

Japan International Cooperation Agency (JICA)

Ministry of Industry, Mines and Energy (MIME)

Electricite du Cambodge (EDC)

The Kingdom of Cambodia

Feasibility Study
on
The Sihanoukville Combined Cycle
Power Development Project
in
The Kingdom of Cambodia

FINAL REPORT

(MAIN)

January 2002

NEWJEC Inc.

PREFACE

In response to a request from the Government of the Kingdom of Cambodia, the Government of Japan decided to conduct the Feasibility Study on The Sihanoukville Combined Cycle Power Development Project in the Kingdom of Cambodia, and the study was implemented by the Japan International Cooperation Agency (JICA).

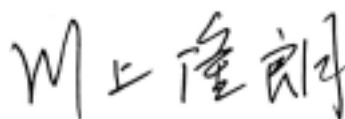
JICA sent a study team, led by Mr. Toshio Shiomi of the NEWJEC Inc., to the Kingdom of Cambodia six times from February 2000 to November 2001.

The team held discussions with the officials concerned of the Government of the Kingdom of Cambodia, and conducted related field surveys. After returning to Japan, the team conducted further studies and compiled the final results in this report.

I hope this report will contribute to promote Power Development Plan and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Kingdom of Cambodia for their close cooperation throughout the study.

January 2002

Handwritten signature in black ink, reading '川上隆嗣' (Takao Kawakami).

Takao Kawakami
President
Japan International Cooperation Agency

January 2002

Mr. Takao Kawakami
President
Japan International Cooperation Agency
Tokyo, Japan

Dear Mr. Takao Kawakami,

LETTER OF TRANSMITTAL

We are pleased to submit to you the Final Report for the Feasibility Study on the Sihanoukville Combined Cycle Power Development Project in the Kingdom of Cambodia. The report contains the results of the feasibility study on the 180 MW thermal power plant, which is planned to be constructed in Sihanoukville City. The study was carried out from February 2000 to November 2001.

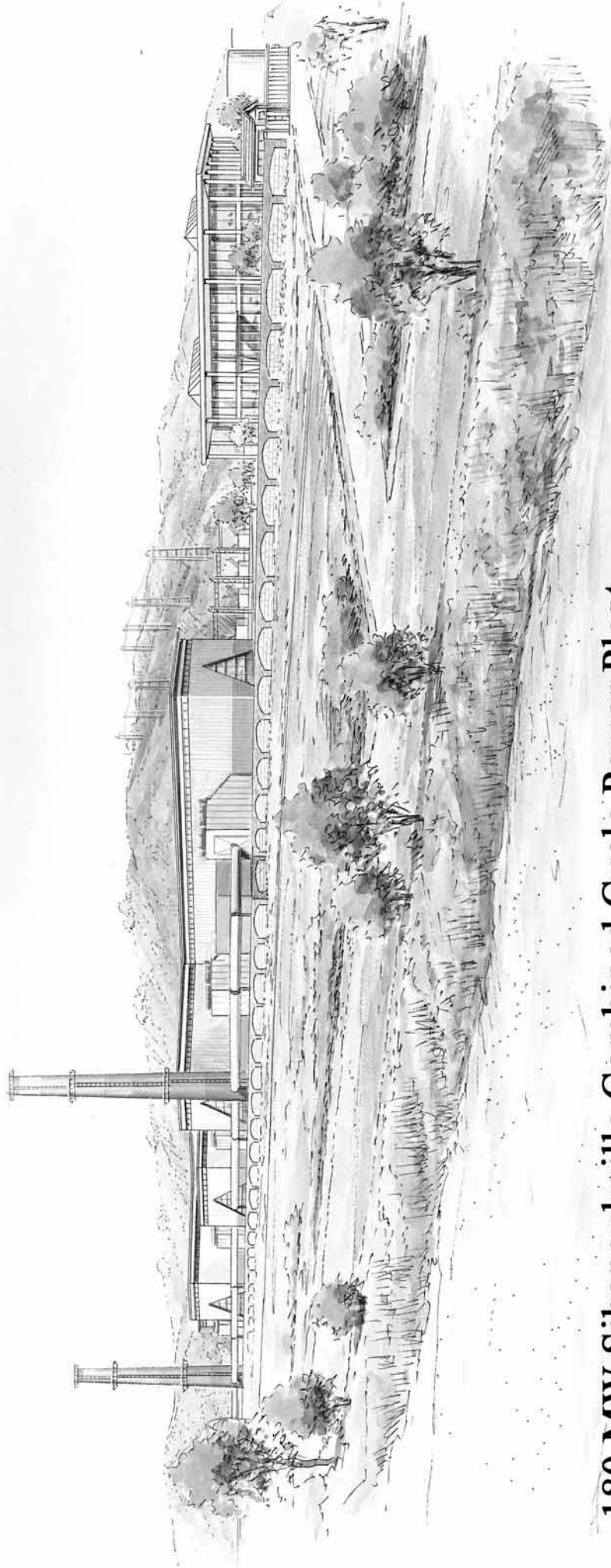
As the results of study, the report recommends that a gas turbine combined cycle power plant with 180 MW capacity is to be constructed in two (2) stages, i.e. 90 MW in 2006 and another 90 MW in 2008, respectively. However, the most important factor to realize this project is a possibility of utilization of natural gas for the plant, which is not available but under developing at present in Cambodia. Therefore, it is strongly desired that natural gas will become available in time.

