Japanese ODA Loan

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: India
Project: Madhya Pradesh Transmission System Modernisation Project
Loan Agreement: June 16, 2011
Loan Amount: 18,475 million yen
Borrower: The President of India

2. Background and Necessity of the Project

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

With its recent fast-paced annual economic growth of more than 8%, energy consumption in India has been increasing, which has made the country becoming the fifth largest energy consumer in the world. However, energy supply has not met the energy demand (FY2010: April 2010 - March 2011: serious shortage of electricity supply, 10.6% in the total requirement, 12.1% in the peak demand). In addition, a high rate of power transmission losses (FY2010: 25.5% on an average for the entire India) and frequent power cuts have become serious problems with respect to power supply.

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

Under the Eleventh Five-Year Plan (April 2007 to March 2012), the Government of India plans o develop new power sources of 62,374 MW and establish power transmission facilities. As such,, the Government of Madhya Pradesh has established an "Eleventh Five-Year Transmission Plan of Madhya Pradesh," whose initiative includes the Madhya Pradesh Transmission System Modernization Project (hereinafter referred to as "the Project") that contributes to establish power transmission networks in Madhya Pradesh (hereinafter referred to as "MP State").

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

In Japan's Country Assistance Programs for India, "Promotion of Economic Growth" has been identified as one of the priority areas. Accordingly, JICA has set the "Promotion of Sustainable Growth through the Development Assistance to the Infrastructure" as a prioritized area. In order to deliver stable and efficient supply of electric power, strengthening power supply capacity as well as power transmission capacity is necessary. JICA's primary assistance includes establishment of highly efficient power supply facilities (power stations and transmission/distribution systems), improving efficiency of the existing old power facilities, and reduction of power transmission losses, which are all consistent with the objective of the Project. . As for the past Japanese ODA loan projects in the energy sector, there were 69 projects totaling 966.6 billion yen (or 31% of the total loan amount extended to India). With regard to the transmission system improvement projects, JICA extended ODA loans to the "Transmission System Modernization and Strengthening Project in Hyderabad Metropolitan Area" in FY2006, the "Maharashtra Transmission System Project" in FY2007, and the "Haryana Transmission System Project" in FY2008. As for technical cooperation, JICA conducted development study titled the "Andhra Pradesh Power Distribution Improvement Planning Study" and the "Thermal Power Generation Management Improvement Planning Study."

(4) Other Donors' Activities

The World Bank and the Asian Development Bank (ADB) have been supporting not only the power sector reforms in each state, but also projects related to the establishment of transmission and distribution systems, strengthening of the capacity of state electric power corporations, development of hydroelectric power generation, and energy efficiency improvement.

(5) Necessity of the Project

MP State is one of the states located in the Delhi-Mumbai Industrial Corridor (DMIC), which is an initiative developed between the Governments of Japan and India. As MP State plans on

contributing to the DMIC-area development, such as the special economic zone near the Indore Airport, distribution center near Dewas City, and an industrial zone in Pithampur, stable economic growth is expected to continue, which should lead to an increase in electric power demand in urban areas. In order to meet the increasing demand for electric power, two new thermal power plants (with a total capacity of 1,700 MW) are planned to begin operations by 2013. With the increase in electricity generation capacity, strengthening of the transmission systems is required. Out of the five regions in India's power transmission systems, MP State belongs to the western region, which has the highest demand for electric power in India. As MP State is located at the center of the western region, the State has nine out of 19 trunk substations, and therefore, reliability and stability in transmission system of the State will further contribute to reliability not only in the western region but also in the DMIC area and ultimately entire India. As such,, by improving transmission system in the State, the Project aims to contribute in stabilizing the transmission system in the State as well as the western region, reducing transmission losses, and stabilizing management of the power supply systems, which makes JICA's assistance for the Project necessary and relevant.

3. Project Description

(1) Project Objective

The objective of the Project is to ensure reliable transmission of expanded volume of electricity and to avoid overloading of transmission system in the state of Madhya Pradesh and ultimately in the western region after the prospected expansion of power generation, by modernising transmission system throughout MP state, thereby promoting economic growth in the served area.

(2) Project Site/Target Area

The entire state of Madhya Pradesh

(3) Project Components

Laying of transmission lines (220 kV, 132 kV), construction of new substations, and augmentation work at existing substations throughout the State

1) Procurement of Equipment
   - Laying and reinforcement of transmission lines (220 kV, 132 kV): approximately 2,100 km in total
   - Construction and augmentation of the following substations:

	Construction	Augmentation
400 kV/220 kV	None	3 substations
220 kV/132 kV	8 substations	15 substations
132 kV/33 kV	26 substations	66 substations

2) Civil works related to installation

(4) Estimated Project Cost (Loan Amount)

22,213 million yen (Loan Amount: 18,475 million yen)

(5) Schedule

June 2011 – May 2015 (48 months); Project completion is scheduled in May 2014, which is the expected time for commencement of commercial operation.

