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Report No: PAD 1276

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF
SDR 14.4 MILLION
(USD 20 MILLION EQUIVALENT)

TO

NEPAL

FOR THE

POWER SECTOR REFORM AND SUSTAINABLE HYDROPOWER DEVELOPMENT PROJECT

September 3, 2015

Energy and Extractives Global Practice
South Asia Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective July 31, 2015)

USD 1.0 = NPR 102.58
SDR 1.0 = USD 1.389

FISCAL YEAR
July 16 – July 15

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AEPC	Alternative Energy Promotion Center
CA	Constituent Assembly
DA	Designated Account
DfID	Department for International Development
DoED	Department of Electricity Development
DoI	Department of Irrigation
DP	Development Partner
DPC	Development Policy Credit
EIRR	Economic Internal Rate of Return
ESMF	Environmental and Social Management Framework
ESSD	Environmental and Social Studies Department
ETFC	Electricity Tariff Fixation Committee
FDI	Foreign Direct Investment
FIRR	Financial Internal Rate of Return
FM	Financial Management
GMR	Grandhi Mallikarjuna Rao
GSEEP	Grid Solar and Energy Efficiency Project
GoN	Government of Nepal
GWh	Gigawatt hour
IA	Implementing Agency
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
IDA	International Development Association
IFC	International Finance Corporation
IKHP	Ikhuwa Khola Hydropower Project
IPP	Independent Power Producer
IUFR	Interim Unaudited Financial Reports
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau
KTP	Kabeli Transmission Project
LRMC	Long-run Marginal Cost
M&E	Monitoring and Evaluation

MCC	Millennium Challenge Corporation
MoE	Ministry of Energy
MoEST	Ministry of Environment, Science and Technology
MoF	Ministry of Finance
NCB	National Competitive Budding
NEA	Nepal Electricity Authority
NIETTP	Nepal India Electricity Transmission and Trade Project
NPR	Nepali Rupee
NWEDC	National Water and Energy Development Company
OAG	Office of the Auditor General
O&M	Operation and Maintenance
OP	Operational Policy
PDAs	Project Development Agreements
PDO	Project Development Objective
PDP	Power Development Project
POL	Petroleum Products
PMU	Project Management Unit
PPA	Power Purchase Agreement
PPIAF	Public Private Infrastructure Advisory Facility
PPP	Public-private Partnership
PSC	Project Steering Committee
PTA	Power Trade Agreement
QCBS	Quality and Cost Based Selection
RFP	Request for Proposal
RoW	Rights-of-Way
SAARC	South Asian Association for Regional Cooperation
SAWI	South Asia Water Initiative
SAWI-P2 MDTF	SAWI Phase 2 Multi-Donor Trust Fund
SESA	Strategic Environmental and Social Assessment
SJVNL	Sutlej Jal Vidyut Nigam Limited
SOE	Statement of Expenditures
TA	Technical assistance
ToR	Terms of Reference
UAHEP	Upper Arun Hydropower Project
USAID	United States Agency for International Development
VAT	Value Added Tax
VDC	Village Development Committee

Regional Vice President:	Annette Dixon
Country Director:	Johannes C.M. Zutt
Country Manager:	Takuya Kamata
Sector Global Practice Director:	Anita Marangoly George
Practice Manager:	Julia Bucknall
Task Team Leader:	Jie Tang

Nepal

Nepal: Power Sector Reform and Sustainable Hydropower Development Project

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PAD DATA SHEET

Nepal

Nepal: Power Sector Reform and Sustainable Hydropower Development Project (P150066)

PROJECT APPRAISAL DOCUMENT

SOUTH ASIA

GEEDR (0000009058)

Report No.: PAD1276

Basic Information			
Project ID: P150066	EA Category: A - Full Assessment		Team Leader: Jie Tang
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [No]		
	Financial Intermediaries [No]		
	Series of Projects [No]		
Project Implementation Start Date 01-July-2015	Project Implementation End Date 31-Dec-2019		
Expected Effectiveness Date 01-Jan-2016	Expected Closing Date 30-June-2020		
Joint IFC Yes	Joint Level Complementary or Interdependent project requiring active coordination		
Practice Manager Julia Bucknall	Senior GP Director Anita M. George	Country Director Johannes C.M. Zutt	Regional Vice President Annette Dixon

Borrower: Government of Nepal			
Responsible Agency: NEA			
Contact:	Mukesh Raj Kafle	Title:	Managing Director
Telephone No.:	977-1-4153007	Email:	neamd@mos.com.np
Responsible Agency: Water and Energy Commission Secretariat			
Contact:	Gajendra Kumar Thakur	Title:	Secretary
Telephone No.:	977-1-4211416	Email:	wecs@mos.com.np

Project Financing Data(in USD Million)					
[ ]	Loan	[ ]	IDA Grant	[ ]	Guarantee
[X]	Credit	[ ]	Grant	[X]	Other

Total Project Cost:	24.0	Total Bank Financing:	20.0
Total Trust Fund	2.5		
Financing Gap:	0.00		

Financing Source	**Amount**
BORROWER/RECIPIENT	1.50
International Development Association (IDA)	20.00
South Asia Water Initiative (SAWI)-P2 MDTF	2.50
Total	24.00

Expected Disbursements – IDA Credit (in USD Million)

Fiscal Year	2016	2017	2018	2019	2020	
Annual	4.00	5.00	5.00	4.00	2.00	
Cumulative	4.00	9.00	14.00	18.00	20.00	

Expected Disbursements – SAWI Trust Fund (in USD Million)

Fiscal Year	2016	2017				
Annual	1.5	1.0				
Cumulative	1.5	2.5				

Institutional Data

Practice Area / Cross Cutting Solution Area

Energy & Extractives

Cross Cutting Areas

[x] Climate Change
[ ] Fragile, Conflict & Violence
[x] Gender
[ ] Jobs
[x] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Energy and mining	Hydropower	50		
Energy and mining	General energy sector	20		
Industry and trade	Other domestic and international trade	15		
Energy and mining	Transmission and Distribution of Electricity	10		

Education	General education sector	5		
Total		100		

☑ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Financial and private sector development	Infrastructure services for private sector development	50
Environment and natural resources management	Environmental policies and institutions	20
Financial and private sector development	Corporate governance	20
Human development	Education for the knowledge economy	5
Social development/gender/inclusion	Gender	5
Total		100

Proposed Development Objective(s)

The project development objectives are to (a) strengthen the capacity of the power sector agencies to plan and prepare hydropower and transmission line projects following international standards and best practices; and (b) improve the readiness of the power sector agencies for regulatory and institutional reforms.

Components

Component Name	**Cost (USD Millions)**
Component A: Preparation of Hydropower and Transmission Line Investment Projects	18.00
Component B: Studies and Preparation for Policy Recommendations and Sector Reform	5.60
Component C: Capacity Building for Safeguard Management and Hydropower Development	0.40

Systematic Operations Risk- Rating Tool (SORT)

Risk Category	**Rating**
1. Political and Governance	High
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial

6. Fiduciary	Substantial
7. Environment and Social	High
8. Stakeholders	Moderate
9. Other	None
OVERALL	Substantial

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ] No [X]
Does the project require any waivers of Bank policies?	Yes [ ] No [X]
Have these been approved by Bank management?	Yes [ ] No [ ]
Is approval for any policy waiver sought from the Board?	Yes [ ] No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X] No [ ]

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	**X**	
Natural Habitats OP/BP 4.04	**X**	
Forests OP/BP 4.36	**X**	
Pest Management OP 4.09		**X**
Physical Cultural Resources OP/BP 4.11	**X**	
Indigenous Peoples OP/BP 4.10	**X**	
Involuntary Resettlement OP/BP 4.12	**X**	
Safety of Dams OP/BP 4.37	**X**	
Projects on International Waterways OP/BP 7.50	**X**	
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants

Name	Recurrent	Due Date	Frequency
Establishment and maintenance of the Project Steering Committee		One (1) month after the Effective Date	

Description of Covenant
Financing Agreement and SAWI-P2 MDTF Grant Agreement, Section I.A.1 of Schedule 2: Recipient to establish and maintain the Project Steering Committee, in a manner acceptable to the Association.

Name	Recurrent	Due Date	Frequency
Establishment and maintenance of the NEA Project Management Unit		One (1) month after the Effective Date	

Description of Covenant Project Agreement, Section I.A.1 of the Schedule: NEA to establish and maintain the NEA Project Management Unit, in a manner acceptable to the Association.			
Name	**Recurrent**	**Due Date**	**Frequency**
Establishment and maintenance of the WECS Project Management Unit		One (1) month after the Effective Date	
Description of Covenant SAWI-P2 MDTF Grant Agreement, Section I.A.2 of Schedule 2: Recipient to establish and maintain the WECS Project Management Unit, in a manner acceptable to the World Bank.			
Name	**Recurrent**	**Due Date**	**Frequency**
Establishment and maintenance of the Dam Safety Panel of Experts		Six (6) months after the Effective Date	
Description of Covenant Project Agreement, Section I.A.2 of the Schedule: NEA to establish and maintain for purposes of implementation of Part 1 of the Project, a dam safety panel of experts, in a manner satisfactory to the Association.			
Name	**Recurrent**	**Due Date**	**Frequency**
Establishment and maintenance of the Environmental and Social Panel of Experts		Six (6) months after the Effective Date	
Description of Covenant Project Agreement, Section I.A.3 of the Schedule: NEA to establish and maintain throughout Project implementation, for purposes of implementation of Part 1 of the Project, an environmental and social panel of experts, in a manner acceptable to the Association.			
Name	**Recurrent**	**Due Date**	**Frequency**
Audited financial statements for NEA and the Project		Six (6) months after the end of each Fiscal Year	
Description of Covenant Project Agreement, Section II.C.3 of the Schedule: NEA to have its financial statements as well as the financial statements for its Respective Parts of the Project audited and to ensure that the audited financial statements are: (a) furnished to the Recipient and the Association; and (b) made publicly available in a timely fashion, in a manner acceptable to the Association.			
Name	**Recurrent**	**Due Date**	**Frequency**
Internal audit reports		Three (3) months after the end of each fiscal trimester	
Description of Covenant Project Agreement, Section II.C.4.(a) of the Schedule: NEA to conduct trimester internal audits of operations, resources and expenditures related to the Project, and to prepare and furnish to the Association the internal audit reports, in form and substance satisfactory to the Association;			
Name	**Recurrent**	**Due Date**	**Frequency**

Report on physical verification and reconciliation of goods procured		Three (3) months after the end of each fiscal trimester	
Description of Covenant Project Agreement, Section II.C.4.(b) of the Schedule: NEA to conduct, as part of the internal audits, physical verification and reconciliation of goods procured in accordance with the Procurement Plan.			
Name	**Recurrent**	**Due Date**	**Frequency**
Reconciliation report of the physical verification and reconciliation		Three (3) months after the end of each fiscal trimester	
Description of Covenant Project Agreement, Section II.C.4.(c) of the Schedule: NEA to prepare and furnish to the Association, as part of the internal audit reports, a reconciliation report of the physical verification and reconciliation conducted, in form and substance satisfactory to the Association			
Name	**Recurrent**	**Due Date**	**Frequency**
Implementation of the Financial Management Improvement Action Plan		September 30, 2016	
Description of Covenant Project Agreement, Section II.C.4.(d) of the Schedule: NEA to carry out all the actions of the Financial Management Improvement Action Plan, in a manner acceptable to the Association			
Name	**Recurrent**	**Due Date**	**Frequency**
Maintenance of financial management system			
Description of Covenant SAWI-P2 MDTF Grant Agreement, Section II.C.1 of Schedule 2: The Recipient to ensure that a financial management system is maintained in accordance with the provisions of Section 2.07 of the Standard Conditions.			
Name	**Recurrent**	**Due Date**	**Frequency**
Interim unaudited financial reports for the Project		Forty-five (45) days after the end of each fiscal trimester	
Description of Covenant SAWI-P2 MDTF Grant Agreement, Section II.C.2 of Schedule 2: The Recipient to ensure that interim unaudited financial reports for the Project are prepared and furnished to the World Bank, in form and substance satisfactory to the World Bank.			
Name	**Recurrent**	**Due Date**	**Frequency**
Each audit of the Financial Statements for the Project		Six (6) months after the end of each Fiscal Year	
Description of Covenant SAWI-P2 MDTF Grant Agreement, Section II.C.3 of Schedule 2: The Recipient to have its Financial Statements for the Project audited and furnished to the World Bank.			
Name	**Recurrent**	**Due Date**	**Frequency**

Internal audit reports		Three (3) months after the end of each fiscal trimester	

Description of Covenant
SAWI-P2 MDTF Grant Agreement, Section II.C.4 of Schedule 2: The Recipient to conduct trimester internal audits of operations, resources and expenditures related to the Project, in a manner acceptable to the World Bank, and furnish to the World Bank the internal audit reports, in form and substance satisfactory to the World Bank.

Name	Recurrent	Due Date	Frequency
Mid-Term Review		September 30, 2017	

Description of Covenant
Project Agreement, Section II.B of the Schedule and SAWI-P2 MDTF Grant Agreement, Section II.B of Schedule 2: NEA and the Recipient to prepare, under terms of reference satisfactory to the Association/World Bank, and furnish to the Association/World Bank a mid-term review report for its Respective Parts of the Project.

Name	Recurrent	Due Date	Frequency
FM Improvement Action Plan		September 30, 2016	

Description of Covenant
Project Agreement, Section II.C. (b) of the Schedule: NEA to carry out all the actions of the Financial Management Improvement Action Plan, in a manner acceptable to the Association.

Conditions

Source of Fund	Name	Type
IDA	Execution of the Subsidiary Agreement	Effectiveness

Description of Condition
Section 5.01(a) of the Financing Agreement: The Subsidiary Agreement has been executed on behalf of the Recipient and NEA.

Source of Fund	Name	Type
IDA	Overdue audited financial statements	Effectiveness

Description of Condition
Section 5.01(b) of the Financing Agreement: NEA has furnished to the Association all overdue audited financial statements for Fiscal Year 2013/2014.

Source of Fund	Name	Type
IDA/SAWI-P2 MDTF	Execution of the SAWI-P2 MDTF Grant Agreement and Financing Agreement	Cross-Effectiveness

Description of Condition
Section 5.01(b) of the Financing Agreement and Section 5.01(b) of the SAWI-P2 MDTF Grant Agreement: The SAWI-P2 MDTF Grant Agreement and the Financing Agreement have been executed and delivered and all conditions precedent to their effectiveness or to the right of the Recipient to make withdrawals under them have been fulfilled.

Team Composition

Bank Staff

Name	Title	Specialization	Unit
Jie Tang	Task Team Leader	Power Sector Policy	SACBN
Rabin Shrestha	Co-Task Team Leader	Systems Planning	GEEDR
William Young	Lead Water Resources Specialist	Water Resources	GWADR
Rajib Upadhya	Senior External Affairs Officer	Ext. Communication	SAREC
Purna Bahadur Chhetri	Sr. Rural Development Specialist	Agriculture	GFADR
Mohan P. Aryal	Operations Officer	Education	GEDDR
Richard B. MacGeorge	Lead Infra. Finance Specialist	Finance	GEEDR
Ashish Rauniar	Operations Officer	Trade & Competiveness	GTCDR
Bhanu Mehrotra	Senior Investment Officer	PPP	CASPS
Pravin Karki	Senior Hydropower Specialist	Hydropower	GEEDR
Sandeep Kohli	Senior Energy Specialist	Energy	GEEDR
Tomoyuki Yamashita	Senior Energy Specialist	Renewable Energy	GEEDR
Chaohua Zhang	Lead Social Specialist	Social Development	GSURR
Jun Zeng	Senior Social Specialist	Social Development	GSURR
Parthapriya Ghosh	Sr. Social Development Specialist	Social Development	GSURR
James Orehmie Monday	Senior Environmental Specialist	Environment	GENDR
Drona Raj Ghimire	Environmental Specialist	Environment	GENDR
Shambhu Prasad Uprety	Senior Procurement Specialist	Procurement	GGODR
Timila Shrestha	Financial Management Specialist	Financial Management	GGODR
Juliana Victor	Senior M & E Specialist	M & E	GPSOS
May Cabilas Olalia	Senior Operations Officer	Operational Services	GPSOS
Giovanni Bo	Counsel	Legal	LEGES
Junxue Chu	Senior Financial Officer	Loan Operations	CTRLN
Satish Kumar Shivakumar	Financial Officer	Loan Operations	CTRLN
Roshan D. Bajracharya	Senior Economist	Economics	GMFDR
Annu Rajbhandari	Consultant	Environment	GENDR
Leanne Farrell	Consultant	Environment	GENDR
Barsha Pandey	Consultant	Energy	GEEDR
Ashish Shrestha	Consultant	Energy	GEEDR
Gunjan Gautam	Consultant	Energy	GEEDR
Gregory Scopelitis	Infrastructure Finance Specialist	Energy	GEEDR
Zhiyun Jiang	Junior Professional Associate	Environment	GENDR
Shaukat Javed	Program Assistant	Program Assistant	GEEDR
Sunita Gurung	Program Assistant	Program Assistant	SACNP

Non Bank Staff		
Name	**Title**	**City**

Locations					
Country	**First Administrative Division**	**Location**	**Planned**	**Actual**	**Comments**
Nepal					

I. Strategic Context

A. Country Context

1. Nepal is a land-locked country that is facing major development challenges. With 27.8 million people, Nepal had a per capita income of US$730 in year 2013. Of the population, 25.2 percent live on less than US$1.25 per day and 82 percent live in rural areas. Nepal has made remarkable progress in poverty reduction and human development. Nepal attained the first Millennium Development Goal to halve extreme poverty, ahead of time. Poverty reduction accelerated sharply from 1.5 percentage points per year over 1996-2004 to 2.5 percentage points over 2004-2011. In 2014, out of 187 countries Nepal ranked 145 on the Human Development Index as compared to 157 in 2011. In addition, Nepal has achieved gender parity in education and sharp reductions in infant and maternal mortality. To maintain the momentum, Nepal will need to exploit its demographic opportunity, helping its reasonably educated youth to raise agriculture productivity and incomes and transition to non-farm employment in the urban areas.

2. Nepal's Constituent Assembly (CA), the second since 2008, is approaching the final leg of finalizing a new constitution. Momentum picked up following the signing of an agreement between the largest political parties in June 2015 in the aftermath of the devastating earthquake sequence in April and May 2015. Among the last remaining issues the CA is grappling with the demarcation of provinces in the future federal set-up. Once a new constitution is promulgated the CA will convert into a regular Parliament for the remaining two years of its tenure.

3. Economic growth rate reached over 5.0 percent in FY14, slightly above the 4.7 percent achieved on average over 2008-2012. This slowdown had been resulted from reduced public spending, particularly for infrastructure; low levels of private investment, due to power outages, labor issues, policy inconsistency, and political uncertainty; and a disappointing monsoon and depressed agricultural growth. Going forward and in the absence of new endogenous sources of growth, economic activity will remain dependent on consumption (supported by remittances) and on weather conditions and external developments.

4. Endowed with rich hydropower resources, Nepal views hydropower development as the key opportunity for economic growth and human development, as was clearly evident from the recent consultations with people at different levels of society at various places across Nepal. While benefits from hydropower development, off-grid small and on-grid large hydro schemes, are expected in accessing modern energy services, generating revenues, creating jobs, spurring economic growth and improving quality of living, the macroeconomic impacts of large scale hydropower investments are yet to be clearly understood.

5. Foreign direct investment (FDI) is low (0.2 percent of gross domestic product (GDP) in FY14). The recently signed Project Development Agreement (PDA) for development of large scale hydropower projects and Power Trade Agreement (PTA) with India are expected to provide the much-needed boost in perception that the investment climate in Nepal is changing for better. FDI inflow is expected to substantially increase from these signed agreements run-up to implementation and during implementation compared to the current FDI inflow situation. The impact on the Balance of Payment in the short term can be managed (FY14 Balance of Payment reserve: US$1.23 billion), if net transfer inflow continues at the current level and substantial part of FDI inflow covers the convertible currency cost of import project cost. To get a better handle of FDI inflow on macro aggregates, an assessment study has been initiated.

B. Sectoral and Institutional Context

6. **Natural resources available in Nepal for power generation.** Nepal's hydropower potential is estimated at about 84,000 MW theoretically and 43,000 MW economically viable. Average solar radiation varies from 3.6 to 6.2 kWh/m^2 per day and there is an average of 300 days of sunshine a year. The commercial potential of solar power for grid connection is about 2,100 MW[1]. There are potential sites for wind power generation and a Bank-supported wind resource mapping is under way. Potentials of fossil fuel resources are limited and the country fully relies on import of petroleum products (POLs) and liquefied petroleum gas to meet domestic energy needs for transportation and cooking. Hydropower remains the least-cost option for power generation to meet domestic demand and has the potential to make Nepal a battery of the South Asia region.

7. **Reserve balance sufficient to cover one year equivalent of import capacity.** POL imports in FY14 was US$ 1.34 billion, with a 10 percent increase from FY13 in U.S. dollar terms. Average annual exports earning's coverage of POL import is 70 percent (68 percent in FY 14) of total POL imports–insufficient to cover POL import bill. With positive net transfers (remittance at 28 percent of GDP in FY14), the year-end reserve coverage was equivalent to 11.5 months of merchandise import capacity. With low thermal power installed capacity (53.4 MW) and factoring in reported captive generators as a means of power generation during grid power outage, the total demand of POL to generate power is not large and not in the scale of the use of POL for transportation.

8. **Access to electricity services.** According to the national census, about 75 percent of the population in Nepal is estimated to have connections to grid (about 50 percent) and off-grid (about 25 percent) electricity. Although off-grid connections provide relatively reliable electricity supply in the rural areas, access to the grid in rural and urban areas does not necessarily mean access to electricity due to continuing load shedding (see section 9). Lack of access to reliable grid-supplied electricity is one of the key obstacles to lifting the remaining people below the poverty line out of poverty. While Nepal has achieved remarkable progress in off-grid electrification, coordination with grid extension needs to be enhanced through planning future rural electrification to avoid stranded off-grid assets when the grid is extended to the off-grid areas.

9. **Energy crisis as a major constraint to growth.** The electricity supply and demand gap was about 410 MW in November 2013, when peak demand reached 1,201 MW, resulting in load shedding of up to 14 hours a day. The lack of grid-supplied electricity is a major barrier for Nepal to expand access to quality electricity services, improve living standards, raise agriculture productivity and incomes, and help its youth transit from farming to non-farm employment. Commercial and industrials consumers run captive generators using expensive imported diesel fuel at a very high cost, ranging from US$0.35 to US$1.20 per kWh. This high cost has severely weakened their productivity, competitiveness and ability to expand. Moreover, the lack of job opportunities has pushed more than 5 million Nepali laborers to work overseas. Agriculture is the major sector contributing to the GDP, but raising productivity through irrigation is also constrained by the lack of electricity. While the energy sector has the potential to become a major source of income and to bring Nepal to middle-income status, the sector currently relies on government subsidies to survive since the price charged to consumers for electricity and imported fuel consumption does not cover the high cost incurred due to inefficiency of the sector. Subsidies to the energy sector have become a major drain on scarce public resources.

[1]Solar and Wind Energy Resource Assessment in Nepal, July 2008, the United Nations Environment Program and Global Environment Facility.

10. **Key barriers for power sector development**. To increase electricity supply, improve the power sector performance, and develop Nepal's huge hydropower potential for earning export revenues, Nepal is facing major challenges, as described in the following paragraphs:

11. *Protracted political transition and lack of consensus among political parties*. Political instability in the country is one of the most significant barriers to further investment, particularly by international investors and financial institutions. There is a broad consensus among stakeholders in the Nepalese power sector that political instability is endemic and an important factor in explaining failures to develop the country's hydropower potential. That said, consensus-building among political parties around hydropower development has seen remarkable progress in recent years. In a positive gesture of solidarity, top leaders of seven political parties signed a joint statement of their commitment to development of the country's hydropower on April 9, 2013, recognizing the need to improve hydropower license management, support hydropower export, ensure environmental sustainability, share benefits with the local people, and not hinder hydropower project works. This general consensus at the top-level of parties is needed to filter down to implementation levels, and Technical Assistance (TA) is needed to agree on a master plan for locations, sizes and functions of potential hydropower projects and sequence of development.

12. *Lack of legal* and *regulatory framework.* While successive governments in Nepal have expressed a commitment to attract private sector investment to develop hydropower potential given the scarcity of public resources, progress in an establishing enabling environment for private investments has also been limited. Attracting and retaining private investment requires mechanisms for sharing risks, the provision of common infrastructure such as transmission corridors and roads, streamlined procedures, regulatory improvements, and structural reforms. The new Electricity Act and Nepal Electricity Regulatory Commission Act drafted in 2005 are yet to be revised and enacted by the Parliament. Given the mixed role of the Nepal Electricity Authority (NEA) under the vertically integrated structure there is a need to restructure the NEA's generation, transmission and distribution businesses and functions and to establish independent sector regulation to oversee planning, pricing, and system dispatch so that independent power producers (IPPs) operate on a level playing field.

