

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

### 1. Name of the Project

Country: The Islamic Republic of Pakistan

Project: National Transmission Lines and Grid Stations Strengthening Project

Loan Agreement: March 31, 2010

Loan Amount: 23,300 million yen

Borrower: The President of the Islamic Republic of Pakistan

### 2. Background and Necessity of the Project

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

The recent rapid growth of power demand in Pakistan has been causing serious demand-supply gap and thus there is the urgent need for investment in the power generation sector. With regard to the power transmission and distribution sub-sector, the power loss ratio is so high that development and strengthening of transmission and distribution facilities are urgently required for stable and efficient power supply. At the institutional side, the power sector reform has been undergoing, where the Water and Power Development Authority (WAPDA) was unbundled into four generation companies, one transmission company, and nine distribution companies, but there are still many issues such as resolution of large debt due to the low tariff level and unsatisfactory collection, development of efficient operational system, and development of human resources.

#### (2) Development Policy for the Power Sector in Pakistan and the Priority of the Project

The Government of Pakistan has set out a Medium Term Development Framework 2005-2010 (May 2005) in which it states the intention to promote the development of power sources, promote privatization, improve the power institutions, and reduce transmission and distribution loss ratio to 21.5% by 2010. This project is fully in accordance with this policy.

#### (3) Japan and JICA's Assistance Policy and Operations in the Power Sector

Based on Country Assistance Program for the Islamic Republic of Pakistan drawn by Government of Japan, for the purpose of "the development of a healthy market economy" as a one of the direction of assistance strategy, JICA assists "development of the economic infrastructure to support the activation of a market economy and the reduction of poverty" as priority agenda through policy and institutional reforms, efficient infrastructure development, and its sustainable operation and maintenance. JICA has so far financed 17 yen loans in this sector, recently focusing on the transmission and distribution sub-sector. In addition, a technical cooperation project is planned for capacity building of the operation and maintenance of transmission facilities.

#### (4) Other Donors' Activities

The World Bank and the Asian Development Bank (ADB) have provided comprehensive assistance for institutional improvement and the transmission and distribution infrastructure development, in addition to the power sector reform.

#### (5) Necessity of the Project

Power demand in Pakistan has grown by around 7% annually over the past 10 years in line with economic growth, but power supply has not kept up with such growth. In summer 2009, there was a demand-supply gap of approximately 4,000MW to 5,000MW, resulting in power cuts on a national level for approximately 10 hours per day. Such power shortage has caused obstacles to the development of industry and agriculture, and presents a threat to the livelihoods of people in Pakistan. In order to respond to this increase in demand, it is

necessary to urgently expand the capacity of generating facilities, and to upgrade transmission and distribution facilities accordingly, as well as to reduce the transmission and distribution losses. Some of Pakistan's sub-stations have been already operating in an overloaded condition as a result of the increase in demand, and others are anticipated to face overloads sooner or later. Since power demand is anticipated to continue to increase, there is the need to expand transmission facilities throughout Pakistan. Therefore, JICA's assistance is necessary and highly relevant.

### **3. Project Description**

#### (1) Project Objectives

This project aims to improve the reliability and efficiency of power supply by newly constructing and upgrading prioritized 500kV and 220kV transmission lines and sub-stations in Punjab and Sindh provinces in Pakistan, thereby contributing to economic development and improvement of living standards of local residents in the concerned area.

#### (2) Project Site/Target Area

Punjab Province and Sindh Province

#### (3) Project Components

- 1) Construction and upgrading of new substations and existing substation and construction of new related transmission lines (Chishtian, Gujrat, Lahore, and Shikarpur) (Procurement method: International competitive bidding)
- 2) Consulting services (preparation of bidding documents, assistance with bidding process, construction supervision, etc.) (Procurement method: Recruitment according to Pakistan's domestic laws (outside the scope of yen loan))

#### (4) Estimated Project Cost

29,339 million yen (Loan Amount: 23,300 million yen)

#### (5) Schedule

March 2010 to July 2014 (planned) (total 53 months); the project will be completed when the facilities begin operation (July 2013).

#### (6) Project Implementation Structure

- a) Borrower: The President of the Islamic Republic of Pakistan
- b) Agency for Execution and Operation and Maintenance: National Transmission and Despatch Company Ltd.

#### (7) Environmental and Social Considerations/Poverty Reduction/Social Development

##### a) Environmental and Social Considerations

##### (i) Category: B

##### (ii) Reason for Categorization:

It is judged that the project has no serious adverse environmental impact because the project does not fall under any large scale sector that is likely to have impact and the project area is not susceptible to the impact under the terms of the "Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations" (established in April 2002).

