

Ex-Ante Evaluation (for Japanese ODA Loan) (Draft)

1. Name of the Project

Country: The Islamic Republic of Pakistan

Project: Islamabad and Burhan Transmission Line Reinforcement Project (Phase 1)

Loan Agreement Signed: May 4, 2017

Loan Amount: 2,665 million Yen

Borrower: The President of the Government of the Islamic Republic of Pakistan

2. Background and Necessity of the Project

(1) Current State and Issues of the Energy Sector in Pakistan

The Islamic Republic of Pakistan (Pakistan) has been facing a serious energy supply-demand gap in recent years; the peak supply of electricity is more than 20% short from the peak demand, due to the deterioration of the power infrastructure and a lack of fuel due to a structural problem in energy sector. With this background, it is projected that the energy demand in Pakistan will increase 5.5 % as an annual average by 2020 and the peak demand in 2020 will be up more than 1.3 times compared with 2015.

The major cause for the serious power shortage in Pakistan results from the structural problem in which the distribution and transmission companies have huge debts because of the electricity charges being suppressed politically, the late adjustment for fuel prices, the low average collecting fee, and high transmission and distribution losses. Against this background, there is the large supply-demand gap and also long term power outages, as generation companies have difficulty procuring the fuel and have no choice but to cut operating rates.

Another challenge in the energy sector is reinforcement of the existing transmission lines to cope with the growing demand for power supply and the decreasing rate of power outages, coupled with expansion of the generation facilities. In Pakistan, major power outage is more likely to happen because transmission line facilities are getting older with insufficient maintenance as well as most of the transmission lines are single lines thus backup system in any accident is insufficient. In addition, as the rate of transmission and distribution loss in Pakistan is still higher than other countries in South East Asia and South Asia countries, further effort for loss reduction is also required.

(2) Development Policies for the Energy Sector in Pakistan and the Priority of the Project

The Government of Pakistan developed the National Power Policy 2013 in July 2013. This Project will contribute to resolving the supply demand gap as the goal of above policy and support improving energy efficiency.

(3) Japan and JICA's Policy and Operations in the Energy Sector

The Government of Japan's Country Assistance policy for the Islamic Republic of Pakistan (April 2012) states "Improvement of Economic Infrastructure (Transportation and Energy)" as one of its priority areas and focuses on "Support to build an efficient and sustainable energy supply system" in the energy sector. Also, the JICA Country Analysis Paper for Pakistan

(March 2014) analyzed that resolution of the serious supply-demand gap is one of the most important areas, and reinforcement of the transmission lines and substation equipment is also important corresponding to enhancement of the generating facilities. Therefore, the Project is consistent with this policy and analysis. The Japanese government has implemented 20 loan Projects in the energy sector in Pakistan. Focused on the transmission and transformation sector in recent years, JICA has implemented loan projects for the reinforcement of transmission networks and supported to sustain energy supply through the technical cooperation for the Project for Improvement of Training Capacity on Grid System Operations and Maintenance (March 2011-December 2014).

(4) Other Donors' Activity

The World Bank and the Asia Development Bank have both supported structural reform of the energy sector, and reinforcement of the transmission and distribution facilities. The World Bank, especially, supports large-scale hydro power plants such as the Tarbela hydro power plant and the Dasu hydro power plant.

(5) Necessity of the Project

The Project aims to contribute to the sustainable energy supply in the Islamabad capital territory and surrounding areas and to promote efficient energy through the introduction of low loss conductors. It is highly necessary and relevant for JICA to implement this Project as the Project is consistent with the development policy of Pakistan and the assistance policy of Japan.

3. Project Description

(1) Project Objective(s):

The objective of the Project is to improve the reliability of the national grid network to meet the growing demand for power supply to the Islamabad capital territory and surrounding areas, thereby contributing to improving the economic infrastructure of Pakistan.

(2) Project Site/Target Area: Punjab Province and Khyber Pakhtunkhwa Province

(3) Project Component(s):

- ① Reinforcement of the 220kV transmission line (low-loss conductor), total distance:35km
- ② Consulting Service (Detailed design, Tender assistance, Construction supervision)

(4) Loan Amount: 2,665 million Yen

(5) Schedule: From May 2017 to November 2021 (55 months). Completion of the Project is defined as the completion of the construction.

