

Document of
The World Bank

FOR OFFICIAL USE ONLY

Report No: 20243

IMPLEMENTATION COMPLETION REPORT
(LOAN 37000; 3700A; 37020)

ON A

LOAN

IN THE AMOUNT OF US\$211 MILLION

TO THE

NATIONAL POWR CORPORATION AND
THE PHILIPPINE NATIONAL OIL COMPANY

FOR THE

LEYTE-CEBU GEOTHERMAL PROJECT

MARCH 31, 2000

**Energy and Mining Development Sector Unit
East Asia and Pacific Regional Office**

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

CURRENCY EQUIVALENTS

(Exchange Rate Effective as of March 20, 2000)

Currency Unit = Philippine Peso (P)

P1.00 = US\$ 0.024

US\$ 1.00 = P40.95

Average Exchange Rates during Project Years

1993 US\$1= P27.12

1994 US\$1= P26.42

1995 US\$1= P25.71

1996 US\$1= P26.22

1997 US\$1= P29.47

1998 US\$1= P40.89

1999 US\$1= P39.06

FISCAL YEAR

January 1 to December 31

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
BOO	Build-Own-Operate
BOT	Build-Operate-Transfer
DENR	Department of Environment and Natural Resources
EIA	Environmental Impact Assessment
EOIS	Efficiency and Operational Improvement Study
ERB	Energy Regulatory Board
ESP	Energy Sector Plan
IDC	Interest During Construction
IPP	Independent Power Producer
LLGP	Leyte-Luzon Geothermal Project
NPC	National Power Corporation
PDP	Power Development Program
PNOC	Philippine National Oil Corporation
PNOC-EDC	PNOC Energy Development Corporation
PPA	Power Purchase Agreement
PTRP	Power Transmission and Rehabilitation Project
ROW	Right-of-Way
TGRP	Transmission Grid Reinforcement Project

Vice President:	Jemal Kassum
Country Manager/Director:	Vinay Bhargava
Sector Manager/Director:	Yoshihiko Sumi
Task Team Leader/Task Manager:	Selina Shum

FOR OFFICIAL USE ONLY

**Philippines
Leyte-Cebu Geothermal Project
Loans No. 3700; 3700A; 3702**

CONTENTS

	Page No.
1. Project Data.....	1
2. Principal Performance Ratings.....	1
3. Assessment of Development Objective and Design, and of Quality at Entry	1
4. Achievement of Objective and Outputs	3
5. Major Factors Affecting Implementation and Outcome.....	9
6. Sustainability.....	11
7. Bank and Borrower Performance	13
8. Lessons Learned.....	14
9. Partner Comments.....	15
10. Additional Information.....	16
Annex 1: Key Performance Indicators/Log Frame Matrix.....	17
Annex 2: Project Costs and Financing	19
Annex 3: Economic Costs and Benefits	21
Annex 4: Bank Inputs.....	24
Annex 5: Ratings for Achievement of Objectives/Outputs of Components	25
Annex 6: Ratings of Bank and Borrower Performance	26
Annex 7: Key Performance Indicators: Energy Sector Plan.....	27
Annex 8: Key Performance Indicators for NPC.....	32
Annex 9: PNOC-EDC Financial Indicators.....	34
Annex 10: Economic Value of Installed IPP Capacities	35
Annex 11: PNOC-EDC Financial Rate of Return on Project Components	37
Annex 12: ICR Mission Aide Memoire	39
Annex 13: Borrower's ICR: PNOC-EDC	45
Annex 14: Borrower's ICR: NPC.....	56

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

<i>Project ID:</i> P004584	<i>Project Name:</i> LEYTE CEBU GEOTHERMAL
<i>Team Leader:</i> Selina Wai Sheung Shum	<i>TL Unit:</i> EASEG
<i>ICR Type:</i> Core ICR	<i>Report Date:</i> March 31, 2000

1. Project Data

Name: LEYTE CEBU GEOTHERMAL *L/C Number:* 37000; 3700A; 37020
Country/Department: PHILIPPINES *Region:* East Asia and Pacific Region
Sector/subsector: PT - Thermal

KEY DATES

<i>PCD:</i> 10/16/89	<i>Effective:</i> 11/12/96	<i>Revised/Actual:</i> 07/18/94
<i>Appraisal:</i> 04/13/93	<i>MTR:</i>	
<i>Approval:</i> 02/03/94	<i>Closing:</i> 06/30/98	09/30/99

Borrower/Implementing Agency: NPC AND PNOC / NPC AND PNOC-EDC
Other Partners: BOT Private Power Generation Contractors; Nordic Investment Bank/Nordic Development Fund

STAFF	Current	At Appraisal
<i>Vice President:</i>	Jemal Kassum	Gautam S. Kaji
<i>Country Manager:</i>	Vinay K. Bhargava	Callisto E. Madavo
<i>Sector Manager:</i>	Yoshihiko Sumi	Vineet Nayyar
<i>Team Leader at ICR:</i>	Selina Wai Sheung Shum	Claudio Fernandez
<i>ICR Primary Author:</i>	Selina Wai Sheung Shum; Mikio Matsumura	

2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

Outcome: U

Sustainability: UN

Institutional Development Impact: M

Bank Performance: S

Borrower Performance: S

QAG (if available)

ICR

Quality at Entry:

U

Project at Risk at Any Time: Yes

3. Assessment of Development Objective and Design, and of Quality at Entry

3.1 Original Objective:

The objectives of the Project are to, *inter alia*, (a) improve the efficiency and overall performance of the energy sector; (b) assist the Borrower in meeting the rapidly increasing demand for electricity power in Cebu province, by expanding the geothermal power generation capacity and reinforcing its related power

transmission system; (c) strengthen the Borrower's financial viability and institutional capabilities to enable it to undertake its long-term investment program; and (d) promote private sector participation in geothermal power generation projects in the Philippines.

The project objectives were consistent with the country's priorities and the Bank's Country Assistance Strategy (CAS) prevailing at the time of project preparation/loan approval (1989-94). Specifically, the CAS aimed at assisting the country to regain a sustainable high growth path led by the expansion of an internationally competitive private sector through such priority measures as improved policy and project implementation as well as provision of infrastructure. The project design is directly relevant towards achieving the above objectives.

Overall Energy Sector Performance. In agreement with the Bank, an Energy Sector Plan (ESP) was developed by the government to lay out policies and define improvements in all areas of concern in the sector as well as their completion schedule. Implementation of the ESP was supported by a series of Bank operations in the sector, including this Project.

Power Transmission and Promotion of Private Power Generation. In response to the power crisis and the consequent opportunity cost of economic losses in the early 1990s, the project objectives relating to the physical components were directed at ensuring the successful implementation of the Government's "fast track" Build-Operate-Transfer (BOT) private power program. In particular, they were essential to achieve the interrelated project objective of promoting private sector participation in geothermal power generation projects by transmission of the power generated.

Strengthening the Finances of NPC and PNOC-EDC. The ESP noted above included actions directed at strengthening the finances of sector institutions, including the National Power Corporation (NPC) and Philippine National Oil Corporation - Energy Development Corporation (PNOC-EDC). The planned measures included privatization of the two institutions as well as various other actions (e.g. tariff adjustment, equity infusion) to enable NPC to achieve financial viability. The minimum financial performance targets agreed with NPC and PNOC-EDC were incorporated in the financial covenants.

Strengthening the Institutional Capability. The Project included a component for technical assistance and training to strengthen project implementation, enhance operational efficiency and power sector investment planning/reform.

3.2 Revised Objective:

3.3 Original Components:

1. PNOC-EDC's Components comprised the following: (i) development of a 185 MW Geothermal steam field, including steam collection and power interconnection system (PNOC-EDC); (ii) carrying out a BOT Contract between PNOC-EDC and private sector companies to construct and operate 185 MW geothermal power plants; and (iii) technical assistance for project implementation.
2. NPC's Components comprised the following: (i) construction of an overhead transmission line in Leyte (about 77 km at 230 kV) and another in Cebu (about 93 km at 230 KV, and about 27 km at 138 KV); (ii) installation of submarine cables (about 32 km at 230 kV) linking the Leyte and Cebu lines; (iii) upgrading of NPC's existing 138 kV and 69 kV power transmission facilities in Cebu; (iv) provision of goods under the Energy Sector Project (to cover the impact of the Yen revaluation under the Bank's

special commitment for irrevocable letters of credit); and (v) technical assistance consultancies for the design and preparation of tender documents for two hydro projects (totalling about 400MW); institutional support consultancies to implement the Project, NPC's Power Development Program (PDP) and the recommendations of the Efficiency and Operational Improvement Study (EOIS).

3.4 Revised Components:

3.5 Quality at Entry:

Overall, quality at entry is rated as marginally unsatisfactory, with the PNOC-EDC components rated as satisfactory and NPC components rated as unsatisfactory. In hindsight, the project implementation schedule in the SAR proves to be overly optimistic in its critical assumption that NPC could successfully address the long standing implementation problems of tardy procurement and the right-of-way (ROW) issues.

- NPC's implementation delays. At the time of project appraisal, the risks of NPC's tardy procurement procedures were considered to have been mitigated by the reorganization of NPC and all the key bids were underway. Further, NPC and PNOC-EDC had appointed high-level project directors to coordinate all project activities. The satisfactory implementation performance of PNOC-EDC's components confirmed their readiness for project implementation. By contrast, the substantial implementation delays encountered by NPC reflected, in part, its inadequate readiness for project implementation at the time of loan approval, particularly in regard to the resettlement action plan. Indeed, the project appraisal failed to identify the substantial risks related to ROW issues which had contributed to delays in the implementation of NPC's projects.
- Risk Assessment. In light of the substantial uncertainties of the operating environment, it is not clear if a sufficiently rigorous risk analysis had been performed to avoid overly optimistic expectations of the project outcome related to NPC's finances and its project components, paying particular attention to the following: (i) the risks related to fixed obligations under the "take-or-pay" provisions of the BOT contracts, taking into account potential implementation delays, market risks and mismatch in currencies between the revenues and liabilities of the project entities; (ii) the risks of delayed and lower power tariff adjustments; (iii) the impact of competition from new IPPs and self-generation by industrial users; and (iv) the impact of combination of adverse factors on the project economics and entities' finances.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

This Project is one in a series of recent operations through which the Bank supported the implementation of the aforementioned ESP and reduction of bottlenecks in power transmission to promote economic growth. In particular, the Bank loan for the Power Transmission and Rehabilitation Project (PTRP) was approved six months prior to this Project and the Implementation Completion Report for the PTRP (dated April 1998) set a precedent for evaluating the outcomes of this and other subsequent projects in the series.

Despite the achievement of physical objective, the overall project outcome is rated as unsatisfactory mainly because (i) NPC has maintained its precarious financial situation and the objective of strengthening the financial viability of the project entities has not been achieved; and (ii) the high cost of

meeting the Project's physical objective was a contributing factor to this situation, and consequently a negative net present value (NPV) is currently estimated for the economics of the Project. NPC's financial viability was seen as critical for the improved performance of the power sector, since the Corporation's financial problems and consequent under-investment were considered to have been one of the key contributing factors leading to the power crisis. Hence, ensuring the sustainability of the Project's physical objective to eliminate the power crisis was also dependent on achieving the longer term financial objective.

Sectoral Improvement Objective. Although many of the actions in the ESP have been implemented (Annex 7), a major issue of concern is the protracted delays by Congress in the passage of (i) a power sector restructuring bill; and (ii) a geothermal bill to increase financial incentives for investment in geothermal development. The current fiscal regime for geothermal development does not allow for a level playing field with competing imported fossil fuels (which are taxed at a much lower rate) and hinders private sector investment in the sector.

Financial Objective. The legal agreements under this Project included the following financial performance covenants: (a) for NPC, a minimum of 8% rate of return (ROR) on revalued net fixed assets and a minimum debt service coverage ratio of 1.3 times; and (b) for PNOC-EDC, a maximum debt/equity ratio of 70/30, a current ratio of not less than 1 time and a minimum debt service coverage ratio of 1.25 time.

BOT Obligations and Financial Ratios. At the time of project appraisal, BOT obligations were considered operating costs in the financial forecasts of both NPC and PNOC-EDC. On the other hand, the legal agreements did not make explicit reference to the treatment of BOT obligations in the definition of financial ratios, while the term "debt" was defined as "any indebtedness" of the Borrower maturing by its terms more than one year. Subsequently, the Commission on Audit (COA, state auditor in the Philippines) issued accounting guidelines on the BOT schemes which are considered capitalized lease and part of the liabilities of the project entities. In the case of a subsequent Bank-financed project for NPC, the Loan Agreement was amended to define "debt service" to include, inter alia, the BOT lease obligations, which was consistent with the approach of the co-financier, Asian Development Bank (ADB). However, in the case of PNOC-EDC, no such action was taken. Thus, notwithstanding the "take-or-pay" provisions in the BOT contracts and the above accounting treatment stipulated by COA, PNOC-EDC's calculation of the debt service coverage ratio has not taken into account the cash payment for BOT obligations, based on its interpretation that "the BOT arrangement is a mere provision of services whereby payment is contingent to the delivery of services". As such, this is a substantial deviation from the SAR approach (with internal cash generation net of BOT obligations) and that of the NPC (with debt service including BOT obligations). Similarly, the PNOC-EDC calculation of debt/equity ratio has excluded the liabilities for fixed BOT obligations. Consequently, the ICR mission initiated discussions with PNOC-EDC regarding the above issues; these will be followed up by the supervision mission of the Leyte Luzon Geothermal project. In hindsight, given the significant impact of the BOT obligations on the finances of the project entities, the legal agreements should have made explicit reference to the treatment of such obligations.

(a) NPC. Despite the valiant efforts made by the NPC, the Corporation had not complied fully with the financial covenants for some years even prior to the Asian financial crisis (Annex 8). The precarious finances of NPC are largely due to factors beyond its control, including its under-capitalization and inadequate tariff adjustments. To meet its liquidity needs, NPC has incurred huge liabilities which, in turn, expose the Corporation to expensive debt service and "take-or-pay" obligations under IPP contracts. Its financial difficulties have been exacerbated by the recent regional financial crisis, particularly the impact of local currency devaluation (54% by end-1997), lower energy demand and over-capacity in power generation.

Power sector restructuring, recapitalization and privatization of the NPC lie at the heart of the Corporation's recovery program. In particular, passage of the Electricity Industry Reform Bill would enable various measures to put NPC on the path to financial sustainability, including (i) the government to convert a substantial portion of its debt to equity; (ii) privatization of the NPC; and (iii) recovery of a portion of the stranded costs of NPC (including IPP obligations) through a universal levy on all electricity consumers. However, there are considerable uncertainties related to the timing of the passage of the Bill. In the absence of adequate remedial measures, NPC's finances will deteriorate further. In the interest of partnership, the ADB is taking the lead in power sector restructuring and privatization. It is understood that ADB has indicated to the government the need for a task force comprising the government, ADB and NPC officials to agree on an acceptable financial recovery action plan; the Bank will continue to coordinate closely with the ADB on this matter.

(b) PNOC-EDC. Until 1997, PNOC-EDC had consistently complied with all of the above financial performance covenants (Annex 9). However, in its ICR (Annex 13), PNOC-EDC noted that it is ironic that the BOT scheme which helped in financing the power plant has required PNOC-EDC to seek external financing in order to pay part of the BOT obligations, due to the mismatch between electricity revenues (25 years sales contract with NPC) and BOT payments (10 years contract) and operating expenditures as well as the negative effect of the currency crisis affecting the Asian region. Consequently, PNOC-EDC reported noncompliance with (a) the current ratio covenant in 1997 and 1998; and (b) the debt service coverage ratio in 1998.

Based on PNOC-EDC's unaudited financial statements in 1999, prior to the inclusion of the BOT lease obligations, its debt service coverage ratio was 1.5 times, current ratio at 1.7 times and debt/equity ratio at 55/45. On the other hand, if these financial ratios were to include the BOT obligations (as in the case of NPC), its debt service coverage ratio would have been reduced to 0.7 times, current ratio at 0.6 times and debt/equity ratio at 78/22.

Over the medium term, PNOC-EDC's latest financial forecast indicated its expectation of improvement in profitability. However, even before the inclusion of BOT obligations, its debt service coverage ratio is projected to fall below 1 time in 2001, mainly due to the bullet repayment. After the inclusion of BOT obligations, the financial ratios would be weakened considerably. Thus, the financial risk noted above would need to be closely monitored and managed by PNOC-EDC.

Physical Objective and Project Economic Rate of Return. The Project substantially achieved the objective of meeting the increasing demand for power in Cebu using indigenous and environmentally superior geothermal energy resources. Compared to the early 1990s, when the country was suffering from power shortages, consumers are unequivocally better served. However, this achievement came at a high cost (in 1999, average production cost of NPC plants was P1.76/kWh, whereas the average cost for NPC's contracts with the IPPs was P 2.66/kWh, of which the geothermal plants cost P 2.8/kWh) and the current estimate of the NPV is negative for the economics of the Project.

Promotion of Private Geothermal Power Generation Projects. This objective was substantially achieved by the Project, although the actual cost is substantially higher than the appraisal estimate. This Project is the first phase of the Leyte Geothermal Project; together with the second phase Bank-financed Leyte Luzon Geothermal Project, geothermal power accounted for about 80% of the total power generation in the Visayas system in 1999.

4.2 *Outputs by components:*

Physical Components

I. PNOC-EDC's components

(a) Development of a 202 MW geothermal steam field (which is higher than the SAR estimate of 185 MW), comprising the drilling of 12 production and reinjection wells (which are significantly higher than the appraisal estimate of 8 development wells), the construction of the fluid collection and disposal system, and the construction of a 230 KV interconnection system and switching station. Overall, implementation was on schedule and within budget and the output is rated as highly satisfactory.

(b) Carrying out two BOT contracts with private companies to construct and operate geothermal power plants (Upper Mahiao and Malitbog Unit 1, totaling 202 MW). Achievement of the physical objective has come at an expectedly high cost (65% higher than appraisal estimate). Overall, output is rated as satisfactory.

The PNOC-EDC components were completed on schedule, with the commissioning of the BOT plants in July 1996. These power plants are owned by a private company and will be transferred to PNOC-EDC after ten years under the present BOT contract.

II. NPC's components

(a) NPC constructed 48.7 km 230 kV and 5.8 km 138 kV transmission lines in Leyte, and 90.8 km 230 kV and 16.7 km 138 kV transmission lines in Cebu. This component was energized in July 1997, which was 12 months behind the appraisal schedule. Overall, output is rated satisfactory.