13. *Inefficiency, price distortion and poor creditworthiness.* The NEA is heavily in debt and has suffered net losses over past years, due to high costs and system losses (24.8 percent in 2013/14) as well as insufficient increases in retail tariffs, among other factors. As a result, the NEA is unable to serve its debts or generate the financing required to invest in power system infrastructure. The Government of Nepal (GoN) has been providing budget support to the NEA that has helped to maintain its operations and so far there has been no default on payment against the Power Purchase Agreement (PPA). To date, the NEA has signed take-or-pay PPAs for more than 1,700 MW of hydropower projects that are denominated, partially or fully, in U.S. dollars for projects with foreign financing. While all the NEA's revenues are in local currency, it has been paying some IPPs in U.S. dollars and recently GoN has decided to on-lend foreign loan to the NEA in U.S. dollars. This obligation to take foreign exchange risks and uncertainties about the sales of the surplus electricity after 2017/18 may put the NEA under an increasing financial risk to meet its obligations in the near future. The NEA's poor creditworthiness is one of the major difficulties for IPPs in raising project financing against PPAs. To improve the NEA's financial performance, there are urgent needs to lower high distribution losses to an acceptable level, reform the NEA's retail tariff to ensure cost recovery, including a mechanism for foreign exchange risk management, and put in place a trading mechanism to sell surplus electricity to neighboring countries.

14. *Lack of proper country risk mitigation and high risk of implementation delays due to land and forestry management issues*. Due to competing uses of scarce public resources, the GoN has opened hydropower generation to private investment since 1993, and in total 13,000 MW have been licensed to IPPs. Nonetheless, the NEA has completed only 70 MW of hydropower capacity while IPPs have added 140 MW since 2002. Most of the IPPs are struggling to raise financing due to inability to arrange adequate equity and weak credit worthiness of NEA as the off taker, as well as other risks such as foreign exchange risk and political and country risks that impede the bankability of hydropower projects in Nepal. Disputes on compensation for transmission rights-of-way (RoW) due to lack of clear policies and procedures for RoW compensation and benefit-sharing, and prolonged processes for forestry clearance for transmission lines, have contributed to unacceptable delays in transmission line construction. For example, a 78 km 220 kV transmission line of strategic importance for the national grid, approved by the Bank in 2002, has not yet been completed and another donor-funded transmission line could not be completed due to RoW disputes, making the project a stranded asset. Uncertainties in planning, financing and completing transmission line construction thus pose another challenge for hydropower development.

15. *Lack of power system master planning to guide investments.* There has been no master planning initiative in transmission, distribution and generation since 2004/05. The issuance of survey and generation licenses are not strictly issued according to overall power system development plan. Lack of coordination among generation, transmission, and distribution projects in the absence of a power system master plan pose huge risks and challenges for investments in the power sector. For hydropower development, there is an urgent need for planning on a basin-wide approach so that hydropower licenses can be issued in a systematic manner that would guide the development process and investments, and ensure environmental and social sustainability.

16. *Export market challenges for Nepal's huge hydropower potential.* In Nepal, domestic demand will reach about 2,000 MW by 2020 and 4,500 MW by 2030, as estimated by the NEA. With about 1,400 MW from run-of-river hydropower plants (under construction) to be added to the NEA grid by 2017/18, the supply gap during in the winter will be narrowed while there will be surplus electricity during the summer. The natural market for this surplus electricity is the neighboring India, but it was not until October 2014 that the long-awaited PTA between India and Nepal was signed. A few other important steps were also recently taken: in particular, PDAs for the large-scale export-oriented hydropower projects, Upper Karnali (900 MW) and Arun III (900 MW), were signed in September 2014 and November 2014 respectively. Given the promising progress in PDA negotiations with other large-scale export-oriented hydropower projects managed by the Investment Board of Nepal (IBN), totaling 1,350 MW, there is an urgent need for Nepal to: (a) set up its regulatory and institutional arrangement for power trading with India to manage its power shortage in winter time and surplus in summer time; and (b) establish high-voltage cross-border transmission lines to enable power flows both ways. The first 400 kV cross-border transmission line to India is under construction with contractual commissioning date in September 2015.

17. *Weak technical capacity in preparation of large-sized hydropower and transmission line projects.* Local capacity is yet to be developed for preparation of large-sized hydropower projects and transmission lines and substations with voltages higher than 220 kV, including feasibility study and design, bidding documents, environmental and social impact assessment (ESIA), and mitigation in a strategic and cumulative basin-wide approach. A lack of adequate number of projects prepared in line with international standards is also one of the major barriers in catalyzing expected foreign investment and financing. Inadequate capacity within public agencies has

generated long delays in the review and approval process when the technical preparation work is submitted from private developers.

18. *Other factors that hindered the hydropower development in Nepal*:

(a) Lack of timely implementation of power sector objectives, strategies and action plans;
(b) The institutional framework with overlapping and unclear mandates and authority, which prevents a streamlined decision and planning process;
(c) Weak management in hydropower licensing and the need of transition from a developer driven approach to an open, transparent and efficient licensing process based on basin-wide hydropower development planning;
(d) Weak institutional capacity in Nepal to develop and enforce appropriate environmental and social policies and regulation related to hydropower development;
(e) The potential for politicization of hydropower projects by local, regional and national interest groups, particularly in the on-going debate of federalism; and
(f) Lack of coordinated planning for expanding access to electricity through grid extension and off-grid renewable technologies.

19. **Government short-, medium-, and long-term strategies and actions.** While the GoN has been continuously promoting off-grid renewable energy development to expand access to energy services in rural areas, it is re-shaping and implementing a strategy for grid-side solutions to deal with the energy crisis in urban areas and, eventually, achieve the long-term power sector objectives. The strategy and actions are to (a) reduce load shedding in the short term, through rehabilitation of existing hydropower plants to increase supply, rehabilitation of distribution network to reduce system losses, adding generation capacity that can be quickly installed (25 MWp grid-connected solar farm), promotion of private investments through incentives in the form of tax exemption, subsidies and reimbursements, issuing tax policy to support roof-top solar in urban areas, and launching a power sector reform to address key sector issues; (b) expand access to grid electricity services and reach supply-demand balance in the medium term, through grid extension, and commissioning of hydropower under construction (about 1,500 MW), including the Upper Tamakoshi (456 MW), and the first 400 kV cross-border transmission line for power import from India (up to 1,000 MW); and (c) ensure universal access to sustainable, reliable and affordable electricity supply in Nepal and generate export revenues to sustain economic growth in the long term, through development of its rich hydropower potentials and integration into the South Asia regional power market.

20. **Regional and GoN commitment to power sector development.** The signing of the PDAs of export-oriented Upper Karnali and Arun III projects and a paradigm shift in regional cooperation with signing of the PTA between Nepal and India shows strong commitment from the GoN to expedite the development of hydropower sector. This commitment was further reinforced on multilateral basis through the South Asian Association for Regional Cooperation (SAARC) Framework Agreement on Cooperation in energy which was signed by all SAARC countries.

21. **Rationale for World Bank Group support.** In line with the GoN objectives and strategy for the power sector, the World Bank Group has both (a) on-going projects supporting the immediate needs of increasing power supply through grid and off-grid solutions; and (b) a planned Hydropower Transformational Engagement Program (see Table 1) to address key power sector challenges at the sector level, and to facilitate financing and implementation at the project level:

a) *Sector level.* The Bank is considering to support, through a series of Development Policy Credit (DPC) operations, GoN's policy and reform actions to address key sector issues, in

a phased approach. The proposed project will prepare and prioritize recommendations of policy and reform actions, and strengthen capacity of sector institutions.

b) *Project level.* The Bank will support preparation of priority projects in line with international standards, to facilitate both public and private investments.

Table 1: Bank Support and Transformational Hydropower Engagement Program

GoN Strategy	Bank Support
Short Term Reduce the load shedding	**Expand access to energy and improve grid electricity supply and efficiency** • Off-grid: micro hydro, solar home systems, biogas; improved cook stoves • Generation: Kali Gandaki A Hydropower Rehabilitation(144MW); Grid Solar (25MW) • Transmission: critical cross-border and domestic high voltage transmission lines • Distribution: NEA distribution system loss reduction, rehabilitation and expansion **Prepare Rural Electrification Master Plan and Power System Expansion Master Plan** • River basin planning in an Integrated Water Resources Management approach • Generation, transmission and distribution master plans • Rural electrification master plan **Prepare the Transformational Engagement Program for long-term sustainability** • Prepare policy and reform actions and enhance capacity through the proposed project • Prepare critical hydropower and transmission project to solicit investment • Prepare a renewable energy policy to guide off-grid planning and interventions
Medium Term Expand access to modern energy services; reach supply-demand balance	**Improve supply, transmission and distribution, and expand access to electricity** • Import power from India: up to 500 MW • Expand the east-west backbone 220/400 kV transmission lines • Rehabilitate/expand distribution system • Commission 1,077 MW hydropower - by IPPs/NEA **Implement the Transformational Engagement Program for long-term sustainability** • *Sector level:* DPC series to support policy and reform actions • *Project Level:* Prepare projects and facilitate investments o Completion of Kabeli A Hydroelectric Project (KAHEP) (37.6 MW) o Commence large hydropower (about 4000 MW hydropower) o Commence new domestic and cross-border high-voltage transmission lines o Continue rural electrification to expand access to electricity (grid and off-grid)
Long Term Ensure reliable, affordable and sustainable supply to domestic demand, and make revenues from hydro export	**Establish an efficient and sustainable power sector, and achieve GoN objectives** • Universal access to reliable and affordable electricity services in Nepal • More than 5,000 MW operational, through adding around 4000 MW into the system • Robust domestic transmission and distribution system to deliver electricity to demands • Sustainable water resource management and hydropower development • Sufficient cross-border transmission capacity operational for power import/export • Efficient sector institutions, at benchmark efficiency in energy service delivery • A financially robust power sector • Full integration into South Asia regional power market

c) *Linkage between the proposed project and the follow-on DPC*. The proposed project will prepare recommendations of policy and reform actions, and help the GoN systematically address challenges faced in hydropower and power sector development. This will also inform the preparation of the envisioned DPC operation.

d) *Macroeconomic implications.* A separate Bank-supported study on macroeconomic impacts of the large hydropower program envisaged in Nepal is going on in parallel.

22. **Other Development Partners' support to energy sector development.** The Bank is working jointly with the development partners (DPs) on transformation of the energy sector of Nepal, to develop off-grid renewable energy for expansion of access to electricity in rural areas and develop its hydro potentials to meet domestic demand and enhance regional integration. Together with Asian Development Bank (ADB), the Department for International Development (DfID), and the Norwegian Government, the Bank has supported Alternative Energy Promotion Center (AEPC) in the development of off-grid solutions through micro and small hydro, solar home systems, biogas, waste to energy and improved cook stoves to meet the energy needs of rural people. The Bank and DfID jointly supported the IBN in review of the four export-oriented large hydropower projects and negotiation of PDAs, with the major outcome of PDAs signed for two of the four large hydropower projects in November 2014. The Bank, ADB and DfID jointly supported the policy dialogue and capacity building for regional integration, with the major outcomes of the PTA signed between India and Nepal. The Bank and ADB are jointly supporting the rural electrification master planning, and development of a power trading strategy, and are coordinating with the Millennium Challenge Corporation (MCC) and the United States Agency for International Development (USAID) to support sector regulations.

23. For concept design of the proposed project, the Bank conducted several rounds of communication and consultation with all the donors respectively, and a joint workshop was held in early 2014 with all these DPs and relevant government institutions. There is a consensus among all the stakeholders that the power sector reform and sector regulation as well as basin-wide planning for optimal hydropower development are needed.

24. **Institutions.** For policy formulation, planning, implementation and regulation of the energy sector, the Ministry of Energy (MoE) is the apex energy agency responsible for sector policy formulation and regulation, oversight of planning, investment, and development of the power sector, as well as issuing of licenses for electricity generation, including hydropower up to 500 MW, transmission, and distribution. The IBN, Department of Electricity Development (DoED), Water and Energy Commission Secretariat (WECS), Electricity Tariff Fixation Committee (ETFC), NEA and AEPC are other agencies in the power sector. In addition, the National Planning Commission provides policy guidance to these agencies. However, these agencies sometimes have overlapping functions, unclear mandates or multiple roles (see annex 7).

C. Higher Level Objectives to which the Project Contributes

25. The proposed project is consistent with the joint IDA/IFC/MIGA Country Partnership Strategy for Nepal (FY14-18) dated May 1, 2014 (Report No. 83148-NP), which stresses the importance of increased supply of electricity and improved access to reliable and affordable electricity to boost economic growth and competitiveness.

26. The project is also consistent with the GoN's strategy to meet the domestic demand in the medium and long terms, generate export revenues through development of hydropower resources and ensure long-term sustainability of the energy sector.

II. Project Development Objectives

A. PDO

27. The project development objectives (PDOs) are to (a) strengthen the capacity of the power sector agencies to plan and prepare hydropower and transmission line projects following

international standards and best practices, and (b) improve the readiness of the power sector agencies for regulatory and institutional reforms.

B. Project Beneficiaries

28. The Project beneficiary are NEA and GoN agencies which will benefit from preparation of hydropower and transmission projects, creation of a conducive environment for promotion of hydropower and water resources development in a sustainable way, and improvement of institutional capacity for power sector policy making.

C. PDO Level Results Indicators

29. Key results indicators to monitor and measure achievements include the following:

(a) Capacity of hydro power projects prepared (MW)
(b) Length of transmission line projects prepared (km)
(c) Number of key sector policy and reform proposals validated and endorsed at the institutional level by the MoE, NEA, Ministry of Environment, Science and Technology (MoEST), and WECS (number)

III. Project Description

A. Project Components

30. **Component A: Preparation of Hydropower and Transmission Line Investment Projects**. It will support preparation of two hydropower projects, Upper Arun Hydropower Project (UAHEP) (335 MW) and Ikhuwa Khola Hydropower Project (IKHP) (30 MW), as proposed by the GoN, and priority high voltage transmission line projects to be identified by the on-going Transmission System Master Planning supported under the on-going Nepal India Electricity Transmission and Trade Project (NIETTP), in line with international standards and the Bank's safeguard policies. Specifically, it will finance (a) the preparation of the UAHEP and the IKHP, including detailed engineering designs and bid documents, ESIA including a cumulative impact assessment (CIA) and mitigation studies, and the hiring of a dam safety panel of experts and an environmental and social panel of experts; and (b) the undertaking of a feasibility study and the preparation of basic design, route survey, ESIA, and bid documents for the transmission line projects to be identified.

31. **Component B: Studies and Preparation for Policy Recommendations and Sector Reform.** It will address critical power sector issues**.** It will support preparation, prioritization, and sequencing of recommendations for policy and reform actions, and build consensus and capacity. It will support preparation of (a) river basin planning with an integrated water resource management (IWRM) approach for selected river basins; (b) recommendations for improvement of water resources management and regulations, including updating of the Water Resource Act and capacity building of the WECS; (c) Power System Expansion Plan, including preparation of a Hydropower Generation Master Plan; (d) establishment and operationalization of a power trading company; and (e) the NEA business restructuring for improved management and efficiency, including provision of computerized management tools and installations of smart meters to enhance the distribution business management, and conducting asset evaluation. See annex 2 for other TA activities under projects supported by the Bank and DPs, which will also provide critical inputs to the preparation of policy and sector reform actions for the energy sector.

32. **Component C: Capacity Building for Safeguard Management and Hydropower Development**. It will support improvement of the environmental and social safeguard

management system in Nepal and associated capacity building. It will support the following activities:

(a) Conducting a Strategic Environmental and Social Assessment (SESA) as part of the integrated river basin planning under Component B;
(b) Preparing recommendations for environmental and social guidelines for hydropower development;
(c) Safeguard capacity building for management of transmission line RoW issues; and
(d) Project management.

B. Project Cost and Financing

33. The financing plan for the estimated project cost of US$ 24.00 million includes: (a) IDA financing of US$ 20.0 million in credit; (b) South Asia Water Initiative (SAWI) Phase 2 Multi-Donor Trust Fund (SAWI-P2 MDTF)[2] of US$ 2.5 million in grant; and (c) the NEA counterpart funding of US$ 1.5 million. See annex 2 for details.

C. Lessons Learned and Reflected in the Project Design

34. Lessons and experiences from both donor-funded projects and TA for capacity building in Nepal and power sector reforms in other countries were considered in the design of the project.

35. **Importance of broad-based consensus for institutional change**. Consultations and active engagement with all key stakeholders are critical to ensure broad-based consensus and successful preparation and implementation of policy and reform recommendations. For preparation of the proposed project, extensive consultations were carried out with political party leaders, GoN agencies, news media, DPs, private developers, academia, and policy makers. Furthermore, a two-day "Power Sector Policy and Reform Consultation Workshop" was organized by the Bank in July 2014, with over 40 participants, to consolidate the design of the proposed project (minutes available in the project files). Taking stock of the studies and proposed reforms of the past, the proposed project will systematically conclude and sequence key reform recommendations and engage stakeholders throughout the project implementation.

36. **Ensuring coordination between different government agencies**. Close coordination among government agencies involved in water resources management and hydropower development is critical to ensure development of large hydropower and associated road and transmission infrastructures. Similarly, coordination is essential for preparing and building consensus on key policy and reform recommendations. The July 2014 workshop also highlighted the importance of coordination and ensuring continuity of project management throughout project implementation. To ensure such coordination and continuity, it has been agreed that GoN will form for the proposed project a Project Steering Committee (PSC) chaired by the Energy Secretary and comprising representatives from the Ministry of Finance (MoF), DoED, WECS, IBN, NEA, ETFC, and AEPC.

37. **Ensuring implementation of key policy and reform actions.** Political will and strong leadership are critical for implementation of policy and reform actions. Support to consensus building among political parties has been an important part of the Bank's engagement in the power sector. Besides commitment from the major political parties, agreement on setting up of the PSC for the proposed project, and open discussions on and expressed interests in institutional reforms in the power sector are key indicators of support at the highest levels. Continued engagement with

[2] The SAWI-P2 MDTF for the Project is expected to be closed on June 30, 2017.

top-level political party leaders and GoN authorities and Bank support of the planned DPC operation will be critical to implement key policy and reform actions.

38. **Ensuring coordination among development partners.** Since various DPs are involved in the power sector in Nepal, harmonized voices and coordinated efforts are critical to ensure smooth preparation and implementation of policy and reform actions. There was extensive coordination among DPs and GoN agencies at the early stages of concept development for the project. This coordination will continue throughout the preparation and implementation. There has been interest from DPs in co-financing the envisaged DPC operation.

39. ***Procurement management.*** Inadequate capacity of GoN agencies in procurement management has caused delays in contracting under various Bank-funded projects. Support from the Bank in preparing procurement documents and starting the procurement work early will help avoid delays in procurement. Procurement of major contracts have been initiated by the NEA and WECS. Procurement training/workshops have also been provided to the staffs of these two Implementing Agencies (IAs), and further training and support in procurement management will be provided to the Project Management Unit (PMU) to be established under the IAs.

40. ***Safeguards.*** Some of the lessons learnt from Bank-supported projects in the energy sector are the need for robust environmental and social assessment processes including proactive stakeholder engagement, timely disclosure of project-related documents, dissemination of correct information, regular/continuous consultations, and effective grievance redressal mechanisms. The key elements of Component C aim to directly addressing some of these lessons by strengthening the GoN capacity and systems for strong environmental and social management across the hydropower sector. In addition, the environmental and social assessment processes for the priority projects under Component A will be based on these lessons and follow global good practices.

IV. Implementation

A. Institutional and Implementation Arrangements

41. An inter-agency PSC will be established to ensure coordination among various government agencies. The project will also strengthen the project implementation capacity of the PMUs.

42. **Project Steering Committee.** The MoF, MoE, DoED, NEA, WECS, ETFC, IBN and academic institutions will be fully involved through a PSC to be chaired by the Energy Secretary. The role of the PSC will be to oversee and coordinate the PMUs in formulating the various policy and reform recommendations under Components B and C of the project.

43. **Project Implementation Agencies.** The two IAs for implementation of the project are:

(a) The NEA, for implementation of Components A and B (c), (d), and (e); and
(b) The WECS, for implementation of Components B (a) and (b), and C.

44. Each IA will set up a PMU consisting of a full or part time project manager, a financial management (FM) specialist and a procurement specialist, supported by technical staffs of the IAs.

45. **Funds Flows.** The IDA credit will be on-lent to the NEA by the MoF through a subsidiary agreement under terms and conditions approved to the Bank, and the SAWI Grant will be provided directly to the WECS, for implementation of the project activities.

B. Results Monitoring and Evaluation

46. The IAs are responsible for regular monitoring and reporting of the progress and results during project implementation. The IAs will prepare project progress reports on a trimester basis, and annual reports covering: (a) status and issues; (b) disbursement and financial statements; (c) status of key performance indicators and intermediate result indicators; and (d) updated implementation schedule. The NEA will prepare and submit to the GoN, no later than three months after the closing date, the relevant information necessary for the preparation of the project completion report to be provided to the Bank within three months of the closing date. The Bank will also conduct regular implementation support missions, including reviews and monitoring of project progress and results, on a semi-annual basis, and a mid-term review of the project by September 30, 2017.

C. Sustainability

47. **Technical.** Preparation of investment projects, river-basin planning and power system expansion planning, and environmental and social safeguards will use international practices and standards and follow the Bank's safeguard policies to ensure technical sustainability. Preparation of recommendations of policy and reform actions will be based on review of various existing studies and recommendations, additional studies to fill in gaps, communication with local stakeholders and DPs, coordination across government agencies, and reference to international experiences, lessons and local context, for contextualized recommendations appropriate for Nepal. A challenge for the project will be to ensure consensus and acceptability of the policy and reform recommendations within the political parties, government agencies, DPs, other stakeholders, and the public at large. This will be mitigated with a communications strategy to drive continuous consultations and communications at different levels with all these key stakeholders. The technical sustainability is considered high.

48. ***Financial.*** The proposed project is to help GoN agencies manage water resources in a sustainable manner, improve sector performance and ensure financial sustainability. The hydropower projects proposed for preparation are deemed to be the least cost options for augmenting generation capacity to supply demand in the medium and long terms. The preparation work will include detailed financial analysis to justify future investments. The preparation of recommendations for policy and reform actions will aim to create an enabling environment to ensure financial sustainability of both public and private investments as well as the power sector. For these reasons, the project financial vulnerability is considered to be moderate.

II. Key Risks

A. Overall Risk Rating Explanation

49. The overall implementation risk is Substantial. The project risks were identified based on the limited implementation capacity of the WECS and NEA. Risk mitigation measures were identified based on lessons learned from the previous/on-going donor funded energy projects, the successful experiences in other countries to address similar governance specific issues in the power sector, and consultations with DPs, local and national concerned groups and experts. The key mitigation measures are discussed in the following paragraphs:

50. **Political and governance risk.** The CA was reinstated following the election in order to promulgate a new constitution. With uncertainty regarding political and governance systems and high degree of instability during this transitional period, the objective of ensuring readiness for

improving policy, legal and regulatory framework for sustainable water resource management and hydropower development could be affected. The risk is rated high.

- **Mitigation measures.** The Bank has developed close relation with the main stakeholders of the power sector and welcomed the convergence of the main political parties towards a common commitment to water resource management and hydropower development. In addition, there is strong commitment from the MoE to institute a steering committee for coordination and building consensus among government agencies. The Bank is also deeply involved to promote growth, employment, and economic stability and contribute to poverty alleviation in Nepal.

51. **Macroeconomic risk.** The potential high volumes of investment in the sector followed by electricity trade and impact of future employment may crowd out other sectors. This might affect the revenue and the balance of payment across sectors. The risk is rated substantial.

- **Mitigation measures.** The Bank is carrying out a parallel study to address these issues. The study will focus on economic impact of increased electricity generation and trade and associated fiscal management and policy implications. The study will also identify the mitigation strategies to reduce the potential macroeconomic impacts.

52. **Sector strategies and policies risks.** The risk from poor implementation of sector strategies and policies is substantial. Key proposed policies in the sectors are still weak and needs to consider recent developments, for holistic planning, financial sustainability and regional integration.

- **Mitigation Measures.** The energy sector is preparing for major changes to enhance its regulation and financial, environmental, and social sustainability with the support of this project. The project size remains small compared to the capacity of the IAs and is not at risk to the sustainability of the sector.

53. **Institutional capacity for implementation and sustainability risk.** With respect to the PDO, engagement with several government agencies as well as DPs directly or indirectly is a necessity. The IAs have some in-house capacity but will require substantial support from external consultants especially for the technical studies. The risk is rated substantial.

- **Mitigation measures.** The project will include capacity building. Some of the government agencies are already receiving capacity building in related activities through other projects. The project envisions hiring of independent consulting firms for preparing detailed engineering design studies and ESIA for hydropower and transmission line projects to be identified and supporting the WECS and NEA with international and local experts as required for advisory services and capacity building.