(6) Project Implementation Structure:

- 1) Borrower: The President of the Government of the Islamic Republic of Pakistan
- 2) Executing Agency: National Transmission and Despatch Company (NTDC)
- 3) Operation System: Grid System Operation under NTDC will manage and coordinate all activities for the Project

(7) Environment and Social Consideration/Poverty Reduction/Social Development

- 1) Environmental and Social Considerations

- (i) Category : B
- (ii) Reason for Categorization: The Project is not likely to be large scale compared with other projects in the energy sector and is not located in a sensitive area under the “Japan International Cooperation Agency Guidelines for environmental and social considerations”.
- (iii) Environmental Permit: The Environmental Impact Assessment (EIA) report concerning this Project is expected to be completed by the executing agency and approved by the Environmental Protection Agency (EPA) by November 2017.
- (iv) Anti-Pollution Measures: Measures against pollution, noise and waste products will be taken by controlling construction in the rainy season as well as the construction term, and correctly disposing of waste cooperation with the EPA to satisfy the discharge and environmental standards in Pakistan.
- (v) Natural Environment: The area targeted by this Project is not located in or around any sensitive areas such as national parks, and so adverse impact on the natural environment is assumed to be minimal. In areas located 3 km around the forest area near the Tarbela hydro power plant, an overhead cable will be used for material transport as a measure to minimize the influence on traffic and tree felling. In cases where tree felling cannot be avoided, substitute trees will be planted in neighboring areas.
- (vi) Social Environment: Since relocation of the existing pylons are not expected as part of this Project, land acquisition and resident relocation is not expected to be necessary. In case the pylons do need to be relocated for any reason, the relocation will be limited within range of the ROW to prevent resident relocation.
- (vii) Other/Monitoring: In this Project, the contractor will monitor the water pollution, noise, waste products and ecological system, with the consultant and the executing agency taking control as the responsible organization.
- 2) Promotion of Poverty Reduction: None in Particular
- 3) Promotion of Social Development: None in Particular
- (8) Collaboration with Other Donors: The World Bank has implemented a fourth extension of the Tarbela hydropower plant to add 1,410 MW. This Project aims to reinforce the capacity of the transmission line between the Tarbela hydropower plant and the Burhan substation enough for the Tarbela hydropower plant to continue to transmit after the extension project implemented by the World Bank.
- (9) Other Important Issues: None in Particular

<h4>4. Target Outcomes</h4>

- (1) Quantitative Effects
 - 1) Outcome (Operation and Effect Indicators)

Indicators	Route	Baseline (Records from 2015)	Target (2022) [2 years after completion]
Transmission line operating rate (%) (Tarbela-Burhan)	1	62.5	34.2
	2	68.8	29.7
Maximum load of the operation of the transmission line (MW)	1	200	298.82
	2	220	259.36
Amount of transmitted power (MWh)	1	1,086,100	1,505,156
	2	505,233	1,306,396
Transmission loss rate (%)	1	1.87	0.57
	2	2.70	0.42

2) Internal Rate of Return

Based on the following assumptions, this Project's economic internal rate of return (EIRR) will be 23.46% and the financial internal rate of return (FIRR) will be 2.18%.

[EIRR]

Costs: Project cost (excluding tax), management / maintenance and administration cost

Benefit: Increasing Amount of Transmitted Power, Save Transmission Loss

Project life: 40 years

[FIRR]

Costs: Project cost, management / maintenance and administration cost

Benefit: Revenue Increase

Project life: 40 years

(2) Qualitative Effects

Activation of the economy through a stable energy supply

5. External Conditions and Risk Control

The political situation and public security in Pakistan will not become exacerbated. The progress of reinforcement of the Tarbela hydro power plant will not become delayed.

6. Lessons from Past Projects and Application to this Project

(1) Lessons from similar projects

The results of the evaluation survey for the Secondary Transmission Lines and Grid Stations Project revealed that the schedule became delayed because of a contract problem. In this case, although the Executing Agency requested that an internal technician design and administrate due to the financial situation, the Executing Agency changed to a contract with an external consultant by the end of the study.

(2) Application of the lesson to this Project

As low loss conductors will be introduced into Pakistan through this Project as a new technology, JICA and the Executing Agency have agreed to hire an international consultant to manage the process well.

7. Plan for Future Evaluation

(1) Indicators to be used in the future evaluation

- 1) Transmission line operating rate (%) (Tarbela-Burhan)
- 2) Maximum load of the operation of the transmission line (MW)
- 3) Amount of transmitted power (MWh)
- 4) Transmission loss rate (%)

(2) Future evaluation timing

2 years after Project completion

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