

Ex-Ante Evaluation (for Japanese ODA Loan)

South Asia Division 2, South Asia Department,
Japan International Cooperation Agency

1. Name of the Project

- (1) Country: Nepal
- (2) Project Site/Target Areas: Major urban areas. The current candidate areas are Pokhara City in Kaski District and Kathmandu Valley (Kathmandu District, Lalitpur District, and Bhaktapur District).
- (3) Project: Urban Transmission and Distribution System Improvement Project
- (4) Loan Agreement: September 21, 2022

2. Background and Necessity of the Project

(1) Current State and Issues of Power Sector Development in Nepal and the Position of the Project

Nepal has enjoyed relatively strong growth in recent years and has averaged real GDP growth of about 6% or more since 2017, when the country emerged from a decline caused by the earthquake in 2015 (IMF, 2020). Against the backdrop of such robust economic growth and increased imports of electricity from neighboring India, electricity demand has increased at an average rate of 4.7% over the past 10 years (2011-2020) (Nepal Electricity Authority (hereinafter referred to as, "NEA"), 2020). Peak demand is also assumed to increase from about 1.4 GW in 2019 to about 18 GW in 2040 (NEA, 2019). Although the economic slowdown caused by the coronavirus temporarily reduced electricity demand, annual electricity sales have increased at an average annual rate of about 11% over the past three years (2019-2021), and future electricity demand is expected to increase with economic growth after the COVID-19 pandemic. (NEA, 2021).

Nepal's economically viable hydropower potential is enormous at approximately 42 GW, and although hydropower generation accounts for more than 90% of Nepal's power supply, power development has not progressed sufficiently, and power outages due to supply shortages have become the norm. Recently, the supply capacity of hydroelectric power generation has greatly improved due to the rapid development of hydroelectric power generation projects by independent power producers (hereinafter referred to as, "IPPs"). Because the majority of hydropower generation is run-of-river power generation without inter-seasonal adjustment, the shortage in the dry season is still covered by electricity imports from India, but since 2018, electricity has been exported to India during the rainy season when surplus power is generated, and the situation regarding power generation is improving (NEA, 2020).

However, the transmission and distribution sector is facing issues such as insufficient transmission and distribution capacity due to rapid demand growth and aging transmission and distribution facilities in major urban areas. Moreover, there are still many single-circuit transmission lines outside major areas, resulting in widespread power outages in the event of accidents. Therefore, there is an urgent need to improve the power transmission and distribution network to ensure a stable supply of electricity over a wide area. For example, in Pokhara City, the second largest city by population and the center of the tourism industry, which is a major industry, electricity demand has been increasing at an average annual rate of approximately 11% for the past five years (2016 to 2020), and is expected to exceed the capacity of the existing substation in the city within the

next five years, causing concerns about a serious impact on electricity supply. In the Kathmandu valley, the aging and insufficient capacity of existing power transmission and distribution facilities are the main causes of power outages, which occur approximately 165 times per year averaging 57 hours per household (NEA, 2021), and the improvement of the power transmission and distribution network is an urgent issue to meet the future increase in demand.

The Urban Transmission and Distribution System Improvement Project (hereinafter referred to as, the “Project”) is to develop power transmission and distribution networks in major urban areas, with Pokhara City and Kathmandu metropolitan area as candidates. The 15th Five-Year Plan (FY 2019/2020 to FY 2024/2025) of Nepal also positions the power sector as a priority sector that will drive economic development and is an important project in Nepal’s power sector because it calls for the enhancement of domestic power transmission and distribution facilities. In addition, the Long-term Strategy for Net-zero Emissions announced by Nepal in 2021 calls for the promotion of electrification in the transportation, manufacturing, and residential sectors in order to achieve carbon neutral by 2045. Because there is a possibility of further increase in electricity consumption due to the promotion of electrification, this Project may contribute to the promotion of this strategy.

