Project Administration Manual

Project Number: 50059-002
Loan and/or Grant Number(s): {LXXXX; GXXXX; TAXXXX}
June 2017

NEPAL: Power Transmission and Distribution Efficiency Enhancement Project

ABBREVIATIONS

ADB	–	Asian Development Bank
EMP	–	environmental management plan
ESSD	–	Environmental and Social Services Department
GESI	–	gender equality and social inclusion
kV	–	kilovolt
MW	–	megawatt
NEA	–	Nepal Electricity Authority
PMD	–	Project Management Directorate
SPS	–	Safeguards Policy Statement

CONTENTS

Project Administration Manual Purpose and Process

The project administration manual (PAM) describes the essential administrative and management requirements to implement the project on time, within budget, and in accordance with the policies and procedures of the government and Asian Development Bank (ADB). The PAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the PAM.

The Nepal Electricity Authority (NEA) is wholly responsible for the implementation of ADB-financed projects, as agreed jointly between the borrower and ADB, and in accordance with the policies and procedures of the government and ADB. ADB staff is responsible for supporting implementation including compliance by NEA of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.

At loan negotiations, the borrower and ADB shall agree to the PAM and ensure consistency with the loan and grant agreements. Such agreement shall be reflected in the minutes of the loan negotiations. In the event of any discrepancy or contradiction between the PAM and the loan and grant agreements, the provisions of the loan and grant agreements shall prevail.

After ADB Board approval of the project's report and recommendations of the President (RRP), changes in implementation arrangements are subject to agreement and approval pursuant to relevant government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval, they will be subsequently incorporated in the PAM.

I. PROJECT DESCRIPTION

1. **Rationale**. Reliable electricity service is a necessary requirement for accelerating economic development of a country and is also considered an important input in improving quality of life. Energy development in Nepal has been slow largely because of a history of weak and inconsistent policies, absence of an independent electricity regulator, lack of comprehensive planning, public sector financing limits, NEA's credit and offtake risks, and difficulty in land acquisition and transmission line right-of-way issues. Nepal's overall electricity demand has far outgrown the supply: estimated peak demand in FY2016 was around 1,385 megawatt (MW) versus installed capacity of 835 MW, resulting in a deficit of about 550 MW. As a consequence, Nepal has been suffering from a severe shortage of power with frequent load shedding. The quality of electricity supply in Nepal is among the poorest in the world, ranking 137th out of 147 countries.[1]

2. As a government corporation responsible for generation, transmission and distribution, NEA has dominated Nepal's electricity subsector. It has recorded poor operational and financial performance, and at the end of FY2015, its accumulated losses reached NRs26.8 billion. In FY2015 alone, NEA incurred losses of NRs6.5 billion.[2] The financial position of NEA is further deteriorating due to a number of factors such as (i) lack of cost-based tariff adjustments; (ii) high cost of service arising from an elevated internal purchase price at generation point, the annual escalation of costs in purchasing power from independent producers, operation of thermal plants, import of relatively high-cost seasonal energy from India, and increased operation and maintenance costs; (iii) high system losses at over 24%; and (iv) increased arrears largely from the public sector, including municipalities.

3. The Government of Nepal endorsed an action plan in February 2016 to end the energy crisis within 2 years. The Ministry of Energy prepared a concrete action plan to reduce power shortages within 1 year and eliminate them altogether within 2 years. The government has also declared the National Energy Crisis Reduction and Electricity Development Decades, an action plan comprising 99 specific activities that are relevant to sector operations including that of improving the service delivery by modernizing the electricity distribution system. Some visible developments are noticed recently in terms of NEA's operational performance through significant reduction in load shedding in Kathmandu Valley and other major cities of Nepal together with electricity theft control measures. Ultimately, the reform program will be successful only if energy and electricity pricing is rationalized and the sector shifts to a fully commercial basis, since government budgets have not been sufficient to cover energy subsidies.

4. Electricity supplies are expected to increase rapidly during the next several years via (i) imports from India through the first 400 kilovolt (kV) cross-border line,[3] (ii) commissioning of the 456 MW Upper Tamakoshi hydropower project in 2019, and (iii) an additional 1,635 MW from multiple hydropower projects with planned commissioning by 2022. Therefore, existing transmission and distribution systems need to be immediately rehabilitated and upgraded for the network to be able to deliver the additional electricity supplies to consumers. Given this, electricity network enhancement has been a priority and is included in the government's action plan to address power crisis to provide reliable and affordable electricity, and universal access for all by 2030. This is a fundamental effort consistent with achieving Sustainable Development Goal #7

[1] ADB. 2015. *Asian Development Outlook.* Manila.
[2] NEA. 2015. *Annual Report*.
[3] This line has power capacity of at least 1,000 MW.

(Sustainable Energy for All) as well as Nepal's Nationally Determined Contributions for the United Nations Framework Convention on Climate Change.

5. The Kathmandu Valley accounts for approximately 400,000 consumers or about 16% of NEA's total consumers in the country, and contributes to about 27% of the total revenue generated from the sale of electricity. There are 11 distribution centers which operate distribution networks comprising 11.0 kV primary feeders and 0.4 kV lines. Power made available in the Kathmandu Valley is about 400 MW, and the existing distribution network cannot handle more than this amount without rehabilitation. This became clear in 2015, when liquefied petroleum gas was lacking and households were forced to use electricity for cooking, which meant an additional load of 200 MW. The distribution network could not handle the resulting overload, and numerous distribution transformers were damaged. Moreover, energy consumption in the Kathmandu Valley (1,038 gigawatt-hours in FY2016) is rising more than 10% per year, which will lead to a doubling of demand every 7 years.

6. The maintenance and reinforcement of the Kathmandu Valley electricity network have not kept pace with growth in electricity demand and the number of consumers added to the network.[4] It is imperative to enhance the distribution capacity and improve the reliability and quality of electricity supply by reducing system overloads as well as technical and commercial losses (currently about 15%). In addition, the existing substation capacity needs to be augmented so that additionally incoming power can be accommodated. Also, implementation of other system efficiency upgrades and efficiency measures—such as advanced grid operation software, distribution system automation, and smart metering that will provide consumers with more information about their own electricity use and greater flexibility in managing their own accounts—will modernize the distribution system and bring it technologically up to date. Further, system efficiency improvements and loss reductions to about 10% will improve NEA's financial health, while customers will benefit from more reliable and better electricity supply and less dependence on diesel generators. Operational upgrades will also aid the integration of new generation capacity scheduled to come on line in the next 3–4 years. A project that covers these specific areas can easily be replicated in other cities in the country.

7. The Asian Development Bank (ADB) has been the leading partner in Nepal's energy sector, supporting a broad spectrum of interventions in generation, transmission, distribution, and access to energy. Since 2014, ADB's overall investment strategy has followed a logical sequence: (i) improve reliability and quality of grid-supplied electricity through network expansion, efficiency improvements, and expanded imports; (ii) rationalize tariffs, with eventual elimination of non-lifeline subsidies; (iii) mobilize TA to develop large-scale hydropower generation; (iv) provide additional financing for national grid connected utility-sale solar power development; and (v) continue financing for access to energy via renewable energy mini grids, supply-side efficiency, and other "last mile" interventions. ADB's country partnership strategy, 2013–2017 for Nepal supports the government's development objective of accelerated and inclusive economic growth, and tackles infrastructure bottlenecks in key areas such as energy services in order to create an enabling environment for increased business and employment opportunities.[5] This project will be ADB's first investment in Nepal that specifically focuses on energy efficiency by improving the distribution system.[6]

[4] The last planned systematic reinforcement was carried out about 15 years ago with the assistance from the Japan International Cooperation Agency.

[5] ADB. 2013. *Country Partnership Strategy: Nepal, 2013–2017.* Manila.

[6] An earlier project included components for more efficient lighting (compact fluorescent lamp promotion) and demonstration of rooftop solar systems.

8. **Impact and Outcome.** The impact will be reliable and efficient electricity supply for all achieved, aligned with the Government of Nepal's action plan to overcome the country's energy crisis.[7] The outcome will be improved access to efficient, adequate, and high-quality power supply in the Kathmandu Valley.

9. **Outputs.** The main outputs of this project will be:

(i) **Transmission grid capacity to feed the primary distribution networks for Kathmandu Valley strengthened**. Six new grid gas-insulated substations will be included under this component. A 220/132 kV 160 MVA substation each at Barhabise and Laphsiphedi and a 132/11kV 45 MVA substation at Changunarayan are necessary to help complete the Tamakoshi–Kathmandu 220/400 kV Transmission Line Project which will then provide vital power supply to Kathmandu from the power-generating stations that are being constructed in the Khimti (Tamakoshi) and Barhabise areas. Another three 132/11 kV 45 MVA each substations in Chapagaun, Mulpani, and Phutung will feed in necessary power to the Kathmandu Valley.

(ii) **Kathmandu Valley distribution network rehabilitated and capacity increased.** This covers distribution system automation and the rehabilitation of low-voltage and medium-voltage networks, initially in the central and northern distribution centers of Kathmandu Valley. The majority of the new and existing construction will be underground, since overhead distribution is impractical in densely populated areas where the access roads are very narrow.

(iii) **Operational and financial performance of NEA distribution centers enhanced.** Single-phase and three-phase smart meters with associated communication facilities that are aligned with modern international practice will be introduced to automate customer metering and reduce nontechnical losses.

(iv) **NEA's capacity to operate and manage advanced distribution system, intelligent network (smart grid) technology with GESI aspects in electricity access and end-user awareness developed**. Training and other capacity-building activities will be conducted to help NEA staff to plan and execute advanced distribution efficiency projects with special emphasis on gender.

[7] Government of Nepal. 2016. *National Energy Crisis Reduction and Electricity Development*. Kathmandu. http://www.moen.gov.np/pdf_files/Rastriya-Urja-Sankat-Niwaran-2072.pdf; and National Planning Commission. 2015. *Sustainable Development Goals 2016–2030*. National Preliminary Report. Kathmandu.

II. IMPLEMENTATION PLANS

A. Project Readiness Activities

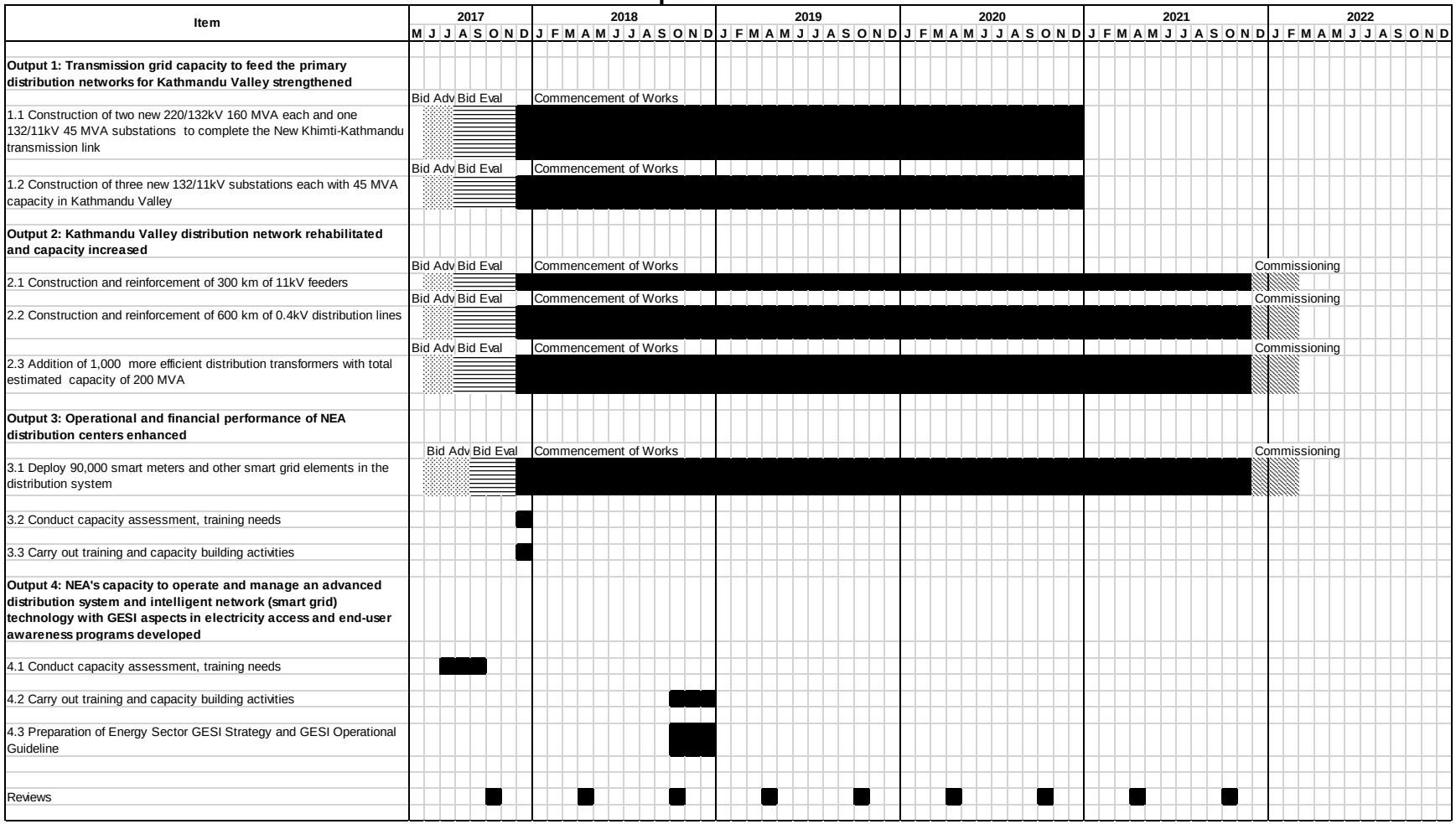
	Oct 2016	Nov 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Responsible Individual/Unit/ Agency/Government
Advance contracting actions		X										NEA/ADB
Retroactive financing actions		X										NEA/ADB
Establish project implementation arrangements	X											NEA
Loan/Grant Negotiations								X				NEA/ADB
ADB Board approval									X			ADB
Loan {grant} signing										X		NEA/ADB
Government legal opinion provided										X		GoN
Loan {grant} effectiveness											X	NEA/ADB

ADB=Asian Development Bank, GoN=Government of Nepal, NEA=Nepal Electricity Authority.

B. Overall Project Implementation Plan

10. The project will be implemented over a period of 5 years after the loan/grant effectiveness, including procurement and construction activities.

Table 1: Implementation Schedule



III. PROJECT MANAGEMENT ARRANGEMENTS

A. Project Implementation Organizations: Roles and Responsibilities

Project Implementation Organizations	Management Roles and Responsibilities
Steering Committee chaired by Secretary, Ministry of Energy	Will be responsible to guide the project on strategic and policy decisions on implementation, and coordinate inter-agency issues.
Executing agency Nepal Electricity Authority Project Management Directorate	➢ Overall responsibility for; (i) project management, (ii) implementation coordination, and (iii) function as project implementation unit to assist in day-to-day project implementation. ➢ Preparing overall project implementation plan and consolidated annual work plan. ➢ Preparing standard bid documents to comply with ADB guidelines. ➢ Procuring equipment and services. ➢ Ensuring project compliance with loan and grant covenants. ➢ Coordinating with ADB on matters related to disbursements. ➢ Maintaining project documents and submitting timely reports to ADB and the government. ➢ Obtaining necessary clearances.
ADB	➢ Conduct regular project reviews and facilitate the implementation of the project. ➢ Monitor and review overall implementation in consultation with the executing agencies including: project implementation schedule, actions required with reference to the summary of poverty reduction and social strategy, environment management plan, and resettlement plan if applicable, timeliness of budgetary allocations and counterpart funding, project expenditure progress with procurement and disbursement, statement of expenditure when applicable, compliance with loan and grant covenants, and likelihood of attaining project development objectives.

ADB = Asian Development Bank.

B. Key Persons Involved in Implementation

Executing Agency

Nepal Electricity Authority
(NEA)

Kulman Ghising
Managing Director, NEA
Central Office, Durbarmarg
Kathmandu, Nepal
Telephone No: +977-1-4153051
Fax: +977-1-4153009
Email: info@nea.org.np
Website: www.nea.org.np

Manoj Silwal
Project Coordinator, NEA
Telephone No: +977-1-5164096
Fax: +977-1-5164099
Email: manoj.silwal@nea.org.np

Asian Development Bank

Energy Division
South Asia Development (SARD)

Priyantha Wijayatunga
Director, Energy Division
Telephone No: +63 2 632-6301
Email address: pwijayutanga@adb.org

Mission Leader

Jiwan Acharya
Senior Energy Specialist, Energy Division
Telephone No: +91 11 2410 7200
Email address: jacharya@adb.org

C. Project Organization Structure

11. The key organizations involved in implementation of the project are in Figure 1 and the safeguards implementation arrangements are in Figure 2.

