ADB

Report and Recommendation of the President to the Board of Directors

Project Number: 44219
April 2014

Proposed Loan, Technical Assistance Grant and Administration of Grants
Nepal: South Asia Subregional Economic Cooperation Power System Expansion Project

Asian Development Bank

CURRENCY EQUIVALENTS
(as of 10 March 2014)

Currency unit	–	Nepali rupees (NRs)
NRs1.00	=	$0.01016
$1.00	=	NRs98.41

ABBREVIATIONS

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
AEPC	–	Alternative Energy Promotion Centre
CDTA	–	capacity development technical assistance
EA	–	executing agency
EARF	–	environment assessment and review framework
EIB	–	European Investment Bank
EIRR	–	economic internal rate of return
EMP	–	environmental management plan
FIRR	–	financial internal rate of return
HTLS	–	high temperature low sag
IEE	–	Initial Environmental Examination
IP	–	indigenous people
IPP	–	independent power producer
MOE	–	Ministry of Energy
MOSTE	–	Ministry of Science, Technology and Environment
NEA	–	Nepal Electricity Authority
NERC	–	Nepal Electricity Regulatory Commission
O&M	–	operation and maintenance
PAM	–	project administration manual
PPTA	–	project preparatory technical assistance
RIPP	–	resettlement and indigenous peoples plan
SCF	–	Strategic Climate Fund
SREP	–	Scaling Up Renewable Energy Program in Low Income Countries
TA	–	technical assistance

WEIGHTS AND MEASURES

kV	–	kilovolt
kWh	–	kilowatt hour
MVA	–	megavolt-ampere
MW	–	megawatt

NOTE

In this report, "$" refers to US dollars.

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PROJECT AT A GLANCE

1. Basic Data — **Project Number:** 44219-014

Project Name	South Asia Subregional Economic Cooperation Power System Expansion Project	**Department /Division**	SARD/SAEN
Country	Nepal	**Executing Agency**	Alternative Energy Promotion Center (AEPC), Nepal Electricity Authority (NEA)
Borrower	Government of Nepal		

2. Sector	**Subsector(s)**	**ADB Financing ($ million)**
✓ Energy	Electricity transmission and distribution	175.00
	Renewable energy generation - small hydro	5.20
	Renewable energy generation - solar	0.10
	Renewable energy generation - wind	0.20
	Total	**180.50**

3. Strategic Agenda	**Subcomponents**	**Climate Change Information**	
Inclusive economic growth	Pillar 1: Economic opportunities, including jobs, created and expanded	Adaptation ($ million)	2.00
Environmentally sustainable growth	Global and regional transboundary environmental concerns	Mitigation ($ million)	140.00
	Natural resources conservation	CO_2 reduction (tons per annum)	20,000
Regional integration	Pillar 1: Cross-border infrastructure	Climate Change impact on the Project	Medium

4. Drivers of Change	**Components**	**Gender Equity and Mainstreaming**	
Governance and capacity development	Organizational development	Effective gender mainstreaming (EGM)	✓
Partnerships	Bilateral institutions (not client government)		
	International finance institutions (IFI)		
	Official cofinancing		

5. Poverty Targeting		**Location Impact**	
Project directly targets poverty	No	Rural	Medium
		Urban	Medium

6. Risk Categorization: Complex

7. Safeguard Categorization **Environment:** B **Involuntary Resettlement:** A **Indigenous Peoples:** B

8. Financing

Modality and Sources	Amount ($ million)
ADB	**180.50**
Sovereign Technical Assistance: Technical Assistance Special Fund	0.50
Sovereign Loan: Asian Development Fund	180.00
Cofinancing	**191.20**
Strategic Climate Fund	11.20
European Investment Bank	120.00
Norway	60.00
Counterpart	**68.80**
Beneficiaries	8.46
Government	60.34
Total	**440.50**

9. Effective Development Cooperation

Use of country procurement systems	Yes
Use of country public financial management systems	Yes

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on (i) a proposed loan, (ii) proposed administration of a grant to be provided by the Government of Norway, and (iii) proposed administration of a grant to be provided by the ADB Strategic Climate Fund (SCF)[1], all to Nepal for the South Asia Subregional Economic Cooperation (SASEC) Power System Expansion Project. The report also describes a proposed technical assistance (TA) for Support for Rural Electrification through Renewable Energy, and if the Board approves the proposed loan and administration of the grants, I, acting under the authority delegated to me by the Board, approve the TA[2].

2. The project is designed to assist Nepal's energy sector development by facilitating (i) near-term expansion of domestic power transmission capacity, (ii) medium and long-term power exchange with India, (iii) augmentation and expansion of the distribution networks, and (iv) mini-grid based renewable energy access in rural areas[3].

II. THE PROJECT

A. Rationale

3. Nepal is facing chronic power shortages: only 65% of the country's households have access to electricity, comprising 56% through national grid and 9% through off-grid solutions, and per capita electricity consumption is only 102 kilowatt hours (kWh) per year, one of the lowest in the world. The existing installed capacity is 762 megawatts (MW), whereas the peak demand is 1,095 MW. Therefore, grid-connected consumers experience scheduled power cuts of 12 hours per day or more during dry seasons. With the expected commissioning of six hydropower projects totaling 732 MW, including the 456 MW Upper Tamakoshi hydropower plant, in the next 3-6 years, and with more than 1,500 MW of additional capacity under development, a wet season supply surplus is anticipated by 2018.[4] Limited power transmission and distribution network, however, is becoming the bottleneck for meeting domestic power demand as well as power trade with neighboring countries.

