Country	: Republic of the Philippines
Project	: Palinpinon Geothermal Generation Plant Project (II), (II-2)
Borrower	: The Government of the Republic of the Philippines
Executing Agency	: Philippine National Oil Company - Energy Development Corporation (PNOC-EDC) National Power Corporation (NPC)
Date of Loan Agreement	: (II) May 1989 (II-2) January 1993
Loan Amount	: (II) ¥ 6,300 million (II-2) ¥ 3,653 million
Local Currency	: Peso
Report Date	: September 1997 (Field Survey: February 1997)

Production Well

One of the production well of the project.

［Reference］

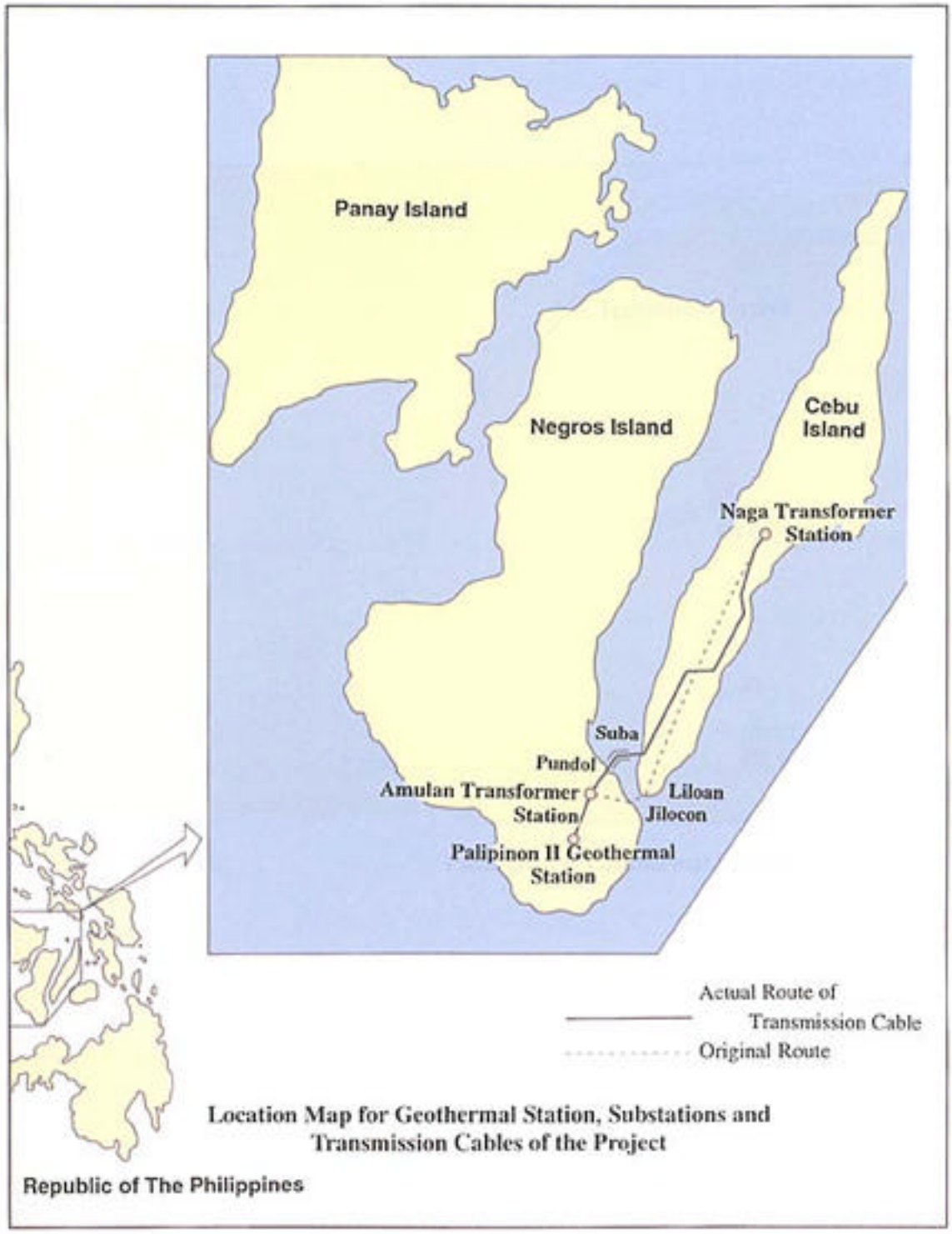
1. Abbreviations

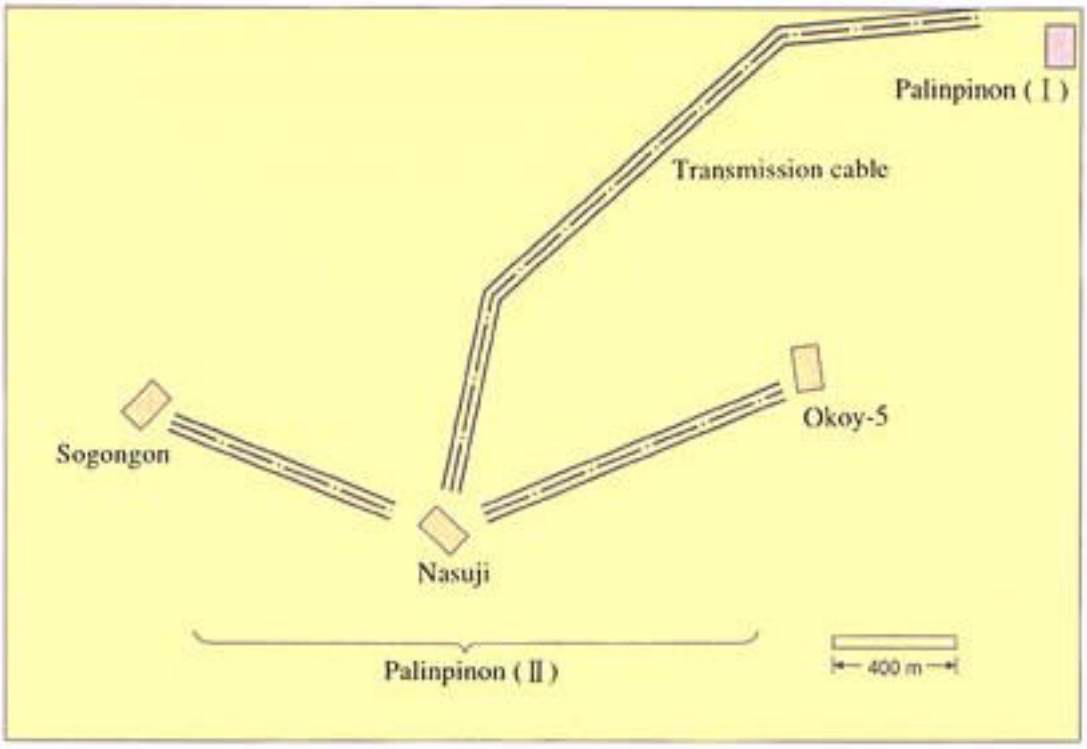
PNOC-EDC	Philippine National Oil Company, Energy Development Corporation
NPC	National Power Corporation
NEDA	National Economic and Development Authority
SAPROF	Special Assistance for Project Formation

1. Project Summary and Comparison of Original Plan and Actual

1.1 Project Location

Palinpinon II Geothermal Project as a project implementation site and substations are indicated below as well as transmission cable route.





Plant Location Map for Palinpinon II Geothermal Project

1.2 Project Summary

This project is intended to drill and develop 22 steam wells (both production and reinjection wells), near the existing Palinpinon Ⅰ Geothermal station in the south of Negros Island, Republic of the Philippines. The steam and hot water produced are to be carried by a pipeline to a steam separator and to generating stations (hot water is returned underground through six reinjection wells), which generate 80MW (20MW x 4units). This project is also to construct a transmission cable line from Negros Island to Cebu Island (115km of overhead cable and 7.1km of seabed cable). The construction of this cable line supplies electricity to Cebu Island and also to Panay Island through a transmission cable between Negros and Panay Islands.

This project is co-financing with World Bank and the portions of ODA loan are the drilling of eight wells (two production and six reinjection wells), construction of the pipeline for transmission of steam and hot water and construction of the electricity transmission line between the Amulan Substation in Negros Island and the Naga Substation in Cebu Island (constructions of generating stations is under World Bank loan).

1.3 Background

(1) The Philippines' Energy Development Plans

The Philippines' Medium-term Development Plan (1987~1992), which was adopted in November 1986, lays down the following three key concepts for energy policy.

① Stable supply of energy at an appropriate price.
② Promotion of the efficient use of energy.
③ Energy development which minimizes environmental impact.

At the time, electricity demand was predicted to increase by an average of 3.8% per year over the six years from 1987 to 1992. Within the supply to meet that demand, the targets were to reduce reliance on imported oil from 51.4% in 1986 to 46.9% in 1992, and to raise the energy self-sufficiency rate from 45.1% in 1986 to 52.0% in 1992.

【Table 1.1 Energy Plan in the Philippines】

(MMFOE : in million barrels of fuel oil equivalent)

	1986 MMFOE	**Composite ratio (%)**	1987	1988	1989	1990	1991	1992	**Composite ratio (%)**
Domestic energy	43.7	**45.1**	47.2	50.1	52.7	54.7	60.4	63.9	**52.0**
Import crude oil	49.8	**51.4**	48.8	50.2	53.2	56.4	57.8	57.7	**46.9**
Import coal	3.4	**3.5**	2.6	2.8	1.7	1.9	0.4	1.3	**1.1**
Total	96.9	**100.0**	98.5	103.1	107.7	113.0	118.6	123.0	**100.0**

Source: OEA

(2) The Philippines' Electricity Supply Plans

Under this energy development plan, the Philippines government planned to reduce reliance on electricity generation from imported oil and to strengthen electricity generation based on coal and geothermal energy . The share of electricity generated from oil (including diesel generators) was to be reduced from 41.9% in 1986 to 36.9% in 1992 under the plan. On the other hand, coal-fired generation was to be raised from 8.3% to 13.3% and geothermal generation to 14.2% over the same period. The total capacity of electrical supply was to be increased to 7,050MW by 1992.

【Table 1.2 Electrical Supply Plan in the Philippines (by source of electricity generation) 】

(MW)

	1986	**Composite (%)**	1987	1988	1989	1990	1991	1992	**Composite (%)**
Hydraulic	2,132	**33.0**	2,221	2,235	2,254	2,275	2,297	2,297	**32.6**
Coal-fired	535	**8.3**	535	535	535	535	535	935	**13.3**
Geothermal	894	**13.9**	894	894	894	894	1,004	1,004	**14.2**
Oil (including diesel)	2,703	**41.9**	2,698	2,659	2,600	2,600	2,600	2,600	**36.9**
Others	191	**3.0**	198	205	210	214	214	214	**3.0**
Total	6,455	**100.1.0**	6,546	6,528	6,493	6,518	6,650	7,050	**100.0**

Source： OEA

(3) The Philippines' Electrical Power System and Role of This Project

The Philippines' electrical power system is broadly divided into three grids of Luzon, Visayas and Mindanao. The Visayas grid is further divided into five sub-grids (Cebu, Negros, Panay, Leyte and Bohore). Of these, the Cebu, Negros and Panay sub-grids are directly involved in this project.