54. **Fiduciary.** The IAs' capacity especially in FM and procurement is weak and could substantially affect achievement of the PDOs. Review of a previous NEA implemented project by the Integrity Vice Presidency has brought to light specific weakness in NEA project management and contract management processes. In this case, a number of distribution transformer procured and delivered to the NEA were found to have aluminum windings instead of copper windings as specified in the supply contract. It is certainly a violation of the contract conditions due to poor management of contract execution. The NEA had asked and the supplier had agreed to replace all the transformers delivered with new transformers of copper windings. To date only 55 out of 735 transformers supplied have been replaced. Given the slow replacement progress, the NEA has initiated an arbitration process and the arbitrators have been appointed and the first claim submitted

is under review. Similarly, inadequate institutional capacity at the WECS to adhere to the Bank's fiduciary requirements may adversely affect project implementation. Fiduciary risk is substantial.

- **Mitigation measures.** The PMUs in the IAs will be provided with training and software, as needed, and guidance to mitigate the fiduciary risk by implementing FM and procurement practices satisfactory to the Bank. The FM and procurement practices at IAs will be periodically assessed as part of regular monitoring. The project FM arrangements with enhanced controls, with a dedicated finance officer and a finance assistant assigned to the project ensuring compliance of IAs policies and procedures, will be adopted to mitigate the identified risks. As part of its internal audits, the NEA will conduct physical verification and reconciliation of goods procured in accordance with the Procurement Plan.

55. **Environmental and social risk.** While the project itself will not finance any physical construction activities, the specific hydropower and transmission line investments to be prepared under Component A may pose diverse, complex and significant impacts and risks to the environment and local communities once construction begins. Development of Nepal's hydropower potential is also a socially contentious matter and has attracted the interest and scrutiny of numerous stakeholder groups at both national and international levels. The environmental and social risk is high,

- **Mitigation measures.** The preparatory studies for each investment will therefore include robust environmental and social assessment and management planning processes in full conformance with the Bank's safeguard policies and international good practices, including stakeholder engagement and consultation. Independent panels of experts will also be retained to advise the NEA on the environmental, social and dam safety aspects of the proposed investments. The Bank will furthermore carefully monitor and provide technical guidance throughout the study period.

V. Appraisal Summary

A. Technical

56. For preparation of investment projects under the project, competent firms will be selected to support the NEA in preparing detailed technical design and associated bidding documents, and environment and social impacts assessment and mitigation, following international standards and the Bank's safeguard policies. The project will lay the critical foundations for reform in the sector that will lead to sustainable hydropower development. Reform recommendations and plans proposed will be based on analysis, with reference to lessons and experiences outside Nepal and the Nepalese context and broad consensus with key stakeholders.

B. Economic and Financial Analysis

57. **Economic analysi**s. With valuation of the project's net benefits based on an estimate of long-run marginal cost (LRMC) of electricity and electricity import substitution, the economic internal rate of return (EIRR) of the UAHEP is found to be 28 percent and 33 percent respectively. In case of the IKHP, the economic analysis is part of the detailed feasibility study, which assessed five options based on design discharge calculated using percentile exceedance of probability flow from Q35 to Q70. All options show a benefit-cost ratio of more than 1.0 and EIRR of more than 10 percent. The analysis shows that IKHP is economically viable for all capacity options, but is optimized for the installed capacity of 30.17 MW at 40 percent probability of exceedance of flow, with an EIRR of 18.5 percent.

58. **Financial analysis**. The financial analysis shows that the UAHEP yield a financial internal rate of return (FIRR) of 19.11 percent. The average cost of loan from the commercial banks in Nepal is from 10 to 12 percent. This clearly indicates that the project is financially feasible. Detailed engineering work, and subsequently updated economic and financial analysis will be carried out as part of the preparation work under Component A for both the UAHEP and IKHP, and the transmission line projects to be identified. The updated economic and financial analysis will provide critical data for the follow-on investment decision making.

C. Financial Management

59. The NEA has extensive experience in FM for Bank-supported projects, including the ongoing Kabeli Transmission Project (P112893), Kali Gandaki Hydropower Project (P132289), NIETTP (P115767) and the recently closed Power Development Project (P043311). The WECS is also working in the Bank-funded Irrigation and Water Resource Management Project (IWRMP, P099296). However, as the reporting and disbursement arrangements with the Bank for the WECS in the IWRMP is being done through Department of Irrigation (DoI), necessary support to build capacity in the WECS will be provided through FM expert hired under Bank executed component.

60. The overall FM capacity of the NEA, especially its internal controls, requires strengthening, as pointed out in the external auditors' qualifications and observations. Nevertheless, the FM at the Bank-supported project level has been better maintained than at the entity level, with enhanced controls in the form of a dedicated project finance officer and a finance assistant ensuring compliance of the NEA's policies and procedures. The audit reports of the project accounts are, therefore, not qualified. Based on the lessons learned, the FM arrangements for the proposed project will include a dedicated finance officer and a finance assistant to ensure effective FM, specifically to mitigate the risks of delay in accounting and reporting and inadequate contract monitoring. A finance officer and a finance assistant will also be assigned in the WECS to ensure mitigation of the same risks with guidance of the FM expert (to be hired under the Bank-executed TA), particularly on disbursement and reporting requirements. The project finance staff of the WECS will maintain effective project FM on a day-to-day basis. To further strengthen monitoring and oversight, trimester internal audits of the project accounts have been agreed with both IAs. The NEA will conduct, as part of the internal audits following the first procurement of goods, and every six (6) months thereafter, physical verification and reconciliation of such goods procured under Component B in accordance with the Procurement Plan.

61. Both IAs will maintain separate books of accounts for their respective components/sub-components ensuring that the project expenditures incurred are in line with the Financing Agreement and separately identifiable from other financing sources. The trimester internal audit will also review appropriateness of the basis of charging expenditures under different financing sources in line with the Financing Agreement. The IAs will submit Interim Unaudited Financial Reports (IUFRs) on a trimester basis within 45 days of the end of each trimester. The external audit report for project accounts for each FY of the project implementation will be submitted within six months of the end of the FY by both IAs. The NEA will also submit an external audit report for its financial statements within six months of the end of the FY. To avoid delays in submitting audit reports, NEA will request the Office of the Auditor General (OAG) to appoint the auditor at least two months before the end of the FY and start audit one month after the end of the FY. The NEA will also proactively plan the audit process closely with the auditors, prepare the financial reports on time and put substantial efforts towards convening timely Board meetings. The NEA is making efforts to address the audit qualifications and observations of its financial

statements through implementation of the Short-term FM Improvement Action Plan (dated September 18, 2014). Efforts are also being made for institutionalizing the required FM improvements in implementing the International Financial Reporting Standards (IFRS), Internal Control Framework and Integrated FM Information System. The progress of these initiatives and the FM Improvement Action Plan are being closely monitored by the Bank. The overall FM risk for the project is Substantial based on the FM assessment (see annex 3).

D. Procurement

62. Procurement under the proposed project will be carried out by the respective PMUs of the NEA and WECS. The PMUs are responsible for preparing procurement documents, including the procurement plans, bidding documents, and bid evaluation reports.

63. Procurement will follow the Bank's 'Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' published by the World Bank in January 2011, revised in July 2014 (Procurement Guidelines), in the case of goods, works and non-consulting services; and 'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' published by the Bank in January 2011, revised in July 2014 (Consultant Guidelines) in the case of consultants' services; and with the provisions stipulated in the Legal Agreements. For each contract planned to be financed under the Credit or Grant, procurement methods or consultant selection methods, the estimated costs, prior review requirements, and time frame have been agreed between the Borrower and the Bank in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

E. Social and Environmental

64. The proposed project will not finance any civil works or other physical activities, and therefore will not itself have any direct adverse environmental or social impacts under its planned supporting activities. Overall the project is expected to result in significant environmental and social benefits by preparing critical studies, policy and planning recommendations, and capacity for improved management and integration of environmental and social considerations in the hydropower sector.

65. Nonetheless, the future infrastructure investments to be studied and prepared under Component A (UAHEP, IKHP, and priority transmission projects to be identified) may have significant environmental and social impacts. Likewise, the studies and activities related to water resources and basin planning, development and/or reform of regulations and guidelines, and capacity building in the power sector, especially hydropower, will also shape how power sector investments take place in the future, with implications for the environment and affected communities. Therefore, the proposed project triggers OP4.01 - Environmental Assessment, and consistent with this policy has been assigned environment assessment Category A. Furthermore, the proposed project also triggers OP4.04 - Natural Habitats, OP4.36 - Forest, OP4.11 - Physical Cultural Resources and OP4.37 - Safety of Dams.

66. The construction of the UAHEP and IKHP is expected to require land acquisition, but not physical relocation, and would potentially benefit local indigenous communities. Consequently, the proposed project trigger's OP4.12-Involuntary Resettlement and OP4.10-Indigenous Peoples.

67. To address the requirements of the Bank Policy, the NEA in collaboration with the WECS has prepared an Environmental and Social Management Framework (ESMF) that specifies the

appropriate requirements, activities, processes, and institutional responsibilities. The ESMF will help ensure that all activities under the project are carried out in compliance with Bank's safeguard policies and Nepal's environmental and social laws and regulations, as well as other activities under the project for enhancing environmental and social sustainability of power sector investments in Nepal. As specified in the ESMF, preparation of the specific investment projects under Component A will include a full ESIA (including CIA), as well as comprehensive social planning and design studies in line with relevant Nepali laws and Bank policies and preparation of environment and social management plans (ESMPs). Social planning will cover social impacts related to land acquisition, gender, indigenous peoples, benefit-sharing and public participation. The ESMF was finalized with wider stakeholder consultations and was first disclosed in Kathmandu and at the Bank's InfoShop on January 22, 2015 and again on April 3, 2015 with an updated version.

68. **OP7.50 - Projects on International Waterways.** In compliance with OP7.50, riparian notification was sent in a letter from the Bank, on behalf of GoN to the upstream and downstream riparian countries (China, India and Bangladesh) on January 12, 2015. Comments were received from Bangladesh on February 10, 2015. India requested an extension of the response deadline to March 12, 2015, which was accommodated, with an acknowledgement sent on February 27, 2015. The information that was requested by Bangladesh was also provided along with a confirmation that the Bank would continue to process the project. Further comments of a clarifying nature were received from Bangladesh on June 11, 2015, and a response to these comments was sent to Bangladesh on August 25, 2015.

F. World Bank Grievance Redress

69. **Communities and individuals who believe that they are adversely affected by a World Bank supported Project may submit complaints to existing Project-level grievance redress mechanisms or the World Bank's Grievance Redress Service.** The latter ensures that complaints received are promptly reviewed in order to address Project-related concerns. Project affected communities and individuals may submit their complaint to the World Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and World Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service, please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

Annex 1: Results Framework and Monitoring
Nepal: Power Sector Reform and Sustainable Hydropower Development Project

Project Development Objectives: The PDOs are to (a) strengthen the capacity of the power sector agencies to plan and prepare hydropower and transmission line projects following international standards and best practices and (b) improve the readiness of the power sector agencies for regulatory and institutional reforms.

PDO Level Results Indicators	Core	Unit of Measure	Basel-ine	Cumulative Target Values*					Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (linked financing sources)
				YR 1	YR 2	YR3	YR 4	YR 5				
Capacity of hydro power projects prepared		MW	0	0	0	0	30	360	Trimester	Progress report	NEA	IDA
Length of transmission line projects prepared.	☐	km	0	0	0	50	100	150	Trimester	Progress report	NEA	IDA
Number of key sector policy and reform proposals validated and endorsed at the institutional level by the MOE, NEA, MOEST, and WECS	☐	Num-ber	0	0	4	5	5	5	Trimester	Progress report	NEA, WECS	SAWI, IDA
INTERMEDIATE RESULTS												
Intermediate Result (Component A):Preparation of Hydropower and Transmission Line Investment Projects												
Detailed engineering and ESIA reports for the UAHEP	☐		none	--	--	--	Completed	Com-pleted	Trimester	Progress report	NEA	IDA
Detailed engineering and ESIA reports for the IKHP	☐		none	--	--	--	Completed	Com-pleted	Trimester	Progress report	NEA	IDA
Detailed engineering and ESIA reports for selected high-voltage transmission line projects	☐		none	--	--	Completed	Completed	Com-pleted	Trimester	Progress report	NEA	IDA
Intermediate Result (Component B): Studies and Preparation for Policy Recommendations and Sector Reform												
Action plan for NEA business restructuring	☐		none	--	Completed	Completed	Completed	Com-pleted	Trimester	Progress report	NEA	IDA
Generation master plan			none	--	--	--	Completed	Com-pleted	Trimester	Progress report	NEA	IDA
Number of river basin plans, including hydropower master plan, prepared with IWRM approach	☐	Num-ber	0	0	1	2	2	2	Trimester	Progress report	WECS	SAWI

Intermediate Result (Component C): Capacity Building for Safeguard Management and Hydropower Development												
Number of workshops on SESA/CIA) conducted	☐	Num-ber	0	0	1	2	2	2	Trimester	Progress report	WECS	SAWI
Number of workshops on benefit sharing guidelines conducted	☐	Num-ber	0	1	2	2	2	2	Trimester	Progress report	WECS	SAWI
Number of workshops on resettlement guidelines conducted	☐	Num-ber	0	1	2	2	2	2	Trimester	Progress report	WECS	SAWI
NEA corporate policy for compensation of RoW prepared and disseminated			none	Completed	Completed	Completed	Completed	Com-pleted	Trimester	Progress report	WECS	SAWI
Recommendations for SESA/CIA guidelines for hydropower development			none	--	Completed	Completed	Completed	Com-pleted	Trimester	Progress report	WECS	SAWI
Citizens and/or communities involved in planning / implementation / evaluation of development programs		Yes/ No		Yes	Yes	Yes	Yes	Yes	Trimester	Progress report	WECS, NEA	IDA, SAWI

Note: *Target values should be entered for the years that data will be available, not necessarily annually.

Annex 2: Detailed Project Description
Nepal: Power Sector Reform and Sustainable Hydropower Development Project

1. There are several power sector agencies responsible for policy formulation, planning, implementation and regulation of the sector. The MoE is the apex energy agency, mainly responsible for sector policy formulation and regulation, oversight of planning, investment, and development of the power sector, as well as issuing licenses to the private sector for electricity generation, transmission, and distribution, including hydropower up to 500 MW. The IBN, DoED, WECS, ETFC, NEA and AEPC are other agencies in the power sector. In addition, the National Planning Commission also provides policy guidance to these agencies. However, these agencies also have overlapping functions, unclear mandates or multiple roles (see annex 7).

A. Project Components

2. The proposed project has three components: (a) Preparation of Hydropower and Transmission Line Investment Projects; (b) Studies and Preparation for Policy Recommendations and Sector Reform; and (c) Capacity Building for Safeguard Management and Hydropower Development.

3. This project will support technical and analytical studies, capacity-building activities and policy dialogue to address challenges in the energy sector in a holistic and coherent manner. The project concept and design has gone through several rounds of consultation and close coordination with various government agencies and DPs, including ADB, DfID, USAID, MCC, Japan International Cooperation Agency (JICA), Kreditanstalt für Wiederaufbau (KfW) and the Norwegian Embassy.

4. **Component A: Preparation of Hydropower and Transmission Line Investment Projects**. It will support preparation of two hydropower projects, UAHEP (335 MW) and IKHP (30 MW), as proposed by the GoN, and priority high voltage transmission line projects to be identified by the on-going Transmission System Master Planning supported under the on-going NIETTP, in line with international standards and the Bank's safeguard policies. Specifically, it will finance (a) the preparation of the UAHEP and the IKHP, including detailed engineering designs and bid documents, ESIA including a CIA and mitigation studies, and the hiring of a dam safety panel of experts and an environmental and social panel of experts; and (b) the undertaking of a feasibility study and the preparation of basic design, route survey, ESIA, and bid documents for the transmission line projects to be identified.

5. The GoN has officially proposed the UAHEP and IKHP for Bank financing. Under the proposed project the Bank will support the preparation of these two projects, including the associated transmission line project for evacuation of power from the UAHEP and IKHP. Consulting firms will be hired through international competitive bidding (ICB) to assist the NEA in (a) reviewing previous studies from these two projects and associated transmission lines for power evacuation; (b) optimizing the project basic design from a basin-wide view to confirm the locations, sizes, and functions of the two projects and associated power evacuation arrangement; (c) preparing the engineering design for the two projects and associated transmission line projects to the extent required for preparation of bidding documents to call for bids on civil works, equipment, and consulting services; (d) carrying out detailed ESIA including a CIA, in parallel with the project design optimization, and preparing associated impact mitigation plans, in line with the Bank's safeguard policies and the government's laws and regulations; and (e) conducting detailed economic and financial analysis to verify viability of the investments needed.

6. To ensure quality of the work and full compliance with international practices, Bank policies, and government regulations, two panels of experts—one for environmental and social and one for dam safety—will be hired to check the work done by the firms stated above.

7. *Climate Change analysis for the UAHEP.* During preparation of the proposed project, a comprehensive analysis has been conducted for the UAHEP for considerations of climate change and other disaster-related hazards in the planning of the UAHEP. The analysis has applied a climate and disaster risk screening tool, which gives indications of vulnerabilities associated with water availability.

8. A comprehensive climate change screening has also been done under a separate study entitled "Programmatic Approach to Impacts of Climate Change on Hydropower". Under this study, a decision tree, developed to help guide the process, was applied in the following phases:

(a) Project screening - does the project have climate sensitivities at all?
(b) Initial analysis - are those sensitivities relatively significant when compared to other non-climate sensitivities?
(c) Climate stress test - what exactly are the climate related vulnerabilities, if any?
(d) Risk management - what adaptation measures can be added to account for the vulnerabilities?

9. The study also focused on understanding a mix of non-climatic conditions that would either exacerbate or ameliorate those climate risks, and thereby make informed recommendations on adaptation measures. The interest was to understand climate risks fully, but also to understand the relative importance of those risks compared to economic and cost-related risks, political risks and disaster risks associated with natural hazards, such as sediment, landslide, and glacier lake outburst flood risks. The analyses was done using data taken from the feasibility study of the UAHEP with a proposed 335 MW design (see section C below). The analyses will need to be adjusted once the detailed design study is completed and the salient features of the plant (dam dimensions, design discharge, turbine capacity etc.) are fixed under the Component A.

10. Preliminary results indicate that there are risks to the economic viability of the UAHEP in low flow scenarios (diminished precipitation and glacier melt). Further analyses are being conducted to understand how likely those scenarios are relative to other potential climate scenarios. To address the mitigation measures for disaster related hazards, a comprehensive guidance note for sediment management was developed.

11. **Component B: Studies and Preparation for Policy Recommendations and Sector Reform.** It will address critical power sector issues**.** It will support preparation, prioritization, and sequencing of recommendations for policy and reform actions, and build consensus and capacity. It will support preparation of (a) river basin planning with an IWRM approach for selected river basins; (b) recommendations for improvement of water resources management and regulations, including updating of the Water Resource Act and capacity building of the WECS; (c) Power System Expansion Plan, including preparation of a Hydropower Generation Master Plan; (d) establishment and operationalization of a power trading company; and (e) the NEA business restructuring for improved management and efficiency, including provision of computerized management tools and installations of smart meters to enhance the distribution business management, and conducting asset evaluation. See annex 2 for other TA activities under projects supported by the Bank and DPs, which will also provide critical inputs to the preparation of policy and sector reform actions for the energy sector.

12. Other TA activities under on-going and planned projects supported by the Bank and/or DPs will provide critical inputs to the preparation of policy and sector reform actions stated above:

(a) TA to support update of Power System Expansion Plan (Public–Private Infrastructure Advisory Facility [PPIAF][3] Grant managed by the Bank)
(b) TA to support consultations on revision of the Electricity Act and Regulatory Commission Act as part of GoN's own efforts (PPIAF Grant managed by the Bank)
(c) TA for capacity building of the DoED/MoE and Nepal Electricity Regulator Commission to be established in power sector regulation and management (PPIAF Grant managed by the Bank)
(d) TA for preparation of a road map for the NEA's institutional restructuring. This activity will explore the options of institutional reform of the NEA. Possibilities of unbundling of NEA will be explored. The institutional restructuring of the NEA should be able to promote greater efficiency by streamlining operations of power distribution, transmission, generation and trading, while also promoting transparency and accountability (PPIAF Grant managed by the Bank)
(e) Tariff reform supported by a trust fund managed by the Bank, together with parallel reduction of system losses and cost of service (under the Grid Solar and Energy Efficiency Project [GSEEP])
(f) GoN policies to facilitate private investment in hydropower and transmission lines, for example, the need for GoN guarantee (PPIAF Grant managed by the Bank)
(g) Transmission Master Planning (under the NIETTP) and associated capacity building;
(h) Distribution System Master Planning and capacity building for distribution management (under the Grid Solar and Energy Efficiency Project (GSEEP)
(i) Improvement of hydropower licensing from a developer driven to an open, transparent, competitive licensing process (under TA supported by the IFC) based on the basin-wide hydropower development planning (under the proposed project)
(j) TA managed by the Bank, focusing on: (i) modeling economic impacts of increased power generation and trade; (ii) identifying associated fiscal management and policy challenges and implications; and (iii) estimating potential social impacts of hydropower investments/projects at the local level and of retail tariff reform and proposing mitigation strategies
(k) Rural Electrification Master Planning (funded by ADB), in coordination with the Bank-supported distribution planning (under the GSEEP)
(l) Power Trading Strategy (funded by ADB) and associated capacity building in power trading with India (funded by USAID)
(m) Review of renewable energy potentials, such as solar, micro hydro and wind, and preparation of a renewable energy policy to envisage objectives, targets, timeline and policy instruments to enable private investments or public-private partnership to achieve the objectives (PPIAF Grant managed by the Bank)
(n) Wind resource mapping (Energy Sector Management Assistance Program Trust Fund managed by the Bank).

13. **Component C: Capacity Building for Safeguard Management and Hydropower Development.** It will support improvement of the environmental and social safeguard

[3] Commitment of PPIAF funding is to be confirmed.

management system in Nepal and associated capacity building. It will support the following activities:

(a) Conducting a SESA as part of the integrated river basin planning under Component B;
(b) Preparing recommendations for environmental and social guidelines for hydropower development;
(c) Safeguard capacity building for management of transmission line RoW issues; and
(d) Project management.

14. Other TA activities under on-going and planned projects supported by the Bank will provide critical inputs to the environmental and social regulations and capacity building stated above:

(a) TA for environmental and social capacity building:
    - Environmental Impact Assessment (EIA) guidelines and procedures for hydropower projects (under on-going IFC TA)
    - Capacity building for CIA, including minimum ecological flows (under KAHEP)
    - Preparation of guidelines for hydropower resettlement and benefiting sharing (under KAHEP)
(b) Preparation of recommendations for updating environmental and social regulations and procedures for hydropower development, covering the following areas (under KAHEP):
    - Cumulative/strategic impact assessment, including minimum ecological flows, in a basin-wide approach
    - Hydropower resettlement and benefit sharing and gender equality
(c) Climate change adaptation and mitigation:
    - Adoption of recommendation for mitigating impacts of climate change on water resources and hydropower, which is being reviewed through an ongoing Bank funded TA (results expected in 2015)
    - Adoption of recommendations on proposed policy, regulation and institutional capacity building work to incorporate climate variability/uncertainty in planning and investment decision-making. Help understand how climate uncertainty can be a key investment risk for long term contracts and therefore influence the design of the policy and regulation to address the management of climate related risks (SAWI Grant managed by the Bank)
    - Safeguard capacity building, including in understanding the impacts of climate change and disaster risk management in hydropower planning and operations, and support to the NEA, WECS, MoE and other GoN agencies for development of hydropower and associated facilities (SAWI Grant managed by the Bank)
(d) Human resource development, with Trust Fund managed by the Bank, through education of next generation of engineers and professional for hydropower, in collaboration with universities, including the following programs:
    - Student exchange programs
    - Faculty exchange programs
    - Enhancement of hydropower-related curriculum at selected universities

B. Project Cost and Financing

15. The proposed financing plan for the estimated project cost of US$24.00 million includes: (a) IDA financing of US$20.0 million in credit; (b) SAWI-P2 MDTF grant in the amount of US$2.5 million, and (c) GoN counterpart funding of US$1.5 million. See Tables 2.1 and 2.2 for details of cost estimations and financing plan.