Figure 1: Project Organization Structure

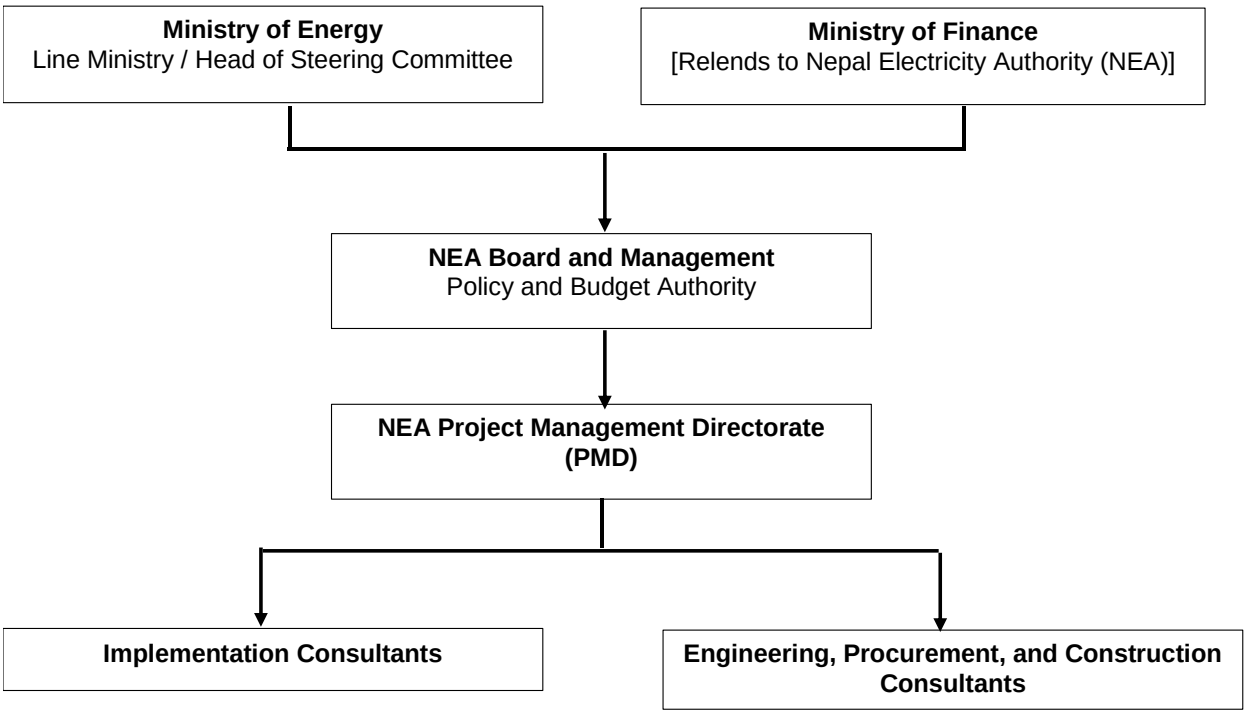
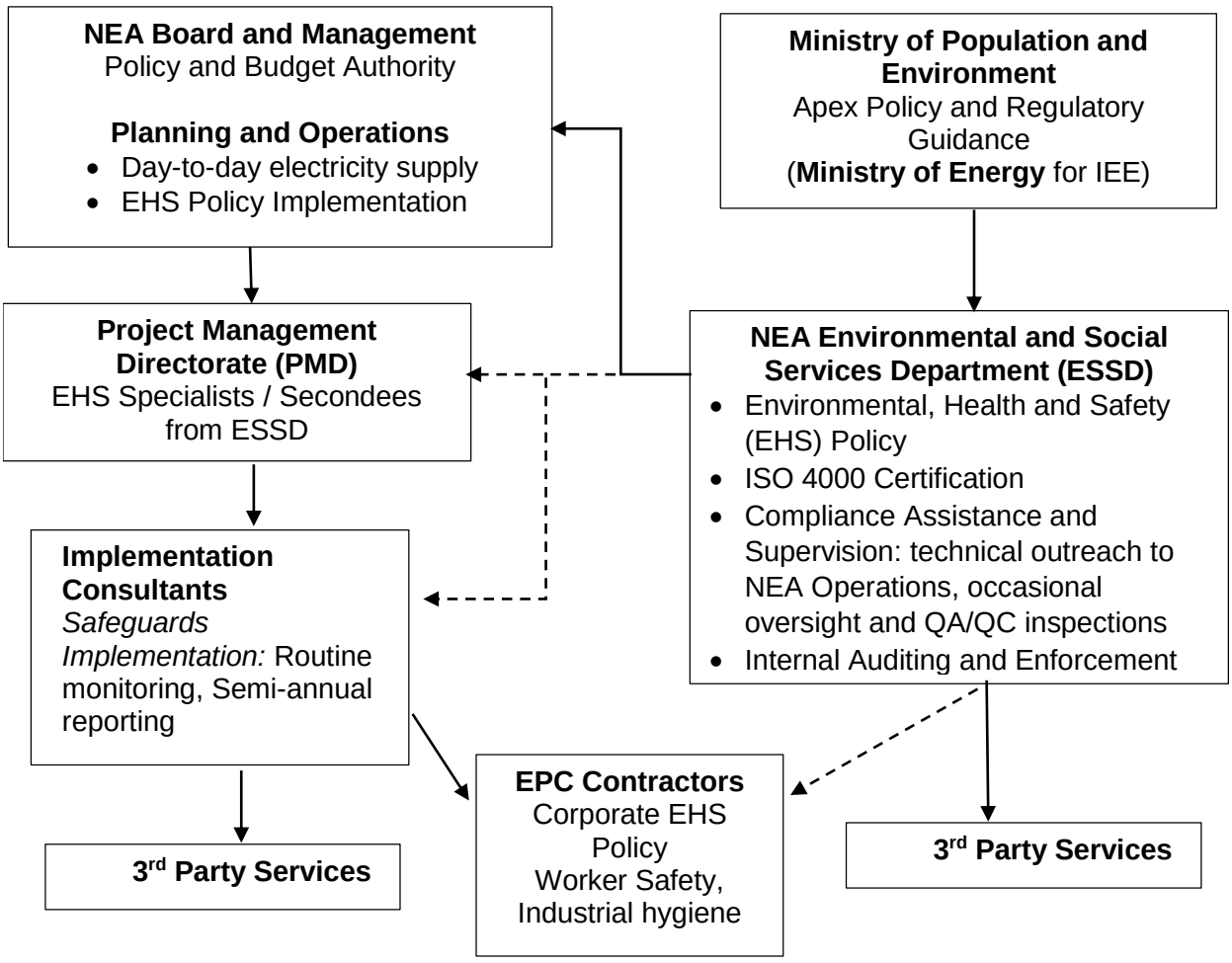


Figure 2: Safeguards Implementation Arrangements



IV. COSTS AND FINANCING

A. Cost Estimates Preparation and Revisions

12. Base cost estimates were prepared by NEA based on NEA's assessment of unit quantities and recent tender prices received by NEA for similar works. Contingencies and financial charges during implementation were estimated by ADB. The project cost is estimated at US$189.0 million, including physical and price contingencies, financing charges during implementation, taxes and duties. The project investment plan is summarized in Table 2.

Table 2: Project Investment Plan
($ million)

Item			Amount
A.	**Base Cost**[a]		
	1.	Transmission system augmentation and reinforcement	77.7
	2.	Distribution system augmentation and reinforcement[b]	85.8
	3.	Project supervision and capacity development	7.2
		Subtotal (A)	**170.7**
B.	**Contingencies**[c]		**16.1**
C.	**Financing Charges During Implementation**[d]		**2.2**
		Total (A+B+C)	**189.0**

[a] In fourth-quarter 2016 prices. Includes taxes and duties of $7.1 million.
[b] Physical contingencies computed at 5% of base costs. Price contingencies computed using the Asian Development Bank's forecasts of international and domestic inflation. Includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
[c] For the loan, interest during implementation has been computed using a base rate of 1%.
Sources: Nepal Electricity Authority and Asian Development Bank estimates.

13. The government has requested a concessional loan in various currencies equivalent to SDR109,229,000 ($150 million equivalent)[8] from ADB's ordinary capital resources to help finance the project. The loan will have a 32-year term, including a grace period of 8 years, an interest rate of 1.0% per year during the grace period and 1.5% per year thereafter, and such other terms and conditions set forth in the draft loan and project agreements. The financing plan is in Table 3.

Table 3: Financing Plan

Source	**Amount** ($ million)	**Share of Total** (%)
Asian Development Bank		
Ordinary Capital Resources (Concessional loan)	150.0	79.0
Nepal Electricity Authority/Government	39.0	21.0
Total	**189.0**	**100.0**

Sources: Nepal Electricity Authority and Asian Development Bank estimates.

B. Key Assumptions

14. The following key assumptions underpin the cost estimates and financing plan:

(i) Exchange rate: NPR 106.0 = $1.00 (as of 10 November 2016).

(ii) Price contingencies based on expected annual inflation over the implementation period is as follows:

Table 4: Escalation Rates for Price Contingency Calculation

Item	**2017**	**2018**	**2019**	**2020**	**2021**	**Average**
Foreign rate of price inflation	1.4%	1.5%	1.5%	1.5%	1.5%	1.5%
Domestic rate of price inflation	8.2%	7.0%	7.0%	7.0%	7.0%	7.2%

Source: Asian Development Bank estimates.

[8] $1 = SDR0.724213 as of 19 May 2017.

C. Detailed Cost Estimates by Expenditure Category

Table 5: Detailed Cost Estimates by Expenditure Category

Item			NPR million			USD million			
			Foreign Exchange	Local Currency	Total Cost	Foreign Exchange	Local Currency	Total Cost	% of Base Cost
A.	**Investment Costs[a]**								
	1.	Turnkey contracts – substations	6,600.3	359.7	6,960.0	62.27	3.39	65.66	38%
	2.	Turnkey contracts – distribution	7,629.8	290.1	7,919.9	71.98	2.74	74.72	43%
	3.	Equipment supply	766.2	16.6	782.8	7.23	0.16	7.39	4%
	4.	Consultants							
		a. Project management and supervision	282.2	35.8	318.0	2.66	0.34	3.00	2%
		b. Project formulation	112.9	14.3	127.2	1.06	0.14	1.20	1%
		c. Capacity building	272.8	34.6	307.4	2.57	0.33	2.90	2%
		d. Support for gender inclusion	212.0	10.6	222.6	2.00	0.10	2.10	1%
		Subtotal (A)	**15,876.2**	**761.8**	**16,638.0**	**149.78**	**7.19**	**156.96**	91%
B.	**Other Costs**								
	1.	Environmental and social mitigation	0.0	159.0	159.0	0.00	1.50	1.50	1%
	2.	Project overheads[b]	0.0	499.1	499.1	0.00	4.71	4.71	3%
	3.	Land	0.0	1,007.0	1,007.0	0.00	9.50	9.50	6%
		Subtotal (B)	**0.0**	**1,665.1**	**1,665.1**	**0.00**	**15.71**	**15.71**	9%
	Total Base Cost		**15,876.2**	**2,426.9**	**18,303.1**	**149.78**	**22.90**	**172.67**	100%
C.	**Contingencies**								
	1.	Physical [c]	766.0	117.1	883.2	7.23	1.10	8.33	5%
	2.	Price[d]	4,788.9	518.1	5,307.0	7.39	0.39	7.78	5%
		Subtotal (C)	**5,554.9**	**635.2**	**6,190.1**	**14.61**	**1.49**	**16.11**	9%
D.	**Financing Charges During Implementation**								
	1.	Interest during implementation[e]	293.1	0.0	293.1	2.22	0.00	2.22	1%
		Subtotal (D)	**293.1**	**0.0**	**293.1**	**2.22**	**0.00**	**2.22**	1%
Total Project Cost (A+B+C+D)			**21,724.2**	**3,062.2**	**24,786.3**	**166.61**	**24.39**	**191.00**	111%

[a] In Q4 2016 prices. Includes taxes and duties of $7.1 million.

[b] Includes estimated audit fees of NPR 25 million for the audit of the annual project financial statements for the period 2017-2021.

[c] Computed at 5% of base costs.

[d] Computed using ADB's forecasts of international and domestic inflation and includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

[e] For the loan, computed at a base rate of 1%.

Sources: Nepal Electricity Authority and Asian Development Bank estimates.

D. Allocation and Withdrawal of Loan/Grant Proceeds

Table 6: Allocation and Withdrawal of Loan Proceeds
Loan

No.	Item	Total Amount Allocated for ADB Financing ($) Category	Basis for Withdrawal from the Loan Account
1	Turnkey contracts - substations	62,300,000	100.00% of total expenditure claimed*
2	Turnkey contracts - distribution	72,200,000	100.00% of total expenditure claimed*
3	Equipment Supply	7,000,000	100.00% of total expenditure claimed*
4	Project Management and Capacity Development	6,300,000	100.00% of total expenditure claimed*
5	Interest During Construction	2,200,000	Total amount due
	Total	**150,000,000**	

*exclusive of taxes and duties

Table 7: Allocation and Withdrawal of Loan Proceeds
TA Grant

No.	Item	Total Amount Allocated for ADB Financing ($) Category	Basis for Withdrawal from the Loan Account
1	Support for Gender Inclusions and capacity building of NEA staff	2,000,000	100.00% of total expenditure claimed*
	Total	**2,000,000**	

*exclusive of taxes and duties

E. Detailed Cost Estimates by Financier

Table 8: Detailed Cost Estimates by Financier

Item	ADB				Government				Total
	COL Loan	% of Cost Category	JFPR Grant	% of Cost Category	Amount	Taxes and Duties	Total	% of Cost Category	
A. Investment Costs									
1. Turnkey contracts - substations	62.27	95%	0.00	0%	0.00	3.39	3.39	5%	65.66
2. Turnkey contracts - distribution	71.98	96%	0.00	0%	0.00	2.74	2.74	4%	74.71
3. Equipment supply	7.23	98%	0.00	0%	0.00	0.16	0.16	2%	7.39
4. Consultants									
a. Project management and supervision	2.66	89%	0.00	0%	0.00	0.34	0.34	11%	3.00
b. Project formulation	1.06	89%	0.00	0%	0.00	0.14	0.14	11%	1.20
c. Capacity building	2.57	89%	0.00	0%	0.00	0.33	0.33	11%	2.90
d. Support for gender inclusion	0.00	0%	2.00	95%	0.10	0.00	0.10	5%	2.10
Subtotal (A)	**147.78**	94%	**2.00**	1%	**0.10**	**7.09**	**7.19**	5%	**156.96**
B. Other Costs									
1. Environmental and social mitigation	0.00	0%	0.00	0%	1.50	0.00	1.50	100%	1.50
2. Project overheads	0.00	0%	0.00	0%	4.71	0.00	4.71	100%	4.71
3. Land	0.00	0%	0.00	0%	9.50	0.00	9.50	100%	9.50
Subtotal (B)	**0.00**	0%	**0.00**	0%	**15.71**	**0.00**	**15.71**	100%	**15.71**
Total Base Cost	**147.78**	86%	**2.00**	1%	**15.81**	**7.09**	**22.90**	9%	**172.67**
C. Contingencies									
1. Physical	0.00	0%	0.00	0%	8.33	0.00	8.33	100%	8.33
2. Price	0.00	0%	0.00	0%	7.78	0.00	7.78	100%	7.78
Subtotal (C)	**0.00**	0%	0.00	0%	**16.11**	**0.00**	**16.11**	100%	**16.11**
D. Financing Charges During Implementation									
1. Interest during implementation	2.22	100%	0.00	0%	0.00	0.00	0.00	0%	2.22
Subtotal (D)	**2.22**	100%	0.00	0%	**0.00**	**0.00**	**0.00**	0%	**2.22**
Total Project Cost (A+B+C+D)	**150.00**	79%	**2.00**	1%	**31.92**	**7.09**	**39.00**	20%	**191.00**

COL = concessional OCR lending.
Sources: Nepal Electricity Authority and Asian Development Bank estimates.

F. Detailed Cost Estimates by Outputs

Table 9: Detailed Cost Estimates by Outputs
($ million)

Item		Total Cost	Component 1 - Transmission		Component 2 - Distribution		Component 3 - Consulting	
			Amount	% of Cost Category	Amount	% of Cost Category	Amount	% of Cost Category
A.	**Investment Costs**							
	1. Turnkey contracts – substations	65.66	65.66	100%	0.00	0%	0.00	0%
	2. Turnkey contracts – distribution	74.71	0.00	0%	74.71	100%	0.00	0%
	3. Equipment supply	7.39	0.00	0%	7.39	100%	0.00	0%
	4. Consultants							
	a. Project management and supervision	3.00	0.00	0%	0.00	0%	3.00	100%
	b. Project formulation	1.20	0.00	0%	0.00	0%	1.20	100%
	c. Capacity building	5.00	0.00	0%	0.00	0%	5.00	100%
	d. Support for gender inclusion	2.10	0.00	0%	0.00	0%	2.10	100%
	Subtotal (A)	**156.96**	**65.66**	42%	**82.10**	52%	**9.20**	6%
B.	**Other Costs**							
	1. Environmental and social mitigation	1.50	0.50	33%	1.00	67%	0.00	0%
	2. Project overheads	4.71	2.14	45%	2.57	55%	0.00	0%
	3. Land	9.50	9.50	100%	0.00	0%	0.00	0%
	Subtotal (B)	**15.71**	**12.14**	77%	**3.57**	23%	**0.00**	0%
	Total Base Cost	**172.67**	**77.80**	45%	**85.67**	50%	**9.20**	5%
C.	**Contingencies**							
	1. Physical	8.33	4.03	48%	4.30	52%	0.00	0%
	2. Price	7.78	3.30	42%	4.48	58%	0.00	0%
	Subtotal (C)	**16.11**	**7.33**	45%	**8.78**	55%	**0.00**	0%
D.	**Financing Charges During Implementation**	**2.22**	**1.00**	45%	**1.10**	50%	**0.12**	5%
Total Project Cost (A+B+C+D)		**191.00**	**86.13**	45%	**95.56**	50%	**9.32**	5%

Sources: Nepal Electricity Authority and Asian Development Bank estimates.