As was mentioned before, reduction of dependence on imported oil as a source of electrical power is a basic policy of the Philippines' energy development plan. At the Electrical Supply Plan in June 1988, the breakdown of energy sources in the Visayas sub-grid in the year 2000 is to be 112.5MW of geothermal power, 165MW of coal-fired generation, 24MW of hydroelectric generation and 5.5MW of diesel generation.

In Negros Island in particular, which was 100% dependent on oil in June 1988, in order to provide low-cost electricity by geothermal generation and to improve linkage among the Cebu, Negros and Panay sub-grids, a new Palinpinon II Geothermal Station (20MW x 4 generators) is planned to be built near the existing Palinpinon I Geothermal Station (37.5MW x 3 generators) in South Negros. Transmission lines will be built between Negros and Panay islands and between Negros and Cebu islands.

(4) How Geothermal Power Works

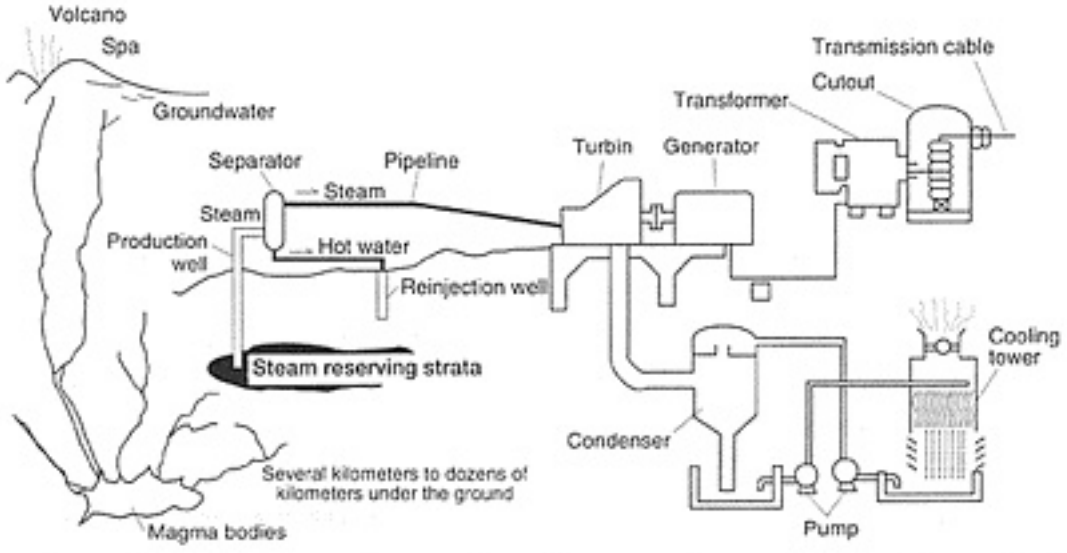
Geothermal generation is generation using the enormous reserves of thermal energy existing in and near volcanoes. The process is illustrated in the diagram below.

First, steam is collected through a well (production well) bored down to the steam - reserving strata. Steam-reserving strata are those where high-temperature/high pressure hot water or steam is reserved in fissures of rocks after groundwater is heated by the heat and hot gases from bodies of magma.

The produced steam is usually accompanied by hot water. The steam and water are separated in a separator and the water is returned underground through reinjection wells.

The steam is supplied through a pipeline to the generating station where the steam turns turbines which are directly linked to generators to produce electricity. Transmission of electricity from the generators is the same as for electricity produced in any other way. Steam used at the turbines is sent to a condenser where the steam is cooled by mixing with coolant water from the cooling tower. As it condenses, the volume of the steam reduces enormously, creating a vacuum at the outlet side of the turbine. This vacuum increase the pressure difference between the pressurized inlet side and the outlet side, thus raising the efficiency of the turbine.

The used steam, now condensed to water, is recycled to the cooling tower for use as coolant water. A portion of it evaporates from the cooling tower to the atmosphere.



Mechanism of Geothermal Power

1.4 Comparison of Major Original Plan and Actual

1.4.1 Project Scope

Item	Plan [Note 1)]	Plan [Note 2)]	Actual	Difference [Note 3)]
1. Steam Well Development Project				
Production well boring / development	16 wells	Same as left	18 wells	+2 wells (+2 wells)
[For ODA loans]	〔2 wells〕		〔4 wells〕	
Reinjection well boring / development	6 wells		5 wells	-1 well (-1 well)
[For ODA loans]	〔6 wells〕		〔5 wells〕	
Separation and collection facilities for steam wells	1 set		1 set	
Consulting service	36 M/M		Not employed	Not employed
2. Construction Project of Electricity Transmission Cable				
Construction of overhead cable	115.0km	113.5km	112.96km	-2.04km (-0.54km)
Construction of seabed cable	7.1km	17.3km	18 km	+10.9km (+0.7km)
Consulting service	38 M/M	Same as left	65.36 M/M	27.36 M/M
Substation				
● Isolation [Note 4)]	3	Same as left	Same as left	
● Capacitor [Note 5)]	1			
● Telecommunication facility	1 set			
3. Generating Plant				
(World Bank loan) Generating module	20MW×4			

(Refer to Appendix 1)

Note 1: is a plan in May 1989, and Note 2: is in Jan. 1993.

Note 3: Figures in the parentheses show the difference between plan in Jan. 1993 and actual.

Note 4: Circuit-breaker

Note 5: Condenser

1.4.2 Implementation Schedule

Item	Plan [Note 1)]	Plan [Note 2)]	Actual	Difference [Note 3)]
Overall	88.9 ~ 92.10 (49 months)	88.9 ~ 94.3 (66 months)	89.5 ~ 95.3 (70 months)	Start + 8 months (+ 8 months) Period +21 months (+4 months)
1. Steam Well Development Project [Note 4)] Start of design ~ Completion of construction	'88.9 ~ '91.12 (39 months)	'88.9 ~'93.8 (59 months)	'89.5 ~ '95.3 (70 months)	Start + 8 months (+ 8 months) Period +31 months (+11 months)
2. Construction Project for Electricity Transmission Cable Start of tender ~ Completion of construction	'90.5 ~'92.10 (29 months)	'90.5 ~ '93.7 (38 months)	'92.2 ~ '94.7 (29 months)	Start +21 months (+21 months) Period 0 month (-9 months)
3. Generating Plant (World Bank Loan) Start of tender ~ Completion of construction	'89.7 ~ '92.9 (38 months)	'90.6 ~ '94.3 (45 months)	'90.2 ~ '95.3 (61 months)	Start + 7 months (-4 months) Period +23 months (+16 months)

Note 1: is a plan in May 1989 and Note 2: is in Jan. 1993.
Note 3: Figures in the parentheses show the difference between plan in Jan. 1993 and actual.
Note 4: This implementation schedule relate to ODA loan portion, Other wells had already been installed.

1.4.3 Project Cost

Item	Plan [Note 1)]	Plan [Note 2)]	Actual	Difference [Note 3)]
1. Steam Well Development Project [Note 4)] (including ODA Loan)				
Foreign currency (¥ million)	2,586	4,075	2,073	-513 (-2,002)
Local currency (million Pesos)	324	435	1,063.2	+739.2(+628.2)
2. Construction Project for Electricity Transmission Cable [Note 4)] (including ODA Loan)				
Foreign currency (¥ million)	1,824	5,663	4,662	+2,838(-1,001)
Local currency (million Pesos)	96	162	206.4	+110.4(+44.4)
3. Generating Plant (World Bank loan)				
Foreign currency (¥ million)	6,514	12,158	12,303	+5,789(+145)
Local currency (million Pesos)	0	284	318	+ 318 (+ 34)
Total (¥ 1 million)	13,569	26,132	24,849	+11,280(-1,283)

(Conversion rate) At the time of appraisal (October 1988) = 1 Peso = ¥6.3, (January 1992) = 1 Peso = ¥4.81,
At the time of completion (1995) = 1 Peso = ¥3.66.

Note 1: is a plan in May, 1989, and Note 2: is a plan in Jan, 1993
Note 3: Figures in the parentheses show the difference between plan in Jan. 1993 and actual.
Note 4: This project cost relates to ODA loans portion. The cost for other wells already installed is not included. The ODA loans are for foreign and a part of local currencies.

2. Analysis and Evaluation

2.1 Evaluation of Project Implementation

Introduction

The plan for the Palinpinon II Geothermal Project called for the installation of four generators, rated at 20MW each, to generate a total of 80MW. These generators were located on three sites, Nasuji, Okoy and Sogongon (two generators).

Under the plan, the steam supply for the generators was to be provided by the boring of 16 production wells (three or which are spares). Separated hot water was to be returned underground through six reinjection wells. Of these wells, boring of fourteen production wells, including the spare wells is complete. Therefore, the loan request to the OECF for the steam well development project was to cover the project cost for the remaining two production wells and the six reinjection wells.

For the transmission cable, the route of the seabed cable between Negros and Cebu islands was changed from the original plan, which was to run the cable between Jilocon and Liloan, but changed to between Pundol and Suba.This rerouting led to a request from the government of the Republic of the Philippines for additional financing and a supplement loan agreement was concluded for this purpose.

This project was co-financed with the World Bank. Finance from each source was allocated as shown below.

① Steam Well Development Project	ODA Loan Portion
② Generating Plant Construction Project	World Bank Loan Portion
③ Construction Project of Electricity Transmission Cable	ODA Loan Portion

This project will be analyzed and evaluated on the basis of the above background.

2.1.1 Project Scope

This project comprises the following three main elements.

① Geothermal Well Development Project: Boring of production wells and transmission of the vented steam and hot water through a pipeline to a separator, which sends only steam to the geothermal generating station. Reinjection wells are bored to return the hot water underground.

② Generating Plant Construction Project: A total of four generators of 20MW capacity each are installed on three sites at Nasuji, Okoy and Sogongon.

③ Construction Project of Electricity Transmission Cable: Laying of a transmission cable with aerial and seabed portions to carry the generated electricity to Cebu Island.

① Geothermal Well Development Project (ODA-financed portion)

As was mentioned in the foreword, the plan for Palinpinon (II) Geothermal required the boring of 22 wells (16 production and 6 reinjection wells). This ODA loan was to cover two of the production wells and six reinjection wells. In fact, the total number of wells required was changed to 23, (18 production and five reinjection wells). As a result, the number of production wells bored under the ODA loan was increased by two to four and the number of reinjection wells was reduced by one to five. This happened because the two production wells, when bored, did not produce the expected volume of steam, necessitating the boring of two more. On the other hand, it was judged that five reinjection wells would provide adequate reinjection capacity, rather than the planned six, so the number of borings was reduced by one.

Finally, two production wells which first went boring, yielded steam suitable for power generation. Now, with the exception of one well which has problems with the composition (quality) of its steam, three production wells are in use for generation. (The condition of this well is described later in the section on Operations and Maintenance).

As will be noted in 2.1.3 the section on project cost, the changes were in response to the technical demands of the job. It is judged that these changes were reasonable from the viewpoint of project scope (The OECF has approved this revision).

