

1. Introduction

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This report provides the results of feasibility study of the 180 MW power plant, which was carried out from February 2000 to November 2001. The report consists of two volumes, one is named “MAIN” and another is named “SUPPLEMENT”. SUPPLEMENT describes mainly the detailed survey results of the project site and related areas.

NEWJEC Inc., Osaka, Japan, carried out this feasibility study in association with GCP International, Inc., USA. In addition, as the sub-contractors of NEWJEC, SIAM TONE Co., Ltd., Thailand carried out the topographic, geological, hydrological and oceanographic investigation, and TEAM Consulting Engineering Management Co., Ltd., Thailand carried out the environmental baseline survey.

Study results of possible environmental impact and mitigation planning for the Project is described in this report. However, Environmental Impact Assessment Report (EIA Report), which was prepared in compliance with the requirements of the environmental law of Cambodia, is submitted separately from this report.

1.1. Background of the Study

Cambodia is composed by wide range of low plains divided by many rivers, and produces various kinds of agricultural products benefited from the rich land and water resources brought by Mekong River. However, various industries and infrastructures were damaged in years of civil war. Recently, Cambodia has just started its process for restoration supported by Japan, the World Bank, Asian Development Bank, the USA, European countries, etc. Power supply facilities had been heavily damaged by the war. Cambodian power systems are isolated. Power generation facilities rely on the small diesel power plants installed only at the major capital cities of each region on the scattered basis. Such being the situation, only 13% of households have access to electricity. Therefore, it is an urgent need for Cambodia to build up the power generation and transmission system.

Besides, another problem obstructing the promotion of electrification in Cambodia is

an expensive power tariff. According to the data of 2000, the averaged power tariff is about 14.6 ¢/kWh which is still quite high enough compared to the neighboring countries. One of the reasons for such high power tariff is the reliance on the 100% imported oil based generation. The other reason is the low efficiency power system due to old small power plants and high transmission and distribution power losses. Recently, Independent Power Producer (IPP) also supplies power to consumers through Electricite du Cambodge (EDC), however, the tariff of power purchased from these IPPs is relatively expensive. Therefore, it is considered indispensable that EDC should have his own power plants to supply a cheaper power to consumers in the future.

Operation results of EDC system in 1998 were the peak demand of 79 MW and the total generation of 367 GWh a year. In the four (4) years from 1994 to 1998, the power demand has been increasing by 25.8% in average per year in the peak demand and 25.2% in the total generation a year. Although the existing power plants are operated at full load, the supply capacity can not meet the increasing power demand. There is no power surplus at present in the power situation in Cambodia.

As mentioned earlier, the electrification ratio in Cambodia stays only at 13%, and the total output by private power generation plants excluding IPPs reaches 30 MW which is said to be a quite large capacity compared to the peak demand of 97 MW in whole Cambodia. These findings show that there are a lot of potential power demand in the country, therefore, the demand/supply balance will be much severe in the future. The power demand structure as of 1999 was classified as 47% for household use, 12% for industrial, 12% for commercial and 27% for public use, respectively. From this, it is known that the major consumers are household users, however, it is forecasted that the industrial users will increase in response to the industrialization of the country.

From these viewpoints, the power demand is estimated to increase steadily after this, and the peak demand and the total generation of whole country a year will reach at 746 MW and 2,634 GWh, respectively in 2016. Therefore, it is the most important factor for Cambodia to prepare the least-cost optimum power development program to meet the rapid increase of power demands.

Based on the above mentioned background, the consultant appointed by the World

Bank carried out the master plan study to present the long-term, economical and stable power development plan. As one of the most optimum power development option in this master plan report, the construction of the gas turbine combined cycle plant was proposed as one of the options. Based on this, the Government of Cambodia proposes in the Cambodia Power Sector Strategy prepared in January, 1999 to introduce the gas turbine combined cycle power plant in Sihanoukville to be commissioned in 2003 and 2005, each stage with 90 MW capacity, respectively.

In this connection, the Government of Cambodia applied for technical assistance to the Japanese Government to conduct the Feasibility Study on Sihanoukville Combined Cycle Power Development Project. In response to this request, the Japanese Government dispatched its Project Formation Team in July, 1999 for justification and confirmation of the priority of the Project from the view point of development policy and power demand/supply balance.

As the result of study by this Project Formation Team, the appropriateness of the Project was justified and the necessity of carrying out the feasibility study was confirmed. To discuss the scope of work, time schedule, etc. for the feasibility study with the relevant authorities in Cambodia, the Preliminary Study Mission was again dispatched to Cambodia in October, 1999 and the Scope of Works was agreed by and between Japan International Cooperation Agency (JICA) and MIME/EDC on October 27, 1999.

1.2. Objective of the Study

Objective of the Study is to conduct the Feasibility Study on the Sihanoukville Combined Cycle Power Development Project. Further to be carried out is to provide the technical transfer on the power development study to the counterpart engineers of MIME and EDC during a period of the Study.

The type of power plant is proposed to be gas turbine combined cycle with 90 MW \times 2 at present, however, the appropriateness of the installed capacity shall be reviewed in the course of the Study. The optimum power generation system will be selected by comparing the combined cycle with various types of thermal power plants such as steam plant and diesel plant.