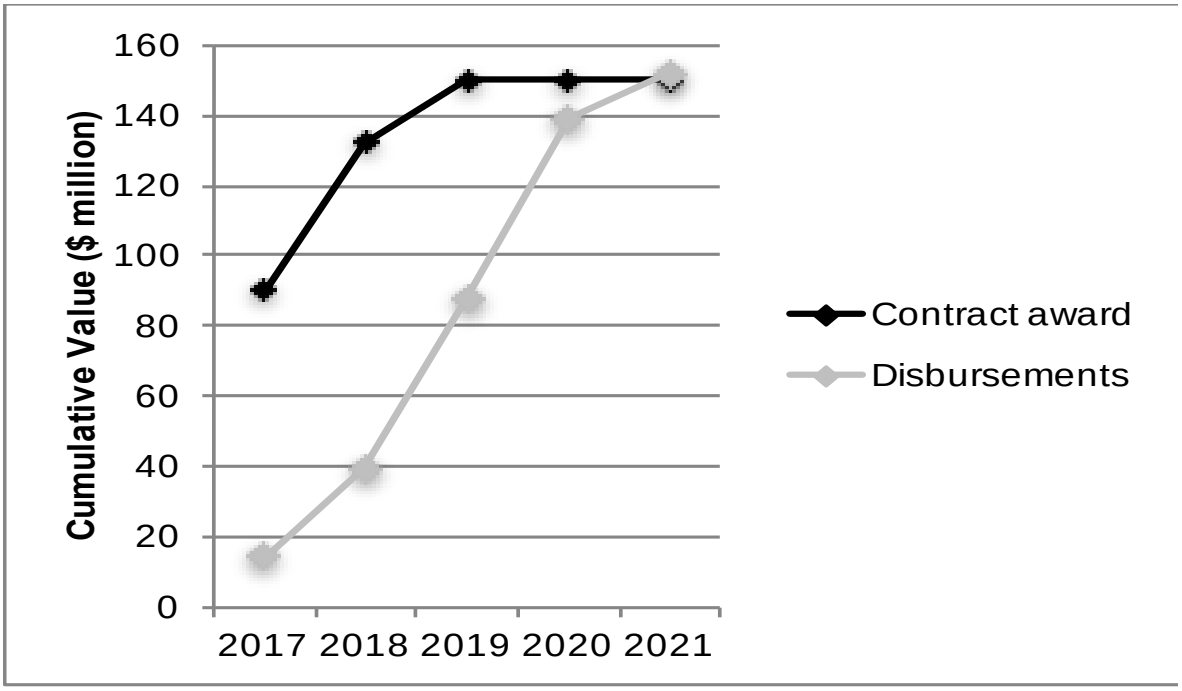
G. Detailed Cost Estimates by Year

Table 10: Detailed Cost Estimates by Year
($ million)

Item			Total Cost	Year 1	Year 2	Year 3	Year 4	Year 5
A.	**Investment Costs**							
	1.	Turnkey contracts – substations	65.66	6.57	15.71	22.27	17.12	3.99
	2.	Turnkey contracts – distribution	74.71	7.47	7.47	22.41	29.89	7.47
	3.	Equipment supply	7.39	0.43	1.01	2.37	2.69	0.90
	4.	Consultants						
		a. Project management and supervision	3.00	0.15	0.38	0.98	1.13	0.38
		b. Project formulation	1.20	0.12	0.24	0.36	0.36	0.12
		c. Capacity building	2.90	0.29	0.58	0.87	0.87	0.29
		d. Support for gender inclusion	2.10	0.21	0.42	0.63	0.63	0.21
		Subtotal (A)	**156.96**	**14.68**	**26.28**	**50.17**	**52.20**	**13.63**
B.	**Other Costs**							
	1.	Environmental and social mitigation	1.50	0.10	0.45	0.45	0.25	0.25
	2.	Project overheads	4.71	0.47	0.94	0.94	1.18	1.18
	3.	Land	9.50	4.75	4.75	0.00	0.00	0.00
		Subtotal (B)	**15.71**	**5.32**	**6.14**	**1.39**	**1.43**	**1.43**
	Total Base Cost		**172.67**	**20.01**	**32.42**	**51.56**	**53.63**	**15.05**
C.	**Contingencies**							
	1.	Physical	8.33	1.01	1.53	2.47	2.62	0.71
	2.	Price	7.78	0.29	0.90	2.26	3.24	1.10
		Subtotal (C)	**16.11**	**1.29**	**2.42**	**4.72**	**5.86**	**1.80**
D.	**Financing Charges During Implementation**		**2.22**	0.07	0.28	0.64	1.16	0.07
Total Project Cost (A+B+C+D)			**191.00**	**21.37**	**35.12**	**56.93**	**60.65**	**16.92**
% Total Project Cost			100.00	11.19	18.39	29.80	31.75	8.86

Sources: Nepal Electricity Authority and Asian Development Bank estimates.

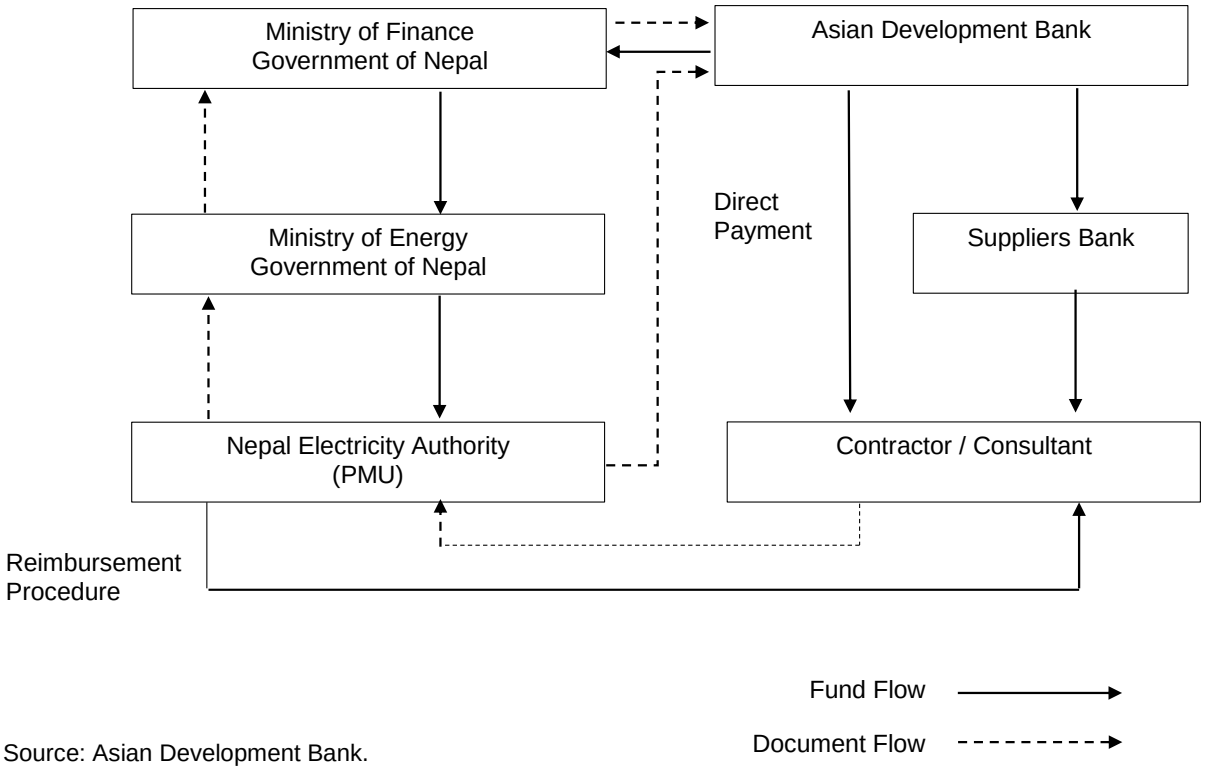
H. Contract and Disbursement S-Curve



Contract Awards Projections	2017	2018	2019	2020	2021	Total
	75.0	75.0				150.0
Q1	0.0	0.0	0.0	0.0	0.0	
Q2	0.0	50.0	0.0	0.0	0.0	
Q3	0.0	25.0	0.0	0.0	0.0	
Q4	75.0	0.0	0.0	0.0	0.0	

Disbursement Projections	2017	2018	2019	2020	2021	Total
	15.0	30.0	55.0	30.0	20.0	150.0
Q1			10.0	0.0	0.0	
Q2		15.0	20.0	15.0	0.0	
Q3			10.0	15.0	20.0	
Q4	15.0	15.0	15.0	0.0	0.0	

I. Fund Flow Diagram



Source: Asian Development Bank.

V. FINANCIAL MANAGEMENT

A. Financial Management Assessment

15. The financial management assessment (FMA) was conducted in September 2016 in accordance with ADB's Guidelines for the Financial Management and Analysis of Projects (2005), Financial Due diligence a Methodology Note (2009), and Financial Management Technical Guidance Note (2015) and updates an earlier assessment conducted for NEA in 2014 for the SASEC Power System Expansion Project (Loan 3139-NEP).[9] The FMA considered the capacity of the NEA, including funds-flow arrangements, staffing, accounting and financial reporting systems, financial information systems, and internal and external auditing arrangements. Based on the assessment, the key financial management risks include (i) NEA's current spreadsheet-based accounting system, which is inflexible, prone to errors and inadequate for an entity of NEA's size and complexity, (ii) inflated assets and liabilities requiring write down, (iii) inadequate resolution of audit issues, (iv) delays in the implementation of the ERP-based IFMIS, and (v) weak internal controls. A further concern arises from the Government's preference that for all future loans NEA will borrow directly from development partners in foreign currency with a sovereign guarantee. NEA also had difficulty in complying with financial covenants under previous loans, particularly the debt service coverage ratio. It is concluded that the overall premitigation financial management risk of of NEA is substantial. The government and NEA have agreed to implement an action plan as key measures to address the deficiencies. The detailed Financial Management,

[9] This is available as Supplementary Linked Document 18.

Internal Control and Risk Assessment is provided in the detailed FMA. The financial management action plan is summarized in Table 11 below.

Table 11: Financial Management Action Plan

Action	Responsibility	Resources	Timing
Prepare plan for further financial restructuring of NEA	NEA	No resource requirement	By 15 December 2017
NEA to ensure that ERP-based IFMIS is implementation successfully	NEA	NEA/WB	ERP-based IFMIS to be implemented by 31 December 2019.
Prepare foreign exchange risk management policy	NEA	No resource requirement	Within 9 months of loan signing.
Resolve external audit issues relating to receivables, trade debtors, provisions for loans and advances, interest expenses and Government grant	NEA	No resource requirement	By 15 December 2017
Request revenue subsidy from Government to allow NEA to meet existing debt service coverage ratio covenants.	NEA and Government	No resource requirement for preparing subsidy request; Government budget requirement for revenue subsidy will vary year-to-year	Annually from 15 July 2017
Revised risk based internal audit manual is approved by the Audit Committee	NEA	No resource requirement	15 December 2017
Generate the following operational and commercial reports: - collation of all petitions to ETFC; - quantification of electricity losses and summary of measures taken to reduce commercial losses - revenue collection performance; and - Electricity reliability indices.	NEA	No resource requirement	Annually from 15 July 2017

ETFC = Electricity Tarif Fixation Commission, IFMIS=Integrated Financial Management Information System, NEA = Nepal Electricity Authority, WB = World Bank.

B. Disbursement

1. Disbursement Arrangements for ADB Funds

16. The loan and grant proceeds will be disbursed in accordance with ADB's *Loan*

Disbursement Handbook (2015, as amended from time to time), *Technical Assistance Disbursement Handbook* (2010, as amended from time to time) and detailed arrangements agreed upon between the government and ADB. Online training for project staff on disbursement policies and procedures is available.[10] Project staff are encouraged to avail of this training to help ensure efficient disbursement and fiduciary control.

17. The direct payment mechanism is preferred. Supplier invoices will be sent to the PMU for initial verification in accordance with ADB's and NEA's procedures. The PMU accountant will prepare documentation for withdrawal of funds and the PMU Director will approve and submit to ADB with supporting documentation.

18. **Statement of expenditure procedure**.[11] The SOE procedure may be used for reimbursement of eligible expenditures up to $100,000. Supporting documents and records for the expenditures claimed under the SOE should be maintained and made readily available for review by ADB's disbursement and review missions, upon ADB's request for submission of supporting documents on a sampling basis, and for independent audit. Reimbursement and liquidation of individual payments in excess of the SOE ceiling should be supported by full documentation when submitting the withdrawal application to ADB.

19. Before the submission of the first withdrawal application, the borrower should submit to ADB sufficient evidence of the authority of the person(s) who will sign the withdrawal applications on behalf of the government, together with the authenticated specimen signatures of each authorized person. The minimum value per withdrawal application is US$100,000 equivalent. Individual payments below this amount should be paid by NEA and subsequently claimed to ADB through reimbursement, unless otherwise accepted by ADB.

2. Disbursement Arrangements for Counterpart Fund

20. Disbursement for counterpart funds will be carried out in accordance with guidelines and practices of the Government. Based on its forecast of expenditure, NEA submits its requirement for counterpart funds for the next financial year to Government and an allocation is made in the national budget. Funds are generally released to NEA twice a year, typically as payment to NEA's nominated bank account. The Government's contribution to taxes and duties is by way of exemption; exemptions are granted after NEA and its suppliers submit requisite documentation to the Ministry of Finance.

C. Accounting

21. NEA will maintain, or cause to be maintained, separate books and records by funding source for all expenditures incurred on the project following accounting principles and practices prescribed by the Government of Nepal Financial Procedures Act (1999) and Financial Procedures Rules (2007). NEA will prepare consolidated project financial statements in accordance with the government's accounting laws and regulations which are consistent with international accounting principles and practices.

D. Auditing and Public Disclosure

22. NEA will cause the detailed project financial statements to be audited in accordance with Supreme Audit Institution's Audit Regulations, by an independent auditor acceptable to ADB. The

[10] Disbursement eLearning. http://wpqr4.adb.org/disbursement_elearning

[11] SOE forms are available in Appendix 9B and 9C of ADB's *Loan Disbursement Handbook* (2015, as amended from time to time).

audited project financial statements together with the auditor's opinion will be presented in the English language to ADB within 6 months from the end of the fiscal year by the NEA.

23. The audited entity financial statements, together with the auditor's report and management letter, will be submitted in the English language to ADB within 1 month after their approval by the relevant authority.

24. The audit report for the project financial statements will include a management letter and auditor's opinions, which cover (i) whether the project financial statements present an accurate and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting standards; (ii) whether the proceeds of the loan and JFPR grant were used only for the purpose(s) of the project; and (iii) whether the government or NEA was in compliance with the financial covenants contained in the legal agreements (where applicable).

25. Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the external auditor.

26. The government and NEA have been made aware of ADB's approach to delayed submission, and the requirements for satisfactory and acceptable quality of the audited project financial statements.[12] ADB reserves the right to require a change in the auditor (in a manner consistent with the constitution of the borrower), or for additional support to be provided to the auditor, if the audits required are not conducted in a manner satisfactory to ADB, or if the audits are substantially delayed. ADB reserves the right to verify the project's financial accounts to confirm that the share of ADB's financing is used in accordance with ADB's policies and procedures.

27. Public disclosure of the audited project financial statements, including the auditor's opinion on the project financial statements, will be guided by ADB's Public Communications Policy 2011.[13] After the review, ADB will disclose the audited project financial statements and the opinion of the auditors on the project financial statements no later than 14 days of ADB's confirmation of their acceptability by posting them on ADB's website. The management letter, additional auditor's opinions, and audited entity financial statements will not be disclosed.[14]

VI. PROCUREMENT AND CONSULTING SERVICES

A. Advance Contracting and Retroactive Financing

28. All advance contracting and retroactive financing will be undertaken in conformity with

[12] ADB's approach and procedures regarding delayed submission of audited project financial statements:
(i) When audited project financial statements are not received by the due date, ADB will write to the executing agency advising that (a) the audit documents are overdue; and (b) if they are not received within the next 6 months, requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement, and issuance of new commitment letters will not be processed.
(ii) When audited project financial statements are not received within 6 months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement, and issuance of new commitment letters. ADB will (a) inform the executing agency of ADB's actions; and (b) advise that the loan may be suspended if the audit documents are not received within the next 6 months.
(iii) When audited project financial statements are not received within 12 months after the due date, ADB may suspend the loan.

[13] Public Communications Policy: http://www.adb.org/documents/pcp-2011?ref=site/disclosure/publications

[14] This type of information would generally fall under public communications policy exceptions to disclosure. ADB. 2011. *Public Communications Policy*. Paragraph 97(iv) and/or 97(v).

ADB Procurement Guidelines (2015, as amended from time to time) and ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). The issuance of invitations to bid under advance contracting and retroactive financing will be subject to ADB approval. The government and NEA have been advised that approval of advance contracting and retroactive financing does not commit ADB to finance the project.

29. **Advance contracting.** In order to expedite project implementation, the government has requested advance contracting actions for all the works, goods and consulting services.