As for the employment of consultants, the initial plan for the geothermal well development called for the use of consultants in the civil engineering technical survey, to support the design process, to inspect materials and equipment and to stimulate the project's progress. In practice, no consultants were employed. By 1990 the PNOC-EDC had already selected the consultants and the OECF had approved the selections as suitable. Then, according to the procedure that was required at the time, the PNOC-EDC submitted an application concerning the selection of consultants to the Office of the President in September 1990, to receive government approval. Following this application, however, approval was not forthcoming. Bearing in mind the importance of consultants in this project, the OECF urged the Office of the President and the National Economic Development Agency (NEDA) to expedite the approval. As a result, approval was granted by the Philippines government one year after the executing agency submitted the application. During that time the actual construction work on the geothermal wells had largely been completed and the executing agency decided to do without consultants. (This delay in administrative procedures by the Philippines government was an isolated occurrence. A revision of the government's internal regulations thereafter has prevented any further project delays for similar reasons).

② Generating Plant (World Bank-Financed Portion)

The generating plant was constructed with finance from the World Bank. In this construction project there was no alteration to the overall generating capacity, but the initial planned locations, two generators in Nasuji, one in Okoy and one in Sogongon, was changed to one in Nasuji, one in Okoy and

two in Sogongon. (See 1.1 Project Location). Problems in the site conditions at Nasuji led to the relocation of one of the generators allocated from Nasuji to Sogongon. This change was needed because in Nasuji, which was scheduled to receive two generators under the initial plan, the rock strata and other conditions were found to make ground leveling and preparation difficult. One of the two generators was placed in Sogongon instead to reduce this problem. However, the unexpected addition of one more generator to the Sogongon site necessitated the improvement of soft soil to secure an adequate area of level ground. This operation caused the delays and increased costs which will be detailed later.

③ Transmission Cable Construction Project (OECF-Financed Portion)

The route of the cable was changed in the seabed section running between Negros and Cebu islands. (See 1.1 Project Location). As a result, additional finance was requested for the project.

Problems of seabed topography and ocean currents led to a revision of the route. Initially, the cable was to run from Jilocon to Liloan, but the route was moved to run between Pondol and Suba. As a result, the length of the aerial and seabed cables had to be reviewed and the original loan amount was clearly no longer adequate to cover the increased project cost. An additional loan was requested.

The detailed survey of the route of the seabed cable was to be conducted after the start of the project within the TOR (Term of Reference) for the consulting service. As a result, the revision of the route of the seabed cable appears to have been unavoidable. There was no major disparity between the plan after the revision and the actual result.

(The report of the feasibility study conducted by the NPC, who was the executing agency for the projects of generating plant and transmission cable at the time, contains no comments or information regarding seabed topography and currents. The route seems to have been selected purely on the basis of the shortest distance between Negros and Cebu Islands. In the light of this experience, the OECF conducted a SAPROF (Special Assistance for Project Formation) in August 1996 for the NPC's project to lay a seabed cable between Leyte and Bohore, in order to assist the NPC's feasibility study. The NPC also received technical transfer assistance from the OECF in its survey of the seabed).

2.1.2 Implementation Schedule

The project as a whole, including the portion financed by the World bank, which was due to be completed in October 1992, was completed 29 months later in March 1995. Transmission of electricity began in May 1995.

This delay was due to an 8 months delay in the start of the design process for the boring and development of the geothermal wells and the construction period overrunning 21 months. The reasons why construction period overran by 21 months are, as mentioned in 2.1.1 Project Scope, mainly the alterations in the number of well borings and the route of the seabed cable. The breakdown of the delays is indicated below. (However, it was possible to implement the three portions of the project, the

geothermal well development, the laying of the transmission cable and the construction of the generating plant, in parallel. Therefore it is difficult to say exactly how long a given problem influenced the overall delay. The following information is based on interviews with the PNOC-EDC and the NPC).

① When the geothermal wells were bored at the planned locations, they did not initially produce the required amount of steam. Reboring and other civil engineering works were necessary to resolve this problem, resulting in an extended construction period for these works.

→ A delay of 16 months, mainly due to problems ① and ②.

② Bidding from suppliers of equipment and materials for the geothermal well development project did not proceed satisfactorily and had to be repeated many times, a process which required considerable time.

③ The location of one of the generators was altered, necessitating additional ground preparation for the generating station. This lengthened the time necessary for the civil engineering works.

→ A delay of 3 months.

Other than these main reasons for the lengthening of the construction period, there were delays in the delivery of cement, a typhoon caused wind and water damage, and when sub-contractors were changed, the old sub-contractors did not prepare the necessary documentation indicating the progress of the work (lack of administrative continuity). These failures invited further delays. As described before, it was possible to implement the three portions of the project, the geothermal well development, the laying of the transmission cable and the construction of the generating plant, in parallel, the rerouting of the seabed cable did not cause significant influence for the delay.

The completion of the implementation schedule itself was far overdue. Of the various reasons for the delay, most, with the exception of repeated tendering for equipments and materials procurement, were changes in the content of the project in response to technical demands. Therefore, most of the delay can be judged to have been unavoidable.

2.1.3 Project Cost

The actual cost of the entire project, including the World Bank-financed construction of the generating station, exceeded the initially-planned amount by ¥8,114 million in foreign currency and 1,167.6 million Pesos of local currency.

Within this increase, the cost overrun on the construction of the World Bank-financed generating station amounted to ¥5,789 million in foreign currency and 318 million Pesos of local currency. This represents over half the increased cost of the Palinpinon II Geothermal Project. According to the World Bank Implementation Report, the project cost of the generating plant was estimated at the time of

appraisal (June 1989) at US$80.2 million, but by the time of completion, this cost had risen to US$109.11 million, an increase of US$28.91 million. The stated reasons for this increase were added costs associated with the prolongation of the implementation schedule and exchange rate fluctuations. On the other hand, the new cost increase of 318 million Pesos of local currency was due to the relocation of one generator to Sogongon, as mentioned in 2.1.1 Project Scope, which incurred additional costs, mainly for ground preparation.

The geothermal well development project actually cost ¥513 million less than planned in its foreign currency cost, but the local currency cost was up 739.2 million Pesos. The increase in local currency cost was due to the increased number of wells, which led to increased costs for steam separation and collection equipment, construction costs for electrical equipment and for additional facilities. On the other hand, international competitive bidding produced a comparatively low cost for procurement of parts, leading to a reduced foreign-currency cost.

The cost overrun on the transmission cable construction was ¥2,838 million in foreign currency and 110.4 million Pesos of domestic currency. The increase in foreign currency cost is mainly due to the rerouting of the seabed cable. As detailed design for the seabed cable was not made at the time of the initial plan , the actual cost was different from that estimated at the planning stage. More precisely, the revised route was longer than the original plan. These factors led to an increase of ¥2,928 million on the foreign currency cost of this part of the project.

At the time of the initial plan, the rate of inflation in prices was estimated at 0%p.a. in foreign currency and 9%p.a. in local currency. In fact, as local currency inflation was 12% (the average rate of price increase in the construction industry in the Philippines over the implementation period, 1989-1994), this difference in inflation rates does not seem to have had a great impact on project cost.

The increased number of wells, and particularly the added production wells, had a great impact on the project cost as well as on the length of the implementation schedule. The reason behind this change is a common problem with geothermal generation projects, which is that some wells bored as production wells often cannot be used for that purpose. These are called failed wells. The number of wells drilled for the Palinpinon II Geothermal Project, including failed wells, was 23% greater than planned. Comparing this figure with similar projects in the Philippines, the southern Negros Geothermal Project (the Palinpinon I Geothermal Project) exceeded the planned number of wells by 38%, while the actual bored number for the Tongonan Power Plant Construction Project was 21% less than planned. In short, it is generally difficult to accurately predict the volume of steam from a well at the planning stage, so there is no guarantee that wells will produce the planned steam volume. However, it is not practically possible to set aside excessive reserves to avoid shortage of fund after the project initiation. In future geothermal generating projects of this type, it is important that the possibility of failed wells should be built into the planned implementation schedule and project cost when initial implementation schedule and project cost are studied. Moreover, it is more important to take prompt and flexible action when additional fund is required. In this project, some reserve was built in against additional costs, but the

allowance was 10% of consultant fees and 5% of other project costs.

2.1.4 Implementation Scheme

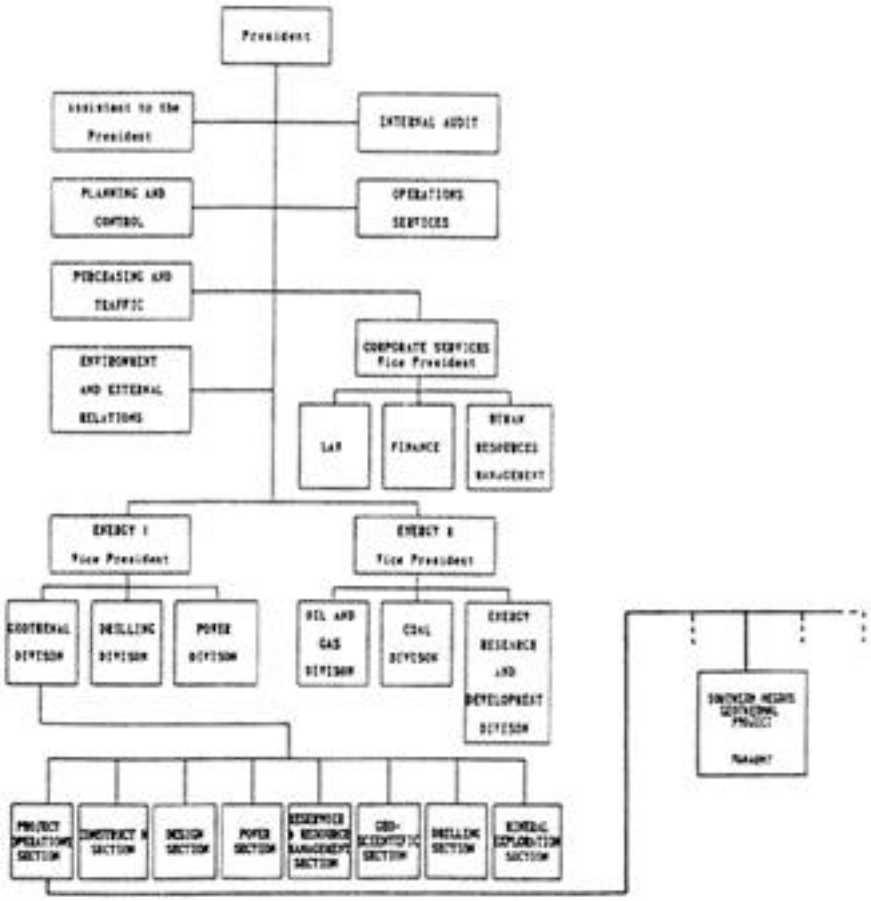
Project implementation was done by two agencies according to the phases of its development, as shown below.

