Report and Recommendation of the President to the Board of Directors

Project Number: 44219
June 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 15 May 2014)

Currency unit	–	Nepalese rupee/s (NRe/NRs)
NRe1.00	=	$0.01051
$1.00	=	NRs95.17

ABBREVIATIONS

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
AEPC	–	Alternative Energy Promotion Centre
EIB	–	European Investment Bank
EMP	–	environmental management plan
NEA	–	Nepal Electricity Authority
PAM	–	project administration manual
SCF	–	Strategic Climate Fund
TA	–	technical assistance

WEIGHTS AND MEASURES

km	–	kilometer
kV	–	kilovolt
MVA	–	megavolt-ampere
MW	–	megawatt

NOTE

(i) The fiscal year (FY) of the Government of Nepal and its agencies ends on 15 July. “FY” before a calendar year denotes the year in which the fiscal year ends, e.g., FY2012 ends on 15 July 2012.

(ii) 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	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
		Mitigation ($ million)	140.00
Environmentally sustainable growth	Global and regional transboundary environmental concerns	CO_2 reduction (tons per annum)	20,000
	Natural resources conservation	Climate Change impact on the Project	Medium
Regional integration	Pillar 1: Cross-border infrastructure		

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 Capacity development technical assistance: Technical Assistance Special Fund	0.50
Sovereign Project loan: Asian Development Fund	180.00
Cofinancing	**191.20**
Norwegian Grant (w/ LoA)	60.00
European Investment Bank	120.00
Strategic Climate Fund - SREP	11.20
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

Source: Asian Development Bank

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 Power System Expansion Project. The report also describes proposed technical assistance (TA) for Supporting 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) expansion of domestic power transmission capacity, (ii) power exchange with India, (iii) augmentation and expansion of the distribution networks, and (iv) mini-grid-based renewable energy access in rural areas.[3] The project is prioritized as part of the South Asia Subregional Economic Cooperation Program's Power Generation and Transmission Master Plan and Regional Cooperation Business Plan, 2014–2016.[4]

II. THE PROJECT

A. Rationale

3. Nepal is facing chronic power shortages. Only 65% of the country's households have access to electricity—56% through the national grid and 9% through off-grid solutions. Per capita electricity consumption is 102 kilowatt-hours per year, one of the lowest in the world. The installed capacity is 762 megawatts (MW), well below the peak demand of 1,095 MW. As a result, consumers connected to the national grid experience scheduled power cuts of 12 hours per day or more during the dry season. With the expected commissioning of six hydropower projects with a combined capacity of 732 MW in the next 3 to 6 years and more than 1,500 MW of additional capacity being developed, a wet season supply surplus is anticipated by 2018.[5] However, the limited power transmission and distribution network is becoming a bottleneck for meeting domestic power demand, as well as power trade with neighboring countries.

4. The Government of Nepal has set the following key targets to be met by year 2027: (i) increasing per capita electricity consumption to 400 kilowatt-hours 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.[6] 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 the Nepal Electricity Authority (NEA); and a long-term agreement for bulk power trading with India is being negotiated. Parallel institutional improvements are needed. An incremental retail tariff increase of 20% during 2002–2012 improved NEA's financial position,

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[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 TA. ADB. 2013. *Technical Assistance to Nepal for Preparing the South Asia Subregional Economic Cooperation Power System Expansion Project*. Manila.
[4] ADB. 2013. *South Asia Regional Cooperation Operations Business Plan, 2014–2016*. Manila.
[5] The total installed capacity will be more than 3,000 MW against the projected peak load of 2,052 MW in FY2020.
[6] Government of Nepal. 2010. *Three Year Interim Plan (2010–2013).* Kathmandu.

but it is still weak because tariffs do not reflect costs.[7] In addition, system planning capacity needs to be improved; NEA's generation, transmission, and distribution departments need to be ring-fenced[8] as a precursor to further corporate restructuring; and a fully independent regulatory agency needs to be established.

5. To achieve the 25% electrification target through off-grid solutions, the government has enacted policies and plans such as the 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. 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 supported by development partners.