30. **Retroactive financing.** The government and NEA have been advised that the expenditures incurred for works are eligible for retroactive financing, provided these have been incurred before the effectiveness of the related loan agreement, but not earlier than 12 months preceding the signing of the loan agreement and as long as they do not exceed an amount of 20% of the loan.

B. Procurement of Goods, Works, and Consulting Services

31. All procurement of goods and works will be undertaken in accordance with ADB's Procurement Guidelines (2015, as amended from time to time).

32. Except as otherwise agreed with ADB, international competitive bidding (ICB) procedures will be followed for procurement packages for works contracts estimated to cost more than $5 million and goods contracts estimated to cost more than $2 million, including the application of domestic preference.

33. An 18-month procurement plan indicating threshold and review procedures, goods, works, and consulting service contract packages and national competitive bidding guidelines is in Section C.

34. All consultants will be recruited according to ADB's Guidelines on the Use of Consultants (2013, as amended from time to time).[15] The terms of reference for all consulting services are detailed in Section D.

35. NEA will recruit an international consulting firm in association with domestic consultants to oversee project implementation and supervision, including capacity building and training of NEA staff. An estimated 329 person-months (125 international and 204 national) of consulting services are required for the Project Supervision Consultants (PSC). The PSC will be recruited using the quality and cost-based selection (QCBS) method with a quality cost ratio of 90:10 under the full technical proposal.

36. NEA has a reasonably adequate capacity in terms of knowledge of procurement and has a moderate procurement risk assessment as they have had previous ADB-funded projects as well as ad hoc staff to provide assistance to them. NEA is capable of handling ADB funded project including any advance action e.g. advance contracting that needs to be undertaken in the project. NEA's procurement committee and staff have substantial experience in procuring works, goods, including the recruitment of consultants.

[15] Checklists for actions required to contract consultants by method available in e-Handbook on Project Implementation at: http://www.adb.org/documents/handbooks/project-implementation/

C. Procurement Plan

37. The procurement plan is prepared in accordance with the generic or country-specific templates prepared by the Operations Services and Financial Management Department.

PROCUREMENT PLAN
Basic Data

Project Name: Power Transmission and Distribution Efficiency Enhancement Project	
Project Number: 50059-002	**Approval Number:**
Country: Nepal	**Executing Agency**: Nepal Electricity Authority (NEA)
Project Procurement Classification: Category B **Project Procurement Risk:** Moderate	**Implementing Agency**: Nepal Electricity Authority (NEA)
Project Financing Amount: US$ 189,000,000 **ADB Financing:** US$ 150,000,000 **Cofinancing (ADB Administered):** **Non-ADB Financing:** US$ 39,000,000	**Project Closing Date:** 30 June 2022
Date of First Procurement Plan: 26 March 2017	**Date of this Procurement Plan**: 19 May 2017

A. Methods, Thresholds, Review and 18-Month Procurement Plan

1. Procurement and Consulting Methods and Thresholds

Except as the Asian Development Bank (ADB) may otherwise agree, the following process thresholds shall apply to procurement of goods and works.

Procurement of Goods and Works		
Method	**Threshold**	**Comments**
International Competitive Bidding (ICB) for Works	$5,000,000[1]	Prior review by ADB
International Competitive Bidding for Goods	$2,000,000[1]	Prior review by ADB

Consulting Services	
Method	**Comments**
Quality and Cost Based Selection (QCBS)	Prior review by ADB

2. Goods and Works Contracts Estimated to Cost $1 Million or More

The following table lists goods and works contracts for which the procurement activity is either ongoing or expected to commence within the next 18 months.

Package Number	General Description	Estimated Value	Procurement Method	Review (Prior/ Post)	Bidding Procedure	Advertisement Date (quarter/year)	Comments
A-1	220 kV Lapsiphedi SS and 132 kV Changunarayan S/S	23,000,000.00	ICB	Prior	1S2E	Q2 / 2017	Prequalification of Bidders: N Domestic Preference Applicable: Y Advance

Package Number	**General Description**	**Estimated Value**	**Procurement Method**	**Review** (Prior/ Post)	**Bidding Procedure**	**Advertisement Date** (quarter/year)	**Comments** Contracting: Y Bidding Document: Plant
A-2	132 Kv Substations at Kathmandu Valley (Phutung, Moolpani & Chapagaun)	25,000,000.00	ICB	Prior	1S2E	Q1 / 2017	Prequalification of Bidders: N Domestic Preference Applicable: Y Advance Contracting: Y Bidding Document: Plant
A-3	220 kV Barhabise SS	16,000,000.00	ICB	Prior	1S2E	Q2 / 2017	Prequalification of Bidders: N Domestic Preference Applicable: Y Advance Contracting: Y Bidding Document: Plant
B-1	Enhancement of Distribution Networks in the Central Regions of Kathmandu Valley	38,700,000.00	ICB	Prior	1S2E	Q2 / 2017	Prequalification of Bidders: N Domestic Preference Applicable: Y Advance Contracting: Y Bidding Document: Plant
B-2	Enhancement of Distribution Networks in the Northern Regions of Kathmandu Valley	21,000,000.00	ICB	Prior	1S2E	Q2 / 2017	Prequalification of Bidders: N Domestic Preference Applicable: Y Advance

Package Number	General Description	Estimated Value	Procurement Method	Review (Prior/ Post)	Bidding Procedure	Advertisement Date (quarter/year)	Comments
							Contracting: Y Bidding Document: Plant
C-1	Supply and delivery of smart meters and associated facilities	13,000,000.00	ICB	Prior	1S2E	Q2 / 2017	Prequalification of Bidders: N Domestic Preference Applicable: Y Advance Contracting: Y Bidding Document: Plant
C-2	Supply and delivery of distribution transformers	7,000,000.00	ICB	Prior	1S2E	Q2 / 2017	Prequalification of Bidders: N Domestic Preference Applicable: Y Advance Contracting: Y Bidding Document: Goods

3. Consulting Services Contracts Estimated to Cost $100,000 or More

The following table lists consulting services contracts for which the recruitment activity is either ongoing or expected to commence within the next 18 months.

Package Number	General Description	Estimated Value	Recruitment Method	Review (Prior / Post)	Advertisement Date (quarter/year)	Type of Proposal[8]	Comments
D-1	Project Supervision Consultant	6.3	QCBS	Prior	Q1/2017	FTP	International, QC Ratio: 90:10 Advance Contracting: Y

4. Goods and Works Contracts Estimated to Cost Less than $1 Million and Consulting Services Contracts Less than $100,000 (Smaller Value Contracts)

The following table groups smaller-value goods, works and consulting services contracts for which the activity is either ongoing or expected to commence within the next 18 months.

Goods and Works								
Package Number	**General Description**	**Estimated Value**	**Number of Contracts**	**Procurement Method**	**Review** [Prior / Post/Post (Sampling)]	**Bidding Procedure**	**Advertisement Date** (quarter/ year)	**Comments**
None								

Consulting Services								
Package Number	**General Description**	**Estimated Value**	**Number of Contracts**	**Recruitment Method**	**Review** (Prior / Post)	**Advertisement Date** (quarter/ year)	**Type of Proposal**[8]	**Comments** [9]
None								

B. Indicative List of Packages Required Under the Project

The following table provides an indicative list of goods, works and consulting services contracts over the life of the project, other than those mentioned in previous sections (i.e., those expected beyond the current period).

Goods and Works							
Package Number[5]	**General Description**	**Estimated Value (cumulative)**	**Estimated Number of Contracts**	**Procurement Method**	**Review** [Prior / Post/Post (Sampling)]	**Bidding Procedure**	**Comments**
None							

Consulting Services							
Package Number	**General Description**	**Estimated Value (cumulative)**	**Estimated Number of Contracts**	**Recruitment Method**	**Review** (Prior / Post)	**Type of Proposal**	**Comments**
None							

C. List of Awarded and On-going, and Completed Contracts

The following tables list the awarded and on-going contracts, and completed contracts.

1. Awarded and On-going Contracts

Goods and Works							
Package Number	**General Description**	**Estimated Value**	**Awarded Contract Value**	**Procurement Method**	**Advertisement Date** (quarter/ year)	**Date of ADB Approval of Contract Award**[10]	**Comments**
None							

Consulting Services							
Package Number	**General Description**	**Estimated Value**	**Awarded Contract Value**	**Recruitment Method**	**Advertisement Date** (quarter/year)	**Date of ADB Approval of Contract Award**[10]	**Comments**
None							

2. Completed Contracts

Goods and Works								
Package Number	**General Description**	**Estimated Value**	**Contract Value**	**Procurement Method**	**Advertisement Date** (quarter/ year)	**Date of ADB Approval of Contract Award**	**Date of Completion**	**Comments**
None								

Consulting Services								
Package Number	**General Description**	**Estimated Value**	**Contract Value**	**Recruitment Method**	**Advertisement Date** (quarter/ year)	**Date of ADB Approval of Contract Award**	**Date of Completion**	**Comments**
None								

D. Non-ADB Financing

The following table lists goods, works and consulting services contracts over the life of the project, financed by Non-ADB sources.

Goods and Works				
General Description	**Estimated Value (cumulative)**	**Estimated Number of Contracts**	**Procurement Method**	**Comments**
None				

Consulting Services				
General Description	**Estimated Value (cumulative)**	**Estimated Number of Contracts**	**Recruitment Method**	**Comments**
None				

E. Consultant's Terms of Reference

38. The detailed Terms and References (TOR)[16] of the Consultants are presented in Annex 1.

VII. SAFEGUARDS

39. **Environment.** The project is classified as environment category B. Initial Environmental Examinations (IEEs) have been prepared following the ADB's Safeguard Policy Statement (SPS) (2009) and the government's environmental regulations. Public consultation and information disclosure requirements have been met. A grievance redress mechanism will be established by NEA. Potential impacts may arise from earthmoving for new substations and burial of distribution lines. The potential impacts are temporary, predictable and reversible and can be mitigated through adherence to national and international standards, design criteria, and implementation of the environmental management plan (EMP). Sensitive ecosystems will not be affected. The environmental management plans include budgets which are sufficient to ensure proper implementation of mitigation and monitoring measures. Environmental and social safeguards experts are included in the scope of work for project implementation consulting services. NEA's PMD will supervise EMP implementation, and submit environmental monitoring reports to ADB semiannually during construction stage and annually during operation stage. The implementation status will be followed up during ADB review missions. Contractors will be required to comply with the EMPs during pre-construction and construction stages under close monitoring of project supervision consultant and NEA. The EMP will be updated as necessary if unanticipated impacts are identified during implementation. NEA has sufficient capacity to implement the EMP, using third-party services as necessary. The environmental assessment for the project was disclosed on ADB's website.

[16] Terms of reference guidelines available at: http://www.adb.org/Documents/Manuals/Consulting-Services-Operations-Manual/CSOM.pdf?bcsi_scan_D4A612CF62FE9576=AORY9a8Nho2ezS9Xss/ligEAAAANNiAA&bcsi_scan_filename=CSOM.pdf (paras 65–72).

40. **Involuntary Resettlement and Indigenous Peoples.** The project is categorized as A for involuntary resettlement and C for indigenous peoples. The substations and distribution components will have both permanent and temporary impacts. Permanent impacts are anticipated due to land acquisition for construction of six substations which require 22.62 hectares of private land. The temporary impact will be few-day business interruption due to surface disturbance during construction of underground distribution lines and re-stringing of the overhead lines. Consultations and surveys undertaken during the due diligence and a resettlement plan have been prepared to address both permanent and temporary impacts in compliance with ADB's SPS and the government's legal requirements. The draft resettlement plan was disclosed on ADB's website. The resettlement plan will be updated to incorporate final technical designs and major changes, if any. Corrective action plan will be prepared, if necessary. Updated resettlement plans and corrective action plans will be disclosed on ADB's website. NEA has implemented ADB projects and the Environment and Social Studies Department (ESDD) of NEA has worked as a core unit to undertake land acquisition and resettlement and rehabilitation activities. For the project, NEA will set up dedicated PMD and under the PMD a social development specialist will be engaged for implementation of the resettlement plan. Also, where additional capacity and resources are needed, implementation consultants will be hired to assist and support the implementation of the plan. Social specialists in the PSC team will guide and advise the PMD, and monitor implementation of the resettlement plan with support from implementation consultants. Further, the capacity of NEA and PMD will be enhanced through the safeguard programs envisaged under the technical assistance (TA). NEA's PMD will establish and publicize a grievance redress mechanism and a Grievance Redress Committee (GRC) will be formed to ensure grievances are addressed properly. The implementation will be monitored by internal and external monitors and the monitoring reports will be submitted to ADB on semi-annual basis. The implementation status will be followed up during ADB review missions as well. For indigenous people, the project does not have any impacts on their indigenous dignity, human rights, livelihood system, culture territories and natural resources.

41. **Prohibited investment activities.** Pursuant to ADB's Safeguard Policy Statement (2009), ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the Safeguard Policy Statement (2009).

VIII. GENDER AND SOCIAL DIMENSIONS

42. The project is classified as "Effective Gender Mainstreaming". To strengthen the capacity of government energy organizations including NEA and its environmental and social studies department (ESSD) for promoting gender equality and social inclusion (GESI), a capacity development technical assistance (CDTA) and a GESI action plan have been prepared and gender activities will be undertaken with support from the Japan Fund for Poverty Reduction (JFPR). The loan agreements will include a standard assurance related to compliance with labor standards for contractors, including provisions to ensure equal pay for work of equal value, and the provision of awareness training on sexually transmitted infections (including HIV), forced and/or bonded labor, and human trafficking. Dialogue and communication, both written and verbal, with stakeholders will be carried out in a gender-specific and culturally sensitive manner and in local languages, as required. GESI Action Plan is given below.

GENDER EQUALITY AND SOCIAL INCLUSION ACTION PLAN

Output/Activities	Indicators and Targets	Responsibility	Time Frame
General Activities:			
1. Set up TA Implementation Unit (TAIU) at ESSD/NEA	• TAIU's TOR defined and office set up. • TA Coordinator, Finance and Admin and M&E officers recruited. • NEA ESSD officer designated with clear TORs	NEA/ESSD	Q1
2. Contract international and national consultants	• TORs of international consulting firm and national partner NGO developed. • Consultancy services in place.	TAIU/NEA/ ESSD/ADB	Q2
3. Develop GESI responsive Project Performance Monitoring System (PPMS)	• Sex, caste/ethnicity- disaggregated and BPL/HHs data collected, compiled, monitored and reported regularly for each TA component across all training and beneficiary related parameters. • GESI/AP indicators and disaggregated data on participation and benefits integrated in the loan PPMS. • Quarterly reports on GESI/AP produced documenting GESI-related results	TAIU/Consulting Firm	Q3 and Project Duration
Output 3: Operational and financial performance of NEA distribution centers enhanced			
4. Train NEA staff in new energy technologies	• 100 staff [Target: 30% women] of NEA from 20 distribution centers in Kathmandu and outside Kathmandu and 20 senior NEA staff trained in new energy technologies as described in TA linked document to the RRP (see Supplementary Documents)	TAIU/NEA Distribution Department/ Consulting Firm	Q3–Q7
Output 4:[a] NEA's capacity to operate and manage an advanced distribution system and intelligent network (smart grid) technology with GESI aspects in electricity access and end-user awareness programs developed			
5. Prepare Energy Sector GESI Strategy and Operational Guideline	• Energy Sector (i) GESI Strategy; and (ii) GESI Operational Guideline developed, approved by NEA Board and published.	NEA/ESSD/ Consulting Firm	Q2–Q4
6. Assess ESSD's role and structure	• Consultative meetings with NEA senior management and staff organized • Dissemination and workshops on the assessment findings with NEA and related agencies • Role of ESSD redefined to support NEA on social safeguards and GESI aspects	TAIU/NEA/ ESSD	
7. Train NEA/ESSD staff as GESI resource persons	• 20 staff of NEA/ESSD trained as GESI resource persons and 100 other staff trained in tested approaches and practices to mainstream GESI	TAIU/Consulting Firm	Q4–Q5
8. Train NEA/ESSD staff on Energy Sector GESI Strategy and Operational Guideline	• 150 NEA/ESSD officials and staff including NEA's subsidiary agencies[b] trained on the use of NEA-approved GESI strategy, guidelines and manual		
9. Train NACEUN staff and EUC members on GESI aspects of energy projects	• 25 officials (30% women) of NACEUN on GESI mainstreaming and participatory M&E in energy projects trained • 300 members (minimum 40% women participants and 40% from marginalized groups) of at least 15 EUCs of 7 districts on GESI responsive approaches, and energy efficiency given trained	TAIU/ Consulting Firm	Q3–Q4

Output/Activities	Indicators and Targets	Responsibility	Time Frame
10. Revise the Community Rural Electrification (CRE) Operational Guidelines	• Final CRE Operational Guidelines for EUCs developed with GESI aspects incorporated	NEA/ Consulting Firm	
11. Train EUC women members	• Livelihood skills training need assessment for poor women of at least 15 EUCs conducted • Training design and curriculum developed • Up to three-day business orientation training targeting 500 women held • Training of 500 EUC women members from poor and marginalized groups in energy-based livelihoods and related technical skills completed • Post-training support for linkage to accessing finance and market for enterprises development received by 500 women • At least 60% (300) of total women who received above services have set up businesses, ensured through outcome study • Electricity efficiency and safety awareness training done targeting EUC women and men members. 9,000 users will benefit from awareness program with 40% women participation in 75 events	ESSD/NEA, Consulting Firm	Q4–Q8
12. Conduct mass media campaigns in Kathmandu Valley and districts	• Localized awareness campaign (radio/FM jingle, ads in local/district press newspapers, hoardings, and billboards) conducted and distributed • Information giving flyer (or materials with key messages) distributed in bill collection centers • Mobile SMS, video clips, public service announcements broadcasted on TV • Awareness campaigns and audio/visual materials on energy efficiency and safety designed with GESI sensitive messages and produced in different local languages	TAIU/NEA/ ESSD Consulting Firm	Q4–Q8

AP = affected persons; BPL = below poverty line; CRE = Community Rural Electrification; ESSD = Environment and Social Studies Department; EUCs = Electricity User Cooperatives; GESI = Gender Equality and Social Inclusion; HH = household; M&E = monitoring and evaluation; NACEUN = National Association of Community Electricity Users Nepal; NEA = Nepal Electricity Authority; PPMS = project performance monitoring system; Q = quarter; TAIU = Technical Assistance Implementation Unit; TOR = terms of reference.