4. The government has set the following key targets to be met by year 2027[5] : (i) increasing per capita electricity consumption to 400 kWh per year; (ii) commissioning 4,000 MW of generation capacity; (iii) providing electricity to 75% of the population through the national grid and 25% through decentralized generation solutions; and (iv) developing exportable power capacity. Steps have been taken to meet these targets. A master plan for hydropower with annual storage capacity has been prepared; the transmission system master plan is being updated; a distribution system and rural electrification master plan has been outlined by Nepal Electricity Authority; and long-term agreement for bulk power trading with India is being negotiated. Parallel institutional improvements are needed: While the incremental retail tariff increase over a ten year period (2002-2012) of 20% in 2012 has improved NEA's financial position to some extent, NEA's financial position is still weak due to tariffs not being cost

[1] Under the Scaling Up Renewable Energy Program in Low-Income Countries financed by the Strategic Climate Fund
[2] The design and monitoring framework is in Appendix 1.
[3] The Asian Development Bank (ADB) provided project preparatory technical assistance (PPTA). ADB. 2013. *Technical Assistance to Nepal for Preparing the South Asia Subregional Economic Cooperation Power System Expansion Project*. Manila
[4] The total installed capacity will be more than 3,000 MW against the projected peak load of 2,052 MW in FY 2019/2020.
[5] Government of Nepal. 2010. *Three Year Interim Plan (2010-2013).* Kathmandu.

reflective, which needs to be significantly enhanced[6]; system planning capacity needs to be improved; generation, transmission and distribution departments of NEA need to be ring-fenced as a precursor to further corporate restructuring, and a fully independent regulatory agency needs to established.

5. To achieve the 25% electrification target through off-grid solutions, the government has enacted relevant policies and plans, such as Rural Energy Policy 2006; Subsidy Policy for Renewable (Rural) Energy 2009-2013; Renewable (Rural) Energy Subsidy Delivery Mechanism 2013; and Delivery Mechanism of Additional Financial Support to Micro/Mini Hydro Project 2011. The enabling measures, such as targeted grants (subsidies), and exemption of renewable energy projects from certain licensing requirements have been set up. These activities are being coordinated and implemented under the National Rural and Renewable Energy Program, a government-led "single window" program for off-grid renewable energy which is supported by various development partners.

6. The project will contribute to Nepal's energy development objectives by (i) scaling up both on-grid and off-grid RE supply, (ii) facilitating cross-border power exchange, (iii) increasing access to RE in rural areas, and (iv) building capacity for on-grid and off-grid power sector development. The on-grid components will be able to evacuate 2,000 MW of new generation outputs at Kali Gandaki Corridor and Marsyangdi Corridor[7] to the main load centers at Kathmandu valley and facilitate minimum 1,200 MW of power export to India including 600 MW from the Upper Marsyangdi 2 Hydropower Project to be developed by GMR, once connected to the second 400 kilovolt (kV) cross-border transmission line from Bardaghat (Nepal) to Gorakhpur (India).[8] The off-grid component will provide access to electricity and facilitate productive energy use activities in rural locations without national grid connection[9], enhancing income and welfare of rural communities by utilization of the renewable energy, mainly in sectors of agriculture, rural enterprise, health and education. The project is fully consistent with the ADB Country Partnership Strategy[10] which focuses on: (i) improving inclusive electricity access; (ii) renewable energy development; (iii) regional cooperation; and (iv) strengthening sector governance. The project is also prioritized as part of the SASEC Power Generation and Transmission Master Plan and Regional Cooperation Business Plan 2014-2016.[11] The sector and programmatic context of the project is presented in Supplementary Document 22.[12]

7. **ADB's interventions**. In 2009, 2011 and 2013, ADB approved three projects[13] to address the immediate needs for power sector including generation, transmission and distribution system expansion and improvement. In particular, the CDTA 8329-Support for

[6], NEA still suffered from net loss of NRs 4.53 billion in FY 2012-2013.

[7] The Marsyangdi Corridor transmission line could have been assigned to a private developer who is considering building a 600 MW hydropower plant in Nepal. Although the proposal has many merits, the NEA opted for a purely public facility in this case. The rationale is to offer all private investors power evacuation facilities on a national and equal basis.

[8] The feasibility study for the second cross-border transmission line is being funded by Grant 0361-NEP: Project Preparatory Facility for Energy.

[9] The off-grid component has been developed pursuant to the Nepal Country Investment Plan of the Scaling Up Renewable Energy in Low-income Countries program.

[10] ADB. 2013. *Nepal Country Partnership Strategy 2013-2017*. Manila.

[11] ADB. 2013. *South Asia Regional Cooperation Operations Business Plan 2014-2016*. Manila.

[12] Sector and Programmatic Context of the Project (available from the list of linked documents in Appendix 2, subject to request)

[13] ADB. 2009. *Energy Access and Efficiency Improvement Project*. Manila; ADB. 2011. *Electricity Transmission and Supply Improvement Project*. Manila; and ADB, 2013. *Tanahu Hydropower Project*. Manila. The Tanahu Hydropower Project is associated with a capacity development technical assistance (CDTA) 8329-NEP: *Support for Energy Sector Management and Reforms*.