(b) NPC installed 4 X 32 km of 230 kV submarine cables (cross sectional area is 630 square mm each) between Tabango (Leyte) and Talisay (Cebu). This component was completed in November 1997, representing a 17 months delay from the effective date (July 1996) for its power purchase agreement (PPA) with PNOC-EDC. This was mainly attributable to delays in procurement activities and accidental damage of the submarine cable when fiber optics cables were laid for a telephone company. Overall, output is rated satisfactory.

(c) Cebu Grid Reinforcement: This component included installation of 26.9 km 138 kV transmission lines, a 100 MVA 138/69 kV substations, and additional transformers in three existing substations in Cebu. Implementation of this component has been delayed significantly mainly due to difficulties in right-of-way (ROW) issues and consequent need for changes of project sites. Thus, despite extension of the original loan closing date by 15 months (to September 30, 1999), one section of the transmission lines (currently under expropriation procedures) and a substation subcomponent have not yet been completed. Completion of these two subcomponents are scheduled for the second quarter of 2000 and April 2002, respectively. The incompleteness of this component and the related output is rated as unsatisfactory.

Institutional Component

I. PNOC-EDC's component

Technical assistance for project implementation. During all phases of the project, PNOC-EDC

was assisted by consultants with extensive experience in geothermal development. The output of this component is satisfactory.

II. NPC's components

Technical assistance and institutional support for NPC. Major output included the following: (i) TA for the hydro projects included completion of final configuration of the scheme, documents for tendering, environmental assessment, and financial & economic viability of the project; and (ii) NPC was assisted by consultants for project implementation, especially tower design and submarine cable installation. NPC acquired an Integrated Resource Planning (IRP) software package for NPC's power development program and the supplier provided a training course on the software. NPC's system planners were able to enhance their capacity in conducting system analysis and planning. Various consultants assisted NPC to implement the EOIS recommendations including training for project management. The overall output of this component is satisfactory.

Environmental/Resettlement Component

I. PNOC-EDC's component is rated as highly satisfactory.

PNOC-EDC prepared a detailed Environmental Impact Assessment (EIA) for the geothermal development. The Department of Environment and Natural Resources (DENR), based on its own evaluation, issued an Environmental Compliance Certificate approving the project implementation subject to protective measures during construction and operation. PNOC-EDC implemented the protective measures properly. A multi-sectoral task force composed of the DENR, NGOs, Local Government Units and PNOC regularly monitors compliance with relevant standards. PNOC-EDC has so far had no violations pertaining to air and water quality.

Overall, the environmental/resettlement component of the PNOC-EDC's component is rated as highly satisfactory. The Corporation designed and implemented a resettlement program for families affected by the geothermal development. The program included (a) protection of residents from potential health hazards; (b) relocation of the residents from the project area; (c) assistance for the relocated community in regaining their standard of living prior to relocation; and (d) facilitating the formation of community institution and self reliance. The total number of households affected by the Leyte Geothermal Project was 106 and the resettlement program was successfully implemented, with about half of the affected households transferred to the newly constructed relocation site.

II. NPC's resettlement component is rated as highly unsatisfactory. There have been significant delays in compensation payments by NPC, particularly for land acquisition, which are partly beyond the control of NPC in such cases as missing or incomplete documentation of some landowners. As of December 31, 1999, compensation payments remained only at 77%. Under the Resettlement Recovery Action Plan agreed in October 1999, NPC is committed to the completion of all the compensation payments by June 2000, except for cases where NPC has no control and cannot expedite payment due to incomplete documentation by affected landowners. Meanwhile, under the agreed action plan, NPC has established an escrow account for all the outstanding compensations, except for cases under expropriation (for which NPC has already provided provisional deposits). Further, the preparation of deeds of sales for land acquisition increased to 99% by February 2000. Implementation of the Resettlement Recovery Action Plan will continue to be monitored closely by the mission through NPC's monthly progress reports to the Bank.

4.3 Net Present Value/Economic rate of return:

During the power crisis in the country, the project was designed to meet the rapidly increasing demand for power in Cebu using indigenous and environmentally superior renewable energy resources. However, the current estimates of the economic benefits are sharply lower than the appraisal estimates (Annex 3). This is attributable to a combination of factors, including (a) significantly lower power sales in the initial years of operation (about 47% of full capacity production in 1998 and 1999) mainly due to lower than expected demand growth and delayed project completion; (b) significantly lower tariff levels than the appraisal estimates; and (c) total costs (including BOT lease obligations) were higher than the appraisal estimate.

Least Cost Analysis. Based on the actual/latest cost data, and the assumptions of fuel oil and diesel prices (in constant 1993 price terms) at about \$14/bbl and \$19/bbl, respectively, the economic costs of the power investment program with the Leyte Cebu project were compared with those of the alternative program of isolated development for Visayas. The results indicated that at an NPV discount rate of less than 14% (as compared with the appraisal estimate of 29%), this Project is part of the least cost solution for the Visayas system. Based on a discount rate of 12%, the NPV of the savings associated with the program that includes this Project is currently estimated at \$19 million (in constant 1993 price terms), which is significantly lower than the appraisal estimate of \$165 million. However, one of the critical factors affecting the least cost analysis is the movement of petroleum product prices which is historically volatile. The results of sensitivity analysis indicated that a 20 % increase of the prices of fuel oil and diesel prices from 2000 onwards would result in about 2% increase in the break-even NPV discount rate (to 16%) between this Project and the alternative program of isolated development. According to PNOC-EDC's estimate, the competitiveness of geothermal energy to oil would only be affected if crude oil price is reduced to an average of \$16/barrel from the present levels.

Economic Rate of Return (ERR). The appraisal estimates of the ERR and NPV (at 12% discount rate) were about 16% and \$89 million, respectively. Given the substantial uncertainties in the operating environment, the expected ERR could vary significantly under a wide range of scenarios. Based on NPC's latest financial projection to increase the average revenues to P3.54 /kWh (or US 4 cents/kWh, in constant 1993 price terms) by 2004, the results of sensitivity analysis indicated that the ERR would be increased to (i) about 3 % in the event NPC's average revenues were to remain at the 2004 level for the balance of the project life; and (ii) 8 % in the event NPC's average revenues were to be the same as the appraisal estimate of US 7.1 cents/kWh from 2005 onwards. The overall project ERR is estimated to be negative if NPC's future average revenues were to remain at its 1999 level of P 2.34/kWh or US 6 cents/kWh (in current price terms). In summary, the current estimates of the ERR under a range of scenarios are significantly lower than the appraisal estimate and the NPV is expected to be negative. On the other hand, as in the case of the appraisal estimates, the current estimates of ERR are conservative since the unit benefits assumption has not captured other benefits to the economy encompassed in the consumers' surplus and the positive environmental impacts associated with geothermal development.

4.4 Financial rate of return:

The overall financial rate of return (FRR) for PNOC-EDC's components and the BOT power plants are currently estimated at 9.8% (in real terms), which is close to the appraisal estimate of 9.5%, despite the significant divergence between the latest estimates and appraisal assumptions for selected key factors (Annex 11). In particular, due to the non-passage of the long delayed Geothermal Bill, the financial incentives (including royalty/tax holiday) anticipated earlier for geothermal development did not materialize. Consequently, the actual/latest estimate of power rate is P1.65/kWh (in constant 1993 price

terms), which is 18% higher than the appraisal assumption of P1.4/kWh.

It should be noted that the base case FRR estimated in the SAR has included sunk costs incurred by PNOC-EDC; this is useful for assessing whether the original decision to proceed with the project was well founded. However, consistent with standard Bank practice for ERR/FRR calculations, for the purpose of deciding whether to proceed with the incremental investment at the time of project appraisal, the sunk costs should have been excluded from the calculation of the FRR, as in the case of the ERR estimate in the SAR. With the exclusion of sunk costs, the overall FRR is currently estimated at 16.8 % based on the current contracted power price to NPC (as compared with the imputed appraisal estimate of 16.3% had the sunk cost been excluded).

However, it should be noted that NPC received long delayed approval (in December 1999) for less than full cost recovery (P 1.45/kWh) on the basis of "avoided cost" documented by NPC. In response, NPC has planned a two pronged approach to (i) apply to the Electricity Regulatory Board for full cost recovery with the requisite documentation requested by ERB, including the higher than expected contract price due to the nonimplementation of tax/royalty holiday noted above; and (ii) renegotiate the contract with PNOC-EDC. The results of sensitivity analysis indicated that if the power price were to be reduced to P1.45/kWh (in constant 1993 price terms) from 2001 onwards, the FRR would be reduced to 14% without sunk costs, and 7.9% with sunk costs.

4.5 Institutional development impact:

Overall, the institutional development impact is rated as moderate. Achievement of this objective has been partial in the case of NPC. Specifically, the technical assistance subcomponents for the design of two hydro projects was implemented satisfactorily. However, further improvement is still required with respect to project management, most notably in procurement and resettlement aspects, as well as the need for closer integration between financial and non-financial planning within NPC. In the case of PNOC-EDC, the objective of institutional development has been substantially achieved. With the assistance of consultants with extensive experience in geothermal development, the Company demonstrated its competence by the satisfactory completion of the project in a timely and cost-effective manner.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

- ▷ Asian financial crisis was a significant external factor beyond the control of the government and the implementing agencies. Consequent sharp devaluation of the peso and slowdown of power demand growth contributed to the unsatisfactory outcome of this Project, both in terms of project economics and the objective to ensure the financial viability of NPC and PNOC-EDC.
- BOT Power Plant Costs: The bargaining power of the government/PNOC-EDC to secure the best contractual terms from private investors (in 1993) was severely limited where there were power shortages and the country was rated as "non-investment" grade. Consequently, the substantial cost overrun for the BOT plants is attributable, in part, to a high risk premium required by the investors.
- The submarine cables were accidentally damaged when fiber optics cables were laid for a telephone company. This has, in turn, contributed to substantial project implementation delays, higher project cost and lower project economics.
- There have been significant delays in compensation payments by NPC, particularly for land acquisition, which are partly beyond the control of NPC in such cases as missing or incomplete documentation of some landowners

5.2 Factors generally subject to government control:

Pace and scope of energy sector reform

- In the wake of the power crisis, the Executive Order 215 in 1990 repealed the Marcos decree on NPC's monopoly on power generation and allowed for private sector development of power plants and infrastructure facilities. In addition, development and implementation of the Energy Sector Plan by the government also contributed positively to the realization of this Project.
- Ironically, introduction of competition from new IPPs contributed to NPC's loss of market share and exacerbated its financial difficulties.
- The protracted delays in the passage of the power sector restructuring bill have, in turn, hampered the implementation of financial recovery action plan by NPC.
- The levels and timeliness of power tariff adjustments fell short of the appraisal expectation, thus contributing to the unsatisfactory outcome in terms of the finances of NPC, project economics and sustainability.
- The delayed passage of the Geothermal Bill has, in turn, affected adversely the finances and sustainability of PNOC-EDC and their components under this Project.

5.3 Factors generally subject to implementing agency control:

Project Management, including among others, coordination among the relevant departments, procurement procedures and resettlement policies, has a significant impact on the performance of project implementation.

5.4 Costs and financing:

The total financing requirements (including interest during construction) amounted to \$612.98 million, which were \$154.08 million or 34% higher than the appraisal estimate of \$458.9 million (Annex 2). The BOT power plants accounted for the lion share (\$112.8 million or 73%) of the cost overrun, while the balance was attributable to NPC's cost overrun. On the other hand, the Bank loan, totaling \$193.11 million, was 8% lower than the original loan amount, mainly due to (i) co-financing with the Nordic Investment Bank/Nordic Development Fund subsequent to Bank loan approval for NPC's components; and (ii) higher amount of financing by PNOC-EDC's own internal cash generator for geothermal development.

(a) PNOC-EDC's Components

PNOC-EDC's total financing requirements, including interest during construction (IDC) of \$4.03 million, amounted to \$ 92.04 million, which is close to appraisal estimate of \$91.3 million (including IDC of \$7.5 million). This is mainly due to higher than expected engineering and administrative costs (including well drilling costs not accounted for in the SAR, well development, geoscientific investigation and reservoir engineering costs) which were largely offset by the cost savings in well drilling.

Of the original Bank loan (\$64 million) to PNOC, which in turn lent the proceeds to its subsidiary, PNOC-EDC, \$53.03 million were disbursed, and the undisbursed balance (\$10.97 million) canceled. The loan was closed on schedule in June 30, 1998. Under-utilization of the Bank loan was mainly due to PNOC-EDC's use of in-house rigs for well drilling which were not eligible for reimbursement under the loan.

(b) BOT Power Plants

The total cost of the two contracts with private power producers amounted to \$287.5 million, which was 65% higher than the appraisal estimate.

(c) NPC's Components

The total financing requirements of NPC's components amounted to \$233.5 million (including IDC of \$ 23.5 million), representing an 21% cost overrun against the appraisal estimate of \$192.9 million (including IDC of \$16.5 million). This is mainly due to (a) the submarine cable contract (\$95 million) which was 39% higher than the appraisal estimate (\$68.6 million) ; and (b) the aforementioned accidental damage of the submarine cables which resulted in an additional cost of \$15.9 million for repair as well as an additional \$5.6 million for embedment.

Upon the bid opening of the submarine cables contract which was substantially higher priced than the appraisal estimate, NPC secured co-financing from the Nordic Investment Bank/Nordic Development fund of \$15.0 million. When the submarine cables were damaged, NPC secured additional co-financing (\$25 million) from the Nordic Investment Bank. Further, financing of the subcomponent for reinforcement of the 138/69 kV substations (\$4.8 million) was transferred to the ongoing Transmission Grid Reinforcement Project. Of the total Bank loan of US\$ 147 million, US\$ 140.08 million were disbursed. The loan was closed on September 30, 1999 after a 15 month extension, and a grace period (up to February 10, 2000) was granted for loan disbursement against eligible expenditures incurred before the loan closing date. As of February 10, 2000, undisbursed balance of US\$ 6.9 million were canceled.

6. Sustainability

6.1 Rationale for sustainability rating:

Overall, the prospects for project sustainability are uncertain in light of the considerable uncertainties of the operating environment, including the protracted delays encountered in the passage of enabling legislation critical for the financial recovery of NPC.

In terms of responding to the power crisis, the Project has contributed to making it unlikely that "power crisis" will happen again in the country in the foreseeable future. In fact, rather than suffering from undercapacity, NPC now experiences a high reserve margin. Moreover, subsequent projects, including Leyte Luzon Geothermal and Transmission Grid Reinforcement projects, continue to improve the robustness of NPC's transmission network.

However, meeting the Project's physical objectives came at a high cost, and has contributed to the perpetuation of NPC's already poor financial position and significant weakening of PNOC-EDC's liquidity position until the expiry of the BOT power purchase agreement (in 2006). Thus, one of the project objectives to strengthen the financial viability of NPC and PNOC-EDC have not been achieved.

Since the financial viability of NPC is critical to ensuring an effective and efficient power sector, this means that the Project's sustainability as a whole is uncertain, taking into account the following factors: (i) general sectoral uncertainty caused by the protracted delay in the passage of an enabling legislation for power sector restructuring and the Geothermal Bill which would reduce the high royalty imposed on the geothermal industry and level the playing field with nominally cheaper but more polluting

fossil fuel; and (ii) the current overcapacity in power generation is expected to continue over the medium term, coupled with the fixed take-or-pay IPP obligations of NPC, has an adverse impact on the Corporation's finances.

6.2 Transition arrangement to regular operations:

(a) Transition Arrangements for the project's future operation

The steam supply system of PNOC-EDC as well as interconnection connecting the developed power plants to PNOC-EDC Central switching station are operated by PNOC-EDC Leyte Geothermal Production Field Office. The Field Office is in charge of operation and maintenance of PNOC-EDC facilities in Leyte geothermal area, including production plan and coordination with the BOT power plants. It includes adequate experts including geologists to operate the geothermal steam system. PNOC-EDC has formed a Power Department in the Field Office to monitor the maintenance and operation of these BOT plants and will institute training program for PNOC-EDC staff. The BOT plants will be transferred to PNOC-EDC in the year 2006 under the current contract. The BOT contracts further provide PNOC-EDC personnel with training one year prior to the formal turn-over of the plants.

Upon commissioning of the Leyte-Cebu interconnection of NPC as well as other transmission systems installed under the Project, the operation of these systems was transferred from the NPC Cebu Engineering Project Office, which was in charge of the construction, to Visayas Regional Center of NPC. Adequate maintenance would be provided to the facilities based on NPC's guidelines for maintenance. Special tools, instruments and boats for patrol and maintenance of the submarine cables are equipped with in switching stations at the both end terminals of the cables.

(b) Performance indicators

The following indicators will be monitored annually through the existing data acquisition systems from the Leyte Geothermal Production Field Office of PNOC-EDC and the Visayas Regional Center of NPC: (i) actual available energy and sales transferred to NPC Leyte-Cebu system from geothermal plants in Leyte; (ii) percentage of geothermal energy among energy sources for power generation in Visayas system; (iii) energy transferred from Leyte to Cebu through Leyte-Cebu interconnection; (iv) system reliability of the Visayas system; (v) system losses in Visayas system; and (vi) frequency deviation in the Visayas system.

(c) Follow-up by the Bank

The Bank has helped finance the second phase of the Leyte geothermal development project under the Leyte-Luzon Geothermal Project (LLGP, Loan 3746/3747-PH). The NPC transmission network has also been developed and reinforced under the LLGP and Transmission Grid Reinforcement Project (TGRP, Loan 3996/3997-PH). NPC has installed HVDC interconnection between Luzon system and Visayas system under LLGP and Northwestern Luzon 500 kV transmission lines under TGRP. TGRP has also included the establishment of a National Load Dispatch Center, which will allow for the operation of the interconnected transmission systems (Luzon, Visayas and Mindanao) in the country, once the planned Leyte-Mindanao interconnection is installed in the future. Under the TGRP, it was agreed with NPC that the Bank would monitor similar system performance indicators mentioned above for the three transmission systems.

7. Bank and Borrower Performance

Bank

7.1 Lending:

The overall Bank performance in project identification, preparation and appraisal is satisfactory, with substantial inputs having been provided by Bank staff on both the policy front and extensive project preparation. However, selected aspects of the Bank's assessment had limitations, including (i) NPC's resettlement policy and action plan and the risks of right-of-way issues; (ii) the interrelated aspects of project entities' finances, BOT contracts and risk analysis of the Project and entities; (iii) inconsistencies in selected assumptions for the calculation of ERR and FRR. Moreover, the monitoring and evaluation indicators were oriented toward project output rather than outcome.

