as laid out in the White Paper, requires developing more PRoR and storage projects. The technical preparations and project financing plans for Uttar Ganga Storage (828 MW) is expected to be completed within the Plan period. Similarly, NEA has initiated the feasibility study of Begnas-Rupa Pump-Storage project (150 MW). Additionally, NEA will begin preliminary investigation of different PRoR and storage projects of at least 2500 MW during the Plan period.

In the last few years, there have been promising advances in large-scale electricity storage technologies. If financially viable, such utility-scale storages would be an ideal fit for Nepal's hydro electricity generation profile because surplus electricity can be stored and used when there is higher demand. NEA will assess the suitability of such emerging technologies and devise policies and tariffs to promote the commercial development of such facilities. Work on defining the policies and tariffs will begin during the Plan period with an aim of offering tariff rates within the next five years.

The Engineering Services Directorate will be responsible for meeting the KPIs of the investigations in this Activity and the Economic Analysis Department will conduct the analysis for the utility-scale battery facilities.

Activity 3: Ensure a healthy generation mix as per the White Paper

At present, most of Nepal's installed hydro power capacity is RoR projects. Of the 1074 MW installed capacity in FY 17/18, Nepal had 92 MW storage capacity, 305 MW PRoR capacity and 54 MW thermal capacity where as RoR projects have a combined installed capacity of 623 MW. The percentage break down between the targets provided by the White Paper and Nepal's current generation mix is provided in the table below:

TABLE 7: Generation Mix

	TARGET %	PRESENT %
Storage	30-35	9
PRoR	25-30	28
RoR	30-35	58
Non-hydro Renewable	5-10	NA

Due to the long gestation periods for hydropower, it might not be possible to meet the generation mix targets set by the government in this Plan period. Nonetheless, NEA understands the importance of attaining the targeted mix for Nepal's energy security and is working towards it. NEA will henceforth solely focus on the development of storage and PRoR projects as evidenced by the projects it plans to begin constructing through its subsidiary companies, and the technical investigations it is conducting of other storage projects.

The Power Trade Department will take heed of the policy guidelines provided by the White Paper and sign PPAs to achieve the percentages derived by GoN.

Activity 4: Market Integration

Integration with the Indian and Regional markets improves Nepal's energy security. NEA will begin energy banking with India and trading within the Region. It is essential to provide electricity to Nepali homes and businesses when there is a shortfall in domestic generation via imports and exporting domestically produced electricity when there is surplus generation. This interdependence will help NEA supply reliable power to its customers and help keep the organization in good financial condition. Market integration will also make the system more efficient. Trading of electricity in the day ahead and term ahead markets will be initiated in the first year of the CDP.

Nepal Power Trading Company and/ or Power Trade Department will be responsible for meeting the KPIs of this Activity.

4.2 THEME 2 - CAPABLE, MODERN AND SMART UTILITY

NEA is a corporate entity and as such is expected to operate in a commercially viable and sustainable manner. Efficiency, automation, modernization and improving customer service are some integral aspects needed for the sustenance of a 21st century corporate body. The Goals and Activities under this Theme are intended to transform NEA into an efficient, capable modern entity within the Plan period.

The specific Goals and Activities under the Theme are listed below:

TABLE 8: Transform NEA into a Capable, Modern and Smart Utility

SN	GOALS	#	ACTIVITIES
1.	Reduce Aggregate Technical and Commercial Losses to under 15%	1.	Build institutional capacity to reduce losses
		2.	Develop infrastructure and system to digitalize data acquisition and generate reports
		3.	Invest in system infrastructure for loss reduction
		4.	Decrease non-technical losses
2.	Demand Side Management and Energy Efficiency	1.	Build institutional capacity to make system more efficient
		2.	Promote measures to make economy more energy efficient
		3.	Employ Demand Side Management tools to clip peak and fill valley of load curve
		4.	Encourage consumers to change consumption behavior
3.	Detailed Recording of Accounting Transactions	1.	Identify and separate Generation, Transmission and Distribution assets and liabilities
		2.	Determine per unit Generation, Transmission and Distribution cost of service
		3.	Create individual financial statements for the seven provincial Distribution Companies / Regional Offices
4.	Use of Modern IT systems	1.	Improve IT policy and standards
		2.	Develop a state-of-the-art communication network between all branches
		3.	Establish a centralized Data Center and back-up system
		4.	Build IT Capacity of employees
		5.	Develop infrastructure and system to digitalize data acquisition and generate reports
		6.	Implement Enterprise Resource Plan (ERP) Software
		7.	Develop automated billing and payment system infrastructure
		8.	Modernize internal communications and record keeping

Contd... Transform NEA into a Capable, Modern and Smart Utility

SN	GOALS	#	ACTIVITIES
5.	Increase Non-tariff Income	1.	Increase capacity and mandate of Treasury Department
		2.	Establish Business Development Directorate to increase income
6.	Improve employee benefits, productivity and human resource planning	1.	Improve human resource planning
		2.	Enhance employee benefits and safety
7.	Re-brand NEA as a Modern Corporate Entity	1.	Build institutional capacity for Communications and Outreach
		2.	Increase Communications and Outreach activities
8.	Preparedness for Regulatory requirements	1.	Increase institutional capacity to file annual tariff petitions
		2.	Determine scientific and pragmatic tariff
9.	Operationalize a competent Power Trading Company	1.	Establish a well-resourced NPTC
		2.	Begin banking electricity with neighboring countries
		3.	Begin trading of electricity
		4.	Competitive bidding of PPAs
10.	Improve Contract and Project Management	1.	Improve Contract Management abilities
		2.	Improve coordination between various GoN agencies
11.	Establish and operationalize a well-resourced Business Development Directorate	1.	Establish a well-resourced BDD
		2.	Develop long-terms plans of BDD
		3.	Quarterly Monitoring and Reporting
12.	Improve safety and ensure compliance of technical standards	1.	Increase institutional capacity to improve safety and ensure compliance of technical standards
		2.	Audit for compliance of Technical and Safety Standards
		3.	Safety Awareness Public Campaign
		4.	Capacity building of employees to reduce workplace accidents

The availability of affordable, reliable and stable electricity is essential to Nepal's development and progress. Thus, NEA's ability to transform itself into a capable, modern and smart utility has a direct impact on the nation's economic development and the standard of living of its citizens. This reform process is ongoing and will be a major focus for NEA during this Plan period.

4.2.1 GOAL 1 - REDUCE AGGREGATE TECHNICAL AND COMMERCIAL LOSSES TO UNDER 15%

Aggregate Technical and Commercial (AT&C) losses have seriously hampered the financial situation of NEA. A recent study estimated that a reduction in AT&C losses of 1% increased NEA revenue by NPR 700 million. NEA in FY 2017/18 had AT&C losses of 20.45%. The Plan aims to rectify this loss by lowering it to 14.4% in the next five years.

Activity 1: Build institutional capacity to reduce losses

NEA will focus on building its institutional capacity to reduce losses in the Plan period. Developing the knowledge of sources and causes of losses and the equipment upgrades required to reduce them is the precursor to being actually reducing losses. The establishment of the Energy Efficiency and Loss Reduction Department (EELRD) under the leadership of the Managing Director was an important step towards building NEA's institutional capacity in this sector. Furthermore, two pilot programs are in the implementation phase to gather loss information and devise concrete measures to overcome them.

EELRD has made significant progress in increasing NEA's knowledge of the sources of losses and proposing remedies. It is currently conducting a pilot program to automate the data collection from five sub-stations. Electricity data will be collected on real time basis from automated sensors in these sub-stations. A new software at the Corporate Office will generate load profiles of busbars and feeders. This technology is expected to inform Management of losses incurred by overloaded transformers, conductors, feeders and busbars. It will allow NEA to make effective investment decisions by identifying and prioritizing faulty and overloaded equipment upgrades.

NEA is also in the process of developing a Distribution Loss Reduction Master Plan. This exercise entails extensive data collection, a computer model for system simulation, information on losses across voltage levels and a computerized distribution system technical analysis program. The Master Plan will offer concrete steps required to decrease loss reduction in the distribution system. NEA will carrying out loss reduction activities in five Distribution Centers (DC) as a pilot. The program can be scaled up based on the learnings of the pilot.

DCSD and EELRD will coordinate and monitor the KPIs of this activity.

Activity 2: Develop infrastructure and system to digitalize data acquisition and generate reports

An Automated Data Acquisition Plan will be developed in the second year of the Plan. It proposes the use of Geographic Information System (GIS) mapping technology to map sub-stations, feeders, transformers, poles and meters in all 117 DCs and its sub-branches. The network mapping exercise will be accompanied by mounting automatic data emitting sensors in all distribution assets. This measure will enable NEA to identify all loss prone areas on a real time basis. It will aid in prioritizing equipment replacements and upgrades required to reduce losses. Furthermore, it will also help in identifying the exact point of loss of connection or faulty equipment. This knowledge is expected to help NEA repair the problem and resume electricity supply in a shorter time frame. The GIS mapping program will be implemented in 35 DCs in the first phase and implemented in all DCs during the Plan period. The data on the flow of electricity within NEA network will be made available to the Management on a real time basis through a dashboard.

DCSD and IT-PMITD will jointly be responsible for meeting the KPIs of this Activity.

Activity 3: Invest in system infrastructure for loss reduction

Distribution system losses are the result of a combination of technical and non-technical reasons. Technical losses are caused by subpar distribution infrastructure while non-technical losses, also termed commercial losses, are caused due to theft and non-payment.

NEA will invest close to NPR 80 billion in the next five years to improve the distribution network to enable the efficient distribution of 5000 MW. The FY 17/18 AT&C loss within the distribution network is estimated to be 14.82% and is targeted for reduction to 10.08% during the Plan period. DCSD will issue loss targets to all Regional Offices, which in turn will allocate loss targets to their respective Distribution Centers. A performance contract system with specified loss reduction targets will be signed by Chiefs of Regional Offices and DCs. Meeting set targets will result in financial incentives as well as extra points for promotion and priority in transfers.

> Overloaded feeders will be identified and upgraded. The Plan has set forth a target of upgrading 475 feeders in the next five years. Decrease in congestion, especially during peak hours, is key to loss reduction. NEA also plans to add 2500 capacitor banks to improve voltage at the load-end which will reduce distribution losses.

All DCs will be equipped with personnel and machinery to carry out loss reduction tasks. The Regional Offices will ensure that distribution transformers, energy meters, metering units, poles, conductors and cables are appropriately stocked. These are necessary pre-requisites for DCs to meet their loss reduction targets.

On the transmission front, NEA plans to reduce transmission losses from 5.63% to 4.80% in the next five years. To reduce transmission losses the present transmission voltage of 132 kV will be upgraded to 400/220 kV in most of the transmission links. Substations will be upgraded and new substation infrastructures will be installed as per consumer demand. Furthermore, the Load Dispatch Center will be modernized and effective, and economic load dispatch mechanism will be developed.

DCSD, TD and LDC will be responsible for meeting the KPIs of this Activity.

Activity 4: Decrease non-technical losses

All DCs will continue implementing anti-theft activities. The Corporate Office and the Regional Offices will ensure sufficient budget allocation to all DCs for mobilizing security personnel and vehicles to carry out loss reduction activities. All activities to control theft and punish perpetrators will be compiled and published on an annual basis.

NEA will also increase its efforts to create social pressure to limit the theft of electricity and encourage all customers to pay their bills on time. The Public Relations and Grievance Handling Section under the General Administrative Department will spearhead this public relations campaign. Social media tools will be used to support the campaign.

DCSD and Public Relations and Grievance Handling Section will be responsible for meeting the KPIs of this Activity.

4.2.2 GOAL 2 - DEMAND SIDE MANAGEMENT AND ENERGY EFFICIENCY

Operating an efficient electricity system requires both supply side and demand side management (DSM). The variation in the availability of water in the rivers of Nepal between seasons pose a challenge in generating and supplying a steady quantum of electricity. Two measures to mitigate supply side challenge include increasing Nepal's storage and PRoR capacity and enhancing cross-border interconnections. In terms of DSM, seasonal and TOD tariffs, use of efficient electrical appliances and change in consumption patterns can be used to decrease demand for electricity during peak hours and increase demand during off-peak hours.

Building institutional capacity of NEA to use DSM tools, promoting efficient electrical appliances and encouraging changes in consumer behavior will be crucial to achieving DSM and energy efficiency KPIs.

Activity 1: Build institutional capacity to make system more efficient

Enhancing the institutional capacity of EELRD will have a significant impact on improving system efficiency of INPS. It is therefore essential to provide the department with additional human resources as well as budgetary support to build up the team and increase the magnitude of its activities. It is also equally important for the department to increase its knowledge and know-how of the subject matter.

EELRD also requires an effective long-term plan to fulfill its mandate. It will therefore develop a Peak Load Reduction Plan with the vision of clipping the peak and filling the valley of the load curve. This plan will detail measures to incentivize customers to decrease evening time demand and increase off-peak usage. Strategies such as decreasing the price of power during off-peak hours, making energy efficient appliances financially more attractive and appealing to the ethos of the general public for behavioral change will make the system more efficient.

EELRD will be responsible for implementing the strategies of the Plan and meeting the KPIs of this Activity.

Activity 2: Promote measures to make economy more energy efficient

Nepal's evening peak load is mostly attributed to lighting. Past efforts to promote the use of compact fluorescent lighting (CFL) and increasing use of LED lights in recent years has helped reduce demand to a certain extent. Additionally, introducing higher electricity tariff during evening hours can act as an incentive to shape customer's decision-making by switching from inefficient bulbs and tube lights to LED lights.

EAD will analyze the price of purchasing LED lights and the reduction in electricity costs associated with its use versus the price and usage costs of traditional lights. Similar exercises will also be conducted for other household appliances such as fans, TVs, refrigerators and water pumps. A 28-Watt modern fan, for example, has the same performance as that of a 75-Watt traditional fan. NEA will provide policy recommendations to the Ministry of Finance based on this analysis. The recommendations will make a case for fiscal incentives to energy efficient appliances to make them cheaper. The use of these appliances will result in decrease in energy consumption during peak hours.

Establishing a Bureau for Energy Efficiency under MoEWRI will be a major achievement for Nepal. The Bureau should have the mandate of rating electrical appliances as per their electricity consumption and durability. The development of a rating system will provide important information to consumers when they decide which appliance to purchase. For example, consumers may choose to buy a 5-star rated refrigerator over a 2-star rated one even if the former is a bit more expensive. Similar ratings of appliance efficiencies are also relevant in the industrial and commercial sectors. Efficient motors, energy efficient industrial design and use of energy efficient construction materials will help make the economy more energy efficient.

NEA will provide policy recommendations to MoEWRI for the establishment of the Bureau.

EELRD is already piloting some energy efficiency programs. Ground water pumps for agriculture is one such program that can have a significant impact in improving voltage levels in rural areas. Farmers currently suffer from voltage fluctuations in the distribution system leading to inefficient pumping of ground water as well as frequent damages to their pumps. Three solar-based water pump prototypes are being piloted. The first one is a community-level water pump powered by a 12-kW solar panel set. The other two are household pumps designed to displace diesel and electric water pumps. The successful implementation of this program will not only help farmers by increasing water available for farming but also help improve the voltage level in rural areas. EELRD plans to install as many as 1500 solar pumps during the Plan period.

EELRD is also in the process of installing smart programable streetlights. These lights will be lit at full luminosity from 6 to 11 PM, 30% luminosity from 11 PM to 4 AM and full luminosity for an hour in the morning. The timings and luminosities can be programmed as required. The program is expected to provide massive energy savings, and are easy to meter. A pilot has been initiated with Lalitpur Sub-Metro to procure and install 1000 lights. A nation-wide scale up is planned thereafter.

Efficient motors, energy efficient industrial design and use of energy efficient construction materials will help make the economy more energy efficient.

The EELRD and DCSD will be responsible for meeting the KPIs of this Activity.

Activity 3: Employ Demand Side Management tools to clip peak and fill valley of load curve

TOD tariff is an effective tool to improve load factor of a system. If the price of electricity is higher during peak times and lower at other times, the usage should follow accordingly. NEA has started offering TOD and seasonal tariffs to its high and medium voltage customers. The EAD will conduct further analysis to determine the most suitable seasonal and TOD tariffs. The objective of DSM is to shift some peak hours demand to off-peak hours ensuring a more efficient system. NEA plans to offer differential tariffs to its high-end domestic customers as soon as 3-phase Smart Meters are installed for these customers. It will also provide TOD tariffs to its domestic single-phase customers after successful implementation of its Smart Meter program.

