

Ex-Ante Evaluation (for Japanese ODA Loan)

1. Name of the Project

Country: The Republic of Uzbekistan

Project: Talimarjan Thermal Power Station Extension Project

Loan Agreement: May 1, 2010

Loan Amount: 27,423 million yen

Borrower: The Government of the Republic of Uzbekistan

2. Background and Necessity of the Project

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

In the Republic of Uzbekistan, the electricity demand has been growing at an annual average rate of 2% while the economy has been growing steadily since 2002. According to the electricity demand forecast made by the state-run electricity company of Uzbekistan in 2004 for the 10 years from 2005 to 2014, the demand will keep growing at about the same rate. With 8.1% of economic growth in 2009 (according to the government), further growth of electricity demand is expected. The electricity demand in 2015 is estimated at 57.9TWh.

On the other hand, although the current gross rated capacity of power generation in the country is approx. 12,400MW (86% by thermal power, 14% by hydraulic power), the effective generation capacity in 2008 remained at approx. 10,000MW due to obsolete equipments (over 40-50 years old) and other factors. In this situation, they plan to take some actions to provide against electricity shortage in the future, e.g. the Tashkent Thermal Power Plant Modernization Project (370MW, yen loan provided in 2002), the Navoi Thermal Power Plant Expansion Project (478MW, underway with the country's own fund) and construction of Tashkent Heat Supply Power Plant (84MW, request for yen loan received in 2004). However, the electric power that can be supplied in 2015 is expected to be below the above-mentioned demand.

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

Uzbekistan has announced that its priority tasks are efficient use and stable supply of energy through modernization of existing power plants and new power source development using the natural gas reserve in the country. Especially this project, which will be carried out in 2010-2014, is positioned as a national project in the electricity sector and is given high priority in the country. The Welfare Improvement Strategy of Uzbekistan (2007), developed by the Uzbek government with the IMF, the World Bank and other international organizations, points out the necessity of improving power generation capacity and efficiency to maintain high rates of economic growth.

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

This project falls under the category of "upgrade and development of economic infrastructures", one of the priority areas of Japanese aid activities to Uzbekistan. It also falls

under the category of “promotion of regional cooperation”, another priority area, as it will expand electric power supply to the surrounding countries by constructing 2-1 and 2-2 power units in addition to the existing first unit (800MW).

Japan has provided assistance to the electricity sector of the country through the earlier mentioned Tashkent Thermal Power Plant Modernization Project (2002).

#### (4) Other Donors' Activity

In this project a cofinance loan with the ADB is planned under the ACFA scheme. A collaborative project for power transmission and distribution will be carried out by the World Bank.

#### (5) Necessity of the Project

With the purposes of alleviating power shortage in the country and expanding power supply to surrounding countries, the necessity to implement this project at the request of Uzbekistan and the ADB is extremely high.

### **3. Project Description**

#### (1) Project Objectives

The purposes of this project are to ensure stable domestic power supply and improvement of energy efficiency by adding a combined cycle generation plant to the existing facilities of the Talimarjan Thermal Power Station in the southern part of Uzbekistan; and therefore to increase the possibility of alleviation of power shortage in the country, sustainable growth of the country's economy and expansion of power supply to surrounding countries.

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

Talimarjan, Kashkadarya region

#### (3) Project Components

Installation of a combined cycle generation plant (370-450MW x 2) (international competitive bidding) and consulting service (supervision of the project / capacity development, to be procured in a short-list method)

#### (4) Estimated Project Cost (Loan Amount)

117,005 million yen (Loan amount: 27,423 million yen)

#### (5) Schedule

The planned implementation schedule of the project is from May 2010 to December 2015 (68 months in total). The use of the facilities will start in December 2014, which is regarded as the completion date of the project.