7.2 Supervision:

- The overall Bank performance in supervision of this complex project, with two implementation agencies, is rated satisfactory.
- Supervision of the procurement activities was generally satisfactory. However, there were inadequate follow up actions with NPC on resettlement issues during most of the project implementation period. Nevertheless, after the substantial completion of NPC's physical components, supervision efforts intensified on both the project level and country portfolio management level.
- Exceptionally frequent changes in task manager and team members hampered the continuity and effectiveness of the supervision efforts.

7.3 Overall Bank performance:

On balance, overall Bank performance is rated satisfactory. The above assessment of Bank performance is consistent with the comments by NPC and PNOC-EDC in their ICR (Annexes 13 and 14).

Borrower

7.4 Preparation:

Overall, the performance of both NPOC-EDC and NPC during extensive preparation for this complex project was rated satisfactory. Both corporations were committed to the Project and undertook the necessary upfront actions to meet all the Bank's conditions of Board presentation (conclusion of BOT/BOO contracts) and disbursement (effectiveness of BOT contracts for PNOC-EDC loan and implementation of demand charges for NPC loan). However, as noted above, the protracted delays encountered by NPC in the implementation of the resettlement action plan reflected its inadequate preparation and is rated highly unsatisfactory for this component.

7.5 Government implementation performance:

Many of the actions in the ESP have been implemented and substantial progress has been made in reforming the energy sector (most notably in the full deregulation of the downstream oil industry). However, protracted delays in the passage of power sector restructuring bill and geothermal bill, as well as the levels and pace of power tariff adjustments, have significant adverse impact on the finances of the implementation agencies, project economic viability and sustainability. Nevertheless, it should be noted

that the executive and legislative branches of the Philippine Government are independent of each other. While the executive branch can make several commitments to the Bank regarding policy (such as certifying a proposed bill), the passage of legislation is not within its sole control. Overall, the performance of the government is rated satisfactory.

7.6 Implementing Agency:

On balance, the overall performance of the implementation agencies was rated as satisfactory. Project implementation by both entities was marked by many contracts being completed satisfactorily and within budget for most of the components. PNOC-EDC is rated as highly satisfactory for implementing the project on schedule and largely within budget. On the other hand, as noted above, NPC's procurement activities were tardy and its delayed implementation of the resettlement action plan is rated unsatisfactory. NPC's performance was hampered, in part, by changes in management and staff working on the Project. Separately, the financial objective of the Project was not achieved. However, as noted above (Sections 4 and 5), a number of the critical factors contributing to this result were outside the direct control of NPC and PNOC-EDC during the project implementation period.

7.7 Overall Borrower performance:

On balance, overall Borrower performance is rated satisfactory.

8. Lessons Learned

- While "fast-track" BOT projects have proved crucial in alleviating power shortages, the economic efficiency of individual private investments should be improved with due consideration for (a) a cohesive sectoral approach, with special attention to prudent investment planning and financial management as well as risk management; and (b) rationalization of prices and risk sharing arrangements within a competitive and transparent framework.
- It may not be realistic to expect power projects developed with private funds under the "fast-tracked" Independent Power Producer (IPP) Program to be least cost in the "traditional" sense; the additional cost over the hypothetical "least-cost" alternative is the price to pay for mobilizing resources that would otherwise not be available to the sector/country.
- The high cost of the IPP Program has been a contributing factor to the failure of the Project to meet its financial objective and has adversely affected the project economics. Such an outcome indicates the need for sufficient risk analysis/management in a highly uncertain operating environment, particularly in a sector undergoing major structural reform.
- Conventional economic rate of return analysis is poorly suited to an environment where higher-cost, sub-optimal investments are required to eliminate power shortages. In the case of NPC, the transmission investments to bring power from higher-cost plants are likely to be underutilized now that the power crisis is over. The main economic benefits were reaped in the first few years when power was scarce and the value of avoiding outages was very high. The quantification of benefits and the estimation of the economic rate of return is therefore critically dependent on the estimated value of unserved energy.
- The use of a "rate of return on assets" target for financial performance is inappropriate for a company/sector with a very large and lumpy investment program.
- In cases where such obligations as BOT contracts have significant impact on the entities' finances, the legal agreements should made explicit reference to the treatment of such obligations in the definition of financial covenants.
- Quality at entry is a critical success factor for project implementation. In particular, for the

resettlement component, resolution of the right-of-way (ROW) issue and completion of compensation payment is one of the pre-conditions prior to project construction. Moreover, an adequate risk analysis is essential for realistic expectations of project outcome.

- In its ICR, NPC noted that as in the case of previous transmission line projects of the Corporation, the perennial ROW problem should be given top priority in terms of adequate policies and guidelines acceptable to affected landowners; adequate and qualified personnel to handle negotiations and expropriation cases; secure full support of other government agencies involved in the processing of ROW documents including speedy court decisions. These actions are vital in solving ROW problems of similar projects in the future.
- In its ICR, PNOC-EDC noted that although the BOT scheme ensured the availability of private capital, there is a need to plan for possible funding deficits resulting from imbalance between project revenues and project operating and financing costs.
- The complications associated with two implementation agencies (in different subsectors) under one project should be taken into account in the design of future projects. Indeed, in light of the diverse performance of the two project entities, the rating of project performance and outcome could be different if there had been two separate projects.
- There are no short cuts to a successful complex operation; above-average inputs of Bank resources and broad staff skill mix for project design, appraisal and supervision are required.
- Frequent changes of task manager and team members are not conducive to efficiency and effectiveness of the Bank's inputs. On the other hand, synergies may be achieved by a series of Bank interventions with the same project team.

9. Partner Comments

(a) Borrower/implementing agency:

Both NPC and PNOC-EDC provided data and comments which have been largely incorporated in the ICR, except for selected comments by PNOC-EDC which are summarized below:

- Revision of the rating for "quality at entry" from marginally unsatisfactory to satisfactory since the rating is based on hindsight observations which were unforeseeable at the time of appraisal. Given the relatively positive economic environment and optimistic projections at the time of appraisal, the decision of PNOC-EDC to proceed with the Project would have been made even if sensitivities had been run up to the extreme downside the Philippine economy has seen in the past 2 years, simply because these conditions, at the time of appraisal, were unlikely.
- The BOT setup was recommended by the Bank as an integral component of the project. Contrary to the Bank and the Company's initial expectations, the BOT setup was not the optimum way by which the project could have been implemented since this resulted in the short term funding gap as well as substantial VAT outlays.
- Revision of the rating for financial objective for PNOC- EDC from unsatisfactory to satisfactory; the financial gap that PNOC-EDC is subject to is only short-term (1997-2006).
- The ICR calculations of the estimated ERR of the project are largely pessimistic; the ERR calculations should include the impact of benefits to the economy not considered or not present during the time of appraisal, such as (a) avoided fuel importation brought about by higher fuels prices; (b) positive environmental impacts associated with geothermal development; and (c) reduced dependence on expensive power purchased or generated by diesel and gas turbines. From a macro perspective, the value of approximately \$4.8 billion of power plant investments has been more than offset by an accompanying increase in GDP growth of \$8.44 billion (Annex 10).
- Deletion of IRR without sunk costs as it is irrelevant since the FRR inclusive of sunk costs, at 9.8%, is

already viable. Similarly, deletion of reference to price adjustment which would only result in exacerbating the liquidity squeeze currently experienced by PNOC-EDC.

- The unsatisfactory project outcome is only temporary and if viewed in the long term, the projected outcome will still be satisfactory.

(b) Cofinanciers:

Draft ICR was provided to the Nordic Investment Bank and its comments incorporated in the final ICR.

(c) Other partners (NGOs/private sector):

10. Additional Information

Annex 1. Key Performance Indicators/Log Frame Matrix

Outcome / Impact Indicators:

Indicator/Matrix	Projected in last PSR ¹	Actual/Latest Estimate
I. Leyte-Cebu Project		
- Energy transferred to NPC Leyte-Cebu system from geothermal plants in Leyte	- 1,370 GWh per year (1997-98) based on PPA	- 660GWh per year (July 1997- June 1998)
- NPC: Percentage of geothermal energy for power generation in Visayas system	-- not available	- 69.95% in 1998 (compared with 52.08% in 1995)
- NPC: Energy transferred from Leyte to Cebu through the interconnection system	-- not available	- 843 GWh in 1998
- NPC: System reliability in Visayas system	-- not available	- 99.79% in 1999 (compared with 99.60% in 1995)
II. Overall NPC Operation		
Total NPC Energy Sales (GWh)	-- 35,730 GWh in 1997	-- 36,442 GWh in 1997 and 37,321 GWh in 1998
Power Sold/Total Pop. (kWh/person)	-- 504 kWh/person in 1998	-- 508 kWh/person in 1998
-- Sales per Oper. Employees (MWh)	-- 2,926 MWh in 1997	-- 3,152 MWh in 1997 and 3,143 MWh in 1998
-- % Total Energy Losses & Plant Use	-- 6.9% in 1997	-- 6.50% in 1998
III. Financial Ratios		
- NPC's rate of return on revalued net fixed assets no less than 8%	8% in 1997	7.2% in 1997 and 3.20% in 1998
- NPC's debt service coverage no less than 1.3 times	1.3 times in 1997	0.96 time in 1997 and 1.18 times in 1998
- PNOC-EDC's debt service coverage ratio no less than 1.25 times	1.7 times in 1998	0.7 time in 1999
- PNOC-EDC's debt/equity ratio no more than 70/30	41/59 in 1998	78/22 in 1999
- PNOC-EDC's current ratio no less than 1 time	3.9 times in 1998	0.6 time in 1999

1/ SAR did not identify monitoring indicators for the Leyte Cebu Project per se; appraisal estimates for specific indicators for overall NPC operation and financial ratios are shown under the last PSR column. Further details of appraisal vs. actual are shown under Annexes 9 & 10.

Output Indicators:

Indicator/Matrix	Projected in last PSR	Actual/Latest Estimate
<p>- PNOC-EDC to develop 185MW steamfield</p> <p>- NPC to (i) construct 50km 230kV and 7km 138kV transmission lines in Leyte;</p> <p>- NPC to (ii) construct 93km 230kV and 27km 138kV transmission lines in Cebu;</p> <p>- NPC to (iii) construct 32km submarine cable linking Leyte to Cebu;</p> <p>- NPC to (iv) reinforce/upgrade existing Cebu transmission system</p> <p>- PNOC-EDC to engage in TA consultancy for project implementation</p> <p>- NPC to: (i) engage in TA consultancy for implementation of project, PDP and recommendations of EOIS</p> <p>- NPC to: (ii) engage in TA consultancies for Agbulu and Pulangi V hydro projects</p> <p>- PNOC-EDC to enter into BOT contract for 185 MW power plant</p>	<p>- 202MW steamfield developed</p> <p>- 48.7km 230kV and 5.8km 138kV transmission lines constructed in Leyte</p> <p>- 90.8km 230kV and 16.7km 138kV transmission lines constructed in Cebu</p> <p>- 4x32km 230kV submarine cable (cross section: 630 square mm each) constructed between Tabango (Leyte) and Talisay (Cebu)</p> <p>- 26.9km 138kV transmission lines to be constructed, but one section still not completed due to RoW problem. construction of a 100MVA 138kV substation and installation of three additional transformers in existing substations not yet commenced due to RoW problem for the 100MVA substation.</p> <p>- TA successfully implemented</p> <p>- TA for project implementation and PDP successfully implemented. Recommendations of EOIS partially implemented.</p> <p>- TA for project implementation and PDP successfully implemented. Recommendations of EOIS partially implemented.</p> <p>- TA successfully implemented, but Pulangi V hydro project has been dropped out from system development plan.</p> <p>- BOT contracts were awarded in August/September 1993. The BOT plants (Upper Mahiao and Malitbog #1) were commissioned in July, 1996.</p>	<p>- 202MW steamfield developed</p> <p>- 48.7km 230kV and 5.8km 138kV transmission lines constructed in Leyte</p> <p>- 90.8km 230kV and 16.7km 138kV transmission lines constructed in Cebu</p> <p>- 4x32km of 230kV submarine cable (cross section: 630 square mm each) constructed between Tabango (Leyte) and Talisay (Cebu)</p> <p>- The transmission line will be completed in the second quarter of 2000.</p> <p>- 100MVA substation site finalized. The completion of the substations will be in April 2002.</p> <p>- TA successfully implemented</p> <p>- TA for project implementation and PDP successfully implemented. Recommendations of EOIS partially implemented.</p> <p>- TA successfully implemented, but Pulangi V hydro project has been dropped out from system development plan.</p> <p>- BOT contracts were awarded in August/September 1993. The BOT plants (Upper Mahiao and Malitbog #1) were commissioned in July, 1996.</p>

¹ End of project

Annex 2. Project Costs and Financing

Project Cost by Component (in US\$ million equivalent)

Project Cost By Component	Appraisal Estimate	Actual/Latest Estimate	Percentage of Appraisal
	US\$ million	US\$ million	
A. PNOC Geothermal Development			
Goods and Equipment	33.30	39.95	120
Works	35.80	32.23	90
Technical Assistance & Others	5.70	15.82	278
B. BOT Power Plant	157.80	287.48	182
C. NPC Transmission System			
Overhead Trans. Lines and Substations	65.60	62.60	95
Submarine Cables	59.00	95.00	161
Submarine Cable Repairment and embedment	0.0	21.50	
Cebu Grid Reinforcement	9.80	7.40	76
Contracts under Energy Sector Loan	4.90	4.30	88
Right-of-Way and Compensation	3.80	12.00	316
Institutional Development	12.30	7.20	59
Total Baseline Cost	388.00	585.48	151
Physical Contingencies	24.60		
Price Contingencies	22.20		
Total Project Costs	434.80	585.48	135
Interest during construction	24.10	27.50	114
Total Financing Required	458.90	612.98	134

* Submarine Cable Repairment and embedment costs were not foreseen at the time of project appraisal

Project Costs by Procurement Arrangements (Appraisal Estimate) (US\$ million equivalent)

Expenditure Category	Procurement Method			N.B.F.	Total Cost
	ICB	NCB	Other ²		
1. Works	31.00 (24.80)	10.00 (4.00)	0.00 (0.00)	3.30 (0.00)	44.30 (28.80)
2. Goods	175.40 (150.20)	0.00 (0.00)	16.50 (15.00)	0.00 (0.00)	191.90 (165.20)
3. Services	0.00 (0.00)	0.00 (0.00)	18.40 (17.00)	0.00 (0.00)	18.40 (17.00)
4. Compensation & Administration	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	5.60 (0.00)	5.60 (0.00)
5. BOT Plant	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	174.70 (0.00)	174.70 (0.00)
Total	206.40 (175.00)	10.00 (4.00)	34.90 (32.00)	183.60 (0.00)	434.90 (211.00)

^{1/} Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies

^{2/} Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

Project Financing by Component (in US\$ million equivalent)

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	Bank	PNOC/NPC	CoF.	Bank	PNOC/NPC	CoF.	Bank	PNOC/NPC	CoF.
PNOC Geothermal Devl. IDC (PNOC)	64.00	19.70		53.03	34.98		82.9	177.6	0.0
		7.50			4.03		0.0	53.7	0.0
BOT Power Plant			174.70			287.48	0.0	0.0	164.6
							0.0	0.0	0.0
NPC Transmission IDC (NPC)	147.00	29.50		140.08	24.32	40.00	95.3	0.82	0.0
		16.50			23.50		0.0	142.4	0.0
							0.0	0.0	0.0
TOTAL	211.00	73.20	174.70	193.11	86.83	327.48	91.5	118.6	187.5

Note: Co-financiers included BOT power plant contractors, Nordic Investment Bank/Nordic Development Fund

Annex 3: Economic Costs and Benefits

Least-Cost Expansion with Leyte-Cebu and with the Second-best Solution (in Constant 1993 Prices)

US \$ Million

LEYTE-CEBU LEAST-COST SOLUTION						ISOLATED SYSTEMS - SECOND BEST					
Year	Total Investment Cost	Fuel Cost	O&M Cost	Energy Not Served	TOTAL SYSTEM COST	Total Investment Cost	Fuel Cost	O&M Cost	Energy Not Served	TOTAL SYSTEM COST	NET SAVINGS
1993	59.48	22.86	24.52	0.00	106.86	38.10	22.86	24.52	0.00	85.48	-21.38
1994	22.95	23.46	23.88	0.00	70.29	14.88	23.46	23.88	0.00	62.22	-8.07
1995	58.35	31.05	25.80	0.00	115.20	69.21	31.05	25.80	0.00	126.06	10.86
1996	154.65	56.46	45.62	0.00	256.73	42.87	56.46	27.12	0.00	126.45	-130.28
1997	6.00	57.88	70.00	0.00	133.88	53.28	54.93	53.68	0.00	161.89	28.01
1998	55.27	36.22	76.60	0.00	168.09	83.22	44.34	48.74	0.00	176.30	8.21
1999	12.03	21.53	80.26	0.00	113.82	88.93	29.57	47.47	0.00	165.97	52.15
2000	55.39	8.91	87.16	0.00	151.46	48.96	31.59	44.39	0.00	124.94	-26.52
2001	80.74	14.70	84.65	0.00	180.09	63.07	36.50	46.79	0.00	146.36	-33.73
2002	132.81	26.26	84.65	0.00	243.72	88.91	49.53	51.32	0.00	189.76	-53.96
2003	126.16	35.42	86.94	0.00	248.52	163.34	60.44	55.40	0.00	279.18	30.66
2004	90.73	43.09	89.23	0.00	223.05	165.81	84.12	55.27	0.00	305.20	82.15
2005	191.39	59.09	97.72	0.00	348.20	247.90	100.27	58.95	0.00	407.12	58.92
2006	146.50	79.55	99.31	0.00	325.36	162.96	108.07	65.65	0.00	336.68	11.32
2007	230.95	103.00	57.00	0.00	390.95	307.29	118.60	75.40	0.00	501.29	110.34
2008	313.72	117.05	64.17	0.00	494.94	414.14	137.53	83.23	0.00	634.90	139.96
2009	374.28	132.50	71.08	0.00	577.86	489.96	161.16	94.95	0.00	746.07	168.21
2010	375.28	150.24	83.87	0.00	609.39	339.08	178.44	105.90	0.00	623.42	14.03
2011	353.64	169.94	93.92	0.00	617.50	298.66	176.25	118.89	0.00	593.80	-23.70
2012	360.51	177.09	99.40	0.00	637.00	270.41	196.94	129.16	0.00	596.51	-40.49
2013	280.44	191.09	112.23	0.00	583.76	345.91	222.62	144.11	0.00	712.64	128.88
2014	73.61	211.47	128.38	0.00	413.46	89.73	256.57	158.66	0.00	504.96	91.50
2015	0.00	237.86	145.69	0.00	383.55	0.00	288.22	177.36	0.00	465.58	82.03
2016	-2482.90	237.86	163.27	0.00	-2081.77	-2814.51	288.22	177.36	0.00	-2348.93	-267.16
Present Values											
10%	713.41	514.21	593.68	0.00	1,821.29	745.24	634.62	486.28	0.00	1,866.14	44.84
12%	619.28	409.66	492.56	0.00	1,521.50	641.69	503.75	394.90	0.00	1,540.35	18.85
15%	502.48	303.11	382.64	0.00	1,188.23	512.29	369.55	299.14	0.00	1,180.99	(7.24)
18%	412.19	234.25	305.90	0.00	952.34	411.96	282.30	235.09	0.00	929.34	(23.00)