DSM tools will also be developed with a focus on agriculture customers. Nation-wide usage of electrically operated water pumps can dramatically boost agriculture yield as well as increase electricity demand during off-peak hours. A program to promote ground water pumps with subsidies to make them affordable and a suitable tariff structure may encourage thousands of Nepali farmers to use these pumps for irrigation. Such interventions will be planned and implemented with relevant stakeholders during the Plan period. Promotional tariffs for seasonal industries is another DSM to encourage more usage of electricity during the monsoon months. Commercial operations such as fertilizer industries and cold storages can be provided promotional prices during the wet season.

The EAD and DCSD will be responsible for meeting the KPIs of this Activity.

Activity 4: Encourage consumers to change behavior

Changing societal behavior is enormously difficult yet extremely important if Nepal wants to have a well-balanced electricity demand-supply situation. NEA will use Information Communication Technology (ICT) platforms to inform customers about peak and off-peak hours. It will appeal to the goodwill of its customers and discourage them to use some electrical appliances during peak hours.

NEA is currently running similar promotional campaigns and plans to conduct further promotions during the Plan period. The campaign will encourage customers to purchase and use efficient electrical appliances while limiting use during peak hours.

DCSD, EELRD and Public Relations and Grievance Handling Section will be responsible for meeting the KPIs of this Activity.

4.2.3 GOAL 3 - DETAILED RECORDING OF ACCOUNTING TRANSACTIONS

With about 11,000 employees and assets worth NPR 284 billion, NEA is one of the largest corporate entities of Nepal. It has more than 4 million customers and physical assets in all districts. Maintaining up-to-date accounts of such a large corporation with more than 34 years of legacy is challenging. To address this challenge, NEA is working towards adopting and implementing Nepal Financial Reporting Standards (NFRS) within the duration of the CDP period.

NEA's Goal goes beyond just calculating total actual assets. More importantly, it involves an in-depth exercise to identify and separate Generation, Transmission and Distribution (GTD) assets within NEA. Furthermore, the accounting system will have the capability of creating individual financial statements for the three GTD components. Separate books will also be maintained for the seven Provincial distribution companies / Regional Offices during the Plan period.

The Administrative Directorate and the Finance Directorate will be jointly responsible for meeting the KPIs of this Goal.

Activity 1: Identify and separate Generation, Transmission and Distribution assets and liabilities

NEA's core business activity includes generation, transmission and distribution of electricity. Its assets, liabilities, revenues, and expenses are assigned to a particular business division. To illustrate, the Kaligandaki hydro plant and its associated assets, debts, and expenses are assigned to the Generation Directorate, and all 132kV substations assigned to the Transmission Directorate.

On the other hand, resources that are shared amongst GTD need to be allocated to each business unit based on their relative contribution. For example, costs associated with NEA's subsidiary management unit should be allocated overwhelmingly to Generation whereas the Corporate expenses may be allocated based on asset size, number of employees, or the relative requirements for management and administrative support. This exercise of allocating existing assets, liabilities, and expense balances between GTD is a complex and involved activity but can be achieved via appropriate Management Information System (MIS) and accounting practices.

This Activity shall include debt balance, fixed asset and inventory separation of GTD units. The Finance Directorate will be responsible for meeting the KPIs of this Activity.

Activity 2: Determine per unit Generation, Transmission and Distribution cost of service

Once internal division of GTD systems is accomplished, the next course of action is to establish cost of service for each activity. This is a relatively straightforward process because all costs will have already been either assigned or allocated. In addition, NEA needs to develop and implement an effective internal transfer pricing mechanism to determine the per unit revenue of each business unit. To illustrate, Generation and Transmission businesses will be able to charge Distribution for the power they supply and wheel. Revenue for Generation and Transmission will equal expense to Distribution. The determination of transfer pricing between GTD is a complex exercise and should include considerations on costs, return on capital, and operational efficiency.

> Once the revenues and expenses for individual businesses are established, it will be easier to monitor and evaluate performance, and set improvement and efficiency targets. This exercise will also better inform NEA of its cost structure and help in the setting and revision of consumer tariffs.

The Finance Directorate will be responsible for meeting the KPIs of this Activity.

Activity 3: Create individual financial statements for the seven provincial Distribution Companies / Regional Offices

The Board of NEA has already decided to form one distribution company per Province as per the new Federal structure. DCSD will develop a step-by-step plan to increase the capacity and mandate of seven Provincial distribution units into preparation of eventual spin off into independent companies. Management and accounting personnel will be deployed in all seven units. The creation of individual financial statements is a pre-requisite to the formation of separate distribution companies / Regional Office.

FD and DCSD will be responsible for meeting the KPIs of this Activity.

4.2.4 GOAL 4 – USE OF MODERN IT SYSTEMS

NEA's success will largely depend on its ability to adopt and implement modern IT systems in its day-to-day operations. The use of modern IT systems is a pre-condition to smooth and efficient operations of any corporation. Automation, digitization, data storage, a workforce capable of using modern IT systems and investment-decisions based on accurate data are key to transforming NEA into a corporation of the 21st century.

NEA is committed to making the necessary technology upgrades. It is already in the process of procuring new IT systems and will continue upgrading IT infrastructure in the next five years. Planned reforms include amending NEA's IT policy and standards, developing a centrally connected communication backbone with entire NEA outlets, establishing a dedicated Data Center backed by a Recovery Center, and improving employees' ability to use modern systems.

Activity 1: Improve IT Policy and standards

NEA's IT Policy requires amendment. The revised policy framework, to be approved by the NEA Board, will establish set protocols to be abided by the utility to make appropriate use of technology and to ensure safety and security of its data and systems. The amended policy will require annual Certified Audit of Software, Hardware and Network to ensure periodic update of all systems in use, to set appropriate controls for securing data, setting a proper back-up system and hacking prevention.

IT Department will be responsible for meeting the KPIs of this activity.

Activity 2: Develop a state-of-the-art communication network between all branches

Connecting all of NEA's directorates, Regional Offices and Distribution Centers through an optical fiber network is a central part of the IT upgradations planned in this CDP. It is absolutely necessary that data is accessed on a real time basis by all NEA outlets. Such state-of-the-art connectivity will enable centralization of multiple types of data such as distribution system losses, electricity consumed, payroll, book of accounts and revenue among others.

IT Department will develop a road map to connect all of NEA's outlet during the first year of the CDP and begin connecting all budget centers including 117 DCs and sub-branches as per the targets set in the activity matrix.

The IT Department will be responsible for meeting the KPIs of this activity.

Activity 3: Establish a centralized Data Center and back-up system

An advanced Data Center that houses all NEA data is a prerequisite to transforming NEA into a modern entity. The implementation of modern IT systems will generate large quantum of data, which needs to be stored properly and accessed easily. Furthermore, a back-up system with similar functional capability is required should the Data Center suffer some technical glitch or undergo routine maintenance. NEA is already in the process of establishing a well-equipped Data Center at its Corporate Office. A Data Recovery Center is also required to make it a secure system. The development and implementation of the Recovery Center will also be accomplished during the tenure of this Plan.

The Project Management Directorate and the IT Department will be responsible for meeting the KPIs of this activity.

Activity 4: Build IT capacity of employees

Benefits from the use of modern IT systems can only be realized if employees are able to use these systems properly. A modern entity therefore must do more than invest in modern systems. It must empower its employees to use the new systems. The IT Department and Training Center will thus develop an extensive NEA Employee IT Capacity Building Plan. This plan will determine the types and frequency of trainings required for all concerned offices. NEA understands the importance of this activity and therefore will ensure that trainings and refresher courses are held properly and frequently. The targets and schedule of trainings are set forth in the activity matrix.

The IT Department and AD will be responsible for meeting the KPIs of this activity.

Activity 5: Develop infrastructure and system to digitize data acquisition and generate reports

NEA plans to develop the infrastructure to digitize all data acquisition during the CDP timeframe. Data will be gathered automatically, stored centrally and accessed via a dashboard.

The first step of this process is to develop an Automated Data Acquisition Plan that categorically identifies all data that needs to be gathered, and investments required to develop this infrastructure. The IT Department will develop this plan with inputs from DCSD, TD and GD. The Plan includes GIS mapping of both the distribution network (entire 117 Distribution Centers) and transmission network while installing sensors across the network. The targets for GIS mapping implementation and sensor placements are set out in the activity matrix.

The IT Department, DCSD and TD will be responsible for meeting the KPIs of this Activity.

Activity 6: Implement Enterprise Resource Plan software

Enterprise Resource Plan (ERP) implementation is expected to significantly improve NEA's data centralization and standardization effort. It will increase NEA's efficiency in financial transactions, improve control measures, provide transparency in operations, increase accountability and provide a stable platform for data storage and access.

The software will centralize the six modules of Integrated Financial Management Information System (IFMIS):

1) Fixed Asset
2) Project Accounting
3) Financial Management
4) Payroll
5) Material Management
6) Human Resource Management

And three modules of Revenue Management System (RMS)

7) Metering Model
8) Billing and Collection
9) Energy Audit

The in-operation batch of software were deployed over time to meet the requirements of financial accounting, human resources and material management. The systems were introduced at different points in time to cater to different functions and for the most part operate in independent silos. The procurement and implementation of ERP will help integrate and centralize all the different modules.

> NEA also plans an extensive capacity building exercise to increase software proficiency of relevant employees. Refresher training and constant support during the implementation years will be necessary to ensure capacity development in ERP use.

FD, the IT Department, DCSD and TD will be responsible for meeting the KPIs of this Activity.

Activity 7: Develop automated billing and payment system infrastructure

Modern IT systems enable electronic bill issuance and payment via electronic payment options. The utility is no longer required to physically deliver printed bills. Likewise, customers can pay online via internet and mobile banking options, which is easy, quick and time-saving. NEA will, therefore, invest in developing and expanding the online billing and payment infrastructure during the CDP period.

Data from smart meters will be integrated with ERP's billing module. Bills will be delivered to customers via email and/or mobile phone SMS. Multiple secure modes of payment will be available for customers, which include online bank transfers, mobile transfers, use of some online payment facilities as well as the existing counters at NEA Distribution Centers.

NEA is currently in the process of incorporating information transmitting modems in all existing TOD meters used by NEA's high voltage and medium voltage customers. It also plans to install Smart Meters with the capability of transmitting electricity usage data from high-end domestic customers to NEA's main server. Through these initiatives, NEA targets to have at least 75% of electricity consumed measured by Smart Meters in the next five years.

> Discount schemes will be introduced to encourage customers to pay through these modern payment methods, which will reduce paper use, save money and benefit the environment. The Plan has set an ambitious target to have 2 million customers pay online within five years. The Central Bank will also be engaged to relax online transaction amount restrictions of high-use and industrial customers so that they too are also able to pay online.

The Planning & Technical Services Department, ITD and DCSD will be responsible for meeting the KPIs of this Activity.

Activity 8: Modernize internal communications and record keeping

The transition towards a paper-less office will take shape during this CDP period. All human resources and inventory recordings will be migrated to NEA's online database. Internal approval procedures will also be operationalized via an online platform. These measures will ensure data safety, security and access.

NEA needs to begin using electronic communications for internal communications. SMSs and emails offer scale, speed, reliability and cost efficiency. They enable messages to be sent to thousands of NEA personnel at once without incurring significant additional effort or cost. Moreover, electronic messages create documentation trails, and enhance transparency and accountability between communicating parties.

NEA needs to use its Intranet to access and disseminate information internally. The Intranet can serve as an online library with research, studies, reports, periodicals, journals and online training courses. It can be a virtual repository for maintaining institutional memory. Records of contractual transactions and investigations carried out by or on behalf of NEA can be safely stored and access from the virtual library.

The Administrative Directorate and ITD will be responsible for meeting the KPIs of this Activity.

4.2.5 GOAL 5 - INCREASE NON-TARIFF INCOME

Approximately 90% of NEA's income is derived from electricity tariff. Leveraging NEA's assets to increase non-tariff income will benefit NEA and its customers. A modern and capable institution must make optimal use of its assets. Earnings from non-income tariff can be used to subsidize the price of electricity. Electricity is an intermediate good. Cheaper electricity directly translates to a lower cost of living and lower cost of production of goods and services.

Activity 1: Increase capacity and mandate of Treasury Division

NEA's current monthly revenue is approximately NPR 5 Billion and the organization has an on-going cash balance of about NPR 30 Billion. The monthly revenue is expected to grow by 400% in the next five years. Access to such quantities of cash necessitates a specialized Treasury Division within NEA whose sole function will be to ensure that NEA is able to earn the highest returns from the short-term cash at its disposal. Commercial Banks (with smaller quantities of available cash) have specialized teams responsible for this function which NEA can similarly adopt to handle large volumes of cash. The Plan envisions strengthening the Treasury Division after conducting a rapid assessment of the responsibilities and requirements of the unit.

The Corporate Finance Department will be responsible for meeting the KPIs of the Activity.

Activity 2: Establish Business Development Directorate to increase income

NEA has approximately 30,000 Ropanis of land in nearly all districts of the country. Some of these plots are located in prime commercial areas. NEA can earn handsome returns if these lands are developed as commercial real estates. Similarly, NEA own a network of transmission and distribution towers/poles that runs across all urban and semi-urban areas. NEA could generate additional income by leasing this infrastructure for optical fiber connections.

The Business Development Directorate will be established to focus on additional income generation activities. Once established and operationalized, the directorate will assess all of NEA's potential income sources and develop a Non-Tariff Income Enhancement

Plan. Other sources of additional revenue generation are optimizing revenues from renting of optical fiber lines, transmission and distribution infrastructures, leasing machinery and developing real estate for commercial purpose and leasing. The plan will provide a full list of potential income sources and suggest an implementation strategy to generate additional revenues.

MDS and the Business Development Directorate will be responsible for meeting the KPIs of the Activity.

4.2.6 GOAL 6 - IMPROVE EMPLOYEE BENEFITS, PRODUCTIVITY AND HUMAN RESOURCE PLANNING

Employees are at the heart of NEA's operations. Maintaining a high caliber workforce and ensuring their welfare is of utmost importance to the corporation. NEA should strive to hire the best and brightest of the nation; and should be able to provide competitive compensation packages to its employees. To enhance the capacity of its employees, the CDP will initiate a comprehensive corporate training program at all levels and strive to provide a safe working environment for all.

Activity 1: Improve human resource planning

The CDP envisions improving the human resource planning of NEA. Enhancement of employee capacity is key to long-term growth. The Human Resource Department (HRD) will develop and finalize job descriptions for all positions in all Units and Departments. It will liaise with Unit and Department heads to identify training needs. A Capacity Building Plan will be developed and implemented based on the need-assessment conducted by HRD.

NEA plans to serve 6 million customers and manage a network capable of distributing 5000 MW. It must plan its human resource needs accordingly. While use of modern technology such as smart meters and online payment mechanisms may decrease the need of employees in certain areas, other areas will need reinforcements. There is a dearth of finance and management experts in the organization. Departments related to financial analysis, data analysis, planning and information technology will require additional human resources in the coming months. A new Office and Management (O&M) Survey will be conducted in the first two years of the Plan.

With an aim of improving NEA staff capacity, the NEA Training Center located in Bhaktapur will be developed as a Center of Excellence. NEA will seek collaboration with specialized training agencies to offer world class trainings to its employees as well as other interested participants. Spanning across 203 Ropanis, the Center of Excellence will offer courses on all aspects of electricity ecosystem.

HRD will be responsible for meeting the KPIs of the Activity.

Activity 2: Enhance employee benefits and safety

Employee safety and security is a top priority for NEA. The CDP aims to decrease workplace accidents by at least half from present levels. Improved safety trainings will be provided to employees on a regular basis to meet this CDP target. Given NEA's new technology adoption priorities, training on use of ERP and other office software and programs will be offered to all relevant employees.

To attract the brightest talents and understand what can incentivize them to join, a Salary and Employee Benefit Survey will be carried out to understand the financial incentives offered by similar businesses.

> NEA will strive to provide competitive compensation packages as well as career development opportunities to its employees.

HRD will be responsible for meeting the KPIs of the Activity.

4.2.7 GOAL 7 - RE-BRAND NEA AS A MODERN CORPORATE ENTITY

Developing brand value is extremely important to Corporations. NEA needs to move on from its image of a loss making and functionally challenged utility to a profitable, modern and capable one. A specialized unit for Communications and Outreach will be established for this purpose.

