

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: India

Project: New and Renewable Energy Support Project (Phase 2)

Loan Agreement: September 1, 2014

Loan Amount: 30,000 million yen

Borrower: Indian Renewable Energy Development Agency

2. Background and Necessity of the Project

(1) Current Status and Issues of the New and Renewable Energy Sectors in India

With its recent rapid economic growth, India has seen a rapid increase in demand for electricity as peak-hour demand increased from 109,000 MW in 2007 to 130,000 MW in 2011. However, its electric power development efforts cannot keep pace with the increase in demand; peak-hour supply in 2011 was only 116,000 MW. India suffers from chronic electricity shortages. With poor oil resources and insufficient natural gas utilization, the country depends on coal-fueled power generation for 57% of its power-generating capacity (2012). Nevertheless, the coal supply is tight, forcing the country to cover its coal shortage with imported coal. Given these circumstances, the Government of India is working to develop new and renewable energy sources in order to diversify the country's energy supply structure. Although new and renewable energy generates 26,920 MW of power, 13% of the country's total power-generating capacity (2013), renewable energy is considered to have high development potential, estimated to supply up to 158,000 MW.

(2) India's Development Policies for the New and Renewable Energy Sector and the Role of the Current Project

In 1987, the Government of India established the Indian Renewable Energy Development Agency (IREDA), the executing agency of the Project, to develop new and renewable energy. In 1992, the Ministry of Non-Conventional Energy Sources was established as the organization to supervise IREDA. In 2006, this ministry was renamed the Ministry of New and Renewable Energy. By providing this organizational structure for new and renewable energy, the Government of India has been making efforts to promote new and renewable energy, including a feed-in tariff system introduced in the 12th Five-Year Plan (April 2012 to March 2017) to increase domestic power supply while simultaneously reducing the country's dependence on fossil fuels. During the period of this plan, the government aims to develop new power sources to provide 118,536 MW of power, of which 30,000 MW (25%) is planned to be supplied by new and renewable energy.

(3) Japan and JICA's Policy and Operations in India's New and Renewable Energy Sectors

The Government of Japan places importance on the development and promotion of new and renewable energy to strengthen energy security and realize a low-carbon society; it provides solar panels and transfer technology to developing countries through JICA's Grant Aid for Environment and Climate Change and Technical Cooperation. The government is determined to play an important role in promoting new and renewable energy globally; in 2009, it signed the IRENA Charter to establish the International Renewable Energy Agency. In the 7th Japan-India Energy Dialogue held in September 2013, both countries confirmed the importance of bilateral cooperation in the area of new and renewable energy. The Japanese Country Assistance Program for India (May 2006) states the importance of assistance in this area with "improvement of poverty and environment issues" as a priority area. JICA also sees "response to environmental problems and climate changes" as a priority area for India. The loan agreement for Phase 1 (loan of 30,000 million yen) of the Project was signed in June 2011, and by the end of March 2014, 28,722 million yen (96% of the total loan) had been loaned for 16 sub-projects.

(4) Other Donors' Activities

IREDA also received loans from the World Bank in 1993 and 2000; the Asian Development Bank (ADB) in 1997; Kreditanstalt für Wiederaufbau (KfW) in 1999, 2008 and 2011; and L'Agence Française de Développement (AFD) in 2010. ADB, KfW, and AFD plan to provide new loans to IREDA in 2014.

(5) Necessity of the Project

India must promote development of new power sources in order to meet demand for electricity that has been increased by recent economic growth and the increase in the population. Volatile energy prices and political unrest in oil-producing regions have forced the country to lower its dependence on conventional energy sources, such as oil and coal. Since promoting new and renewable energy is also effective in maintaining a stable energy supply and sustainable economic growth, the Government of India has established a few organizations to implement its environmental and energy policies. Amid recently growing interest in global environmental issues, the Government of Japan has shown a willingness to assist India in implementing its environmental and energy policies through Japan-India Energy Forums, Japan-India Energy Dialogues and joint statements by the prime ministers of both countries. These moves reflect the importance of bilateral cooperation in the area of new and renewable energy. Promoting India's efforts to develop new and renewable energy by providing it with concessionary funds through IREDA, the executing agency of the Project, meets the country's development needs and is consistent with the assistance policies of Japan and JICA. For this reason, it is highly necessary and appropriate for JICA to assist with the Project.