##### (iii) Environmental Permit:

The Environmental Impact Assessment (EIA) reports for the 220kV sub-station in Chishtian, and the related transmission lines, and for the 220kV sub-station in Gujrat and the related transmission lines were approved by the Environmental Protection Agency, Punjab Province in December 2008. Preparation of EIA reports regarding the other substations and the related

transmission lines are expected to be completed by the executing agency before April 2010, and EIA reports will be approved by the Environmental Protection Agencies, Punjab and Sindh provinces by July 2010.

(iv) Anti-Pollution Measures:

Domestic environmental standards regarding air pollution and noise, etc., during the construction will be complied by spraying water and employing appropriate operation and maintenance methods of equipment.

(v) Natural environment:

Because the project area does not fall under the category of the protected area, such as a national park, adverse impact on the natural environment is minimal.

(vi) Social Environment:

This project involves the land acquisition of approximately 58ha. This land acquisition is being carried out in accordance with domestic laws in Pakistan and the compensation policy of the executing agency, and is expected to be completed by the time when the construction work on the project begins. Resettlement is not required.

(vii) Other Monitoring

In this project, the executing agency will monitor noise and other types of pollution.

b) Promotion of Poverty Reduction

None

c) Promotion of Social Development (e.g. Gender Perspective, Countermeasures to Infectious Diseases including AIDS, Participatory Development, Consideration for the Handicapped, etc.)

None

(8) Partnership with Other Donors

None

(9) Other Important Issues

It is anticipated that staff who will be trained in training facilities improved by Technical Cooperation Project "The Project for improvement of Training Capacity on Grid System Operation and Maintenance" will be engaged in operation and maintenance of the newly built and upgraded sub-stations and the related transmission lines by this project.

**4. Targeted Outcomes**

(1) Performance Indicators (Operation and Effect Indicator)

Indicator		Baseline (Actual figure in 2009 )	Target (2015) (Expected figure 2 years after project completion)
Capacity Operating Rate (%) (Note 1)	Lahore sub-station area	85	81
	Shikarpur sub-station area	99	42
	Gujrat sub-station area	103	40
	Chishtian sub-station area	102	80
Forced Outage Hours Per User (hours/year)		0	0
Electricity Supply (GWh)(note 2)		-	10,637
Transmission Loss (%) (note 3)		3.58	3.58

(Note 1) The definition of Capacity Operating Rate is Transformer's peak load (MW) divided by maximum available capacity. It indicates the utilization level of available capacity. This is a criterion to make decision on the need (or otherwise) for further new facilities to be constructed.

(Note 2) The figure of the electric power transmitted per year from the newly constructed and upgraded substations.

(Note 3) Although the loss is supposed to increase along with continuously increasing demand, expected from the baseline year to the target year, the target figure was set to maintain the current level, taking account of improvement under the project.

## (2) Internal Rates of Return

Based on the conditions indicated below, the Economic Internal Rate of Return (EIRR) for this project is 11.3%, and the Financial Internal Rate of Return (FIRR) is 10.8%.

[EIRR]

Costs: Project cost (excluding tax and duties), operation and maintenance cost

Benefit: Reduction of power generation cost

Project life: 30 years

[FIRR]

Costs: Project cost, operation and maintenance cost

Benefit: Revenue

Project life: 30 years

## 5. External Factors and Risk Control

None

## 6. Lessons Learned from Past Projects

Ex-post evaluations of past projects show that “it would have been effective to further consider details of the state of facilities and equipment that did not fall within the scope of the project, in order to create further effect, that is to say, responding to latent demand and ensuring stable supply”. With respect to this project, the mid and long-term plans for strengthening and upgrading the generation, transmission, and distribution facilities and equipment were confirmed in the appraisal mission, and thus the maximum effect of this project are achievable. During the implementation of this project, encouragement for timely strengthening and upgrading facilities and equipment will be given to executing agency.

## 7. Plan for Future Evaluation

(1) Indicators to be Used for the Future Evaluation

- 1) Capacity Operating Rate of Sub-stations (%)
- 2) Forced Outage Hours Per User (hours/year)
- 3) Electricity Supply (GWh)
- 4) Transmission Loss (%)
- 5) Economic Internal Rate of Return (EIRR) (%)
- 6) Financial Internal Rate of Return (FIRR) (%)

(2) Timing of the Next Evaluation

Two years after the project completion