6. The project will contribute to Nepal's energy development objectives by (i) scaling up the on-grid and off-grid renewable energy supply, (ii) facilitating cross-border power exchange, (iii) increasing access to renewable energy 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 along the Kali Gandaki corridor and Marsyangdi corridor[9] to the main load centers at Kathmandu Valley, and facilitate at least 1,200 MW of power exports to India once the second 400 kilovolt (kV) cross-border transmission line from Bardaghat (Nepal) to Gorakhpur (India) is connected.[10] Half of the exports will come from the Upper Marsyangdi 2 Hydropower Project, which is to be developed by GMR Group, India. The off-grid component will provide access to electricity and facilitate productive energy use activities in rural locations without connections to the national grid, increasing the income and welfare of rural communities by using renewable energy mainly for agriculture, rural enterprises, health, and education.[11] The project is consistent with the Asian Development Bank (ADB) country partnership strategy for Nepal, which aims to (i) improve inclusive electricity access, (ii) develop renewable energy, (iii) promote regional cooperation, and (iv) strengthen sector governance.[12] The sector and programmatic context of the project is presented in a supplementary document.[13]

7. **ADB interventions**. In 2009, 2011, and 2013, ADB approved four projects[14] to address the immediate needs for the power sector, including generation, transmission, and distribution system expansion and improvement. Capacity development TA attached to the Tanahu Hydropower Project was approved in 2013 and is being implemented to support NEA's financial

[7] NEA incurred a net loss of NRs4.53 billion in 2013.

[8] Financially separated in terms of assets and/or profits.

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

[10] The feasibility study for the second cross-border transmission line is being funded by ADB. 2013. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to Nepal for the Project Preparatory Facility for Energy*. Manila.

[11] The off-grid component has been developed in accordance with the Nepal country investment plan of the Scaling Up Renewable Energy Program in Low-Income Countries.

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

[13] Sector and Programmatic Context of the Project (accessible from the list of linked documents in Appendix 2).

[14] ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Grants to Nepal for the Energy Access and Efficiency Improvement Project*. Manila; ADB. 2011. *Report and Recommendation of the President to the Board of Directors: Proposed Loan, Grant, Technical Assistance Grant and Administration of Grant to Nepal for the Electricity Transmission Expansion and Supply Improvement Project*. Manila; ADB. 2013. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to Nepal for the Project Preparatory Facility for Energy*. Manila; and ADB, 2013. *Report and Recommendation of the President to the Board of Directors: Proposed Loans and Administration of Technical Assistance Grant to Nepal for the Tanahu Hydropower Project*. Manila.

restructuring and management reforms, as well as to strengthen the Electricity Tariff Fixation Commission's capacity to review retail tariff adjustment petitions proposed by NEA and improve its institutional readiness for transformation into the Nepal Electricity Regulatory Commission. ADB is also supporting the government to incorporate the comments by Parliament on the draft Nepal Electricity Act 2009 and Nepal Electricity Regulatory Commission Act 2009. The project will supplement ADB's ongoing interventions by enhancing NEA's financial position through the implementation of a pricing mechanism for the use of NEA's power grid by third parties for electricity exports, as well as improvements in NEA's planning capacity by supporting initiatives including the preparation of the distribution system and rural electrification master plan.

8. **Lessons from ongoing projects.** Since 2009, ADB operations in Nepal's power sector have been instrumental in supporting the reform process, including preparation of NEA's financial restructuring and a tariff increase of 20% after 11 years. However, the implementation of the ongoing projects, including the procurement of consultants and contractors, has been slow. NEA's decision making has also been slow. Land acquisition has been a problem, mostly because of changes in the alignment of transmission lines. Project readiness has been low. These lessons have been integrated into the design of this project. A project management directorate will manage the project. The directorate, headed by a deputy managing director level officer, will be responsible for procurement and construction supervision of all ADB projects.[15] The project preparatory TA includes a consulting firm to help NEA with the detailed design, route surveys, preparation of bidding documents, and selection of turnkey contractors. A project supervision consulting firm, funded by the project, will oversee construction. The implementation schedule will be longer than the standard 5 years. The S curve for disbursement[16] is realistic and takes into account the difficulties encountered in project implementation in Nepal.

