

1. Name of the Project

Country: Republic of Iraq

Project: Deralok Hydropower Plant Construction Project

Loan Agreement: March 31, 2010

Loan Amount: 16,996 million yen

Borrower: The Government of the Republic of Iraq

2. Background and Necessity of the Project

(1) Current State and Issues of the Electricity Sector in Iraq

The long-term economic sanctions and conflicts had been devastating the economic and social environment of Iraq. However, after the Iraq War in 2003, the country is finally undergoing reconstruction and development with the support from the international society.

The electricity sector is the foundation of various activities of the economy and society, and it is essential for the reconstruction of Iraq. However, due to years of lack of new investments/maintenance management and plunder, the functions in all sub-sectors, such as power generation, transmission, transformation, and distribution, have been extremely deteriorated until today. The average daily power supply which was 9,000 megawatts (MW) in 1990s was declined to lower than 3,000MW right after the Iraq War. After the war, with the support from international society, the Government of Iraq has been making effort for the reconstruction of the electricity sector as one of the priority areas. However, the power supply had recovered only up to 5,500MW as of 2009, while the average daily demand is 12,000MW, and long unplanned power outage are forced regularly accordingly. Thus the reconstruction of the electricity sector in Iraq, especially the improvement of power generation capacity, is one of the top priority issues.

(2) Development Policies for the Electricity Sector in Iraq and the Priority of the Project

In the Third National Development Strategy by the Government of Iraq in February 2007, the following four pillars for the post-war reconstruction and national development for 2007-2010 were announced; 1) Strengthening foundations of economic growth, 2) Revitalizing the private sector, 3) Improving the quality of life, and, 4) Consolidating the good governance security and stability in the country. The prioritized target of this strategy includes reduction of unplanned power outage, fulfillment of power-supply demand, improvement of power generation performance, and expansion of transmission/transformation performance.

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

At the International Conference on Reconstruction in Iraq held in Madrid, Spain in October 2003, the Government of Japan announced up to 5 billion US\$, that consists of 1.5 billion US\$ in grant aid in reply to the emergency reconstruction demand of Iraq, and up to 3.5 billion US\$ in ODA Loans to meet middle-term reconstruction demand. Since “Revitalizing of the private sector” is one of JICA's priority areas of the reconstruction assistance to Iraq,

electricity sector assistance matches JICA's assistance strategy. Prior to implementation of the Project, ODA Loans projects were provided for the *Al-Mussaib Thermal Power Plant Rehabilitation Project*, *Electricity Sector Reconstruction Project*, and the *Electricity Sector Reconstruction Project in Kurdistan Region* in 2008.

(4) Other Donors' Activity

The United Nations Development Programme (UNDP) mainly assisted for the electricity sector in Kurdistan Region. The United States assisted this sector through the United States Agency for International Development (USAID). The World Bank is implementing the rehabilitation project for the hydropower plant and thermal power plant. Korea is assisting the micro hydropower plant project, etc., through the Korea International Cooperation Agency (KOICA).

(5) Necessity of the Project

The average daily power supply in the Kurdistan Region, which consists of the 3 governorates (Dohuk, Erbil, and Sulaymaniyah) with the population of approximately 4.4 million, was around 459 MW in 2008. However, the average daily demand of power supply was 1,850MW based on the estimation in 2008. The condition of the existing power generation facility of this region is unstable due to aging and lack of fuel supply; therefore citizens' lives and economic/social activities are seriously affected through the frequent power outage that is more than 15 hours a day on average in 2007. As the demand for power in the region is expected to rise 12 percent per year, new power generating facilities that can be operated without relying on fuel supplies are urgently needed. Therefore, the necessity and the relevance of JICA's assistance for the Project are high.

3. Project Description

(1) Project Objectives

The objective of the Project is to increase the amount of power and contribute to the economic and social reconstruction of the country through the construction of a hydropower plant (run-of-river generation equipment) in Dohuk Governorate.