Table 2.1: Project Cost Estimations

Project Components	Cost Estimation (US$ m)	Source of Financing
Component A: Preparation of Hydropower and Transmission Line Investment Projects		
a) Preparation of the UAHEP and IKHP*		
(i) Optimization, engineering design and bidding documents	10.20	IDA
(ii) ESIA and mitigation plan	2.20	IDA
(iii) Panels of experts a) Environmental and Social b) Dam Safety	0.70	IDA
b) Preparation of Priority Transmission Line Projects to be identified		
(i) Feasibility study, design, route survey, ESIA, and bidding documents	3.65	IDA
c) Project management	1.25	NEA
Subtotal	**18.00**	
Component B: Studies and Preparation for Policy Recommendations and Sector Reform		
a) Integrated Water Resource Planning and Management		
(i) River-basin planning for selected river basins, including hydropower master planning	2.00	SAWI
b) Recommendations for Water Resources Management and Regulations (i) Updating of Water Resource Act and capacity building of WECS	0.10	SAWI
c) Power System Expansion Planning (i) System planning hardware and software (ii) Updating Generation Master Plan	 0.25 0.25	 IDA NEA
d) Establishment and operationalization of a power trading company	0.50	IDA
e) NEA business restructuring (i) Providing computerized management tools and installation of smart meters, and assets evaluation	2.50	IDA
Subtotal	**5.60**	
Component C: Capacity Building for Safeguard Management and Hydropower Development		
a) SESA as part of river basin planning for selected river basins b) Preparing recommendations for environmental and social guidelines for hydropower development	0.30	SAWI
c) Safeguard capacity building - Management of transmission line RoW issues	0.05	SAWI
d) Project management	0.05	SAWI
Subtotal	**0.40**	
Total	**24.00**	

Note: * Packaged as one consulting service contract, NEA.

Table 2.2: Financing Plan

Financing Plan	US$ million	Percentage
a) IDA Credit	20.00	83.3
b) SAWI Grant	2.50	10.4
c) NEA Counterpart Funding	1.50	6.3
Total Financing	**24.00**	**100**

C. Project Specification of UAHEP and IKHP

16. **The UAHEP** is located in the Sankhuwasabha District of the Eastern Development Region of Nepal about 700 km east of Kathmandu. The proposed dam site is located in a narrow gorge about 350 m upstream of the confluence with Chepuwa Khola in Chepuwa Village. The powerhouse lies in Hatiya Village, nearby the confluence of the Arun River with Leksuwa Khola.

17. The project, in the upper reach of the Arun River, is one of the most attractive projects in the Eastern Nepal. The Arun River is bestowed with high firm flow and steep river gradient, making it favorable for hydropower development. In 1991 NEA engaged international consulting firms for carrying out feasibility study of this project. Now the NEA has given priority for development of this project to augment the energy generation capability of the Integrated Nepal Power System due to its relatively low cost of generation and availability of abundant firm energy.

18. Based on the feasibility study carried out in 1991, the installed capacity of peaking run-of-river type UAHEP is 335 MW. The design discharge of the project is 78.8 m^3/s and generates the firm energy of 2050 GWh per year. The project has a design head of 492 m. Similarly, this project has an EIRR of 14.52 percent and levelized energy cost of the project is 1.90 cents per kWh.

19. In 2011, a review study of the 1991 feasibility study of this project was carried out by the NEA. The project cost was revised as part of this review, considering prevailing road facilities which are already built up to Num, near the dam site of Arun 3 Hydroelectric Project and the transmission line. The total project cost was calculated to be US$ 445.54 million. The review study also shows the increment in the annual generation to 2734.2 GWh. This makes the project more attractive than presented in the 1991 feasibility study. The review study shows that the project is highly attractive in both the cases whether the project is constructed by the NEA with the loan taken from GoN or the project is develop by NEA with loan from commercial bank. The estimated energy cost of NPR. 2.10 per kWh is far below the prevailing rate offered in PPAs. The cut off energy rate is NPR. 2.74 per kWh from the year 2020 onwards.

20. On February 15, 2013, the Cabinet of the GoN gave permission to the NEA to implement the UAHEP under the ownership of the GoN. To carry out the detailed engineering design, environmental and social assessments, and the tender document preparation for the construction of the project, the NEA management has decided to procure these services from two international consulting firms—one for engineering work and one for ESIA following requirements of the Bank's safeguard policies—so that the project would be constructed at the earliest.

21. The Bank is supporting a study on the impacts of climate change on the UAHEP and decision making under uncertainty of climate change (results to be shared in 2015).

Table 2.3. Salient Features of the Project

Sl. No.	Item	Description
1	Type of the project	Peaking run-of-river
2	River	Arun River (left bank)
3	Total catchment area	25,700 km^2 (25,300 km^2 in Tibet Autonomous Region, China)
4	Average flow	200 m^3/s
5	Firm flow (95%)	58.7 m^3/s
6	Probable Maximum Flood	4,000 m^3/s
7	Glacial Lakes Outburst Flood	6,900 m^3/s
8	Dam	37 m high, Radial Gated Concrete Weir
9	Radial gates	3 numbers x 12 m width x 22 m height

Sl. No.	Item	Description
10	Gross storage volume	760 x 103 m^3
11	Active storage volume	440 x 103 m^3
12	Design head	492 m
13	Rated discharge	58.7 m^3/s
14	Design discharge	78.8 m^3/s
15	Full supply level	1,598 m above sea level
16	Minimum operating level	1,588 m above sea level
17	Normal tail water level	1,089 m above sea level
18	Intake sill level	1,583 m above sea level
19	De-sanding basin	Three caverns 128 m long, 24 m wide and approximately 32 m high, each housing two settling basin
20	Headrace tunnel	Length = 7,840 m, diameter = 5.5 m
21	Surge tank	Height = 91 m, Diameter = 18 m, simple circular
22	Pressure shaft	Height = 454 m, Diameter = 2.8 m, steel-lined
23	Penstock tunnel	Length = 60 m, Diameter = 2.8 m, steel-lined
24	Powerhouse type	Underground powerhouse
25	Turbines	Four units of Pelton turbine
26	Installed capacity	335 MW (4 x 83.75 MW)
27	Annual firm energy	2,050 GWh
28	Tailrace tunnel	Length = 850 m, area = 50 m^2/s , horseshoe
29	Access road	Total 46.8 km, including road tunnel 1.7 km from Arun III Dam
30	Project economics - 1991 price level:	
	Total project cost	US$500.79 million
	EIRR	17%

Source: Feasibility Study Phase II carried out in 1991, NEA

22. As amended by Securities Registration and Issue Registrations, Notwithstanding anything mentioned in sub-regulation (1) the corporate body using local natural resource and materials as its raw material shall be required to set aside at least 15 percent of its issues capital to the public and ten percent of its issued capital to for the public residing in the area affected by the industry. Given that the UAHEP is being planned to be developed with 100 percent ownership of the government, the provision of project shares under this modality is not possible. Several rounds of conversations have been carried out with the local leaders, and the NEA has subsequently come up with a plan to develop a medium-sized hydropower project under the Public Company Act in the vicinity of the project area under the umbrella of the UAHEP. In this regard, the NEA has identified a project, named, IKHP, located in close vicinity of the UAHEP.

23. **The IKHP,** in the Sankhuwasabha District, Eastern Nepal is a run-of-river scheme, which diverts water from the Ikhuwa River by a diversion weir to the intake and then to the underground/surface de-sanding basin at the right bank of the stream. The canal and the headrace tunnel will connect the water way to the forebay and then to the powerhouse through the inclined shaft, and to the turbine generator units of 30 MW, which are expected to produce about 191.315 GWh energy annually. The water will be diverted to the Arun River through a tailrace tunnel.

24. The project lies in the Pawa Khola Village Development Committee (VDC) of the Sankhuwasabha District of the Eastern Development Region of Nepal. The site is close to the confluence of the Ikhuwa River with the Arun River, approximately 8km downstream from the Arun River powerhouse. The area can be accessed by an approximately 30 km drive from Khandbari to Num Bazar and 20 km of main foot trails from Num Bazaar to the intake site along the Arun Valley. The proposed powerhouse site is about 910 m above mean sea level and the intake

site is about 1520 m above mean sea level. The proposed intake is located in Pawa Khola VDC and the proposed powerhouse is located in Sirutar Village of the Pawa Khola VDC.

25. The powerhouse site is covered by alluvium deposit in the right terrace of the Arun River near the confluence of the Arun River and the Ikhuwa Khola.

Table 2.4. Salient Features of the Ikhuwa Khola Project

Location	**District: VDCs**	**Sankhuwasawa PawaKhola VDC**
Purpose		Hydropower generation
Hydrology	Catchment area Average annual flow Design flow: (40% exceedance) Flood flow: (100-year return period)	127.4 Km^2 7.52 m^3/s 6.02m^3/s 346m^3/s
Headworks	**Diversion weir** Type Crest elevation Crest length Maximum height Design flow Geology	 Non-gated overflow concrete gravity 1496.8 Masl 3m 6.92m^3/s Alluvial deposit (Boulders, gravel, sand)
Intake Structure	Design flow Intake bays Size of each bay Intake water level Intake sill level Intake length Intake velocity Geology	6.92 m^3/s 2 Numbers 3 m×1.7 m 1493 m above seal level 1491.3 m above seal level 10 m 0.68 m/s Alluvial deposit
Headrace Canal-1	Design flow Section Size Gradient Length Geology	6.92 m^3/s Rectangular, covered concrete lined 2.5 m×2 m 1:1000 40 m Alluvial and colluvial deposit
Desilting Basin	Design flow Type Section Size Length Silt particle size Settling velocity Mean flow velocity Geology	6.92 m^3/s Single chamber with continuous flushing Rectangular (upper-half) and inclined at 45^o(lower half) concrete lined 8 m×4 m 83 m Larger than 0.20mm 0.024m/s 0.27m/s Alluvial and colluvial deposit
Headrace Canal -2	Design flow Section Size Gradient Geology	6.02 m^3/s Rectangular, covered, concrete lined 2.2 m×2 m 1:1000 Alluvial and colluvial deposit
Headrace Tunnel	Design flow Section Size Gradient Length Geology	6.02 m^3/s D-shaped 2.5 m×2.5 m 1;1000 3640 m

		Banded gneiss
Forebay	Water level Section Size Length Geology	1488.42 m Rectangular, concrete lined 10 m×4 m 56 m Alluvial and colluvial deposit
Penstock	Design flow Diameter Length Thickness Geology	6.02 m^3/s 1.4 m 1560 m 25 mm Colluvial deposit
Powerhouse and tailrace	Type Size Turbine axis at elevation Installed capacity Number of generating units Tailrace water level Net Head Tailrace canal Section Size Gradient Length Geology	Surface Length= 35 m; Width= 20 m; Height= 28 m 875 m 30 MW 2 Numbers 871.9 601 m Rectangular Covered, concrete lined 2.2 m×2 m 1:1000 40 m Alluvial and colluvial deposits
Generating equipment		
Turbines	Type Number Capacity	Vertical shaft, Pelton 2 Each with output 15 MW
Generators	Type Number Capacity	A/c synchronous brushless excitation system 2 Each with output 15MW Synchronous speed 1000 rpm and generating voltage 11 kV
Power transformer	Type Number Rated Output Rated voltage	Outdoor, oil immersed 2 Each with 17650 kVA 11 kV/132 kV
Transmission line	Length Transmission voltage Type of cooling	37 km 132 kV ONAN
Energy generation	Average Annual Energy Dry season Wet season	181.74GWh 40.72 GWh 141.02GWh
Project cost and economic indicators	Estimated cost (excluding tax & duties at 2014 price level)	NPR. 4,144,550,116
Transmission line	NPV (in thousands) Benefit-Cost Ratio EIRR	NPR. 2970764 1.7 18.50%

Source: Interim Progress report on Feasibility Study & IEE of Ikhuwa Khola Hydropower Project, 2014, DoED, MoE

D. Detailed Project Description

26. Given the challenges facing the power sector and the aspirations of the GoN and the DPs to spur economic growth and provide affordable and reliable access to electricity, the project has

identified activities for assessment to inform policy and sector reform actions. While preparing the project consultation and active engagement with all key stakeholders have been carried out. Rationale for the policy and reform described below present the status, ongoing engagement and justification for pursuing reforms in identified areas.

27. **Existing legal and regulatory provisions**. The acts, policies and plans relevant to the sector are given below. Some of these are in the process of revision.

- Land Acquisition Act, 1977
- Nepal Electricity Authority Act, 1984
- Electricity Act, 1992
- Water Resource Act, 1992
- Foreign Investment and Technology Transfer Act, 1992
- Electricity Tariff Fixation Regulation, 1993
- Water Resource Regulation, 1993
- National Environmental Impact Assessment Guidelines, 1993
- Water Resource Strategy, 2002
- National Water Plan, 2001
- The Hydropower Development Policy 2001
- Investment Board Act, 2010

28. The power sector was stagnant until it has seen many changes in the past few years. The low interest of private sector investors in power projects a decade ago is witnessing a dramatic turnaround. The recent PTA between Nepal and India and signing of the PDA between the GoN and Grandhi Mallikarjuna Rao (GMR) Group of India for the Upper Karnali Hydropower Project (900 MW) and with Sutlej Jal Vidyut Nigal Limited (SJVNL), also from India, for the Arun III Hydropower Project (900 MW) has brought hope for foreign investors. These latest developments highlight the need to update and revise the prevailing policies and acts that could address current issues of the power sector.

29. The prevailing Electricity Act 1992 and the Electricity Regulations 1993 provide a framework for the regulation of electricity distributed to the consumers. The legislations, among other things, deal with determination of tariffs and provision of safe and quality electric energy to the consumers. These include

- licensing of the private sector for participation in electricity generation, transmission and distribution;
- establishment of an Electricity Tariff Fixation Commission for the purpose of fixing electricity tariff and other charges;
- fixing of volt level and other technical matters;
- adoption of security measures in generation, transmission and distribution;
- safety and precautionary measures; and
- inspection and supervision.

30. The required institutional arrangements were made to carry out the above functions. A DoED (previously known as Electricity Development Centre) was created mainly for licensing and promotion of the private sector. The Electricity Act also called for the establishment of an

independent agency, the ETFC for the purpose of fixing electricity tariff. The Electricity Tariff Fixation Regulations 1993 were framed to exercise the powers conferred under the Electricity Act.

31. The proposed Electricity Act and Nepal Electricity Regulatory Commission Act is being reviewed to be updated. The parliamentary committee has asked to re-submit the new draft and Ministry of Energy is in process of revision of the current drafts.

32. The ETFC is responsible for fixing tariff. It reviews and approves retail electricity tariff rates and other charges. The Electricity Tariff Fixation Regulations provide the basis on which tariffs can be established. However, the prevailing tariff structure needs further reform. The Bank is supporting the NEA to ensure its financial sustainability through system loss reduction and ETFC for tariff reform.

33. The list of challenges confronting the power sector perhaps is due to the lack of an independent electricity regulator. The sector regulator can strengthen the performance of the NEA and be a source of sector stability that will serve the requirements necessary to attract investor commitment of capital over time. However, the institution should be fully staffed and resourced, and enjoy full authority to deliver on expectations of effective oversight.

34. Power sector reform needs to carefully consider the power trading strategy for Nepal. After signing the PDA for some export-oriented projects, the power trading strategy can play a major role in smoothening the process of power trading. The power trading strategy should consider some critical issues such as need of a regulatory forum, payment securitization, dispute resolution mechanism, market operator and many more. ADB is currently conducting a study on power trading strategy for Nepal.

35. **Integrated river basin planning.** This is critical for hydropower development. Developing the country's vast hydropower potential could eliminate domestic shortages while also generating export revenues. However, hydropower development involves trade-offs in allocation and use of water resources. To manage these trade-offs in an effective and sustainable manner, an integrated planning process is needed to reconcile other actual and planned water uses as well as ecological needs with energy generation, and put in place governance systems for socially accountable adaptive management of shared resources at a basin scale. This activity will support the GoN in analyzing and proposing specific policy reform recommendations that address incentive issues and legal mandates for upfront integrated planning.

36. A workshop on integrated basin-level water resources planning and management was jointly organized by the GoN and the Bank in September 2014. The workshop aimed to increase understanding and generate buy-in among key governmental and non-governmental actors regarding the purpose and value of integrated basin planning, and to lay the groundwork (including enhancing donor coordination) for carrying out such planning processes in relation to hydropower development planning nationally.

37. The Bank and ADB are working hand-in-hand to avoid duplication of work on basin planning. The terms of reference (ToR) developed to hire a consultant has been reviewed by both organizations. Following the recommendation of the integrated river basin planning for all the river basins in Nepal, a Hydropower Generation Master Plan will be developed.

38. The river basin planning involves trade-offs of water uses, mainly water supply, irrigation, hydropower, and so on, and involves multiple agencies including the DoI, DoED, NEA,

Department of Water Supply and Sewerage and WECS. The Bank team is leading the coordination among these key stakeholders. The following aspects have been agreed on:

a. *Technically.* River basin planning shall be carried out as the basis and platform for preparation and coordination / trade-offs among: a) Irrigation Master Plan; b) Hydropower Generation Mater Pan; and c) water supply planning. All planning shall be coordinated—from ToRs to implementation timeline to co-sharing data—and be implemented in parallel.

b. *Institutionally.* The WECS will be responsible for river basin planning including Hydropower Generation master Planning; the DoI for Irrigation Master Planning; and Department of Water Supply and Sewerage for water supply planning. A Coordination Committee will be set up, chaired by the WECS Secretary, with the participation of the director generals of the DoI and DoED, managing director of NEA and representatives of Department of Water Supply and Sewerage, to ensure coordination and cooperation.

c. *Resources*. ADB will finance the DoI for Irrigation Master Planning. IDA funds, including with the SAWI grant, will finance the WECS for river basin planning including the Hydropower Generation master Planning, and the NEA for Power System Expansion Planning. NEA together with the DoED will work on the Power System Expansion Plan based on the river-basin planning to be carried out by the WECS. IDA finances will help the NEA with hardware/software required for the system planning purpose.

39. Communication strategies have been developed for continuous consultation at different level with donors, institutions, the public, and political parties.

40. **Communications strategy.** The objectives of this communication strategy are (a) to build stronger public awareness and understanding of the project, its development objectives and key expected results; (b) to anticipate and manage potential risks in the implementation of the various project components; and (c) to engage key external stakeholders to help build a shared vision around the potential transformational development of hydropower in Nepal.

41. For this, the project will require three distinct sets of communication interventions. These will be tailored to address the risks, opportunities, and engagement needs specific to each project component. The strategy will be executed by the IAs with inputs from the Bank and the consultant. The approach will be to assist and support the GoN and Bank program teams and the overall hydropower development community of stakeholders to overcome/manage communications challenges, including the following:

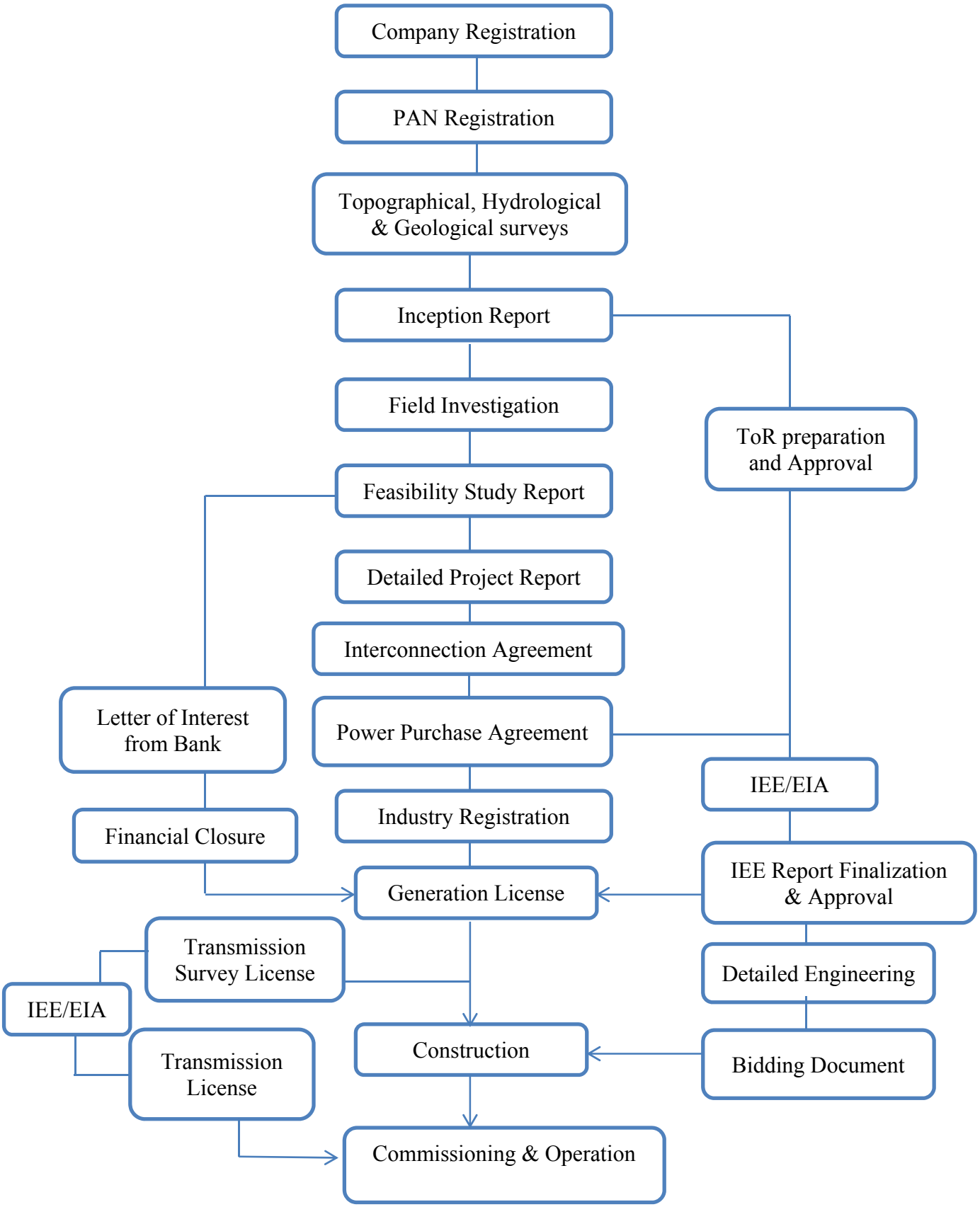
- Institutional set-up
- Risk mitigation
- Project preparation
- Transmission/generation planning
- Financing
- Environmental and social standards
- Ownership

42. The Bank is taking steps to put hydropower development in Nepal on a long term replicable, scalable, and sustainable path by establishing robust planning, project preparation, environmental and social management, benefit sharing, and trading and financing frameworks in place. The comprehensive basin-wide planning for river basins under this project would be an important part of the overall effort. A need has been felt for following robust project preparation

and licensing processes that result in the selection of high quality and reputed investors who are then capable of(and are held accountable for) implementing projects in a time-bound manner.

43. This requires more up-front data collection and sharing with potential bidders, greater definition of project conceptual design; integrated and credible planning for roads and transmission lines, including their financing arrangements; making potential multilateral or bilateral financing available to all potential bidders; bringing all institutional players on one platform to make processes simpler for investors, greater upfront engagement with communities; environmental and social base-lining; and a priori preparation of draft project-specific contractual documents not subject to change after award of project to the selected developer so as to avoid lengthy negotiations after licensing. Figure 2.1 illustrates the detailed procedure of hydropower development in Nepal. The Bank will support the GoN for a comprehensive policy, planning and transactional approach that will help in catalyzing substantial private investment in the future. Under this arrangement, IFC's Advisory in PPP transactions, in co-ordination with the Bank team will support the implementation of transactions for selected projects. It is anticipated that IFC will mobilize funding of approximately US$6 million for such transaction advisory services. The master planning process is not a one-time exercise. The plans will be continuously updated in the future reflecting the latest status of various licenses and to make opportunities, to re-commit water resources across sectors in optimized manner, available to decision makers. Further, the master plans will help the government make informed and efficient decisions while giving concessions of uncommitted resources. Signed concession agreements and licenses issued to IPPs will inform the river basin and Hydropower Generation Master Plans, as input. For sites not yet licensed out or where licenses have expired, the Hydropower Generation Master Planning in coordination with river basin planning process will define the optimized locations, sizes and functions.

Figure 2.1 Hydropower Development Process



Annex 3: Implementation Arrangements
Nepal: Power Sector Reform and Sustainable Hydropower Development Project

A. Project Institutional and Implementation Arrangements

1. The implementing mechanism for Component A consists of the PMU under the engineering services department that will be headed by a project manager. The manager will lead the hydropower projects and the transmission line projects to be identified. The team will comprise necessary human resources, such as (i) financial management specialist, (ii) procurement specialist, and (iii) environmental and social specialist in additional to all needed technical staff.