9. **Coordination with other development partners**. The project has been developed in coordination with the NEA; the Alternative Energy Promotion Centre (AEPC); the Ministry of Energy; the Ministry of Science, Technology and Environment; 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 complement the operations of the World Bank Group and the Japan International Cooperation Agency.[17]

B. Impact and Outcome

10. The project's impact will be increased electricity access in Nepal and improved power exchange across the border. The outcome will be increased capacity of the national power grid and enhanced renewable energy development.

C. Outputs

11. The project will have four outputs:

(i) **Output 1: Power transmission capacity increased.** This comprises (a) construction and/or augmentation of 45.0 kilometers (km) of 400 kV and 191.5 km of 220 kV transmission lines along the Kali Gandaki corridor and the 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

[15] Details are in the Project Administration Manual (accessible from the list of linked documents in Appendix 2).
[16] A display in curve of projected cumulative disbursement amount plotted against time of project implementation.
[17] The World Bank is supporting the Dhalkebar (Nepal)–Muzarffarpur (India) 400 kV cross-border transmission line.

kV/33 kV, and 120 MVA of 33 kV/11 kV grid substations along the Kali Gandaki corridor and Marsyangdi–Kathmandu route; and (c) construction and/or replacement of grid service substations with an aggregate capacity of 393.8 MVA across the country.[18]

(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-volt distribution lines; 216 MVA 33kV/11kV substations; and 20 MVA distribution substations in the 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 4.3 MW of mini hydroelectric power plants and up to 0.5 MW of mini-grid-based solar or solar and 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.[19]

(iv) **Output 4: Capacity development for Nepal Electricity Authority and Alternative Energy Promotion Centre provided.** The physical investments will be reinforced and supplemented by capacity building for NEA and AEPC, including support for project management; preparation of a distribution system and rural electrification master plan, as well as a feasibility study of a large-scale wind farm; and parallel livelihood development activities in the project area.

D. Investment and Financing Plans

12. The project is estimated to cost $440 million including physical and price contingencies and interest during implementation. The investment plan is summarized in Table 1. Detailed cost estimates are in the project administration manual (PAM).[20]

13. The government has requested a loan of $180.0 million in various currencies equivalent to SDR116.5 million from ADB's Special Funds resources to help finance the project.[21] 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 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, comprising a loan of $120.0 million from the EIB,[22] a grant of $60.0 million equivalent from the Government of Norway,[23] and a grant of $11.2 million from the ADB SCF. The funds from the Government of Norway and the ADB SCF will be administered by ADB.[24] ADB and the Government of Norway will conclude a joint contractual cofinancing agreement, while ADB and EIB will conclude an

[18] In addition, the EIB will provide parallel cofinancing for the construction of 125 km of a 220 kV transmission line and 400 MVA of 220 kV/132 kV/33 kV substations along the Marsyangdi corridor, and 24 km of a 132 kV transmission line, and 30 MVA 132 kV/33 kV and 6/8 MVA of 33 kV/11 kV substations for Samundratar–Trishuli 3B Hub transmission line.

[19] Under the Scaling Up Renewable Energy Program in Low-Income Countries financed by the SCF, Nepal has been selected as a pilot country for funding and TA. The government prepared the Scaling Up Renewable Energy Program Investment Plan, which was endorsed by the governing trust fund committee of the SCF in November 2011. Outputs 3 and 4 will be implemented as integral parts of the National Rural and Renewable Energy Program.

[20] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

[21] This includes $70 million from the allocation for regional cooperation and integration projects.

[22] The EIB cofinancing is parallel and will not be administered by ADB.

[23] The Government of Norway will provide cofinancing in Norwegian kroner.

[24] ADB and ADB-administered funds will finance transportation and insurance costs. For ADB-administered cofinancier funds, cost sharing will be applied and disbursement will be handled by ADB.

aide-memoire on collaborative cofinancing. Given the government's budget constraints, the SCF will finance the taxes and duties of the mini hydroelectric subprojects imposed within Nepal.[25]

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)	**387.9**
B.	**Contingencies**[c]	**25.1**
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 a cash contribution, and $0.58 million for mini hydro subprojects under output 3 to be financed by the ADB Strategic Climate Fund.
[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 a provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
[d] Interest during construction for ADB loan has been calculated at 1.0% per annum during the grace period of 8 years and 1.5% per annum thereafter (24 years).
Source: Asian Development Bank, Nepal Electricity Authority, and Alternative Energy Promotion Centre.