Energy Sector Management and Reforms, associated with Tanahu Hydropower Project approved in 2013, is being implemented to support NEA's financial restructuring and management reforms, to strengthen the Electricity Tariff Fixation Commission (ETFC)'s capacity to review retail tariff adjustment petitions proposed by NEA and improve ETFC's institutional readiness for transformation to Nepal Electricity Regulatory Commission (NERC). ADB is also supporting the government to review and incorporate the comments by parliament on the draft Nepal Electricity Act 2009 and NERC Act 2009. CDTA 8329 is treated as a single window technical assistance for ADB to support institutional and policy development in the on-grid power sector of Nepal, and more resources will be allocated as needed. The project will supplement ADB's ongoing interventions by enhancing NEA's financial position through implementation of a pricing mechanism for the use of NEA's power grid by third parties for electricity exports, and improving NEA's planning capacity through supporting preparation of the distribution system/rural electrification master plan, among others.

8. **Lessons learned from on-going projects.** ADB's operations in the power since 2009 have been instrumental in supporting the power sector reform process including preparation of NEA's financial restructuring and a major tariff increase of 20% after 11 years. However, the implementation of the ongoing projects including procurement of consultants and contractors has been slow. The same applies to decision making within the NEA. Land acquisition has also been a problem caused mostly by alignment changes. The readiness of projects has been low. The design of this project has fully integrated these lessons. Project management will be handled by a Project Management Directorate (PMD). This will be headed by a deputy managing director level officer, and will be responsible for procurement and construction supervision of all ADB projects[14]. The PPTA includes a consulting firm to help NEA conduct detail design, route surveys, prepare bidding documents, and select turnkey contractors. Further, a project supervision consulting firm, funded by the project, will oversee project construction. The implementation schedule will be longer than the standard 5-years schedule. The S curve for disbursement is realistic and takes into account the difficulties encountered into project implementations in Nepal.

9. **Coordination with other donors**. The project has been developed with active coordination among the NEA under the Ministry of Energy (MOE); the Alternative Energy Promotion Centre (AEPC) under the Ministry of Science, Technology and Environment (MOSTE); the government of Norway and the Norwegian Agency for Development Cooperation; the European Investment Bank (EIB); the government of Denmark and the German Development Bank. The project components are complementary to operations of the World Bank Group[15] and Japan International Cooperation Agency.

B. Impact and Outcome

10. The project's impact will be increased electricity access both in Nepal and across the border. The outcome will be increased capacity of national electricity grid and increased renewable energy use.

C. Outputs

11. The Project outputs will be:

(i) Output 1. Power transmission capacity increased. This comprises: (a) construction and/or augmentation of 45 km of 400 kV and 191.5 km of 220 kV

[14] For details, see Project Administration Manual (accessible from the list of linked documents in Appendix 2).
[15] The World Bank is supporting Dhalkebar (Nepal) –Muzarffarpur (India) 400 kV cross border transmission line.

transmission lines along Kali Gandaki corridor and Marsyangdi-Kathmandu route; (b) construction and/or augmentation of 500 megavolt-ampere (MVA) of 400 kV/220 kV/132 kV, 500 MVA of 220 kV/132 kV/33 kV, and 120 MVA of 33 kV/11 kV grid substations along Kali Gandaki corridor and Marsyangdi-Kathmandu route; and (c) construction and/or replacement of grid service substations with an aggregated capacity of 393.8 MVA across the country.[16]

(ii) Output 2. Power distribution network improved. This comprises the construction and/or upgrading of 410 km of 33 kV, 545 km of 11 kV, and 725 km of 400 V distribution lines, 216 MVA 33kV/11kV substations and 20 MVA distribution substations in East, Central and West regions.

(iii) Output 3. Mini-grid based renewable energy systems in off-grid areas increased. This includes installation of up to total 4.3 MW of mini hydro-electric power plants and up to total 0.5 MW of mini-grid based solar or solar/wind hybrid systems, in selected rural communities, through the provision of (a) a credit line of $5 million from ADB's Special Funds to user communities for mini-hydro power plants and (b) a $10 million grant from the SCF administered by ADB.[17]

(iv) Output 4. Capacity development supports to NEA and AEPC provided. The physical investments will be reinforced and supplemented by capacity building support to NEA and AEPC, including project management support, preparation support for distribution system/rural electrification master plan and feasibility study of large scale wind farm, and parallel livelihood development activities in the project area.

D. Investment and Financing Plans

12. The total project cost is estimated at $440 million including physical and price contingencies and interests during implementation. The investment plan is summarized in Table 1. Detailed cost estimates are included in the project administration manual (PAM)[18].

13. The government has requested a loan of $180.0 million[19] in various currencies equivalent to SDR 115,932,321 from ADB's Special Funds resources to help finance the project. The loan will have a 32-year term, including a grace period of 8 years, an interest rate of 1.0% per annum during the grace period and 1.5% per annum thereafter, and such other terms and conditions as set forth in the draft loan and project agreements. ADB will finance the interest during construction.

14. The government also requested cofinancing of $191.2 million, which comprises a loan of $120 million from the EIB[20], a grant of $60.0 million equivalent from the Government of

[16] In addition, EIB will parallelly cofinance the construction of 125 km of 220 kV transmission line and 400 MVA of 220 kV/132 kV/33 kV substations at Marsyangdi corridor, and 24 km of 132 kV transmission line, and 30 MVA 132 kV/33 kV and 6/8 MVA of 33 kV/11 kV substations at Samundratar-Trishuli 3B transmission hub.
[17] Under the Scaling Up Renewable Energy Program in Low Income Countries (SREP) financed by the SCF. Nepal has been selected as a pilot country identified for funding and technical assistance under SREP. The government prepared the Scaling Up Renewable Energy Program Investment Plan which was endorsed by the governing trust fund committee of SCF in November 2011Outputs 3 and 4 will be implemented as integral parts of the National Rural and Renewable Energy Program.
[18] Project Administration Manual (accessible from the list of linked documents in Appendix 2).
[19] This includes $70 million from the allocation for regional cooperation and integration projects.
[20] The EIB cofinancing is parallel, and will not be administered by ADB.