(2) Japan’s and JICA’s Policy for the Power Sector and the Positioning of the Project

The Country Development Cooperation Policy for Nepal by the Japanese government (September 2021) positions the power sector in the priority area of economic growth and poverty reduction. In addition, the JICA Country Analysis Paper for Nepal (August 2020) states that Nepal's economy has continued to grow in recent years, and as the country is scheduled to graduate from the Least Developed Countries by 2026, it is important to promote the development of economic infrastructure to accelerate high-quality growth, including development of power transmission and distribution networks in the electric power sector. At the same time, theme 3. Energy and Mining of JICA's Global Agenda (Issue-Specific Project Strategies), sets "strengthening the electricity transmission and distribution network" as a cooperation policy, and this project is consistent with these policies and analyses.

(3) Other Donors’ Activities

In Nepal, the World Bank and ADB are working on master planning for power transmission and distribution, as well as the development of power generation, transmission, and distribution. The World Bank approved the Grid Solar and Energy Efficiency Project (loan amount of USD 130 million) in 2014 to support the development of a master plan to promote solar power generation, develop a master plan of distribution network to reduce distribution loss, and construct a 400/230kV substation. ADB is supporting Nepal in the South Asia Subregional Economic Cooperation (SASEC) Power System Expansion Project (loan amount of US\$180 million) approved in 2014, which aims to meet increasing demand until 2035. ADB is supporting the development of a Distribution System / Rural Electrification Master Plan, a plan for the development of an electricity distribution network for all of Nepal by 2035. In addition, the Power Transmission and Distribution Efficiency Enhancement Project (loan amount of USD 150 million) was approved in 2017 and the Electricity Grid Modernization Project (loan amount of USD 156 million) was approved in 2020 (with an additional USD 60 million approved in 2021) to support the development of the power transmission and distribution network. The Project includes the projects listed in the master plan prepared by support of ADB, and it has been confirmed with the implementing agencies

that there is no overlap with projects being implemented by other donor agencies.

3. Project Description

(1) Project Description

- ① Project Objective: It is to improve the transmission and distribution system in urban areas in Nepal, by developing new and/or upgrading the existing transmission and/or distribution system, including grid substations and related equipment, thereby contributing to economic growth and improvement of living environment in Nepal. .
- ② Project Components: The Project is a sector loan for the construction of a power transmission and distribution network in the major urban areas of Nepal. After the start of consulting services, the consultant and the executing agency will discuss the sub-projects to be selected based on the selection criteria such as project effectiveness, economic efficiency, and environmental and social impacts, and the implementing agency will decide on the sub-projects. The sub-project candidates currently envisioned are stated below under a). In addition, procurement will include consulting services for basic design, bidding assistance, construction supervision, and environmental and social considerations for all sub-projects.
 - a) New construction and expansion of substations and transmission and distribution lines (voltage of 132 kV or less) (international competitive bidding).

The sub-projects currently envisaged are the construction of one new substation and related transmission and distribution lines in Pokhara City, and the construction and expansion of five new substations and related transmission and distribution lines in the Kathmandu Valley.
 - b) Consulting services (basic design, bidding assistance, construction supervision, environmental and social considerations, etc.) (short list method)
- ③ Project Beneficiaries (Target Group)

Final beneficiaries: Approximately 3 million people (However, this will vary depending on the selected sub-project.)

(2) Estimated Project Cost

18,144 million yen (including the Japanese ODA loan: 15,901 million yen)

(3) Schedule

September /2022- February /2028 (66 months)

(4) Project Implementation Structure

- ① Borrower: The Government of Nepal
- ② Guarantor: none
- ③ Executing Agency: Nepal Electricity Authority (NEA)

(5) Collaboration and Sharing of Roles with Other Projects and Donors

① Japan's Activity

The "Integrated Power System Development Plan Project" (2021-2023), a technical cooperation

project aimed at formulating a power development plan that comprehensively covers development priorities, development scale and timing, financing methods, and investment plans including the division of roles and procurement methods between private and public funds, and the establishment of coordination functions among related organizations is being implemented by The Ministry of Energy, Water Resources and Irrigation, NEA, and other counterparts, and an expert Advisor for Hydropower Planning (2021-2023) is being dispatched to NEA.