① Geothermal well development

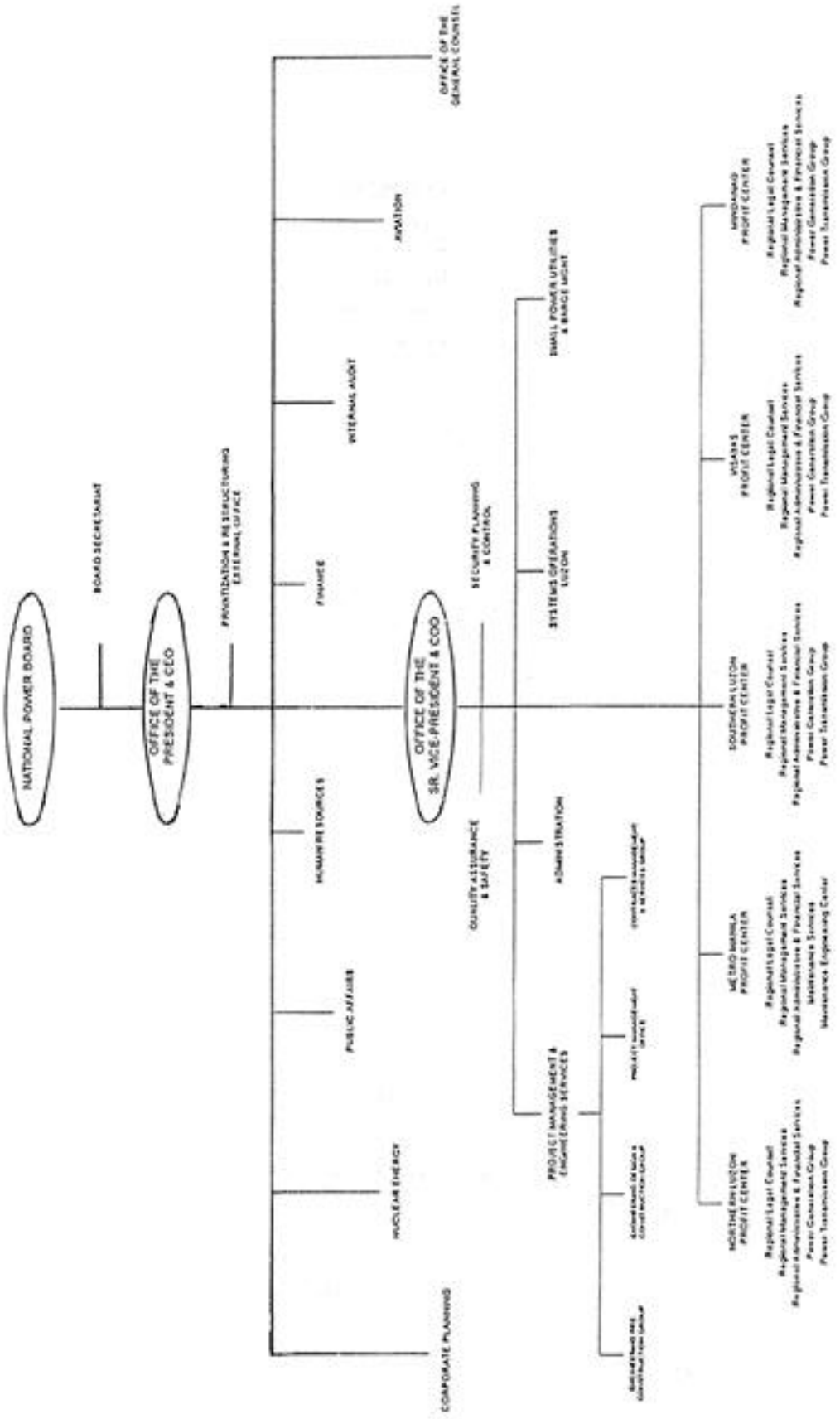
The executing agency was the Energy Development Corporation (EDC), a wholly-owned subsidiary of the Philippine National Oil Company (PNOC), which is in turn a wholly government-owned corporation.

② Power transmission cable construction and generation station construction

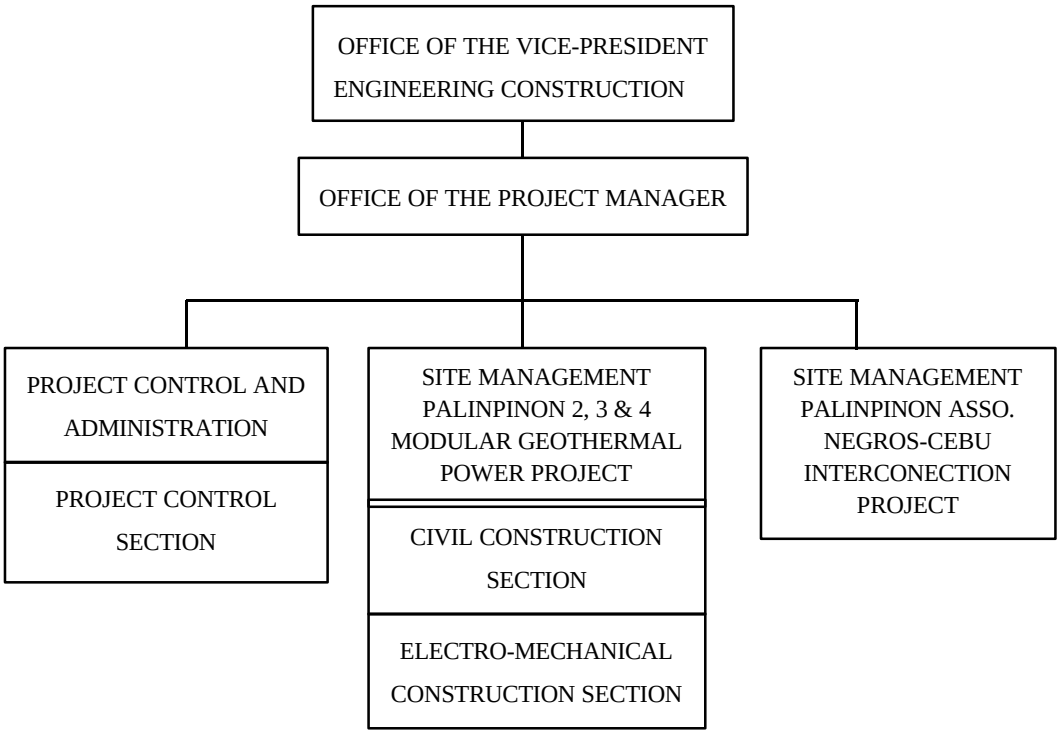
The executing agency is the National Power Corporation (NPC), a wholly government-owned corporation.



【Figure 2.1 Organization Chart of PNOC-EDC】



【Figure 2.2　　Organization Chart of NPC】



【Figure 2.3　Organization Chart of NPC (Palinpinon Geothermal Project)】

• The PNOC-EDC Implementation Scheme

Other than the inability to employ consultants, there were no notable problems in the PNOC-EDC implementation scheme. Tendering from contractors was, in principle, open to international competitive bidding, but limited competitive bidding was allowed for some contractors. In these cases, tendering was limited to certain contractors in the light of their past record of achievement in the Philippines. These were approved by the OECF at the time of contracting on the basis of each contractor's P/Q (prequalification). There does not appear to be any significant problem with this selection process.

On the other hand, the increase in the number of wells bored is not considered a significant problem because, in the end, all but one of the wells is in use for electricity generation. The executing agency also acted appropriately to make up for construction delays by extending the working hour per day, increasing the workforce and strengthening contractor management performance.

• The NPC Implementation Scheme

The construction of the generating plant, which was funded by the World Bank, was delayed by the relocation of one of the generators, and the project cost was increased. This indicates that the initial survey of the projected sites for the generators should have been conducted with more care. Furthermore, this field survey received no concrete information on what additional effort was taken to minimize the delay in the construction of the generating plant and to improve working efficiency.

The NPC states that the work and ability of the contractors involved was satisfactory. In principle, tendering was by international competitive bidding but, as was the case with the PNOC-EDC, tendering for the transmission cable and for the construction of expanded transformer stations was limited to certain Philippines contractors of proven expertise. As with the PNOC-EDC, these selections were approved by the OECF at the time of contracting on the basis of each contractor's P/Q, and there does not appear to be any significant problem with this selection process. The selection of contractors, including the ability of the selected contractors to do the job, seems to have had no particular problems.

The main tasks intended to be performed by consultant services were the detailed survey of the route of the seabed cable, the preparation of tendering documents, and supervision of project implementation. The result of consulting service chosen is reported to have been satisfactory.

- Cooperation between the PNOC-EDC and the NPC

Cooperation between the two executing agencies was an important element in the implementation of this project. The two sides held monthly meetings during the project implementation period to work together on issues such as the number of well borings, the route of the seabed cable and the delays in construction. These efforts were commendable. Since the completion of construction the two agencies have been in communication on a quarterly basis on various issues. Other than problems with the composition (quality) of the steam from one production well, which was mentioned in 2.2.2 “Operations and Maintenance”, the two agencies are cooperating well.

2.2 Evaluation of Operations and Maintenance

2.2.1 Operations and Maintenance Scheme

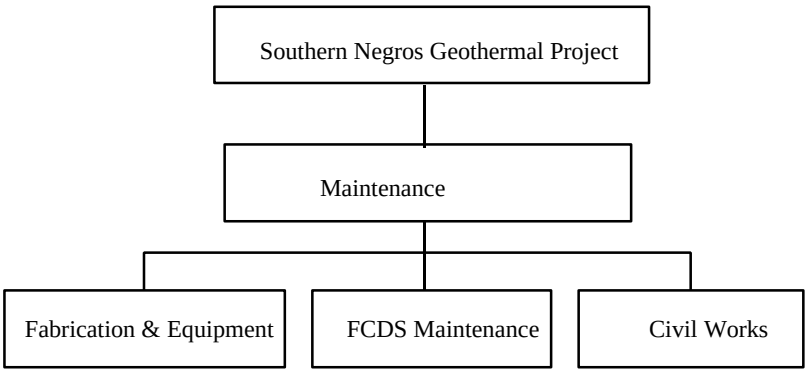
Operations and maintenance schemes devised by each executing agency are as described below.

PNOC-EDC

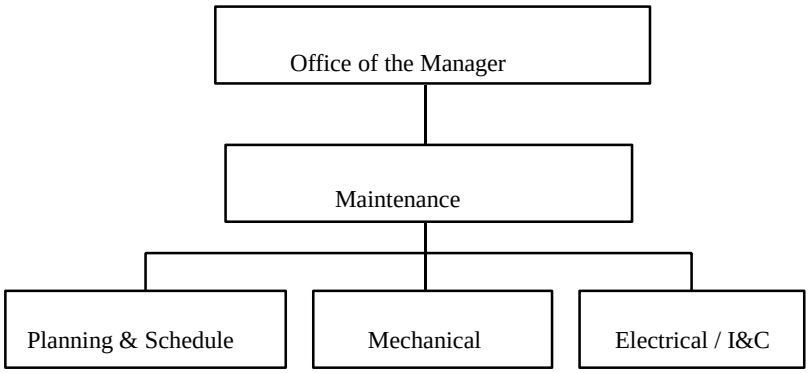
The operations and maintenance of the process of directing steam to the generating stations and returning hot water underground is handled by the same offices which handled the geothermal well development. The South Negros Geothermal Development Project, set up within the Geothermal Division, has responsibility. Under its administrative umbrella are 298 people, including 91 maintenance personnel. Of these maintenance personnel, twenty, including managers, are engineering-related posts.