[a] GESI and/or affected persons activities will be fully financed under the Japanese Fund for Poverty Reduction technical assistance attached to the loan.

[b] NEA's subsidiary agencies are those involved in the implementation of large (mostly hydro) projects such as the Tanahu Hydropower Limited, and Upper Tamakoshi Hydropower project including similar others.

IX. PERFORMANCE MONITORING, EVALUATION, REPORTING, AND COMMUNICATION

A. Project Design and Monitoring Framework

Impact the Project is Aligned with
Reliable and efficient electricity supply for all achieved by 2030 (National Energy Crisis Reduction and Electricity Development)[a]

Results Chain	**Performance Indicators with Targets and Baselines**	**Data Sources and Reporting Mechanisms**	**Risks**
Outcome Access to efficient, adequate, and high-quality power supply in the Kathmandu Valley improved	By 2022: a. Customer accounts with 24/7 electricity supply increased to 20% in Kathmandu Valley (2016 baseline: 100% of customer accounts with 16 hours per day of average duration of electricity supply) b. Distribution losses in the Kathmandu Valley reduced to 10% resulting energy savings of 0.0065 TWh/year (2015 baseline: 15%) c. Aggregate greenhouse gas emissions reduced by 54,400 tCO_2e per year[b] (2015 baseline: 0)	a.–c. NEA reports	Full project benefits not realized due to delayed implementation of other planned generation, transmission and distribution projects
Outputs 1. Transmission grid capacity to feed the primary distribution networks for the Kathmandu Valley strengthened	By 2020: 1a. Two new 220/132 kV 160 MVA each and one 132/11 kV 45 MVA substations installed to complete the New Khimti–Kathmandu transmission link (2016 baseline: 0) 1b. Three new 132/11 kV substations established in Kathmandu Valley each with 45 MVA capacity (2016 baseline: 0)	1a.–b. NEA reports	Implementation is significantly delayed due to political and security situation.
2. Kathmandu Valley distribution network rehabilitated and capacity increased	By 2021: 2a. 300 km of 11 kV feeders constructed and/or reinforced (2016 baseline: 0) 2b. 600 km of 0.4 kV distribution lines constructed and/or reinforced (2016 baseline: 0)	2a.–c. NEA reports	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	2c. 1,000 new distribution transformers installed with added capacity of 200 MVA (2016 baseline: 0)		
3. Operational and financial performance of NEA distribution centers enhanced	By 2021: 3a. 90,000 smart meters and associated communications facilities deployed and installed (2016 baseline: 0) 3b. 100 NEA staff trained (at least 30% women) and 20 senior NEA staff on new technologies, operational and financial management, and a medium- to long-term distribution efficiency enhancement program (2016 baseline: 0) 3c. 100 local stakeholders, including private sector, trained and oriented on various smart grid technologies and their roles (2016 baseline: 0)	3a.–c. NEA reports	
4. NEA's capacity to operate and manage an advanced distribution system and intelligent network (smart grid) technology with GESI aspects in electricity access and end-user awareness programs developed	By 2020: 4a. At least 150 staff of NEA/ESSD trained on the use of NEA-approved GESI strategy, GESI operational guidelines, and effective GESI mainstreaming in social safeguards of energy projects (2016 baseline: 0) 4b. At least 300 members of electricity user cooperatives (40% women) oriented on GESI mainstreaming and compliance with social safeguards' requirements in energy projects (2016 baseline: 0) 4c. At least 500 women (covering different social groups and profiles) of electricity user cooperatives	4a.–c. TA completion report	

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting Mechanisms	Risks
	trained on energy-based enterprises (2016 baseline: 0)		

Key Activities with Milestones

1. Transmission grid capacity to feed the primary distribution networks for Kathmandu Valley strengthened

1.1 Two new 220/132 kV, 160 MVA substations each and one 132/11 kV, 45 MVA substation built to complete the New Khimti–Kathmandu transmission link by December 2020

1.2 Three new 132/11 kV substations in the Kathmandu Valley, each with 45 MVA capacity, built by December 2020

2. Kathmandu Valley distribution network rehabilitated and capacity increased

2.1 Construction of 300 km of 11 kV feeders constructed and/or reinforced by December 2021

2.2 Upgrade of 600 km of 0.4 kV distribution lines constructed and/or reinforced by December 2021.

2.3 Addition of 1,000 more efficient distribution transformers with total estimated capacity of 200 MVA by December 2021

3. Operational and financial performance of NEA distribution centers enhanced

3.1 Deploy 90,000 smart meters and other smart-grid elements in the distribution system by December 2021

3.2 Assess capacity and training needs by December 2019

3.3 Carry out training and capacity-building activities by December 2017

4. NEA's capacity to operate and manage an advanced distribution system and intelligent network (smart grid) technology with GESI aspects in electricity access and end-user awareness programs developed

4.1 Assess capacity and training needs by Q2 2017

4.2 Carry out training and capacity-building activities by Q3 2018

4.3 Prepare energy sector GESI strategy and GESI operational guidelines by Q3 2018

Inputs

Asian Development Bank Ordinary Capital Resources (Concessional loan): $150 million
Japan Fund for Poverty Reduction (grant): $2 million
Government: $39 million

Assumptions for Partner Financing

Not Applicable

ESSD = Environment and Social Studies Department, GESI = gender equality and social inclusion, km = kilometer, kV = kilovolt, MVA = megavolt-ampere, MWh = megawatt-hour, NEA = Nepal Electricity Authority, Q = quarter, tCO_2e = ton carbon dioxide equivalent, TWh = Terawatt-hour.

[a] Government of Nepal. 2016. *National Energy Crisis Reduction and Electricity Development*. http://www.moen.gov.np/pdf_files/Rastriya-Urja-Sankat-Niwaran-2072.pdf; and National Planning Commission. 2015. *Sustainable Development Goals 2016–2030*. National Preliminary Report. http://www.npc.gov.np/images/download/23rd_Jan_final_for_print_Sustainable_Development_Goals.pdf.

[b] Greenhouse gas reductions will accrue from less use of backup generators running on diesel or gasoline, which have an emission factor of 0.8 tCO_2e per MWh. Kathmandu Valley has 200 MW of diesel gensets, which produced 340,000 MWh in 2012–2013. Assuming that this is all displaced by a mix of hydropower and imports from India, the greenhouse gas reductions will be 340,000 MWh/y x 0.16 tCO_2e/MWh = 54,400 tCO_2e/y. The effective emission factor for Upper Tamakoshi plus India grid is calculated as: 1,997,280/7,008,000 x 0.82 = 0.64 tCO_2e/MWh. This is subtracted from the diesel emission factor to calculate net greenhouse gas reduction: 0.8 – 0.64 = 0.16 tCO_2e/MWh.

Note: Unless otherwise indicated, output indicators are incremental with a zero baseline.
Source: Asian Development Bank.

B. Monitoring

43. **Project performance monitoring.** ADB shall field an **inception mission** within 3 months of the approval of the Project. NEA will undertake overall monitoring of the project in terms of progress. ADB, the government and NEA will conduct **semiannual reviews** throughout the implementation of the project. The review will monitor the following:

(i) project output quality,
(ii) implementation arrangements,
(iii) implementation progress, and
(iv) disbursements.

44. Performance will also be monitored based on indicators and targets stipulated in the design and monitoring framework. **Quarterly progress reports** will be submitted to ADB within 30 days from the end of each quarter. These reports will include:

(i) a narrative description of progress made during the period;
(ii) changes in the implementation schedule;
(iii) problems or difficulties encountered;
(iv) work to be carried out during the next period;
(v) progress on environmental and social compliance;
(vi) a report on implementation of the EMPs; and
(vii) compliance with covenants of the individual loan and project agreements.

45. A **mid-term review** shall be carried out 2 years after the loan effectiveness for the Project focusing on the engineering, resettlement, environmental and social aspects, and reviewing its financial status. The review will allow for any necessary midcourse corrections to ensure successful project implementation and achievement of objectives of the project.

46. The progress reports will include project expenditures during the period and total expenditures to date. These quarterly reports will provide information necessary to update ADB's project performance reporting system.[17] A **project completion report** will be prepared within 6 months of project completion

47. **Compliance monitoring.** In addition to the standard assurances, compliance with the specific assurances will be monitored. They will be based on the loan, grant, and project agreements as well as procurement and disbursement guidelines. The procurement of goods, related services, and works financed by ADB will follow procedures outlined in the ADB's Procurement Guidelines. The ADB financing proceeds will be disbursed in accordance with ADB's Loan Disbursement Handbook (2015, as amended from time to time).

48. **Safeguards monitoring.** The resettlement plan and IEE include detailed description of roles and responsibilities of the government, NEA, ADB, construction contractors, and project implementation consultants. NEA's Project Management Directorate will have primary responsibility for safeguards monitoring, as described in paragraphs above and as illustrated in Figure 2. Project implementation consulting services include environmental and social safeguards experts. For resettlement, an external monitor will be engaged for the project monitoring and the terms of reference is specified in the resettlement plan. Environment monitoring reports will be prepared semi-annually during construction and annually during operation, and resettlement monitoring reports will be prepared semi-annual basis, and publicly disclosed on NEA and ADB

[17] ADB's project performance reporting system is available at http://www.adb.org/Documents/Slideshows/PPMS/default.asp?p=evaltool

websites.

49. **Gender and social dimensions monitoring.** The social indicators included in the preparation and implementation of resettlement plans will be monitored through resettlement monitoring reports. In addition, the inclusion and compliance with gender action plan (GAP), labor standards, health and gender aspects will be monitored through review of bidding documents, contract awards, and progress reports.

C. Evaluation

50. ADB will field regular review missions, in general every 6 months at the minimum, to review status of contract awards, disbursements, physical progress, and implementation of the environmental management plan and resettlement plans. Within 6 months of physical completion of the project, NEA will submit the project completion report (PCR) to ADB. Subsequently, ADB will field a mission to finalize the PCR.[18]

Evaluation Activity	Purpose	Methodology	Who responsible and involved
Review Missions	Review the progress of the project and provide guidance to facilitate implementation	Site visits and meetings with NEA, contractors, and consultants at least twice a year	ADB/NEA
Mid-Term Review	Comprehensive review of the project	2 years after the loan effectiveness, focusing on engineering, resettlement, and environmental aspects of the project, and financial status of NEA.	ADB/NEA
Project Completion Report	Evaluate the overall output of the project and its relevance and suitability	Site visits and meetings with NEA, consultants, and contractors	ADB/NEA/GOV

ADB = Asian Development Bank, GOV = Government of Nepal, NEA = Nepal Electricity Authority.

D. Reporting

51. NEA will provide ADB with (i) quarterly progress reports in a format consistent with ADB's project performance reporting system; (ii) semi-annual/annual environment monitoring reports and semi-annual resettlement monitoring reports, (iii) consolidated annual reports including (a) progress achieved by output as measured through the indicator's performance targets, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation plan for the next 12 months; and (iv) a project completion report within 6 months of physical completion of the project. To ensure that projects will continue to be both viable and sustainable, project accounts and the executing agency audited financial statement together with the associated auditor's report, should be adequately reviewed.

[18] Project completion report format is available at: http://www.adb.org/Consulting/consultants-toolkits/PCR-Public-Sector-Landscape.rar

E. Stakeholder Communication Strategy

52. Environmental and social safeguards documents, including semi-annual/annual monitoring reports and other routine reports, will be publicly disclosed in accordance with Government, NEA, and ADB policies and procedures. NEA will maintain an "open door" policy for fielding complaints and project-related inquiries, utilizing a grievance redress mechanism as necessary (see Figure 3). A Grievance Redress Committee (GRC) will be formed at the project level to ensure grievances are addressed properly in a timely manner. Minor grievances will be redressed by NEA officials at site level and the unsettled case will be referred to GRC which will take action within 30 working days. Grievances not redressed by the GRC will be referred to the appropriate court of law. The stakeholder communication strategy is summarized in Table 12.

Figure 3: Grievance Redress Mechanism Complaint Flow

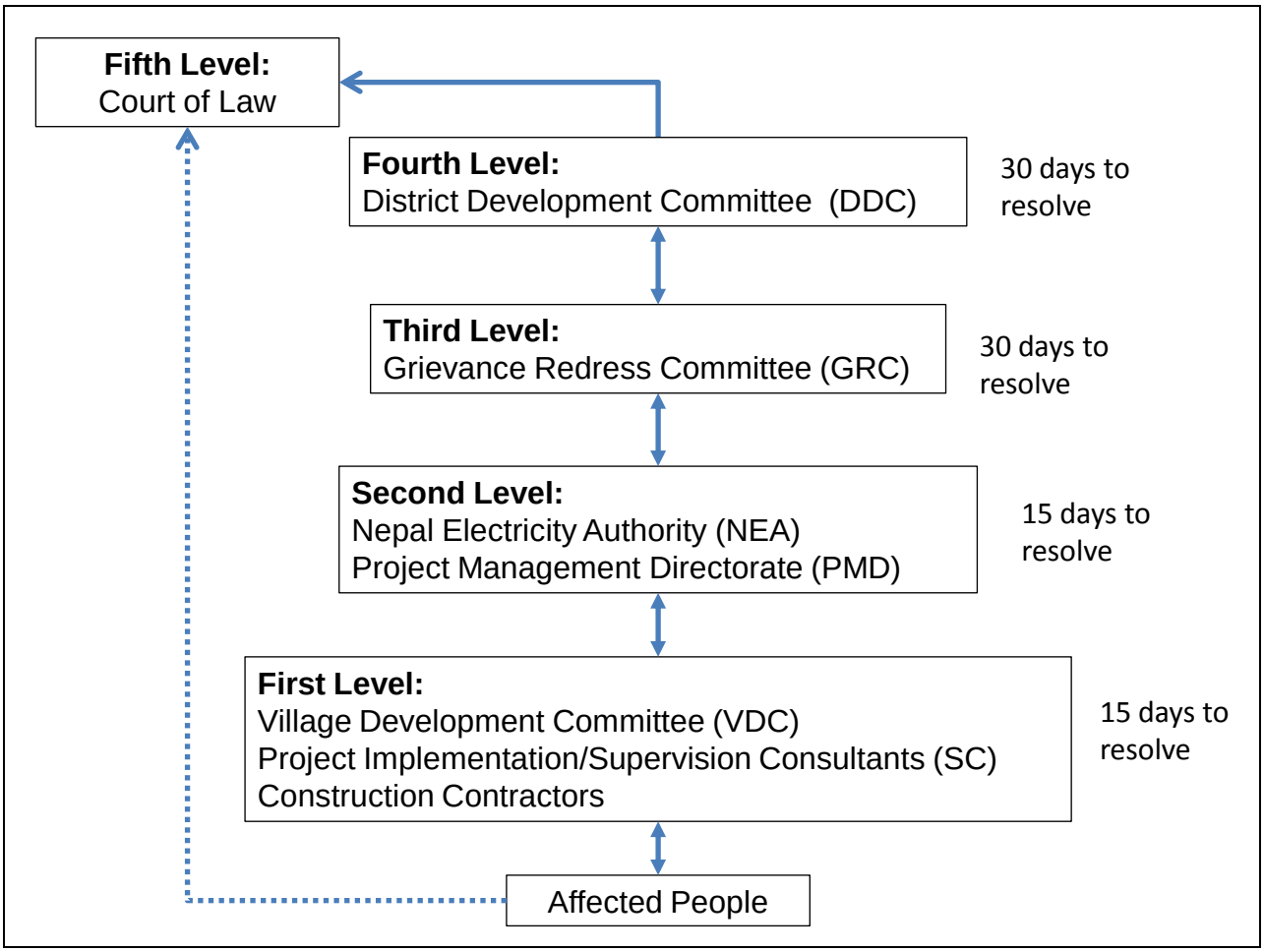


Table 12. Stakeholder Communication Strategy

Project Information to be communicated	Means of Communication	Responsibility	Audience	Frequency
Report and Recommendation of the President (RRP) with linked documents	ADB website	ADB	ADB, GOV, Development Partners, Civil Society, Individuals	Once
Project information while planning/ designing	Discussions and stakeholder consultations	EA	Project beneficiaries	Regular intervals during planning and design
Safeguards Documents (i.e., IEE and RP) and any update during implementation	ADB and NEA website	EA	ADB, GOV, Development Partners, Civil Society, Individuals	Once before implementation and as needed during implementation
Status of implementation during construction	Communication boards at site	EA/Contractors	Project beneficiaries	All the time at construction sites
Project Performance Reports and Project Information Documents	ADB website	ADB	ADB, GOV, Development Partners, Civil Society, Individuals	Every quarter
Safeguards Monitoring during implementation (i.e., review of Environmental and Social Monitoring Reports; and visit mission sites)	ADB website	ADB and EA	ADB, GOV, Development Partners, Civil Society, Individuals	Environment: Semi-annual during construction and annual during operation Social: Semi-annual
Project Completion Report	ADB website	ADB	ADB, GOV, Development Partners, Civil Society, Individuals	Once

ADB = Asian Development Bank, EA = executing agency, GOV = Government of Nepal, IEE = initial environmental examination, NEA = Nepal Electricity Authority.