Norway[21], and a grant of $11.2 million from the ADB SCF. The funds from the Government of Norway and ADB SCF will be administered by ADB[22]. ADB and the government of Norway will conclude a joint contractual cofinancing agreement, while ADB and EIB will conclude an aide-memoire on collaborative cofinancing. Given the government budget constraint, ADB SCF will finance the taxes and duties of mini hydro subprojects imposed within Nepal[23].

Table 1: Project Investment Plan
($ million)

Item		Amount[a]
A.	**Base cost** [b]	
	1. Power transmission capacity expansion	314.8
	2. Power distribution network improvement	39..5
	3. Mini-grid based renewable energy development in off-grid areas	24.4
	4. Project management and capacity building	9.2
	Subtotal (A)	**387.8**
B.	**Contingencies**[c]	**25.2**
C.	**Financing Charges During Implementation**[d]	**27.0**
	Total (A+B+C)	**440.0**

a. Includes taxes and duties of $7.75 million to be financed by the government through cash contribution, and $0.58 million for mini hydro subprojects under output 3 to be financed by the ADB SCF.
b. In March 2014 prices.
c. Physical contingencies computed at 3% of base cost. Price contingencies computed using ADB's forecasts of international and domestic inflation includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
d. Interest during construction (IDC). IDC for ADB loan has been calculated at a rate of 1.0% per annum during the grace period of 8 years and 1.5% per annum thereafter of 24 years.
Source: Asian Development Bank, Nepal Electricity Authority, and Alternative Energy Promotion Centre

15. The financing plan is provided in Table 2. The loan proceeds from ADB, and the grant proceeds from the Government of Norway and ADB SCF will be relent to NEA and AEPC, as appropriate, pursuant to respective financing arrangements, on terms and conditions acceptable to ADB[24]. The government will make available all counterpart funds as needed on a timely basis.

Table 2: Financing Plan

Source	**Amount** ($ million)	**Share of Total (%)**
Asian Development Bank		
Special Funds resources (loan)	180.00	40.91
Cofinanciers		
ADB Strategic Climate Fund (grant)	11.20	2.55
Government of Norway (grant)	60.00	13.64
European Investment Bank (loan)	120.00	27.27
Government	60.34	13.71
Communities	8.46	1.92
Total	**440.00**	**100.00**

Source: Asian Development Bank estimates

[21] The Government of Norway will provide cofinancing in Norwegian kroner
[22] ADB and ADB administered funds will finance transportation and insurance cost. For ADB administered cofinancer funds, cost sharing will be applied, and disbursement will be handled by ADB.
[23] The amount is within the reasonable threshold identified during the CPS preparation process, and does not represent an excessive share of the project investment plan. The taxes and duties apply only to ADB-financed expenditures, and the financing is material for AEPC and relevant to the success of the project
[24] The EIB loan proceeds will also be relent to NEA.

E. Implementation Arrangements

16. NEA will be the executing agency (EA) for outputs 1 and 2 (the on-grid components); AEPC will be the EA for output 3; and both NEA and AEPC will be EAs for output 4. The on-grid components will be implemented and supervised by a project management unit (PMU) to be set up within the PMD of NEA. For AEPC, a project implementation unit (PIU), including experienced staff headed by a Project Manager, has been set up to be responsible for implementation, including procurement, accounting, quality assurance, and safeguards. NEA's PMU and AEPC's PIU will be supported by project implementation consultants funded by the project. The implementation arrangements are in Table 3 and described in detail in the PAM.

Table 3: Implementation Arrangements

Aspects	**Arrangements**		
Implementation period	1 January 2015–31 December 2021		
Estimated completion date	31 December 2021 (loan and grant closing on 30 June 2022)		
Management			
(i) Oversight body	Steering committee chaired by Secretary, Ministry of Energy, and co-chaired by Secretary, Ministry of Science, Technology and Environment		
(ii) Executing agencies	Nepal Electricity Authority (NEA) and Alternative Energy Promotion Centre (AEPC)		
(iii) Implementation units	Project Management Unit and Project Implementation Unit established in NEA and AEPC, respectively, with 25 (NEA) and 8 (AEPC) professional staff and supporting staff.		
Procurement	International competitive bidding	6 packages	$217.0 million
	National competitive bidding	16 packages	$13.70 million
	Shopping	2 packages	$0.20 million
Consulting services	Quality- and cost-based selection (90:10) for firms	300 person months	$8.4 million
	Individual	80 person months	$0.8 million
Advance contracting and retroactive financing	All eligible contract packages and expenditures agreed between ADB and the government relating to all outputs		
Disbursement	The loan and grants (including ADB administered cofinancing) will be disbursed in accordance with ADB's Loan Disbursement Handbook (2012, as amended from time to time) and arrangements agreed upon between ADB and the government.		

Source: Asian Development Bank.