2. The NEA is the IA for the Component A and B (c), (d) and (e). It is a government-owned utility operating about 478 MW of generation capacity and building an additional 300 MW, either owned by the NEA or by its subsidiaries. The NEA was created on August 16, 1985, under the Nepal Electricity Authority Act 1984, through the merger of the Department of Electricity of the Ministry of Water Resources, Nepal Electricity Corporation and related Development Boards. It generates approximately 64 percent of the total electricity output in Nepal, owns the transmission grid and most of distribution network in Nepal, and is responsible for system operation. The NEA is also the single off-taker of electricity from the IPPs. The company is entirely owned by the State of Nepal. Its Board of Directors is chaired by the Minister of Energy and otherwise consists of one representative from the MoE, one from the MoF, one consumer representative, two power sector experts from non-government sector, and three representatives from the industry, commerce and financial sector. All eight members of the Board of Directors, including the managing director, are nominated by the GoN. The NEA's primary mission is to generate, transmit and distribute adequate, reliable and affordable power by planning, constructing, operating, and maintaining all generation, transmission, and distribution facilities in Nepal's power system both interconnected and isolated. In addition to this, the NEA's major responsibilities are (a) to recommend to the GoN, long- and short-term plans and policies in the power sector; (b) to recommend, determine, and implement the tariff structure for electricity consumption with prior approval of the GoN; and (c) to build manpower capacity in generation, transmission, distribution, and other sectors.

3. Responsibility within the NEA shall rest with the managing director at the corporate level. The PMU will liaise between the Bank and the NEA. It will coordinate the project activities between the NEA headquarters in Kathmandu and the project site. The PMU will be headed by the project manager. The key units of the PMU and their functions and responsibilities are listed:

a) *Project Administration and FM Unit* will be responsible for management and operation of all project-related accounts including FM, disbursement and financial reporting. This unit will also be responsible for general administration of the PMU.

b) *Engineering Unit* will be responsible for design supervision matters. Further, the unit will be responsible for the overall management of project construction.

c) *Procurement Contract Management and Reporting Unit* will oversee the entire procurement process and monitor and evaluate project progress and performance. Through the PMU, it will liaise with the Bank and be responsible for preparing annual programs and implementation reporting.

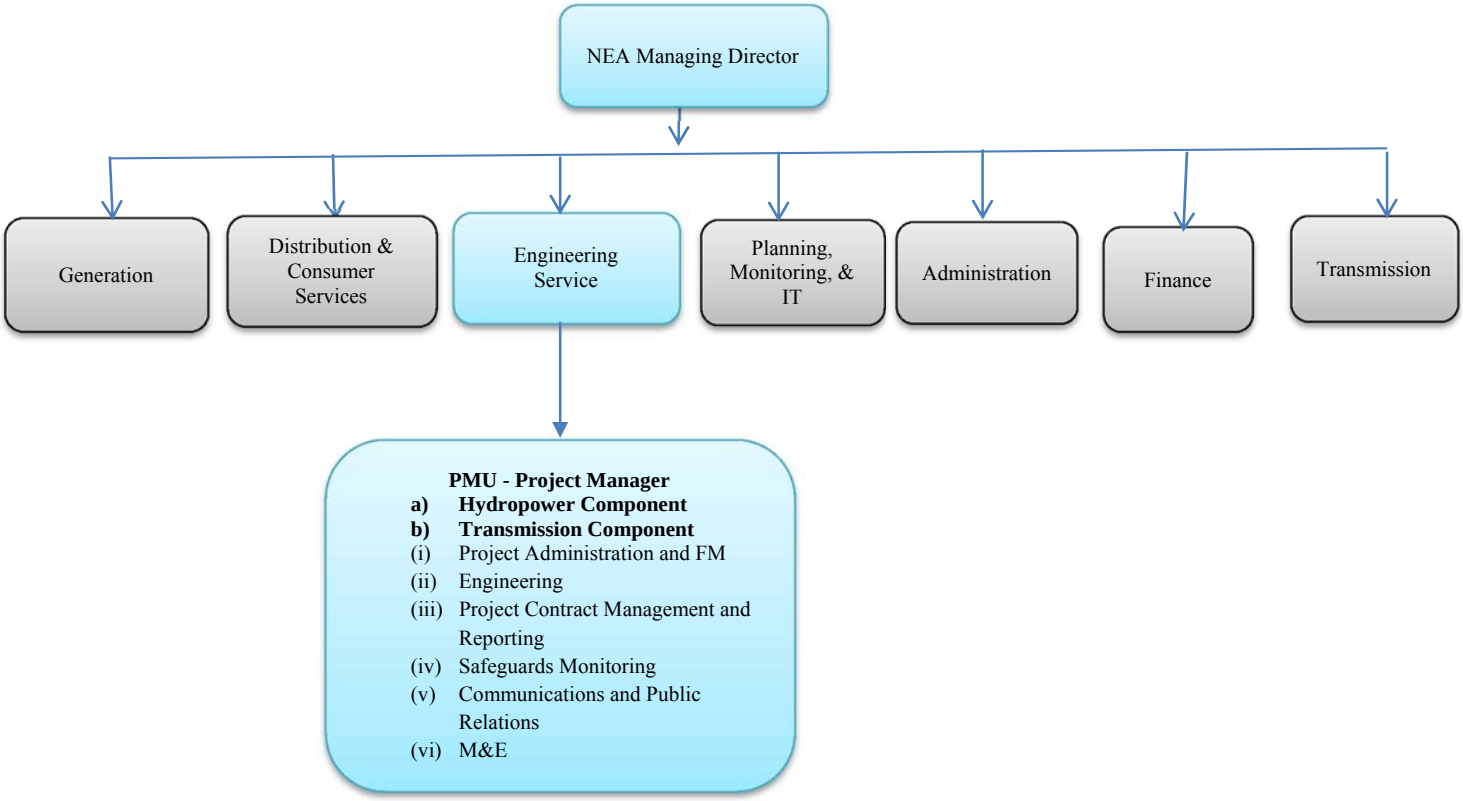
d) *Safeguards (Environmental and Social) Monitoring Unit* will supervise compliance with the safeguard instruments in carrying out the proposed studies. The implementation of

social and environmental safeguard measures will be the responsibility of the NEA through its Environmental and Social Studies Department.

e) *Communications and Public Relations Unit* will be responsible for implementing the communications strategy and managing relations with the public and media.

f) *Monitoring and Evaluation (M&E) Unit* will monitor the activities of the Project throughout its duration and evaluate the achievement of PDOs, results framework and implementation progress.

Figure 3.1 Organizational Charts for Component A



4. The implementing mechanism for Components B and C consists of the PSC that will be chaired by the energy secretary and comprises representatives from different government agencies such as the MoF, DoED, IBN, WECS, NEA, ETFC, and AEPC. The PSC will provide oversight and coordination at the top level between the different GoN agencies. The project IA for Components B (a) and (b) and C will be the WECS, which will have a PMU for the project. The PMU will be headed by the project manager.

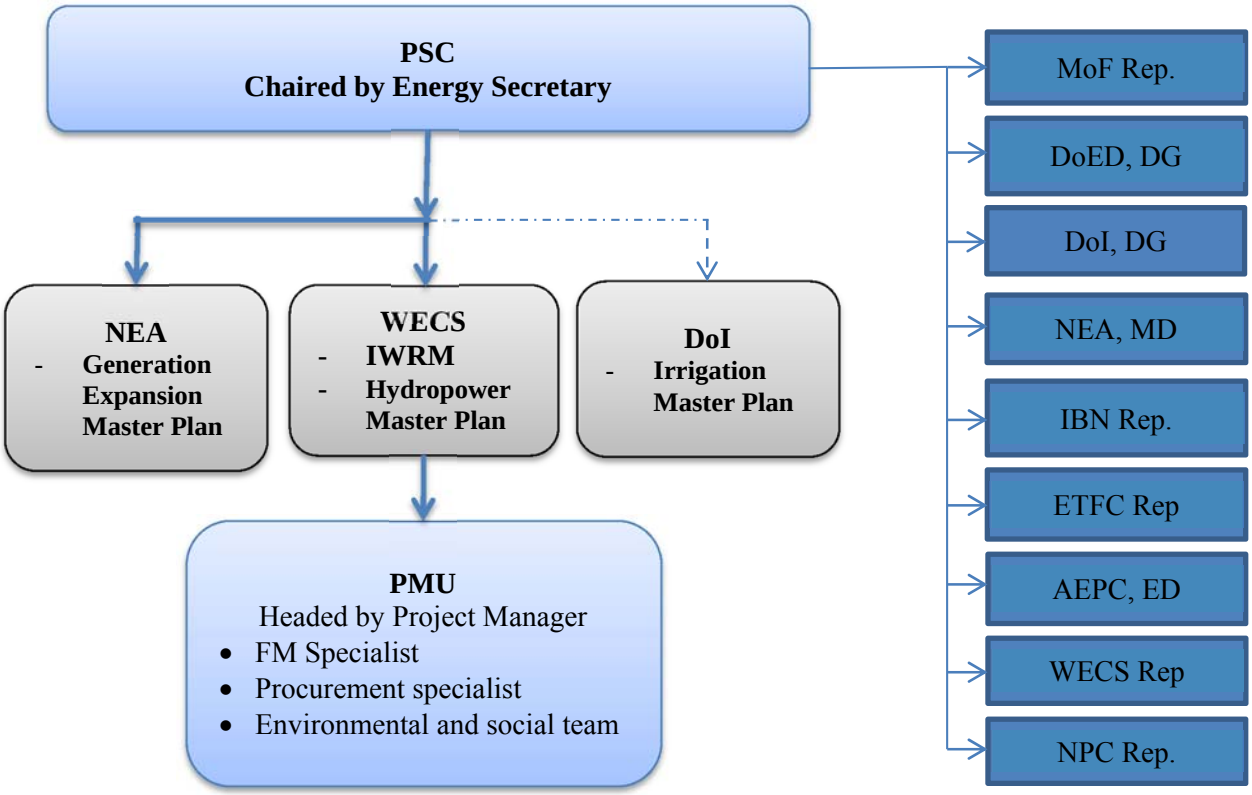
5. The Water and Energy Commission was established by the GoN in 1975 with the objective of developing the water and energy resources in an integrated and accelerated manner. Consequently, a permanent secretariat of the Commission was established in 1981 and was given the name, WECS. The primary responsibility of the WECS is to assist GoN, different ministries relating to water resources and other related agencies in the formulation of policies and planning

of projects in the water and energy resources sector. The objectives and mandates of WEC and WECS have been revised and modified a number of times since their establishment.

6. The IAs will be responsible for project preparation and implementation and also be responsible for procurement and liaison with the Bank. This unit will have necessary human resources such as (a) FM specialist, and (b) procurement specialist

7. **Project implementation period.** The project is expected to be implemented during the period July 2015 to December 2019. The organizational chart for Component B (a), (b), (c) and C is shown in Figure 3.2 below. The chart also shows parallel activities implemented by DoI that are relevant to the activities under the proposed project.

Figure 3.2: Organizational Chart for Components B (a), (b) and C



B. Financial Management Assessment

8. The two IAs have experience with Bank-financed projects and thus have a good knowledge of FM requirements. The NEA has a long working relationship with the Bank in implementing power projects, including the ongoing KTP (P112893), Kali Gandaki Hydropower Project (P132289), NIETTP (P115767) and recently closed PDP (P043311). Similarly, the WECS is also implementing a component of Bank-funded Irrigation and Water Resource Management Project (IWRMP, P099296).

9. Efforts are under way in the NEA to ensure implementation of the Short-term FM Improvement Action Plan (dated September 18, 2014) to address the NEA entity-level audit qualifications. The audit qualifications are mostly based on inadequate verification and valuation

of assets and liabilities, including property, plant and equipment, inventories, receivables/debtors and creditors; unreconciled balances and inter-unit accounts; and differences between revenue reports and records. The weaknesses in internal audit and contract management functions of the NEA have also been raised by the auditors. An FM Strengthening Committee has been formed under the chairmanship of the deputy managing director finance to monitor implementation progress of the Short-term FM Improvement Action Plan. One-day workshops were conducted in the regional offices to ensure implementation by all the budget centers. The instructions have been issued to all budget centers for ensuring verification and valuation of all assets, reconciliation of unreconciled items, and aging of debtors/creditors. Currently, the central office is in the process of collecting confirmation from all the budget centers on progress made on the issued instructions. Progress has been reported on reconciliation of inter-unit transactions with installation of software in the Central Account Division, installation of fixed assets software in 25 different locations, settlement of claims with the Government, plan for training of internal audit staff in India, initiation of disposal and write-off of unused inventories in the Kathmandu Regional Office and Central Workshop Hetauda, procurement of consulting service for reconciling revenue reports with records as well as main and sub-ledgers, adjustments of credit balances included in loan, and advances. It was agreed with the NEA to build on the progress made and ensure implementation of the action plan according to the timelines for various activities, the latest of which is to be completed by September 30, 2016.

10. Efforts are also underway in the NEA to implement institutional strengthening initiatives initiated under the PDP. The review of the Internal Control Manual and Internal Audit Manual proposed by international consultants hired under the PDP has been completed by the designated Review Committee, which will be presented to the NEA Board for approval. Similarly, proposed accounting policies and chart of accounts based on the IFRS and the IFRS Roadmap are also being reviewed and the NEA has agreed to share an action plan for their adoption particularly considering the need of external expertise for implementation of the IFRS. The progress of this is being closely monitored by the Bank. The Bank is also financing the development of an enterprise resource planning system for the NEA (Integrated FM Information System) under the NIETTP, which is currently in the process of rebidding. Until all these institutional strengthening initiatives are completed and institutionalized in the NEA, the dedicated finance officer and finance assistant will help ensure effective FM through compliance with the NEA policies and procedures and adoption of enhanced controls/mitigation measures as required as the project progresses. A similar arrangement has been agreed with the WECS, and the details of which are provided below.

C. Planning and Budgeting

11. The proposed project will follow the government planning and budgeting procedure in case of the WECS, while the NEA will follow its own procedure. The NEA and WECS will prepare their annual work program and budget for their respective components/sub-components and submit for the government's approval. For the NEA, budget authority from the MoF is requested and released through the MoE. In case of the WECS, the MoF authorizes the budget release directly to the WECS. The same procedure is followed for approval of the annual work program by the National Planning Commission. The budget formulation process of the NEA is considered satisfactory as it is prepared based on the budget preparation guidelines and in coordination with the various NEA cost centers, concerned directorate's offices, and corporate planning and central finance division. Similarly, the budget preparation process of the WECS is also considered

satisfactory, being based on the government guidelines and formulated in consultation with concerned units.

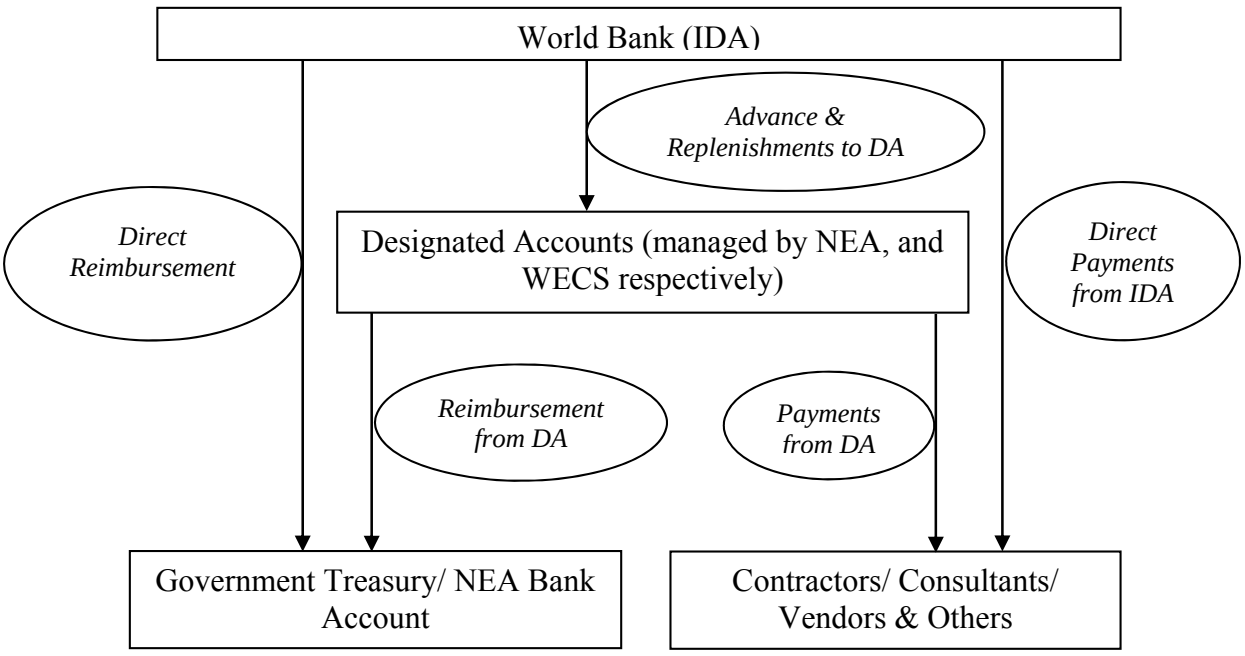
12. A separate identifiable budget head will be defined for the project in the government's 'Red Book' for each agency. As the project is expected to be effective in the current FY, the budget allocation will be required from any other existing budget heads in the Red Book for FY2015/16. After obtaining commitment from the Bank for the project funding, efforts are required toward obtaining approval of the budget and the annual work program for FY2015/16.

D. Funds Flow Arrangement

13. The NEA has prior experience with the Bank's disbursement procedures. The same disbursement/funds flow arrangements which were working well in other NEA-implemented Bank-financed projects will be adopted in this project. As funds flow for the WECS in the IWRMP is being managed by the DoI, support for building capacity on the disbursement procedures with the Bank will be provided through the FM expert hired under Bank-executed trust fund.

14. The disbursements from the Bank will be based on Statements of Expenditures (SOEs). A Designated Account (DA) in U.S. Dollars will be established at Nepal Rastra Bank each for the NEA and the WECS. An advance with specified ceiling will be provided in the DAs. As the NEA is managing the DA on behalf of the government and is accountable to the government for utilization of the DA funds, the potential impact/risk of the NEA's difficult financial position on implementation of the DA is considered as low. Based on the experience of the other Bank-financed projects that the DA funds have only been used for the confirmed eligible expenditures by the NEA, the provision of the DA will be continued in this project. Similar to other NEA/ WECS-implemented projects, the DA can be used for direct payments as well as for reimbursing the funds pre-financed from the government Treasury/NEA for both the NEA and WECS components. For large payments or reimbursements, funds can also be directly paid from IDA. If required, special commitments can also be provided for Letter of Credit payments

Figure 3.3 Funds-flow Arrangement



E. Project Financial Accounting, Reporting and Internal Controls

15. The NEA follows an accrual basis accounting system and the project accounts will also be prepared based on the same. The project accounts for the WECS will be based on the government's cash basis accounting system. The chart of accounts and accounting procedure under both systems are considered adequate for the project. The two agencies will be submitting the IUFRs of the Project for their respective components/sub-components on a trimester basis within 45 days of the preceding trimester, in the format and content agreed with the Bank. While the NEA's accounting system is computerized, the accounting system of the WECS is manual. Based on the experience of the projects implemented by the NEA and WECS, both the agencies need to strengthen the timeliness and quality of IUFR reporting. The agencies also need to emphasize on timely updating of required ledgers and registers including the DA Ledgers, and Credit/Grant Registers. The finance staff in both the NEA and WECS dedicated for the project will help to ensure timely and quality accounting and reporting, which will be regularly monitored by the Bank. The finance staff will also help ensure that the NEA entity-level audit observations on internal controls specified earlier are mitigated in the project, particularly on contract monitoring.

16. The NEA and WECS will ensure that separate books of accounts are maintained for their respective components/sub-components. The accounting, reporting and internal control system for and the WECS will be based on the government's Financial Administration Act and Regulations, while the NEA will follow its own regulations and guidelines.

17. Some issues regarding timeliness of Procurement Plan, cost estimate and budget; asset management; contract monitoring; and deductions and reporting of tax/value added tax (VAT) have been raised in the audit report of the WECS. The finance staff assigned for the project will help ensure that those issues do not occur in the project. The FM expert hired under Bank-executed trust fund will also guide the project on mitigating those risks. Also, as the WECS has been reporting through the DoI in the case of the IWRMP, support for building capacity regarding the reporting requirements of the project will also be provided through the same FM expert.

F. Audit

18. **Internal audit.** The Internal Audit Department of the NEA will conduct internal audit of the project reporting directly to the audit committee with copy to the managing director. The audit committee makes recommendations to the Board of Directors based on the internal audit report. Due to delays in conducting the audit, the internal audit reports are not as effective for the project and helpful in timely decision making by the Board of Directors and for external audit. Internal audit needs to be conducted every trimester and reports submitted on time as required by the NEA's policy, to ensure regular monitoring and oversight. It was agreed with the NEA that this will be ensured in the project. According to the government policy, the internal audit for the WECS also needs to be conducted on trimester basis by the District Treasury Controllers Office. However, as the internal audits are not being conducted on trimester basis by the Office in other Bank-financed projects, it was agreed with the WECS to ensure trimester internal audits in the project by requesting the District Treasury Controllers Office on time.

19. **External Audit.** The Office of the Auditor General (OAG) is responsible for auditing the accounts of the NEA and WECS. In the case of the NEA, the OAG is appointing independent professional auditor for the audit of the NEA's financial statements and project accounts. Separate audit reports for the respective components/sub-components implemented by the NEA and WECS

will require to be submitted within 6 months of the FY-end for each FY of the project implementation, including for the year when the project becomes effective. In the case of the NEA, the audit report for the NEA's financial statements will also be required within the same deadline. While the audit reports for FY2012/13 for the project accounts of Bank-financed projects implemented by the NEA were received within the grace period, the FY2012/13 audit report for the NEA's financial statements was received after the grace period mainly due to the difficulty in convening the Board meeting. The overdue audit reports of FY2013/14 for project accounts have been agreed with the NEA to be received by September 30, 2015, and for entity financial statements to be received by the grace period. Furnish of all overdue audited financial statements for FY2013/14 to the Bank by NEA is a condition for effectiveness of the proposed IDA Credit. Exceptional approval has been obtained to proceed for negotiations notwithstanding the overdue audit reports. It has been agreed with the NEA to request the OAG on time for appointing the auditor at least two months in advance. Furthermore, it was also agreed that the NEA proactively plans the audit process closely with the auditors, prepares the financial reports on time, and makes a substantial effort toward convening timely Board meetings. Similarly, the audit report for project accounts of the Bank-financed projects implemented by the WECS (through DoI) are also being received within the grace period. The WECS has also agreed to coordinate with the OAG during May of each year (which is the period the OAG starts planning) to ensure that the audit for the project is scheduled on time. It was also agreed with the WECS to prepare and complete the annual financial statements and associated audit reports on time, that is, by six months from the end of each FY.

20. The following audit reports will be monitored in the Bank's system:

Table 3.1: Audit Reports

Implementing Agency	Audit	Auditor	Audit Due Date
NEA	Project Financial Statements	Independent Professional Auditor appointed by the OAG	6 months after the end of each FY
NEA	NEA Entity Financial Statements	Independent Professional Auditor appointed by the OAG	6 months after the end of each FY
WECS	Project Financial Statements	OAG	6 months after the end of each FY

21. **Adequacy of FM arrangements.** From the fiduciary perspective, based on current assessment as outlined above, the overall FM risk rating is Substantial.

22. **Allocation of financing proceeds.** Disbursement under the proposed project will be made as indicated in the following table, which indicates the percentage of financing for different categories of expenditures of the project.

Table 3.2: Allocation of Financing Proceeds

Category	Amount of the Credit Allocated (US$)	Amount of the Grant – Trust Fund Allocated (US$)	Percentage of Expenditures to Financed (Inclusive of Taxes)
(1) **Component A** of the project			
(a) Goods and Consulting Services – NEA	16,750,000		100%

(2) **Component B** of the project	3,250,000		
(a) Goods and Consulting Services – NEA			100%
(b) Consulting Services/ Training & Workshops – WECS		2,100,000	100%
(3) **Component C** of the project			
(a) Goods and Consulting Services/Training & Workshops – WECS		350,000	100%
(b) Incremental Operating Cost		50,000	100%
Total Financing	**20,000,000**	**2,500,000**	

23. There will be the NEA's counterpart funding of US$1.25 million for management of the project implementation under Component A (US$1.25 million).

G. Disbursement Arrangements

24. **Disbursement methods.** The applicable disbursement methods include: Advance, Reimbursement, Direct Payment and Special Commitment. To facilitate disbursement, an advance of a specified amount will be provided in a separate DA to be opened at the Nepal Rastra Bank for each of the two agencies. The two DAs in U.S. Dollars will be established on terms and conditions satisfactory to IDA. The DAs will be managed by the respective agencies. The DA can be used for direct payments as well as for reimbursing the funds pre-financed from the Government Treasury/NEA. For large payments or reimbursements, funds can also be directly paid from IDA. If required, special commitments can also be provided for Letter of Credit payments. There will be a minimum application amount for requesting direct payments, direct reimbursements or special commitments from IDA.