X. ANTICORRUPTION POLICY

53. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.[19] All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all project contractors, suppliers, consultants, and other service providers. Individuals and/or entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the project.[20]

54. To support these efforts, relevant provisions are included in the loan agreement/regulations or grant agreement/regulations and the bidding documents for the project. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the project.[21]

[19] Anticorruption Policy: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf
[20] ADB's Integrity Office web site: http://www.adb.org/integrity/unit.asp
[21] Available at: http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf

55. ADB's Anticorruption Policy designates the Office of Anticorruption and Integrity (OAI) as the point of contact to report allegations of fraud or corruption among ADB-financed projects or its staff. OAI is responsible for all matters related to allegations of fraud and corruption. For a more detailed explanation, refer to the Anticorruption Policy and Procedures. Anyone coming across evidence of corruption associated with the project may contact the Anticorruption Unit by telephone, facsimile, mail or email at the following numbers/addresses:

Email : integrity@adb.org or anticorruption@adb.org
Phone : +632 632 5004
Fax : +632 636 2152

Mail at the following address (Please mark correspondence Strictly Confidential):

Office of Anticorruption and Integrity
Asian Development Bank
6 ADB Avenue Mandaluyong City
1550 Metro Manila, Philippines

XI. ACCOUNTABILITY MECHANISM

56. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make an effort in good faith to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.[23]

XII. RECORD OF CHANGES TO THE PROJECT ADMINISTRATION MANUAL

57. All revisions and/or updates during the course of implementation are retained in this section to provide a chronological history of changes to implemented arrangements recorded in the PAM, including revision to contract awards and disbursement s-curves.

Date	Changes made to the Project Administration Manual

[23] Accountability Mechanism. http://www.adb.org/Accountability-Mechanism/default.asp.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

Strengthening the Capacity of Nepal's Energy Sector to Deliver Gender Equality and Social Inclusion (GESI) Results (TA)

A. Background

1. With a Gender Inequality Index (GII) of 0.479, Nepali women continue to lag behind men in both socio-economic condition and empowerment.[3] While women play an important role in the management of household needs, including energy, their contributions continue to remain undervalued. Thus, while gender considerations have taken a foothold in many other sectors in Nepal, and are beginning to have an impact,[4] they have not yet been prioritised in the energy sector. Similarly, people of excluded social groups—like Dalits and disadvantaged ethnic groups—experience lower human development indicators and have poorer access to energy sources.

2. In the past years, the Government of Nepal has made significant efforts to strengthen its policy and institutional framework on promoting gender equality and social inclusion (GESI). The enactment of the Gender Equality Act of 2006 was an important development. In the energy sector, the Nepal Electricity Authority (NEA) initiated the Community Rural Electrification Program (CREP) in 2005 to encourage public participation in rural electrification. Under this Program, a legally registered electricity user cooperative (EUC) submits an electricity connection application before the Community Rural Electrification Department (CRED) of NEA. The government shoulders 90% of the cost of electrification and the community provides a 10% counterpart. The NACEUN plays a key role in organizing and mobilizing the EUCs to avail of the opportunities provided by the CREP.

3. The Ministry of Energy, as well as the NEA and ESSD, however does not have an overarching GESI Strategy guiding the energy sector.[5] The human resource policies of NEA contain provisions for maternity leave and affirmative scoring for women during recruitment. But there are no clearly allocated personnel or unit within NEA to address GESI issues in the energy sector.[6]

4. This TA aims to assist the energy sector of Nepal (both government as represented by NEA and ESSD and civil society as represented by NACEUN) address this general capacity gap to mainstream GESI in energy programs and projects, and to ensure GESI mainstreaming particularly in the proposed loan project, NEP: Power Transmission and Distribution Efficiency Enhancement Project. It also provides opportunity for NEA women and men staff to be trained in new energy technology systems and applications to be introduced by the proposed loan project.

B. Individual Consultants (National experts)

5. Four individual consultants will be hired under ADB ICS method that will be based in Technical Assistance Implementation Unit (TAIU).

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[3] Human Development Reports: Gender Equality Index.
[4] Such as, for instance, the adoption of GESI strategy by the Ministry of Health and Population in 2010 and the subsequent drafting of GESI Guidelines in 2013. http://www.nhssp.org.np/gesi/GESI%20guidelines.pdf
[5] Interview with Ministry of Energy official.
[6] Human Resource Development Centre, 2014.

6. TA coordinator (24 person-months). The expert will have a postgraduate degree or equivalent professional training in development planning, gender or social development or any related field, and more than 7 years of experience in project management with prior involvement in managing Government or development partner-financed projects, preferably in the area of social development, GESI and/or women's empowerment. She/he will be based at NEA, work closely with the Project Management Directorate (PMD) at NEA and counterpart officer in overall project management and ensure smooth project implementation. She/he will lead the TAIU in annual planning and budgeting, regular and periodic monitoring and reporting, develop standards and systems in recruitment of consultants, facilitate ADB review missions, provide technical advice to NEA, international organization [firm or nongovernment organizations (NGOs)] as needed, oversee the performance of the international organization and liaise with development partners on behalf of the project.

7. **Monitoring and evaluation expert** (24 person-months). The expert will have a bachelor's degree or higher in project development and management or any related field and at least 5 years of experience in project monitoring and evaluation with prior involvement in monitoring government- and/or development partner-financed projects, preferably in the area of social development, GESI and/or women's empowerment. She/he will be based at NEA and develop project monitoring system and tools, train partners in use of tools, and produce aggregated project monitoring reports showing disaggregated data by sex and other dimensions (e.g. caste, ethnicity, and poverty). She/he will train partners in writing case stories, work closely with partners and consultants in identifying good practices and lessons for documentation, publication and dissemination, and lead in the identification and publication of knowledge products.

8. **Finance and procurement expert** (24 person-months). The expert will have at least a bachelor's degree in accounting, finance or public administration and qualification of certified public accountant from a national recognized institute of accountancy, with at least 5 years of relevant finance experience at national level and familiarity with government accounting system and ADB standards. She/he will be based at NEA. She/he will provide project implementation support to the financing accounting, reporting, submission of withdrawal applications for the TA, draft terms of references for expert(s) and specialized service provider(s), participate in selecting experts and consultants, and facilitate fund requests and releases.

9. **Social safeguards expert** (4 person-months). The expert will have a post-graduate degree in a relevant social science discipline or equivalent professional training, and more than 10 years of experience in social safeguards, preferably in infrastructure, in collaboration with the government and non-government development institutions. The expert will assess problem in determining land rate in implementation of hydro power and transmission line project in Nepal. She/he will review the current practices of valuation for land acquisition in power generation projects, its associate facilities, tower footing and ROW of transmission line project. She/he shall collect information on issues and challenges of land valuation, review current practice of providing 10% compensation of land, and compensation restriction imposed on building construction and big tree plantation. She/he will prepare and propose a land valuation guideline for TL projects with review of national and international good practices. In this process the expert will facilitate necessary stakeholder consultations.

C. International Consulting Firm

10. An international organization (firm or NGO) will include (i) eight individual international experts (one, team leader for 10 person-months ; one GESI expert for 10 person-months; one social safeguards expert for 4 person-months; one capacity development expert for 6 person-

months; four new energy technology experts, with 4 person-months/each for 16 person-months, for a total of 46 person-months; (ii) one individual national expert (one social safeguards expert, 6 person-months) and (iii) one national NGO (24 months). The international organization will enter into subcontract with the national NGO on terms and conditions approved by ADB. The approach and methodology for supervising and administering such subcontract, and the identity and qualifications of the proposed national NGO, will need to be detailed by each shortlisted international organization in their simplified technical proposal, as this aspect will be given significant weight in the evaluation. Outline terms of reference of international and national experts are outlined below.

a. Individual international experts

11. **Team Leader** (10 person-months). The expert will have a postgraduate degree or equivalent professional training in development management, community development, or any related field, and more than 10 years of experience in managing social development projects – preferably related to gender and development, women's empowerment and social inclusion in the energy sector – in collaboration with the government and NGOs. She or he will lead international firm with the implementing team and provide required technical and administrative support to the recruited international consultants and NGOs. She or he will be responsible for planning, budgeting and implementation of the activities as per contract, and ensuring delivery of the results under each components of the project. The TL of consulting firm will work in coordination with the TA Coordinator and NEA counterpart; maintain communication with PMD NEA; manage consultant team; and ensure project processes, progress and results are properly documented and reported to the TAIU, PMU as well as to the ADB. In addition to the team leader's role, she/he will technically contribute to draft *GESI Strategy* and *GESI Operational Guidelines* of NEA, and related modules.

12. **GESI expert** (10 person-months). The expert will have a postgraduate degree in a relevant social science discipline or equivalent professional training, and more than 10 years of experience in social development work, specifically in Gender and Development, women's empowerment, preferably in energy programs and projects, in collaboration with the government and non-government development institutions. In consultation with the ESSD/NEA, she/he will draft the *GESI Strategy* and *GESI Operational Guidelines* of NEA and GESI-related training modules. She will support in design and implementation of (i) training of trainers and staff of ESSD/NEA staff on tested approaches and global practices in mainstreaming GESI in energy programs and projects during the international and national training, (ii) training of NACEUN on GESI mainstreaming in energy programs and projects, and (iii) GESI training of NEA officials on GESI guides and EUC members on GESI.

13. **Social safeguards expert** (4 person-months). The expert will have a postgraduate degree in a relevant social science discipline or equivalent professional training, and more than 10 years of experience in social development work, specifically in social safeguards preferably in energy infrastructure projects, in collaboration with the government and non-government development institutions. In consultation with the ESSD/NEA, she/he will draft the *procedures and manual for* social safeguards *(resettlement, environment and indigenous people)* for the NEA based on the existing national policies. She/he will also act as the lead resource person of the training to ESSD/NEA staff on developed safeguard procedures and manuals. She/he will also provide technical inputs to development of land valuation guidelines for the NEA.

14. **Capacity development expert** (6 person-months). The expert will have a postgraduate degree or equivalent professional training in human resource and training management,

community development or any related field, and more than 10 years of experience in designing and facilitating capability development programs focused on women's empowerment, gender equality and social inclusion preferably in the energy sector in collaboration with the government and NGOs. Experience in women-focused business and enterprise development in rural poor groups in developing countries will be an added advantage. She/he will support the GESI and Social Safeguards Expert in designing and running training programs (to be held in Nepal) in the energy sector.

15. **New energy technology experts** (4, [4 person-months/each], for 16 person-months). The experts will have postgraduate degrees in electrical engineering or equivalent professional training, and at least 7 years of experience in new and emerging technologies such as use of smart grid elements e.g. smart metering system, advance communication system allowing close consumer interface, demand-side management, effective monitoring of system performance and troubleshooting. Two of these experts will serve as resource persons during the international training on tested approaches and global practices in mainstreaming GESI and social safeguards in energy programs and projects, and will review, from an electrical engineering perspective, the *GESI Strategy* and *GESI Operational Guidelines* of NEA to be drafted by the GESI and Social Safeguards Expert. All four experts will serve as resource persons during the training of at least 100 staff of NEA from 20 distribution centers in Kathmandu and outside Kathmandu in new and emerging energy technologies.

b. National individual expert

16. **Social safeguards expert** (6 person-months). The expert will have post graduate degree in a relevant social science discipline or equivalent professional training, and more than 10 years of experience in social safeguards preferably in energy infrastructure projects, in collaboration with the government and non-government development institutions. She/he will support international safeguard expert in developing safeguard guides and manuals and provide training to EESD and NEA staff on new safeguard guidelines.

c. National nongovernment organization[5]

17. **National NGO**. The national NGO will have demonstrated ability to partner with the government and international organizations in promoting and mainstreaming GESI and women's empowerment in development programs and projects, with at least 5 years of experience in promoting the economic empowerment of communities (especially women) through the provision of business and enterprise development services, including training in livelihood, preferably in the energy sector. The NGO will mobilize and coordinate the provision of services of the following national experts: (i) one GESI expert (12 person-months); (ii) one energy technology expert (4 person-months); and (iii) one energy-based livelihood expert (12 person-months). In addition, there will be 24 social mobilizers (8 person-months each, for a total of 192 person-months) to be assigned in the 15 EUCs. The terms of reference associated with each of these experts are outlined below.

18. **GESI expert** (12 person-months). The expert will have a bachelor's degree or higher in relevant social science discipline or equivalent professional training, and more than 5 years of experience in social development work, specifically in Gender and Development and women's empowerment. She/he will assist the international GESI and Social Safeguards Expert in

[5] The NGO will be selected based on its track record in enabling women and girls in poor and marginalized communities to engage in capacity development activities and in livelihood activities.

gathering information for the drafting of the *GESI Strategy* and *Operational Guidelines* of NEA and in ensuring the context sensitivity of GESI-related training modules to be developed. She/he will also assist the international GESI expert in running the (i) consultation workshops for the drafting of the GESI Strategy and Operational Guidelines; (ii) training of trainers of ESSD/NEA staff on tested approaches and global practices in mainstreaming GESI and social safeguards in energy programs and projects during the international training, (iii) training of trainers of NEA and NACEUN on GESI mainstreaming in energy technologies and systems, and (iv) GESI training of NEA officials and staff. She/he will coordinate and take lead of training to NACEUN staff and 300 EUC members in GESI mainstreaming approaches in energy technologies and systems.

19. **Energy technology expert** (4 person-months). The expert will have a bachelor's degree in electrical engineering or higher and at least 5 years of experience in working with EUCs for the installation and maintenance of electrical services, and also in renewable energy technologies. The expert will assist the International Energy Technology Experts – as local resource persons to ensure the context-sensitivity of the training contents and methodologies – during the training of at least 100 staff of NEA from 20 distribution centers in Kathmandu and outside Kathmandu in new and emerging energy technologies. She/he will also assist the national energy-based livelihood experts in identifying and designing appropriate energy-based livelihood to be introduced to poor and marginalized communities (especially women).

20. **Energy-based livelihood expert** (12 person-months). The expert will have a bachelor's degree or higher in business management and administration or related field, or equivalent professional training; and more than 5 years of experience in designing and assisting community (preferably of women) livelihood projects that tap or are related to available energy resources. She/he will develop a modality of women's energy based livelihood training and design a 3-day training program on business development and provide the training to at least 500 women in 20 batches in 15 districts. Based on a training needs assessment, she/he will provide training on energy-based livelihood and enterprise to 500 EUC women members in around 30 batches from 15 districts from poor and marginalized groups with the assistance of national energy technology expert.

21. **Social mobilizers** (24, 8 person-months each). Each social mobilizer will have a bachelor's degree in social development or gender and development, or related field, or equivalent professional training, and at least 5 years of experience in community development work. One to two social mobilizers will be assigned to an EUC based on population size. Their tasks include: (i) disseminating information on the project to assigned EUCs; (ii) conducting training needs assessment with regard to GESI in energy programs and projects, and in business development, particularly those that are energy-based; (iii) social mobilization and organization of EUCs for capacity development; (v) coordinating with EUC officials in the selection and invitation of EUC members to business development and energy based livelihood training; (v) support and facilitate training organization at local level and communicate with training participants; (vi) provide post training support to women trainees to start business, link them with finance institutions and employment; (vii) document and report disaggregated data of training participants to TAIU; and (vi) assisting the EUC officials in formulating a project exit plan for the sustainability of the project.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

Proposed Power Transmission and Distribution Efficiency Enhancement Project

PROJECT SUPERVISION CONSULTANT

I. BACKGROUND

1. Electricity is one of the key infrastructures for the acceleration of economic development of any country and is considered as an important input to improve quality of life. About 65% of the population of Nepal has access to grid electricity. Moreover, the accessibility to electricity is concentrated in the urban areas. Even if the generation and transmission projects are completed in time, the outdated distribution network would be the ultimate hurdle that shall halt the energy access in the major cities of the country. Currently Nepal Electricity Authority (NEA), the state-owned electric utility, provides electric service in all districts except one district. The total consumers as of July 2016 stand at 3,168,000. Out of the total consumers, Kathmandu valley which houses the capital of Nepal accounts for approximately 450,000 consumers, about 16% of the total consumers and other major urban centers account for 40% of the total consumers. The urban centers contribute about 75% of the total revenue generated from the sale of electricity.

2. The average annual growth rate of peak demand of the country is 9% while the energy demand growth rate is 8%. Kathmandu Valley and major urban centers have witnessed a rapid growth in huge residential apartments and commercial complexes over the last decade putting heavy burden on NEA to meet the electricity demand. Because of the sudden jump in the peak demand, many feeders and transformers in Kathmandu valley and major urban centers have tripped due to overloading. In many cases, the distributions transformers were burnt due to overloading.