15. The financing plan is in Table 2. The loan proceeds from ADB and the grant proceeds from the Government of Norway and the SCF will be relent to NEA and AEPC, as appropriate, pursuant to respective financing arrangements, on terms and conditions acceptable to ADB.[26] 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)[a]	11.20	2.55
Government of Norway (grant)[b]	60.00	13.64
European Investment Bank (loan)[c]	120.00	27.27
Government of Nepal	60.34	13.71
Communities	8.46	1.92
Total	**440.00**	**100.00**

[a] Under the Scaling Up Renewable Energy Program in Low-Income Countries financed by the SCF. Administered by the Asian Development Bank.
[b] Administered by the Asian Development Bank.
[c] Not administered by the Asian Development Bank.
Source: Asian Development Bank estimates

E. Implementation Arrangements

16. The NEA will be the executing agency for outputs 1 and 2 (the on-grid components); AEPC will be the executing agency for output 3; and NEA and AEPC will be executing agencies for output 4. The on-grid components will be implemented and supervised by a project

[25] The amount is within the reasonable threshold identified during the preparation of the country partnership strategy 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.
[26] The EIB loan proceeds will also be relent to NEA.

management unit to be set up within the project management directorate of NEA. For AEPC, a project implementation unit, including experienced staff headed by a project manager, has been set up to be responsible for implementation, including procurement, accounting, quality assurance, and safeguards. The NEA's project management unit and AEPC's project implementation unit 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	January 2015–December 2021		
Estimated completion date	31 December 2021 (loan and grant closing on 30 June 2022)		
Management			
(i) Oversight body	Steering committee chaired by the secretary of Ministry of Energy and co-chaired by the secretary of 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 established in NEA and project implementation unit established in AEPC, 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	6 packages	$0.60 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	All eligible contract packages and expenditures ADB and the government agreed upon 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 ADB and the government agree upon.		

Source: Asian Development Bank.

17. The project will be implemented over 7 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). Procurement to be financed by ADB funds 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 in the form of grants from the Government of Norway and the SCF for operations financed by the Asian Development Fund (ADF), universal procurement will apply to all procurement packages to be financed by ADF resources, jointly by ADF resources and the grant from Norway, and by the SCF grant.[27]

18. The government has asked ADB to approve advance contracting for procurement of goods and turnkey works, and for recruitment of consultants. The government has been advised that ADB's approval of advance contracting does not commit ADB to finance the project. The government has requested ADB assistance in selecting the project supervision consultant.

III. TECHNICAL ASSISTANCE

19. The project will be supported by capacity development TA for Supporting Rural Electrification through Renewable Energy.[28] The Ministry of Science, Technology and Environment will be the executing agency. AEPC and NEA will be the implementing agencies.

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

[28] Attached Technical Assistance (accessible from the list of linked documents in Appendix 2).

The TA is estimated to cost $500,000, which will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-V). The government will provide counterpart support in the form of staff, office accommodation, and other in-kind contributions. The TA 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 costs 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 conductors.[29] AEPC 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 designing and commissioning 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.[30] All financial costs and benefits are expressed in constant 2014 prices. The NEA's weighted average cost of capital was estimated at 1.2% (in pre-tax real terms). Based on conservative assumptions adopted for base case analysis, a one-off real tariff increase of 20% and continuing annual real increases of 1.4% are required to ensure the financial viability of the project in aggregate with a financial internal rate of return of 1.4%.[31] The financial internal rate of return will rise to 3.2% if wheeling power from the Upper Marsyangdi 2 hydropower station to India through transmission facilities is considered.[32]

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.[33] The economic internal rate of return of the project is 22%. Sensitivity analysis shows that the project returns are robust against changes to critical variables with a minimum economic internal rate of return of 16%.[34] The on-grid components will support new clean energy supplies of at least 200 MW for domestic use—sufficient for the minimum needs of at least 2 million people—and facilitate exchange of at least 1,200 MW with India. The off-grid component will help 30,500 households to access electricity in off-grid areas. Mainly because of the displacement of fossil fuel and kerosene-based lighting system in off-grid areas, about 20,000 tons of carbon dioxide will be reduced annually.