We wish to take this opportunity to express our sincere gratitude to your Agency, Ministry of Economy, Trade and Industry, and Ministry of Foreign Affairs. We also wish to express our deep gratitude to the authorities and experts concerned of the Ministry of Industry, Mine and Energy of Cambodia and Electricite du Cambodge for the close cooperation and assistance extended to us during our investigation and study in Cambodia.

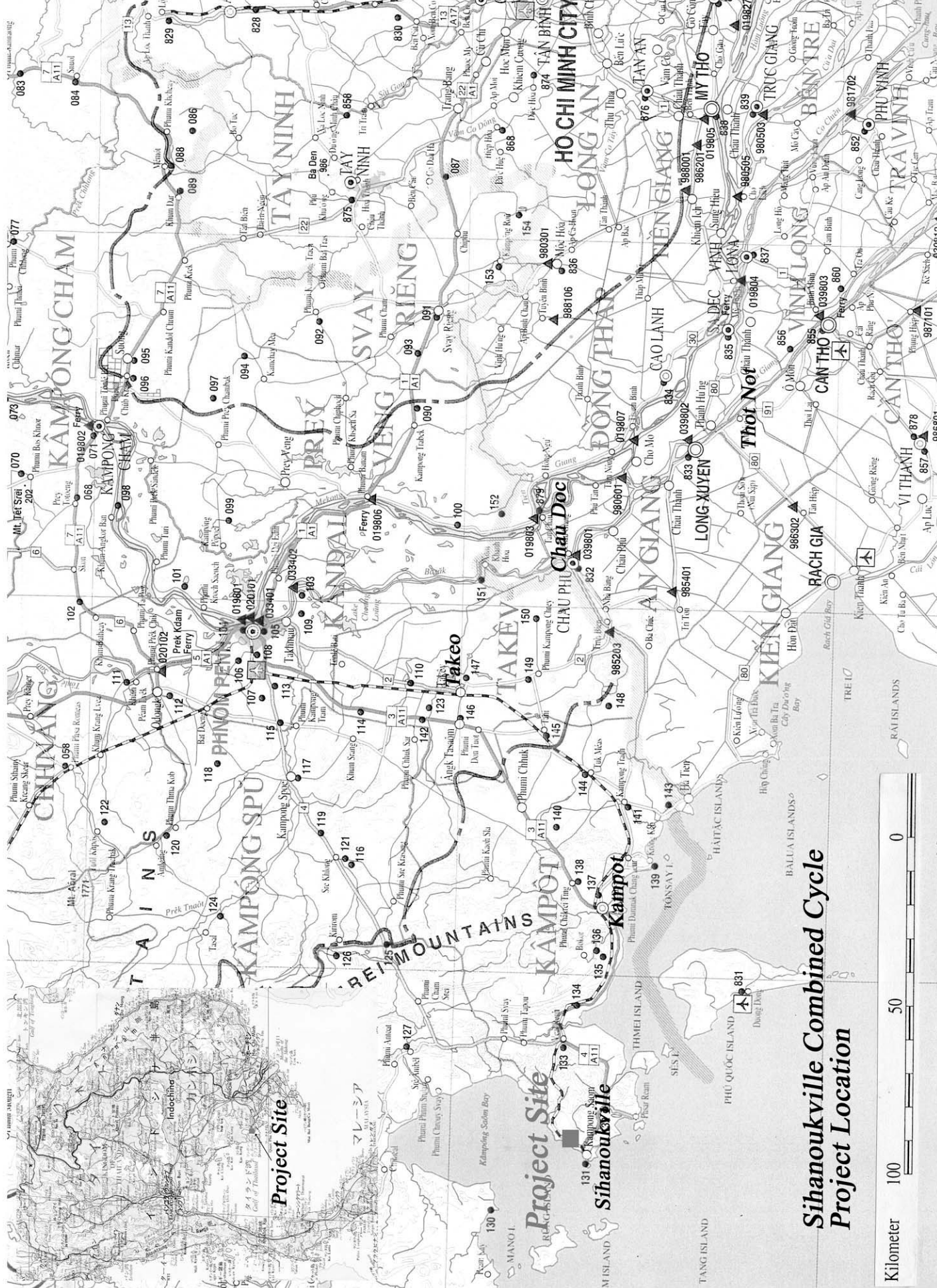
Very truly yours,



Toshio Shiomi
Team Leader
Study Team for Feasibility Study on
the Sihanoukville Combined Cycle Power
Development Project



180 MW Sihanoukville Combined Cycle Power Plant



Project Site

Project Site
Sihanoukville

Sihanoukville Combined Cycle Project Location





180 MW Sihanoukville Combined Cycle Power Plant Site

Abbreviations and Definitions

ADB	:	Asian Development Bank
CIF	:	Cost, Insurance and Freight
CMAC	:	Cambodian Mine Action Center
CNPA	:	Cambodia National Petroleum Authority
DSCR	:	Debt Service Coverage Ratio
EAC	:	Electricity Authority of Cambodia
EIA	:	Environmental Impact Assessment
EDC	:	Electricite du Cambodge (one of the counterpart)
EIRR	:	Economic Internal Rate of Return
EVN	:	Electricity of Vietnam
GDP	:	Gross Domestic Product
GT	:	Gas Turbine
HHV	:	Higher Heating Value