Activity 1: Build institutional capacity for Communications and Outreach

A dedicated unit for communications and outreach is essential to re-brand and project NEA's new image. An Office and Management Survey (O&M) will be conducted to increase the scope of work and capacity of the Public Relations and Grievance Handling Section (PRGHS). The number of employees and skill sets required for the formation of a competent team will be assessed. The Division will be under the Administrative Directorate and will be responsible for developing a long-term Communications Strategy and a Re-branding Action Plan.

The MDS and AD will be responsible for meeting the KPIs of the Activity.

Activity 2: Increase Communications and Outreach activities

The Communications Strategy will identify measures through which information can be shared with NEA's customers and will create platforms through which customers can share their queries and comments with NEA. Activities planned will increase NEA's media presence through both traditional media outlets, social media platforms and ICTs such as SMS and Viber messages.

NEA may also appoint famous personalities as brand ambassadors to help convey messages and appeal to wider masses on issues such as control of electricity theft, use of efficient electrical appliances and decrease in electricity use during peak hours.

Other activities to increase media presence such as sponsorship of sports teams, sponsorship of regional and national events and corporate social responsibility actions will also be discussed in the Re-branding Action Plan.

PRGHS will be responsible for meeting the KPIs of the Activity.

4.2.8 GOAL 8 – PREPAREDNESS FOR REGULATORY REQUIREMENT

The Electricity Regulatory Commission Act came into force in 2017 and will result in the formation of the Electricity Regulatory Commission (ERC). ERC will become an important institution for the electricity sector as it will regulate wholesale, transmission and retail tariffs. NEA needs to adapt itself to be regulated and needs to file annual tariff petitions as well as prepare documents as mandated by ERC.

Activity 1: Increase institutional capacity to file annual tariff petitions

NEA needs to generate authentic cost of service data to file tariff petitions annually. A dedicated team will be formed at the Economic Analysis Department (EAD) for this purpose. The team will collect, analyze and prepare tariff petitions annually. It will also be responsible for preparing any other document required by ERC. Capacity building trainings will be provided to members of EAD to increase the knowledge and skill set of the Unit.

PMITD and EAD will be responsible for meeting the KPIs of this Activity.

Activity 2: Determine scientific and pragmatic tariff

A detailed tariff study will be conducted during the Plan term. The study will cover a wide variety of topics such as review of existing tariff structure, long run marginal cost of supply, demand elasticity, price elasticity, transfer pricing, lifeline tariff, TOD and seasonal tariff among others. The goal is for NEA to move towards a cost reflective tariff with a certain level of protection for lifeline users.

EAD will be responsible for meeting the KPIs of this Activity.

4.2.9 GOAL 9 - OPERATIONALIZE A COMPETENT TRADING COMPANY

The trade of electricity, similar to the trade of goods and services, ensures optimal use of scarce resources. Electricity trade between and within countries is common all over the world. Nations sell power to neighboring countries when they have excess and purchase power when they are in deficit. Nepal has tremendously benefited from the import of electricity in the past few years, and can provide vast quantities of renewable hydroelectricity to the South Asian region in the future.

A company that specializes in the trading of short term and long-term trading of electricity is essential for Nepal to maximize the benefits of trading. India's electricity trade market is dynamic and complex. NEA also needs to develop a firm understanding of the electricity markets and mechanisms of other countries in South Asia.

> The Nepal Power Trading Company (NPTC) will need to acquire expertise in trading of electricity quickly to maximize financial gains from trading.

Activity 1: Establish a well-resourced NPTC

The Office and Management Survey (O&M) will be conducted for the NPTC in the first year of the CDP. The O&M will identify positions required for the new company along with job description for all positions. NEA will ensure that NPTC is well resourced in terms of human resources and that adequate investments are made to create a functional office environment. Investment in capacity building of employees will also be prioritized.

Nepal has tremendously benefited from the import of electricity in the past few years, and can provide vast quantities of renewable hydroelectricity to the South Asian region in the future.

A long-term Business Plan is in the process of being finalized. It will categorize short-term, medium-term and long-term activities and priorities of the new company.

The MD and NPTC will be responsible for meeting the KPIs of this Activity.

Activity 2: Begin banking electricity with neighboring countries

Energy Banking may provide the solution to alleviate Nepal's seasonal electricity imbalance in the short term. The demand for electricity in some neighboring countries is higher in the summer months. Farmers require electricity to irrigate their lands. High temperatures also cause homes to turn on air-conditioners and fans. The increase in demand in bodes well for Nepali hydropower as they generate in full capacity during these months.

Similarly, there is a decrease in production capacity of Nepali hydro in the winter and a corresponding decrease in demand in those neighboring countries. This presents an opportunity for a barter of electricity between nations. Both Nepal and its neighbors would benefit from the exchange. An agreement detailing this barter of electricity needs to be finalized and signed by the affected parties at the earliest. Such an achievement will be a major milestone in Nepal's history. NEA plans to begin energy banking in the second year of the Plan.

The NPTC and/or the Power Trade Department will be responsible for meeting the KPIs of this Activity.

Activity 3: Begin trading of electricity

Nepal has till now been in a net deficit state. This will soon change after the many hydro power projects currently under construction come into commercial operation. Domestic generation will be more than demand during the monsoon season. However dry season shortage, especially during peak hours, is likely to persist in the near future. NPTC needs to purchase cheap electricity when in deficit and sell when in excess. The consumers need to be ensured of electricity supply while NEA needs to sell excess supply for its financial wellbeing. Therefore, increasing NPTC's knowledge and know-how of electricity trade is paramount to Nepal's welfare and the financial health of NEA. Trading of electricity in the day ahead and term ahead markets will be initiated in the first year of the CDP.

The NPTC and/or the Power Trade Department will be responsible for meeting the KPIs of this Activity.

Activity 4: Competitive bidding of PPAs

NEA has plans to sign PPAs with developers through a competitive bidding process. A procedural framework will be developed and approval sought from the NEA Board and the ERC. Once the framework is in place, the Power Trade Department will initiate the process of competitively bid PPAs.

The NPTC and/or the Power Trade Department will be responsible for meeting the KPIs of this Activity.

4.2.10 GOAL 10 - IMPROVE CONTRACT AND PROJECT MANAGEMENT

A majority of NEA's ongoing projects face delays as a result of contractual issues with contractors and project execution issues due to delays in government approvals and/or obstructions by local populations. Infrastructure projects face time and cost over runs as a result. Improving contractual issues and project implementation is extremely important for NEA and the CDP envisions a focused approach to improve the existing situation.

Activity 1: Improve Contract Management abilities

Under the leadership of the Managing Director, detailed discussions will be held on major issues faced by NEA during contract implementation. The discussion and analysis will include relevant examples of problems faced with Contractors during contract implementation. These activities will result in the development of a Contract Management Improvement Action Plan.

It will identify required measures that will help in solving the challenges faced by NEA while implementing contracts. The plan will be shared with relevant GoN ministries via MoEWRI with the aim of making legislative changes should such changes be required for smooth implementation of contracts.

A detailed contract management training module will be developed in the first year of the Plan and all project managers and concerned officers will be provided the training in years two and three. The training will also focus on improving the quality of contract NEA signs with Contractors.

The MDS, AD, GD, TD and DCSD will be responsible for meeting the KPIs of this Activity.

Activity 2: Improve coordination with various GoN agencies

As with Activity 1, under the leadership of the Managing Director, NEA will hold detailed discussions on the major issues faced by NEA regarding delays in GoN approvals of infrastructure projects. Different focal persons will be appointed for different Ministries.

> The appointed focal persons will liaise and correspond with their counterparts in their assigned Ministries to resolve bureaucratic hurdles and attain timely GoN approvals.

Similarly, NEA will initiate dialogue with all three levels of government to resolve problems created by local populations. Furthermore, legislative changes required to allow prompt implementation of projects will be recommended to relevant ministries via MoEWRI.

The MDS, GD, TD and DCSD will be responsible for meeting the KPIs of this Activity.

> **Improving contractual issues and project implementation is extremely important for NEA and the CDP envisions a focused approach to improve the existing situation.**

4.2.11 GOAL 11 – ESTABLISH AND OPERATIONALIZE A WELL-RESOURCED BUSINESS DEVELOPMENT DIRECTORATE

NEA established the Subsidiary Company Monitoring Directorate (NSCMD) in 2018 to better manage the activities of NEA subsidiaries. A majority of the 20 subsidiaries are hydropower generation companies while some companies that provide consulting services, cross border power transmission and power trade have also been established.

The number of NEA subsidiaries is expected to grow in the future to the point at which the subsidiaries will have a combined generation capacity greater than NEA's own generation. The development of large projects requires substantial financial commitment from NEA and the dividends received from the subsidiaries will have a significant impact on NEA's financial health. It is therefore important for NEA to have good oversight into the activities of its subsidiaries on a continual basis. The Plan envisages the creation of a new directorate called the Business Development Directorate (BDD). The responsibilities of NSCMD will be taken forward by this new directorate during the Plan period. BDD will be responsible for increasing NEA's non-tariff incomes by leveraging all of NEA's assets.

Activity 1: Establish a well-resourced BDD

BDD will require a team of highly capable employees to oversee the activities of all the subsidiaries and increase NEA's non-tariff income. Since a majority of the subsidiaries are currently under construction or under detail study stage, it is important for NEA to be informed of any delays or disruptions to proceedings. The directorate will therefore be adequately staffed so as to enable it to have regular oversight of all the activities of its

subsidiaries. A well-defined mandate of the Directorate will also be developed.

Similarly, a dedicated team within the directorate will have the mandate to develop NEA's Non-Tariff Income Enhancement Plan in the second year of the Plan period and to implement the plan in the subsequent years. The ability to increase NEA's non-tariff income has a direct effect on consumer tariff.

> Since making electricity affordable is a key goal of theme three of this CDP, increasing non-tariff income is a high priority activity. NEA will therefore ensure that a well-resourced team be put into place to achieve this important task.

The MD and BDD will be responsible for meeting the KPIs of this Activity.

Activity 2: Develop long-term plans of NEA Subsidiaries

BDDD will develop a NEA Subsidiary Investment Plan that will detail the investments required for the development of all NEA subsidiaries. It is important for NEA senior management as well as the NEA Board to be regularly updated of the investments required to fund the activities of its subsidiaries. The Directorate will regularly update the Investment Plan and inform NEA of any changes in investment schedule.

Similarly, the NEA Subsidiary Dividend Projection Report and the NEA Subsidiary Pipeline Report will be developed and updated annually.

BDD will be responsible for meeting the KPI of this Activity.

Activity 3: Quarterly Monitoring and Reporting

BDD will institutionalize a process of monitoring and getting quarterly updates from all subsidiaries. It will compile these progress reports and present to Senior Management. Periodic investments required by subsidiary companies will have a significant impact on the financial health of NEA and therefore it will be prudent for BDD to have constant oversight of all subsidiary activities.

BDD will be responsible for meeting the KPI of this Activity.

4.2.12 GOAL 12 - IMPROVE SAFETY AND ENSURE COMPLIANCE OF TECHNICAL STANDARDS

The safety of NEA's customers, its employees and its infrastructure are of utmost importance to NEA. It plans to uphold and comply with a high standard of safety to ensure the safety and security of everyone concerned. Work accidents, some fatal, are still prevalent. Lapses in compliance of technical standards lead to disruptions and damage expensive equipment while electricity-related accidents are common in Nepal. There is room for improvement and NEA is determined to improve the safety of the entire ecosystem.

Activity 1: Increase institutional capacity to improve safety and ensure compliance of technical standards

The CDP envisions the creation of two dedicated units within NEA to help improve safety and security standards. The Safety Management Division (SMD) will be created as an arm of the Energy Efficiency and Loss Reduction Department (EELRD). It will be responsible for increasing public awareness on safety standards. Similarly, the Contract, Norms and Specifications

Department (CNSD) will be established under the Planning, Monitoring and IT Directorate (PMITD). This department will be responsible for developing standards and protocols for NEA operations.

Office and Management Surveys (O&M) will be conducted for these two new units to identify the number of employees and skill sets required for the formation of competent SMD and CNSD. Ensuring the safety of its customers, employees and equipment is a high priority for NEA and therefore these units will be endowed with ample human and financial resources to carry out these important mandates.

> CNSD will develop and/or amend NEA's Safety Standards, Generation Technical Standards, Transmission Technical Standards and Distribution Technical Standards in the second year of this Plan.

The MD, PMITD, EELRD and CNSD will be responsible for meeting the KPIs of this activity.

Activity 2: Audit for compliance of Technical and Safety Standards

The Technical Audit Division (TAD) under the Internal Audit Department (IAD) will conduct compliance audit as per NEA's Distribution Technical Standards in 5 Distribution Centers in the second year. Lapses in protocol and non-compliance of standards will be recorded and reported to the DC Chief, the Regional Office Chief and the Deputy Managing Director of DCSD. All DCs and sub-branches, grid substations, power plants and projects under construction will be audited during the Plan period.

A second audit to confirm compliance will be conducted a year after the first audit concludes. The targets for the first and second audits are provided in the activity matrix.

TAD-IAD and DSCD will be responsible for meeting the KPIs of this activity.

Activity 3: Safety Awareness Public Campaign

Electricity-related accidents occur frequently in Nepal, some unfortunately lead to fatalities. The Safety Management Division (SMD) and the Public Relations and Grievance Handling Section (PRGHS) will jointly develop and implement a Safety Awareness Public Campaign. The campaign will focus on providing information to the general public about the precautions required to be taken to avoid electric shocks. Social media platforms, FM radios, print media advertisements and online resources will be used to inform customers of precautions required to keep their family members and houses safe.

SMD-EELRD and PRGHS-AD will be responsible for meeting the responsibilities of this activity.

Activity 4: Capacity building of employees to reduce workplace accidents

Accidents at the workplace, unfortunately, still occur frequently at NEA. It is imperative that employees be given the knowledge and the equipment to keep them safe while performing their duties. SMD and the Human Resources Department will develop and implement a training program for all Distribution Centers, grid substations, power plants and projects under construction.

SMD, HRD and DCSD will be responsible for meeting the KPIs of this activity.

4.3 THEME 3 - IMPROVE CUSTOMER CARE

The Goals and Activities under this Theme have been designed to improve the quality of service provided by NEA. Customers deserve reliable, quality and safe electricity at affordable prices. Ending load shedding was a major achievement and now NEA will turn its focus on improving the quality and reliability of electricity supply. It also needs to improve on the customer service it provides in terms of prompt service delivery and better complaint handling.

The summary of the Goals and the Activities are listed in the table below.

TABLE 9: Improve Customer Care

SN	GOALS	#	ACTIVITIES
1.	Supply reliable, affordable, high-quality and safe electricity	1.	Ensure adequate electricity supply with reliability, quality and safety
		2.	Provide affordable electricity
2.	Use of Information Communication Technology to	1.	Use of ICT platforms to inform, engage and facilitate customer queries
	Improve Customer Experience	2.	Improve complaint handling process and delivery

All the Goals and Activities outlined in this CDP are directly linked to making reliable electricity available to Nepali consumers at an affordable rate. This theme is therefore of utmost importance.

4.3.1 GOAL 1 - SUPPLY RELIABLE, AFFORDABLE, HIGH-QUALITY AND SAFE ELECTRICITY

NEA needs to supply electricity to its customers through domestic generation or through imports. The supply of electricity has to be stable and reliable. It also has to be affordable. Efficient investments in generation, transmission and distribution infrastructure as well as astute trading of electricity is required for the fulfillment of this Goal.

Activity 1: Ensure adequate electricity supply with reliability, quality and safety

The best way for NEA to improve customer care is to provide customers with adequate supply and high-quality electricity. This has by far been the biggest issue of the past two decades. There has been tremendous improvements on this front in the past two years. NEA is not resting on its laurels though, and is now focusing on improving the quality and reliability of supply.

It is in the process of upgrading its generation, transmission and distribution infrastructure to be able to securely transmit and distribute 5000 MW of electricity. Existing transmission and distribution infrastructure will be enhanced through the addition of capacitor banks and upgrade of overloaded conductors and transformers. It is also constructing high voltage cross-border infrastructure to enable Nepal to import and export of electricity. The Dhalkebar – Muzaffarpur cross border transmission line will be charged at 400 kV in FY 19/20 and the 400 kV New Butwal – Gorakhpur cross border transmission line is expected to be completed during the tenure of the CDP.