IRR: 14.0%

Internal Economic Rate of Return

Year	Cost			Unit Benefit /2	Generation /3	Benefit (@1993 prices)	Net Benefit
	Investment (US\$million)	O & M /1 (US\$million)	Total (US\$million)				
1993	21.38		21.38				-21.38
1994	8.07		8.07				-8.07
1995	34.77		34.77				-57.82
1996	21.00	20.06	41.06				-162.69
1997	2.99	47.87	50.86				-53.20
1998	3.06	49.86	52.92	4.05	588.79	23.86	-31.82
1999		49.86	49.86	4.15	588.79	24.45	-25.42
2000		49.86	49.86	4.74	1,008.80	47.79	-2.07
2001		49.86	49.86	4.48	1,098.04	49.22	-0.65
2002		49.86	49.86	4.40	1,261.00	55.51	5.64
2003		49.86	49.86	4.16	1,267.50	52.78	2.92
2004		49.86	49.86	4.01	1,267.50	50.78	0.92
2005		49.86	49.86	4.01	1,267.50	50.78	0.92
2006		49.86	49.86	4.01	1,267.50	50.78	0.92
2007		9.21	9.21	4.01	1,267.50	50.78	41.58
2008		9.21	9.21	4.01	1,267.50	50.78	41.58
2009		9.21	9.21	4.01	1,267.50	50.78	41.58
2010		9.21	9.21	4.01	1,267.50	50.78	41.58
2011		9.21	9.21	4.01	1,267.50	50.78	41.58
2012		9.21	9.21	4.01	1,267.50	50.78	41.58
2013		9.21	9.21	4.01	1,267.50	50.78	41.58
2014		9.21	9.21	4.01	1,267.50	50.78	41.58
2015		9.21	9.21	4.01	1,267.50	50.78	41.58
2016		9.21	9.21	4.01	1,267.50	50.78	41.58
2017		9.21	9.21	4.01	1,267.50	50.78	41.58
2018		9.21	9.21	4.01	1,267.50	50.78	41.58
2019		9.21	9.21	4.01	1,267.50	50.78	41.58
2020		9.21	9.21	4.01	1,267.50	50.78	41.58
2021		9.21	9.21	4.01	1,267.50	50.78	41.58

Internal Economic Rate of Return **3.3%**
NPV @ 12 % **-168**

- Notes: /1 Estimates only (at 1.5% of the investment cost).
/2 1998-2000 are actual tariffs (by NPC to customers) while 2001-2004 are projected by NPC.
/3 Net of 2.5% transmission loss
/4 Assumptions for (a) P/US\$ exchange rate: 41 in 2000; 42 in 2001; 43.5 in 2002; 45 in 2003; 46.5 in 2004;
(b) local inflation rates: 7% in 2000; 5.5 in 2001; 4.5 in 2002; 4.0 in 2003; 3.5 in 2004; and
(c) foreign inflation rates: 2.4% in 2000-2004.

Year	Cost			Unit Benefit /2 (USc/kWh)	Generation /3 (GWh)	Benefit (@1993 prices) (US\$million)	Net Benefit (US\$million)
	Investment (US\$million)	O & M /1 (US\$million)	Total (US\$million)				
1993	21.38		21.38				-21.38
1994	8.07		8.07				-8.07
1995	34.77		34.77				-57.82
1996	21.00	20.06	41.06				-162.69
1997	2.99	47.87	50.86				-53.20
1998	3.06	49.86	52.92	4.05	588.79	23.86	-31.82
1999		49.86	49.86	4.03	588.79	24.45	-25.42
2000		49.86	49.86	4.85	1,008.80	47.79	-2.07
2001		49.86	49.86	4.25	1,098.04	49.22	-0.65
2002		49.86	49.86	3.49	1,261.00	55.51	5.64
2003		49.86	49.86	5.16	1,267.50	52.78	2.92
2004		49.86	49.86	4.06	1,267.50	50.78	0.92
2005		49.86	49.86	7.10	1,267.50	89.95	40.09
2006		49.86	49.86	7.10	1,267.50	89.95	40.09
2007		9.21	9.21	7.10	1,267.50	89.95	80.75
2008		9.21	9.21	7.10	1,267.50	89.95	80.75
2009		9.21	9.21	7.10	1,267.50	89.95	80.75
2010		9.21	9.21	7.10	1,267.50	89.95	80.75
2011		9.21	9.21	7.10	1,267.50	89.95	80.75
2012		9.21	9.21	7.10	1,267.50	89.95	80.75
2013		9.21	9.21	7.10	1,267.50	89.95	80.75
2014		9.21	9.21	7.10	1,267.50	89.95	80.75
2015		9.21	9.21	7.10	1,267.50	89.95	80.75
2016		9.21	9.21	7.10	1,267.50	89.95	80.75
2017		9.21	9.21	7.10	1,267.50	89.95	80.75
2018		9.21	9.21	7.10	1,267.50	89.95	80.75
2019		9.21	9.21	7.10	1,267.50	89.95	80.75
2020		9.21	9.21	7.10	1,267.50	89.95	80.75
2021		9.21	9.21	7.10	1,267.50	89.95	80.75

Internal Economic Rate of Return **8.1%**
NPV @ 12 % **-96**

Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle Month/Year	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating	
	Count	Specialty	Implementation Progress	Development Objective
Identification/Preparation				
March 1992	5	1 FA, 2 PE., 1 EA and 1 Ec..		
July 1992	4	1 FA, 1 EA., 1 PE. and 1 PA.		
December 1992	8	1 PE, 1 EA, 1 Eg., 2 FA, 1 EEc. and 1 Lw		
Appraisal/Negotiation				
April 1993	6	2 FA, 1 PE. and 1 RS, 1 Lw, 1 DO		
Supervision				
June 1994	4	1 Ec., 1 PE, 1 RS and 1 FA	S	S
September 1994	3	1 EA, 1 PE. and 1 RS	S	S
February 1995	7	1 Pr., 1 Ev., 2 FA, 1 PE, 1 RS, 1 Cp	S	S
December 1995	4	1 EE, 2 PE and 1 ES	S	S
July 1996	2	1 ES and 1 FA	U	S
August 1997	3	2 ES and 1 PvA	S	S
February 1998	4	2 ES., 1 FS and 1 Rt.	S	S
December 1998	2	1 ES., 1 OP	S	S
June 1999	1	1 ES	U	S
ICR				
November 1999	4	1 FA, 1 PE, 1 SI Spec. and, 1 OP	U	U
January 2000	3	1 FA, 1 PE and 1 OP	U	U

NOTE: FA = Financial Analyst; PE = Power Engineer; EA = Energy Advisor; Ec.= Economist; PA = Procurement Advisor; EEc = Energy Economist; Eg. = Engineer; Lw = Lawyer; RS = Reservoir Specialist; DO = Disbursement Officer; OP = Operations Officer; SI = Social Impact Specialist; ES = Energy Specialist; Pr. = Procurement; Ev. = Environmentalist; Cp. = Compensation; EE = Environmental Engineer; PvA = Privatization Advisor; Rt = Resettlement; SI Spec. = Social Impact Specialist;

Missions for this Project were combined with those of other projects

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US\$ (,000)
Identification/Preparation	102.6	225.3
Appraisal/Negotiation	43.6	104.9
Supervision	80.9	210.6
ICR	15.1	50.2
Total	242.2	591.0

Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	<i>Rating</i>				
<input checked="" type="checkbox"/> <i>Macro policies</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Sector Policies</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Physical</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Financial</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input checked="" type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Institutional Development</i>	<input type="radio"/> H	<input type="radio"/> SU	<input checked="" type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Environmental</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA

Social

<input checked="" type="checkbox"/> <i>Poverty Reduction</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Gender</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input checked="" type="radio"/> NA
<input checked="" type="checkbox"/> <i>Other (Please specify)</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input checked="" type="radio"/> N	<input type="radio"/> NA
<i>Resettlement</i>					
<input checked="" type="checkbox"/> <i>Private sector development</i>	<input type="radio"/> H	<input checked="" type="radio"/> SU	<input type="radio"/> M	<input type="radio"/> N	<input type="radio"/> NA
<input checked="" type="checkbox"/> <i>Public sector management</i>	<input type="radio"/> H	<input type="radio"/> SU	<input type="radio"/> M	<input checked="" type="radio"/> N	<input type="radio"/> NA
<input type="checkbox"/> <i>Other (Please specify)</i>					

Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

6.1 Bank performance

Rating

- Lending
- Supervision
- Overall

HS S U HU
 HS S U HU
 HS S U HU

6.2 Borrower performance

Rating

- Preparation
- Government implementation performance
- Implementation agency performance
- Overall

HS S U HU
 HS S U HU
 HS S U HU
 HS S U HU

Key Performance Indicators - Energy Sector Plan Implementation Status

Issues/Areas of Action	Required Action	Implementing Agency/Schedule	Status (by March 2000)
A. GENERAL/INSTITUTIONAL			
1) Energy Sector Coordination	Establish the Department of Energy (DOE)	President/Congress, December 1992.	Done.
	Formalize DOE organization.	DOE Secretary, March 1993.	Done.
2) Privatization	Propose clear congressional policy statement on private sector involvement in energy projects.	ECC/President	Done.
a) NPC/Power Sector	Complete OEA-commissioned study of privatization options	OEA-Price Waterhouse, November 1992.	Done.
	Submission of privatization plan.	DOE, NPC, September 1993.	Done.
	Approval of privatization plan.	Cabinet, March 1994.	
	Continue BOT approach for new projects; conduct bidding and come up with short list for the 900 MW and 200 MW BOT coal plants for Luzon and Mindanao, respectively.	NPC, June 1993.	1000 MW Sual Coal Fired Plant in Luzon - Energy Conversion Contract Signed in 1994; plant commissioning in 1999
			200 MW Mindanao Coal Fired Plant deferred -- commissioning in 2006
	Complete evaluation of bids.	October 1993.	10 contracts for 2300 MW already signed with the private sector. Other than the ABB BTO's (600 MW) all are BOT contracts.
	Awarding of contracts.	December 1993.	
3) Oil Industry Deregulation	Congressional policy statement on oil industry deregulation.	President/Congress, December 9, 1992.	Done (DOE Law).
	Complete ERB Energy Pricing Study.	ERB/IDP, June 1993.	Final study issued in March 1993.
	Complete industry cost structure study.	DOE/K&M, August 1993.	Draft report submitted March 1993.
	Recommend presidential endorsement of bill amending OPSF's law to effect automatic price adjustments.	DOE/ERB/OP, September 1993.	Done.

Key Performance Indicators for Project Operation - Energy Sector Plan Implementation Status (continued)

Issues/Areas of Action	Required Action	Implementing Agency/Schedule	Status (by March 2000)
	Set maximum oil industry rate of return.	ERB/Oil Companies, September 1993.	Done. ERB set a 10.6% average ROR for Oil Companies (April 16, 1993)
	Submit program for oil decontrol and other deregulation activities.	DOE, 1996.	Republic Act No. 8180, Oil Deregulation Law approved on March 29, 1996, but the law was declared unconstitutional by the Supreme Court on November 5, 1997, and is therefore invalid. Congress approved a new and more competitive deregulation law in February 1998.
	Approval of deregulation program.	Cabinet, 1996.	- do -
	Recommend presidential endorsement of ERB charter to allow decontrol of oil prices.	ERB/OP, 1996.	- do -
	Deregulate dealership activities (deregulation measures non-price related would be advanced whenever feasible).	DOE, 1996.	- do -
	Remove inter-fuel price subsidies.	DOE/ERB, 1996.	- do -
	Draft bill rationalizing the tariff tax component of petroleum product prices.	DOE/ERB/OP, 1996.	- do -
	Recommend presidential endorsement of draft bill.	DOE/OP, 1996.	- do -
	Submit petroleum import/export liberalization schedule.	DOE/ERB, 1996.	- do -
4) Single Price-Regulatory Body for Utilities	Legislation placing NPC and REC's under ERB price regulation.	Congress/President.	Done. DOE Law in operation.
5) More Efficient Approval System for Energy Projects	Presidential directive to DAR, DA, NEDA, DENR, November 1992.	ECC, DAR, NEDA, DENR, November 1992.	Done.
	Agreement between DENR and RDC regarding approval requirements and time limit for action.	DENR/RDC, June 1993.	Done. Latest guidelines for ECC processing issued in July 1994.
	Agree to approve power projects on a program basis instead per individual projects.	NPC/NEDA, June 1993.	Completed March 1993.
	NPC to develop standard BOT contracts for various power plant technologies.	NPC/NEDA, September 1993.	Model contracts for coal, diesel and gas turbines already developed.
	Approval of standard contracts.	NEDA-ICC. One month after completion of contract by NPC.	

Key Performance Indicators for Project Operation - Energy Sector Plan Implementation Status (continued)

Issues/Areas of Action	Required Action	Implementing Agency/Schedule	Status (March 2000)
B. POWER SECTOR			
1) Availability and Reliability of Supply	Ensure completion of fast track projects.	NPC/DOE, October 1993.	6 BOT contracts in operation.
	Ensure implementation of power development program.	NPC/DOE, ongoing.	PDP approved by ICC and presented to the Cabinet in May 1993.
	Submit plan to rehabilitate or retire/replace aging plants.	NPC, December 1993.	Done.
	Evaluate and approve NPC plan and allocate funding for technical assistance.	NEDA, January 1994.	Done. OPSF and PAGCOR grants approved.
	Adopt rehabilitation or retirement plan for old plants.		Rehabilitation of Sucat 2 & 3 completed.
2) NPC's Financial Viability	Conduct more effective public information program on the need for NPC rate increase.	NPC/Cabinet, Oct-Dec 1992.	Effective public information on price increase in place.
	Decision on acceptable rate of return base methodology.	ERB, September 1993.	Done. February 1993.
	Motion for early resolution by the Supreme Court of NPC fuel tax exemption cases.	NPC, May 1993.	Tax exemption cases of NPC were resolved by the Supreme Court favorably for NPC in the case of Maceda vs. Macaraig (197 SCRA 771).
	Approve automatic foreign exchange adjustment formula.	NPC, May 1993.	Formula applied once exchange rate exceeded P28/dollar.
	Implement rate adjustment to meet loan covenants. Develop annual projection of rate increase or decrease investment and overall financial requirement.	NPC, December 1992. NPC, end of each year.	NPC implemented tariff increase of P0.18/kWh from March 26, 1993, and additional P0.03/kWh from July 1993.
	Propose to DBM the level of government equity infusion to NPC. Submission of proposal for annual equity infusion to NPC.	NPC, March each year. DBM, June each year.	Approved for 1993. P3 billion from OPSF in 1993 approved by RA 7639, in addition to the P1 billion annually
	Executive support of bill proposing equity infusion to NPC.	DOE.	Done.
	Complete operational efficiency improvement study.	NPC/World Bank, December 1993.	First phase report completed in March 1993. Draft report for Second Phase completed end of June 1993.

Key Performance Indicators for Project Operation - Energy Sector Plan Implementation Status (continued)

Issues/Areas of Action	Required Action	Implementing Agency/Schedule	Status (March 2000)
3) Rate Restructuring (Demand charges and direct connections)	Complete nationwide consultation, especially in Bacolod, Cebu and Mindanao.	NPC, August 1993.	Ongoing.
	Implement rate restructuring down to distribution level.	NPC/Cabinet, NEA/RECs, ERB/PUs, December 1993.	Done.
4) Bataan Nuclear Power Plant (BNPP)	Complete negotiations with Westinghouse.	NPC-BNPP, December 1992.	Negotiations failed.
	Decision on BNPP operation.	Cabinet, March 1993.	Proposal for conversion of BNPP to 1500 MW gas fired plant (BOT) was approved but discontinued due to excess generation capacity
5) Improve Electricity Distribution Efficiency	Set limit to distribution loss that can be recovered through tariff.	NEA/ERB/ECC, ongoing.	ERB Resolution 91-22 has set to reduce losses permitted in tariffs from 14% to 10% in 5 years.
	Presidential endorsement of anti-pilferage bill.	ECC/OP, March 1993.	Done. (RA # 7832).
6) Energy Efficiency Standards	Finalize standards for power intensive appliances.	OEA/BPS-DTI, June 1994.	Building efficiency guidelines published March 1993.
C. DOWNSTREAM OPERATIONS			
1) Refinery Expansion	Decide price adjustment for non-crude increase	ERB, May 1993.	Done.
	Firm up PNOC expansion plans.	PNOC/DOE, January 1994.	Done.
2) Coal Import Liberalization	Implement financial/technical support program for local coal.	OEA, January 1994.	Initial program formulated.
	Reduce volume and tariff restriction.	DOE/ERB/NEDA, June 1994.	All coals in temporary exclusion list until June 1996. Anthracite and lignite having a 0% tariff and bituminous 10% tariff to 1999 and 5% thereafter.
3) Institutionalize Energy Conservation	Executive endorsement of DOE bill with provisions for continuation of energy conservation program.	President.	Done (DOE Law).
D. UPSTREAM OPERATIONS			
1) Geothermal Law to Encourage Private Sector Participation	Recommend presidential endorsement of pending legislation on geothermal royalties and development.	DOE/PNOC/OP, June 1993.	Senate hearings on SB 423 and 366 in April 1993. Still pending.
2) Improved Incentives for Oil and Gas Exploration	Recommend presidential endorsement of pending legislation on oil and gas development.	DOE/OP, June 1993.	