NPC

The operation and maintenance management of the power station as a whole and the transmission of electricity from Negros to Cebu islands is handled by the Negros Oriental Complex. Under its administrative umbrella are 213 people, including 60 maintenance personnel.



【Figure 2.4　Organization Chart of PNOC-EDC(Southern Negros Geothermal Project)】



【Figure 2.5　Organization Chart of NPC (Negros Oriental Complex）】

2.2.2 Operations and Maintenance

Working Condition

(1) Wells

Plant for the Palinpinon II Geothermal Project is divided into three sites, Nasuji, Okoy 5 and Sogongon. The working condition of steam supply to each site is shown in Table 2.1. This table shows that, with the exception of Okoy 5, there is no problem with the generator work rates. The generator at Okoy 5 has a work rate (assumptive formula: work rate = actual load rate/ standard load rate) of 89%, which is below 100% because the maximum amount of steam which can be supplied to the generator (planned capacity = 20MW) is only equivalent to 17.5MW (Table 2.2). This is because there is a problem with the composition of the steam from one of the production wells and delivery of this steam to the generating station has now (March 1997) been suspended. According to PNOC-EDC, this is due to differences in the analysis methods and interpretation of results on the quality of steam (quantity of residual impurity in steam) between PNOC-EDC and the NPC (actually, the manufacturer, F Denki, which supplied the generating plant). The generating facilities are already complete, so the PNOC-EDC must clarify the problem, with the aid of the NPC, and quickly devise a solution. As noted above, the production wells, with the exception of Okoy 5, are currently producing adequate quantities of steam, but recorded data for the nearby Palinpinon I Geothermal Project for the fourteen years after completion show that total steam volume is now down to 75% of the starting volume. It seems probable that the Palinpinon II Geothermal Project will experience a similar diminution of steam volume in the future.

The Palinpinon II Geothermal Project has been using five reinjection wells since it began operation and these have experienced no problems. However, as the operation started only less than three years ago and in consideration of the fact that Palinpinon I is now experiencing decline of 6.7% per year in reinjection well capacity, it is likely that further reinjection wells will have to be bored in the future.

【Table 2.1 Working Condition of Generators】

Location of Plants	Work Rate
Nasuji	99%
Okoy 5	89%
Sogongon	104%

Note: Work rate = actual load rate/ standard load rate

【Table 2.2 Actual Generator Capacity】

Location of Plants	Planned Capacity (MW)	Allowable Capacity (MW)	Operable capacity (MW)
Nasuji	20 X 1	34	20
Okoy 5	20 X 1	18	17.5
Sogongon	20 X 2	47	40

Note: Allowable capacity refers to the generating capacity calculated from the capacity of the production well.
Operable capacity refers to the generating capacity as limited by the generating equipment, assuming the capacity of the production well is adequate.

(2) The transmission cable between the Amlan Substation in Negros Island and the Naga Substation in Cebu Island

In 1994 when the transmission cable linking the electrical systems of Cebu and Negros Islands was completed, power transmission from Cebu to Negros was as high as 60% of transmission from Negros to Cebu (38,571MWh/62,933MWh, as shown in Table 2.3).

From the start of 1995, however, power transmission to Negros Island reduced, as the Palinpinon II Geothermal Project came on stream, falling almost to zero by the end of the year (89MWh in December 1995). Conversely, the average power transmission from Negros to Cebu in late 1995 (September to December) was in the range 30~50MW. Maximum power value, if a load rate is assumed at 70% , is equivalent to 40~70MW. There have been no breakdowns in the transmission cable link and there has only been one interruption for maintenance work to prevent reactor at the Amlan Substation. Clearly, operation of the transmission cable link is stable.

【Table 2.3 Cebu-Negros-Panay Linking Transmission 1994 - 1995】

	1994	'95 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	**1995**
Receiving power														
Power volume (MWh) Cebu → Negros	**38,571**	1,579	1,313	381	1,939	259	189	140	428	42	22	7	**89**	6,387
Average power (MW)*	21.1	10.2	8.5	2.7	12.5	1.7	1.2	0.9	2.8	0.3	0.1	0.0	0.6	3.5
Transmission power														
Power volume (MWh) Cebu ← Negros	**62,933**	5,093	7,669	10,093	5,504	14,687	11,739	11,478	11,558	23,213	21,968	40,290	25,484	188,776
Average power (MW)**	9.1	8.6	13.0	19.0	9.3	25.8	19.9	20.1	19.6					16.9
Average power (MW)***										**31.2**	**30.5**	**54.2**	**35.4**	**37.9**
No. of days	*365*	*31*	*31*	*28*	*31*	*30*	*31*	*30*	*31*	*31*	*30*	*31*	*30*	*365*

Source: Annual Operational Report (Amlan Switchyard)
* Estimated as 5 hours for receiving power time
** Estimated as 19 hours for transmitting power time
*** Estimated as 24 hours for transmitting time

(3) Generating plant

The working condition of the generating plant on the three sites was as shown below during 1996. The work rates, expressed as a percentage of the output for 24-hour operation at full capacity, are high. (The plant capacity is calculated from the operable capacity in Table 2.2. Therefore, the value for Okoy 5 is calculated at the equipment capacity of 17.5MW).

【Table 2.4 Working Conditions for Each of the Generating Plants (FY '96) 】

Location of Plants	Generating Volume Actual (MWh)	Full Capacity Operation (MWh)	Work Ratio (%)
Nasuji	130,718	175,200	75
Okoy 5	116,850	153,300	76
Sogongon	275,711	350,400	79

Source: PNOC-EDC

(4) Environmental Operations and Maintenance

Environmental survey:

Some of the production wells for future generation are operating on a trial basis, and the hot water from these is being discharged to rivers. The PNOC-EDC is monitoring the environment to assess the impact of these discharges on plant and animal life. This monitoring consists of daily sampling of river water at nine locations. These samples are only tested for boron concentration by an on-site analytical method. The PNOC-EDC suspends the venting trials when the concentration exceeds a standard threshold value. This standard threshold value is currently set at 2ppm, but it will be reduced to 0.75ppm from next year. It will be difficult to clear this stricter standard using current practices, so the PNOC-EDC is now considering other ways of returning water to the rivers. The PNOC-EDC conducts arsenic analyses at its head office, and the arsenic level has never exceeded the drinking water standard (0.1ppm). In any case, to clear domestic standards from next year, the method of returning water from the production wells under trial operation will have to be changed. As the method of discharging the hot water directly into rivers is not used in similar geothermal generation in Japan, even on a trial basis, it is not desirable in view of the impact on environment.

Scenic management:

The pipes for supplying steam and hot water are painted green on the outside to lessen their visual impact on the environment. This is an improvement on the Palinpinon I Geothermal Project.

The above points show that, while there remain “some outstanding problems in some technical aspects”, the state of operation of this project's equipment demonstrates that operations and maintenance is being conducted properly. However, as was noted in the description of the project's working conditions, records for the Palinpinon I Geothermal Project show that there will be an unavoidable decline in the work rate of the wells. This problem must be taken into account in forecasts and in electrical power planning, and the necessary financial arrangements must be made in advance.

(Some Outstanding Problems in some Technical Aspects)

(1) Well boring

“The necessity of planned development of production and reinjection wells on the basis of scientific data”

The total volume of vented steam at the Palinpinon I Geothermal Project has been declining over the years while the enthalpy (the state of thermal energy) has been rising. From this situation, it can be inferred that, overall, the supply of water to the steam reserving strata is insufficient. The PNOC-EDC is apparently aware of the fact that return of hot water to the ground is necessary, not only for purposes of environmental preservation, but also to manage the geothermal aquifer. However, from their planning of reinjection wells and from views they have expressed, their approach appears to be one of trial and error in many cases. (For example, they plan to use failed production wells as reinjection wells. When the returned hot water appears to be cooling the geothermal aquifer, they repeatedly bore reinjection wells at small distances from production wells. This practice, even though it does not cause cooling in the short term , risks diminishing the capacity of all production wells in the long term, and is certainly undesirable).

The success rate in boring production wells at the Palinpinon II Geothermal Project is 82%, which is high compared to the general level encountered in geothermal generation projects. Therefore there is no problem in this regard at present. However, the method of drilling reinjection wells must be reviewed with consideration for the long term stability of the geothermal aquifer. This must start with the creation of a model of the geothermal aquifer into which regularly-measured parameters for the wells and data derived from tracer tests and the long-term monitoring of pressure and temperature in multiple monitoring wells can be entered. The planning of reinjection wells must be based on this kind of numerical simulation of the geothermal aquifer.

The OECF, recognizing the importance of such advance technical studies concerning the boring of production and reinjection wells, conducted a SAPROF on "The North Negros Geothermal Generation Project" in December 1995, to supplement the PNOC-EDC feasibility study. The OECF is also transferring the latest technology to the PNOC-EDC for surveying geothermal resources.

(2) Steam and hot water transmission equipment

Some localized defects in the civil engineering works have been noted. The volume of rainfall in the area brings the risk of landslides, which could destroy the steam and hot water transmission equipment. If this happened, the repair work would be extremely difficult and the impact on the environment would be severe. Remedial measures should be taken urgently to prevent such a disaster.

(3) Other

Swallows are able to fly into the generator buildings and their nests, when built inside, can cause machinery malfunctions. Barriers must be erected to prevent their entry.

2.3 Project Effects and Impacts

2.3.1 Plan

The project was initially expected to yield the effects described below.

(1) Qualitative effects
   1) Stabilization of electrical supply: Diversification of sources of electricity, use of domestic energy (reduction of crude oil imports) and improvement of the electrical grids.
   2) Promotion of industry and improvement of the standard of living.

(2) Quantitative effects
   1) Financial Internal Rate of Return (FIRR): 11.1%

The projects success in achieving the above is an analyzed below.

2.3.2 Actual

(1) Qualitative effects

1)-a) Stabilization of electrical supply

As Tables 2.5 and 2.6 show, the completion of the Palinpinon II Geothermal Project created a new supply of 80MW of electricity in the Visayas region, thus diversifying sources of electricity and improving the electrical grid.

【Table 2.5　Actual Results of Changes for Facility Capacity】

Visayas	1987		1994	1995	
	MW	**Composite (%)**	MW	MW	**Composite (%)**
Hydraulic	2	**0.3**	7		**0.8**
Geothermal	234	**38.9**	268	308	**33.2**
Thermal-coal	105	**17.5**	160	160	**17.3**
Thermal Note) -oil	260	**43.3**	427	452	**48.8**
Other	0	**0.0**			
Total	601	**100.0**	862	927	**100.0**

Note: Including diesel
Source: 1995 NPC Annual Report

【Table 2.6　Actual Results of Changes for Electric Power Consumption】

Visayas	1987		1994	1995	
	GWh	**Composite (%)**	GWh	GWh	**Composite (%)**
Hydralic	9	**0.5**	9	10	**0.3**
Geothermal	806	**47.6**	1,464	1,782	**52.7**
Theermal - coal	78	**4.6**	523	591	**17.5**
Thermal- oil	800	**47.3**	1,032	997	**29.5**
Total	1,693	**100.0**	3,028	3,380	**100.0**

Source: 1995 NPC Annual Report

1)-b Reduction of crude oil imports

By using geothermal energy, a domestic energy source, the Palinpinon II Geothermal Project has achieved savings of crude oil imports worth US$2.24 million in 1994, US$10.3 million in 1995 and US$16.6 million in 1996. These figures are produced from comparison with the crude oil cost of the same amounts of electricity generated by thermal power generation (by diesel generators in the same Visayas region).