Customer safety is extremely important and NEA is in the process of taking concrete steps to improve safety and limit electricity-related accidents. Replacements of wooden poles, upgrading of clearance of conductors and replacements of old transformers will help in reducing accidents. Public awareness is also equally important. Knowledge of appropriate household wiring standards and earthing requirements will decrease electricity-related hazards in Nepali homes. The Safety Management Division and Public Relations and Grievance Handling Section will jointly develop and implement a Safety Awareness Public Campaign.

DCSD, TD, GD and BDD, SMD-EELRD and PRGHS-AD will be responsible for meeting the KPIs of this Activity.

Activity 2: Provide affordable electricity

NEA plans to improve operational and network efficiencies to provide reliable power at the lowest cost possible. Initiatives such as data automation, online payment infrastructure and daily MIS generation will help NEA become a more efficient institution. Increase in efficiency will result in decrease in operating costs, which in turn will reduce the cost of supply of electricity.

Real-time identification of problems in the transmission and distribution network will enable prompt repair resulting in a reduction in electricity supply disruptions.

> Reduction of AT&C losses from over 20% to 14% will significantly increase NEA's net revenue. These revenue gains should decrease the cost of supply and make electricity more affordable.

Trading of electricity with neighboring countries will ensure optimal pricing of electricity and will also make NEA financially viable. The CDP envisions active trading to begin from the first year of the Plan period. Competitively bid PPAs will also ensure procurement of electricity at the cheapest prices.

Both activities should help decrease the cost of electricity.

Attempts to increase non-tariff income by developing the capacity of the Treasury Division and leveraging NEA's physical infrastructure such as transmission poles, optical fiber network and real estate should result in increased non-tariff revenues. Increased non-tariff income will be used to subsidize NEA's operating costs and will make electricity affordable.

DCSD, TD, PTD, BDD and EELRD will be responsible for meeting the KPIs of this Activity.

4.3.2 GOAL 2 - USE INFORMATION COMMUNICATIONS TECHNOLOGY TO IMPROVE CUSTOMER EXPERIENCE

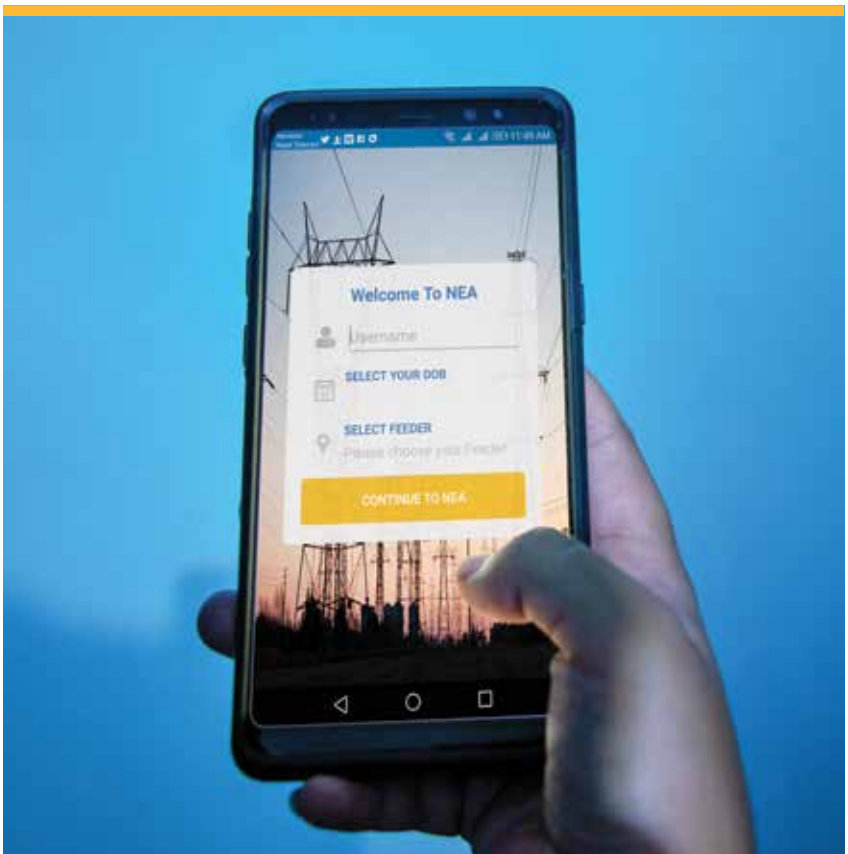
Modern corporations maximize the use Information Communications Technology (ICT) to promote and engage with their clientele. A specialized Public Relations and Grievance Handling Section will be established for this purpose.

This Section will develop NEA's Communication Strategy and promote NEA's activities using all available communication channels. Efforts to improve complaint handling process and standardize service delivery will also be set as targets for the CDP.

Activity 1: Use of ICT platforms to inform, engage and facilitate customer queries

The use of ICTs is an efficient and cost-effective means to communicate important NEA messages. They include traditional media outlets such as print media, FM radios and television as well as newer social media platforms such as Facebook, Twitter, NEA website, electronic-mail, SMS, dedicated hunting phone lines, Viber, WhatsApp and any other widely used programs.

The Public Relations Section will make use of all possible platforms to share important NEA messages to its customers. Messages to discourage electricity theft, usage of energy efficient appliances and limited usage of electricity during peak hours can be sent to NEA customers in a cost-effective manner. Most social media platforms are free to use and can be used multiple times to share important information.



It is important to ensure that communication between NEA and the customers is not a one-way stream. It is equally important for NEA to listen to its customers. Platforms such as Facebook, Twitter, NEA website, etc. can be used to receive feedback from customers. The Public Relations Section will have adequate staff to interact with customers and manage the conversations. A system of channeling customer complaints to relevant department heads and seeking their response will be developed and implemented.

PRGHS-AD will be responsible for meeting the KPIs of this Activity.

Activity 2: Improve complaint handling process and delivery

The existing complaint handling process will be improved and implemented through all Distribution Centers. The standardized process will define the actions required to be taken by NEA once a complaint is filed and NEA's response time will be documented. A Complaint Response Report will be generated by all DCs on a quarterly basis.

> The quarterly reports will be complied and an Annual Complaint Handling Report will be published for public review. Such documentation and reporting protocol will make NEA a more responsive utility and improve the customer care it provides.

The KPIs of this Activity will be met by DCSD and PRGHS-AD.


नेपाल विद्युत प्राधिकरण
NEPAL ELECTRICITY AUTHORITY
प्रधान कार्यालय / Head Office

5.

FINANCING THE CORPORATE DEVELOPMENT PLAN

The successful implementation of a corporate plan requires the availability of adequate resources including money, people and time. There are two aspects of financing under consideration: NEA's capital budgeting policy and availability of financing relative to resource requirement. It is important that NEA develop a detailed funding framework and policy in subsequent iterations of the CDP to provide a clear and transparent basis for investment decisions that dictate capital requirements.

5.1 FUNDING FRAMEWORK AND POLICY

NEA requires large capital investments to upgrade and augment its infrastructure for generation (including subsidiaries), transmission, distribution and for additional corporate assets. The investments are long overdue and expected to significantly improve revenues, operational efficiency and service quality. Notwithstanding their necessity, the required investments are nevertheless very large compared to NEA's current and projected operating cash flows (IRG – internal revenue generation). NEA will need to access other sources of capital from banks and financial institutions (BFIs) and GoN for debt and additional equity.

The CDP assumes that the fund sourcing strategy will be in accordance to what was developed in the Financial Viability Action Plan (FVAP). 80% of investments in generation and transmission assets will be funded by BFI (multilateral development banks and domestic financial institutions) debt, 10% sourced through GoN equity infusion and the remaining 10% through IRG. 70% of capital investments in distribution will be financed by BFI loans, 15% through additional equity infusion and the remaining 15% through IRG. All rural electrification projects will be fully funded by GoN and minor corporate investments will be fully funded by IRG.

The CDP assumes that storage hydropower projects (Subsidiaries) will be funded by a mix of 70% debt and 20% GoN equity. The remaining 10% of capital cost will be covered by NEA IRG; there is no public shareholding because it will be challenging for storage projects to generate market returns. However, RoR and PRoR projects are considerably cheaper to build and therefore will attract public participation. RoR and PRoR generation subsidiaries will also be funded by 70% debt. Of the remaining 30% capital cost, 49% will be raised through public issues (including locals and affected population) and the remaining 51% be financed by NEA IRG.

The investments proposed in the current CDP will be instrumental in serving customer demand and modernizing NEA's outdated transmission and distribution infrastructure. It is advisable for future editions of the CDP to develop a comprehensive funding framework that evaluates proposed investments on benefit to cost ratios. The quantitative analysis should take investment requirement, expected benefits, and NEA's cost of capital into consideration. There should also be adequate consideration to non-monetary benefits, or societal benefits of the investments. Such a framework would ensure the optimization of NEA's financial resources and could also be incorporated into NEA's annual budgetary process.

TABLE 10: Funding Framework

	DEBT FUNDED BY MDB/BFIS	EQUITY FUNDED BY GON/LOCAL GOVERNMENTS	EQUITY FUNDED BY IRG	EQUITY FUNDED BY PUBLIC EQUITY
NEA Generation	80%	10%	10%	-
Subsidiaries (Storage)	70%	20%	10%	-
Subsidiaries (RoR/PRoR)	70%		15.3%	14.7%
Transmission	80%	10%	10%	-
Distribution	70%	15%	15%	-
Rural Electrification	-	100%	-	-
Corporate	-	-	100%	-

5.1.1 RESOURCE REQUIREMENT

NEA requires to raise capital investments in the order of NPR 429 billion over the next 5 years. The greatest requirement will be in the upgradation and expansion of the distribution network (NPR 164 billion) followed by transmission network (NPR 162 billion) and investments in generation subsidiaries (NPR 86 billion). Investments in generation and subsidiaries includes investments in mega projects such as Upper Arun, Dudhkoshi and Uttar Ganga. Since these projects are at the pre-construction stage and the timings associated with their implementation is uncertain, actual investment requirements will vary in accordance with individual rates of project implementation. It is important to note here that NEA will be merely raising incremental capital for its generation subsidiaries as their anchor developer. In such cases, the debt capital raised will not impact NEA's balance sheet.

NEA will also require sizable investments to develop and overhaul its generation plants (NPR 15 billion) and miscellaneous corporate projects (NPR 1 billion). Estimated investments are shown in Table 11.

TABLE 11: Resource requirement

	TOTAL (NPR MILLIONS)
Generation	15,380
Subsidiaries	86,451
Transmission	162,120
Distribution	163,575
Corporate	1,250
Total	**428,776**

> The total investment required over the next 5 years dwarfs NEA's current balance sheet, with asset size of NPR 285 billion.

At the end of the plan period, NEA's assets will have grown by a factor of 1.7. Managing a change of this magnitude requires meticulous planning and significant improvement in management capabilities and efficiency.

5.1.2 RESOURCE MOBILIZATION PLAN

Over the next 5 years, required investments steadily increase from NPR 56 billion in 2018/19 to NPR 107 billion in 2022/23. The magnitude of this increase can be explained by investments in Subsidiaries, Transmission and Distribution in the final two years of the Plan period. When combined, investments in Subsidiaries, Transmission and Distribution in 2021/22 and 2022/23 account for 44% of the total required investment. The following table shows total investment required in each category over the next 5 years.

TABLE 12: Total Financial Resources Required

ALL FIGURES IN NPR MILLIONS	2018/19	2019/20	2020/21	2021/22	2022/23	TOTAL
Generation	4,748	6,778	3,854	-	-	**15,380**
Subsidiaries	3,113	9,332	17,178	24,506	32,322	**86,451**
Transmission	29,116	35,091	43,394	32,283	22,236	**162,120**
Distribution	15,000	31,000	40,525	41,025	36,025	**163,575**
Corporate	250	250	250	250	250	**1,250**
Total	**52,227**	**82,451**	**105,201**	**98,064**	**90,833**	**428,776**

Since the investment amounts are manifold higher than what NEA's operations can generate, it will have to access other sources of capital. The following table shows NEA's IRG funding requirement when both lenders' and GoN funds are deployed.

TABLE 13: Resource mobilization Plan - IRG Requirement

ALL FIGURES IN NPR MILLIONS	2018/19	2019/20	2020/21	2021/22	2022/23	TOTAL
Generation	475	678	385	-	-	**1,538**
Subsidiaries	863	2,211	3,931	4,416	5,527	**16,948**
Transmission	2,912	3,509	4,339	3,228	2,224	**16,212**
Distribution	1,500	1,650	3,079	3,454	3,454	**13,137**
Corporate	250	250	250	250	250	**1,250**
Total	**6,000**	**8,298**	**11,984**	**11,348**	**11,455**	**49,085**

As is evident from the table above, NEA's total funding requirement is reduced to 11% of total capital costs. The remainder of the requirement is financed by loans from MDB/BFIs and capital grants from GoN. The resulting IRG funding requirement compares favorably with NEA's operating income (profit before interest and taxes) and cash flows generated from operations. During the 5-year period, NEA's operating income is 2.13x IRG funding requirement. A more relevant metric, operating cash flows, is also greater than IRG funding requirement during this period at 1.79x IRG. NEA operates adequate cash flows to meet its IRG obligation throughout the Plan period. The table below compares NEA's IRG funding requirements with its operating income and operating cash flows.

TABLE 14: IRG Funding Coverage Ratios

ALL FIGURES IN NPR MILLIONS	2018/19	2019/20	2020/21	2021/22	2022/23	TOTAL
IRG	6,000	8,298	11,984	11,348	11,455	**49,085**
Operating Income (EBIT)	9,124	9,110	18,749	35,815	31,842	**104,640**
Operating Cash Flow (CFO)	11,961	9,020	18,128	27,012	21,579	**87,700**
IRG Coverage – EBIT	1.52	1.10	1.56	3.16	2.78	**2.13**
IRG Coverage – CFO	1.99	1.09	1.51	2.38	1.88	**1.79**

NEA anticipates the largest contribution of capital from various debt providers: bi-lateral and multilateral development agencies; local BFIs and superannuation institutions. NEA requires capital infusion of NPR 247 billion from these institutions over the Plan period. Table 15 outlines amounts anticipated from the debt capital providers. Of the total debt required, the amount raised on behalf of subsidiaries (NPR 44 billion) will not be carried in NEA's balance sheet and will not attract interest payments.

TABLE 15: Resource Requirement from Debt Providers

ALL FIGURES IN NPR MILLIONS	2018/19	2019/20	2020/21	2021/22	2022/23	TOTAL
Generation	3,798	5,423	3,083	-	-	**12,304**
Subsidiaries	935	4,217	7,779	13,346	17,666	**43,943**
Transmission	23,293	28,073	34,715	25,827	17,789	**129,697**
Distribution	7,000	7,700	14,367	16,117	16,117	**61,301**
Total	**35,026**	**45,413**	**59,944**	**55,290**	**51,572**	**247,245**

Although NEA's assumptions for raising capital seem aggressive, assurances for much of the funding have been received. A significant portion of the required amounts have been already committed by various agencies. Furthermore, GoN will also contribute to NEA's capital requirement in the following manner as outlined in the table below.

TABLE 16: Resource Requirement from GoN

ALL FIGURES IN NPR MILLIONS	2018/19	2019/20	2020/21	2021/22	2022/23	TOTAL
Generation	475	678	385	-	-	**1,538**
Subsidiaries	1,315	2,904	5,468	6,744	9,129	**25,560**
Transmission	2,912	3,509	4,339	3,228	2,224	**16,212**
Distribution	6,500	21,650	23,079	21,454	16,454	**89,137**
Total	**11,202**	**28,741**	**33,271**	**31,426**	**27,807**	**132,447**

In summary, NEA will likely have both internal and external resources to finance its ambitious capital expansion plans based on IRG guidelines adopted by the FVAP. In this respect, the challenge for NEA will be to secure timely tariff revisions, realize value from excess energy by trading and managing increasing interest costs.

5.1.3 FINANCIAL PROJECTIONS FOR PLAN PERIOD – STATUS & TRENDS OF KEY FINANCIAL RATIOS

NEA's financial performance during the Plan period will be fueled by aggressive increases in demand with commensurate expansion of supply. The key driver of financial performance will be tariff revisions in FY 2019/20 and FY2020/21 to bring average tariff closer to the cost of supply. Tariffs will have to be increased by 12% each year during the revisions. The tariff revisions recommended here are the absolute minimum required to cover operating costs and be able to fund NEA's IRG with an adequate margin of safety. They do not incorporate an explicit return on investment for NEA, which if included, will result in higher tariffs than what has been projected.