25. The authorized allocations for the DA will be US$2.0 million for NEA and US$500,000 for the WECS respectively.

26. The disbursements from the Bank will be based on SOEs. For expenditures planned as post review in the Procurement Plan, the disbursements will only be made based on SOE. For requests for direct reimbursement (without using the DA) and for reporting eligible expenditures paid from the DA, the supporting documents should include (a) a list of payments against contracts that are subject to the Bank's prior review according to the Procurement Plan, together with records evidencing eligible expenditures (for example, copies of receipts, supplier invoices) and (b) SOEs for all other expenditures (post-review expenditures). In addition, a DA reconciliation statement along with the Bank statement should be submitted for reporting eligible expenditures paid from the DA. The requests for direct payments to suppliers /consultants from IDA funds (without using DA) should be supported by the records evidencing eligible expenditures, for example, copies of receipts, supplier invoices.

27. **Review of SOEs.** During the project implementation, the Bank team will closely review SOE claims to ensure that funds are used for the intended purposes. Any ineligible expenditure identified during such reviews will need to be refunded to IDA.

28. **Supervision.** Intensive supervision of FM will be undertaken by the Bank, which will include follow-up on the implementation of the agreed action plan for FM improvement at the NEA among others. The FM rating will be reviewed periodically based on progress of the agreed and required FM actions.

29. **Action Plan.** The following agreed action plan needs to be implemented by the NEA to ensure effective financial management of the project.

Table 3.3: Action Plan

	Agreed Actions	Deadline
1	Assign a finance officer and a finance assistant dedicated for the project respectively by the NEA and WECS	Two months after the project effectiveness
2	Submit internal audit reports of trimester internal audits of the project by the NEA and WECS	Three months from the end of each trimester
3	Coordinate with the OAG for timely appointment of auditor by the NEA	Two months prior to the FY-end
4	Coordinate with the OAG for scheduling timely audits	May of each year
5	Implement FM Improvement Action Plan to address the NEA audit observations	September 30, 2016

H. Procurement Arrangements

30. Procurement under the proposed project will be carried out by the respective PMUs of the NEA and WECS. The PMUs are responsible for preparing procurement documents, including the procurement plans, bidding documents, bid evaluation reports, and overall project implementation reports.

31. Procurement will follow the Bank's 'Guidelines: Procurement of Goods, Works and Non-consulting Services under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' published by the Bank in January 2011, revised July 2014 ('Procurement Guidelines'), in the case of goods, works and non-consulting services; and 'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers' published by the Bank in January 2011, revised July 2014 ('Consultant Guidelines') in the case of consultants' services; and with the provisions stipulated in the Legal Agreements. For each contract to be financed under the Credit or Grant, procurement methods or consultant selection methods, the estimated costs, prior review requirements, and time frame will be agreed between the Borrower and the Bank in the Procurement Plan (which will be updated by the Borrower and will be reviewed by the Bank before the project negotiations). The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

32. All expected procurement of goods and consultants' services will be listed in the project's General Procurement Notice. Table 3.4 shows the overall procurement arrangements with tentative amounts.

Table 3.4: Summary of Procurement Plan for the First Eighteen Months

Ref. No.	Description of Assignment	Estimated Cost ($'million)	Selection Method	Review by IDA (Prior/ Post)	Expected Proposals Submission Date	Comments
Preparation of Hydropower and Transmission Line Investment Projects						
Contract 1	Preparation of detailed engineering report and Bidding document. • UAHEP	10.20	QCBS	Prior	July, 2015	

	• IKHP					
Contract 2	Preparation of environmental and social safeguards documents and impact mitigation plans. • UAHEP • IKHP	2.2	QCBS	Prior	May, 2016	
	Panel of experts • Individual consultants	0.7				
Contract 4	Preparation of detailed feasibility report, route survey and bidding document for the proposed transmission line	2.0	QCBS	Prior	January, 2016	
Contract 5	Preparation of ESIA report for the proposed Transmission line.	1.65	QCBS	Prior	May, 2016	
Studies for Policy Recommendations and Sector Reform						
Contract 7	Hardware/Software for preparation of Power System Expansion Plan	0.25	ICB/Shopping	Prior	May, 2016	
Contract 8	Goods and software for distribution business enhancement of the NEA restructuring	2.5	ICB	Prior	NA	Multiple contracts
Contract 9	Preparation of River Basin Master Plan and Hydropower Generation Master Plan • Koshi Basin • Other basins • SESA	2.0 2.0 0.3	QCBS	Prior	March, 2016	
Contract 10	Legal advisory services • Support to updating of Water Resource Act	0.1	DC	Prior	NA	
Capacity Building for Safeguard Management and Hydropower Development						
Contract 11	Preparation of policy and gudelines on environmental and social procedures for hydropower projects	0.025	QCBS	Post	November, 2015	
Contract 12	Consulting services for RoW policy	0.010	QCBS	Post	November, 2015	
	Training and workshops • Safeguard capacity building • Consultation workshops • Study visit	0.015	To be financed by SAWI Grant. Whether the activities fall under non-procurement item or category of procurement for the procurement activities will be agreed during procurement plan preparation.			

	Incremental operating cost • WECS	0.05	

Notes:

ICB: International Competitive Bidding
NCB: National Competitive Bidding
DC: Direct Contracting
QCBS: Quality and Cost Based Selection
IND: Individual Consultants
SSS: Single Source Selection

33. **Assessment of WECS's procurement capacity.** The WECS's capacity for procurement is inadequate and will be strengthened through procurement training and intensive supervision by the Bank. Based on the assessment of procurement capacity, the WECS's risk rating is Substantial.

34. **Assessment of NEA's procurement capacity**. The NEA's procurement capacity for implementation of Bank-funded projects was carried out by the Bank in March 2014. On the basis of overall assessment of the NEA in general and the project specific procurement arrangement, the overall procurement risk for the project has been rated High and the residual risk is Substantial.

35. **Procurement of goods.** Goods to be procured under this project include vehicles and simple office logistics with low-value contracts and, therefore, no ICB procedure is envisaged for this.

36. **Procurement of consulting services.** Contracts with consulting firms will be procured in accordance with QCBS procedures or other methods given in Section II of the Consultants' Guidelines. For contracts with consulting firms estimated to cost less than US$300,000 equivalent per contract, the shortlist of consultants may consist entirely of national consultants in accordance with the provisions of paragraphs 2.7 of the Consultant Guidelines. Other selection methods like Quality Based selection, Fixed Budget Selection, Selection based on Consultant Qualification, Least Cost Selection, Selection of Individual Consultants, and Selection through Sole Source can be considered with the concurrence of the Bank.

37. **Incremental operating costs.** The project will support incremental operational costs such as for operation and maintenance (O&M) of vehicles, vehicle and office rentals, and rentals for information technology services such as internet connection, utilities, and office consumables required for the day-to-day running of the PMU under WECS, and travel cost to the project sites.

38. **Exceptions to procedures for NCB.** To ensure economy, efficiency, transparency and broad consistency with the provisions of Section 1 of the Procurement Guidelines, the following exceptions to procedures shall apply in the case of NCB:

a) Only the model bidding documents for NCB agreed with the Association (as amended from time to time), including qualification criteria shall be used.
b) Bid documents shall be made available, by mail or in person, to all who are willing to pay the required fee.
c) Foreign bidders shall not be precluded from bidding and no preference of any kind shall be given to national bidders.
d) Bids shall be opened in public in one place, immediately after the deadline for submission of bids.
e) Qualification criteria (in case pre-qualifications were not carried out) shall be stated in the bidding documents, and if a registration process is required, a foreign firm declared as the

lowest evaluated bidder shall be given a reasonable opportunity for registering, without let or hindrance.

f) Evaluation of bids shall be made in strict adherence to the criteria disclosed in the bidding documents, in a format and specified period agreed with IDA, the Association, and contracts shall be awarded to the lowest evaluated bidders.
g) Under Prior Review, re-bidding shall not be carried out without the prior concurrence of the Association.
h) Under Prior Review, extension of bid validity shall not be allowed without the prior concurrence of the Association (A) for the first request for extension if it is longer than four (4) weeks and (B) for all subsequent requests for extension irrespective of the period; and
i) There shall not be any restrictions on the means of delivery of the bids.

39. ***Procurement planning.*** The Procurement Plan the key contracts for goods, works and consultants' services was prepared by the NEA and WECS and agreed during negotiations on August 28, 2015. Procurement under the project will be carried out in accordance with the Procurement Plan. The Procurement Plan will be closely monitored and updated as required. No procurement, regardless of the value, will be done by the IAs unless it has been included in the Procurement Plan in agreement with the Bank. Any change in the estimated cost of any contract will promptly be conveyed to the Bank for its clearance. No changes will be accepted after bidding documents have been made available to bidders. The Procurement Plan will also be available on the websites of IAs and in the Bank's external website.

40. **Prior review.** The Procurement Plan shall set forth those contracts which shall be subject to Bank's prior review.

41. **Post review.** All other contracts will be subject to post review by the Bank. The PMU will send a list of all contracts for post review as per the Bank's request. The Bank will select contracts in a sample of about 5-20 percent of the contracts based on the procurement capacity risk rating of the IAs.

42. **Frequency of procurement supervision.** The Bank supervision would be carried out every six months and more frequently in the early stages of the project implementation.

Annex 4: Safeguards and Communication Strategy
Nepal: Power Sector Reform and Sustainable Hydropower Development Project

A. Safeguards

1. This is largely not a physical investment project. It will support planning and technical design of critical hydropower generation and transmission line projects, important technical and analytical studies in the hydropower sector, necessary policy dialogues with the government, and capacity-building activities to strengthen relevant government institutions for the energy sector. This advisory project will not finance any civil works or other physical activities, and therefore will not itself have any direct adverse environmental or social impacts under its planned supporting activities. By design, this advisory project is expected to generate significant positive impacts in the management of social and environmental issues in the energy development sector at a national level. There are various social studies and research done in Nepal relevant to the energy sector. These studies are on gender, social exclusion, land acquisition, involuntary resettlement, indigenous communities and benefit sharing.[4] They have reviewed the current policies and practices and made recommendations for improvement of the country system. The project will build on these to support strengthening of existing Nepali systems in the management of adverse social impacts and maximize project benefits. Specifically, the project will focus on three key areas—involuntary resettlement, benefit-sharing and gender. It will aim to improve policies and institutional capacities for better management of involuntary resettlement issues, streamlining of benefit-sharing practices and a more gender-sensitized and responsive development approach in hydropower development. On-going TA activities supported by the Bank will provide critical inputs to improve the environmental and social management system for hydropower in the country and support capacity building. Some of the key activities include:

- IDA-funded development of reservoir resettlement and benefit sharing guidelines under KAHEP;
- IDA-funded capacity building of DoED for hydropower CIA under KAHEP;
- IDA-funded capacity building of IBN for environmental and social monitoring of large-sized hydropower projects;
- IFC-supported TA for hydropower EIA capacity building of both MoEST and private developers; and
- IDA-supported gender assessment for energy sector in Nepal.

2. Through the analytical studies, policy dialogue and development initiatives, the project together with on-going Bank-supported projects and TA activities, will help deepen the understanding within the GoN of social and environmental issues in the energy sector, and hydropower development in particular, and improve existing or develop missing but important social environmental policies for the energy sector, on areas such as environmental assessment, CIA, environmental flows, river basin planning, resettlement and rehabilitation, benefit-sharing, gender and social inclusion. These policy initiatives will lead to development of improved policies, decrees, planning and implementing guidelines, and operational handbooks. The parallel

[4] Among these are a Review on Resettlement and Benefit-sharing in Nepal, and three major pieces on gender—Gender and Social Exclusion in Nepal, on-going Gender Assessment for the Energy Sector in Nepal and a Gender Review of Major Hydropower Projects that includes a Nepali project.

Bank-supported TA activities will also support capacity building initiatives targeting key energy institutions, such as the DoED, WECS and MoE, in the management of social and environmental issues, including by expanding and up-skilling the pool of national experts in these agencies, which are responsible for environmental and social management aspects of the energy and hydropower sector. These initiatives will create a favorable and enabling environment for addressing relevant social and environmental issues in energy sector development and create a better prospect for sustainable hydropower development.

3. Nonetheless, the future infrastructure investments being prepared through the project under Component A may result in potentially significant negative environmental and social impacts. The basin-level planning activities and sector-wide policy analysis and reform recommendations to be produced through Components B and C also aim to enable future infrastructure investments that may have significant potential environmental and social impacts. The Project is therefore considered Category A according to OP 4.01.

4. In accordance with Bank safeguard policies, an ESMF has been prepared that specifies the appropriate requirements, activities, processes, and institutional responsibilities for ensuring that all activities under the project are carried out in compliance with the Bank's safeguard policies. As detailed further in the ESMF, the compliance approach is outlined in section 5.

5. For all proposed investments being prepared under Component A, the detailed design, environmental and social studies to be commissioned will be carried out in accordance with applicable national environmental and social requirements (including laws, regulations and international conventions that Nepal has ratified), as well as World Bank safeguard policies. For the UAHEP and the IKHP, detailed ToRs for the required ESIA and social planning studies have already been prepared by the NEA, cleared by the Bank and disclosed by the NEA. Independent panels of experts will also be retained by the NEA in accordance with OP 4.01 and OP 4.37. The specific studies to be completed for the UAHEP and IKHP, as outlined in the ToR, are the following:

- ESIA for both the UAHEP and IKHP
- Environment and Social Management Plans for the UAHEP
- Environment and Social Management Plans for IKHP
- CIA of the Arun River Watershed
- Resettlement Policy Framework (RPF)
- Resettlement Action Plans
- Vulnerable and Indigenous Peoples Development Plan
- Downstream Impacts Management Plan
- Gender Assessment and Action Plan
- Benefit-sharing Action Plan
- Public Health Assessment and Action Plan
- Public Participation and Consultation Plan
- Communication Strategy and Action Plan.
- One Executive Summary of these documents, in English and Nepali
- Dam Safety Plans

6. **OP 7.50 – Projects on International Waterways.** In compliance with OP7.50, riparian notification was sent in a letter from the Bank, on behalf of GoN to the upstream and downstream riparian countries (China, India and Bangladesh) on January 12, 2015. Comments were received from Bangladesh on February 10, 2015. India requested an extension of the response deadline to March 12, 2015, which was accommodated, with an acknowledgement sent on February 27, 2015. The information that was requested by Bangladesh was also provided along with a confirmation that the Bank would continue to process the project. Further comments of a clarifying nature were received from Bangladesh on June 11, 2015, and a response to these comments was sent to Bangladesh on August 25, 2015.

7. For the future transmission line investment to be identified which will also be prepared under Component A, once the investment is identified, the NEA and the Bank will screen the proposed projects to determine the applicable Bank safeguards policies as well as national laws and regulations, and to develop detailed ToR for the corresponding required environmental and social studies in accordance with applicable the GoN legal requirements and World Bank safeguard policies. The impact assessments of the power transmission line, to be carried out under Component A, will consider relevant environmental and social issues identified during screening when defining the ToR for the assessment,

8. Under Component B, a number of studies will be financed, which include, among other things, basin-wide approach for water resource and hydropower development planning for several major basins in Nepal. This will involve developing an integrated database of basin-level information and carrying out integrated basin-wide planning processes.

9. Component C will meanwhile focus on improving the environmental and social safeguard management systems and associated capacity building of key agencies in GoN responsible for power development, especially hydropower. The studies and activities will include strategic environment and social assessment as part of the integrated river basin planning; preparation of recommendations for environmental and social regulations; and safeguard capacity building for management of transmission line RoW issues. The SESA will provide recommendations, (a) on consultations with local communities to establish the broad support for management of potential environmental and social impacts related to future energy investments in these basins, (b) for strengthening of the relevant institutional, regulatory and decentralization framework, and (c) for integration of relevant issues into subsequent planning decisions for the choice of location and size and scale of future investments. These activities are expected to have significant environmental and social benefits in the context of increasing development of the power and especially hydropower sector in Nepal.

10. **Public consultations and disclosure:** A public consultation was organized by the NEA on behalf of the GoN, on December 23, 2014, to consult with the project stakeholders regarding the draft ESMF outlining the safeguards compliance strategy, requirements and processes across all project components, and including the detailed ToRs for environmental and social assessments and studies for the UAHEP and IKHP investments. In the case of the UAHEP and IKHP, the first formal consultation event was held on the initial draft ToRs for the ESIAs and social planning studies on April 30, 2014 as part of preparation of this TA project, and the ToRs (attached as an annex to the full ESMF) have been updated by the NEA to reflect feedback received. Minutes of these consultation events are annexed to the ESMF. Additional consultations will be held on the draft studies. Throughout the project, the NEA will maintain a project-specific website, where

information about the specific investments being prepared under the project can be accessed. Similar consultation requirements are expected to apply to the transmission line investment to be identified and studied under this TA. In addition, river basin planning under Component B will include broad stakeholder participation, and the updating of environmental and social regulations and procedures for hydropower (an activity under Component C) will include a broad consultation with public sector and civil society stakeholders at the national level, in addition to private sector. Draft and final versions of these policy and planning studies will be made publicly available as outlined in the ESMF.

11. In line with committed policy initiatives under the on-going TA, the project will also provide support in training and capacity building of relevant government agencies in the management of the above mentioned environmental and social impacts. These capacity building programs will be developed in detail during the project implementation in line with the progress of the relevant TA policy initiatives.

12. On-going TA activities supported by the Bank will provide critical inputs to improve the environmental and social management system for hydropower in the country and support capacity building. Some of the key activities include:

- IDA-funded development of reservoir resettlement and benefit sharing guidelines under the KAHEP;
- IDA-funded capacity building of the DoED for hydropower CIA under the KAHEP;
- IDA-funded capacity building of the IBN for environmental and social monitoring of large-sized hydropower projects;
- IFC-supported TA for hydropower EIA capacity building of both the MoEST and private developers; and
- IDA-supported gender assessment for energy sector in Nepal.

B. Communication Strategy

Component A: Preparation of Hydropower and **Transmission Line Investment Projects**

13. **Context.** The Bank has developed a joint IDA/IFC strategy for hydropower development to draw on all resources and parts of the Bank to promote hydropower development through large-scale public and private investments. These will include (a) rehabilitation of an existing hydropower plant and investments in energy efficiency; (b) the development of on-grid solar and off-grid renewable energy; (c) investments in new generation such as the recently approved IFC/IDA-supported KAHEP (37.6 MW), or IFC's current two loans to the Butwal Power Company Ltd. (BPC) for the expansion of the Andhi Khola Hydropower Plant (5.1 MW).

14. Component A of the project will support the preparation of two hydropower projects and a priority high voltage transmission line to meet international standards and the Bank's safeguard policies. It will include preparation of detailed project designs, bidding documents and environmental and social impact assessments and mitigation. The GoN and the Bank have thus far jointly identified the UAHEP. On the other hand, the transmission line projects will be identified through the Transmission Master Plan under the IDA-supported NIETTP and the lessons from previous experiences in addressing stakeholder concerns will be applied.

Table 4.1: Communications Strategy -- Component A

Audiences	Key Message Themes	Methodologies/ Instruments	Channels and Partners	Outcome Indicators
Local residents likely to be directly affected by development of hydropower plants and transmission lines. Local opinion leaders/civil society Local and Kathmandu based media Public officials in IAs	Local and national benefits from hydropower development Details of the proposed investment projects Measures instituted in the design of specific investment projects, or plans and programs to be carried out in conjunction with the investments, to mitigate social and environmental impact, including compensation, resettlement and livelihood programs for vulnerable communities Feedback solicitation Grievance redress	Stakeholder Mapping and Baseline Attitude Survey in project areas Messaging Workshop Communications and Disclosure Protocols linked to project safeguards and fiduciary timelines, available in appropriate form and language for diverse stakeholder groups FAQs and information packages tailored and updated regularly to local, national and international needs (including online) ICT-enabled Public Information Centers with designated spokespersons and grievance handling personnel in the proposed investment project locations and in Kathmandu Public consultations, hearings, and/or focus group discussions in areas of proposed investment projects (specific methodologies to be determined based on investment context and stakeholder mapping results), synchronized with the engineering design studies; social and environmental assessments, , so that stakeholder feedback can be taken into account	Survey team Consultant teams recruited to carry out social and environmental studies Local Political Leaders Local Civil Society/NGO partner(s) Local Media Village and District Administrators CA members representing project areas Journalists' Organizations RTI activists and social accountability champions Communications Trainers Bank resource people	Shift to attitudes supportive of project implementation measured at regular intervals against the baseline survey Number of stakeholders participating in investment-specific consultation events Percent of concerns, queries and grievances of local communities proactively responded to and resolved within designated timeframe Total number and types of grievances received

Hydropower community of practice and stakeholders	Sensitization on transparency and social accountability tools, learning from past experiences How best-practice concepts are incorporated into these new generation of projects The rationale for public sector investment in hydropower Feedback solicitation	Grievance mechanism Regular Media Briefings Toolkits and workshops on transparency, social accountability, risk mapping/management and crisis communications Focus group meetings and Energy Forums Hydro days - part II (after the successful March 2014 hydro days)	Local community leaders/champions IPPs Association of Nepal Nepal Hydropower Association (NHA) Bank Resource Persons Implementing Agencies Other multilaterals, donors Consultant Experts	Transparency in project activities; effective disclosure and grievance handling; efficient inter-agency internal communications and crisis preparedness Proactive participation by IAs in public consultations and hearings Local support in project areas enhanced Empowerment of third party voices in hydropower development process

Note: NGO = Nongovernmental Organization; RTI = Right to information; ICT = Information and communication technologies.

Component B: Studies for Policy Recommendations and Sector Reforms

15. **Context.** Despite its huge hydropower potential, Nepal suffers from chronic under-investment in the energy sector to the extent that Nepalese are forced to endure up to 14 hours a day of "load-shedding" (black outs) during the dry winter months. This is a fundamental obstacle to economic and human development. That too, when imports from India promise to ameliorate much of the dry season deficit in Nepal in exchange for export of wet season surplus from Nepal when demand in India peaks. Nepal and India recently signed the PTA, a first step in a series of critical reforms this component intends to support. In conjunction with other DPs, Component B of the Project will help address critical barriers to hydropower development and challenges in power sector development. This component will also carry out integrated basin planning processes for water resource management and hydropower development. While the proposed project intends to inform the concerned sector institutions and build consensus on what should be the policy and reform

actions based on the recommendations and the agreed actions to the GoN/parliament for endorsement as needed.

Table 4.2: Communications Strategy – Component B

Audiences	Key Message Themes	Methodologies/ Instruments	Channels and Partners	Outcome Indicators
Hydropower Community of Practice and stakeholders Key political party leaders and members of relevant Parliamentary Committees GoN officials in agencies related to hydropower development	Key findings and policy recommendations of the studies, including options and tradeoffs Scenarios for basin development and corresponding water resource quality and availability at a basin level, to inform decision making around water resource use and management	Baseline Survey Technical Workshops Political economy analyses Regular briefings to Members of the Constituent Assembly and Parliamentary Committees Focus Group Meetings Hydro days - part II (after the successful March 2014 hydro days)	Survey team Bank and DPs resource people Other multilaterals and donors Consultant experts IPPS Association of Nepal IBN Journalists' organizations	Sustained dialogue with key stakeholders leads to greater receptivity to policy recommendations and reform actions measured regularly during the life of the project against the baseline survey
Media		Media briefings and media training	Media organizations	Accurate reporting on the challenges and opportunities and improved media literacy on hydropower development
Opinion leaders		Op-eds Social media content		Influential third party voices in support of reforms

Component C: Capacity Building for Safeguards Management and Hydropower Development

16. **Context.** Component C of the project intends to promote knowledge exchanges and cross-country peer learning to support the growth and sustainability of transformational hydropower development in Nepal. This component will support forward looking agendas such as sector-wide capacity building in social, environmental and safeguards management; basin-wide planning and strategic/CIA, among others. This component will also support the production of local human resources through twinning arrangements with reputed educational institutions in the neighborhood. This component will support capacity building in understanding impacts of climate change and disaster risk management.

Table 4.3: Communications Strategy -- Component C

Audiences	Key Message Themes	Methodologies/ Instruments	Channels and Partners	Outcome Indicators
WECS, MoE, NEA and other key agencies in hydropower planning and development Hydropower Community of Practice and stakeholders – enlarged to include water resource management experts Political party representatives and advisors Media and civil society Faculty and students of the Institute of Engineering, Tribhuvan University, and of other reputable academic institutions	Components of "successful and sustainable" hydropower development and water resources management in the present day context; consensus building and societal tradeoffs How communications and disclosure protocols can help future generation and transmission projects	Technical workshops Clinics on Safeguards management Templates and training modules on communications and disclosure protocols Innovations marketplace Study visits	Bank resource persons Academia RTI advocates and social accountability champions Media trainers Journalists' organizations Institute of Engineering, Tribhuvan University Kathmandu University Nepal Engineers Association IPPS Association of Nepal Other multilaterals/ donors GoN agencies	A deepened understanding of the capacity requirements, key challenges, and areas of policy reform needed to enable environmentally and socially sustainable hydropower development

C. Outcome Monitoring

17. Outcomes will be measured in qualitative terms (for example, the degree to which perceptions are changed and public understanding of reform issues is deepened; social consensus and national ownership of the reforms agenda is built; and a positive climate for implementation are achieved) through periodic surveys against the proposed preliminary baseline.