② Other Donors' Activity

If a sub-project in the Kathmandu valley is selected for the Project, a part of the Project will be connected to the power transmission and distribution network to be developed under the ADB-supported Power Transmission and Distribution Efficiency Enhancement Project, and there is a possibility of collaboration with the ADB.

(6) Environmental and Social Considerations

① Environmental and Social Considerations

a) Category: FI

b) Reason for Categorization: The Project is categorized as FI based on Japan International Cooperation Agency Guidelines for Environmental and Social Considerations (issued April 2010), which means sub-projects cannot be identified before JICA's loan approval, and such sub-projects are expected to have environmental impacts.

c) Others/Monitoring: In the Project, the executing agency, with the support of a consultant hired under the ODA loan, will classify each sub-project into categories based on Nepal's domestic legal system and the Japan International Cooperation Agency Guidelines for Environmental and Social Considerations (issued April 2010), and ensure that necessary measures are taken in the relevant categories. Category A projects are not included in the sub-projects.

(7) Cross-Sectoral Issues: Nothing in particular

(8) Gender Category: [Not Applicable] ■GI (Gender mainstreaming needs survey/analysis project)

<Reason for Categorization>: Although the Project was confirmed to be implemented in accordance with the Gender Inclusion Policy (2013) and Strategy (2015-2020) of the Government of Nepal, the Project does not include specific indicators and efforts that would contribute to gender quality. In the construction work of the Project, the Project will promote gender equality by ensuring equal pay for equal work for men and women and providing facilities for women workers, as well as promote and actively employ women in the project implementation system and operation and maintenance management system.

(9) Other Important Issues: Nothing in particular.

4. Targeted Outcomes

(1) Quantitative Effects

1) Outcomes (Operation and Effect Indicators)

The figures for high priority sub-projects are as follows. The details will be set after the sub-projects are finalized.

Package	Indicator	Baseline	Target (2029) [2 years after project completion]
Pokhara	Transmission end power supply (GWh)	-	About 180
	Number of outages at substations to be developed (times/year)	-	0
Kathmandu	Transmission end power supply (GWh)	-	About 1,200
	Number of outages at substations to be developed (times/year)	-	0

(2) Qualitative Effects: Stabilization and streamlining of electricity supply in the target cities, reduction of transmission and distribution losses, revitalization of the economy and industry of the target cities through stable electricity supply, and improvement of the living standards of residents, etc.

(3) Internal Rate of Return: IRR is not calculated for this project because sub-projects cannot be identified in advance.

5. Prerequisites and External Factors

(1) Prerequisites and External Factors: That there is no instability in the political situation or sudden deterioration of public security.

6. Lessons Learned from Past Projects and Application of Lessons Learned to the Project

In the past ex-post evaluation of the Secondary Transmission Lines and Grid Station Project (evaluation year: 2010), an ODA loan to the Islamic Republic of Pakistan, the project progress was delayed due to protracted negotiations on compensation with the affected residents under the transmission line, etc. The lessons learned from this experience indicate that it is necessary to plan an implementation schedule based on past construction results and consider measures to prevent project delays.

Because the Project may include a new power transmission and distribution component, based on the lessons learned above, the sub-projects with small social impacts, such as land acquisition and resettlement, are selected as candidates in the preparatory study for cooperation to avoid project delays due to prolonged consensus building with the affected residents. In addition, for sub-projects that require land acquisition and resettlement, JICA proposed an implementation schedule that takes into account environmental and social considerations, and has agreed with NEA to start the environmental and social study as early as possible to reduce the risk of project delays.

7. Evaluation Results

This Project is consistent with Nepal's development issues and policies, as well as the cooperation policy and analysis of Japan and JICA, and will contribute to the stabilization and improvement of efficiency of electricity supply in Pokhara City, a key urban area in the country, and the Kathmandu Valley through the development of an electricity transmission and distribution network. It is also expected to contribute to SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), and SDG 9 (Industry, Innovation and Infrastructure). For these reasons, the necessity of supporting the implementation of the Project is high.

8. Plan for Future Evaluation

(1) Indicators to be Used

As provided in Section 4.