> NEA's profitability will be further enhanced by reductions in AT&C losses, with such losses under 15% at the end of the Plan period. Energy deficit will rapidly decrease, and NEA will be a net exporter within the Plan period. 90% of excess generation will be exported to the regional market. In subsequent years, profitability is driven by the interplay of growth between demand and supply.

NEA has planned investments of close to NPR 250 billion in transmission and distribution (excluding rural electrification) during the Plan period. Since transmission and distribution assets cannot be monetized in isolation, their cost has to be recovered by incorporating them in final consumer

tariffs. Therefore, NEA will need the tariff increases to pay for power purchase costs and additional financing (interest costs). Projected profit after taxes increases from NPR 4 billion in 2018/19 to NPR 11 billion 2022/23, close to increase in revenues by a factor of 2.80. Profitability is also impacted due to conservative assumptions on the sale of export power. Table 16 shows NEA's projected Income Statement for the Plan period.

TABLE 17: Projected Income Statement for the CDP period

ALL FIGURES IN NPR MILLIONS	2018/19	2019/20	2020/21	2021/22	2022/23
Revenue from Sale of Power	**67,531**	**92,227**	**118,140**	**134,498**	**147,711**
Revenue from Export	-	1,914	16,169	31,569	39,848
Other Income	7,288	8,016	8,818	9,700	10,670
Dividend Income	162	1,115	1,256	1,256	1,679
Expenses					
O&M Cost	15,954	17,230	18,608	20,097	21,705
Employee Expenses	11,140	12,031	12,994	14,033	15,156
R&M	2,623	2,833	3,060	3,305	3,569
A&G	2,190	2,365	2,555	2,759	2,980
Purchase of Power	41,623	67,816	97,579	111,663	136,915
Fuel consumption	-	-	-	-	-
Royalty	1,778	1,778	1,778	1,778	1,778
Transmission/Wheeling Charge	1,036	1,036	1,036	1,036	1,036
Total Expenses	**60,391**	**87,860**	**119,002**	**134,575**	**161,434**
EBITDA	**14,590**	**15,412**	**25,381**	**42,448**	**38,474**
Depreciation	5,466	6,302	6,632	6,632	6,632
EBIT	**9,124**	**9,110**	**18,749**	**35,815**	**31,842**
Interest on Loan	3,348	7,633	8,288	12,212	15,701
Interest on WC Loan	797	949	1,100	1,232	1,265
Profits Before Tax (PBT)	**4,979**	**528**	**9,361**	**22,371**	**14,876**
Income Tax	1,245	132	2,340	5,593	3,719
Profit After Tax (PAT)	**3,734**	**396**	**7,021**	**16,778**	**11,157**

The table below highlights some key operating and profitability ratios for NEA during the Plan period. While profitability metrics are projected to be satisfactory through most of the period, there is no general trend. Profitability is influenced by the interaction of network (Generation, Transmission, and Distribution) expansion and retail revenue growth (driven by both usage and tariffs). The two main reasons behind uneven profitability are

i. uncertainty in prices and quantities associated with energy exports
ii. financing cost associated with network expansion and upgradation

In line with the assumptions of the FVAP, the forecast assumes that only 90% of surplus energy is sold. The price at which surplus energy is sold is not certain as of now. This effect is more pronounced in years 4 and 5, when energy exports become significant. Another reason for declining profitability is increasing interest cost driven by NEA's network expansion and upgradation initiatives.

> Interest expenses on account of transmission and distribution infrastructure augmentation is expected to total NPR 20 billion during the CDP period, 52% of NEA's total forecast profits.

TABLE 18: NEA's total forecast revenues

ALL FIGURES IN NPR MILLIONS	2018/19	2019/20	2020/21	2021/22	2022/23
Gross Margin	0.42	0.33	0.31	0.36	0.31
EBITDA Margin	0.19	0.15	0.18	0.24	0.19
Operating Income Margin	0.12	0.09	0.13	0.20	0.16
PAT Margin	0.05	0.00	0.05	0.09	0.06
Interest Coverage Ratio	3.52	1.80	2.71	3.17	2.27
Fixed Charge Coverage Ratio	1.16	1.07	1.12	1.20	1.12
Operating Ratio	21%	17%	13%	11%	11%

It bodes well for NEA that its financial health is projected to be satisfactory even after such intensive capital expansion and conservative treatment of surplus energy. This highlights the importance of securing the best possible financing terms and quickly operationalizing the power trading company to address these critical issues at the earliest possible.

5.1.4 IRG COVER AND CONSUMER TARIFF SCENARIOS

NEA's ability to maintain profitable operations and finance its capital expansion initiatives largely depend upon its ability to secure timely increases in consumer tariffs. In the base case scenario, NEA is able to secure 12% tariff increases in FY 2019/20 and in 2020/21. As a result, NEA is able to generate adequate amounts of profits and cash with adequate margin of safety. However, if NEA is not able to secure any tariff increase during the CDP period it will neither be able to fund capital expenditures nor become financially sustainable. As is shown in the table below, NEA will require average annual escalations of 8.5% in consumer tariffs to achieve similar results as the base case.

TABLE 19: IRG Cover and Consumer Tariff Scenarios

		BASE CASE		NO CHANGE IN TARIFF		ANNUAL 8.5% INCREASE	
		IRG Cover - EBIT	IRG Cover - CFO	IRG Cover - EBIT	IRG Cover - CFO	IRG Cover - EBIT	IRG Cover – CFO
Year	2018/19	1.52	1.99	1.52	1.99	1.52	1.99
	2019/20	1.10	1.09	n/a	0.09	0.75	0.80
	2020/21	1.56	1.51	n/a	n/a	0.96	0.97
	2021/22	3.16	2.38	0.75	0.40	3.37	2.40
	2022/23	2.78	1.88	0.16	n/a	4.13	2.71
Total		**2.13**	**1.79**	**0.28**	**0.19**	**2.29**	**1.80**

6.

RESTRUCTURING

6.1 RATIONALE FOR RESTRUCTURING

Nepal is at a historical juncture, and so is its electricity market. The electricity sector has evolved from one in which NEA was solely responsible for transmission, generation and distribution to one where there are multiple actors in each of these verticals. In the generation sector there are multiple sellers but only a single buyer. Transmission was effectively a monopoly under NEA but the establishment of the Rashtriya Grid Prasaran Company Limited (RGPCL), and the commissioning of the first cross border transmission project Dhalkebar-Muzzafarpur transmission line, under a NEA subsidiary company (Power Transmission Company Nepal Limited – PTCNL) implies that there will be multiple actors in the transmission sector. Distribution is primarily carried out by NEA but efforts are already underway to unbundle this vertical into seven separate distribution companies mirroring Nepal's Provincial structure. Furthermore, trade of electricity in the region has already become an important aspect of the electricity market.

Punctuating these milestones was the enactment of the Electricity Regulatory Commission Act which will result in a new regulatory environment that will ensure a more transparent and competitive electricity sector. Looking forward, the governing legislations and regulations for the sector will be overhauled to account for the varying degrees of jurisdiction the three tiers of government (Federal, Provincial and Local) have on the energy sector which will impact NEA's operations and organizational structure. These changes are imminent even as the timing and scope is uncertain.

Re-organizing NEA's corporate structure is driven in part by political imperatives of the new form of government but there are also business-based reasons to embark on the path towards a more efficient and responsive NEA. Lessons gleaned from NEA's mis-steps – lack of accountability and delegation of authority, inefficient decision making, lack of planning, inadequate investment in the development of its network and human capital, politicization of its workforce - over the last couple of decades makes a strong case for re-structuring

its organization and operations. A key shortcoming of the current corporate organization is that decision making has been inefficient and has resulted in significant costs to the NEA, both financially and to its reputation. A root cause for this has been that responsibility has been concentrated at the very highest level without the requisite delegation of authority down the organization and the re-organization of NEA will take these into account.

NEA will adopt a pro-active strategy and begin the restructuring initiatives to meet the new challenges and opportunities the evolving political and electricity market dynamics will demand. Restructuring a vertically integrated utility is a multi-year process and NEA will employ a two-step approach to implementing this initiative:

1. Re-Organization during the Plan Period
2. Re-Organization beyond the Plan Period

6.2 RE-ORGANIZATION DURING THE PLAN PERIOD.

With the changing political context and the dynamic electricity market that is emerging in Nepal and the region, NEA cannot afford to operate with the business as usual mindset. NEA plans to transform its organizational structure and operational processes to meet the challenges and opportunities that will emerge in all three segments of the business – generation, transmission and distribution. In addition, NEA also plans to develop new verticals such as trading, consulting and asset management to deliver on its vision and create value for its shareholders.

During the Plan period, NEA will re-structure its organizational structure which will transform the electricity market from the existing structure (Fig 5) to the one in Fig 6.

NEA has already started the necessary preparation to functionally segregate along different business verticals and will give continuity to this process. A pre-requisite to undertaking this initiative is the completion of the asset verification and valuation exercise that is currently underway. This exercise will be completed in the initial years of the Plan period and provide the data and information required to complete the functional separation in a meaningful way.

We will begin the process by functional segregation. Each functional unit will be allocated responsibility and delegated the requisite authority to operate independently. This will be followed by financial separation wherein the functionally segregated business units will have their own financial statements. Following satisfactory outcome on the functional and financial segregation, we will undertake the institutional segregation with the formation of wholly and/or partially owned subsidiary companies of NEA for each functional unit. NEA will essentially morph into a holding company and retain a few but critical functions such as transmission and system operation, planning and investment, and management of its companies.

More specifically the restructuring of the business verticals will be executed in the following manner:

FIGURE 5: Current Electricity Market Overview

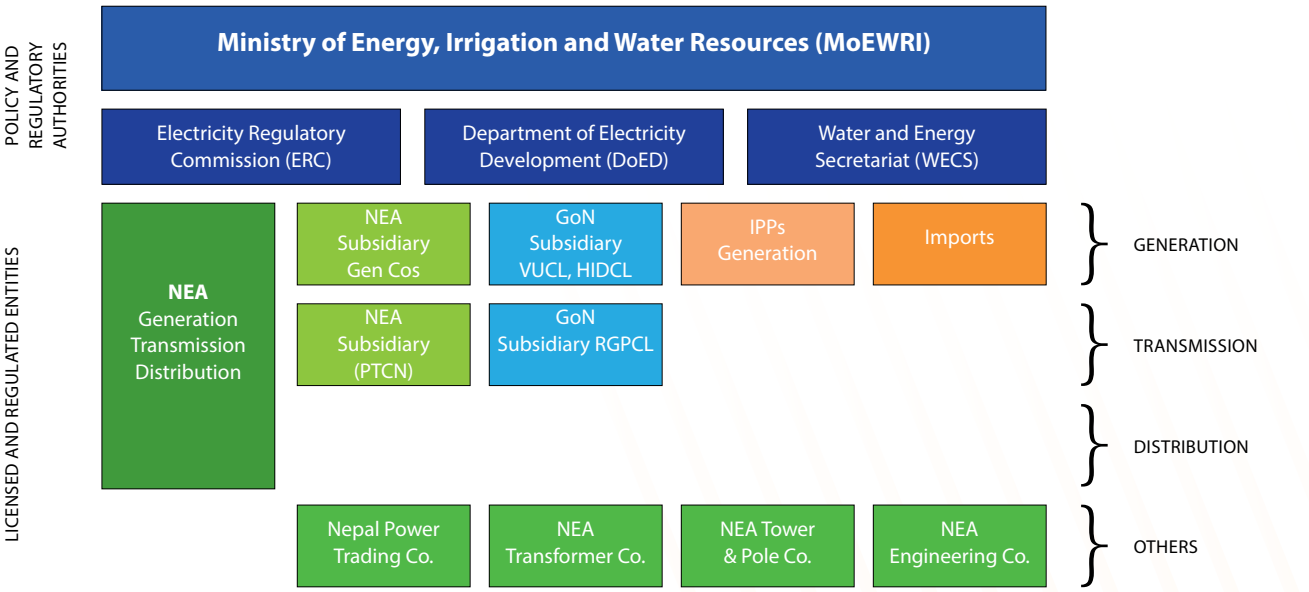
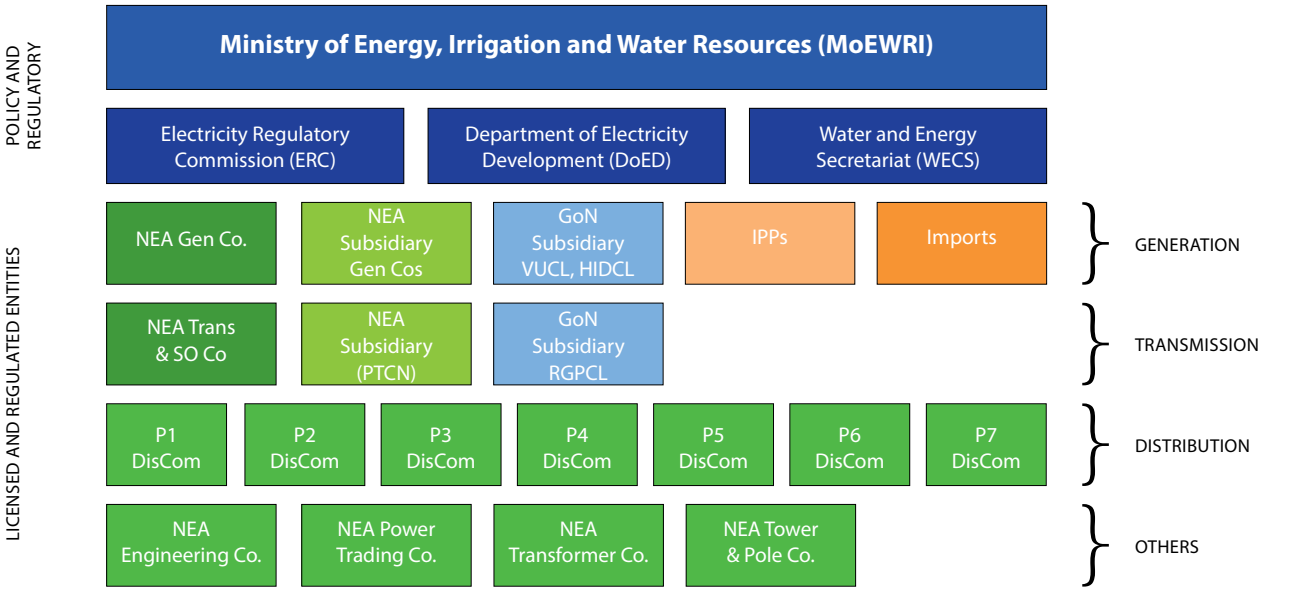


FIGURE 6: Nepal Electricity Market Overview after Re-structuring in the Plan Period



DISTRIBUTION

The NEA Board has provided direction to separate the distribution business into seven companies demarcated along the provincial borders. During the Plan period, NEA will first separate the distribution business into seven autonomous functional units along provincial borders and then transition into separate companies wholly owned by NEA. The two-step process (detailed below) will allow the distribution units to operate independently and leverage the managerial and technical capacity of NEA. This will have twin benefits of reducing transactional costs while allowing these units to improve institutional governance and capacity as they transition from functionally autonomous units to financially and structurally independent companies.

1. **Plan Year 2-3:** During this period, NEA will establish regional offices and endow them with the requisite capacity and resources to function as autonomous distribution entities. These initiatives will include developing and augmenting the technical, operational, financial and management capacities of the regional/provincial distribution centers.

During this period, NEA will continue initiatives to achieve 100% access to electricity services and improve the operational and technical capacity of its distribution centers. NEA will accelerate the installation of smart meters, automate distribution operations, increase operational efficiency through loss reduction and revenue collection to position the distribution companies to be sustainable and viable.

We will also begin developing profit and loss statements for each regional/provincial center. During this period NEA will put into motion the process for each regional/provincial distribution centers to compile their financial statements. These efforts will be synchronized with the asset verification exercise which is expected to conclude at the end of Year 3 of the Plan Period. We expect this process to be an iterative one and NEA will re-assess the regional offices capacity to operate autonomously and adjust resource allocation accordingly.