#### (6) Project Implementation Structure

- 1) Borrower: The Government of the Republic of Uzbekistan
- 2) Executing Agency: The State Joint Stock Company Uzbekenergo
- 3) Operation and Maintenance System: Talimarjan Thermal Power Station

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

- 1) Environmental and Social Consideration

- a Category: A
- b Reason for Categorization: This project corresponds the thermalpower sector listed in the “Japan Bank for International Cooperation Guidelines for Confirmation of Environmental and Social Considerations” (established April 2002). Therefore, this project corresponds to Classification Category A.
- c Environmental Permit: An Environmental Impact Assessment (EIA) report as related to this project has already been approved by the State Ecological Expertise (Glavgosecoexpertiza) on October, 2010.
- d Anti-Pollution Measures: Regarding air pollution, noise and vibration after the project completion, the result of investigation including the existing power plants indicates that the country’s relevant standards will be satisfied.
- e Natural Environment: The project site is not located in and around any sensitive areas such as national parks, and it is likely to have a minimal adverse impact on the natural environment.
- f Social Environment: Land acquisition or resident relocation will not be required in this project, which will be carried out in the site of an existing power plant.
- g Other / Monitoring: Uzbekenergo will conduct monitoring of air and water quality in this 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, Considerations for Persons with Disabilities, etc.): A community center will be established with the budget of the Uzbek government to carry out social support programs for the employees of Talimarjan Thermal Power Station and their family.

(8) Collaboration with Other Donors:

Collaboration with the World Bank (for a 500kV substation and a 500kV transmission line (approx. 218km)) is planned.

(9) Other Important Issues:

ACFA, the scheme for the cofinance loan with ADB, will also be used for yen loan.

<b>4. Targeted Outcomes</b>
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(1) Performance Indicators (Operation and Effect Indicator)

Indicator	Baseline	Target (2016) 【Expected value 2 years after project completion】
Maximum Output (MW)	—	740 – 900
Plant load factor (%)	—	75 – 85
Availability factor (%)	—	85 - 90
Auxiliary power ratio (%)	—	2.5 - 3.0
Gross thermal efficiency (%)	—	55

Annual hours of operation (hr/y)	—	7,500 - 7,900
Outage hours for every cause (hr/y)	—	860 - 1,260
Net electric energy production (GWh/y)		4,715 - 6,533
Human Error (hr/y)	—	0

\*1 All target values except that of “Human Error” may vary depending on the equipment to be installed.

## (2) Internal Rate of Return

Based on the conditions indicated below, the Economic Internal Rate of Return (EIRR) of this project is 20.3%, and the Financial Internal Rate of Return (FIRR) of this project is 6.3%

### 【EIRR】

Cost: Construction cost, operation and maintenance cost (excluding tax)

Benefit: Electric power supply, reduction of gas consumption (energy efficiency effect), reduction of power transmission cost (power transmission from Tashkent to the south will be eliminated because electric power will be generated in the south), CO2 reduction

Project Life: 25 years

### 【FIRR】

Cost: Construction cost, operation and maintenance cost

Benefit: Income by selling electric power

Project Life: 25 years

## 5. External Factors and Risk Control

No particular factors of risks.

## 6. Lessons Learned from Past Projects

We have learned a lesson through past ex-post evaluations that it is important to allocate a sufficient number of personnel to the operation and maintenance of a power plant and also to consider the right method for a training program. This project is the second yen loan project for a power plant in Uzbekistan, but this project will be the first case of the use of a combined cycle power plant in the country along with the Navoi Thermal Power Plant (delivery planned between December 2010 and March 2011), which will be executed with the government budget of the country. Considering the above, we will include, in the consulting service TOR, technology transfer through the establishment and implementation of a training program to strengthen the operation and maintenance system.

## **7. Plan for Future Evaluation**

### (1) Indicators to be Used

- 1) Maximum Output (MW)
- 2) Plant load factor (%)
- 3) Availability factor (%)
- 4) Auxiliary Power Ratio (%)
- 5) Gross thermal efficiency (%)
- 6) Annual hours of operation (hr/y)
- 7) Outage hours for every cause (hr/y)
- 8) Net electric energy production (GWh/y)
- 9) Human Error (hr/y)
- 10) Economic Internal Rate of Return (EIRR)
- 11) Financial Internal Rate of Return (FIRR)

### (2) Timing

Two years after project completion