Key Performance Indicators for Project Operation - Energy Sector Plan Implementation Status (continued)

Issues/Areas of Action	Required Action	Implementing Agency/Schedule	Status (March 2000)
3) Continued Exploration Momentum Generated by Recent Oil Discoveries	Conduct aggressive campaign to attract more oil explorations.		Done.
4) Promote Development and Utilization of Renewable Energy Technologies	Intensify research and development of alternative/renewable energy technologies.	DOST-PCIERD/OEA/PNOC/NEA. Ongoing.	Ongoing.
	Promote utilization of cost-effective alternative energy systems.	OEA/NEA. Ongoing.	Ongoing.

Energy Sector Plan - Proposed Legislation

Issues/Areas of Action	Required Action	Implementing Agency/Schedule	Status (March 2000)
1) Energy Sector Coordination	Enact legislation creating the Department of Energy.	President/Congress (December 9, 1992)	Done. RA #7638, An act creating the Department of Energy.
2) Oil Industry Deregulation	Enact legislation amending the OPSF Law.	December 1993.	RA #8180, Oil Industry Deregulation Act was passed in 1996, but subsequently declared unconstitutional by the Supreme Court. in November 1997. Congress approved a new and more competitive deregulation law in February 1998.
3) Single Price-Regulatory Body for Utilities	Included in the DOE Law. Enact into law ERB charter amendment.	December 1992. June 1994.	Done. Done. RA #'s 7638, 8180, 7832 & 8184.
4) NPC Financial Viability	Approve annual equity infusion to NPC. Enactment of law authorizing OPSF equity infusion to NPC.	December each year.	Done. RA #7639, an Act providing payment in part of OPSF to NPC.
5) Improve Electricity Distribution Efficiency	Enact effective anti-power pilferage legislation. Enact law authorizing increase in NEA capitalization.	December 1993. March 1994.	Done. RA #7832, Anti-Pilferage of Electricity & Theft of Electric T/L Materials.
6) Rationalize Oil Prices	Enact law rationalizing the tariff and tax component of petroleum products.	1996.	Done. RA #8184, an Act Restructuring Excise Tax on Petroleum Products.
7) Energy Conservation	Refile and enact law institutionalizing energy conservation.	December 1993.	Done. EO #123, Institutionalizing the Committee on Power Conservation and Demand Management
8) Geothermal Law	Enact law to encourage private sector participation in geothermal development.	December 1993.	Pending (SB #726 and SB #888).

Key Monitoring Indicators: NPC Appraisal

Financial Year Ending 31- Dec.	1992	1993	1994	1995	1996	1997	
ACHIEVEMENT OF GOALS:							
Total NPC Energy Sales (GWh)	23,835	25,305	28,825	30,212	32,958	35,730	
Net NPC sales (Excl. Test-Run) - GWh	23,476	25,045	28,155	29,752	32,224	34,796	
Power Sold/Total Pop. (kWh/person)	371	386	431	443	474	504	
MANAGEMENT/EFFICIENCY:							
# Days Accounts Receivable	39	38	38	38	38	38	
% Receivables on Billing	10.8%	10.4%	10.4%	10.4%	10.4%	10.4%	
Total Number Employees	11,055	14,210	14,210	14,210	14,210	14,210	
# of Operational Employees	9,372	11,891	11,891	11,891	11,891	11,891	
Personnel Cost on Revenues	3.8%	4.0%	4.7%	4.6%	4.3%	3.9%	
Personnel Cost on Oper. Costs	4.7%	5.0%	5.9%	5.7%	5.2%	4.7%	
Sales per Oper. Employees (MWh)	2,505	2,106	2,368	2,502	2,710	2,926	
% Total Energy Losses and Plant Use	6.8%	7.4%	7.1%	7.0%	6.9%	6.9%	
FINANCIAL RATIOS:							
Average Tariff - P/kWh	1.6	1.7	1.9	2.1	2.4	2.7	
Average Tariff Increase Centavos/kWh	20	11	23	16	26	30	
Average Tariff - USc/kWh	6.0	6.2	6.6	6.8	7.4	8.0	
Average Exchange Rate Pesos/US\$	26.7	27.5	29.6	30.8	32.1	33.4	
Working Ratio (1)	62.0%	59.3%	60.2%	61.0%	64.5%	67.2%	
Operating Ratio (2)	81.0%	78.6%	79.7%	80.2%	82.6%	83.8%	
Rate of Return-NPC's Charter (3)	7.0%	7.8%	7.7%	7.7%	7.6%	7.6%	
Rate of Return on Revalued Assets (4)	7.2%	8.1%	8.0%	8.0%	8.0%	8.0%	
Rate on Capital Employed (5)	1.2%	-2.2%	-2.8%	-0.9%	0.8%	1.9%	
Net Profit - Million US\$	184	160	177	182	208	228	
Net Profit on Equity	7.4%	5.8%	6.0%	5.2%	5.0%	4.4%	
Self-Financing Ratio (3-years Avg.) (6)	-15.0%	25.0%	14.0%	19.0%	25.0%	27.0%	
Debt Service Coverage (7)	0.8	1.51	1.23	1.29	1.37	1.32	
Interest Coverage (8)	1.41	1.45	1.39	1.31	1.33	1.39	
Debt/Equity Ratio (9)	50.0%	54.8%	55.6%	52.5%	47.7%	41.9%	
IN CONSTANT 1993 PRICES:							
Average Tariff - P/kWh	1.72	1.71	1.81	1.84	1.93	2.03	
Real Tariff Increase Centavos/kWh	9	-1	11	2	9	10	
Real Tariff Increase (Decrease)	5.6%	-0.8%	6.2%	1.2%	5.1%	5.3%	
Critical Financial Indicators Between 1993-1998							
Indicator	Min.	Average	Max.	Indicator	Min.	Average	Max.
Cash-Mill.Pesos	4,673	10,589	18,324	Debt Service Ratio	1.1	1.3	1.5
Average Tariff - P/kWh	1.71	1.88	2.03	Days Accounts Receiv.	38	38	38
Working Ratio	59.3%	63.4%	68.0%	Debt/Equity Ratio	37.4%	48.3%	55.6%
Rate of Return (Revalued)	8.0%	8.0%	8.1%				

- 1/ Operational expenses excluding depreciation / operational revenues
2/ Total operational expenses (including depreciation & prov. for d/a) divided by operational revenues
3/ Operating income on net average fixed assets plus one sixth of cash operating expenditures
4/ Operating income on net average revalued fixed assets in operation
5/ Profit before interest and taxes / total equity and reserves
6/ Cash available from operations / 3-year average capital expenditures
7/ Operating cash flow divided by debt service (principal plus operational interest)
8/ Profit before interest and taxes / total interest (operational and capitalized)
9/ Long-term debt / (long-term debt plus total equity)

Key Monitoring Indicators: NPC
Actual Operational & Audited Financial Results

Financial Year Ending 31- Dec.	1992	1993	1994	1995	1996	1997	1998
<u>ACHIEVEMENT OF GOALS:</u>							
Total NPC Energy Sales (GWh)	23,958	24,805	28,745	31,031	33,381	36,442	37,321
Net NPC sales (Excl. Magellan & Test-Run)	23,875	24,712	28,520	30,356	32,549	36,442	36,429
Power Sold/Total Pop. (kWh/person)	395	409	474	452	487	496	508
<u>MANAGEMENT/EFFICIENCY:</u>							
# Days Accounts Receivable	38	39	36	38	37	38	44
% Receivables on Billing	10.70%	11.91%	10.33%	11.13%	11.22%	11.75%	13.93%
Total Number Employees	14,208	14,560	15,794	14,742	13,119	13,512	14,719
# of Operational Employees	11,185	13,142	12,448	12,164	11,024	11,583	11,875
Personnel Cost on Revenues	3.76%	3.85%	4.97%	6.41%	6.39%	6.21%	5.23%
Personnel Cost on Operational Costs							
Sales per Oper. Employees (MWh)	2,142	1,887	2,309	2,651	3,028	3,152	3,143
% Total Energy Losses & Plant Use	6.80%	6.80%	6.10%	6.80%	6.30%	5.90%	6.50%
<u>FINANCIAL RATIOS:</u>							
Average Tariff - P/kWh	1.58	1.64	1.77	1.73	1.96	2.12	2.38
Average Tariff Increase Centavos/kWh	18	6	13	-4	23	16	26
Average Tariff - USc/kWh	6.3	5.9	7.3	6.6	7.4	5.3	6.1
Average Exchange Rate Pesos/US\$	26.7	27.1	26.4	25.7	26.2	29.5	40.9
Working Ratio/1	62.4%	60.3%	61.1%	56.9%	59.5%	64.1%	69.1%
Operating Ratio/2	81.2%	83.5%	76.1%	78.0%	79.1%	84.9%	92.0%
Rate of Return-NPC's Charter/3	6.8%	5.7%	8.0%	7.0%	7.9%	6.9%	3.10%
Rate of Return on Revalued Assets /4	7.1%	5.9%	8.3%	7.3%	8.2%	7.2%	3.20%
Rate on Capital Employed /5	11.4%	20.0%	18.8%	20.0%	22.2%	13.1%	14%
Net Profit - Million US\$	91	51	282	152	211	104	-88
Net Profit on Equity	6.10%	1.90%	7.20%	3.70%	5.60%	2.70%	-2.80%
Self-Financing Ratio (3-years Avg.)/6	7.2%	-11.4%	17.4%	-7.4%	-25.2%	-46.9%	-41.7%
Debt Service Coverage/7	1.14	1.51	1.15	0.98	1.12	0.96	1.18
Interest Coverage/8	1.32	2.36	2.37	2.39	2.75	1.43	1.32
Debt/Equity Ratio/9	49.8%	57.1%	49.9%	59.0%	75.1%	79.7%	77.4%
<u>IN CONSTANT 1993 PRICES:</u>							
Average Tariff - P/kWh	1.72	1.64	1.66	1.53	1.60	1.62	1.70
Real Tariff Increase Centavos/kWh	9	-8	2	-14	7	2	8
Real Tariff Increase (Decrease)	5.6%	-4.7%	1.3%	-8.2%	4.7%	1.6%	4.9%
Critical Financial Indicators Between 1993-1998							
Indicator	Min.	Average	Max.	Indicator	Min.	Average	Max.
Cash-Mill. Pesos				Debt Service Ratio	0.96	1.15	1.51
Average Tariff - P/kWh	1.64	1.93	2.38	Days Accounts Receiv.	36	39	44
Working Ratio	59.5%	61.8%	69.1%	Debt/Equity Ratio	49.9%	66.4%	79.7%
Rate of Return (Revalued)	3.2%	6.7%	8.3%				

- 1/ Operational expenses excluding depreciation / operational revenues
2/ Total operational expenses (including depreciation & prov. for d/a) / operational revenues
3/ Operating income on net average fixed assets plus one sixth of cash operating expenditures
4/ Operating income on net average revalued fixed assets in operation
5/ Profit before interest and taxes / total equity and reserves
6/ Cash available from operations / 3-year average capital expenditures
7/ Operating cash flow divided by debt service (principal plus operational interest)
8/ Profit before interest and taxes / total interest (operational and capitalized)
9/ Long-term debt / (long-term debt plus total equity); long term debt included BOT lease obligation

PNOC Energy Development Corporation
Financial Indicators
Appraisal

	1991	1992	1993	1994	1995	1996	1997	1998
Revenues (peso:million)	1,367	1,499	2,373	3,463	4,504	5,679	11,032	18,533
Net Earnings	395	421	1,031	1,770	1,837	2,170	3,209	3,700
Net Working Capital	434	-110	3,250	3,979	3,601	3,498	3,715	6,616
Capital Assets	11,484	13,238	16,145	20,071	25,622	30,918	32,791	32,643
Long-Term Debt (Foreign)	4,859	5,056	9,032	10,820	14,340	17,579	16,782	16,206
PNOC Advances	3,231	1,774	0	0	0	0	0	0
Stockholders' Equity	4,009	6,576	10,504	13,597	15,250	17,203	20,091	23,421
Total Assets	12,978	14,764	20,650	25,477	30,871	36,230	40,946	43,461
Current Ratio	1.6	0.9	6.3	6.4	5.3	4.7	4.5	3.9
% LT Debt/(Debt+Equity)	67.2	51.6	46.8	44.3	48.5	50.5	45.5	40.9
Debt Service Times	48.9	2.4	2.2	3.5	2.8	2.1	2.8	1.7
Capital Expenditure	1,408	2,196	2,301	4,138	5,415	4,705	1,513	714

PNOC Energy Development Corporation
Financial Indicators
Actual

	1991	1992	1993	1994	1995	1996	1997	1998	1999
Revenues (peso:million)	1,367	1,499	1,970	2,285	2,286	2,920	3,958	12,014	15,594
Net Earnings	394	422	607	1,207	730	797	-140	535	615
Net Working Capital	-207	474	-341	-743	-118	1,147	-1,290	4,749	
Capital Assets	11,484	12,496	15,927	18,324	22,721	25,128	69,582	68,762	72,643
Long-Term Debt (Foreign)	4,859	4,911	9,286	9,972	12,068	15,973	19,843	20,099	25,592
PNOC Advances	3,231	2,078	0	0	0	0	0	0	
Stockholders' Equity	4,009	6,389	10,386	13,631	14,075	14,667	14,369	15,252	15,814
Total Assets	12,981	14,372	21,136	25,272	28,431	34,986	80,880	78,767	82,202
Current Ratio /1	1.6	1.0	2.9	4.2	1.8	2.2	0.9	0.7	1.7
Current Ratio /2	1.6	1.3	3.4	9.1	3.0	3.0	0.7	0.6	0.6
% LT Debt/(Debt+Equity) /1	67	53	48	43	47	53	58	57	55
% LT Debt/(Debt+Equity) /2	67	53	48	45	48	55	79	77	78
Debt Service Times /1	2.8	2.7	2.5	3.7	1.3	1.8	2.1	1.0	1.5
Debt Service Times /2	8.3	3.7	2.2	4.4	3.2	3.6	0.3	0.9	0.7
Capital Expenditure	616	1,128	1,047	679	1,325	1,257	1,165	773	392

Notes: 1) excludes the BOT lease obligations
2) includes the BOT lease obligations
3) 1991-1998: audited; 1999: unaudited

Economic Value of Installed IPP Capacities¹

I. Background

The decision of the Aquino administration to mothball the 620 MW Bataan Nuclear Power Plant in 1986 and the inability to install replacement capacities contributed to the power crisis which started to be felt in the early nineties and the consequent decline in the economic growth of the country. Data regarding GDP at 1985 prices, Electric Sales and IPP installed capacities from 1986 to 1997 are shown in Chart 1.

II. Economic Values of Installed IPP

1. Impact of Electricity Supply on Economic Growth

Prior to the power crisis, the country was experiencing an average GDP growth rate at constant 1985 prices of about 6.5% per annum and electricity demand growth rate of about 10%. In 1990, the GDP growth rate started to decline to 3% and went further down to negative 0.5% in 1991 and 0.3% in 1992. During this period, electricity consumption was almost flat due to the lack of power capacities.

With the entry of power plant capacities by Independent Power Producers starting 1992, its impact on the country's economic growth rate started to be felt, with the GDP growing by 3.8% in 1993 to about 8.7% in 1997 before the impact of the Asian currency crisis was felt by the country. During this period a total of 4,652 MW power plant capacities were installed with electricity sales registering an average increase of about 11.5% per annum.

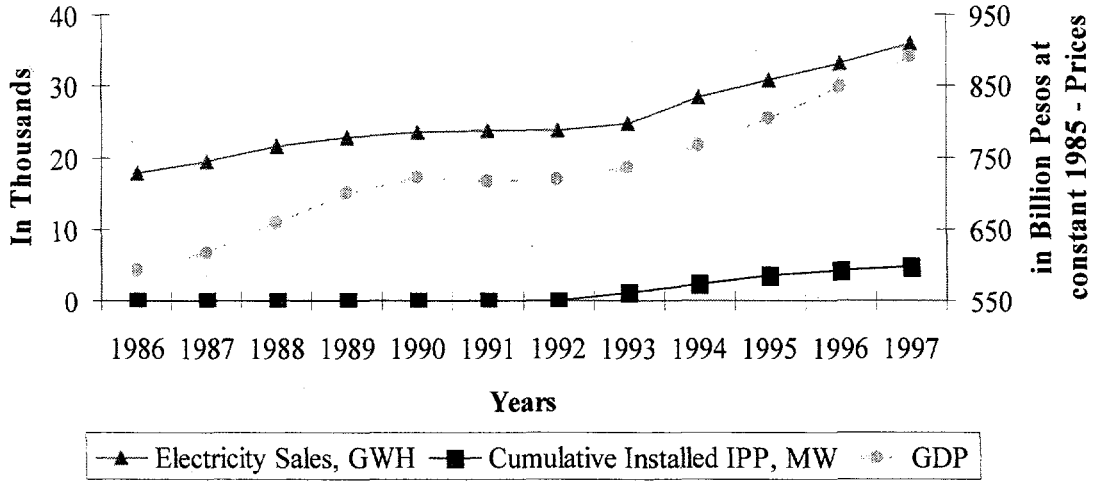
It could be seen from this analysis the importance of electricity supply to economic growth.

2. Economic Value of Installed IPP Capacities

Starting 1993, the economic growth experienced by the country can be mainly attributed to the availability of power supply. From 1993 to 1997, the total value of the incremental GDP growth was about P157 billion pesos or about \$8.44 billion dollars. For the same period, the additional electricity supplied by IPPs was about 11,323 gigawatt hours. This translates to an economic value of P13.8/kwh or \$0.745/kwh. In terms of investment, the estimated cost of about \$4.8 billion for the power plant installed by the IPP has been more than compensated by the increased gross domestic product realized by the country.