3. The majority of the distribution networks in major urban centers including Kathmandu Valley were created decades ago and despite significant increase in electricity demand and the number of consumers, minimal reinforcement of the networks has been carried out. Despite the significant increase in electricity demand and the number of consumers, no systematic reinforcement of the distribution network has been carried out for more than a decade. Hence, a massive reinforcement and modernization of distribution networks is required to enhance the distribution capacity and improve reliability and quality of electric supply in the major urban centers including Kathmandu valley by reducing distribution system overloads and losses and by enhancing operational efficiency. In this backdrop, the Asian Development Bank (ADB) has agreed to provide financing for the Power Transmission and Distribution Efficiency Enhancement Project. The project will contribute to Nepal's distribution system reinforcement in the Kathmandu Valley and other major urban centers by scaling up distribution system efficiency and reliability, facilitating adequate power supply to meet ever-growing energy needs of the valley, increasing service reliability of the utility, and building capacity for the overall distribution system development.

4. Aimed at increasing reliability and distribution capacity of the grid and access to grid electricity, the proposed loan shall finance the following subprojects:

(i) 220 kV substation at Lapsiphedi and 132 kV substation at Changunarayan;
(ii) 132 kV substations at Kathmandu Valley;
(iii) Enhancement of distribution network in Kathmandu Valley:

a. Enhancement of distribution networks in the Central and Northern Region of Kathmandu Valley
b. Enhancement of distribution networks in the Eastern and Southern Region of Kathmandu Valley
c. Enhancement of distribution networks in the Western Region of Kathmandu Valley

(iv) Delivery of distribution transformers
(v) Enhancement of distribution networks in major urban centers of Nepal:

a. Enhancement of distribution networks of urban centers in Eastern region of Nepal
b. Enhancement of distribution networks of urban centers in Central region of Nepal
c. Enhancement of distribution networks of urban centers in Western region of Nepal

5. NEA is the executing agency (EA) for the proposed project. The term “NEA”, “EA” and “the Employer” have the same meaning and may be used interchangeably in this document depending on the context.

6. All subprojects listed in para. 4 shall be collectively referred to hereafter in this document as “the project.”

7. The engineering design, supply of plants and equipment, construction, installation, testing and commissioning of transmission lines and associated substations, communications and protection facilities for all subprojects of the project will be completed through turn key contracts awarded to contractors following ADB’s Procurement Guidelines.

8. NEA seeks through this terms of reference (TOR) to engage a team of Project Supervision Consultants (PSC) through a firm in accordance with ADB’s Guidelines on the Use of Consultants by Asian Development Bank and Its Borrowers to supervise and implement the project. In addition, the PSC shall also study and analyze the current status of the distribution networks in major urban centers other than Kathmandu Valley and prepare and recommend the reinforcement plan for distribution networks. The project is implemented such that the efficiency of the distribution system is improved; distribution capacity is enhanced; reliability of the distribution system is enhanced, and the overall operational efficiency and financial performance of the distribution centers is improved.

9. The team of consultants is referred to hereafter as “the PSC” or “the Consultant”. The term “PSC” and “Consultant" may be used interchangeably in this document depending on the context. The services of the PSC are hereafter referred to as “the Services”.

10. This document sets forth TOR for the Services.

11. The ADB has engaged a team of project preparation support consultants to assist NEA in conducting survey, carrying out design, preparing bidding documents and providing procurement support till contract award of turn key contracts for all of the subprojects of the project.

II. OBJECTIVE OF THE ASSIGNMENT

12. The services aim at providing high quality professional services to assist NEA in supervising and implementing the project and to ensure that the project will be completed

according to the schedule and that the completed project will deliver the quality, capacity, performance, reliability and economic life as required by the employer's requirement defined in the turn key contracts with the contractors.

III. SCOPE OF THE SERVICES, TASKS (COMPONENTS) AND EXPECTED DELIVERABLES

A. Scope of the Services

13. The PSC is expected to deliver the Services for:
(i) project supervision of subprojects in para 4;
(ii) procurement support for subproject (v) in para 4;
(iii) capacity building of NEA staff.

B. Detailed Tasks

14. The PSC's detailed tasks are as follows:

1. Project Supervision

15. For each and all turn-key contracts for the project, the PSC shall review and advise the NEA on approval of contractor's detailed design in accordance with the employer's requirements and technical specifications in the contract.

16. For each and all turn key contracts for the Project, the PSC shall provide oversight of all aspects of the construction in order to assure that it is conducted properly in accordance with the contract.

17. To ensure quality in project implementation, the PSC shall develop and implement a Quality Assurance Program (QAP). The QAP shall ensure that the plants and equipment supplied and installed meet the performance standards and technical characteristics of the technical specifications. The QAP shall cover all aspects of the project implementation including review and approval of design; quality of works during construction; monitoring schedule; inspection of materials before shipment, upon arrival and upon erection; review of documents to assure quality of delivered goods and comparison of as-built drawings to design. Furthermore, shortcomings in any of the aforementioned areas shall be addressed adequately by QAP.

18. For each and all turn-key contracts for the project, the PSC shall supervise the testing and commissioning. All components of the lines, substations, SCADA, communications and protection will be subject to an acceptance test to demonstrate their capability to meet warranted design criteria. For each component subject to test, the consultant will review the contractor's test procedures for compliance with manufacturers' requirements and design criteria. The consultant shall witness the tests and review the test results. If test results are not satisfactory, the consultant shall ensure that any lack of compliance is addressed and that the equipment and overall systems shall be re-tested until compliant results are achieved. During the commissioning phase, the consultant shall provide training on the testing and commissioning of all aspects of the project. The consultant shall assist NEA in this phase of the project and coordinate with the contractor in addressing any issues with the project components that are unsatisfactory. At the end of this period, and when all acceptance tests have been completed to the consultant's satisfaction, the consultant will advise NEA that the construction is complete and all the project components are ready to be declared fully operational. The consultant shall also prepare and recommend a

provisional taking over certificate whenever due for the works or part of the works and alert NEA of work deficiencies and outstanding items, if any. The consultant shall also confirm the remedial measures taken by the contractor, and recommend a final taking over certificate after expiry of the warranty period.

19. The PSC shall hand over the completed project including issuance of completion certificates, provisional acceptance and final acceptance certificates to NEA.

2. Project Preparation Support for Subproject (v) in para. 4

20. PSC shall also prepare the modernization and reinforcement requirements for subprojects (v) in para 4 for procurement in addition to the monitoring and construction supervision of this subproject. The preparation will include analysis, study of the reinforcement requirement, cost estimate, bidding documents and procurement support to NEA until contract award. The PSC shall among others perform the followings:

21. The consultant shall develop long term electricity demand projection for major urban centers of Nepal excluding Kathmandu valley using the suitable forecast methodology. The demand forecast shall cover a period of 20 years. The demand forecast shall be developed for each category of consumer class. The load survey for demand forecast shall include among others number of houses, population, new construction anticipated, hospitals and other public health systems, industries, commercial complexes, apartments, hotels, recreation centers and development programs envisaged. The Consultant shall consult with various stakeholders such as municipalities, Department of Urban Planning and Development, Ministry of Industry, Ministry of Tourism and so on to ensure the accuracy of the demand forecast.

22. The major activities to be performed by the Consultant shall include but not limited to the following:

(i) The consultant shall conduct the load flow studies of distribution networks based on the demand forecast and develop the distribution system reinforcement and expansion plans to meet the forecasted demand.

(ii) The consultant shall develop design norms and parameters to be used in the design of distribution system. The consultant shall propose the reinforcement plans based on internationally accepted design norms and standards on distribution system management. Such reinforcement plan shall aim at reducing the distribution system losses and promote distribution automation to the extent possible. The proposed reinforcement plan shall update and remodel the existing power distribution networks with focus on future demands of the distribution centers of these urban centers including implementation schedule.

(iii) Study and recommend a suitable GIS based distribution automation system that will utilize the SCADA system. The distribution automation shall include and not be limited to fault detection, localization, isolation, and load restoration (FDIR). These sequences will detect a fault, localize it to a segment of feeder, open the switches around the fault, and restore un-faulted sources via the substation as available. This shall result in safely minimizing the fault duration and significantly improving the system average interruption duration index (SAIDI), customer average interruption duration index (CAIDI), system average interruption frequency index (SAIFI) and

Customer average interruption frequency index (CAIFI), performance metric for the customers on those feeders.

(iv) The consultant shall prepare the bidding documents including detailed technical specifications, layouts and other drawings and designs. The consultant shall also prepare the detail cost estimate for the reinforcement packages and provide support in contract award and negotiation.

3. Capacity Building of NEA staff

23. The PSC shall perform a needs assessment and develop a training program for NEA staff associated with the subprojects and working on the project as PSC's counterpart staff. The training program shall include 220 kV and higher voltage class substation design, protection system coordination, distribution system planning, distribution automation, smart grid technology and loss reduction techniques. The NEA counterpart staff will assist the consultant to the extent possible during all phases of the project. All international experts of PSC are expected to work closely with the NEA staff and shall ensure that the NEA staff persons achieve higher skill levels as a result of their involvement.

24. One of the basic objectives of the consulting services is the transfer of technology in this field to the NEA's engineers. This will be achieved by involving the NEA engineers with the international experts as much as possible in various activities of the project implementation during field works of the consultant.

25. The consultant shall arrange a 2-week study tour for NEA's eight officials to visit utility(ies) in order to study distribution system planning process, distribution business plans, advanced technology in the field of distribution. The cost of such study tour including the cost of travel, boarding, lodging and subsistence allowance will be quoted under the provisional sum.

26. In addition to above, the consultant shall arrange one training session in its home office for a total of 20 engineers. The duration of each session shall be 1 month. The cost of such training including the cost of travel, boarding, lodging and subsistence allowance in connection with the engineer's training on consultants offices will be quoted under provisional sum. The training shall be conducted in the in following disciplines:

(i) planning and design of distribution networks by using the software approved by NEA, and practical training on latest loss reduction and energy efficiency measures of distribution systems to meet the overall objective of this project; and

(ii) distribution system automation

27. The consultant shall provide hands-on training on the latest version of internationally recognized distribution system design and planning software. Consultant shall provide with its proposal the details of proposed software.

IV. TEAM COMPOSITION & QUALIFICATION/EXPERIENCE REQUIREMENTS FOR THE EXPERTS AND THEIR RESPONSIBILITIES

A. Team Composition

28. It is estimated that a total 329 person-months of services are required with 125 person-months from international experts and 204 person-months by national non-key experts. Details on expertise and person month requirements are in Table 1. The international expertise should be provided by a consulting firm specializing in designing the transmission and distribution networks reinforcement and expansion in partnership with national firm(s) and/or individual national consultants in Nepal.

Table 1: Expertise and Person Month Inputs

Expertise	No of PM	Total REM	Total REM
		Field	Home
A. International Consultant			
1.Team Leader/Distribution System Engineer	30.00	26.00	4.00
2. Substation Engineer- Electrical	18.00	15.00	3.00
3. Transmission Engineer –Electrical	4.00	3.00	1.00
4. SCADA/Communications Engineer	7.00	6.00	1.00
5. Distribution Automation/Smart Grid Expert	18.00	15.00	3.00
6. Environmental Safeguard Specialist	7.00	5.00	2.00
7. Social Safeguards Specialist	7.00	5.00	2.00
8. Structure Engineer-Transmission and Distribution	7.00	6.00	1.00
9. Utility Management/Reforms Specialist	8.00	6.00	2.00
10. Human Resource Expert	4.00	3.00	1.00
11. GIS Expert	15.00	12.00	3.00
Sub Total- A	**125.00**	**102.00**	**23.00**
B. National Consultant (Non-key)			
1.Transmission Electrical Engineer	3.00	3.00	
2. Substation Engineer (3 number)- Electrical	72.00	72.00	
3. Distribution System Engineer(3 numbers)	72.00	72.00	
4. SCADA/Communications Engineer	4.00	4.00	
5.Environmental Safeguard Specialist	6.00	6.00	
6. Social Safeguards Specialist	6.00	6.00	
7. Structure Engineer-Transmission and Distribution	3.00	3.00	
8. Utility Management/Reforms Specialist	8.00	8.00	
9. GIS Expert	30.00	30.00	
Sub Total-B	**204.00**	**204.00**	**0.00**
Total (A+ B)	**329.00**	**306.00**	**23.00**

B. Qualification/Experience Requirements for the Experts

1. International Experts

29. **Team Leader and Distribution System Engineer** shall have preferably Master's Degree in Electrical Engineering/High Voltage Engineering/Power System Engineering and preferably more than 15 years experience in planning and developing distribution system designs, remodelling and modernizing distribution networks, planning distribution reinforcements, expansion and loss optimization of 33 kV, 11 kV and 400 V distribution systems. The expert shall have previous team leader experience in detail planning, design, remodelling of distribution systems. It is expected that the amount of time spent by the Team Leader in the field will not be less than 80% of the required total person month inputs from the Team Leader during the execution of the project.

30. **Substation Engineer-Electrical** shall have preferably Master's Degree in Electrical Engineering/High Voltage Engineering, preferably with more than 15 years of experience in design/construction supervision of transmission and distribution substations. The expert shall also have experience in designing GIS substations. The expert shall have previous experience in detail design, preparation of technical specifications, cost estimate and construction supervision of transmission and distribution substations of different voltage levels.

31. **Transmission Line Engineer-Electrical** shall have preferably Master's Degree in Electrical Engineering/High Voltage Engineering/Power System Engineering and shall have preferably more than 10 years of experience in designing transmission line projects. The past experience shall include design of transmission line components and line of 220 kV or above voltage level, preparing technical specifications, and designing underground transmission network of 132 kV or above voltage level.

32. **SCADA/Communications Engineer** shall have preferably Master's Degree in Electrical/Communications Engineering or other relevant discipline with preferably over 10 years of experience in the design, selection and preparation of specification of SCADA and communication systems for transmission lines, substations, and control center interfacing. The expert shall have previous experience in designing/planning SCADA/communication system for interconnected/integrated power grid system.

33. **Distribution Automation/Smart Grid Engineer** shall have preferably Master's Degree in Electrical/Communications Engineering or other relevant discipline with preferably over 10 years of experience in designing automation of distribution networks for urban centers. The experience in designing of distribution automation shall cover multiple substations and service area involving consumer not less than one million. The expert shall also have experience in designing smart grid system for distribution and transmission networks.

34. **Environmental Safeguard Specialist** shall have preferably Master's Degree in Environmental Science, Environment Management, Environmental Engineering or closely related discipline with more than 10 years of professional experience. The expert shall have experience in conducting environmental impact analysis (EIA), initial environmental examinations (IEE) of 220 kV or above voltage class transmission line projects as per international standard and practice as well as latest ADB or other donor agencies guidelines with regard to environmental protection and resettlement. The specialist should be conversant with national laws relating to IEE/ EIA, and ADB's Safeguard Policy Statement 2009.

35. **Social Safeguard Specialist** shall have preferably Master's Degree in Sociology/Social Science/Anthropological Science with more than 10 years of professional experience. The Specialist shall have experience in preparation of resettlement plan and indigenous peoples plan, in 220 kV or above voltage class transmission line projects in accordance with the international practices as well as latest donor agencies' guidelines, preferably ADB guidelines with regard to environmental protection and resettlement. The Specialist should be conversant with national laws relating to land acquisition and resettlement and ADB's Safeguard Policy Statement 2009.

36. **Structural Engineer- Transmission and Substations** shall have preferably Master's Degree in Structural Engineering, with preferably more than 10 years of experience in design of 220 kV and above voltage level transmission line towers and substation structures. The expert shall have previous experience in design and construction supervision of 220 kV and above voltage level transmission line projects.

37. **Utility Management/Reforms Specialist** shall have preferably Master's Degree in Utility Management/Energy Economics/Power System Engineering/Business Administration, preferably with more than 10 years of experience in developing best practices/guidelines/norms for enhancing the operation efficiency of the distribution entities. The expert shall also have experience in designing and organizing training programs.

38. **Human Resources Expert** shall have preferably Master's Degree in Electrical Engineering or Personnel Management, preferably with more than 10 years of experience in human resources management of the electric distribution utilities/companies or in the electricity distribution sector. The expert shall also have experience in designing and organizing training programs.

39. **GIS Expert** shall have preferably Master's Degree in GIS or related fields with at least 5 years of experience in GIS and spatial mapping of the distribution networks.

2. National Experts

40. **Electrical Engineer (Transmission)** shall have preferably Master's Degree in Electrical Engineering/High Voltage Engineering/Power System Engineering and preferably 10 years of experience in preparation of transmission line design and specifications or in construction, testing and commissioning of 132 kV or above voltage class transmission lines.

41. **Distribution System Engineer** shall have preferably Master's Degree in Electrical Engineering/High Voltage Engineering/Power System Engineering and preferably more than 10 years' experience in planning and developing distribution system designs, planning distribution reinforcements, expansion of 33 kV, 11 kV and 400 V distribution systems.

42. **Substation Engineer-Electrical** shall have preferably Master's Degree in Electrical Engineering/High Voltage Engineering, preferably with more than 10 years of experience in design/construction supervision of transmission and distribution substations. The expert shall have previous experience in detail design, preparation of technical specifications, cost estimate and construction supervision of transmission and distribution substations of different voltage levels.