2. **Plan Year 4-5:** The conclusion of the asset verification along with the functional and financial separation envisaged above, will allow for the regional/provincial distribution companies to operate as financially independent and accountable entities. Based on the financial situation of the individual regional/provincial distribution centers, NEA will develop a plan to ensure the financial viability of each distribution center. During Year 4 of the Plan Period, NEA will establish each regional/provincial distribution center as a separate company with 100% NEA ownership. The relevant assets will be transferred to the distribution companies and beginning in Year 5 of the Plan Period, NEA will hand over the distribution companies to the provincial companies on terms and conditions defined by the Government of Nepal.

The distribution companies will be the primary interface with the customers and will be responsible for developing, operating and maintaining the distribution infrastructure and ensuring quality and reliable service. Initially the distribution companies will procure power from its parent company NEA, and later from Nepal Power Trading Company (NPTC). Corporate KPIs related to distribution, universal access to electricity, quality of power and financial sustainability will be passed along to the heads of these companies.

GENERATION

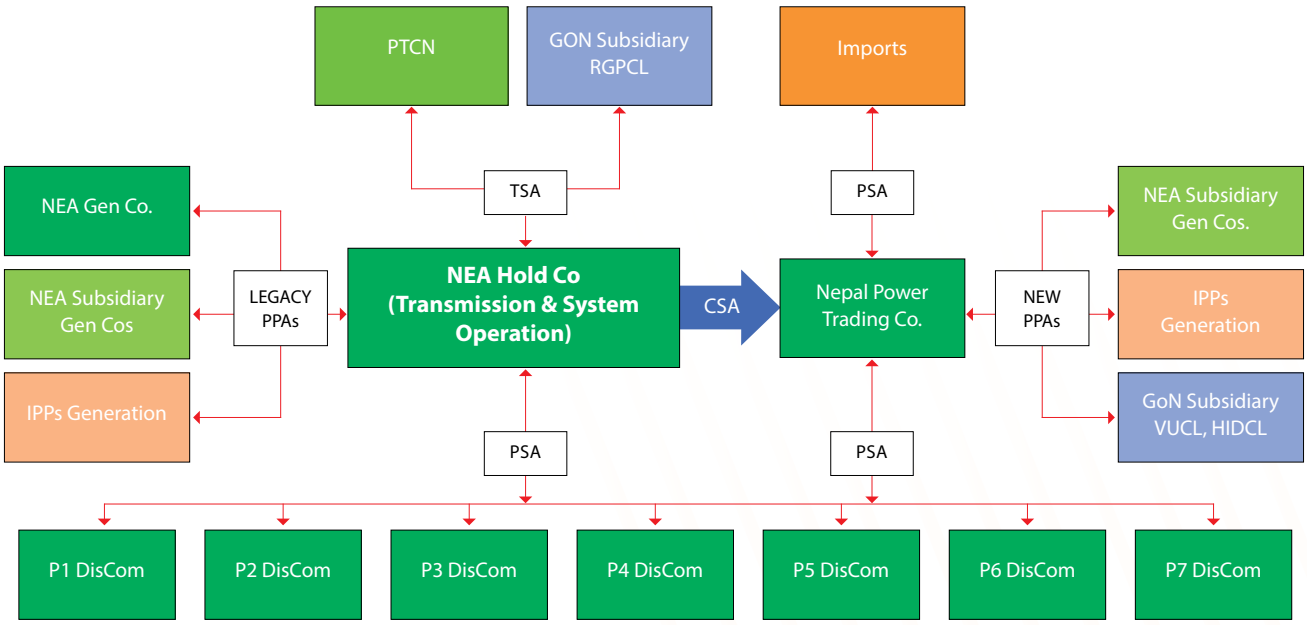
In the generation segment, NEA will align its operations along two verticals, development and operation. On the development vertical, all new generation projects that NEA develops will be structured through subsidiary companies. The model has clearly been demonstrated as a success story and will be given continuity. This company model of development has allowed NEA to achieve the benefits of private sector ingenuity, discipline and efficient decision making while ensuring greater accountability, transparency and focus on profitability.

On the operational side, the 508 MWs of NEA owned generation projects (that were financed on NEA's balance sheet) currently operate as part of the NEA's vertically integrated structure. During the Plan period NEA will undertake the following activities to re-organize its operational generation assets:

1. **Plan Year 2-3:** NEA will conduct an exploratory study to spin-off its generation assets into a separate generation company, NEA Generation Company (NEA GenCo). The study will assess the financial viability of the generation assets at the individual level and collectively for NEA GenCo. Furthermore, the study will outline the roadmap to spin-off NEA GenCo. During this period, NEA will initiate the process of functional and financial separation by maintaining separate book of accounts of the operational generation assets so that they operate as a stand-alone entity.

2. **Plan Year 4-5:** Following the conclusion of the asset verification and valuation exercise, NEA will initiate and conclude the spin-off of NEA GenCo as a separate entity during Plan Years 4 and 5. NEA GenCo will operate as an independent company and will sign PPA/PSA agreement with NEA that will incentivize NEA GenCo to optimize costs and increased operational efficiency.

FIGURE 7: Market Design After Re-structuring during the Plan Period



CSA – Credit Support Agreement; PSA – Power Sales Agreement; TSA – Transmission Services Agreement

TRANSMISSION, SYSTEM OPERATION

Following the spin-off of its generation and distribution businesses as subsidiaries of NEA, NEA as we know it today will be a holding company with the development and operation of the transmission system constituting its core assets and functions. It will be responsible for the development of new transmission lines, operation of the grid and maintenance of the transmission infrastructure. The transmission sector will essentially be a monopoly. NEA will continue to explore the development of the transmission sector through subsidiary companies wholly owned by NEA or through joint ventures as was done in the development of the Dhalkebar-Muzzafarpur cross border transmission line. The Rashtriya Grid Prasaran Company Ltd., a government owned subsidiary, will collaborate with NEA in its transmission planning and development functions and add to the diversity and dynamism of the transmission business.

> During the Plan Period, NEA will undertake the necessary initiatives to position its transmission and system operations to be spun-off as a separate entity after the Plan Period.

On the technical front, automating substation operations, modernizing the dispatch operations and enabling it to operate seamlessly to enable trading with regional countries will be some of the activities that will be undertaken leading up to spin-off of the transmission and system operation function. On the institutional side, NEA will set up separate financial accounts of this business and build the managerial capacity of the unit to function as an independent entity.

OTHER SUBSIDIARY COMPANIES

NEA through its ownership stakes in its wholly and partially owned subsidiary companies in generation, transmission and distribution will be responsible for investment planning and management for energy infrastructure development. NEA will manage, supervise and provide expertise (technical, managerial and operational) to its subsidiary and wholly owned companies.

1. **Trading Company**
   A key feature of the electricity market going forward will be the increasing role of trading. In fact, trade of electricity has been a key piece of NEA's operations in balancing electricity demand and supply. NEA has established the Nepal Power Trading Company (NPTC) with the mandate to trade electricity within Nepal and across the border with its neighbors. The establishment of NPTC means that trading will become a new business vertical for NEA which will play an important role in balancing demand and supply and foster the development of a multi-buyer multi-seller electricity market in Nepal. NPTC will be operationalized during the Plan period as an independent trading company and potentially position it to be the counterparty to PPAs with generation companies, with support from NEA until such time it is required to give comfort to counterparties.

2. **Other Subsidiaries**
   NEA will continue its efforts to extract value from its assets – physical, human and intellectual to create value for its shareholders, reduce the cost of supply and improve the quality, reliability and safety of electricity. NEA has established subsidiary companies to deliver goods and services beyond its core offering of electricity. It will continue to expand its consulting and engineering service business through the NEA Engineering Company (NECo) and position it as the pre-eminent consulting company in the country and the region. It will also fully operationalize the NEA Tower and Pole Company (NTPC) and the NEA Transformer Company (NTC) and explore strategic partnerships or joint ventures to grow these businesses. Maximizing the value and utilization of NEA's assets, particularly its land holdings and wide network of offices across the country will be an area of focus. NEA will explore the establishment of an asset management company, NEA Asset Management Company (NAMCO) to extract the maximum value.

6.3 RESTRUCTURING BEYOND THE PLAN PERIOD

With the restructuring of NEA's generation and distribution functions as separate companies completed during the Plan Period, NEA will primarily function as a transmission utility fulfill planning and investment functions. In addition, NEA will also have ownership interests in various subsidiary companies in the generation and distribution businesses. The need for two transmission entities, NEA and RGPCL, overseeing transmission development and operation functions will no longer be necessary. To remove these redundancies and optimize the transmission related functions, NEA will complete the final piece of the restructuring process after the conclusion of the Plan Period. NEA will spin-off its transmission and system operation business as NEA TransCo and merge RGPCL's assets and operations into this entity.

The remaining entity, NEA HoldCo, will be structured as a holding company. NEA Hold Co will continue to be a crucially important actor in the sector

and play an important role in the development of a robust and vibrant electricity sector. NEA Hold Co, through its web of holding companies and assets will be the conduit through which power from legacy PPAs and NEA's own generation will be allocated to the provincial distribution companies. NEA Hold Co will provide the necessary credit support to NPTC to provide comfort to developers and financiers. But most importantly, the restructuring will unleash tremendous value for its shareholders and create the right environment and conditions to open opportunities for ownership in NEA to the broader public as mandated in the NEA Act 2041.

FIGURE 8: Possible Nepal Electricity Market Overview After Further Re-structuring beyond the Plan Period

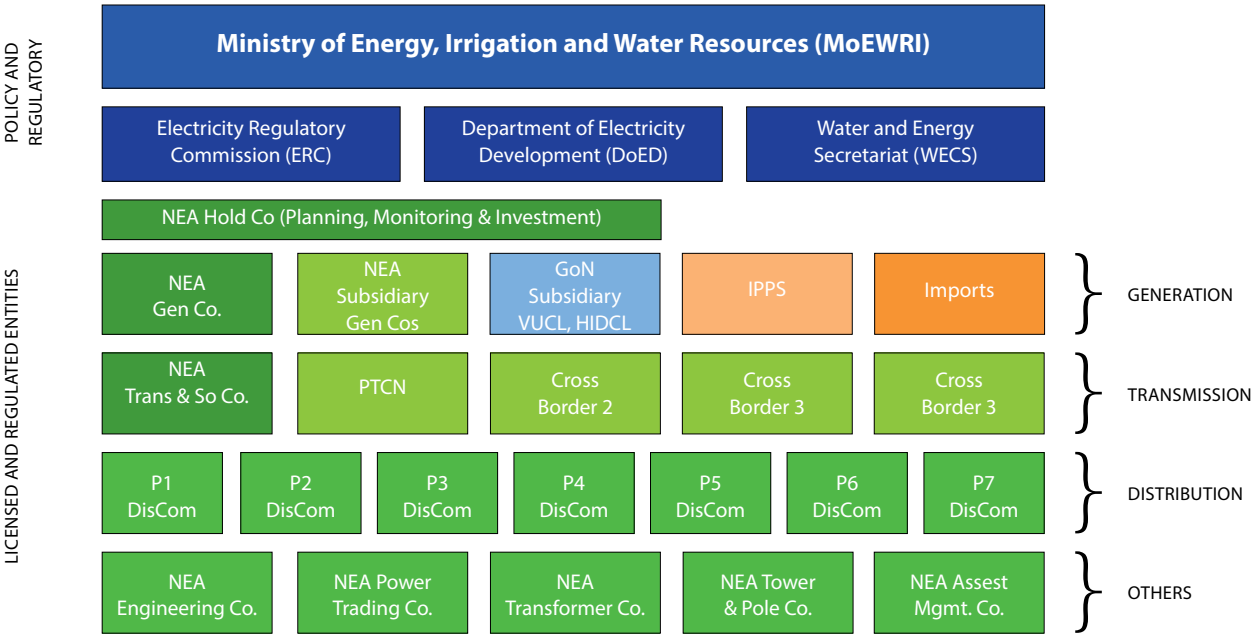
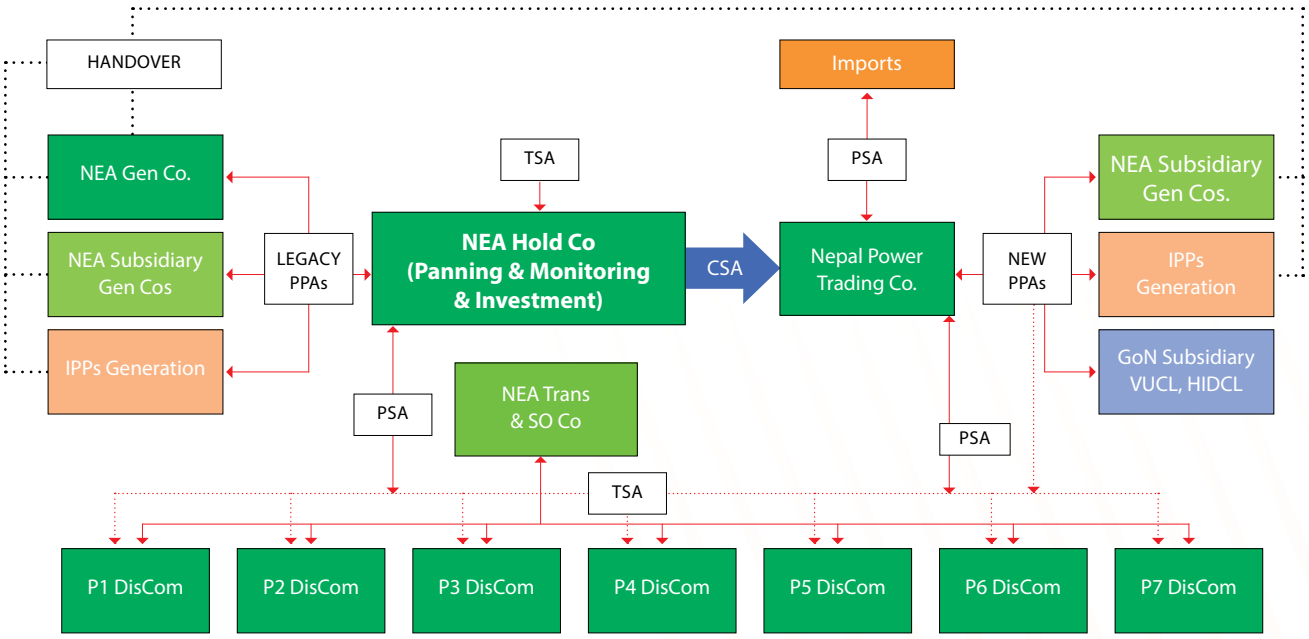
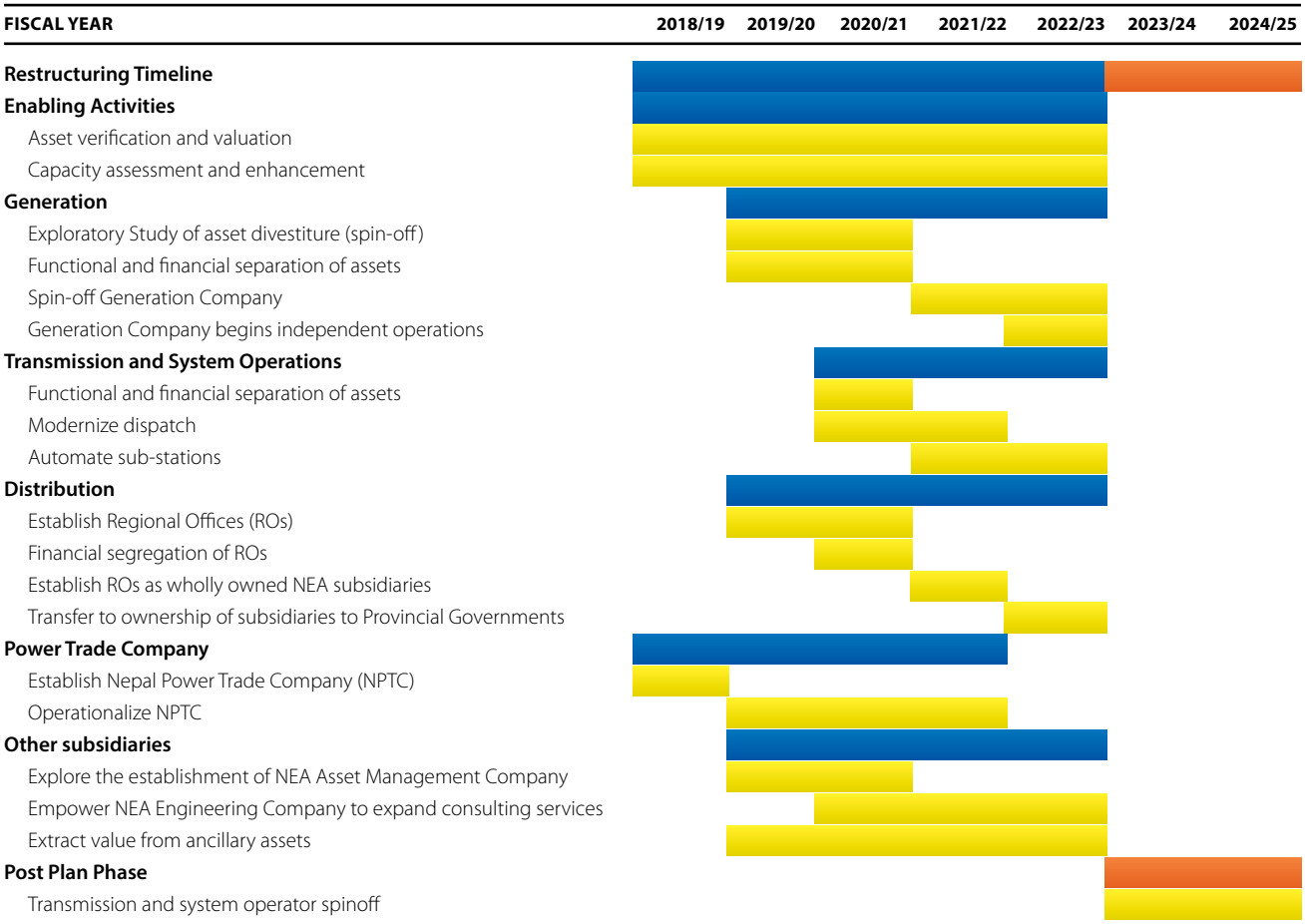


FIGURE 9: Market Design After Further Re-structuring beyond the Plan Period



CSA – Credit Support Agreement; PSA – Power Sales Agreement; TSA – Transmission Services Agreement

FIGURE 10: Restructuring Milestone Timelines



7.