¹ Source: PNO-EDC

Electricity Sales vs. GDP



	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
Electricity Sales, GWH	17.85	19.431	21.573	22.731	23.323	23.625	23.769	24.692	28.449	30.791	33.112	36.015
Cumulative Installed IPP, MW	0	0	0	0	0	0	0.072	1.278	2.472	3.605	4.305	4.652
GDP	591.423	616.923	658.581	699.448	720.69	716.522	718.941	734.156	766.368	802.866	848.451	891.53

PNOC-EDC
FINANCIAL RATE OF RETURN ON PROJECT COMPONENTS:
STREAMFIELD OPERATIONS
(In Million Pesos Constant 1993 Price Terms)

Year	GWh Sales	Revenues 0.33/kWh	Investment Cost	O & M Cost	Depre- ciation	Cum. Reco- Cost	Cost Recovery	Net Proceeds	Govt Share	PNOC EDC Share	PNOC EDC Cashflow
1992			1,935.88			1,161.53					-1,935.88
1993			618.00			1,532.33					-618.00
1994			227.21			1,668.65					-227.21
1995			953.06			2,240.49					-953.06
1996	1,370	285.96	586.96	37.21	131.60	2,761.47	257.37	28.60	17.16	11.44	-318.16
1997	1,370	285.96	93.99	28.94	137.55	2,726.99	257.37	28.60	17.16	11.44	174.81
1998	1,370	285.96	133.21	171.15	145.97	2,866.67	257.37	28.60	17.16	11.44	135.60
1999	1,370	285.96		197.25	145.97	2,952.53	257.37	28.60	17.16	11.44	268.80
2000	1,370	285.96		197.25	145.97	3,038.40	257.37	28.60	17.16	11.44	268.80
2001	1,370	285.96		197.25	145.97	3,124.26	257.37	28.60	17.16	11.44	268.80
2002	1,370	285.96		197.25	145.97	3,210.12	257.37	28.60	17.16	11.44	268.80
2003	1,370	285.96		197.25	145.97	3,295.98	257.37	28.60	17.16	11.44	268.80
2004	1,370	285.96		197.25	145.97	3,381.84	257.37	28.60	17.16	11.44	268.80
2005	1,370	285.96		197.25	145.97	3,467.70	257.37	28.60	17.16	11.44	268.80
2006	1,370	285.96		197.25	14.37	3,421.96	257.37	28.60	17.16	11.44	268.80
2007	1,370	285.96		197.25	8.43	3,370.27	257.37	28.60	17.16	11.44	268.80
2008	1,370	285.96		197.25		3,310.16	257.37	28.60	17.16	11.44	268.80
2009	1,370	285.96		197.25		3,250.04	257.37	28.60	17.16	11.44	268.80
2010	1,370	285.96		197.25		3,189.93	257.37	28.60	17.16	11.44	268.80
2011	1,370	285.96		197.25		3,129.82	257.37	28.60	17.16	11.44	268.80
2012	1,370	285.96		197.25		3,069.70	257.37	28.60	17.16	11.44	268.80
2013	1,370	285.96		197.25		3,009.59	257.37	28.60	17.16	11.44	268.80
2014	1,370	285.96		197.25		2,949.48	257.37	28.60	17.16	11.44	268.80
2015	1,370	285.96		197.25		2,889.36	257.37	28.60	17.16	11.44	268.80
2016	1,370	285.96		197.25		2,829.25	257.37	28.60	17.16	11.44	268.80

FRR (with sunk cost) 1.8%

FRR (without sunk cost) 8.2%

PNOC-EDC
FINANCIAL RATE OF RETURN FOR INTEGRATED COMPONENTS
(In Million Pesos Constant 1993 Price Terms)

Year	Power Sales (1.65 / kWh)	ECA / O & M	Steam Cost	Depre- ciation	Income Tax	Net Cashflow	Total Project Cashflow
1992						0.00	-1,935.88
1993						0.00	-618.00
1994						0.00	-227.21
1995						0.00	-953.06
1996	784.05	578.51	285.96		0.00	-80.42	-398.58
1997	1,985.11	1,551.76	285.96		0.00	147.39	322.20
1998	2,194.75	2,131.47	285.96		0.00	-222.68	-87.09
1999	2,194.74	1,798.21	285.96		36.49	74.08	342.89
2000	2,194.74	1,798.21	285.96		0.00	110.57	379.38
2001	2,194.74	1,798.21	285.96		0.00	110.57	379.38
2002	2,194.74	1,798.21	285.96		0.00	110.57	379.38
2003	2,194.74	1,798.21	285.96		0.00	110.57	379.38
2004	2,194.74	1,798.21	285.96		0.00	110.57	379.38
2005	2,194.74	1,798.21	285.96		0.00	110.57	379.38
2006	2,194.74	1,798.21	285.96		0.00	110.57	379.38
2007	2,194.74	262.01	285.96	231.50	452.89	1,193.89	1,462.69
2008	2,194.74	262.01	285.96	200.51	462.80	1,183.97	1,452.77
2009	2,194.74	262.01	285.96	173.94	471.31	1,175.47	1,444.27
2010	2,194.74	262.01	285.96	150.54	478.79	1,167.98	1,436.78
2011	2,194.74	262.01	285.96	130.30	485.27	1,161.50	1,430.31
2012	2,194.74	262.01	285.96	113.22	490.74	1,156.04	1,424.84
2013	2,194.74	262.01	285.96	98.04	495.59	1,151.18	1,419.98
2014	2,194.74	262.01	285.96	84.76	499.85	1,146.93	1,415.73
2015	2,194.74	262.01	285.96	73.37	503.49	1,143.29	1,412.09
2016	2,194.74	262.01	285.96	63.88	506.52	1,140.25	1,409.05

FRR with sunk cost 9.8%

FRR without sunk cost 16.8%

PHILIPPINES

Leyte-Cebu Geothermal Project (Ln. 3700, 3700A & 3702 – PH)

AIDE MEMOIRE

1. A World Bank mission, comprising Ms. Selina Shum (Task Team Leader) and Mr. Mikio Matsumura (Power Engineer) met with the relevant officials from the NPC and PNOC-EDC at various times during the period January 17 to 31, 2000 for the preparation of an Implementation Completion Report (ICR) for the Leyte-Cebu Geothermal Project (Ln. 3700, 3700 A & 3702-PH). The mission was assisted by Ms. May Olalia (Operations Officer) in the review of resettlement aspects. In addition to officials in Manila, the mission met with NPC officials at their Cebu project office and field trips were made to the various project sites, including Talisay Switching Station (the Cebu side terminal of Leyte-Cebu submarine cable interconnection), a new 100 MVA substation site for the Cebu Grid reinforcement component, and the Leyte Geothermal Production Field. The mission would like to express its appreciation to NPC and PNOC-EDC for their cooperation and hospitality. The findings and recommendations of the mission are summarized below.

Project Implementation**A. PNOC-EDC's Project Components**

2. PNOC-EDC implemented its portion of the project components satisfactorily. Its project components included the following: (a) development of a 202 MW geothermal field, comprising the drilling of 12 production and reinjection wells (which are significantly higher than the appraisal estimate of 8 development wells), the construction of the fluid collection and disposal system, and the construction of 230 KV interconnection system; (b) conclusion of two BOT contracts with private companies to construct and operate geothermal power plants (Upper Mahiao and Malitbog Unit 1, totaling 202 MW); and (c) technical assistance for project implementation. The PNOC-EDC components were completed on schedule, with the commissioning of the BOT plants in July 1996. These power plants are owned by California Energy and will be transferred to PNOC-EDC after ten years under the present BOT contract.

3. **Resettlement Program.** Overall, PNOC-EDC designed and implemented the resettlement program in an exemplary fashion. The total number of households affected was 106. The relocation package included options for cash payment or house replacement and community amenities. In terms of employment, as of June 1998, 75 members of the 88 households who had originally signified their interest in priority employment are either employed by PNOC-EDC, its contractors or by the local cooperatives. PNOC-EDC facilitated community institution self-reliance by organizing the resettlers into the Limao Resettlement Homeowners Association and the Limao Integrated Farmers for Empowerment Livelihood Association. To ensure sustainability and for timely interventions in case of problems, the program has been monitored from 1993 to date.

4. **Project Component Cost and Financing.** PNOC-EDC's total financing requirements, including interest during construction (IDC) of \$4.03 million, amounted to \$92.02 million, which were close to the appraisal estimate of \$91.3 million (including IDC of \$7.5 million). This is mainly due to higher than expected engineering and administrative costs (including well drilling costs not accounted for in the SAR, well development, geoscientific investigation and reservoir engineering costs) which were largely offset by the cost savings in well drilling.

5. Of the original Bank loan (\$64 million) to PNOC-EDC, \$53.03 million were disbursed, and the undisbursed balance (\$10.97 million) canceled. The Bank loan was closed on schedule in June 30, 1998. Under-utilization of the Bank loan was mainly due to PNOC-EDC's use of in-house rigs for well drilling for economic and efficiency considerations, but these expenditures were not eligible for reimbursement under the Bank loan.

6. **Monitoring Project Operation and Performance.** The steam supply system as well as interconnection system connecting the power plants to PNOC-EDC Central switching station are operated by PNOC-EDC Leyte Geothermal Production Field Office. The BOT plants will be transferred to PNOC-EDC in the year 2006. PNOC-EDC has formed a Power Department in charge of monitoring the maintenance and operation of these plants and will institute training program. The BOT contracts further provide PNOC-EDC personnel with training one year prior to the formal turn-over. The mission discussed with PNOC-EDC the performance indicators to be used to monitor future operation and development impact. In order to evaluate the project objectives and impact as well as performance of geothermal generation, the following performance indicators would be monitored: actual available energy and sales to NPC Leyte Cebu system.

B. NPC's Project Components

7. NPC's components include the following:

(a) Construction of overhead transmission lines in Leyte and Cebu and substations.

➤ This component was energized in July 1997, which was 12 months behind the original schedule.

(b) Installation of a submarine cable linking the Leyte-Cebu lines and switching stations at both ends of the cable.

➤ This component was completed in November 1997, representing a 17 months behind the effective date (July 1996) for its power purchase agreement (PPA) with PNOC-EDC. This was mainly attributable to delays in procurement activities and accidental damage of the submarine cable when fiber optics cables were laid for a telephone company.

➤ Damages (caused by dynamite fishing) have been found on the submarine cables. Although the cables are still operating, repair will be carried out. In addition to police and fish wardens patrolling the cable installation and the posting of more

security guards, NPC has decided to extend the burial of the submarine cables from 10 m to 30 m water depth; this is scheduled for completion in February 2000.

(c) Reinforcement of 138/69 kV substations and construction of 138 kV transmission lines

- Implementation of this component has been delayed significantly mainly due to difficulties in right-of-way (ROW) issues. Consequently, despite extension of the original loan closing date by 15 months (to September 30, 1999), one section of the transmission lines (currently under expropriation procedures) and substation sub-component have not yet been completed. The major remaining component includes construction of the 100 MVA Talisay substation near Cebu City where ROW problems forced NPC to relocate the project site twice. The current site is Lagtang where NPC obtained approval from the Protected Area Management Board (PAMB) for release of the land from the water preserved area. The equipment has been delivered and stored at various NPC warehouse/substations. Completion of this component is scheduled for April 2002.

(d) TA components, which have been satisfactorily completed, included the following:

- consultant services for the design and preparation of tender documents for two hydro power projects (Agbulu and Pulangi V)
- institutional support for consultant services to assist in the implementation of this project, NPC's power development program and the recommendations of the Efficiency and Operational Improvement Study.

8. **Resettlement and Land Acquisition.** There have been significant delays in compensation payments by NPC, particularly for land acquisition, which are partly beyond the control of NPC in such cases as missing or incomplete documentation of some landowners.

- Under the Resettlement Recovery Action Plan agreed during last supervision mission (October 1999), NPC is committed to the completion of all the compensation payments by June 2000, except for cases where NPC has no control and cannot expedite payment due to incomplete documentation by affected landowners.
- Meanwhile, under the agreed action plan, NPC would establish an escrow account, by November 30, 1999, for all the outstanding compensations, except for cases under expropriation (for which NPC has already provided provisional deposits). The mission expressed concerns that this action is still pending and it was agreed that NPC would *expedite the internal processing procedures to establish the aforementioned escrow account by around March 10, 2000.*
- NPC has recently intensified its efforts to accelerate the implementation of the Recovery Action Plan; of the total cases excluding expropriation, Deed of Sale (DOS) preparation increased significantly from 82% in December 31, 1999 to 95% in January 31, 2000. However, compensation payments remained at 77%; there is a long lead time (about 4 months on average) between the deed of sales preparation and actual payment of compensation for land acquisition.
- It was agreed that *NPC would identify (with substantiation) the key bottlenecks and accelerate the process to the extent it is controllable by the Company;* to the extent the bottlenecks are within the government's control, assistance may be sought from

the relevant government agency to help improve project performance. Implementation of the Recovery Action Plan will continue to be monitored closely by the mission through NPC's monthly progress reports to the Bank.

9. **Project Component Cost and Financing.** The total financing requirements of NPC's components amounted to \$227.9 million (including IDC of \$ 23.5 million), representing an 18% cost overrun against the appraisal estimate of \$192.9 million (including IDC of \$16.5 million). This is mainly due to (a) the submarine cable contract (\$95 million) which was 39% higher than the appraisal estimate (\$68.6 million); and (b) the aforementioned accidental damage of the submarine cables which resulted in an additional cost of \$15.9 million for repair.

10. Upon the bid opening of the submarine cables contract which was substantially higher priced than the appraisal estimate, NPC secured additional co-financing (\$40 million) from the Nordic Fund, which totaled \$30.9 million in actual disbursement. Further, financing of the subcomponent for reinforcement of the 138/69 kV substations (\$4.8 million) was transferred to the ongoing Transmission Grid Reinforcement Project. Of the total Bank loan of US\$ 147 million, US\$ 140.08 million were disbursed. The loan was closed on September 30, 1999 after a 15 month extension, and a grace period (up to February 10, 2000) was granted for loan disbursement against eligible expenditures incurred before the loan closing date. As of February 10, 2000, undisbursed balance of US\$ 6.9 million were canceled.

11. **Monitoring of Project Operation and Performance.** The Leyte-Cebu interconnection as well as other transmission systems installed under the project are operated by Visayas Regional Center of NPC. Adequate maintenance would be provided to the facilities based on NPC's guidelines for maintenance.

12. The mission discussed with NPC the performance indicators to be used to monitor future operation and development impact. In order to evaluate the project objectives and impact as well as system performance, it was agreed that the following performance indicators would be monitored: (a) percentage of geothermal energy among energy sources for power generation in Visayas system; (b) energy transferred from Leyte to Cebu through Leyte-Cebu interconnection; (c) system losses in Visayas system; (d) system reliability in Visayas system; and (e) frequency deviation in Visayas system. The historical data on these indicators had been provided to the mission.

C. Project Economics

13. During the power crisis in the early 1990s, the project was designed as a least cost solution to meet the rapidly increasing demand for power in Cebu using indigenous and environmentally superior geothermal energy resources. While recalculation of the project economics has not yet been completed (as verification of selected data by NPC and PNO-EDC is still ongoing), the current estimate of the economic rate of return is expected to be significantly lower than the appraisal estimate of 16%. Nevertheless, it should be noted that as in the case of the appraisal estimate, the ERR recalculation will be based on the conservative assumption that the quantifiable project benefits would not include the benefits to the economy encompassed in the consumers' surplus and the positive environmental impacts associated with geothermal development.

14. The lower project economics are attributable to a combination of factors, including (a) significantly lower power sales in the initial years of operation due to lower than expected demand growth and delayed project completion; (b) significantly lower tariff levels than the appraisal estimates; and (c) total project costs (excluding IDC) were \$145.1 million or 33% higher than the appraisal estimate. In particular, the BOT power plants accounted for the lion share (\$112.8 million or 78%) of the total cost overrun.

D. Recalculation of Financial Rate of Return (FRR)

15. Based on the preliminary analysis of data (some of which are in the process of verification by PNOC-EDC), the overall financial rate of return (FRR) for PNOC-EDC's components and the BOT power plants are currently estimated at 9.8% (in real terms), which is close to the appraisal estimate of 9.5%, despite the significant divergence between the latest estimates and appraisal assumptions for selected key factors. In particular, due to the non-passage of the long delayed Geothermal Bill, the financial incentives anticipated earlier for geothermal development did not materialize. On the other hand, the actual/latest estimate of power rate is P1.65/kWh (in constant 1993 price terms), which is 18% higher than the appraisal assumption of P1.4/kWh.

16. It is noted that the base case FRR estimated in the SAR has included sunk costs incurred by PNOC-EDC; this is useful for assessing whether the original decision to proceed with the project was well founded. However, for the purpose of deciding whether to proceed with the incremental investment at the time of project appraisal, the sunk costs should have been excluded from the calculation of the FRR, as in the case of the ERR estimate in the SAR. With the exclusion of sunk costs, the overall FRR is currently estimated at about 17%.

E. NPC Finances

17. **Recent Finances.** NPC's precarious finances are mainly attributable to factors beyond the control of the Corporation, most notably its under-capitalization and inadequate tariff adjustments. To meet its liquidity needs, NPC has incurred huge liabilities which, in turn, expose the Corporation to expensive debt service obligations. Its financial difficulties have been exacerbated by the recent regional financial crisis, particularly the impact of local currency devaluation, lower energy demand and over-capacity in power generation (including "take-or-pay" obligations under IPP contracts). Consequently, its net loss amounted to P 3.6 billion in 1998 and increased to an estimated P 5.6 billion for 1999. Despite valiant efforts by NPC in cost cutting and other measures, financial turnaround of the Corporation (as envisaged in its budget for 1999) did not materialize. Further deterioration of NPC's finances was mainly due to lower than expected power sales and delayed implementation of the proposed tariff adjustments (actual average tariff was 21% lower than the budgeted level).

18. In summary, NPC has been in noncompliance with the financial performance covenants under the Bank-financed projects since 1997; its return on rate base (RORB) was estimated at only 3.4% (far below the covenanted minimum rate of 8%) and its debt service coverage ratio also fell short of the covenanted minimum ratio of 1 time for 1999.

19. **Future Finances.** The survival strategy of NPC includes, among others, seeking timely approval for tariff adjustment applications, proactive marketing of power sales, continued cost cutting measures and rationalization of IPP contracts (including shelving of projects not yet contracted and, if possible, deferral of contracted projects through mutual agreement with the concerned project sponsors). In the case of the PPA under this project, approval for less than full cost recovery (P 1.45/kWh vs. the contracted price of P 1.65/kWh) was recently obtained from the Energy Regulatory Board (ERB) after protracted delays. In response, NPC has planned a two pronged approach to (i) apply to ERB for full cost recovery with the requisite documentation requested by ERB; and (ii) renegotiate the contract with PNOC-EDC.