(2) Project Site/Target Area

Dohuk Governorate

(3) Project Components

- 1) Construction of a hydropower plant (run-of-river generation equipment) (2 units of 15MW)
- 2) Expansion of related transformation/transmission facilities
- 3) Consulting services (procurement support, construction management, training, etc)

(4) Estimated Project Cost (Loan Amount)

17,821 million yen (Loan amount: 16,996 million yen)

(5) Schedule

The planned implementation schedule of the Project is from March 2010 to December 2016 (82 months in total). The taking over and acceptance certificate of the facilities will be issued

in December 2015. Project completion is defined as the issuing the taking over and acceptance certificate.

(6) Project Implementation Structure

- 1) Borrower: The Government of the Republic of Iraq
- 2) Executing Agency: Regional Ministry of Electricity in Kurdistan (RMEK)
- 3) Operation and Maintenance System: Same as 2)

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

1) Environmental and Social Consideration

- a) Category: A
- b) Reason for Categorization: The Project is categorized into Classification Category A, because it corresponds with the hydropower sector listed in the “Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations” (established April 2002).
- c) Environmental Permit: An Environmental Impact Assessment (EIA) report as related to the Project has been prepared based on the domestic law of Iraq, and has already been approved by the Regional Ministry of Environment in Kurdistan and Ministry of Environment of Iraq in June and November 2008, respectively.
- d) Anti-Pollution Measures: Major impact to the water contamination is not expected to occur after the operation, since the Project is aimed for the construction of small-scale run-of-river power generation plant. The consulting services shall include establishment of an environmental monitoring program or necessary relaxation, and appropriate measures for dust problems are also to be taken during the construction.
- e) Natural Environment: The project site is not located in nor surrounded by any sensitive areas such as national parks. It is not likely to have an adverse impact on the natural environment, either. However, if some encounter measures would be required, the measures will be established after a discussion with JICA based on the survey at the phase of Detailed Design.
- f) Social Environment: The Project requires about 90ha of land acquisition, which shall take place accordingly to the procedures in Iraq. The land acquisition is planned to be completed before the start of construction of transmission facilities. The Project does not require relocation of residents.
- g) Other / Monitoring: The Executing Agency shall monitor the air quality, water quality, noise/vibration, soil erosion, waste, inhabiting conditions of fishes, and living of non-affected residents, etc.

2) Promotion of Poverty Reduction: None.

3) Promotion of Social Development (e.g. Gender Perspective, Measure for Infectious Diseases including HIV/AIDS, Participatory Development, Considerations for Persons with Disabilities, etc.): None.

(8) Collaboration with Other Donors: None.

(9) Other Important Issues: None.

4. Targeted Outcomes

(1) Performance Indicators (Operation and Effect Indicator)

Indicator	Baseline (Actual Value in 2009)	Target (2017) 【Expected value 2 years after Project completion】
Unplanned power outage hours (hours/year)	—	0
Capacity factor (Net electric energy production)/(Max.Outage*Annual Hours)*100%) (%)	—	58
Maximum output (MW)	—	30
Net electric energy production (GWh/year)	—	152

(2) Internal Rate of Return

Based on the conditions indicated below, the Financial Internal Rate of Return (FIRR) of the Project is 0.4%. Economic Internal Rate of Return (EIRR) should not be estimated because reliable data is difficult to obtain in the current domestic situation of Iraq.

- 【FIRR】 Cost: Construction cost, operation and maintenance cost
Benefit: Increase of income by selling electric power
Project Life: 50 years

5. External Factors and Risk Control

Deterioration in the security situation, etc.

6. Lessons Learned from Past Projects

From the ex-post evaluation in the past, it was learned that establishment of an appropriate operation/maintenance system is essential for the smooth operation and maintenance of the facilities after the start of operation. Therefore, training programs for RMEK shall be included in the Project for the establishment of the operation/maintenance system, and shall be followed up continuously.

7. Plan for Future Evaluation

(1) Indicators to be Used

- 1) Unplanned power outage hours (hours/year)
- 2) Capacity factor (Net electric energy production)/(Max.Outage*Annual Hours)*100%) (%)
- 3) Maximum output (MW)

- 4) Net electric energy production (GWh/year)
 - 5) Financial Internal Rate of Return (FIRR) (%)
- (2) Timing : Two years after the completion of the Project.