[29] Technical Notes on High-Temperature, Low-Sag Conductors (accessible from the list of linked documents in Appendix 2).
[30] ADB. 2005. *Financial Management and Analysis of Projects*. Manila.
[31] 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.
[32] Financial Analysis (accessible from the list of linked documents in Appendix 2). Independent power producers 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.
[33] ADB. 1997. *Guidelines for the Economic Analysis of Projects*. Manila.
[34] 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. AEPC has experience in local and foreign procurement under domestic projects and external assistance from international development partners. As this will be AEPC's first direct experience with ADB funding, a long-term procurement consultant will be engaged to provide support. 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 interventions are designed to benefit the poor through increased economic opportunity, knowledge, and rights. The project is classified as effective gender mainstreaming. A gender equality and social inclusion plan has been prepared.[35] Enhanced electricity access will help reduce poverty including women's time poverty. The executing agencies and contractors will ensure that priority and preference are given to local workers, especially the poor, the 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 (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 ADB's Safeguard Policy Statement (2009) and the government's environmental regulatory framework.[36] Potential impacts are mostly temporary and reversible, but some irreversible impacts on the natural habitat will occur because of the clearance of about 150 hectares of forested land. 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 comply with Nepal's regulatory requirements. Cumulative and induced impacts will have net positive benefits from easier access to energy and productive end uses of energy. Climate change risk screening was conducted and resulted to a medium climate change classification. Risks identified will be addressed through best practice engineering design.[37]

26. The initial environmental examinations and environmental management plans (EMPs) for all components include mitigation measures, monitoring, and budgetary provisions that are adequate to address the environmental impacts of the project. The EMPs' requirements will be incorporated into bidding documents. The NEA and AEPC have sufficient capacity to supervise construction contracts and EMP implementation, including preparation of semiannual monitoring reports. The EMPs will be updated as necessary during implementation. Public consultation and information disclosure requirements have been met, including requirements for consultation with

[35] Gender Equality and Social Inclusion Plan (accessible from the list of linked documents in Appendix 2).
[36] Initial Environmental Examination; Environmental Assessment and Review Framework (accessible from the list of linked documents in Appendix 2).
[37] Project Climate Risk Assessment and Management Report (accessible from the list of linked documents in Appendix 2)

the management teams for protected areas. The environmental assessment for the project was disclosed on ADB's website on 28 February 2014.

27. **Involuntary resettlement (category A) and indigenous peoples (category B).** The project will require land acquisition and involuntary resettlement, which will primarily be economic displacements with limited impact from physical displacement. The transmission and distribution components will have permanent and temporary impacts. Permanent impacts are anticipated from land acquisition for the construction of new transmission substations, distribution substations, transmission towers, and distribution poles. The temporary impacts will be from the loss of trees and crops along the right-of-way. About 715 households will be affected by land acquisition and loss of crops and trees. An initial assessment shows that the project areas do not have any endangered indigenous peoples groups. The magnitude of the impacts on indigenous peoples is not significant. Impacts are limited to loss of portions of land for some indigenous peoples which 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 of the project and to obtain their endorsement for land acquisition.

28. Based on surveys, two draft combined resettlement and indigenous peoples plans have been prepared for the on-grid components, in line with ADB's Safeguard Policy Statement and the government's legal framework.[38] These plans will be publicly disclosed to interested stakeholders on the ADB and NEA websites.

29. The off-grid component will not have any resettlement impacts for sample subprojects and no adverse impacts on indigenous peoples.[39] The minimum private land requirements for the sample subprojects will be met through voluntary land donation. A due diligence report has been prepared for the sample subprojects. The off-grid component allows for future subprojects, which have not been identified and are subject to due diligence. Therefore, a resettlement framework[40] and an indigenous peoples planning framework[41] have been prepared as required by the Safeguard Policy Statement and related national policies and legislation. AEPC will monitor the implementation of the resettlement and indigenous people plan, and will submit semiannual reports to ADB.