17. The project will be executed over a period of seven years from the date of loan effectiveness. Consultants (individuals and firm) to be financed by ADB funds and ADB administered funds will be recruited in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). All procurement to be financed by ADB fund and ADB administered funds will be carried out in accordance with ADB's Procurement Guidelines (2013, as amended from time to time). Since ADB is administering cofinancing resources of Norwegian and ADB SCF grant for Asian Development Fund (ADF)-financed operations, universal procurement will apply to all procurement packages to be financed by ADF resources, jointly by ADF resources and Norwegian grant, and by ADB SCF grant.[25]

18. The government has requested ADB to approve advance contracting and retroactive financing for procurement of goods and turnkey works and recruitment of consultants. If approved, retroactive financing may be allowed for up to 20% of the loan and grant amounts for expenditures incurred 12 months prior to loan signing. The government has been advised that ADB's approval of advance contracting and retroactive financing does not commit ADB to finance the project. The government has requested ADB assistance in selection of the project supervision consultant.

[25] ADB. 2013. *Blanket Waiver of Member Country Procurement Eligibility Restrictions in Cases of Cofinancing for Operations Financed from Asian Development Fund Resources.* Manila.

III. TECHNICAL ASSISTANCE

19. The project will be supported by a capacity development technical assistance (CDTA) for Support for Rural Electrification through Renewable Energy[26]. MOSTE will be the executing agency. AEPC and NEA will be the implementing agencies. The CDTA is estimated to cost $500,000 to be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-other sources). The government will provide counterpart support in the form of counterpart staff, office accommodation, and other in-kind contributions. The CDTA will examine the feasibility of a large scale wind farm (minimum aggregated installed capacity of 1 MW) in Nepal, and prepare draft regulations for implementing the Renewable Energy Promotion Board Act.

IV. DUE DILIGENCE

A. Technical

20. Technical due diligence has been undertaken on all components and confirmed that the cost estimates are reasonable and unit cost compare favorably with similar recent projects in India and Nepal. The proposed technologies and design concepts are similar to NEA's existing technologies and practices for transmission system design, construction and operation, except that NEA has no experience with high temperature low sag (HTLS) conductors[27]. APEC staff is familiar with the technologies and concepts for all the subprojects of the off-grid component. The capacity development component will provide technical support to NEA and AEPC for design and commissioning of the subprojects.

B. Economic and Financial

21. Financial analysis of the project was carried out in accordance with ADB's Financial Management and Analysis of Projects.[28] All financial costs and benefits are expressed in constant 2014 prices. NEA's weighted average cost of capital was estimated at 2.0% (in pre-tax real terms). Based on conservative assumptions adopted for base case analysis[29], a one-off real tariff increase of 20% and continuing annual real increases of 1.6% are required to ensure financial viability of the project in aggregate with a financial internal rate of return (FIRR) of 2.0%. The FIRR will be increased to 3.9% if wheeling power from the Upper Marsyangdi 2 hydropower station to India through transmission facilities is considered.[30]

22. The project has been analyzed for economic viability using a with- and without-project approach in accordance with ADB's Guidelines for the Economic Analysis of Projects (1997). The economic internal rate of return (EIRR) of the project is 22%. Sensitivity analysis shows that the project returns are robust against changes to critical variables with a minimum EIRR of 16%.[31] The on-grid components will support new clean energy supplies of minimum 200 MW for domestic use sufficient for the minimum needs of at least 2 million people, and facilitate minimum 1,200 MW power exchange with India. The off-grid component will help 30,500 households to access electricity in off-grid areas. 20,000 ton CO2 will be reduced annually mainly due to displacement of fossil fuel/Kerosene based lighting system in off-grid areas.

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[26] Capacity Development Technical Assistance (accessible from the list of linked documents in Appendix 2).
[27] Technical Notes on HTLS Conductors (available from the list of linked documents in Appendix 2subject to request).
[28] ADB. 2005. *Financial Management and Analysis of Projects*. Manila.
[29] In the base case, the only independent hydropower projects that were considered for evacuation of power by the project facilities were those with signed power purchase agreements and 20% of those to which survey licenses have been issued.
[30] Financial Analysis (accessible from the list of linked documents in Appendix 2). IPPs are planning to develop more than 1,000 MW of export-focused hydropower capacity in the Marsyangdi corridor alone including the 600 MW Upper Marsyangdi 2 hydropower project.
[31] Economic Analysis (accessible from the list of linked documents in Appendix 2)

C. Governance

23. Procurement capacity assessments of NEA and AEPC were conducted as part of the due diligence. The NEA has sufficient experience in local and foreign procurement, including ADB standard bidding procedures, under domestic projects and external assistance from international development partners. The AEPC has experience in local and foreign procurement, under domestic projects and external assistance from international development partners. As this will be the first direct experience with ADB funding, a long-term procurement consultant will be engaged to support AEPC. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government, NEA, and AEPC. The specific policy requirements and supplementary measures are described in the PAM.

D. Poverty and Social

24. The project impact, outcome, and outputs are consistent with Nepal's tenth plan for poverty reduction. Project interventions are designed to benefit the poor through increased economic opportunity, knowledge, and rights. The project has been designed to be classified as effective gender mainstreaming. A Gender Equality and Social Inclusion Plan, which integrates indicators and targets in the project design and monitoring framework, has been prepared.[32] Enhanced electricity access will contribute to poverty reduction. The EAs and contractors will ensure that priority and preference are given to local workforce, especially to the poor, disadvantaged, and marginalized ethnic groups. The project will promote and advocate for a socially inclusive, gender equitable and non-discriminatory work environment and practices. Practices will be consistent with core labor standards. Where worker migration is required, the project will minimize the risk of HIV/AIDS through information dissemination campaigns at project areas.