Annex 5: Implementation Support Plan
Nepal: Power Sector Reform and Sustainable Hydropower Development Project

A. Strategy and Approach for Implementation Support

1. As the project involves two implementation agencies, strategy for implementation support has been developed to manage the interactions between these agencies, especially for building consensus on reform recommendations. The strategy is to support the two IAs on the client side, with expert consulting firms and consultants and through capacity building, in complying with the Bank rules/safeguards to achieve high quality and timely results with due focus on risk mitigation.

2. **Procurement:** To avoid fiduciary problems under the project, procurement capacity of the IAs will be enhanced with training and support from the Bank's procurement specialist. With regard to Component A, the procurement capacity of the NEA is being enhanced through a dedicated two-week training "Procurement Procedures for World Bank Aided Projects" provided by the Administrative Staff Collage of India in Hyderabad, India and supported by the Grid Solar and Energy Efficiency Project (P146344). Further, various consulting firms will be procured for technical engineering, bid preparation and management; and for environmental and social impacts assessment and mitigation. With these measures, it is expected that independent views on key project preparation issues will be available to the Bank and the client. Procurement of expert consultants for Components B and C will be on QCBS basis under guidance of the PSC, which will be formed to support sector reform and capacity building for hydropower development and safeguards management. Procurement and FM capacity of agencies implementing Components B and C will be enhanced with training and software as needed.

3. **Environment and Social Safeguards:** The Bank team will supervise and provide support to the consulting firm and consultants engaged in environmental and social assessment and mitigation activities. Through Component C, the Project will enhance capacity for safeguard management and hydropower development. During implementation, environmental and social safeguard specialists from the Bank will work closely in developing and implementing guidelines and mitigation measures.

4. **Technical aspects:** Under Component A, consulting firms will be hired for engineering design, bid preparation and for technical assessment of environmental and social impacts of hydropower and transmission projects. Expert consulting firms and consultants will be hired to assist IAs in preparing technical and legal studies under the components.

5. **Project management:** Component A and B (c), (d) and (e) will be managed through the PMU at the NEA. The NEA has experience in working on hydropower and transmission project preparation in collaboration with the Bank and consulting firms. Components B (a), (b) and C a PSC, to be chaired by the Energy Secretary, will be formed to guide and sequence the analytic work and implementation related to power sector reform and capacity building. The PSC, as part of the project management strategy, will assist in coordinating multiple public and private sector stakeholders and in building consensus on key reform recommendations.

B. Implementation Support Plan

6. For Component A, formal supervision and field trip would be carried out semi-annually or as often as needed to support the NEA in the implementation of the project. Most of the Bank team

members for the project are based in the Kathmandu office and can provide support to the NEA when needed. For Components B and C, the implementation support plan includes workshops, communication and outreach strategies, focus group discussions, and other coordination and consensus building activities.

7. Detailed inputs from the Bank Team are in the table:

Table 5.1: Main Focus on Implementation Support

Time	Focus	Purpose	Responsibility	Estimate
First 3 months after effective ness	Hiring consulting firm	Detailed engineering design, preparation of tender documents and of UAHEP and IKHEP	NEA	Costs included in Component A budget
	Hiring consulting firm	ESIA and management studies for UAHEP and IKHEP	NEA	Costs included in Component A budget
	Formation of high-level interagency PSC	PSC will provide guidance and support in scoping, sequencing, and implementing power sector reform and capacity building activities under Components B and C	MoE, WECS, MoF or PMO	Costs included in Components B and C budget
	Implementation support mission	Inception meetings with the consulting firms for UAHEP and IKHEP, PSC, and other IAs	WB, MoE, MoF, PMO, NEA, DoED, MoEST, WECS	US$ 30,000 for Bank members to participate the mission.
	Establishment of monitoring and evaluation	Efficient regular project monitoring and early problem detection	Bank, MoE, NEA, WECS, PMO	Necessary costs are included as a part of the project budget.
3-24 months	Project preparation complying with Safeguards	Preparation of UAHEP and IKHEP projects resulting in (i) Finalization of detail engineering design and tender document preparation for IKHEP. Bid preparation and contractors selection for IKHEP (ii) Assessment of environmental and social implications of hydropower and transmission projects and development of appropriate management plans and (iii) Finalization of detail engineering design and tender document for UAHEP	MoE, NEA and the consulting firms	Costs included in Component A budget
	Scoping and sequencing analytic work for power sector reform, Component B	In consultation with PSC, sequencing and scoping priority analytical work and studies for power sector reform and sustainable hydropower development.	MOE, NEA, DoED, WECS, MoF, MoEST	US$ 50,000 for Bank to organize and participate in roundtable discussions and outreach events for building

				consensus on sequence of work and scope of priority work for power sector reform
	Introduce environmental and social regulations and capacity enhancement tools and guidelines	In consultation with PSC, review of environmental and social management approaches and guidelines produced by parallel engagements. Planning capacity-building activities in public sector implementation agencies for hydropower development. Introduce regulations to manage climate change, environmental, and social implications of hydropower and power sector projects	Bank, MoE, NEA, DoED, MoEST	US$50,000 for WB to organize and participate in workshops and outreach events.
	Hiring expert consultants or consulting firms	In consultation with PSC and implementing agencies, expert consultants or consulting firms will initiate prioritized analytic work and studies for power sector reform	MOE, NEA, DoED, WECS, MoF, MOEST	Costs included in Component 2 and 3 budget
	Project implementation support	Review, M&E of the project progress and outputs including review of analytic work, policy briefs, plans, bills and acts, capacity building, and technical, environmental and social aspects of UAHEP and IKHPP.	Bank and NEA	US$120,000 for every 12-months period for Bank members to support the implementation.
30-48 months	Project preparation complying with safeguards	Preparation of UAHEP and IKHEP projects resulting in (i) Bid preparation and contractors selection for UAHEP (ii) Assessment of environmental and social implications of hydropower and transmission project and development of appropriate management plans (iii)	MoE, NEA and the consulting firms	Costs included in Component A budget
	Reform recommendations and DPC preparation	(iv) Propose and implement power sector reform recommendations in a programmatic manner linked with the envisioned DPC operation.	MoE, NEA, DoED, WECS, MoF, MoEST	Costs included in Component B budget
	Project implementation support	Review, monitoring and evaluation of the project progress and outputs including review of reform recommendations and reform implementation, capacity building, and technical, environmental and social aspects of UAHEP and IKHP; and transmission project	Bank, NEA, PSC	US$120,000 for every 12-month period for Bank members to support the implementation.

Table 5.2: Skills Mix Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Project M&E (comprehensive)	1) TTL: 10 2) Technical Expert: 8 3) Sector Policies: 12 4) Procurement: 12 5) FM: 8	Twice annually (depending on circumstances, a third supervision trip may be required)	
Safeguards compliance	1) Social Expert: 12 2) Environmental Expert: 12	Twice annually, or as otherwise needed, during UAHEP and IKHEP preparation	
WB procurement	Outsource to the ASCI	One round trip for each trainee	The two weeks training program of - "Procurement Procedures for the World Bank Aided Projects" – by the ASCI will be provided to implementation agency officers, as needed, in Hyderabad, India.
Project management	1) Training facilitator 1 outsource 2) PM Expert (PMBOK) 1 outsource 3) IT (MS Project) 1 outsource 4) Program assistants	One round trip each to invite 3 international trainers for "A Guide to the Project Management Body of Knowledge " and "MS Project" to Kathmandu	Focus on enhancing capacity on project preparation, construction planning, quality control, schedule management, budget control, and safety management, among others. Training programs will be provided to NEA officers for 1 week. Program assistants to manage logistics, coordination and collaboration with multiple agencies.
Outreach and Communication	1) Communication officers	As needed for key power sector reform workshops, policy and regulation proposals, and outreach events	Communication officers, as part of the core Bank team, will support in planning, coordinating, and managing workshops and public events.

Annex 6: Overview of Donor activities
Nepal: Power Sector Reform and Sustainable Hydropower Development Project

Agencies	Engagement	Status
Challenge 1: Access to Electricity Services - Off-Grid Solutions		
ADB	• Pilot project on rural electrification through wind solar hybrid system	Ongoing
	• Rural Electrification through renewable energy project; by AEPC (to be co-financed by Scaling up Renewable Energy Program and other development partners)	Planned
	• Scaling-up Renewable Energy Program in low income countries (SREP)	
IDA	• Micro hydro under PDP; implemented by AEPC	Ongoing
	• Micro hydro (250 kW), and solar home systems under Kabeli Transmission Corridor; implemented by AEPC	
	• Non Lending Technical Assistance for addressing public and private sector opportunities for scaling up decentralized renewable energy access and scaling up electricity access through mini- and micro-hydropower applications	
	• Scaling-Up Renewable Energy Program in low income countries (extended biogas); implemented by AEPC	
	• Developing improved solutions for cooking; implemented by AEPC	
KfW	• Support through AEPC for the promotion of PV based drinking water supply system in rural areas.	Ongoing
	• Support through AEPC for the upgrade of Renewable Energy Test Station	
	• Detailed study on used battery management and recycling	
	• Implementation of the Plant Rehabilitation and Energy Efficiency Improvement Project for house hold biogas plants through AEPC	
	• Support for the establishment of a used battery recycling plant • Support AEPC for the promotion of institutional PV applications (water supply, health facilities education)	Planned
JICA	• Micro Hydro Improvement Project in Western area in Federal Democratic Republic of Nepal	Ongoing
Challenge 2: Access to Electricity Services - Distribution Grid Expansion		
ADB-Public Sector	• Construction of 33/11 kV distribution substations and switching stations in various locations.	Ongoing
	• Construction of 33/11 kV lines in various locations. • Supply of distribution transformers, ABC cables, UG cables, ACSR conductors, insulators and line materials.	
	• Piloting PPP in distribution consumer services of NEA	
	• Distribution system expansion and augmentation project under SASEC power system expansion project.	
IDA	• Community rural electrification under Kabeli Transmission Line corridor	Ongoing
	• Distribution loss reduction project under Grid Solar project	Ongoing
KfW	• Rural electrification in the transmission line project vicinity	Planned
Norwegian Ministry of Foreign Affairs	• Construction of 33/11 kV distribution substations and switching stations	Ongoing
	• Nepal Energy Access and Efficiency Improvement Project (co-financing)	Ongoing
	• Distribution system expansion and augmentation project under SASEC power system expansion project.	Planned
	• Private Sector Electricity Supply and access	Planned
Challenge 3: Shortage of Electricity Supply - Electricity Generation Inadequacy		
ADB-Public Sector	• Tanahun Storage Hydro Power Project (140 MW) jointly co-financed by JICA, European Investment Bank and Abu Dhabi Fund for Development.	Ongoing

Agencies	Engagement	Status
IDA	• Solar grid tied system at NEA training center (100 kWp) and Bir Hospital (50 kWp)	
	• Marsyangdi Power Station Weir Control and Modernization.	
	• Kali Gandaki A Rehabilitation Project (144 MW)	Ongoing
	• Grid Solar PV (25 MW)	Ongoing
	• Partial Risk Guarantee for Upper Trishuli 1	Planned
IDA&IFC	• Kabeli A (37 MW) to be implemented by Kabeli Energy Limited	Ongoing
IFC	• Andhi Khola HEP by BPC	
	• Equity participation in Upper Trishuli (216 MW)	
	• Joint Development Agreement with GMR for Upper Marsyandi (600 MW)	Planned
	• TA to local FIs for hydro financing, US$10 million local currency credit line for hydro	
KfW	• Support to Operation and Maintenance of Middle Marsyangdi Hydro Power and Lower Marsyangdi Hydro Power	Ongoing
JICA	• Tanahun Storage Hydro Power Project (140 MW) jointly Co-financed by ADB, European Investment Bank and Abu Dhabi Fund for Development	
	• Second Storage Type Hydropower Project recommended by the Nationwide M/P Study on Storage Type Hydroelectric Power Development in Nepal (To be identified)	Planned
Challenge 4: Shortage of Electricity Supply - Transmission Infrastructure Inadequacy		
ADB-Public Sector	• Butwal-Kohalpur 132 kV second circuit stringing, 208 kms	Ongoing
	• Kohalpur-Mahendranagar 132 kV second circuit stringing 185 kms	
	• Khimti Kathmandu 400/220 kV transmission line, 188 kms (co financed by government of Norway)	
	• Dumre-Damauli 132 kV transmission line, 21 kms	
	• Middle Marsyangdi-Marsyangdi 132 kV second circuit stringing, 40 kms	
	• Construction of 132 kV Chapali Substation.	
	• Maharajgung- Chapali 11 kV double circuit underground cable link, 5 kms	
	• Lainchaur-Chabel 66 kV underground cable link, 7.5 kms	
	• SASEC Power System Expansion Project (co-financing expected from Government of Norway and European Investment Bank)	Planned
	➢ Manang- Markichowk-Bardaghat 220 kV transmission line 125 kms	
	➢ Dana-Kusma-New Butwal 220 kV transmission line (155 kms)	
	➢ Markichowk-Kathmandu 220 kV transmission line (82 kms)	
	➢ New Butwal- Bardaghat 400 kV transmission line (45 kms)	
	➢ Reinforcement of Grid Substations	
IDA	• Kabeli Transmission Line (132 kV double circuit, 90 kms)	Ongoing
	• Khimti-Dhalkebar (220 kV double circuit, 75 kms)	
	• Bharatpur-Bhardaghat (220 kV double circuit, 75 kms)	
	• Hetauda-Bharatpur(220 kV single circuit, 75 kms)	
	• Hetauda-Dhalkebar-Inaruwa (400 kV double circuit, 285 kms)	
	• Duhabi-Anarmani Optical Ground Wire stringing	
	• Nepal and India Grid Synchronization Study	
KfW	• Upgrade of LDC Master Station	Planned
	• 28 km 220 kV transmission line between Chilime hub and Trishuli 3B hub	
Norwegian	• SASEC Power System Expansion Project (co-financing)	Planned
Challenge 5: Poor Financial Performance and Weak Creditworthiness of NEA		
Agencies	**Engagement**	**Status**

Agencies	Engagement	Status
ADB-Public Sector	• (TA 8329; NEP) Support for Sustainable Energy Management and Reforms. Assistance under this assignment are as follows:	Ongoing
	➢ Identify gaps in the existing FM system	
	➢ Time-bound reform actions for the NEA to implement a financial restructuring plan.	
	➢ Institutional strengthening of the NEA relative to organizational structure, operations, systems, program resources and resource management.	
	➢ Assist the NEA in developing the social and environmental impact assessment and safeguard plans	
	• Transaction Advisory Services for the GoN and NEA to implement large scale hydropower project under PPP.	
IDA	• NEA Integrated FM System; implemented by the NEA	Ongoing
JICA	• Advisor to NEA for electric administration	Ongoing
Challenge 6: Lack of Private Investment in the Power Sector		
Agencies	**Engagement**	**Status**
ADB-Public Sector	• (TA 8329; NEP) Support for Sustainable Energy Management and Reforms. Assistance under this assignment are as follows:	Ongoing
	• Assisting DoED in attracting private investment in power sector in Nepal with the focus on identification of gaps in existing policies and procedures and project development model.	
	• Review of PPA, Share Holders' Agreement and Implementation Agreement followed in Nepal for hydropower development	
Challenge 7: Lack of Regulatory and Policy Framework to Attract Investments		
ADB-Public Sector	• (TA 8329; NEP) Support for Sustainable Energy Management and Reforms. Assistance under this assignment are as follows:	Ongoing
	Assistance in reviewing and identification of gaps on various technical and commercial codes including standard of performance and consumer grievance redressal mechanism.	
	Draw out a plan and requirement for transition of ETFC to Nepal Electricity Regulator Commission.	
	Organization structure of the regulator (ETFC / Nepal Electricity Regulator Commission),	
	Assistance to ETFC in various tariff related issues like automatic indexation mechanism, unbundling of tariff, tariff determination framework for generation, transmission and distribution, cost of supply and development of tariff tool kit for generation, transmission and distribution.	
	• Preparation of energy efficiency policies and guidelines for Nepal and Bhutan.	
IFC	• Review of the legal and regulatory framework of the power sector in Nepal	Ongoing
IDA	• Development Policy Lending for the energy sector	Planned
IFC	• Streamlining licensing process for small hydro (<25MW) projects	Planned
Challenge 8: Lack of Power System Master Planning to Guide Investments		
Agencies	**Engagement**	**Status**
IDA	• Transmission Master Planning Study including Transmission wheeling charge study	Ongoing
	• TA to DoED/MoE for environmental and social safeguard capacity building: (a) cumulative impact assessment, and (b) basin-wide approach for hydropower planning	Planned
	• Distribution system planning, billing system and rural electrification database under the Grid Solar Project (which can be expanded to Rural Electrification Master Planning)	

Agencies	Engagement	Status
JICA	• Nationwide Master Plan Study on Storage-type Hydroelectric Power Development in Nepal	Completed
Challenge 9: Weak Technical Capacity in Preparation of Large-sized Hydropower and Transmission Line Projects.		
Agencies	**Engagement**	**Status**
ADB-Public Sector	• Project Preparatory Facility for Energy for Feasibility study of Sun Koshi 2 (1110 MW), Sun Koshi 3 (536 MW) and Dudh Koshi (300 MW)	Ongoing
	• Feasibility study of a second cross border transmission line between Nepal and India	
	• (TA 8329; NEP) Support for Sustainable Energy Management and Reforms. Assistance under this assignment are as follows:	
	i) Experience sharing of various hydro development models in selected countries other than Nepal.	
	ii) Assisting Tanahu Hydropower Limited on	
	iii) Organization Structure	
	iv) Financial Policies and Manuals	
	v) Development of Environment and Social Impact Monitoring system	
	vi) Procurement & Inventory Management System	
	• Feasibility study of second cross-border line under project preparatory facility for energy.	Planned
IDA	• TA to IBN to create the foundations for hydropower scale-up (support to development of large hydropower projects)	Ongoing
	• Detail project preparation of UAHEP (335 MW); implemented by NEA	Planned
	• TA to DoED/MoE for E&S safeguard capacity building: (a) cumulative impact assessment, and (b) basin-wide approach for hydropower planning	
	• TA to IBN for facilitating development of large hydropower projects (project based support, IBN capacity building)	
	• Feasibility study of next cross-border transmission link following completion of transmission master planning study	
	• Impacts of climate change on water	
	• Training workshops on (a) contract management; and (b) sedimentation management, associated with large hydropower projects	
IFC	• TA on IAs for IFC projects	Planned
	• Environmental and social guidelines and public sector capacity building	Ongoing
JICA	• Capacity building for the construction, operation and maintenance of hydropower projects in Nepal	Ongoing
Norwegian Ministry of Foreign Affairs	• Feasibility studies of small/medium hydropower	Ongoing
	• Sedimentation handling and headwork design of hydropower stations	
	• Short term support to Butwal Technical Institute	
	• Capacity building of Nepali electro mechanic industry	
Challenge 10: Uncertainties about Market for Nepal's Huge Hydropower Potentials and Lack of Trading Mechanism to Manage Shortage and Season Surplus of Power		
Agencies	**Engagement**	**Status**
ADB-Public Sector	• Study on regional electricity transmission plan for cross-border trade among SASEC member countries including Nepal.	Planned
	• Feasibility study for cross-border trade among SASEC member countries including Nepal.	
IDA	• Power trading strategy study (for possible surplus power in summer time in the future)	Planned

Agencies	Engagement	Status
	• SA Regional Energy Cooperation Project; implemented by the Bank	Ongoing
Challenge 11: Natural Resources for Power Generation		
Agencies	**Engagement**	**Status**
ADB-Public Sector	• Data collection and feasibility Study of Utility Scale Wind energy project	Planned
IDA	• Renewable Energy Resource Mapping Project (Wind); implemented by the Bank	Ongoing
Challenge 12: Energy Efficiency, Demand Side Management, and others		
Agencies	**Engagement**	**Status**
ADB-Public Sector	• Compact Florescent Lamp distribution project; implemented by NEA	Ongoing
	• Solar Street lighting Project in Kathmandu Valley; implemented by NEA.	
IDA	• Scaling up Demand Side Energy Efficiency and DSM Business Line in South Asia; implemented by the Bank	Planned
KfW	• Promotion of energy efficiency measures in Nepalese industrial companies.	Ongoing
Norwegian Ministry of Foreign Affairs	• Energize Nepal	Planned

Annex 7: Nepal Power Sector Overview
Nepal: Power Sector Reform and Sustainable Hydropower Development Project

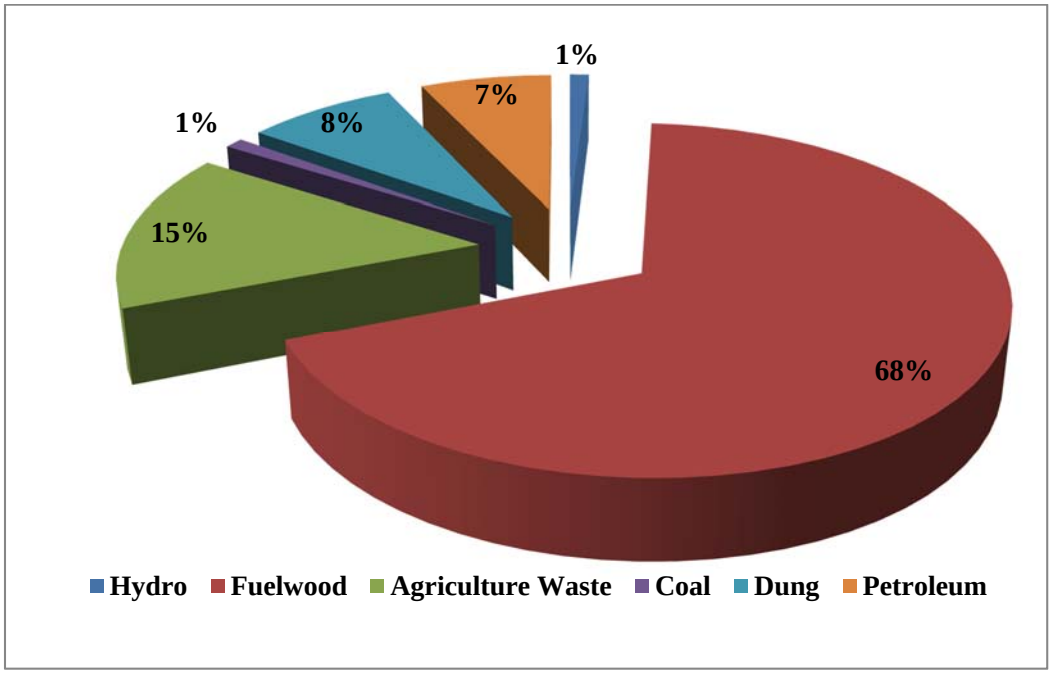
A. Background

1. Nepal is a landlocked country in South Asia. It is bordered by the People's Republic of China to the north and by India to the south, east and west. The Himalaya mountain range runs across Nepal's northern and western parts, and eight of the world's ten highest mountains, including the highest, Mount Everest, lie within its borders.

2. Water is an important natural resource of Nepal and represents a source of potential wealth. Hydropower generating potential is estimated to be about 82,000 MW and commercially viable generating potential is about 43,000 MW. Except for some lignite deposits, Nepal has no known oil, gas or coal deposits. All commercial fossil fuels (mainly oil and coal) are either imported from India or from international markets routed through India. Nepal's fuel imports, at US$ 1.36 billion in FY 14, constitute the single largest import items (Exceeding by a wide margin its revenues from all exports of goods and services).

3. Despite the hydro potential, hydroelectricity accounts for only one percent of total energy supplies. The bulk of Nepal's energy supplies come from traditional sources, such as fuelwood, agriculture waste and dung production by livestock. Fossil fuels, like petroleum and coal, account for the remaining eight percent. The energy mix of Nepal is detailed in the Figure 7.1.

Figure 7.1: Energy Mix of Nepal



B. Existing Institutional Arrangements

4. **Policy level institution**: The MoE is responsible for sector policy formulation and regulation, overseeing planning, investment, and development of the power sector, as well as

issuing licenses to the private sector for electricity generation, transmission, and distribution, including hydropower up to 500 MW.

5. **Regulatory level institution:** The ETFC, an independent body formed by the government comprising the private sector, which includes the representatives from the NEA, Ministry of Water Resources, Nepal Rastra Bank, Federation of Nepalese Chambers of Commerce and Industry, Consumers Forum and experts, reviews and approves retail electricity tariff rates and other charges.