【Table 2.7　Reduced Amounts for Crude Oil Import】

Fiscal Year	Recorded Power Consumption volume (Gwh) A	Substitute Fuel Consumption Volume (liter/kwh) B	Fuel Price (US$/liter) C	Reduced Amounts ($ 1 million) D=A×B×C
1994	63	0.255 note 1)	0.1393 Note 2)	2.24
1995	290	0.255	0.1393	10.30
1996	467	0.255	0.1393	16.60

Note 1: The figure of substitute fuel consumption are taken from the Post-evaluation Report on the South Negros Geothermal Generation Project. They are recorded fuel consumption figures for diesel generators in the Visayas region.
Note 2: The import price of crude oil for the Philippines in 1995, obtained from the Philippines' yearbook for 1996.

2) Promotion of industry and improvement of the standard of living

The increased electrical supply due to this project is equivalent to around 10% of the total electrical supply in the Visayas region. It is difficult to accurately gauge the project's effect in promoting industry and improving the standard of living, but the rise in GDP in the Visayas region, the area covered by the project, shows a certain rise, as seen in Table 2.8. Therefore, it can be inferred that the additional electrical supply provided by this project has made at least some contribution to the promotion of industry. As Figure 2.4 indicates, nearly half of the electrical power used in the Visayas region is residence consumption, and Table 2.9 shows that electrification is spreading steadily. Clearly this project has had some effect in improving the lives of the people.

【Table 2.8 Changes of Actual GDP by Region】

(Unit:Million Pesos)

	1987	**1994**	**1995**
West Visayas Region	44,858	57,058	58,227
Central Visayas Region	39,662	49,663	52,680
East Visayas Region	16,175	18,387	19,374
	100,695	125,108	130,281
The Philippines	616,926	766,451	803,450
Visaya's growth rate		**3%**	**4%**
Growth rate for the Philippines		4%	5%

Based on the standard of 1982 price level.

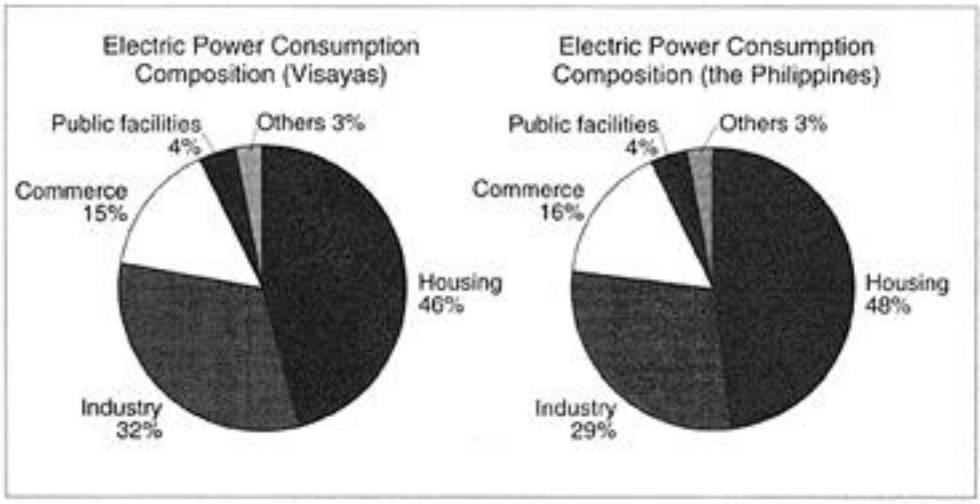
【Table 2.9 Changes of Electrification by Region (via power distribution companies) 】

(Unit:No. of houses)

	1993	**1994**	**1995**	**1996**
West Visayas Region	342,353	365,181	389,894	409,559
Central Visayas Region	240,496	259,150	277,808	294,313
East Visayas Region	208,250	222,143	239,676	256,756
	791,099	846,474	907,378	960,628
Latent demands			1,969,000	1,993,000
Electrification rate			**46%**	**48%**
The Philippines	6,500,876	6,926,035	7,390,267	
Latent demands			10,717,000	
Electrification rate			**69%**	

Source: NEA 1993-1995 Regional Electrification Annual Report

【Figure 2.4】



Source: NEA 1993-1995 Regional Electrification Annual Report

(2) Quantitative effects

Financial Internal Rate of Return (FIRR):

The FIRR was predicted to be 11.1% at the time of the appraisal. This was calculated as the profitability within the NPC on the basis of records at the time (1987) for the unit sale price of electricity and the unit cost of obtaining steam. However, to consider the profitability of the project as a whole, the PNOC-EDC, which constructed the geothermal wells, must be considered as well as the NPC, which constructed the generating plant. This point was considered in this new calculation, and the 14 wells which had already been bored were included. Considering also the rate of decline of the production and reinjection wells of the Palinpinon I Geothermal Project, the cost of boring the additional wells which Palinpinon II Geothermal Project can be expected to need in the future, was also included in the calculation process. The FIRR, recalculated on the basis of these assumptions, becomes 10.2% for the NPC and the PNOC-EDC together.

(3) Other Effects

Creation of employment

Through the geothermal well development portion alone, this project created as many as jobs of 5,000 persons in the region during the project implementation period, as well as creating other employment opportunities.

2.4 Pending Issues

2.4.1 Electrification

As was noted in section 2.3 Project Effects and Impacts, this project has increased the supply of electricity in the Visayas region. It also appears to have raised the rate of electrification. As Table 2.9 showed, the electrification rate in the regions（calculation limited to electricity supplied through power distribution companies）remains low in comparison with the country as a whole . (In 1995 the rate for the overall Philippines was 69%, while the rate in Visayas was 48%).

Interviews with residents of the project area (those living close to the area of the Palinpinon II Geothermal Project in South Negros Island) show that, while the situation is improving, problems occur constantly, such as brownouts at times of peak electrical usage (6~10pm), which disable televisions.

Therefore, ongoing improvement, to raise the electrification rate, as means of stepping up electrical supply, is an important task in the Visayasas region.

2.4.2 Electricity charges

As was noted in section 2.3 Project Effects and Impacts, the Financial Internal Rate of Retun (FIRR) of this project is high, but the analysis of profitability did not extend beyond the sale of electricity to electricity distributors by the NPC. In this analysis, the unit sale price charged by the NPC to distributors was ¥8.8~12.4/kwh (2.0~2.8 Pesos/kwh) as of December 1996. The cost to the end user is this price plus the costs and profits of the distributor. According to the NPC, the unit sale price of electricity to end users in Visayas varies between areas, but is approximately ¥18/kwh (5 Pesos/kwh). In one area of Leyte, where distribution costs are high, the charge is as high as ¥25/kwh (7 Pesos/kwh).

Considering the average income in the Philippines, this is extremely expensive, becoming more so in country regions. This means that, for poorer people, even if their homes are supplied with electricity their actual benefit is very limited. In fact, in interviews with residents in the area (near the Palinpinon II Geothermal Project in South Negros Island), many people were found to use no more electricity each month than the minimum amount provided to them as public subsidies.

These are other problems, which demands continuing efforts from the Philippines' electricity sector.

To solve these problems, the government of the Philippines is now considering reforms of the electricity sector, including privatization of the NPC. The details of these reforms is described in the attached research report.

Research Report

Financial Characteristics of Government-owned or Controlled Corporations in the Philippines

Akihiro Nakagome

Financial Characteristics of Government-owned or Controlled Corporations in the Philippines

< A Research Report >

1. Composition of This Report

This report[1] is to ascertain characteristics of Government-owned on controlled Corporation (GOCC) by gathering information on the finances of GOCCs in the Philippines, based on their annual reports. Before reaching their characteristics, we compared GOCCs with private corporations to clarify what points they have in common. We also looked at the characteristics of Japanese GOCCs for purposes of comparison with the Philippine GOCCs. The Philippine National Power Corporation (NPC), which is predominant among Philippine GOCCs, is moving towards privatization, so we will also refer to that privatization process and see how it relates to the financial characteristics of GOCCs.

1 This report is made through collection and analysis of data and information at time of the post-evaluation for Palinpinon(Ⅱ) Geothermal Project in February 1997. Therefore, the data used in the report are the latest that could be obtained then. However, it shall be noted that the changes after that cannot be reflected in the report. Furthermore, the opinions described in this report are the personal opinion of the author who conducted the studies and analyses, not the official opinion of the Overseas Economic Cooperation Fund.

2. What are GOCCs?

2.1 Characteristics of GOCCs

GOCC is a corporation established by either a special statute, or a part of the government and intended to be independently financially viable. It has both public and corporate characteristics. Classifying GOCCs by their forms of management, there is either direct or indirect government control, public or private ownership of capital, and management by central or regional government. As GOCCs are a kind of corporation they do seek profit, but in their case the profit sought is a reasonable one consistent with the maximum public good. Therefore, although the financial statements of GOCCs are based on the accounting principles of for-profit corporations, the financial figures and disclosures contained in the statements reflect the unique characteristics of GOCCs in the ways described below.

Firstly, there is the principle of self-sufficiency. This means that, with a view to independent profitability, all costs arising should be met from revenues. Thus base costs and prices must be determined according to the break-even point. However, this principle applies in the case where the GOCC charges just enough to cover its expenses. If revenue is insufficient to cover costs, the GOCC can raise its prices or improve its efficiency to reduce base costs. In case of difficulties of any kind, the government will pay subsidies. However, if it is a fixed assumption that the GOCC is covered by subsidies against any shortfall, the result is often an erosion of the will to try to reduce costs and improve service. This kind of problem is commonly manifested on the financial statements as an increasing share of costs due to personnel, excessive buildup of inventory and equipment, and declining asset valuation due to equipment dilapidation caused by poor internal management.

Next, the methods of funding capital should be considered. In the case of GOCCs, capital is contributed by the government. If further capital is required, the GOCC should ideally fund capital by himself, according to independent profitability. Borrowing from outside of the government is also necessary because it reduces dependence on the government. Reduced borrowing from the government, replaced by increased borrowing from private-sector at close to market interest rates will increase the interest payable on loans and put pressure on the profitability of the GOCC concerned. However, such borrowing is important as it also serves to stimulate the GOCC's independence and avoid government interference. It is also a necessary measure for the government to reduce the financial burden on the state.

In the event that a GOCC generates a surplus profit, the state can draw off a certain amount in taxation or payments to the treasury, or the GOCC may be allowed to dispose of its surplus at its own discretion. This latter option is important where independent profitability is emphasized, within bounds consistent with that aim. If the GOCC's profits, earned through enterprising efforts, are forcibly siphoned off by the government, the GOCC will not be able to accumulate capital for further business development. This will suppress the vitality of its business activity. Conversely, excessively preferential treatment in taxation is unfair to private corporations as it is against the principle of free competition. It is important, therefore, to know how profits of the GOCC’s were handled through their balance sheets in order to understand the state policy and attitudes.