30. Social safeguards measures will be achieved in line with the provisions stated in the PAM.[42] A summary of the initial social safeguards assessment is presented in the summary poverty reduction and social strategy.[43]

F. Risks and Mitigating Measures

31. Major risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[44] The project benefits are expected to outweigh the associated risks.

[38] Combined Resettlement Plan and Indigenous Peoples Plan (accessible from the list of linked documents in Appendix 2).
[39] No impacts on indigenous peoples 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 Safeguard Policy Statement and national laws and regulations.
[40] Resettlement Framework (accessible from the list of linked documents in Appendix 2).
[41] Indigenous Peoples Planning Framework (accessible from the list of linked documents in Appendix 2).
[42] Sections VII (safeguards) and VIII (gender and social) of the PAM (accessible from the list of linked documents in Appendix 2).
[43] Summary Poverty Reduction and Social Strategy (accessible from the list of linked documents in Appendix 2).
[44] Risk Assessment and Risk Management Plans (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 the implementation of NEA financial restructuring plan and management reforms, and strengthening ETFC's capacity to review retail tariff adjustment petitions. The project will support NEA in establishing a pricing mechanism for open access to its power grid for electricity exports.
Slow decision making within NEA on project implementation	A dedicated PMD will be responsible for preparation and implementation of the project, with assistance from project implementation support consultants.
Weak implementation capacity of AEPC in larger-scale mini-hydro projects	A two-tier implementation structure will be adopted. The implementation support consultants will assist AEPC at the central level, while RSCs and social mobilizers will support AEPC at the field level.
Tariff collected from end users may not cover O&M cost because of low tariffs and low load factor	The project design has integrated into project implementation the support for productive energy use activities to ensure these activities are ready for operation once the power generation parts are commissioned. The productive energy use will offer higher tariff and consume more power than household use which helps cover O&M cost and increase load factor.

ADB = Asian Development Bank, AEPC = Alternative Energy Promotion Centre, ETFC = Electricity Tariff Fixation Commission, NEA = Nepal Electricity Authority, O&M = operation and maintenance, PMD = project management directorate, RSC = regional service center.
Source: Asian Development Bank.

V. ASSURANCES

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 SDR116,493,000 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) the administration by ADB of the grant equivalent to approximately $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) the 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.

Takehiko Nakao
President

11 June 2014

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Increased electricity access in Nepal and improved power exchange across the border	Cross-border power flows increased from to 2,000 MW by 2025 (Baseline: 100 MW in 2013). Electricity access rate in Nepal increased to 92% in 2025 (Baseline: 65% in 2013)	NEA annual reports SASEC Energy Working Group meeting minutes AEPC annual reports	**Assumptions** The government continues 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 power grid and enhanced renewable energy development	Power evacuation capacity from Kali Gandaki basin and Marsyangdi basin increased to 1,000 MW by 2021 (Baseline: 100 MW in 2013) Distribution capacities in identified areas increased to 316 MVA by 2021 (Baseline: 100 MVA in 2013) 30,500 additional households supplied by renewable energy in rural communities by 2021 CO_2 emissions reduced by 20,000 tons per year by 2021	NEA annual reports SASEC Energy Working Group meeting minutes NEA annual reports AEPC annual reports AEPC annual reports	**Assumption** The government continues to be committed to 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 and associated substations, constructed and/or augmented along Kali Gandaki corridor and Marsyangdi–Kathmandu route by 2021	NEA annual reports SASEC Energy Working Group meeting minutes	**Assumption** Timely availability of counterpart funds from the government **Risk** For AEPC's component, contributions by communities realized on time

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
	125 km of 220 kV transmission line, and associated substations at Marsyangdi corridor; and 24 km of 132 kV transmission line and associated substations at Samundratar–Trishuli 3B transmission hub constructed by 2021 (to be financed by EIB's parallel cofinancing)	NEA annual reports	
	8 grid service substations with aggregate 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 an additional 4.8 MW of mini-grid-based renewable energy capacity established by 2020 in selected communities where at least 33% of the households are headed by women or are disadvantaged	AEPC annual reports	
4. Capacity development support to NEA and AEPC provided	Project management monitoring system developed by 2015	Project quarterly progress report	
	20 persons trained in GESI-based community participation and management of energy systems by 2018	Project quarterly progress report	
	A feasibility study of one large scale wind farm approved by AEPC by 2018	AEPC annual reports	
	Draft regulations for implementing Renewable	AEPC annual reports	