STRATEGIC PLAN IMPLEMENTATION AND MONITORING FRAMEWORK

The CDP constitutes a roadmap for achieving NEA's strategic objectives and goals over the next five years. The Board of Directors will provide strategic input and guidance for the effective implementation of the Plan but the responsibility and execution of the Plan itself will be the responsibility of the Senior Management Team (Management) of NEA under the Managing Director's leadership.

NEA operates in a fluid and rapidly evolving political, regulatory and economic environment that reflects Nepal's emergence as a newly formed federal republic. The Plan is intended to be a dynamic, living document and the strategies herein will be adapted and modified in response to the realities as they emerge. The Plan will be adapted within any Plan year as and when necessary to respond in a manner that is relevant and effective. Updates to the Plan targets and priorities will be managed and agreed between the Board and the Management.

7.1 IMPLEMENTATION STRATEGY

The Activity Matrix outlined in the Section 8 provides a framework that translates NEA's vision, mission and goals into a detailed and actionable plan with performance tracking that includes specific tasks and its associated timelines and department/ key person(s) responsible. However, the implementation of the Plan will require a comprehensive implementation strategy along with an effective communication plan to develop awareness and ownership by all employees and continuous oversight and management of the Plan's implementation. Following the approval of the Plan by the Board, Management will produce a comprehensive and detailed CDP Implementation Action Plan.

7.1.1 COMMUNICATION AND OWNERSHIP ACROSS THE ORGANIZATION

The implementation of the Plan will not be successful if it simply emanates from the boardroom and resides in the minds and file cabinets of a select few members of Management. Management will undertake a comprehensive communication campaign to raise awareness about the Plan and engage the collective effort of their respective departments to achieve departmental and corporate goals. All employees will need to know what The Plan is, understand its rationale, and be committed to its successful outcome. Furthermore, the communication will be a continuous two-way process throughout the Plan Period.

7.1.2 CONTINUOUS MANAGERIAL OVERSIGHT

NEA operates in a fluid and dynamic environment and a key aspect of the Implementation Strategy for the Plan will be to ensure relevance of the Plan's goals and objectives on an ongoing basis. There will need to be a continuous process of review and refinement. Management will develop appropriate and relevant reporting tools and mechanisms to continuously review progress on the implementation of the Plan to ensure timely attainment of goals and continued alignment with GoN's policy objectives. Specifically, Management shall:

- Undertake quarterly and annual review on the implementation of the Plan and submit progress reports;
- Revise and update the Plan when necessary to align and adapt to the changing circumstances and GoN priorities;
- Undertake a mid-term and end-of-term review of the Plan to not only determine success but also lessons learned;
- Automate monitoring and evaluation of implementation of the Plan to improve efficiency in reporting and analysis.

7.2 PERFORMANCE MONITORING AND REPORTING STRUCTURE

The implementation of the Plan will be the responsibility of the MD's office supported by the Planning and Monitoring Directorate. While the Plan outlines goals and objectives at the Senior Management and Directorate/Department level, it will be implemented by the effective cascading of the Plan's activities and goals. During the implementation of the Plan, the Activity Matrix will be further detailed to assign responsibility down to the group/individual level to the extent possible. Accountability for the performance and attainment of the Plan's goals will be cascaded in alignment with the organizational structure as follows:

- Corporate KPIs and targets will be set at the Board level in alignment with annual Performance Contracts of the MD and Senior Management;
- The Corporate KPIs will reflect GoN's and NEA's objectives;
- The Corporate KPIs and any additional high priority KPIs will be assigned to the MD to which the MD is accountable and will be linked to the MD's performance contract;
- All the KPIs in the corporate and MD's performance contracts will be cascaded to the relevant directorate and functional heads and cascaded down to management staff with reference to their specialized contributions;
- Corporate KPIs will also be disaggregated based on geography (regional/provincial, district) and specific projects with targets customized to each level and organizational unit.

7.3 KEY PERFORMANCE INDICATORS (KPIS)

The KPIs considered most relevant to the Strategic Themes of National Priorities, Smart, Modern and Capable Utility and Improve Customer Service are outlined in the Table 19. These KPIs will be tracked and evaluated against yearly targets to determine the success in achieving the Plan's targets on a short-term and medium-term basis.

7.3.1 KEY PERFORMANCE INDICATORS FOR MONITORING AND EVALUATION

TABLE 20: Key Performance Indicators for Monitoring and Evaluation

STRATEGIC PERFORMANCE MEASURES	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
1. National Priorities						
Total Generation Capacity (annual additions in MW)	1,074	233	1,147	1,017	641	1,080
Total Generation Capacity (cumulative in MW)	1,074	1,307	2,454	3,471	4,112	5,192
% of Demand met by domestic generation	63.4%	97%	100%	100%	100%	100%
Per Capita Generation of Electricity (kWh)	150	278	356	517	677	763
Per Capita Consumption of Electricity (kWh)	200	287	342	400	458	496
Number of Customers connected to INPS ('000)	4,051	4,451	4,851	5,251	5,651	6,051
Percentage of Local Governments fully electrified	65%	72%	80%	90%	95%	100%
2. Capable, Modern and Smart Utility						
Total AT&C Losses	20.45%	18.85%	17.00%	16.00%	15.00%	14.40%
Increase System Load Factor	68%	70%	71.5%	73%	74%	75%
Nepal Financial Reporting Standards Implemented				Complete		
Enterprise Resource Planning Software Implemented					Complete	
% of billed energy measured by Smart / Automated Meters		15%	30%	45%	60%	75%
Number of domestic customers making online payments (in thousands)	300	400	700	1000	1500	2000
Office & Management (O&M) Survey completed			Complete			
3. Improve Customer Service						
Increase in employee efficiency (Sales per employee in NPR Millions) *	5.5	6.75	8.57	11.25	14.07	15.98
Complaint Handling Report generated Annually			Yes	Yes	Yes	Yes

* based on 10,000 employees in the beginning of plan period and 5% growth in employee base each year

8.

ACTIVITY MATRIX

8.1 THEME 1: NATIONAL PRIORITIES

GOAL 1: Expand & Upgrade System Capacity to Generate, Transmit & Distribute 5,000 MW

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Increase domestic generation capacity	Total Generation capacity (annual additions in MW)		233	1,147	1,017	641	1,080
	Independent Power Producers	PMITD	149	463	880	511	740
	NEA: own generation	GD	74	-	-	-	-
	NEA: Subsidiary companies	NSCMD	-	624	37	-	140
	Solar	GD	10	60	100	130	200
	Thermal	GD	-	-	-	-	-
Increase and enhance transmission capacity	Prepare a Five-year Transmission System Plan	SPD-PMITD, TD	Complete				
	C-km of 400 kV T-lines	TD	-		570	-	-
	C-km of 220 kV T-lines	TD	-	298	-	271	166
	C-km of 132 kV T-lines	TD	-	684	480	518	675
	C-km of 66 kV T-lines	TD	-		-	-	-
	400 kV substations capacity (MVA)	TD	-		2858.40	-	-
	220 kV substations capacity (MVA)	TD	-	30	-	1300	435
	132 kV substations capacity (MVA)	TD	-	345	547	438	432
	66 kV substations capacity (MVA)	TD	-		-	-	-

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Increase and enhance distribution capacity	Distribution Master Plan developed	DCSD		Complete			
	Province 1						
	Addition of 132/33kv s/s capacity (MVA)	DCSD	98	98	98	98	98
	Addition of 132/66/11kv s/s capacity (MVA)	DCSD	29	29	29	29	29
	Province 2						
	Addition of 132/33kv s/s capacity (MVA)	DCSD	85	85	85	85	85
	Addition of 132/66/11kv s/s capacity (MVA)	DCSD	50	50	50	50	50
	Province 3						
	Addition of 132/33kv s/s capacity (MVA)	DCSD	25	25	25	25	25
	Addition of 132/66/11kv s/s capacity (MVA)	DCSD	174	174	174	174	174
	Province 4: Gandaki						
	Addition of 132/33kv s/s capacity (MVA)	DCSD	12	12	12	12	12
	Addition of 132/66/11kv s/s capacity (MVA)	DCSD	14	14	14	14	14
	Province 5						
	Addition of 132/33kv s/s capacity (MVA)	DCSD	110	110	110	110	110
	Addition of 132/66/11kv s/s capacity (MVA)	DCSD	46	46	46	46	46
	Province 6: Karnali						
	Addition of 132/33kv s/s capacity (MVA)	DCSD	12	12	12	12	12
	Addition of 132/66/11kv s/s capacity (MVA)	DCSD	5	5	5	5	5
	Province 7: Sudurpaschim						
	Addition of 132/33kv s/s capacity (MVA)	DCSD	24	24	24	24	24
	Addition of 132/66/11kv s/s capacity (MVA)	DCSD	10	10	10	10	10
Increase and enhance cross-border infrastructure	Dhalkebar SS charged at full capacity	TD		400 kV			
	Commissioning of New Butwal – Sunauli – Gorakhpur 400 kV	TD					Complete
	Begin construction of Inaruwa – Jogbani – Purniya 400 kV	TD					Begin
	Rasuwagadhi – Chilime HUB – Ratmate 400 kV	TD					Finalize Modality
	Attariya – Bareilly	TD					Begin
	Arun III – Dhalkebar – Muzzafarpur	Dev: SJVC				Complete	
	Upper Karnali – Lamki – Bareilly	Dev: GMR				Begin	

GOAL 2: Increase per Capital Electricity Consumption to 700 kWh

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Build institutional capacity to increase per capita electricity usage	Per capita consumption of electricity (kWh)		287	342	400	458	496
	Per capita production of electricity (kWh)		278	356	517	677	763
	Business Development Directorate formed	MDS		Complete			
	Demand Stimulation Action Plan developed and implemented	BDD, PMITD		Begin			
Prepare TOD and seasonal tariff strategies	Tariff Analysis conducted, Time of Day and Seasonal tariffs recommended to increase off-peak energy usage	EAD-PMITD		Complete	Update	Update	Update
Liaise with government agencies to electrify the economy and increase electricity usage	Policy recommendations provided to MoEWRI, MoF, MoICS and MoPIT	EAD-PMITD, BDD		Complete			

GOAL 3: Universal Access to Electricity

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
	Percentage of Local Governments fully electrified	CRED, DCSD	72%	80%	90%	95%	100%
Build institutional knowledge and capacity on electrification needs	No. of new customers (in thousands)	DCSD, MDS-MD	400	400	400	400	400
	Electricity for All Action Plan developed	DCSD	Complete				
Continue campaign to add new customers to the grid	**Province 1**						
	C-km of 33 kV lines	DCSD	63	63	118	118	118
	C-km of 11 kV lines	DCSD	200	200	600	600	600
	C-km of 400/230 V lines	DCSD	600	600	1800	1800	1800
	33 kV substations capacity (MVA)	DCSD	22	22	62	62	62
	No. of Transformers	DCSD	200	200	600	600	600
	Province 2						
	C-km of 33 kV lines	DCSD	38	38	46	46	46
	C-km of 11 kV lines	DCSD	250	250	333	333	333
	C-km of 400/230 V lines	DCSD	750	750	500	500	500
	33 kV substations capacity (MVA)	DCSD	60	60	80	80	80
	No. of Transformers	DCSD	250	250	334	334	334
	Province 3						
	C-km of 33 kV lines	DCSD			13	13	13
	C-km of 11 kV lines	DCSD			67	67	67
	C-km of 400/230 V lines	DCSD			200	200	200
	33 kV substations capacity (MVA)	DCSD			11	11	11
	No. of Transformers	DCSD			67	67	67

Contd... Universal Access to Electricity

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
	Province 4: Gandaki						
	C-km of 33 kV lines	DCSD	62	62	61	61	61
	C-km of 11 kV lines	DCSD	250	250	267	267	267
	C-km of 400/230 V lines	DCSD	750	750	800	800	800
	33 kV substations capacity (MVA)	DCSD	24	24	25	25	25
	No. of Transformers	DCSD	250	250	267	267	267
	Province 5						
	C-km of 33 kV lines	DCSD	109	109	97	97	97
	C-km of 11 kV lines	DCSD	500	500	600	600	600
	C-km of 400/230 V lines	DCSD	1500	1500	1800	1800	1800
	33 kV substations capacity (MVA)	DCSD	66	66	82	82	82
	No. of Transformers	DCSD	500	500	600	600	600
	Province 6: Karnali						
	C-km of 33 kV lines	DCSD	28	28	168	168	168
	C-km of 11 kV lines	DCSD	100	100	600	600	600
	C-km of 400/230 V lines	DCSD	300	300	1800	1800	1800
	33 kV substations capacity (MVA)	DCSD	8	8	35	35	35
	No. of Transformers	DCSD	100	100	600	600	600
	Province 7: Sudurpaschim						
	C-km of 33 kV lines	DCSD	151	151	41	41	41
	C-km of 11 kV lines	DCSD	650	650	200	200	200
	C-km of 400/230 V lines	DCSD	1950	1950	600	600	600
	33 kV substations capacity (MVA)	DCSD	52	52	14	14	14
	No. of Transformers	DCSD	650	650	200	200	200

***** NOTE: No. of consumers includes 500,000 customers of Community Sales

GOAL 4: Improve Nepal's Energy Security

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Increase Nepal's electricity generation capacity with special focus on PRoR and Storage projects	National demand met through domestic generation	PMITD, GD, BDD	97%	100%	100%	100%	100%
	Kulekhani III Storage (14 MW) completed	GD		Complete			
	Upper Tamakoshi PRoR (456 MW) completed	BDD		Complete			
	Tanahu Storage (140 MW) construction	BDD	Begin				
	Dudh Koshi Storage (635 MW) construction	BDD				Begin	
	Tamakoshi V PRoR (95 MW) construction	BDD			Begin		
	Chainpur Seti PRoR (210 MW) construction	BDD				Begin	
	Upper Arun PRoR (725 MW) construction	BDD				Begin	
	IPP PRoR Completion (MW)	PTD-PMITD	14.8	499	37.6		99.4
Prioritize the development of new projects: PRoR, Storage, Battery stations	Technical preparedness and financing for Uttar Ganga Storage (828 MW)	ESD			Complete		
	Technical preparedness and financing for Andhi Khola Storage (180 MW)	ESD			Complete		
	Preliminary investigations of 2500 MW of projects with peaking / storage capacity	ESD		Begin			
	Study and define policies / tariffs for energy storage technologies: utility-scale battery stations	PMD, EAD	Begin				
Ensure a healthy generation mix as per the White Paper	Required Storage Project targets for PPA signing (MW) (target: 30-35%)	PTD		700	850	1200	1500
	Required PRoR targets for PPA signing (MW) (target: 25-30%)	PTD		300	800	1000	1500
	Required RoR targets for PPA signing (MW) (target: 30-35%)	PTD	380	630	630	271	-
	Required alternate sources targets for PPA signing (MW) (target: 5-10%)	PTD		100	150	150	189
Market Integration	Energy Banking	NPTC		Begin			
	Regional Trading	NPTC		Begin			