E. Safeguards

25. **Environment.** The project is classified as environment category "B". Initial Environmental Examinations, and an environmental assessment and review framework for future unidentified off-grid subprojects, have been prepared for both on- and off-grid components following the ADB's Safeguard Policy Statement (2009) (SPS) and the government's environmental regulatory framework.[33],[34] Potential impacts are mostly temporary and reversible, but some irreversible impacts on natural habitat will occur due to clearance of about 150 hectares of forested lands. Available information on the habitat ranges and elevations of sensitive species indicates that critical habitat will not be directly impacted; potential impacts on natural habitat and potentially sensitive ecosystems have been identified and can be readily mitigated. Due diligence has determined that associated hydropower facilities are in compliance with Nepali regulatory requirements. Cumulative and induced impacts will have net positive benefits from increased access to energy and productive end uses of energy. Climate change risks are medium and can be addressed through best practice engineering design.[35]

26. The IEEs and environmental management plans (EMPs) for all components include mitigation measures, monitoring, and budgetary provisions which are adequate to address the environmental impacts of the project. The EMPs' requirements will be incorporated into bidding documents. NEA and AEPC have sufficient capacity to supervise construction contracts and EMP implementation including preparation of semiannual monitoring reports. EMPs will be

[32] Gender Equality and Social Inclusion Plan (accessible from the list of linked documents in Appendix 2).
[33] Initial Environmental Examination (accessible from the list of linked documents in Appendix 2).
[34] Environmental Assessment and Review Framework (accessible from the list of linked documents in Appendix 2).
[35] Disaster and Climate Change Risk Assessment (available from the list of linked documents in Appendix 2 subject to request)

updated as necessary during implementation. Public consultation and information disclosure requirements have been met, including requirements for consultation with protected areas management teams. The environmental assessment for the project was disclosed on ADB's website on 28 February 2014.

27. **Involuntary Resettlement and Indigenous Peoples.** Based on ADB's SPS, the project is categorized as "A" for involuntary resettlement and "B" for indigenous peoples (IPs). The project will have impact on land acquisition and involuntary resettlement, which will primarily be economic displacements, with limited impacts from physical displacement. The transmission and distribution components will have both permanent and temporary impacts. Permanent impacts are anticipated due to land acquisition for construction of new transmission substations, distribution substations, transmission towers, and distribution poles. The temporary impacts will be due to loss of trees and crops along the right-of-way. Approximately 715 households will be impacted due to land acquisition and loss of crops and trees. Initial assessment shows that there will be no endangered IP groups in the project areas. The magnitude of impacts on IP is not significant as far as the overall sensitivity is concerned. Impacts are limited to loss of portions of land for some IP groups, which loss will be compensated at replacement cost. Where these groups are considered vulnerable, additional resettlement assistance will be provided, in addition to the compensation, and consultations will be carried out to make them aware about the project and to obtain their endorsement for land acquisition.

28. Based on surveys, two draft combined resettlement and indigenous peoples plans (RIPPs) have been prepared for the on-grid components, in line with ADB's SPS and the government's legal framework.[36] The RIPPs will be publicly disclosed to interested stakeholders on ADB's and NEA's websites.

29. The off-grid component will not have any resettlement impacts for sample subprojects and no adverse impacts on IPs.[37] The minimum private land requirements for the sample sub projects will be met through voluntary land donation. A due diligence report has been prepared for the sample sub projects. The off-grid component allows for future subprojects, which have not been identified and are subject to due diligence. Therefore, a resettlement framework[38] and an indigenous peoples planning framework[39] have been prepared as required by SPS and related national policies and legislation. AEPC will monitor the resettlement and indigenous people plan implementation and submit semiannual reports to ADB.

30. Social safeguards measures shall be achieved in line with the provisions stated in the PAM.[40] A summary of the initial social safeguards assessment is presented in the Summary Poverty Reduction and Social Strategy.[41]

F. Risks and Mitigating Measures

31. Major risks and mitigation measures are summarized in Table 4 and described in the risk assessment and risk management plans[42]. The project benefits are expected to outweigh the associated risks.

[36] Resettlement and Indigenous Peoples Plan (accessible from the list of linked documents in Appendix 2).
[37] No impacts on IP groups are foreseen for the off-grid component. If impacts are identified, AEPC will prepare an indigenous peoples plan, identifying fair and inclusive compensation and rehabilitation measures, in line with ADB's SPS and national laws and regulations.
[38] Resettlement Framework (accessible from the list of linked documents in Appendix 2).
[39] Indigenous Peoples Planning Framework (accessible from the list of linked documents in Appendix 2).
[40] Section VII (safeguards) and section VIII (gender and social) of the Project Administration Manual (accessible from the list of linked documents in Appendix 2).
[41] Summary Poverty Reduction and Social Strategy (accessible from the list of linked documents in Appendix 2).

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
Weak regulatory framework	Continued policy dialogue with government to enact Electricity Regulatory Commission Legislation
Financial sustainability of NEA	ADB is supporting to implement NEA financial restricting plan and management reforms, and strengthening ETFC's capacity to review retail tariff adjustment petitions. The project will support NEA to establish a pricing mechanism for open access to NEA's power grid for electricity exports. The wheeling charges will help enhance NEA's financial sustainability.
Slow decision making within NEA on project implementation	A dedicated PMD will be responsible for preparation, and implementation of the project, with supports of project implementation support consultants.
Weak implementation capacity of AEPC in larger-scale mini-hydro projects	Two-tier Implementation structure will be adopted. The implementation support consultants will support AEPC at central level, while RSCs and social mobilizers will support AEPC at field level.
Tariff collected from end users may not cover O&M cost due to low tariff and low load factor	The project design has integrated into project implementation the support for productive energy use to ensure these activities are ready for operation once the power generation parts are commissioned.