2.2 Japanese GOCCs

In 1982 and 1983, the three Japanese public corporations (Japan National Railways, the Nippon Telegraph and Telephone Public Corporation and the Tobacco and Salt Monopoly) were converted into stock companies on the recommendations of the Special Administrative Study Group. This decision was intended to restructure their operations, prevent them from holding complete monopolies, and adapt them better to the high information society, as well as acceding to foreign demands for greater market access. As a result, Japan National Railways was split, and six passenger railway corporations and one freight railway corporation were established (JR). The debts of the former Japan National Railways were taken on by the Japan National Railways Settlement Foundation. The Nippon Telegraph and Telephone Public Corporation and the Tobacco and Salt Monopoly were privatized as Nippon Telegraph and Telephone Corp. (NTT) and Japan Tobacco Corp. (JT), respectively. As of March 31st 1996 the government still held shares of 65% and 80% respectively in these two corporations. The Japanese government holds investments in a total of 94 companies, including NTT, JT and the Japan National Railways Settlement Foundation as of March 31st 1996. The 94 companies are composed of 9 finance corporations, 4 banks, 13 public corporations, 64 business consortia and 4 special companies. These fit the description of GOCCs for the purposes of this report. (There are also five savings and insurance organizations which should be excluded from consideration here, because the government does not hold a majority of shares, but they are included as their influence on overall figures is slight. The GOCCs financed by regional governments are excluded from the examination in this report). Of the total capital value of these 94 companies (¥29.5 trillion), the value of government investment is ¥28.3 trillion. The value of their long-term borrowing, including bonds, is ¥282 trillion, of which over ¥244.5 trillion is borrowing from government investment finance. Thus these companies rely on the state for around 87% of their borrowing. Among these companies, 16 were expected, from their income statements on March 31st 1996, to record losses. The GOCCs making large losses were the Japan National Railways Settlement Foundation, the Honshu-Shikoku Bridge Link Consortium and the Kansai International Airport Co., Ltd. Setting aside the Japan National Railways Settlement Foundation as a separate case, the Honshu-Shikoku Bridge Link Consortium and the Kansai International Airport Co., Ltd. receive no subsidy income from the government. In other words, the Honshu-Shikoku Bridge Link Consortion and the Kansai International Airport Co., Ltd. made losses on their income statements, as a result of preserving their self-sufficiency. On the other hand, most of these GOCCs, while they do record profits, are receiving revenue support from the state coffers in the form of subsidies such as receipts from general accounts, government grants and revenue subsidies. With the exceptions of NTT, JT, the Development Bank of Japan, the Export-Import Bank of Japan, the Central Bank for Commerce and Industry and the Electrical Power Development Co. Ltd., all the companies, if not receive government support, will make losses on the term. These facts demonstrate that most GOCCs in Japan do not function as independent corporations.

2.3 Philippine GOCCs

In the year to December 1995, there were 58 GOCCs in the Philippines, which fell into three main groups:

① 14 major GOCCs. [2]

② 10 companies receiving direct government investment.[3]

③ A further 34 companies which, while they receive no government funding, are placed under government control.

The capital value of these GOCCs is 340,800 million Pesos, which breaks down as 242,400 million Pesos in group ①, 66,800 million in group ② and 31,300 million in group ③. Groups ① and ② occupy a share of over 90% of the total capital value. The total value of long-term borrowing by the 58 companies is 302,600 million pesos, but 212,100 million of that (70%) is procured from overseas, mostly in the form of loans from international aid agencies. Clearly loans from international aid agencies play the same role for Philippine GOCCs as Japanese government investment finance does for their Japanese counterparts.

Profit and Loss statements for the year to December 1995 shows that, of the 58 GOCCs, 16 made a loss over the period, of which eight were in the agricultural sector. Among the profitable GOCCs, however, most were reliant on government subsidies. The total of subsidies given to these corporations in the year to December 1995 was over six billion Pesos. Had they not received these subsidies, ten more corporations would have moved from profit to loss over the term.

Considering the fact that the Philippine government acts as guarantor for borrowing from international aid agencies by Philippine GOCCs, it is clear that these corporations receive generous government protection, compared to others in the private sector.

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[2] 14 major corporations in the Philippines are as follows:
NFA : National Food Authority, NIA : National Irrigation Administration, NEA : National Electrification Administration,
NPC : National Power Corporation, PNOC : Philippine National Oil Company, LUWA : Local Water Utilities Administration,
MWSS : Metropolitan Waterworks and Sewerage System, EPZA : Export Processing Zone Authority,
NDC : National Development Company, LRTA : Light Rail Transit Authority, PNR : Philippine National Railways
PPA : Philippine Ports Authority, NHA : National Housing Authority, MMTC : Metro Manila Transit Corporation

[3] 10 Philippine Government financed companies (excluding 14 major corporations)
Land Bank of the Philippines, Small Business Guarantee and Finance Corporation, Development Bank of the Philippines,
Development Bank of the Philippines- Industrial Guarantee Loan Fund, Home Development Mutual Fund,
Philippine Crop Insurance Corporation, Philippine Deposit Insurance Corporation,
Philippine Export and Foreign Loan Guarantee Corporation, Home Insurance and Guaranty Corporation
National Home Mortgage Finance Corporation
Others
MIAA : Manila International Airport Authority, DBP : Development Bank of the Philippine

3. Accounting Principles and Practices Used by Philippine GOCCs

3.1 Accounting Principles and Practices

The accounting principles and practices applied in preparing financial statements are comparatively analyzed here according to their characteristic aspects.

【Table 3.1 Comparison of Accounting Principles and Practices Applied by Major Philippine GOCCs】

Accounting principles and Practices	NPC	LRTA	PPA	MIAA	NIA	LWUA	Japanese GOCCs	International accounting standard
Accrual basis accounting	○	○	○	○	○	○	○	○
Re-evaluation of fixed assets	○	○	○	○	○	—	×	○
Capitalization of the interest for borrowing to acquire a fix asset	○	○	—	—	—	—	○ (Some)	○
Deferral tax calculation	○	—	—	—	—	—	×	○
Capital lease accounting of BOT	○	—	—	—	—	—	○	○
Adjustment of retained earnings from the preceding term	○	—	—	—	—	○	×	○
Foreign-currency: Translation by the settlement day rate method	○	○ (Some)	—	—	—	○	○ (Short-term credit and debt only)	—

○：Used
×：Not used
—：Inapplicable or unclear

The accounting principles and practices of GOCCs exist to disclose profit and loss over the term to interested parties. As is the case with the accounting principles and practices of private corporations, the principle is that expenses and revenues are accounted for at the time they arise (accrual basis) and not at the time the actual money is paid or received (cash basis). In cases where equipment is held for long periods (mainly infrastructure), special accounting procedures are required, but on this point the accounting principles and practices employed by Philippine GOCCs reflect more realities than those employed by their Japanese counterparts. They are recognized on the international standard accounting. The characteristics accounting principles and practices employed by Philippine GOCCs are discussed below.

3.1.1 Re-evaluation of Fixed Assets

Philippine GOCCs involved in fields such as electrical power, railways and airports, have the current values of their fixed assets re-evaluated by external assessors at intervals of several years. The unrealized gain as a result of re-evaluation is disclosed separately from the other capital accounts on the balance sheets. Under Japanese accounting principles and practices, based on the

historical cost basis, the system does not allow re-evaluation of assets which leads to recoginize unrealized gain. Thus, this method is not used by Japanese GOCCs. Recognization of unrealized gain is the addition of assets and profits which are not financially underwritten. This cannot be accepted from a point of view of historical cost basis. However, if the value of equipment is held at the historical cost (purchase price) for a long period when keeping accounts concerning major equipment under conditions of intense inflation, there is the risk that there will not be sufficient accumulated capital to buy replacement equipment in the future.

Fixed assets are expended over time through the accounting procedure of depreciation, but this acts to constrain the outflow of funds which are disposed of as profits (self-finance). Under an inflationary economy, the price of fixed assets which must be re-acquired in the future keeps on rising. However, if depreciation is applied to the base of the historical cost, only the accumulated value of expenses below the historical cost will be calculated. In other words, only that amount of funding will be held internally. In the future, when it is time to buy replacement equipment, the amount of funding held internally will not meet the increased price of the equipment. Therefore, periodic re-evaluation of fixed assets is an appropriate accounting practice for GOCCs conducting infrastructure projects in developing countries suffering from inflation.

3.1.2 Capitalization of the interest for borrowing to acquire a fix asset

This practice is the inclusion of the cost (interest) of funds borrowed for the purchase, construction or manufacturing of a fixed asset in the base acquisition cost of that fixed asset. This is deemed appropriate accounting practice where the purchase, construction or manufacturing of a fixed asset requires a considerable period of time (for an appropriate asset). It is normally applicable to the fixed assets acquired by GOCCs. The basis of this accounting process is the principle of matching cost with revenue (The cost made for the revenue must match that revenue according to period). This accounting principle is also used by some Japanese GOCCs. It is a desirable procedure according to accounting theory, but in practice the costs of borrowing during the construction of fixed assets are shelved until the completion of the project. This has the effect of improving the apparent profit and loss over the period.

3.1.3 Foreign-currency translation by the settlement day rate method

The method of translation of credits and debts held in foreign currencies is basically the settlement day rate method, which recalculates the value of the credit or debt using the exchange rate on the day of settlement. The exchange gain or loss arised by foreign-currency translation is entered in the relevant income statements. For Philippine GOCCs, which engage in heavy foreign borrowing, profits and losses from exchange translation of foreign-currency debts can have a major impact on profitability. In the case of the NPC, the exchange loss in the year to December 1995 was 2,200 million Pesos, more than half of the 3,900 million Peso profit over the term. However, the some GOCCs do not handle profits and losses in this way. For example, for a specific project (the Metro Rail Transit System), the LRTA did not enter the profits and losses directly as such on the income statement. Instead they were added to the value of the assets on the balance sheet. Thus, in

analyzing the finances of GOCCs, the method of translation of foreign currency credits and debts, and the way resulting profits and losses are reflected in income statements, must be checked. An estimate of the extent of exposure to exchange risk at the end of the term is also required.

3.1.4 Interest Expense

For Philippine GOCCs, which rely heavily on foreign borrowing to obtain funds, the interest expense has a major impact on income statements. The NPC made interest expense of 7.3 billion Pesos in the year to December 1995, nearly double its 3.9 billion Peso profit on the term.

Looking at the accounting principles and practices employed by Philippine GOCCs, as described above, they are no different from those employed by private corporations. They are also closer to international accounting standard than those employed by Japanese GOCCs. The difference in accounting principles and practices between Philippine and Japanese GOCCs are not limitted in GOCCs. Historically, the difference lies in the influence of American occupation. Accounting principles and practices are one area where the American influence is strongly felt, and as a result, these principles and practices are close to the international accounting standard influenced by Europe and America.

3.2 Taxation

For the government, the question of whether or not to levy taxes (particularly corporation taxes) on GOCCs makes little difference to the value of national assets. Therefore, for GOCCs in Japan, there is no obligation to pay corporation tax. In the Philippines, it is not true to say that no GOCCs pay corporation tax, but the result is that only a few companies pay. There are some corporations which make large profits and still pay no tax, including NPC, PNOC, MWSS, PPA, DBP - Industrial Guarantee Loan Fund.