20. However, as demonstrated by its recent financial results, cost cutting and other measures within the control of the NPC are far from adequate in restoring the financial health of the Corporation; ***power sector restructuring, recapitalization and privatization of the NPC lie at the heart of the Corporation's recovery program.*** In particular, the government is aware that the Corporation's heavy reliance on foreign debt finance is unsustainable in the long run. Passage of the Electricity Industry Reform Bill would enable various measures to put NPC on the path to financial sustainability, including the following actions:

- The government would absorb P100 billion to P 150 billion of NPC's liabilities. This is envisaged to be effected through the conversion of a portion of NPC's debt² to equity. In this connection, DOF and NPC are in the process of working out the detailed arrangements, including inter alia, legislative actions needed to increase the Corporation's authorized capital beyond the current limit of P 50 billion (of which P 26 billion of capital stock has been issued).
- Privatization of the NPC would provide proceeds to retire a portion of its debt and reduce its stranded costs.
- The remaining stranded costs of NPC would be recovered through a universal levy on all electricity consumers.

21. However, there are considerable uncertainties related to the timing of the passage of the Bill. In the absence of adequate remedial measures, NPC's finances will deteriorate further in the year 2000, mainly due to MERALCO renegeing on its power purchase agreement and the recent commissioning of the Sual power plant, both of which exacerbate the problem of excess generation capacity. Indeed, in order to avoid the loss of market share, the magnitude of NPC's tariff adjustments is constrained by competition with the IPPs and self generation by the industrial users. Based on the assumption that additional debt would be incurred by NPC to meet its liquidity needs, its debt service coverage ratio is projected at about 0.7 time and RORB at less than 3% in 2000. A possible option for providing immediate debt relief to NPC (that does not require legislative action) is for the DOF to convert a portion of its debt to equity (up to P 24 billion) within the existing authorized capital of the Corporation.

² In end-1998, NPC's foreign loans and other long-term debts amounted to P 174 billion, excluding bonds payable of P48 billion and IPP obligation of P242 billion.

22. **Follow Up Actions.** In the interest of partnership, ADB is taking the lead in power sector restructuring and privatization. It is understood that ADB has indicated to the government the need for a task force comprising the government, ADB and NPC officials to agree on an acceptable financial action plan; the mission will continue to coordinate closely with the ADB on this matter. In addition, to facilitate monitoring of NPC's precarious finances, it was agreed that ***NPC would regularly update the Bank on its financial condition***, including, inter alia, the status of tariff increase application with the ERB and the Electricity Industry Reform Bill, and furnish the Bank with its unaudited quarterly financial statements.

F. PNOC-EDC Finances

23. PNOC-EDC's actual financial results fell short of the appraisal projections (for the period 1993-98) in terms of profitability, liquidity and capital structure indicators. This is, in part, attributable to (i) delayed implementation of selected projects (brought about by the unexpected change in the energy development policy of the Ramos administration, i.e., the displacement of geothermal energy plants as a priority in energy development with coal-fired plants); (ii) non-passage of the long delayed Geothermal Bill which would have reduced the royalty/tax payment of the geothermal industry and level the playing field with nominally cheaper but more polluting fossil fuel; (iii) foreign exchange loss (resulting from devaluation of the pesos); and (iv) write-offs of unsuccessful exploratory costs.

24. Under the provisions of the Project Agreement, PNOC-EDC is covenanted to maintain a maximum debt/equity ratio of 70/30, a current ratio of not less than 1 time and a minimum debt service coverage ratio of 1.25 time. Until 1997, the Corporation consistently complied with all of the above financial performance covenants. However, mainly due to the commencement of its BOT capitalized lease obligations for power purchase in 1997, coupled with its heavy reliance on foreign loans and the adverse impact of peso devaluation, PNOC-EDC has been in noncompliance with all of the above financial covenants.

25. The liquidity squeeze at the Corporation has been largely attributable to the mismatch in the maturity of its BOT contractual obligations with the private power producers (10 years) and its power sales agreement with NPC (25 years). Based on PNOC-EDC's unaudited financial statements in 1999, prior to the inclusion of the BOT lease obligations, its debt service coverage ratio was 1.5 times, current ratio at 1.7 times and debt/equity ratio at 55/45. On the other hand, after the inclusion of BOT lease obligations, its debt service coverage ratio was only 0.7 time, current ratio at 0.6 time and debt/equity ratio at 78/22.

26. Over the medium term, its future finances are expected to improve in profitability. However, prior to the expiry of the BOT contracts in 2006, and in the absence of remedial measures (such as privatization of the Company which has been delayed due to unfavorable market condition since 1997 and the passage of the Geothermal Bill noted above), PNOC-EDC is expected to remain largely in noncompliance with the financial covenants. In this connection, the Bank's main concern is not so much the noncompliance with the Project Agreement covenants per se but the intentions underlying these covenants to promote prudent financial management. Thus, it is recommended that the ***financial risk noted above***

be closely monitored and managed.

G. Next Steps

- | | |
|----------------|---|
| March 14, 2000 | The Bank to send its draft final ICR to NPC/PNOC-EDC for comments. |
| March 22, 2000 | NPC/PNOC-EDC to forward its comments on the draft ICR to the Bank. |
| March 31, 2000 | The ICR will be finalized by the Bank.
Copies will be forwarded to NPC/PNOC-EDC and the relevant GOP agencies. |

**LEYTE CEBU GEOTHERMAL PROJECT
BORROWER'S DRAFT IMPLEMENTATION COMPLETION REPORT
PNOC-ENERGY DEVELOPMENT CORPORATION**

- A. Project Data**
- B. Principal Performance Ratings**
- C. Assessment of Development Objective**

Original Objectives

The project had several original objectives:

- (a) To meet the rapidly increasing demand for power in Cebu and the Visayas region using indigenous and environmentally superior geothermal energy;
- (b) To strengthen the institutional, planning and financial systems of PNOC;
- (c) To promote private sector participation in power generation;
- (d) To improve the performance of the energy sector through better policies and implementing mechanisms; and
- (e) To ensure the financial viability of PNOC to undertake a long overdue investment program

The project objectives are consistent with the country's long term energy plan's key policies to (a) enhance energy self-sufficiency through continuous exploration and development of indigenous energy resources; (b) pursue large scale utilization of new and renewable energy sources; (c) provide reliable and efficient supply of electricity and (d) encourage greater private sector investment and participation in all energy activities. Furthermore the objectives seek to ensure the sustainability of the project and to ensure the financial viability of the implementing entities through privatization, institutional strengthening and to further encourage private sector participation by pushing for the passage of legislation granting further incentives to geothermal developers.

Revised Objectives. The project's original objectives were not revised during the project implementation.

Original Components. Under the loan agreement, PNOC was tasked to (a) undertake the development of a 185 MW geothermal field in Leyte comprising of the drilling of some 8 development wells, the construction of the fluid collection and disposal system, and the construction of the subtransmission system; (b) enter into a BOT contract with a private sector company to construct and operate a 185 MW geothermal power plant; and (c) carry out a technical assistance program for project implementation.

Prior to project proposal preparations, PNOC-EDC updated the resource assessments for all the sectors planned to be developed under Leyte-Cebu and Leyte Luzon. These assessments were reviewed and confirmed by an independent consortium as consistent with an optimized potential in excess of 640 MW.

PNOC-EDC brought into this project extensive experience in implementing large scale geothermal projects. Its management and technical teams had been exposed to all phases of geothermal development and developed, through the years, a favorable reputation in the international geothermal industry.

Revised Components. The project was not revised during the implementation.

D. Achievement of Objectives and Outputs

Outcome/Achievement of Objectives

- a. **To meet the rapidly increasing demand for power in Cebu and the Visayas region using indigenous and environmentally superior geothermal energy**
- b. **To strengthen the institutional, planning and financial systems of PNOC**
- c. **To promote private sector participation in power generation**
- d. **improve the performance of the energy sector through better policies and implementing mechanisms**
- e. **ensure the financial viability of PNOC to undertake a long overdue investment program.**

The outcome of the project was satisfactory, marred only by the delayed completion of NPC's transmission lines. The project achieved its major objectives and is likely to achieve satisfactory sustainable results.

Output by Components

- a. **Undertake the development of a 185 MW geothermal field in Leyte comprising of the drilling of some 8 development wells, the construction of the fluid collection and disposal system, and the construction of a subtransmission system**
 - 1. The outcome/achievement of the above component of the project was highly satisfactory.
 - 2. PNOC-EDC developed a geothermal field complete with fluid collection and disposal system designed to achieve a capacity of 202 MW, constructed corresponding substations and installed a power transmission ring main between substations.
 - 3. PNOC-EDC completed the drilling of the 12 production/reinjection wells (in addition to existing wells drilled under the Energy Sector Loan) as early as July 1995. (Refer to Table 1 for well drilling information).

Table 1. Well Drilling Program

	Appraisal Targets			Actual Results		
	1994	1995	Total	1994	1995	Total
Upper Mahiao	2	6	8	4	3	7
Malitbog	0	0	0	3	2	5
TOTAL	2	8	8	7	5	12

- 4. The fluid collection and disposal system was completed on April 8, 1996. The 230 KV Subtransmission System consisting of switchyards and transmission lines were completed on March 12 and March 6, 1996 respectively.

5. The NPC component of the project, the construction of the submarine cable connecting the islands of Leyte and Cebu and the associated transmission lines, however was not completed until November of the following year resulting in the amendment of the Power Purchase Agreement to treat the energy payments made by NPC from July 25, 1996 to November 25, 1997 as payments for "stored energy" which could be lifted by NPC once the transmission facilities were available at specific intervals during and after the cooperation period. PNOC-EDC, meanwhile, met its obligations with the BOT contractors by paying the stipulated monthly capacity fees.

6. PNOC-EDC prepared a detailed Environmental Impact Assessment (EIA) for the geothermal development component of the Leyte project. From 1991 to 1993, the project was subject to a total of 80 consultations with affected communities, government agencies, the academe, non-government organizations (NGOs), religious groups and the media including 2 public hearings resulting in the endorsement of the project by the Regional Development Council of Region VIII.

Standards for occupational health and safety are set by the Department of Health and the Department of Labor, while standards for the maintenance of air, water and land quality are set by the Department of Environment and Natural Resources (DENR). The DENR, based on its own evaluation, issued an Environmental Compliance Certificate (ECC) approving the project implementation subject to protective measures during construction and operation.

A multi-sectoral task force composed of the DENR, NGOs, Local Government Units (LGUs) and PNOC regularly monitors compliance with standards and from 1994-1998, PNOC-EDC has had no violations pertaining to air and water quality.

7. As stipulated in the loan agreement, PNOC-EDC designed and implemented a resettlement program for families affected by the geothermal development. The objectives of the resettlement program were (a) to protect residents from potential health hazards; (b) to facilitate the implementation of the power project by removing access problems; (c) to assist the relocatee community in regaining their standard of living prior to relocation and (d) to facilitate the formation of community institution and self reliance.

8. The total number of households affected was 106. Consultations were conducted from January to April 1993 and Memorandums of Understanding were signed with the individual families from December 1993 to March 1994. The relocation package included house replacement and community amenities comprising of chapel, village hall/health center, basketball court, water supply, electricity and toilet facilities. The cost of construction amounted to \$1.2 million.

9. By February 1996, 52 houses representing 100% of the housing needs of those who decided to transfer to the relocation site and all community amenities were constructed. As of June 1998, of the 106 affected households, 50 of 52 households had transferred to the relocation site. 2 of the 52 households which originally opted to move to the relocation site changed their minds and opted to move to areas within the geothermal reserve along with 3 other households. 41 households transferred outside of the critical zone but remain within the geothermal reserve while 9 opted for early relocation outside of the project area. 1 widower remains inside the project reserve but is out of the air quality danger zone and thus is not critical for relocation.

In terms of employment, as of June 1998, 75 members of the 88 households who had originally signified their interest in priority employment are either employed by PNOC-

EDC, its contractors or by the local cooperatives. PNOC-EDC facilitated community institution self-reliance by organizing the resettlers into the Limao Resettlement Homeowners Association and the Limao Integrated Farmers for Empowerment Livelihood Association.

Project Management

11. Because of the project's relatively large size, PNOC-EDC managed implementation in terms of three separate subprojects: (a) drilling component; (b) fluid collection and disposal system; and (c) the power plant component within the PNOC-EDC field development area through BOT contracts with private developers. A project director responsible for implementation and coordination was appointed and supported by project implementation units with adequate staff and facilities. During all phases of the project, PNOC-EDC was assisted by consultants with extensive experience in geothermal development. To ensure maximum coordination in the implementation of the sub-projects, an overall Project Manager with extensive operational and project management experience working in close coordination with the Project Director was likewise appointed.

Project Cost and Financing

12. The presence of the World Bank provided confidence in the feasibility of the project. PNOC-EDC was successful in attracting interest from various countries to participate in the project (such as the United States, New Zealand, Italy and Japan), the most significant of which is the private sector which provided 39.4% of the total project cost of Leyte Cebu.

13. Of the \$64 million World Bank Loan only \$53.03 was disbursed. Under-utilization of the loan was due to the undertaking of the majority of civil, structural and mechanical works in-house rendering most of the expenditures incurred as ineligible for reimbursement under the loan. Because it was more cost-efficient, PNOC-EDC chose to drill most of the Leyte-Cebu geothermal wells using its own rigs resulting in rig expenses not eligible for reimbursement under the loan.

14. The total cost of the steamfield was P2,371.72 million inclusive of development drilling and associated costs incurred prior to the time-slice financed by the Bank and by the additional 4 wells drilled (versus the originally programmed 8 wells) in order to meet the required production and reinjection capacity for the 202 MW steamfield.

There were substantial savings in the cost of FCDS goods and equipment while the SAR underestimated PNOC-EDC Engineering and Administration cost which were inclusive of Well Development, Geoscientific Investigation and Reservoir Engineering costs. Likewise, the cost of drilling technical services were underestimated due to PNOC-EDC's decision to contract out on a turnkey basis, drilling fluid and corrosion control services (thus inclusive of the cost of drilling/corrosion control fluids). The cost of the EHV Interconnection System was likewise underestimated by the SAR.

b. Enter into a BOT contract with a private sector company to construct and operate a 185 MW geothermal power plant

1. The outcome/achievement of the above component of the project was highly satisfactory.

2. PNOC-EDC entered into the following BOT agreements to provide 202 MW capacity for export to Cebu via an EHV AC submarine cable for the following plants:

Upper Mahiao 125 MW Power Plant

A BOT contract was awarded to the winning BOT contractor in August 1993 to construct and operate a 125 MW power plant for 10 years. The plant comprises of 4 GCCU (Geothermal Combined Cycle Unit) turbines of 29.9 MW capacity each, and one brine binary unit with a capacity of 5.5 MW. Each GCCU consists of one non condensing steam turbine which exhausts to three OEC binary cycle turbines. The plant was commissioned on July 25, 1996.

Malitbog Power Plant - 1x 77 MW Unit in a Staged Development

A 10-year BOT contract was awarded in September 1993 to construct and operate the first unit in a 3x77 MW power plant located in the Malitbog Sector. The Malitbog turbines are conventional single pressure units with direct contact condensers. The unit was commissioned on July 25, 1996.

3. The Leyte geothermal project followed the BOT model which has come to be regarded as a typical private sector participation format. Under the PNOC-EDC BOT format, the power plant contractor designs, supplies, installs and commissions the plant for a pre-determined cooperation period of 10 years. During the cooperation period, PNOC-EDC pays for the plant through an energy conversion tariff which provides for both capital recovery and operational costs. At the end of the cooperation period, plant ownership is transferred and handed over to PNOC-EDC for zero payment. Thereafter, PNOC-EDC operates the plant itself.

4. In March 1994, PNOC-EDC and NPC executed the Power Purchase Agreement (PPA) for Leyte-Cebu. Under the terms and conditions of the Leyte-Cebu PPA, PNOC-EDC will sell electrical energy from Leyte-Cebu to NPC dedicating the entire contracted energy to NPC equivalent to 1,370 GWH per year.

c. Carry Out a Technical Assistance Program for Project Implementation

1. The outcome/achievement of the above component of the project was highly satisfactory.

2. For its technical assistance requirements, PNOC-EDC hired a consultant with extensive experience in the development and construction of geothermal fields and power plants. The contract was originally bidded out for the Leyte-Cebu project and was subsequently amended to include the work under the Leyte-Luzon project funded by the Bank under World Bank Loan 3747.

Financial Rate of Return

The Project Financial Rate of Return in the SAR was 9.5% under the following major assumptions:

1. Levelized cash flow computations were based on 1992 cost levels
2. Pre-1992 investments carried forward to 1992 with escalation at 4% p.a. in dollar terms
3. Electricity sales revenues based on estimated BOT plant capability from a high of 1,417 Gwh (Yr-1: 1997) to a low of 1,354 GWh (Yr 20: 2016).
4. Electricity Selling Price of P1.40 per kWh

5. ECA Fees based on BOT Contractors' tariff based on bid results (net of VAT)
6. Royalty and income tax on steam operations based on Steam Price of P0.75 per Kwh
7. PD 1442 repealed an new Geothermal Act in place with the following fiscal incentives:

Development Uplift Allowance	-60% of tangible deveopment costs
Filipino Participation Incentive Allowance	-5% of Steam Revenues
Six-year income tax holiday	-1997 to 2002
Eight year royalty holiday	-2003 to 2010
8. Power plant depreciation after takeover using double declining method
9. Income tax rate at 35% of taxable income

The re-evaluated Project Financial Rate of Return is 9.6% under the following major assumptions:

1. Levelized cash flow computations were based on 1999 cost levels
2. Pre-1992 investments carried forward to 1992 with escalation at 4% p.a. in dollar terms
3. Steamfield investments from 1994 to 1998 based on actual project costs.
4. Electricity Sales revenues based on Leyte A PPA Contracted energy of 1,370 Gwh
5. Electricity selling price based on Leyte-Cebu PPA Base Energy Rate of P1.65 per Kwh as of June 1993 (P2.53 per kwh at 3rd Quarter 1999 cost levels)
6. ECA payments based on actual Nominated Capacities for Upper Mahiao and Malitbog (1 unit)
7. 10% VAT on ECA fees from 1996 to 1998; Zero-rating starting 1999.
8. Royalty and income tax on steam operations based on Steam Price of P0.33 per Kwh
9. PD 1442 still in effect with no amendatory legislation for additional fiscal incentives for geothermal.
10. Power plant depreciation after takeover using double declining method
11. Corporate Income Tax Rates: 1997 = 35%; 1998 = 34%; 1999 = 33%; 2000 and beyond = 32%

Refer to Attachment 1 for spreadsheets.