AEPC=Alternative Energy Promotion Centre; ETFC= Electricity Tariff Fixation Commission; NEA=Nepal Electricity Authority; PMD=project management directorate; RSC=Regional Service Center.
Source: Asian Development Bank.

V. ASSURANCES AND CONDITIONS

32. The government, NEA and AEPC have assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the PAM, and loan and grant documents. The government, NEA and AEPC have agreed with ADB on certain covenants for the project, which are set forth in the loan agreement, grant agreements, and project agreements.

VI. RECOMMENDATION

33. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve

(i) the loan in various currencies equivalent to SDR 115,932,321 to Nepal for the South Asia Subregional Economic Cooperation Power System Expansion Project, from ADB's Special Funds resources, with an interest charge at the rate of 1.0% per annum during the grace period and 1.5% per annum thereafter; for a term of 32 years, including a grace period of 8 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board;

(ii) administration by ADB of the grant not exceeding the equivalent of $60,000,000 to Nepal for the South Asia Subregional Economic Cooperation Power System Expansion Project, to be provided by the Government of Norway; and

(iii) administration by ADB of the grant not exceeding the equivalent of $11,200,000 to Nepal for the South Asia Subregional Economic Cooperation Power System Expansion Project, to be provided by the ADB Strategic Climate Fund.

President
Takehiko Nakao

05 June 2014

[42] Risk Assessment and Risk Management Plans (accessible from the list of linked documents in Appendix 2).

APPENDIX 1: DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
Impact Increased electricity access both in Nepal and across the border	Cross border power flows increased from 100 MW (2013) to 2,000 MW (2025). Increase in electricity access rate in Nepal to 92% in 2025 (Baseline: 65 % in 2013)	NEA annual reports AEPC annual reports	**Assumptions** GON will continue prioritizing power sector and regional integration Timely completion of the Dhalkebar (Nepal)–Muzaffarpur (India) 400 kV transmission line, and Bardaghat (Nepal)-Gorakhpur (India) 400 kV transmission line Planned generation capacity in selected valleys achieved on time **Risk** Political instability affecting timely implementation of power sector development projects
Outcome Increased capacity of national grid and enhanced renewable energy development	Power evacuation capacity from Kali Gandaki basin and Marsyangdi basin increased from 100 MW (2013) to 1,000 MW by 2021 Distribution capacities in identified areas increased from 100 MVA (2013) to 316 MVA by 2021 30,500 additional households supplied by renewable energy in rural communities by 2021 CO_2 emission reduced by 20,000 ton per year by 2021	NEA annual reports NEA annual reports AEPC annual reports AEPC annual reports	**Assumptions** GON will continue to be committed to ensure progress on NEA financial and management restructuring
Outputs 1. Power transmission capacity increased	45 km of 400 kV and 191.5 km of 220 kV transmission lines, 500 MVA of 400kV/220kV/132kV, 500 MVA of 220kV/132kV/33kV, and 120 MVA of 33kV/11kV grid substation capacity, constructed and/or augmented along Kali Gandaki corridor and	NEA annual reports	**Assumptions** Timely availability of counterpart funds from GON **Risk** For AEPC's component, contributions by communities are realized on time.

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
	Marsyangdi- Kathamandu route by 2021		
	125 km of 220 kV transmission line, and 400 MVA of 220kV/132kV/33kV substations at Marsyangdi corridor; and 24 km of 132 kV transmission line, 30 MVA of 132kV/33kV and 6/8 MVA of 33kV/11kV substations at Samundratar-Trishuli 3B transmission hub constructed by 2021 (to be financed by EIB's parallel cofinancing)	NEA annual reports	
	8 Nos. of grid service substations with an aggregated capacity of 393.8 MVA constructed and/or replaced by 2020	NEA annual reports	
2. Power distribution network improved	Identified distribution lines (410 km of 33 kV, 545 km of 11 kV, and 725 km of 400 kV), 216 MVA 33kV/11 kV substations and 20 MVA distribution substations constructed and/or upgraded by 2020	NEA annual reports	
3. Mini-grid based renewable energy systems in off-grid areas increased	Up to additional 4.8 MW of mini-grid based renewable energy capacity established by 2020 in selected communities, with at least 33% of the households in those communities are women-headed or from excluded	AEPC annual reports	
4. Capacity development support to NEA and AEPC provided.	Project management monitoring system developed by 2015	Project Quarterly Progress Report	
	5 persons trained in project implementation and management for AEPC and selected stakeholders by 2018	Project Quarterly Progress Report	
	20 persons trained in GESI-	Project Quarterly	

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks
	based community participation and management of energy systems by 2018	Progress Report	
	A updated distribution system / rural electrification master plan adopted by the NEA by 2019	NEA annual reports/ Distribution System Master Plan	
	A pricing mechanism for the use of NEA's power grid by third parties for the purposes of exporting power approved by NEA by 2019	NEA annual reports	
	A feasibility study of one large scale wind farm approved by AEPC by 2018	AEPC annual reports	
	Draft regulations for implementing Renewable Energy Promotion Board Act accepted by AEPC by Jun 2018	AEPC annual reports	