3. Project Description

(1) Project Objective

The Project aims to help India secure stable electric supply and to diversify power supply sources to meet increasing demand for electricity by providing two-step loans through IREDA to new and renewable energy development projects in the country. The Project is also expected to help the country improve the environment, achieve sustainable economic growth and mitigate climate change.

(2) Project Site / Target Area: Throughout India

(3) Project Components (Including Procurement Methods)

Provide power producers (as end users) with the funds necessary to develop new and renewable energy sources in the form of two-step loans through IREDA

(4) Estimated Project Cost (Loan Amount)

33,060 million yen (Loan Amount: 30,000 million yen)

(5) Project Implementation Schedule

April 2014 to March 2020 (72 months). The Project will be deemed complete when the entire amount of loans has been disbursed (March 2020).

(6) Project Implementation Structure

1) Borrower: IREDA

2) Guarantor: The President of India

3) Executing Agency: Same as 1)

4) Operation and Maintenance System: Same as 1)

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

1) Environmental and Social Considerations

(i) Category: FI

(ii) Reason for Categorization: According to the "JICA Guidelines for Environmental and Social Considerations" (put into effect in April 2010; hereinafter, the "JICA Guidelines"), the Project is classified as Category FI because no sub-projects can be identified before approval for JICA's loans (such sub-projects are estimated to have an environmental impact).

(iii) Other Aspects and Monitoring: In the Project, IREDA shall categorize sub-projects and take necessary measures for the relevant categories according to India's domestic laws and the JICA Guidelines. If a sub-project falls under Category A, the environmental and social considerations required for the category will be evaluated for the sub-project, and IREDA will submit an environmental impact report, a resettlement plan and an indigenous peoples plan to JICA for its approval under the frameworks for environmental impact, resettlement planning and indigenous peoples agreed to at the time of screening of the sub-project.

2) Promotion of Poverty Reduction: None

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

(8) Collaboration with Other Schemes or Donors: ADB, KfW, and AFD are considering providing new loans to IREDA.

(9) Other Important Issues: The Project is expected to mitigate climate change as it provides assistance with development of new and renewable energy sources and promotes energy substitution and reduction of greenhouse gas emissions.

4. Target Outcomes

(1) Quantitative Effects

1) Performance Indicators (Operation and Effect Indicators)

Indicators	Baseline (2013)	Target (2022) (two years after project completion)
Maximum output in loan-financed projects (MW)	-	Fixed when the sub-project is approved
Rate of use of equipment in loan-financed projects (%)	-	Fixed when the sub-project is approved
Energy substitution in loan-financed projects (oil equivalent tons/year)	-	Fixed when the sub-project is approved
Reduction in greenhouse gas emissions in loan-financed projects (CO ₂ equivalent tons)	-	Fixed when the sub-project is approved

2) Internal Rate of Return: Not calculated

(2) Qualitative Effects

Environmental improvement; sustainable economic growth; mitigation of climate change

5. External Factors and Risk Control

Risk of fluctuation in the amount of available new and renewable energy resources, risk of system change.

6. Results of Evaluations and Lessons Learned from Past Projects

(1) Evaluation Results of Similar Projects

The following lesson has been obtained from the results of an ex-post evaluation of an environmental protection project in Thailand: in the case of a development loan, if the executing agency to which the loan is granted directly provides equipment investment funds to the end user, it is necessary to establish a system that can monitor the effects of environmental improvement as

well as the usage status of facilities and installed equipment financed by the loan on a regular basis.

(2) Lessons for the Project

To benefit from the above lesson, for every sub-project, JICA will conduct periodical on-site inspections, monitor physical progress in detail and, after equipment has been introduced at facilities, check the usage rate of equipment via quarterly progress reports.

7. Plans for Future Evaluation

(1) Indicators for Future Evaluation

- 1) Maximum output in loan-financed projects (MW)
- 2) Rate of use of equipment in loan-financed projects (%)
- 3) Energy substitution in loan-financed projects (oil equivalent tons/year)
- 4) Reduction in greenhouse gas emissions in loan-financed projects (CO₂ equivalent tons)

(2) Timing

Two years after project completion