(6) Project Implementation Structure

1) Borrower: The President of India
2) Executing Agency: Madhya Pradesh Power Transmission Company Limited
3) Operation and Maintenance System: same as 2) above

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

1) Environmental and Social Considerations

(1) Category: B
(2) Reason for Categorization: The Project does not include sensitive sectors, characteristics or areas described in the Guidelines for Environmental and Social Considerations (issued in April 2010), and therefore the adverse impact of the Project is considered to be moderate.
(3) Environmental Permit: The Environmental Impact Assessment (EIA) report is not required for the Project under the country's domestic laws.
(4) Anti-Pollution Measures: During construction, appropriate mitigation measures will be taken to reduce the dust by spraying water and covering freight carriers and for vehicles and heavy machinery while performing the works..
(5) Natural Environment: The project areas are not located in or around any environment-sensitive areas, such as national parks, and thus adverse impact on the natural environment caused by the Project is expected to be minimal. None of the sites for the installation of transmission lines or construction of substations are located in reserved forests, thus there is no problem in this regard.
(6) Social Environment: The Project requires land acquisition of 97.16 ha, out of which 91.71 ha is owned by the Government, while 5.45 ha is privately owned which is in the process of being acquired with the reacquisition price under the domestic procedures of India as well as compensation policy enacted by the Executing Agency. 4.57 ha has been already acquired and the acquisition of the remaining 0.88 ha is also scheduled to be completed by August 2011. The Project involves no residents resettlement.
(7) Other(Monitoring): During construction, the Executing Agency will monitor air quality, water quality, noise, and vibration. After the completion of the Project, the Executing Agency will monitor the waste, discharged water, solid waste, air quality, and noise. The Executing Agency has agreed to report to JICA the monitoring results every six months during construction, and once a year over a three-years period after the completion of the Project.

2) Promotion of Poverty Reduction
None

3) Promotion of Social Development (e.g. Gender Perspective, Measure for Infectious Diseases Including HIV/AIDS, Participatory Development, Consideration for the Person with Disability, etc.)
None

(8) Collaboration with Other Donors

None

(9) Other Important Issues

The Project aims to improve energy efficiency by reducing transmission losss, and therefore it will contribute in controlling Greenhouse Gas (GHG) emissions.

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicator)

Indicators		Baseline (2010)	Target (2016) (2 Years after Project Completion)
Installed Transformer Capacity (MVA)	400 kV	4,200	8,610
	220 kV	14,030	18,450
	132 kV	15,070	18,032

Average Availability Factor (%)	400 kV substation	99.05	98
	220 kV substation	99.58	98
	220 kV transmission line	98.22	98
	132 kV transformer	99.84	98
	132 kV transmission line	98.70	98
Transmission System Losses (%)[1]		3.88	Below 4%

2) Internal Rates of Return

Based on the conditions indicated below, the Economic Internal Rate of Return (EIRR) for the Project is 18.50% while the Financial Internal Rate of Return (FIRR) for the Project is 14.23%.

EIRR
Cost: Project cost (excluding tax), operation and maintenance expenses
Benefit: Effect of increase in transmission revenue, effect of reduction in power transmission losses
Project Life: 30 years

FIRR
Cost: Project cost, operation and maintenance expenses
Benefit: Effect of increase in transmission revenue
Project life: 30 years

(2) Qualitative Effects

Promotion of investments, improvement in the living environment condition, and economic growth in MP State

5. External Factors and Risk Control

Deterioration of political and economic situation and natural disasters in India and the areas around the Project area

6. Lessons Learned from Past Projects

From the ex-post evaluation of previous energy project named “Anpara Power Transmission System Project (1) (2),” there was a lesson learnt for structural reforms of the energy sector, which requires continuous efforts for effective measures, such as implementation of an appropriate tariff structure (correction of excessive cross subsidies) and unbundling of the sector. .

With the tariff policy ordered by the guidelines of the Madhya Pradesh Regulatory Authority, the Executing Agency is able to maintain a certain level of profitability by collecting sufficient transmission charges tariff from the distribution corporation. However, in case of any revisions to the method for setting transmission charges , discussions will be held with the MP State Government to ensure appropriate profitability.

[1] As for Average Availability Factor and Transmission System Loss, the performance level is very high even at the current level. The Project aims to maintain the current level of Average Availability Factor which is one of the performance indicators.

7. Plan for Future Evaluation

(1) Indicators to Be Used

1) Substation's Transformer Capacity (MVA)
2) Substation's Average Availability Factor (%)
3) Transmission Loss (%)
4) Economic Internal Rate of Return (EIRR) (%)
5) Financial Internal Rate of Return (FIRR) (%)

(2) Timing

Two years after project completion