6. **Operational level institution:** The IBN was established in November 2011 and entrusted with the responsibility of facilitating the development of large infrastructure projects, including hydropower projects above 500 MW. The NEA was formed in August 1985, under the Nepal Electricity Authority Act of 1984, as a vertically integrated government-owned utility responsible for generation, transmission, and distribution of electricity and system dispatch in Nepal. IPPs also invest, own, and operate power generation facilities, mostly based on hydro resources. For domestic grid-based electricity supply, the NEA serves as the single buyer for the power generated by the IPPs.

7. During the 1990s Nepal introduced far-reaching policy changes in opening up the power sector to domestic and foreign private sectors and to boost export of power. Nepal's enactment of the Hydropower Development Policy 1992, Electricity Act, 1992 and Electricity Regulations, 1993 marked the noticeable entry of IPPs in Nepal's power sector through non-recourse financing. Further, the Nepal Electricity Authority act was amended in 1992 to "enable the NEA to function autonomously". Since then the NEAs status has been replaced from that of a sole monopoly player to that of a licensee with the responsibility of buying the privately generated power, hence promoting IPPs.

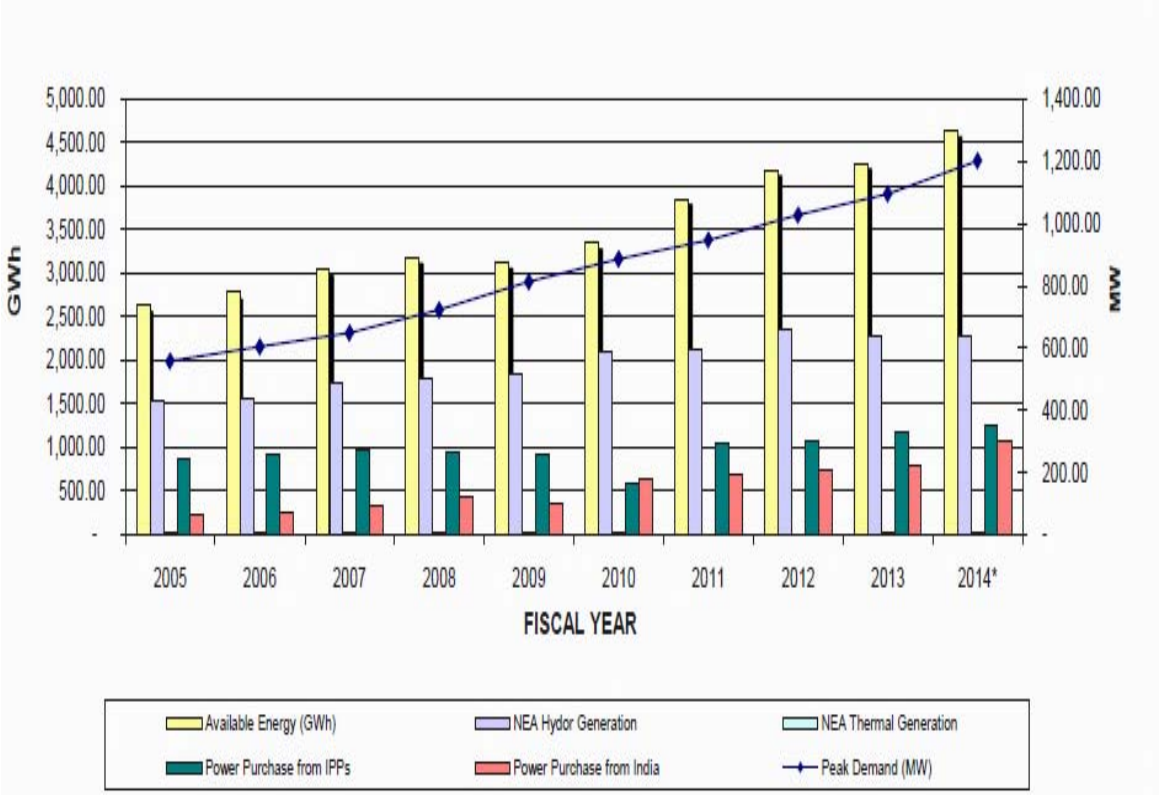
Table 7.1 gives the time line of important development in power sector

Year	Description
FY-1984	Nepal enacted the Nepal Electricity Authority Act, 1984 which paved the way for the formulation of NEA.
August, 1985	The NEA was created under the Nepal Electricity Authority Act, 1984 through the merger of the DoED, Ministry of Water Resources, related Development Boards and Nepal Electricity Corporation
FY-1992	Nepal enactment of the Hydropower Development Policy 1992
FY-1992	Nepal enacted Electricity Act, 1992
FY-1992	The NEA act was amended in 1992 to "enable the NEA to function autonomously". Since then the NEAs status has been replaced from that of a sole monopoly player to that of a licensee with the responsibility of buying the privately generated power, hence promoting IPPs.
FY-1993	Nepal enacted Electricity Regulations, 1993 which marked the noticeable entry of IPPs in Nepal's power sector through non-recourse financing.
February, 2002	The NEA implemented the profit center concept by enacting "Distribution Centre Operation Regulation-2059", to strengthen customer focus and commercial orientation in its operations.
FY-2003/04	The Distribution and Consumer Services Business Group was formed in a part of internal unbundling process of the NEA to strengthen customer focus and operate the NEA in line with commercial principles.
February, 2003	The NEA enacted the "Community Distribution Regualton-2060" to promote and regulate the activities which was followed by the establishment of Community Rural Electrification Department.

C. Power Sector Status

8. The story of power position in Nepal is that of highest potential and lowest consumption. The main load center is the central zone, which includes the Kathmandu Valley. Figure 7.2 illustrates the available energy and peaking demand in the sector. In the area of transmission and sub-transmission of electricity, the NEA system has grown into a network of more than 2129 circuit km of 132 kV, 511 circuit km of 66 kV and around 2500 km of 33 kV power lines. Distribution and customer services were provided with lines around 8000 km of 11 kV by 2012.

Figure 7.2: Available Energy and Peaking Demand



9. The NEA has been always languishing with the issues of high tariff, high system losses, high generation costs, high overheads, over staffing and lower domestic demand. Its endeavors to maximize the utilization of available resources including import through trading of power from the Indian short-term market has not able to offset the imbalance, resulting in long hours of distasteful load shedding.

10. At 9.7 percent growth in peak power demand in FY 2013-14 have further aggravated the situation. In the dry months, shrinking of snow-fed rivers further worsen the situation and the NEA is left with no option but to impose 14 hours per day load shedding for the consumers.

11. The NEA's total operating cost and other costs generally overruns the revenue. Table 7.2 gives an overview of the NEA's financial status.

Table 7.2: NEA's Financial Status (NPR million)

NEA Financial Status			
(Million NRs.)	**2011**	**2012**	**2013**
Total Revenue	19,329.76	21,784.06	27,222.99
Total Operating Expenses	19,849.95	22,293.41	25,728.15
Interest on long term loans	3,594.01	3,885.49	4,039.65
Foreign exchange translation losses/ gains	85.01	896.57	-652.14
Employee benefits	1,890.01	4,106.68	2,112.74
Prior year income/expenses	0.00	-80.91	-34.21
Net Income (Loss)	-6,089.22	-9,317.18	-3,971.20

12. Significant policy developments in the sector suggest that large-scale investments in hydro-projects are likely to materialize over the short to medium terms, which would result in a vast expansion, over time, of power generation and power export. PDAs were signed for the exported-oriented Upper Karnali hydro electricity project (900 MW) in September 2014 and Arun III hydroelectricity project (900 MW) in November 2014. Several other projects are also in the pipeline. (see Table 7.3) Moreover, the signing of a PTA with India is likely to boost interest of investors / developers in the Nepal market going forward.

Table 7.3: Large Hydropower Projects in Advanced Stage of Preparation

Hydropower Projects	Capacity (MW)	Domestic Energy Share	Cost Esti. ($ M)	Status	Leading Sponsor
Upper Karnali	900	12% free to GoN	1,050*	PDA signed	GMR
Arun III	900	21.9% free to GoN	1,009*	PDA signed	SJVNL
Upper Marshyangdi	600	TBD	723*	PDA negotiation	GMR
Tamakoshi 3	660	TBD	925*	PDA negotiation	STATKRAFT
West Seti	750	100	1,000	Memorandum of understanding (survey license)	TGPC
Upper Trishuli 1	216	100	580	PDA/PPA negotiation	NWEDC
UAHEP	335	100	445		NEA
Total	**4361**				

Note: Cost Estimations exclude cost of transmission lines. NWEDC= National Water and Energy Development Company
* Due Diligence Report, IBN, 2013.
** Summer: Two-thirds of annual production will be exported to India; Winter: To be supplied within Nepal

13. Similarly, around 1077 MW projects are under construction and by 2020 around 1500 MW will be added to the current system. Table.7.4 shows power plants under construction and under various stages development.

Table 7.4: Hydropower Projects in Advanced Stage of Preparation

S. No	Plant Name	Type	Commissioning date	Installed Capacity (MW)
NEA owned				
1	Chameliya HEP	PROR	2014/15	30
2	Kulekhani III HEP	ST	2014/15	14
3	Upper Trishuli 3 'A' HEP	ROR	2015/16	60
4	Rahughat HEP	ROR	2017/18	32
6	Upper Trishuli- 3B	ROR	2016/17	40
	Sub total			**176**
Independent power producers				
	NEA's subsidiary company			

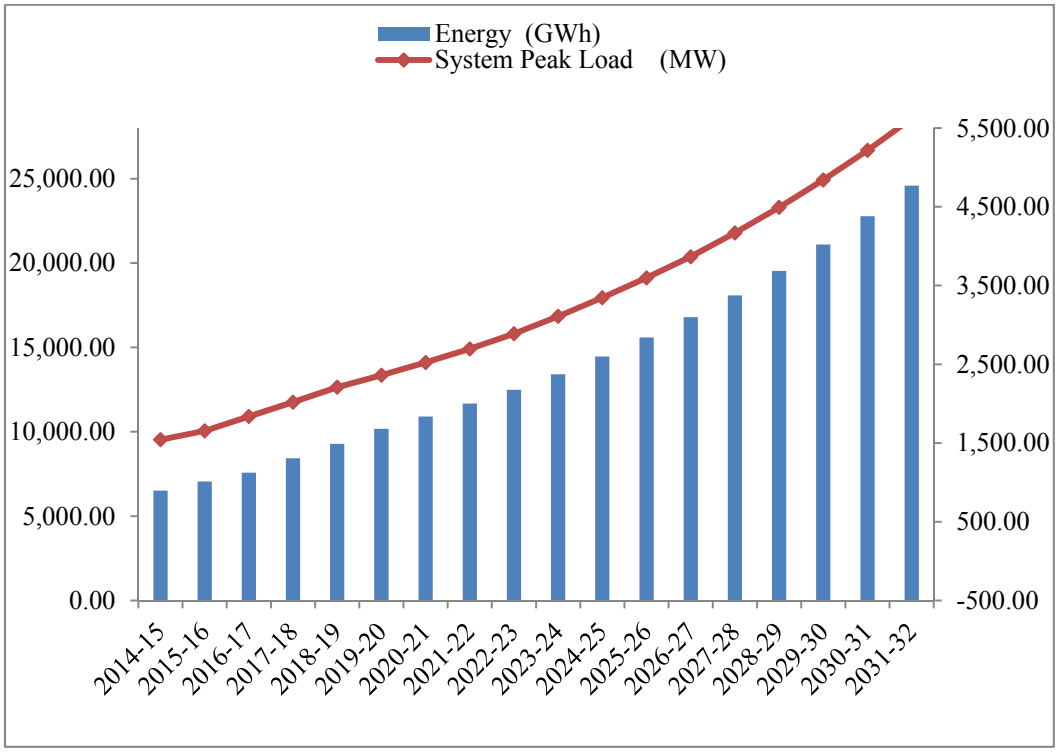
7	Upper Tamakoshi HEP	PROR	2016/17	456
8	Tanahu HEP	ST	2019/20	140
9	Upper Sanjen HEP	ROR	2015/16	14.8
10	Sanjen HEP	ROR	2016/17	42.5
11	Madhya Bhotekoshi HEP	ROR	2018/19	102
12	Rasuwagadhi HEP	ROR	2018/19	111
	Sub total			**866.3**
IPP's under construction (ROR type Projects)				
13	NauGad Gad Khola	–	2016/17	8.5
14	Andhi Khola Upgrading	–	–	4.3
15	Chhandi	–	–	1.7
16	Lower Indrawati	–	2015/16	4.5
17	Jiri Khola	–	2014/15	2.2
18	Pikhuwa Khola	–	2014/16	2.475
19	Mai Khola	–	2014/15	22
20	Belkhu	–	2014/16	0.52
21	Mailung	–	2014/15	5
22	Jhyadi	–	2013/14	2
23	Phawa	–	2015/16	4.95
24	Upper Mai Khola	–	2014/15	9.98
25	Chake Khola	–	2014/15	0.99
26	Upper madi	–	2015/16	19
27	Radhi Khola	–	2013/14	4.4
28	Khani Khola-1	–	2015/16	25
29	Badi Gad	–	2016/17	6.6
30	Gelun	–	2016/17	3.2
31	Hewa Khola	–	2015/16	14.9
32	Upper Marsyangdi	–	2016/17	50
33	Daraudi Khola A	–	2017/18	6
34	Upper Belkhu	–	2015/16	0.75
35	Midim	–	–	0.1
36	Upper Dordi A	–	2017/18	22
37	Lohore Khola	–	2015/16	4.2
38	Upper Mai C	–	2015/16	5.1
39	Madhya Modi	–	2017/18	15.1
40	Thapa Khola	–	2016/17	11.2
41	Tungun-Thosne	–	2015/16	4.36
42	Selang Khola	–	2015/16	0.99
43	Mistri Khola	–	2016/17	42
44	Upper Hugdi Khola	–	2015/16	5
45	Salankhu Khola	–	2015/16	2.5
46	Mai Cascade		2015/16	8
47	Miya Khola	–	2014/15	0.996
48	Khani Khola(Dolakha)	–	2016/17	30
49	Daram Khola A	–	2015/16	2.5
50	Upper Chaku A	–	2014/15	22.2
51	Madkyu Khola	–	2015/16	9.968
52	Dhansi Khola	–	2014/15	0.955
53	Lower Khare	–	2017/18	8.26
54	Khorunga Khola	–	–	4.8
55	Teliya Khola	–	–	0.99
56	Tinau Khola	–	2015/16	0.99
57	Saba Khola	–	2015/16	3.3

58	Lower Modi	–	2017/18	20
59	Sardi Khola	–	2016/17	3.5
60	Junbesi Khola			5.2
61	Dhunge-Jiri	–	2016/17	0.6
62	Upper Mailun A	–	2015/16	5
63	Mai Sana Cascade	–	–	7
64	Tinekhu Khola	–	2015/16	0.99
65	Jumdi Khola	–	2014/15	1.75
66	Suspa Bukhari	–	2014/15	0.35
67	Dordi Khola	–	2017/18	27
68	Tadi Khola	–	2014/15	5
69	Upper Puwa Khola-1	–	2013/14	3
Sub total				**483.864**
IPP's under different stage of development (PPA Concluded)				
70	Narayani Shankar Biomass	–	2014/15	0.6
71	Charanawati	–	2014/15	0.98
72	Golmagad	–	2014/15	0.58
73	Dapcha-Roshi	–	2015/16	5
74	Ladku Khola	–	2015/16	0.7
75	Namarjun Madi	–	2016/17	11.88
76	Lower Balephi	–	2016/17	18.514
77	Seti Khola	–	2014/15	0.465
78	Lower Sunkoshi -III	–	2016/17	9.9
79	Middle Gaddigad	–	2015/16	2.97
80	Theule Khola	–	2015/16	1.5
81	Dorkhu Khola	–	2014/15	0.99
82	Upper charnawati	–	2015/16	2.02
83	Balefi	–	2016/17	24
84	Upper Khimti	–	2015/16	12
85	Likhu-IV	–	2016/17	52.4
86	Chhote Khola	–	2013/14	0.6
87	Upper Ingua Khola	–	2017/18	9.7
88	Upper Mailung	–	2017/18	14.3
89	Tame Khola	–	2015/16	1.25
90	Solu Hep		2016/17	23.5
91	Lower Solu HEP		2016/17	82
92	Khare Khola		2016/17	24.1
93	Mewa HEP		2016/17	50
94	Maya HEP		2016/17	14.9
95	Singati Khola	–	2016/18	16
96	Upper Tadi	–	2017/18	11
97	Upper Mai C	–	2015/16	5.1
98	Kabeli B-1	–	2017/18	25
99	Upper Piluwa Khola	–	2019/20	9.622
100	Khani Khola	–	2015/16	2
101	Middle Tadi	–	2015/16	5.325
102	Upper Jumdi	–	2015/16	0.995
103	Jogmai	–	2016/17	7.6
104	Upper Parajuli Khola	–	2015/16	2.15
105	Upper Solu	–	2017/18	18
106	Rawa Khola	–	2015/16	6.5
107	Bagmati Khola	–	2018/19	20
108	Middle Midim	–	2015/16	3

109	Kabeli –A ***(PPA under negotiation)***	–	2017/18	37.6
110	Lower Jogmai	–	2017/18	6.3
111	Balephi- A	–	2018/19	10.6
112	Upper Trishuli I ***(PPA under negotiation)***	–	2018/19	216
	Sub total			767.641
	Grand Total			**2293.805**

14. The NEA prepares the long-term demand and energy forecast and reviews the forecast once in every two years. However, of late, the NEA has not updated/ reviewed the demand and energy forecast for quite a long duration. The last review was in 2005. The electricity demand forecast, covering the period up to FY 2031/32 is prepared (Figure 7.3) considering the country's macro-economic indicators and rural electrification expansion programs.

Figure 7.3 NEA's Load Forecast



15. Based on the revised load forecast, the capacity and peak load will be balanced by *FY2017/18*. The capacity balance is based on the existing generating system, projects being implemented by the NEA and IPPs, PPAs concluded so far, and import from India. The capacity balance also takes into account the possibility of power supply from other sources such as solar, cogeneration, and bio mass from both the NEA and non-utility generators. The summary of the capacity balance is presented in Table 7.5.

Table 7.5: Capacity Balance

Generation Mix	2013/14	2014/15	2015/16	2016/17	2017/18
Hydro	779	934	1,175	2,092	2404
Thermal	53	53	53	53	53
Import	130.00	130.00	280.00	280.00	280.00
Total	962	1,117	1,175	2,425	2737
Peak demand	1,201	1426	1542	1653	1837
Surplus(Shortage)	(239)	(309)	(367)	772	900

Annex 8: Economic and Financial Analysis

Nepal: Power Sector Reform and Sustainable Hydropower Development Project

A. Scope of Analysis

1. The economic and financial analysis is carried out for Component A of the project comprising the UAHEP and IKHP. The economic analysis of the IKHP is based on the feasibility study report dated March 2014.

B. Overview of Project

2. **Energy and capacity**. The proposed project has considered preparation of two hydropower plants, the UAHEP and IKHP. The UAHEP has been designed as a 335 MW peaking run-of-the-river hydroelectric scheme on the Arun River in the eastern part of Nepal. The average annual electricity generation is expected to be 2050 GWh. The plant capacity factor[5] is thus 69.85 percent. The project will supply electricity to the Nepalese national grid. Similarly, IKHP has been designed as a 30 MW peaking run-of-the-river hydroelectric scheme on the Ikhuwa River in the eastern part of Nepal. The average annual electricity generation is expected to be 181.75 GWh. The plant capacity factor is thus 69.15 percent.

3. **Capital cost**. Financial costs of the project have been estimated including physical and price contingencies to the base costs. The project costs are estimated based on 2011 price level for the UAHEP and March 2014 for IKHP. Economic costs have been arrived at by removing price contingencies, custom duties and taxes (at 1.5 percent of foreign cost), as well as VAT and IDC from the financial cost. Only the base costs and physical contingencies are included. The local currency component of the project costs have been multiplied by the standard conversion factor of 0.85 to adjust for the price distortions of the items like unskilled and skilled labor and exchange rate.

C. Economic Analysis

C.1 Identification and Valuation of Economic Benefits

4. **UAHEP**: The principal benefit of the project is the electric energy generated by the project. In the case of the UAHEP, there are two approaches to valuing the economic benefit of the electric energy. The first approach is the valuation of energy based on the LRMC of electricity generation, which indicates the average incremental cost of electricity generation in Nepal which is a predominantly hydro-based system. The second approach is to use the electricity import substitution cost, meaning that the UAHEP electricity generation would be able to substitute the import of electricity from India. In the past, the NEA has been importing electricity from India on an ad hoc basis, based on a government-to-government power exchange agreement. Recently, NEA has signed contract to import 150 MW of electricity on a long-term (25 years) contract with Power Trading Corporation of India[6]. The tariff for imported electricity is based on the price at the delivery point in India plus wheeling charges and losses up to Dhalkebar substation. These values are used in the economic analysis to establish the range of the likely economic return of the project.

[5] Plant capacity factor=annual energy generation/(installed capacity x 8760)
[6] Power Sales Agreement between NEA and Power Trading Corporation of India PTC, December 2011.

5. **IKHP***:* For the purpose of economic analysis the replacement cost of electro-mechanical equipment has also been taken into account. Analysis was conducted by including all the costs to construct, operate and maintain the project. Costs and energy benefit stream were assessed at present value at 10 percent discount rate to arrive at present day energy cost.

6. To compare the different options with respect to the EIRR and benefit / cost ratio the present value of the costs and benefit of all the options were determined to the first year of construction.

C.2 Other Assumptions

7. Other assumptions are:

For UAHEP

(i) Exchange rate US$ 1=NPR 99
(ii) O&M (salaries, spare parts) has been assumed to be 1.5 percent of the investment costs.
(iii) Useful economic life of the project has been considered as 40 years.
(iv) The project construction period is assumed to be 5 years and electricity generation would start from the beginning of the year 2022.
(v) All costs and benefits are based on 2011 prices level expressed in US dollars and no price inflation is assumed, either in benefits or costs, over the period of analysis.

For IKHP

(i) Construction cost is distributed in three years, 35 percent in the 1st year, 40 percent in 2nd year, and 25 percent in 3rd year.
(ii) Economic Life of the Project: 30 years
(iii) Economic life of the electro-mechanical equipment: 25 years
(iv) Discount rate: 10 percent
(v) Annual benefit starts from Fourth year
(vi) Annual cost of O&M is taken as 2.0 percent of the project cost and disbursement of this starts from the fourth year.
(vii) Rates used for calculation of energy price are: NPR.8.4 per unit for dry season and NPR.4.8 per unit for wet season.

C.3 Base Case Economic Internal Rate of Return

8. **UAHEP***:* The project EIRR for UAHEP is calculated with and without carbon benefit at electricity generation valued at LRMC and long term electricity import tariff. The results are summarized in Table 8.1 below. The economic internal rate of return of the project is found to be very low. The project would yield higher return on import tariff based valuation of benefit.

Table 8.1: The EIRR and NPV for the Project

Case	Net Benefits
EIRR based on LRMC	28.0%
NPV Based on LRMC	US$ 408 million
EIRR based on import tariff	33.0%
NPV Based on Import Tariff	US$ 551 million

9. **IKHP***:* The options show benefit-cost ratio more than 1.0, RR of more than 10 percent and positive NPV. The analysis shows that the project is economically viable for all capacity options however the results of the economic analysis shows that the project is optimized for the installed capacity of 30.17MW at 40 percent probability of exceedance of flow having IRR 18.5 percent and benefit/cost Ratio of 1.7.

Table 8.2: Result of Economic Analysis of all Cases for different Capacity Options

Probability of exceedance (%)	Installed Capacity(MW)	Project Cost (NPR in Million)	Benefit/cost Ratio	EIRR (%)	NPV (NPR in Million)
35	36.5	4,567.6	1.5	16.90	2,576.9
40	30.1	4,144.5	1.7	18.50	2,970.7
45	23.9	3,880.7	1.6	17.48	2,399.6
55	16.8	3,640.6	1.3	15.14	1,471.5
70	11.4	3,242.6	1.2	13.16	763.5

D. Financial Analysis

10. The financial analysis is carried out to assess the financial viability of the project considering all cost and benefits of the project at market price including custom duties and taxes and VAT. Financial analysis without loan financing and before corporate income tax is carried out to understand the financial viability of the project without the effect of financing conditions of the lenders. It should be noted here that financial conditions of the loan could leverage the project return.

11. The financial benefit of the UAHEP is based on the weighted average PPA rates for hydropower plants that is NPR 4.8/kW in wet season and NPR 8.4 /kW in dry season.

D.1 Base Case Financial Internal Rate of Return

12. Using the above assumption, the project level FIRR calculated for the UAHEP. The results are summarized in Table 8.3. The project FIRR is found to be 22.64 percent which is above the average cost of loan from the commercial banks in Nepal, which ranges from 12-15 percent.

Table 8.3: The FIRR and NPV for the Project

Case	Net Benefits
FIRR (Average retail tariff)	22.64 %
NPV	US$ 377.7 million

Annex 9: Maps
Nepal: Power Sector Reform and Sustainable Hydropower Development Project