E. Major Factors Affecting Implementation and Outcome

(a) Factors Outside the Control of Government or Implementing Agency

Delay in Completion of NPC Component

NPC's component for the Leyte-Cebu geothermal project was completed only in November 1997, 16 months after the contracted completion date of July 25, 1996. The implementation of the project was characterized by delays in the procurement and awarding of major contracts, difficulties encountered in land purchases and the acquisition of right-of-way for the construction of transmission lines. The timely implementation of the project was further bogged down by several changes in top management resulting in re-organization and transfer of key personnel out of the project and ultimately, the accidental severing of the submarine cable linking Leyte to Cebu in April 1997.

(b) Factors Generally Subject to Government Control

BOT Legislation

The power crisis in the early 1990s, President Aquino's Executive Order No. 215 repealing the Marcos decree on NPC's monopoly on power generation (Presidential Decree No. 40), the introduction of BOT legislation in 1990 (RA 6957) allowing for private sector development of geothermal and other types of power plant and infrastructure facilities and the 1992 DOE law reviving the Department of Energy with a strong mandate to develop strong initiatives in the energy sector and to implement a comprehensive Energy Development Plan all contributed to the realization and success of this project.

The resulting commercial and institutional environment was advantageous to PNOC-EDC which throughout its existence had made significant investments in the exploration and development of geothermal fields with a limited return on investment due to the Government's erratic implementation of power development program depending on the priorities of the existing administration.

PNOC-EDC and the Leyte Cebu Geothermal Project therefore was thus one of the first beneficiaries of the BOT law allowing PNOC-EDC to transform from a purely energy resource company into an electric generation company fitting neatly into the corporate strategy to use the Leyte Geothermal Power Project to gain experience in power generation. It is ironic however that the BOT scheme which helped PNOC-EDC in financing the power plant has required PNOC-EDC to seek external financing in order to pay part of the BOT obligations due to the mismatch between electricity revenues and BOT payments and operating expenditures and the negative effect of the currency crisis affecting the Asian region.

(c) Factors Generally Subject to Implementing Agency Control

Competence and Professionalism of BOT Contractors

It was noted that the BOT contractors engaged were of a high professional caliber. Construction of the power plants were carried out in a highly efficient and competent manner resulting in the early completion of the power plants.

Extensive Experience of PNOC-EDC in Steamfield Development

Likewise, PNOC-EDC's extensive experience and competence in steamfield development allowed for completion of the project in a timely and cost-efficient manner. Although the development of the steamfield involved the risks typical of any large infrastructure development including construction material shortages, unanticipated cost increases, labor disputes, natural disasters, engineering, environmental and geological problems, non-performance or unsatisfactory performance of contractors, etc., there were no material delays or operational deficiencies affecting its ability to fulfill its contractual obligations to deliver steam or power.

F. Sustainability

Rationale for Sustainability Rating

1. The project's sustainability during its project life is likely with prudent management of the geothermal reservoir and technological advances in the efficient conversion of geothermal steam to electricity.

2. While inroads made into attracting private sector participation in the geothermal industry were considerable, it is to be noted that the sustainability of geothermal power plants and the geothermal industry in a privatized energy sector lies in the reform of the regulatory environment currently imposed on the Philippine Geothermal industry. At present, the price competitiveness of the industry with other fuel sources is bogged down by the Government's policies on royalties and lack of incentives of the use of environmentally benign fuels. To date, the Geothermal Bill which embodies these reforms has yet to be passed into law. Moreover, the Omnibus Power Bill which incorporates the rationalization of taxes on various fuels is still being deliberated by Congress.

Transitional Arrangements for Future Operation

The BOT plants will be turned over to PNOC-EDC in the Year 2007. PNOC-EDC in the meantime has formed a Power Department in charge of monitoring the maintenance and operation of these plants and will be instituting in the next 2 years, a formal training program for its personnel in the maintenance and operations of these plants. The BOT contracts further provide for training of PNOC-EDC personnel 1 year prior to the formal turn-over.

Performance Indicators

1. Actual Available Energy

G. Bank and Borrower's Performance

Bank

1. The Bank performed satisfactorily in the appraisal and supervision of the project. Prior to project implementation the Bank appropriately recommended that high-level project directors be appointed in order to ensure close coordination between the two government corporations. Recognizing the importance of the timely completion of the project considering the penalty provisions existing in the BOT contracts which can result in outflow of funds from the country and not just from the pocket of one government entity to the other, the Bank consistently monitored and encouraged coordination between NPC and PNOC.
2. The Bank dealt with disbursement and procurement issues satisfactorily. In terms of institutional strengthening which was specifically mentioned in the objectives but not provided for as a fundable item, the Bank sponsored local procurement and disbursement seminars on a regular basis, one disbursement seminar in Washington, and a 2 week training course in the use of Microsoft Project Management software to assist PNOC-EDC in project scheduling. The Bank also recommended that key project personnel be enrolled in a 2 month project management program. This training was approved for funding under the GETF grant.

Borrower

1. The borrower performed satisfactorily. All project components and obligations were carried out and completed on schedule or ahead of schedule.

Procurement and disbursement was generally trouble-free with a few exceptions since the Borrower was familiar with the Bank's procurement and disbursement guidelines.

H. Lessons Learned

- 1 For a project which involves several components to be implemented by multiple agencies, a single project director should be appointed in order to facilitate timely and synchronized project completion.
- 2 Although the BOT scheme ensured the availability of private capital, there is a need to plan for possible funding deficits resulting from imbalance between project revenues and project operating and financing costs.

**LEYTE CEBU GEOTHERMAL PROJECT
BORROWER'S DRAFT IMPLEMENTATION COMPLETION REPORT
NATIONAL POWER CORPORATION**

A. STATEMENT AND EVALUATION OF OBJECTIVES

The main objectives of the Leyte-Cebu Geothermal Project under IBRD Loan No. 3700-PH of World Bank are to:

1. Meet the rapidly increasing demand for power in Cebu using indigenous and environmentally superior geothermal energy resources;
2. Strengthen the institutional planning and financial systems of NPC and PNOC;
3. Promote private sector participation in power generation;
4. Improve the performance of the energy sector through better policies and implementation mechanisms, and;
5. Insure the financial viability of NPC and PNOC so they can undertake a long-overdue investment program.

PNOC will be responsible both for the development of the steamfield resource and for electricity generation, on the basis of a Build, Own and Operate (BOO) contract with NPC. On the other hand, NPC will handle the Leyte-Cebu Interconnection Project and will be responsible for the transmission of power of up to 200mw from the Leyte geothermal field of PNOC to the Cebu grid.

The project has four (4) major components, namely: (1) substations and cable terminal stations; (2) submarine cables; (3) overhead transmission lines; and (4) Cebu grid reinforcement.

The construction of the Leyte-Cebu Interconnection is well timely as it is now serving Cebu and the Visayas grid since November 15, 1997 by almost 200mw as envisioned in the feasibility report. The project also constitutes a first step towards the overall interconnection of Luzon, Visayas and Mindanao grids into a unified grid by the year 2003.

B. ACHIEVEMENT OF PROJECT OBJECTIVES

1. Physical Objective

The original construction schedule of the Leyte-Cebu Interconnection Project under six (6) contract packages for the substations and cable terminal stations, submarine cables, and overhead transmission lines took effect on April 3, 1995 and expired on January 10, 1997 (648 cal. days). However, due to delays during construction, the project was completed on July 1, 1997 only. The energization was further delayed when the submarine cables were damaged by a construction company for communication lines. After the repair, this was finally energized on November 15, 1997, or a total delay of 10 months.

As to the Cebu Grid Reinforcement, Schedule I (Naga-Sigpit 138 kV T/L) was completed on August 25, 1998, while schedule II (Sigpit-Talavera 138 kV T/L) is substantially completed with only one tower not erected due to right-of-way problem. Enforcement of writ of possession is still pending in court.

2. Financial Objective

The original project cost based on World Bank allocation was US\$ 29.5 Million (local) plus US\$ 147.0 Million (forex) or a total of US\$ 176.4 Million. Due to substantial increase in the bid price for submarine cables and variation orders during actual construction, actual cost of the project reached US\$ 30.1 Million (local) plus US\$ 158.3 Million (forex) or a total of US\$ 188.5 Million. Another cost was incurred in the amount of US\$ 15.9 Million for the repair of damaged submarine cables which is still for recovery from the Insurance. For further details of project cost and financing, please refer to the annexes.

C. MAJOR FACTORS AFFECTING THE PROJECT

Major problems that caused significant delays were encountered as early as contract tendering until project construction as follows:

1. Tendering and Award of Contracts:

Based on the World Bank Staff Appraisal Report, the contract packages of the project should have been awarded by April 30, 1994. However, as early as contract tendering to opening of bids, the project was already delayed due to several postponement of bidding dates brought about by some changes in the specifications and incorporation of additional provisions to contract specifications. Another reason was re-bidding of Submarine Cables. Further delay was incurred from bid opening to contract effectivity, thus the last contract to be completed was the transmission line in Leyte, scheduled on January 10, 1997. This was already 6 months behind the PNOC schedule of July 25, 1996 for the commissioning of their geothermal plants in Leyte.

2. Project Construction:

During construction, various problems were again encountered further delaying the project. Foremost among them is the right-of-way problem, which resulted to other problems such as re-routing of transmission lines, variation orders, financial difficulties to contractors, etc. Other problems include shortage of skilled workers and stringing equipment for transmission lines, unusually heavy rainfalls and occurrence of more typhoons in 1996. Due to these delays, the project was completed on July 1, 1997 only or a delay of 172 days. Actual energization was carried out after the damaged submarine cables were repaired on November 14, 1997, or a total delay of 10 months.

3. Equipment Supplied By the Contractors:

While generally all the requirement supplied by the contractors are in good order and operated as required in the specifications, Transformer No. 2 at Compostela Substation (150

MVA) however, developed trouble in its first year of operation. Its adverse effect to the objective of the project was a reduction of 50% power transfer capability for almost six months in 1998. The equipment was restored on October 1998.

D. PROJECT SUSTAINABILITY

The energization of the Leyte-Cebu Interconnection Project on November 15, 1997, and its inauguration held in Ormoc, Leyte on December 13, 1997 attended by no less than the Philippine President, Fidel V. Ramos, only showed how important the project is to the power development of the country. Presently, the Cebu-Negros-Panay grids benefits 200mw power supply from the Leyte geothermal field of PNOC. The completed project also assured Cebu province of a continuous and reliable power supply using an environmentally preferable indigenous energy source, thus avoiding coal and oil imports.

In fact, the review and finalization of draft tender documents for the additional 200mw of the Leyte-Cebu Interconnection is now on-going. The project will be funded thru ADB Loan, and will be completed on November 2002, thus increasing the total transfer capability to 400mw.

E. BANK PERFORMANCE

The very serious power crisis experienced by the country in 1991 made the identification of Leyte-Cebu Geothermal Project by World Bank, very timely and most welcome solution. This was consistent with the Government's highest priority, to reform and improve the energy sector.

The project appraisal conducted by World Bank Staff on April 1993 paved the way for the grant of US\$ 147 million loan. In addition, a loan of US\$ 15 M was also secured from NORDIC Fund to finance the fourth Submarine Cable. Additional loan of US\$ 25.M from the NORDIC Fund was also secured to fund the repair of damaged cables. Recovery of the cost of repair of damaged cables is still under litigation in court. The World Bank loan has an estimated surplus of US\$ 10 M, upon project completion.

In over-all, the Bank's performance is satisfactory as a lending institution, which enabled NPC to construct the Leyte-Cebu Interconnection Project, and implement the electrification program of the country in general.

F. BORROWER PERFORMANCE

During project preparations, the Borrower (NPC) failed to immediately comply World Bank's requirement on power rate structure for Visayas and Mindanao, resulting to the delay in the issuance of Loan disbursement clearance, and thus delaying the effectivity of the transmission line contracts for Leyte side. There were also changes in design and deviations from contract pay items to suit actual field conditions, which resulted to variation orders thus increasing the project cost.

During project implementation, NPC failed to solve the perennial right-of-way problems due to disagreement on the price of affected properties and the refusal of

landowners to grant NPC entry to their properties resulting to filing of expropriation cases and re-routings of transmission lines further delaying the project. The final blow was the damage to the submarine cables caused by the laying of fiber optic cables for communication lines which stretched the delay to 10 months. In over-all, despite the delayed project completion wherein some delays were caused by other government agencies as in the case of right-of-way; and the damage to the submarine cables, the Borrower can still be rated satisfactory in its project performance, since the Cebu-Negros-Panay grids are now enjoying the much needed 200mw power supply since November 15, 1997.

G. ASSESMENT OF OUTCOME

Basically, there is no deviation in the original project design component as specified in the SAR of World Bank. The components were adequately designed to achieve the project objective – to provide 200 MW power supply from the geothermal field of PNOC in Leyte to Cebu grid. Except the damage to the four (4) submarine cables in 1997 and the breakdown of one 150 MVA transformer in Compostela Substation in 1998, all components are in normal operation.

As to the achievement of objectives by components, the following are the outcome:

- a) Overhead Transmission Lines in Leyte and Cebu: construction was delayed by six months mainly due to ROW problems resulting to re-routings and variation orders;
- b) Submarine Cables Linking Leyte-Cebu Lines: installation was completed on schedule, however, due to damage on the four cables last 1997, its energization was delayed by four months;
- c) Substation and Telecom System: construction was delayed by three months due to problems in site acquisition and variation orders;
- d) Right of Way Compensation: under the “resettlement issues recovery action plan” all land compensations and easement fees will be completed on June 30, 2000;
- e) Technical Assistance: two technical assistance consultancies were implemented: 1) Definite design and study of the Agbulu Hydroelectric Project – consultant completed the final configuration of the scheme as well as the technical and commercial documents for tendering, including updating of environmental, financial, and economic viability of the project. The consultant recommended a plant of 660 MW installed capacity, however, NPC reduced it to 360 MW due to the uncertainty on the value of peaking energy in the system and the need to reduce the initial capital cost. The project is scheduled for implementation on 2009; 2) Review and selection of implementable project for the definite design and study between Bulanog Batang and Pulangi V Hydroelectric Project – consultant completed the project’s definite design and study including project selection report, scheme configuration report, final reports, prequalification documents, commercial and technical specifications. The consultant’s recommendation have not yet been carried out due to reprogramming in the implementation of NPC projects.

H. FUTURE OPERATIONS

NPC is now undergoing restructuring of its organization in preparation to its privatization. This is grouped into Core Businesses and Non-core Businesses. The Operations is classified under Core Businesses with two (2) main groups namely: Generation Company (GENCO) and Transmission Lines Company (TRANSCO). The Leyte-Cebu Interconnection is now handled by TRANSCO, and is responsible for its adequate staffing (including training), management, operation and maintenance.

In order to monitor future operation and development impact of the project, the following performance indicators are proposed to be monitored: a) percentage of geothermal energy among energy sources for power generation in Visayas system; b) energy transferred from Leyte to Cebu through Leyte-Cebu interconnection; c) System losses in Visayas-system; d) System reliability in Visayas system; and e) frequency deviation in Visayas system.

From the historical data and as shown in the Visayas Performance Indicators for Operation, the following were observed: a) geothermal energy comprised 69.95% of the Visayas generation mix for 1998 compared to 52.08% in 1995 (including independent power producers); b) energy transferred from Leyte to Cebu through Leyte-Cebu Interconnection was 843,259 MWH for 1998 or equivalent to 24.84% of the total energy consumption of Cebu-Negros-Panay grid; c) system loss increased from 4.32% in 1995 to 4.58% in 1998 for Cebu-Negros-Panay-Leyte-Samar system. This is understandable since the source of energy (Leyte) is very far from the load center which is Cebu; d) system reliability increased from 99.60% in 1995 to 99.62% in 1998.

With the discovery of near shore damage to Cable No. 3 last October 1997 in Talisay, Daanbantayan, Cebu caused by dynamite fishing, NPC decided to extend the burial of submarine Cables from 10m to 30m water depth. The work is being undertaken by Alcatel Kabel Norge of Norway and is scheduled for completion on February 2000. Another damaged portions of Cable Nos. 2, 3 and 4 were again discovered early this year, also caused by dynamite fishing. Alcatel had already conducted their investigations and will submit their offer for the repair soon. Although the damaged cables are still operating at present, repair should be carried out. Repair cost will be charged to the Insurance, since the cables are already insured.

To avoid recurrence of damage to the cables caused by dynamite fishing, NPC conducted massive information dissemination to the local residents in the area, and coordinated with the local government and agencies. Police and fish wardens were provided to patrol the cable installations and more security guards were posted. Buoy markers will also be provided to identify the cable corridor as "no fishing area". The problem is foreseen to be solved after the additional burial of cables up to 30m water depth is completed.

It is noteworthy to mention again that an additional 200mw funded by ADB is scheduled for bidding next year to be completed on year 2002, bringing the total capacity to 400mw.

I. KEY LESSONS LEARNED

To avoid recurrence of the problems and delays during the implementation of the project as mentioned in Item C., the following measures are recommended:

1. During Tendering and Award of Contracts:

- a) Bank shall be more clear and firm in its guidelines for the Borrower to follow.

- b) Bank should be flexible enough in dealing with the Borrowers commitments most specifically those involving power rates, which have social, political and economic impacts.
- c) Cost estimated for submarine cables, as well as other equipment not usually procured should be thoroughly analyzed and evaluated, in order to avoid huge variance from the actual bid cost.

2. During Project Construction:

- a) It should be, and a policy that no re-routing of transmission line be allowed to avoid delays of the project and cost overruns.
- b) The right-of-way should be subsequently cleared before the start of construction.
- c) It is a must that for Submarine Cable project, NPC should not totally rely on other government agencies in disseminating informations of the proposed project. On the other hand, this issue is already resolved thru a Memorandum of Agreement with National Mapping and Resource Information Authority (NAMRIA), incorporating all submarine cable installation of NPC in all maritime charts.

As in the previous transmission line projects of NPC, the perennial right-of-way problem should be given top priority in terms of adequate policies and guidelines acceptable to affected landowners; adequate and qualified personnel to handle negotiations and expropriation cases; secure full support of other government agencies involved in the processing of right-of-way documents including speedy court decisions. These recommendations are vital in solving right-of-way problems of similar projects in the future.