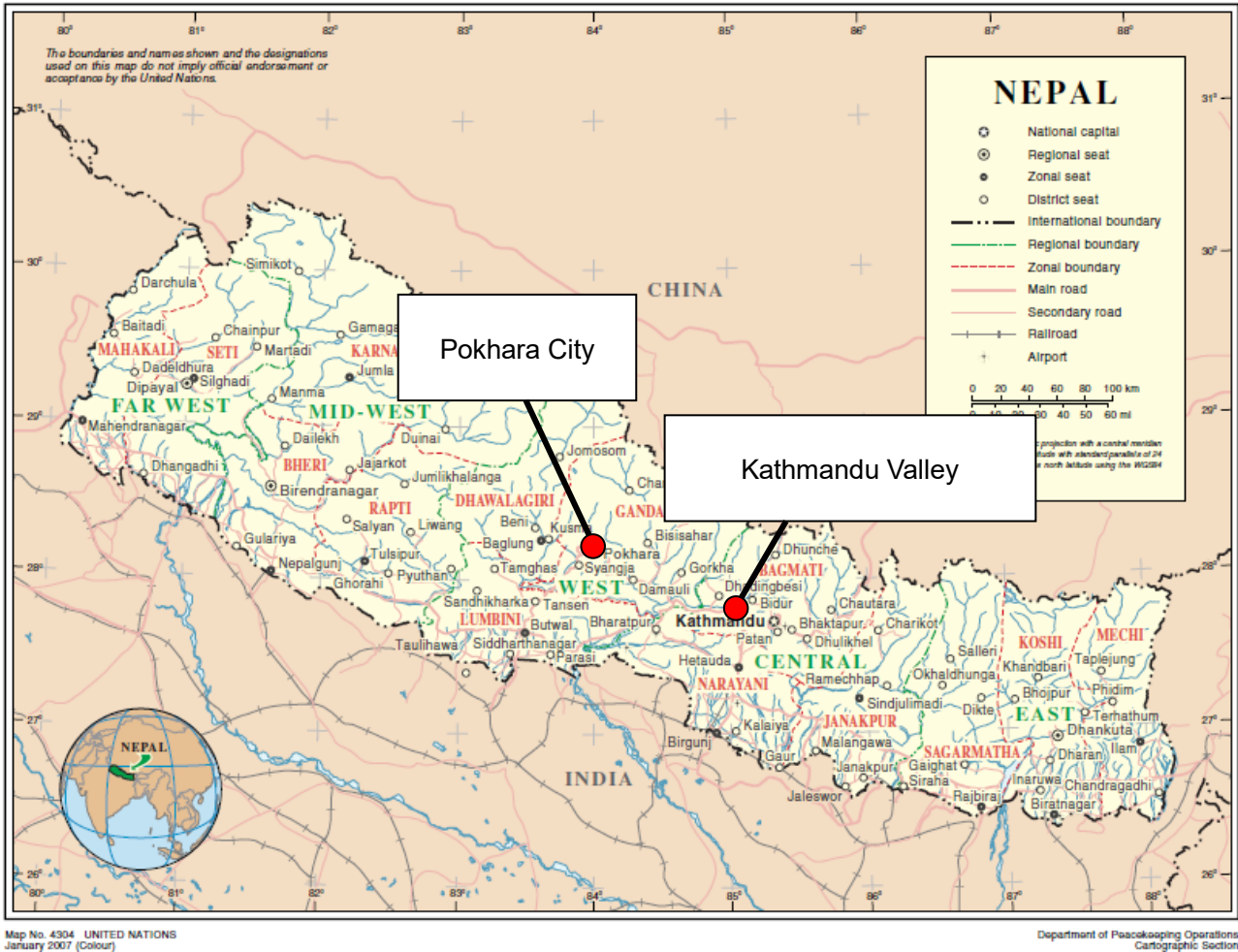
(2) Future Evaluation Schedule

Ex-post evaluation: 2 years after the project completion

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Appendix: Map of Urban Transmission and Distribution System Improvement Project

Map of Urban Transmission and Distribution System Improvement Project



Source: Prepared by JICA from UN map (2007, <https://www.un.org/Depts/Cartographic/map/profile/nepal.pdf>) (location of major urban areas of the project candidates are clearly indicated)