Activities with Milestones	**Inputs**
1. Power transmission capacity increased	Item Amount ($ million)
1.1 Acquisition of land for substations and tower footings (Jun 2015)	**ADF Loan**: **180.0**
1.2 Construction of transmission lines (Jul 2015-Jun 2021)	Output 1 135.0
1.3 Implementation of environment management plan (Jul 2015)	Output 2 40.0
	Output 3 5.0
2. Power distribution network in selected rural areas improved	
2.1 Acquisition of land (if any required) (Dec 2016)	
2.2 Extension of the identified distribution networks (Jan 2017-Dec 2018)	**Government of Norway Grant: 60.0**
	Output 1 52.0
3. Mini-grid based renewable energy systems in off-grid areas increased	Output 4 8.0
3.1 Land contribution by communities for sample mini hydro subprojects (Sep 2015)	**European Investment Bank Loan: 120.0**
3.2 Constructions of sample mini hydro subprojects (Dec 2015-Nov 2017)	(Parallel cofinancing)
3.3 Approval of subsequent mini hydro subprojects (Jun 2016)	Output 1 120.0
3.4 Construction of subsequent mini hydro subprojects (Jul 2017-Jun 2020)	
3.5 Land contribution by communities for sample mini-grid solar and solar/wind hybrid subprojects (Jun 2015)	**ADB Strategic Climate Fund Grant: 11.2**
3.6 Installation of sample mini-grid solar and solar/wind hybrid subprojects (Jan 2016-Jun 2017)	Output 3 10.0
3.7 Approval of subsequent mini-grid solar and solar/wind hybrid subprojects (Sep 2016)	Output 4 1.2
3.8 Installation of subsequent mini-grid solar and solar/wind hybrid subprojects (Sep 2017-Feb 2019)	**Communities: 8.5**
	Output 3 8.5
4. Capacity development support to NEA and AEPC provided	**Government: 60.4**
4.1 Recruitment of PSC for NEA (May-Dec 2015)	Output 1 52.5

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions and Risks	
4.2 PSC to support NEA in supervising the implementation of outputs 1 and 2 (Jan 2016-Dec 2021) 4.3 Recruitment of PIC for AEPC (Aug-Dec 2014) 4.4 PIC to support AEPC in procurement and implementation of output 3 (Jan 2015-Jun 2020) 4.5 Identify key stakeholders which need capacity developments in project implementation and management in Feb 2015 4.6 Social mobilizers engaged by AEPC by May 2015 4.7 Training of NEA, AEPC, and identified stakeholders from May 2015 to Apr 2017 4.8 Consultants for preparation of the distribution system/rural electrification master plan and the pricing mechanism for the use of NEA grid by third parties for purposes of electricity export engaged by Jul 2016 4.9 Candidate sites for utility scale wind farm identified by Aug 2015 4.10 Five wind masts installed by Dec 2015 (funded by the project) 4.11 Completion of wind measurement for one year by Nov 2016 4.12 Feasibility study of one large scale wind farm (minimum 1 MW) accepted by AEPC by Dec 2017 4.13 Draft regulations for implementing Renewable Energy Promotion Board Act accepted by AEPC by Jun 2018 4.14 Distribution system/rural electrification master plan and the pricing mechanism for the use of NEA grid by third parties for purposes of electricity export adopted by NEA by Dec 2019			Output 2 Output 3 **Total** **CDTA(TASF-other sources):** Output 4	4.5 3.3 **440.0** **0.5** 0.5

ADB = Asian Development Bank; ADF = Asian Development Fund; AEPC = Alternative Energy Promotion Centre; CDTA = capacity development technical assistance; EA = Executing Agency; GESI = Gender Equality and Social Inclusion; GON = Government of Nepal; km = kilometer; MVA = megavolt-ampere; MW = megawatt; NEA = Nepal Electricity Authority; PIC = project implementation consultants; PSC = project supervision consultants; SCF = Strategic Climate Fund; TASF = technical assistance special fund.
Source: Asian Development Bank

APPENDIX 2: LIST OF LINKED DOCUMENTS

http://adb.org/Documents/RRPs/?id=44219

1. Loan Agreement
2. Grant Agreement (Externally Financed – Government of Norway)
3. Grant Agreement (Externally Financed – Strategic Climate Fund)
4. Project Agreement (Nepal Electricity Authority)
5. Project Agreement (Alternative Energy Promotion Centre)
6. Sector Assessment (Summary)
7. Project Administration Manual
8. Contribution to the ADB Results Framework
9. Development Coordination
10. Financial Analysis
11. Economic Analysis
12. Country Economic Indicators
13. Summary Poverty Reduction and Social Strategy
14. Gender Equality and Social Inclusion Plan
15. Initial Environmental Examination: Transmission and Distribution
16. Initial Environmental Examination: Sample Subprojects of Mini-grid Renewable Energy
17. Environmental Assessment and Review Framework: Mini-grid Renewable Energy
18. Combined Resettlement and Indigenous Peoples Plan: Transmission
19. Combined Resettlement and Indigenous Peoples Plan: Distribution
20. Resettlement Framework: Mini-grid Renewable Energy
21. Indigenous Peoples Planning Framework: Mini-grid Renewable Energy
22. Due Diligence Report: Sample Subprojects of Mini-grid Renewable Energy
23. Risk Assessment and Risk Management Plan

Supplementary Documents

24. Technical Notes on HTLS Conductors
25. Sector and Programmatic Context of the Project
26. Procurement Capacity Assessment of the NEA and AEPC
27. Financial Management Assessment of the NEA and AEPC
28. Capacity Development Technology Assistance
29. SREP Funding Proposal
30. Nepal Post-conflict Assessment
31. Disaster and Climate Change Risk Assessment
32. Governance Risk Assessment