43. **SCADA/Communications Engineer** shall have preferably Master's Degree in Electrical/Communications Engineering or other relevant discipline with preferably over 10 years

of experience in the design, selection and preparation of specification of SCADA and communication systems for transmission lines, substations and control center interfacing.

44. **Environmental Safeguard Specialist** shall have preferably Master's Degree in Environmental Science, Environment Management, Environmental Engineering or closely related discipline with more than 10 years of professional experience. The expert shall have experience in conducting EIA, IEE of 220 kV or above voltage class transmission line projects as per international standard and practice as well as well as latest ADB or other donor agencies guidelines with regard to environmental protection and resettlement. The specialist should be conversant with national laws relating to IEE/ EIA, and ADB's Safeguard Policy Statement 2009.

45. **Social Safeguard Specialist** shall have preferably Master's Degree in Sociology/Social Science/Anthropological Science with more than 10 years of professional experience. The Specialist shall have experience in preparation of resettlement plan and indigenous peoples plan, in 220 kV or above voltage class transmission line projects in accordance with the international practices as well as latest donor agencies' guidelines, preferably ADB guidelines with regard to environmental protection and resettlement. The Specialist should be conversant with national laws relating to land acquisition and resettlement and ADB's Safeguard Policy Statement 2009.

46. **Structural Engineer- Transmission and Substations** shall have preferably Master's Degree in Structural Engineering, with preferably more than 10 years of experience in design of 132 kV and above voltage level transmission line towers and substation structures.

47. **Utility Management/Reforms Specialist** shall have preferably Master's Degree in Utility Management/Energy Economics/Power System Engineering/Business Administration, preferably with more than 7 years of experience in utility management/developing best practices/guidelines/norms for enhancing the operation efficiency of the distribution entities. The expert shall also have experience in designing and organizing training programs.

48. **GIS Expert** shall have preferably Master's Degree in GIS or related fields with at least 5 years of experience in GIS and spatial mapping of the distribution networks.

C. Responsibilities of the Experts

1. International Experts

49. All international experts indicated in Table 1 are considered as key experts. The main responsibilities of each international expert are highlighted, but not limited to, as follows:

a. Team Leader and Distribution System Engineer

50. As the Team Leader, the expert is responsible for:

(i) leading and managing the entire team including both international and national experts and act as the team's point of contact with NEA and ADB;
(ii) preparing or leading the team to prepare all the reports as listed in the Reporting Requirements in 10;
(iii) handling contract administration matters related to the PSC contract;
(iv) assisting PMD/NEA in administration of all turn key contracts for the project;
(v) reviewing the turn-key contractors' health and safety plans;

(vi) monitoring project progress against plan, report on progress, and propose remedial measures as necessary;
(vii) reviewing the contractor's claims for extension of time or additional costs; and preparing variation instructions and cost review; certifying invoices/volume of works completed and recommend for payment; and
(viii) providing technical support to NEA in settlement of claims and disputes arising from the turn key contracts.

51. The Team Leader as a Distribution Engineer-Electrical shall perform the following:

(i) provide inputs and advice to the project team and to NEA on distribution line and substation technical matters;
(ii) analyze reinforcement requirements of the existing distribution system and develop optimum distribution networks in the major urban centers to supply the future demand;
(iii) prepare reinforcement and expansion plan with the remodelled distribution system that will meet the internationally accepted standards for urban distribution system;
(iv) lead the team to study and recommend a suitable GIS based distribution system or SCADA system which shall include and not be limited to fault detection, localization, isolation, and load restoration (FDIR). These sequences will detect a fault, localize it to a segment of feeder, open the switches around the fault, and restore un-faulted sources via the substation as available;
(v) prepare the technical specifications, cost estimate and bidding documents for the distribution reinforcement packages for major urban centers;
(vi) contribute to capacity building of NEA counterpart staff;
(vii) assist NEA in review and approval of contractor's drawings and technical information;
(viii) witness and certify main equipment shop inspections and assist NEA with inspections and certifications of manufactured main equipment prior to shipment and upon receipt;
(ix) supervise site construction and installation works in conjunction with NEA and other team members;
(x) review, certify, and supervise the contractor's testing and commissioning plans of distribution lines and substations in conjunction with NEA and other team members;
(xi) Review, check and certify suppliers' equipment design, and approve the technical documents.
(xii) assist with the review of contractor's claims for extension of time or additional costs; prepare variation instructions and cost review; certify volume of works completed withdrawal applications and issue of monthly and final payment certificates;
(xiii) assist with the certification of substantial completion and/or completion of main project components as defined in the contract documents; and
(xiv) perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.

52. The Team Leader will lead the capacity building and be responsible for:

(i) performing a training needs assessment for NEA staff and preparing a training program with the assistance of the consultant team and

(ii) contributing to capacity building of NEA counterpart staff.

b. Substation Engineer (Electrical)

(i) assist the consultant team to perform a training needs assessment for counterpart staff and prepare a training program and contribute to capacity building of NEA counterpart staff;
(ii) make necessary inputs and advice to the project team and to NEA on related subject matters;
(iii) assist NEA in review and approval of contractor's drawings and technical information;
(iv) witness and certify main equipment shop inspections and assist NEA with inspections and certifications of manufactured items prior to shipment and upon receipt;
(v) supervise site construction and installation works in conjunction with NEA and other team members;
(vi) review and certify the contractor's testing and commissioning plans;
(vii) supervise testing and commissioning of substations in conjunction with NEA and other team members;
(viii) review, check and certify suppliers' equipment design, and approve the technical documents;
(ix) assist with the review of contractor's claims for extension of time or additional costs; prepare variation instructions and cost review; certify volume of works completed withdrawal applications and issue of monthly and final payment certificates;
(x) assist with the certification of substantial completion and/or completion of main project components as defined in the contract documents;
(xi) develop and finalize the design parameters for the transmission and distribution substations keeping in view the best practices and advance technology in consultation with NEA;
(xii) evaluate different substation schemes including GIS substation and keeping in view the difficulty of the land acquisition;
(xiii) prepare detail substation design for GIS and AIS substations;
(xiv) prepare specifications for substation components such as transformers, SAS, CB, instrument transformers, control and relay panel, instrument transformers etc.;
(xv) prepare bidding documents and detail cost estimate for the substations component; and
(xvi) perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.

c. Transmission Line Engineer-Electrical

(i) develop and maintain a project quality assurance plan for NEA; and ensuring that works are executed in line with the plan and project requirements;
(ii) check the drawings and technical designs submitted by the contractors and recommend them to NEA for approval;
(iii) review, check and certify suppliers' equipment design, and approve the technical documents;
(iv) witness and certify main equipment shop inspections;
(v) assist NEA with inspections and certifications of manufactured items prior to shipment and upon receipt;

(vi) recommend the acceptability of designs and works carried out by the contractors and suggest corrective measures to be undertaken;
(vii) supervise the installation, testing and commissioning of the transmission line and substations;
(viii) review and certify the contractor's testing and commissioning plans;
(ix) supervise testing and commissioning in conjunction with NEA and other team members; and
(x) certify substantial completion and/or completion of main project components as defined in the contract documents.

d. SCADA/Communications Engineer

(i) make necessary inputs and advice to the project team and to NEA on transmission line and substation communication matters;
(ii) assess NEA's existing SCADA and communications systems and prepare design concepts for interfacing with the transmission line and substations;
(iii) assist NEA in review and approval of contractor's drawings and technical information with regards to communication/SCADA system;
(iv) supervise site construction and installation works in conjunction with NEA and other team members;
(v) review and certify the contractor's testing and commissioning plans;
(vi) supervise testing and commissioning in conjunction with NEA and other team members;
(vii) review, check and certify suppliers' equipment design, and assist NEA in approving the technical documents;
(viii) supervise installation, testing and commissioning of the transmission line and substations SCADA and communication systems. Monitor project progress against plan, report on progress, and propose remedial measures as necessary; and
(ix) perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.

e. Distribution Automation / Smart grid Expert

(i) assist the consultant team to perform a training needs assessment for counterpart staff and prepare a training program;
(ii) make necessary inputs and advice to the project team and to NEA on distribution automation system and smart grid technology;
(iii) assess the transmission and distribution networks of major urban centers excluding Kathmandu valley and recommend the suitable distribution automation system;
(iv) prepare conceptual designs and layouts for the distribution automation system and smart grid technology for implementation in major urban centers;
(v) prepare the technical specifications, performance specifications, schedules and drawings for bidding of the project on a turnkey basis;
(vi) assist NEA in review and approval of contractor's drawings and technical information related to automation/smart grid technology;
(vii) supervise site construction and installation works in conjunction with NEA and other team members;
(viii) review and certify the contractor's testing and commissioning plans;

(ix) supervise testing and commissioning in conjunction with NEA and other team members;
(x) review, check and certify suppliers' equipment design, and assist NEA in approving the technical documents;
(xi) supervise installation, testing and commissioning of the automation system; and
(xii) perform other functions as may be assigned or delegated by Team Leader from time to time during the time of assignment.

f. Environmental Safeguard Specialist

(i) make necessary inputs and advice to the project team and to NEA on environmental distribution networks and distribution substation technical matters;
(ii) review detailed design and construction methods before approving them to ensure environmental safeguard properly incorporated;
(iii) support NEA to update the IEE and EMP and assist NEA in implementation of EMP;
(iv) review construction contractors' environmental health and safety plan (EHS) and recommend revisions as necessary;
(v) conduct routine inspections of construction/installation activities including visual survey of ROW clearance, construction equipment storage areas, waste disposal areas and construction camps;
(vi) monitor implementation of EMP by undertaking qualitative regular check and quantitative review as set out in the monitoring plan;
(vii) provide monthly reports for NEA to prepare and submit semi-annual/annual safeguard monitoring reports to ADB; and
(viii) perform other functions as may be assigned or delegated by Team Leader from time to time.

g. Social Safeguard Specialist

(i) support NEA to update existing resettlement plan based selected transmission route alignment in accordance with the national laws, regulations and ADB's SPS 2009;
(ii) make necessary inputs and advice to the project team and to NEA on social safeguard issues as required by the national laws, regulations and ADB's SPS 2009;
(iii) update land acquisition and resettlement impact assessment based on selected route alignment and substation details;
(iv) review/update the entitlement matrix for each subproject listing all likely effects, such as permanent and or temporary land acquisition, and a study to determine the replacement costs of all categories of losses based on the asset valuation process, with particular attention to vulnerable groups including indigenous peoples, women, children and the poor and socially excluded;
(v) update the implementation schedule consistent with all the resettlement plan requirements, making sure that major components are carried out before the civil works;
(vi) establish dialogue with affected peoples for incorporating their suggestions;
(vii) ensure compliance with all government rules and regulations and monitor that the project is implemented in compliance with RP;

(viii) provide guidance to the national safeguard specialist and NEA's concerned staff responsible for social safeguard in data collection and census surveys of affected persons;
(ix) assist NEA to prepare and submit semi annual monitoring reports to ADB; and
(x) perform other functions as assigned or delegated by Team Leader from time to time during the period of assignment.

h. Civil Engineer -Transmission and Distribution

(i) make necessary inputs and advice to the project team and to NEA on transmission line and transmission substation structural matters;
(ii) prepare structure designs for towers and tower foundations (if required) and substation equipment structures;
(iii) prepare structure designs for underground cabling and other civil works;
(iv) check the tower, tower foundation, pole foundation and substation structure designs including control buildings and other civil structures submitted by the contractors and assist in approval of contractor's designs, drawings and technical information; and
(v) perform other functions as may be assigned or delegated by Team Leader from time to time during the period of assignment.

i. Human Resource Expert

(i) assist the consultant team to perform a training needs assessment for counterpart staff and prepare a training program;
(ii) recommend ways to promote corporate reform and institutional development in the distribution business;
(iii) study the existing human resource availability & organogram and recommend required changes to meet the objective of this study;
(iv) prepare Job Description and Job Specification for all jobs in the distribution center;
(v) make necessary inputs and advice to the project team and to NEA on related subject matters;
(vi) contribute to capacity building of NEA counterpart staff; and
(vii) perform other functions as may be assigned or delegated by Team Leader from time to time during the period of assignment.

j. Utility Management/Reforms Specialist

(i) assist the consultant team to perform a training needs assessment for counterpart staff and prepare a training program;
(ii) recommend ways to promote corporate reform and institutional development in the distribution business;
(iii) develop industry practice and service standard for improving operational efficiency of the distribution centers;
(iv) develop financial modules for revenue and cost control;
(v) develop norms and guidelines for setting up the reliability and service standards, customer satisfaction;
(vi) make necessary inputs and advice to the project team and to NEA on related subject matters;
(vii) contribute to capacity building of NEA counterpart staff; and

(viii) perform other functions as may be assigned or delegated by Team Leader from time to time during the period of assignment.

k. GIS Expert

(i) assist the consultant team to perform a training needs assessment for counterpart staff and prepare a training program;
(ii) prepare GIS maps consisting of information on distribution networks of the under the jurisdiction of Distribution centers. The GIS mapping shall include 33 kV, 11 kV distribution lines, distribution transformers, 400 V networks, consumer connections;
(iii) develop computerized data base for lines and consumers based on voltage and consumer class/category;
(iv) make necessary inputs and advice to the project team and to NEA on related subject matters;
(v) contribute to capacity building of NEA counterpart staff; and
(vi) perform other functions as may be assigned or delegated by Team Leader from time to time during the period of assignment.

2. National Experts

53. Although national consultants are classified as non-key in the proposal evaluation, they play important role in the PSC team with local knowledge of dealing with environment (including cultural heritage), social, technical and geographical issues arising from the Project. Each national expert will perform the same or similar duties as his/her counterpart in the international team in his/her respective field.

V. REPORTING REQUIREMENTS, TIME SCHEDULE FOR DELIVERABLES AND IMPLEMENTATION ARRANGEMENT

54. The Consultant shall prepare various reports and maintain records documenting decisions made at meetings, progress on project implementation, financial records and changes to the contract plans. All documents and reports would be made available on electronic format to ADB. The reporting shall, in general, comprise of the following:

(i) Inception report
(ii) Demand forecast report for major urban centers of Nepal
(iii) Distribution system design and reinforcement plan for major urban centers. This report shall include remodelling and modernization of the prevailing distribution networks; SLD of the remodelled networks; recommendations to reduce distribution loss and improve customer service.
(iv) Bidding documents including technical specifications for transmission and distribution reinforcement components for major urban centers.
(v) Manual for checking drawings of towers and foundations, substation structures
(vi) Report on shop inspection and test witnessing
(vii) Formats for site supervision and site supervision reports
(viii) At NEA's request, all necessary reports concerning special matters related to the project (installation, work methodology, safety, claims, checklist for equipment testing and commissioning etc.)
(ix) Monthly reports concerning physical progress/status of works, expenditures, delivery of materials etc. in the formats acceptable to NEA and ADB.

(x) Quarterly progress report giving the progress status, schedules, costs, budgets etc. in the formats acceptable to NEA and ADB.
(xi) Environmental monitoring reports semi-annually during construction and annually during operation and resettlement monitoring reports semi-annually.
(xii) Project Completion Report (PCR) as per requirement of NEA and ADB.
(xiii) Report on a suitable distribution management system or SCADA system which shall include and not be limited to fault detection, localization, isolation, and load restoration (FDIR). These sequences will detect a fault, localize it to a segment of feeder, open the switches around the fault, and restore un-faulted sources via the substation as available. This shall result in safely minimizing the fault duration and significantly improving the SAIDI (system average interruption duration index) and SAIFI (system average interruption frequency Index) performance metric for the customers on those feeders.

55. All documents and reports would be made available on electronic format to ADB. All reports will be in English language.

56. The PSC shall report to the PMD of NEA and headed by the Deputy Managing Director who reports directly to the Managing Director of NEA. The PSC shall work closely with subproject managers, Distribution Centers' Chiefs and their engineers, and NEA's specialized departments if necessary.

57. The consultant is expected to commence the service in May 2017, and the duration of the service will be 48 months from May 2017 to May 2021.

VI. CLIENT'S INPUT AND COUNTERPART PERSONNEL

58. **Administrative support for Consultant Team**: If required by local regulations, NEA will provide consultant with necessary support letters for obtaining visas and permits for its experts. The cost and timing of obtaining the above is entirely the responsibility of the consultants.

59. **Office Space, Office Equipment, Transportation and Accommodation**: NEA will provide office space, necessary furniture and office equipment (computers, fax, telephone etc.) in Kathmandu. The consultant shall make his own arrangements for transportation and accommodation for its personnel in Nepal. The consultant shall arrange itself any other equipment and planning software required during execution of works. consultant shall be responsible for international telephone bills, maintenance of office equipment and consumables necessary for its own use.

60. **NEA Project Team**: The subprojects shall have its own contract management team comprising of project manager, engineer and other support staff. The subproject team shall assist the consultant in collecting data required for study. The subproject team shall work in close collaboration with the consultant's team and be fully involved in all aspects of the consulting services. Both NEA and consultant's teams shall work together as one single team in all matters related to the project.

VII. CLIENT WILL PROVIDE THE FOLLOWING INPUTS, PROJECT DATA AND REPORTS TO FACILITATE PREPARATION OF THE PROPOSALS

61. NEA will facilitate access of the consultant to other government agencies for communications, collecting of relevant information, data documents, etc. and other activities related to the consultant's assignment.