8.2 THEME 2: CAPABLE, MODERN AND SMART UTILITY

GOAL 1: Reduce AT&C Losses to under 15%

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
	Total AT&C Losses	DCSD, PMD, TD, EELRD-MD	18.85%	17.00%	16.00%	15.00%	14.40%
	AT&C Losses in Transmission system	DCSD, PMD, TD, EELRD-MD	5.60%	5.40%	5.20%	5.00%	4.80%
	AT&C losses in Distribution system	DCSD, PMD, TD, EELRD-MD	14.04%	12.26%	11.39%	10.53%	10.08%
Build institutional capacity to reduce losses	Distribution Loss Reduction Master Plan finalized	DCSD		Complete			
	Distribution Loss Reduction Master Plan Phase I implemented in 5 DCs	DCSD			Complete		
	Implementation of online data collection pilot program in 5 substations	EELRD-MD			Complete		
Develop infrastructure and system to digitalize data acquisition and generate reports.	Automated Data Acquisition Plan completed	DCSD, PMITD				Complete	
	GIS mapping of distribution infrastructure completed (# of DCs)	DCSD, PMITD		35	35	35	12
	Auto data emitting sensors installed and operational in distribution infrastructure (# of DCs)	DCSD, PMITD			50	50	17
	Auto data emitting sensors installed and operational in all transmission lines	TD, PMD, ITD-PMITD					
	Dashboard consisting of day-ahead technical and financial parameters developed and made accessible to Management	ITD-PMITD			Developed		
Invest in system infrastructure for loss reduction	No. of overloaded feeders upgraded	DCSD, EELRD-MD	75	100	100	100	100
	No. of capacitor banks installed	DCSD, EELRD-MD	350	500	500	500	650
Decrease non-technical losses	Annual Anti-theft campaign activities complied and published	DCSD, EELRD-MD	Published	Published	Published	Published	Published
	Media Campaign to discourage theft	DCSD, PRGHS-AD	Conducted	Conducted	Conducted	Conducted	Conducted

GOAL 2: Demand Side Management and Energy Efficiency

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
	Increase System Load Factor	TSO-TD	70%	71.5%	73%	74%	75%
Build institutional capacity to make system more efficient	Peak Load Reduction Plan and Policy Developed	EELRD-MD, PMITD		Complete			
Promote measures to make economy more energy efficient	Policy recommendations provided to Ministry of Finance to promote energy efficient electrical appliances	EELRD-MD		Complete			
	Provide policy recommendation to MoEWRI for the establishment of Bureau of Energy Efficiency	EELRD-MD, PMITD		Complete			
	Implement ground water pump program (# of pumps)	EELRD-MD, DCSD	100	300	300	400	400
	Implement pilot smart street light program (# of lights)	EELRD-MD, DCSD		1000	1500	1500	1500
Employ Demand Side Management tools to clip peak and fill valley of load curve	Tariff rates proposed to encourage demand during off-peak hours	EAD-PMITD		Complete			
	TOD tariff also offered to high-end domestic customers with Smart Meters (3-phase)	EAD-PMITD		Complete			
Encourage consumers to change behavior	ICT used to inform customers of peak and off-peak hours	EELRD-MD, PRGHS-AD, DCSD		Informed	Informed	Informed	Informed
	Energy efficiency awareness campaign organized	EELRD-MD, PRGHS-AD, DCSD		Organized	Organized	Organized	Organized

GOAL 3: Detailed Recording of Accounting Transactions

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Identify and separate Generation, Transmission and Distribution assets and liabilities	Nepal Financial Reporting Standards implemented	FD			Complete		
	Debt balances of GTD systems separated	FD			Complete		
	Fixed assets and inventory of GTD systems separated	AD-FD			Complete		
	Implementation of Enterprise Resource Planning software capable of generating financial statements of business unit	AD-FD				Complete	
Determine per unit Generation, Transmission and Distribution cost of service	Separate corporate costs and shared costs allocated to GTD systems	FD			Complete		
	Separate interest costs allocated to GTD based on actual and corporate debt allocations	FD			Complete		
	Distribution costs segregated at the provincial level	FD			Complete		
Create individual financial statements for the seven provincial Distribution Companies / Regional Offices	Plan created to spin off the operations of provincial business units	DCSD			Complete		
	Individual Balance Sheet and Profit and Loss accounts developed	FD			Complete		
	ERP implementation enables instantaneous generation of provincial business unit's financial statements	FD				Complete	

GOAL 4: Use of Modern IT systems

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Improve IT policy and standards	IT Policy revised and approved by NEA Board	ITD-PMITD, MDS		Complete			
	Conduct annual Certified Audit of Software, Hardware and Network in operation	ITD-PMITD			Conducted	Conducted	Conducted
Develop a state-of-the-art communication network between all branches	Develop a road map to connect all branches to Corporate Office	ITD-PMITD	Complete				
	DCs connected to Corporate Office (# of DCs including sub-branches)	ITD-PMITD		50	100	22	
Establish a centralized Data Center and back-up system	Data Center established and in operation at NEA Corporate Office	PMD, ITD-PMITD		Complete			
	Data Recovery Center established at an off-site location	PMD, ITD-PMITD			Complete		
Build IT Capacity of employees	NEA Employee IT Capacity Building Plan developed	ITD-PMITD, AD	Complete				
	IT Capacity Building trainings conducted (# of budget centers)	ITD-PMITD, AD		10	60	93	
	Refresher Training conducted (# budget centers)	ITD-PMITD, AD			10	60	93
	IT Capacity Building trainings conducted for all NEA Directorates	ITD-PMITD, AD		Complete			
	Refresher Course conducted for all NEA Directorates (# of people)	ITD-PMITD, AD			1000	1000	1000
Develop infrastructure and system to digitalize data acquisition and generate reports	Automated Data Acquisition Plan completed	DCSD, PMITD		Complete			
	GIS mapping of distribution infrastructure completed (# of DCs including sub-branches)	DCSD, PMITD		30	40	50	52
	Auto data emitting sensors installed and operational in distribution infrastructure (# of DCs including sub-branches)	DCSD, PMITD			40	50	82
	Auto data emitting sensors installed and operational in all transmission lines	TD, PMD, ITD-PMITD				Complete	
	Dashboard consisting of day-ahead technical and financial parameters developed and accessible	ITD-PMITD			Developed		
Implement Enterprise Resource Plan (ERP) Software	ERP Software procured	ITD-PMITD			Complete		
	Nine modules incorporated in ERP and operationalized	ITD-PMITD				Complete	
	Trainings conducted to make employees proficient in ERP use	ITD-PMITD				Conducted	Conducted
Develop automated billing and payment system infrastructure	% of billed energy measured by Smart / Automated Meters	DCSD	15%	30%	45%	60%	75%
	Bill delivery via SMS and email enabled	DCSD, ITD-PMITD				Complete	
	Multiple payment options (bank transfers, credit cards, mobile payments, etc.) options offered to customers	DCSD, ITD-PMITD				Complete	
	Exemption acquired from NRB limits on maximum online transactions	MD, ITD-PMITD				Complete	
	Number of domestic customers making online payments (in thousands)	DCSD, ITD-PMITD	200	500	1000	1500	2000

Contd... Use of Modern IT systems

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Modernize internal communications and record keeping	Online migration of Human Resources and Inventory records	HRD-AD, ITD-PMITD		Complete			
	Communication between NEA employees migrated to Intranet/email/SMS	AD, ITD-PMITD			Complete		
	Internal approvals conducted through Intranet	AD, ITD-PMITD				Complete	
	Operationalization of online library of research, studies, reports and documents	AD, ITD-PMITD				Complete	

GOAL 5: Increase Non-tariff Income

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Increase capacity and mandate of Treasury Unit	Treasury Unit strengthened through increased staff and appropriate trainings	MD, FD		Complete			
	Treasury Unit Scope of Work determined, and annual income targets set	TD-FD			Complete		
Establish Business Development Directorate to increase income	Business Development Directorate established and operationalized	MD, BDD		Complete			
	Non-Tariff Income Enhancement Plan completed	BDD		Complete			

GOAL 6: Improve employee benefits, productivity and human resource planning

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Improve human resource planning	Office & Management (O&M) Survey conducted	HRD-AD		Complete			
	Job Descriptions and required qualifications for all positions developed	HRD-AD		Complete			
	Capacity Building Plan developed and implemented	HRD-AD			Developed	Begin	
	Additional resources provided to Finance Analysis, Planning and Technology departments	HRD-AD		Begin			
	NEA Training Center revived, and new courses offered	HRD-AD		Begin			
Enhance employee benefits and safety	Salary and Employee Benefit Survey conducted	HRD-AD		Complete			
	Safety at the workplace trainings conducted (# of DCs, sub-stations, generation projects, etc.)	DCSD, SMD-EELRD		60	100	100	100

GOAL 7: Re-brand NEA as a Modern Corporate entity

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Build institutional capacity for Communications and Outreach	Publish Relations and Grievance Handling Section established and operationalized	MDS, AD		Complete			
	Communication Strategy developed	PRGHS-AD		Complete			
	Re-branding Action Plan implemented	PRGHS-AD		Begin	Complete		
Increase Communications and Outreach activities	Media campaign conducted with Brand Ambassador(s)	PRGHS-AD		Begin			
	Increase media presence	PRGHS-AD		Begin	Increased	Increased	Increased
	Local/national teams, events sponsored	PRGHS-AD		Begin	Continue	Continue	Continue

GOAL 8: Preparedness for Regulatory requirement

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Increase institutional capacity to file annual tariff petitions	Dedicated core team formed to collect, analyze and prepare data required for filing tariff petitions	EAD-PMITD	Formed				
	Capacity building trainings provided to Committee members on tariff calculation and petitions	EAD-PMITD	Complete				
Determine scientific and pragmatic tariff	Detailed Tariff study conducted with the view to encourage consumption, reduce peak load as well as protect lifeline tariff	EAD-PMITD		Begin	Complete	Updated	Updated
	File annual tariff petitions to the Regulator	EAD-PMITD		Filed	Filed	Filed	Filed

GOAL 9: Operationalize a Competent Trading Company

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Establish a well-resourced NPTC	Operationalize a well-resourced NPTC	NPTC, MD		Complete			
	NPTC Business Plan developed	NPTC		Complete			
Begin Banking Electricity with neighboring countries	Energy Banking agreement signed	NPTC / PTD-PMITD	Signed				
	Energy Banking initiated	NPTC/PTD-PMITD		Initiated	Continued	Continued	Continued
Begin trading of electricity	Electricity traded with India on day ahead and term ahead markets	NPTC/PTD-PMITD	Begin	Continued	Continued	Continued	Continued
	Regional trading of electricity	NPTC/PTD-PMITD		Begin			
Competitive bidding of PPAs	PPAs procured via competitive bidding process	NPTC/PTD-PMITD			Begin		

GOAL 10: Improve Contract and Project Management

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Improve Contract Management abilities	Identification of major issues with Contract Management	MDS, GD, TD, DCSD		Complete			
	Contract Management Improvement Action Plan developed and implemented	MDS, GD, TD, DCSD		Complete	Implement	Implement	Implement
	Contract Management Training developed	AD, MDS		Developed			
	Contract Management Training provided to concerned officers	HRD, AD		Provided			
Improve coordination with various GoN agencies	Identification of major issues with Project Implementation	MDS, GD, TD, DCSD		Complete			
	Focal persons appointed for different Ministries	MDS, GD, TD, DCSD		Complete			
	Legislative changes recommended for quicker implementation of projects	MDS, GD, TD, DCSD		Complete			

GOAL 11: Establish and operationalize a well-resourced Business Development Directorate

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Establish a well-resourced BDD	Operationalize a well-resourced BDD	MD, BDD		Complete			
	BDD Tasks and Mandate formalized	BDD		Complete			
	Non-Tariff Income Enhancement Plan completed	BDD		Complete			
Develop long-terms plans of NEA Subsidiaries	NEA Subsidiary Investment Plan developed and updated annually	BDD			Complete	Updated	Updated
	NEA Subsidiary Dividend projections developed and updated annually	BDD			Complete	Updated	Updated
	New NEA Subsidiary Pipeline Report developed and updated annually	BDD			Complete	Updated	Updated
Quarterly Monitoring and Reporting	Compile quarterly reports of Subsidiary progress	BDD			Compiled	Compiled	Compiled

GOAL 12: Improve safety and ensure compliance of technical standards

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Increase institutional capacity to improve	Safety Management Division established and operationalized	MD, EELRD		Complete			
safety and ensure compliance of technical standards	Contract, Norms and Specifications Department established and operationalized	MD, PMITD		Complete			
	Safety, Generation, Transmission and Distribution Standards amended	CNSD-PMITD		Complete			
Audit for compliance of Technical and Safety Standards	Audit of Technical and Safety Standard compliance (# of DCs, sub-stations, generation projects, etc.)	TAD-IAD		5	100	100	100
	Follow-up audit to verify fulfillment of audit compliance report (# of DCs, sub-stations, generation projects, etc.)	TAD-IAD		5	100	100	

Contd... Improve safety and ensure compliance of technical standards

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Safety Awareness Public Campaign	Consumer Safety Awareness Campaign developed and implemented	SMD-EELRD, PRGHS-AD		Complete	Implement	Implement	Implement
Capacity building of employees to reduce workplace accidents	Safety at the workplace trainings conducted (# of DCs, sub-stations, generation projects, etc.)	SMD-EELRD, HRD-AD, DCSD	60	100	100	100	

8.3 THEME 3: IMPROVE CUSTOMER SERVICE

GOAL 1: Supply reliable, affordable, high-quality and safe electricity

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Ensure adequate electricity supply with reliability, quality and safety	Expand and upgrade system capacity to generate, transmit and distribute 5000 MW	BDD, GD, TD, PMD, DCSD	233	1,147	1,017	641	1,080
	New cross-border connections established, and existing connections augmented	TD, BDD		Dhalekbar substation charged at 400kV			Butwal-Gorakhpur line complete
	Safety, Generation, Transmission and Distribution Standards amended	CNSD-PMITD		Complete			
Provide affordable electricity	Reduce AT&C losses to reduce cost of supply of electricity	DCSD, PMD, TD, EELRD	18.85%	17.00%	16.00%	15.00%	14.40%
	Business Development Department established and implementation of Non-Tariff Income Enhancement Plan	EAD, FD, BDD		Begin			
	Increase in employee efficiency (Sales per employee in NPR Millions)*	HRD	6.75	8.57	11.25	14.07	15.98

* based on 10,000 employees in the beginning of plan period and 5% growth in employee base each year

GOAL 2: Use of Information Communication Technology to Improve Customer

ACTIVITIES	KEY PERFORMANCE INDICATORS	RESPONSIBILITY	ANNUAL TARGETS				
			18/19	19/20	20/21	21/22	22/23
Use of ICT platforms to inform, engage and facilitate customer queries	Use of ICT platforms to facilitate information sharing and two-way communication	PRGHS-AD		Begin	Continue	Continue	Continue
	Increased presence in old and new media platforms	PRGHS-AD		Begin	Continue	Continue	Continue
Improve complaint handling process and delivery	Standardized complaint handling protocol improved and implemented throughout all DCs	MDS, DCSD, PRGHS-AD		Begin	Continue	Continue	Continue
	Records maintained of NEA's response timing and activities	DCSD, PRGHS-AD		Begin	Continue	Continue	Continue
	Complaint Handling Report generated quarterly for submission to Senior Management	DCSD, PRGHS-AD		Begin	Continue	Continue	Continue
	Complaint Handling Annual Report compiled	DCSD, PRGHS-AD		Begin			

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