HRSG	:	Heat Recovery Steam Generator
IBRD	:	International Bank for Reconstruction and Development (The World Bank)
IPP	:	Independent Power Producer
IRR	:	Internal Rate of Return
ISO	:	International Standard Organization
JBIC	:	Japan Bank for International Cooperation
LHV	:	Lower Heating Value
LNG	:	Liquefied Natural Gas
LPC	:	Levelised Production Cost
LPG	:	Liquefied Petroleum Gas
MEF	:	Ministry of Economy and Finance
MIME	:	Ministry of Industry, Mines and Energy
MOE	:	Ministry of Environment
NPV	:	Net Present Value
PSC	:	Production Sharing Contract
ROE	:	Return on Equity
ST	:	Steam Turbine
Stage 1	:	The works of the first 90 MW capacity plant
Stage 2	:	The works of the second 90 MW capacity plant
Stage 3	:	The works of the third 90 MW capacity plant
VAC	:	Ventilation, Air-Conditioning

Units

BCF	:	Billion Cubic Feet ($10^9 \text{ ft}^3 = 28,320,000 \text{ m}^3$)
¢	:	US cent
kcal	:	Kilo-calorie (1 kcal = 4.187 kJ)
kWh	:	Kilo-watt-hour
GWh	:	Giga-watt-hour (10^6 kWh)
M.	:	Million
MW	:	Mega-watt (10^3 kW)
MMBTU	:	Million Btu (1 Btu = 0.252 kcal = 1.055 kJ)
TCF	:	Trillion Cubic Feet ($10^{12} \text{ ft}^3 = 1,000 \text{ BCF}$)

**THE KINGDOM OF CAMBODIA
THE SIHANOUKVILLE COMBINED CYCLE POWER DEVELOPMENT PROJECT**

FINAL REPORT

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