Japanese ODA Loan

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: India
Project: Tamil Nadu Transmission System Improvement Project
Loan Agreement: September 28, 2012
Loan amount: 60,740 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 of 10.6% in the total requirement, 12.1% in the peak demand. In addition, a high rate of power transmission losses (FY2010: estimated at 25.5% on an average for 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 to develop new power sources of 78,700 MW, establish power transmission facilities, and reduce transmission and distribution losses. As such, the Government of Tamil Nadu (TN) set a goal to develop 16,000 MW in new power sources by 2017, formulate transmission and distribution development plan accordingly, and reduce transmission and distribution loss by 0.4% every year starting Fiscal Year 2012. The Tamil Nadu Transmission System Improvement Project (hereinafter referred to as “the Project”) contributes to TN’s efforts and plans.

(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 71 projects totaling 1,003.7 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 “Maharashtra Transmission System Project” in FY2007, the “Haryana Transmission System Project” in FY2008, and the “Madhya Pradesh Transmission System Modernisation Project” in FY2011. As for technical cooperation, JICA conducted development study titled the “Andhra Pradesh Power Distribution Improvement Planning Study” from FY2002 to FY2004 and the “Thermal Power Generation Management Improvement Planning Study” from FY2008 to FY2010.

(4) Other Donors’ Activities

The World Bank and the Asian Development Bank (ADB) have been supporting not only the power sector reforms in India, 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. The World Bank’s assistance includes in the states of Odisha, Haryana, Andhra Pradesh, Uttar Pradesh, and Rajasthan, and ADB in Gujarat, Madhya Pradesh, Kerala, Assam, Uttarakhand. To date, no other donors have provided assistance to TN State.

(5) Necessity of the Project

In TN State, particularly in the state capital of Chennai, the fifth-largest city in India with a population of 4.6 million, an increasing number of domestic and international corporations have been establishing their business operations, which is expected to contribute to robust economic growth. As TN State is located

along the Sea Lines of Communication to Southeast Asia and encourages foreign capital investments, there is stable labor-management relationship and an abundant labor force, which has led to development of auto industry accumulation. In this environment, an increase in power demand is expected in the future, but power demand surpasses supply (annual power deficit of more than 8%), which results in planned power cuts even in urban areas. To resolve this situation, TN State plans to develop 16,000 MW in new power sources by 2017.

Under these circumstances, by improving power transmission and substation facilities in TN State, the Project aims to achieve stabilization of the power system in TN and other states in the southern India, reduction of transmission loss rate, and stable power supply. Therefore, the aim of the Project is in line with the development policy of the Government of India as well as the foreign aid policy of the Government of Japan and JICA. Consequently, JICA's assistance for the Project is necessary and relevant.

3. Project Description

(1) Project Objective

The objective of the Project is to ensure reliable power transmission system by constructing transmission lines and substations throughout the State of Tamil Nadu in Southern India, including Chennai area, stabilize the power system and reduction in transmission losses, thereby contributing to stable power supply in order to promote economic growth in TN State.

(2) Project Site/Target Area

The entire state of Tamil Nadu

(3) Project Components

1) Procurement of materials and equipment needed for new construction and enhancement for transmission lines (400kV, 230kV, 110kV, total of approximately 1,151 km), including low-loss conductors (311 km circuit length) and High Temperature Low Sag Conductor (HTLS) (382 km circuit length), and civil work.
2) Procurement of materials and equipment for construction of 19 new substations and civil work
3) Consulting services (e.g. project supervision)
   ・Method of procurement: International Competitive Bidding; Consultants: shortlist

(4) Estimated Project Cost (Loan Amount)

85,243 million yen (Loan Amount: 60,740 million yen)

(5) Project Implementation Schedule

September 2012 - October 2017 (62 months). Project completion is scheduled in October 2016, which is the expected time for commencement of commercial operation.

(6) Project Implementation Structure

1) Borrower: The President of India
2) Executing Agency: Tamil Nadu Transmission Corporation Limited
3) Operation and Maintenance System: same as 2)

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

1) Environmental and Social Considerations

i. Category: B
ii. 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.
iii. Environmental Permit: The Environmental Impact Assessment (EIA) report is not required for the Project under the country’s domestic laws.
iv. 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.

v. 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.

vi. Social Environment: Out of 82.6 hectares (ha) of land that the Project requires, 35.2 ha (3 substations out of 19 still needs land acquisition) owned by TN State Government 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. The land acquisition is scheduled to be completed by the time construction begins. The Project involves no resident resettlement.

vii. 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, noise, and other parameters, if any.

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 Schemes or Donors: None

(9) Other Important Issues: None

4. Targeted Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicator)

Indicators		Baseline (2010)	Target (2019) (2 Years after Project Completion)
Installed Transformer Capacity (MVA)	400kV/230kV or 400kV/110kV	1,890	5,955
	230kV/110kV or 230kV/33kV	15,290	17,966
Loading Factor (%)	400kV Transformer	88	60
	230kV Transformer	78	65
	400kV Transmission Line	44	34
	230kV Transmission Line	42	34
	110kV Transmission Line	47	34
Transmission System Losses (%)		4.26	Below 4

2) Internal Rates of Return

Based on the conditions indicated below, the Economic Internal Rate of Return (EIRR) for the Project is 15.34%, while the Financial Internal Rate of Return (FIRR) is 10.44%.

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 through stable and reliable provision of electricity supply in TN State, improvement in the living environment with less power cuts, economic growth in TN State with improvement in industrial production, and mitigation of climate change

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

(1) Evaluation Results of Similar Projects

From the ex-post evaluation of previous energy project named “Anpara Power Transmission System Project (1) (2),” there was a lesson learned 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.

(2) Lessons To Be Applied to the Project

Based on the lessons described above, as part of Project Supervision, JICA will have updated status of the financial situation of Executing Agency, from the view point of the financial sustainability of the Project.

7. Plans for Future Evaluation

(1) Indicators To Be Used

1) Substation's Transformer Capacity (MVA)
2) Substation's Loading 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