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
	Energy Promotion Board Act accepted by AEPC by 2018 An updated distribution system and rural electrification master plan adopted by NEA by 2019	 NEA annual reports; distribution system master plan	
Activities with Milestones			**Inputs**
1. Power transmission capacity increased 1.1 Acquisition of land for substations and tower footings (June 2015) 1.2 Construction of transmission lines (July 2015–June 2021) 1.3 Implementation of environment management plan (July 2015) **2. Power distribution network improved** 2.1 Acquisition of land (if any required) (December 2016) 2.2 Extension of the identified distribution networks (January 2017–December 2018) **3. Mini-grid-based renewable energy systems in off-grid areas increased** 3.1 Land contribution by communities for sample mini hydroelectric subprojects (September 2015) 3.2 Construction of sample mini hydro subprojects (December 2015–November 2017) 3.3 Construction of subsequent mini hydro subprojects (July 2017–June 2020) 3.4 Land contribution by communities for sample mini-grid solar and solar–wind hybrid subprojects (June 2015) 3.5 Installation of sample mini-grid solar and solar–wind hybrid subprojects (January 2016–June 2017) 3.6 Installation of subsequent mini-grid solar and solar–wind hybrid subprojects (September 2017–February 2019) **4. Capacity development support to NEA and AEPC provided** 4.1 PSC support for NEA in supervising the implementation of outputs 1 and 2 (January 2016–December 2021) 4.2 PIC and social mobilizers support for AEPC in procuring and implementing output 3 (January 2015–June 2020) 4.3 Training of NEA, AEPC, and identified stakeholders (May 2015–April 2017) 4.4 Feasibility study of one large-scale wind farm (minimum 1 MW) accepted by AEPC (December 2017) 4.5 Draft regulations for implementing Renewable Energy Promotion Board Act accepted by AEPC (June 2018) 4.6 Distribution system and rural electrification master plan adopted by NEA (December 2019)			**Loan** ADB: $180,000,000 EIB: $120,000,000 **Grant** Government of Norway: $60,000,000 ADB SCF: $11,200,000 **Government of Nepal:** $60,340,000 Communities: $8,460,000

ADB = Asian Development Bank, AEPC = Alternative Energy Promotion Centre, EIB = European Investment Bank, GESI = gender equality and social inclusion, km = kilometer, kV = kilovolt, MVA = megavolt-ampere, MW = megawatt, NEA = Nepal Electricity Authority, PIC = project implementation consultant, PSC = project supervision consultant, SCF = Strategic Climate Fund.
Source: Asian Development Bank.

LIST OF LINKED DOCUMENTS

http://adb.org/Documents/RRPs/?id=44219-014-3

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): Energy
7. Project Administration Manual
8. Contribution to the ADB Results Framework
9. Development Coordination
10. Attached Technical Assistance
11. Financial Analysis
12. Economic Analysis
13. Country Economic Indicators
14. Summary Poverty Reduction and Social Strategy
15. Gender Action Plan: Gender Equality and Social Inclusion Plan
16. Initial Environmental Examination: Transmission and Distribution
17. Initial Environmental Examination: Sample Subprojects of Mini-Grid Renewable Energy
18. Environmental Assessment and Review Framework: Mini-Grid Renewable Energy
19. Combined Resettlement Plan and Indigenous Peoples Plan: Transmission
20. Combined Resettlement Plan and Indigenous Peoples Plan: Distribution
21. Resettlement Framework: Mini-Grid Renewable Energy
22. Indigenous Peoples Planning Framework: Mini-Grid Renewable Energy
23. Risk Assessment and Risk Management Plan

Supplementary Documents

24. Due Diligence Report: Sample Subprojects of Mini-Grid Renewable Energy
25. Technical Notes on High-Temperature, Low-Sag Conductors
26. Sector and Programmatic Context of the Project
27. Procurement Capacity Assessment
28. Financial Management Assessment
29. Scaling Up Renewable Energy Program Funding Proposal
30. Nepal Post-Conflict Assessment
31. Project Climate Risk Assessment and Management Report
32. Governance Risk Assessment