The NPC's profit on the term is calculated as 3,900 million Pesos, but it pays no corporation tax. This exemption dates back to 1985. The background to this situation is that, at the time, the NPC needed large amounts of funds for the construction of new electrical infrastructure and as a result all its earned profits were reserved internally for this purpose. The NPC's expanding demand for funds is one factor behind moves towards its privatization. Beyond its corporation tax exemption, the NPC also enjoys an exemption from some commodity taxes. It does not pay commodity tax on any of the petroleum products it buys as fuel for its thermal power stations. This exemption seems to have been granted as a matter of policy, related to the Oil Price Stabilization Fund, which will be mentioned below. This Fund is becoming a burden on the Philippines government's finances, and it is to be abolished by the Bill related to oil industry liberalization, which was passed in March 1996 as an element of the government's policies for industrial deregulation and economic liberalization.

3.3 Findings Mentioned in Audit Reports

【Table 3-2 Examples of Findings Mentioned in Audit Reports on Philippine GOCCs】

NPC	PPA	LWUA
Incomplete of basic documents on capital lease calculation	Losses omitted on the income statements	Understatement of possibility of collection of loans
Discrepancy between recorded inventory quantities and actual quantities	Discrepancy between recorded inventory quantities and actual quantities	Discrepancy between recorded inventory quantities and actual quantities
	Discrepancy between recorded fixed assets quantities and actual quantities	Discrepancy between recorded fixed assets quantities and actual quantities
		Reality of deferred assets

Financial statements published by corporations are audited by third parties and the audit results are published as audit reports for those who use those financial statements. The results of audits of three Philippine GOCCs are as shown in Table 2. The "fndings" referred to here are opinions which are confined to noting problems with the financial statements and do not go so far as to deny their validity, because the problems concerned are not grave enough to render the statements invalid. Certainly, the problems noted in the findings are not sufficient to cast doubt on the veracity of the financial statements, but anyone using the financial statements concerned should be aware of their inherent problems.

One problem which is common to all the findings stated in the table above concerns the management of inventory and fixed assets. There are major discrepancies between the holdings of such assets on the books and the actual holdings. In a private company the management of assets is an issue with a direct impact on the company's business performance. Companies place a strong emphasis on internal control of such matters and the cause of any such discrepancy between the holdings on the books and the actual situation will usually be searched out and corrected. When aid by the OECF is to provide equipment etc. or for the rehabilitation of fixed assets, the OECF must make the executing agency carefully check asset management system. In addition to holding inquiry on the system of asset management, the executing agency should be asked to perform physical inventory taking and submit an inventory report. At the appraisal of the ODA loan agreement, it will be worthly to study that the OECF should make thorough asset management as a condition of the ODA loan agreement. This would also serve to strengthen the internal control of the executing agency.

Other than problems of asset management, several other problems were raised. They all relate to the accuracy of the accounting data on which the figures contained in the financial statements are based. However appropriate the accounting principles and practices employed may be, if the underlying accounting data cannot be trusted, neither can the financial statements produced from them. At the appraisal of the ODA loan agreement, the OECF should always study the associated audit report in order to be aware of the problems which may be inherent in the financial statements.

4. Case study: Privatization of the NPC

The privatization of the NPC is currently (March 1997) under consideration in the Philippines. The process towards privatization is as described below, according to documents obtained from the NPC.

4.1 Background and Purpose of Privatization

1) To further increase the electrification rate.
2) To contribute to the stable supply of electricity.
3) In order to compete with independent power providers (IPPs), abolition of government regulation is necessary.
4) Infrastructure improvement is expected to require investment of US$1.4 billion per year over the next ten years, while neither the government nor NPC can raise all the money.
5) To make the mechanisms for setting electricity charges rational and transparent.
6) To develop energy sources and establish infrastructure which will be satisfactory, both socially and environmentally.

4.2 Status of Electricity Sector and Problems it Faces

1) Status

Electricity generation is handled by IPPs as well as by the NPC, while MERALCO and a number of other companies, cooperatives distribute electricity. Long-distance electricity transmission remains an NPC monopoly.

2) Problems

①High private-sector electricity charges, comparing with the other Asian countries (see Table 4.1)

【Table 4.1　Main Electricity Charge Rates in Asian Countries】

(Unit:per Kwh)

Country Name	Philippines	Japan	China	Korea	Indonesia	Thailand	Malaysia
Year	'96	'94	'93	'95	'93	'92	'96
Electricity charges (Local currency)	2.0 Pesos ～ 2.8 Pesos		0.20702 Yuan	71.66 Won	152.0 Rupiah	0.97Baht(PEA), 1.47Baht(MEA)	21.7 Malaysian cents
Price converted to Yen	¥ 8.8～ ¥ 12.4	¥ 25	¥ 4.0	¥ 9.5	¥ 8.05	¥ 4.85(PEA), ¥ 7.35 (MEA)	¥ 9.95
Notes	This is the unit price for sale of electricity to distribution companies. The distribution company's expenses and profit must be added to this to find the price to the consumer.		Unit price for sale to resident	Overall unit sale price	Overall unit sale price	These are the unit prices for wholesale of electricity from the Electricity Generation Authority of Thailand (EGAT) to the urban distribution corporation (MEA) and the rural distribution corporation (PEA).	Overall average unit price

②Electricity charges are not based on actual cost. This means the electricity charges do not reflect government subsidies and the cost that can be reduced by improving operating efficiency.

③Enormous financial support is needed for the construction of infrastructure for long-term electrical supply. Unfortunately there does not seem to be the enough budget. The government acts as guarantor for infrastructure construction projects and therefore bears a certain financial risk.

4.3 Reform Proposals

1) NPC privatization

Based on the idea to separate power generation and distribution, the NPC would be dissolved to a number of private-sector power genaration and service companies, apart from Long-distance electricity transmission side, which would remain as a government-managed corporation.

2) Creation of new ways of buying and selling electricity

The objective of a series of restructurings is to create a system that the entire electricity output of the power generation companies is able to be bought by distribution companies or large consumers under market mechanism. Agencies are due to be established to administer the methods of buying and selling electricity in order to build such a system. The transaction methods, administrative rules and charge settings which will come into effect at that stage are now under consideration.

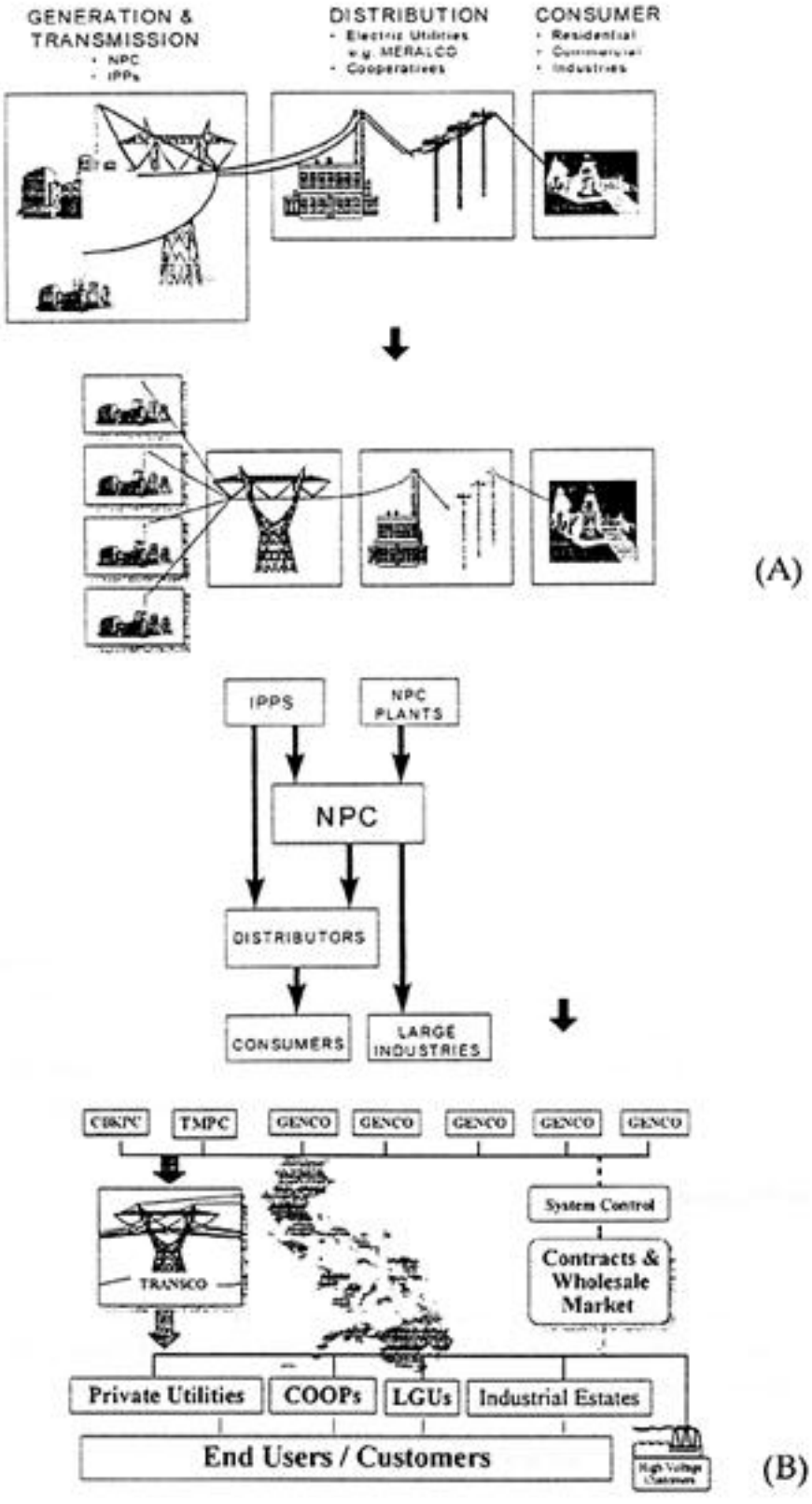


Figure (A), above, is a conceptual diagram of the privatization of the NPC, while Figure (B), below, illustrates the actual privatization scheme.

【Figure 1　Privatization of the NPC】

4.4 Financial Status of NPC

NPC Income Statement (January 1, 1995 ~ December 31, 1995)

(Unit: Million peso)

Operating revenues	52,462
Operating expense	40,919
Material expense / labor expense	25,667
Depreciation	11,062
Administrative expense	1,615
Other	2,575
Operating income	11,544
Non-operating income	8,229
Non-operating expense	15,859
Net income	3,914

NPC Balance Sheet (December 31, 1995)

(Unit: Million peso)

Asset		**Capital:**	
Utility plant	213,888	Capital stock	25,649
Investment and other assets	58,835	Donated capital	2,517
Current asset	29,276	Retained earnings	3,896
Deferred charges	46,155	Appraisal capital	73,917
		Debt:	
		Long term debts	152,220
		Foreign loan etc.	98,461
		Bond	15,044
		Other	38,715
		Current liabilities	54,181
		Deferred credits	35,774
Total of assets	348,154	**Total of capital, debt**	348,154

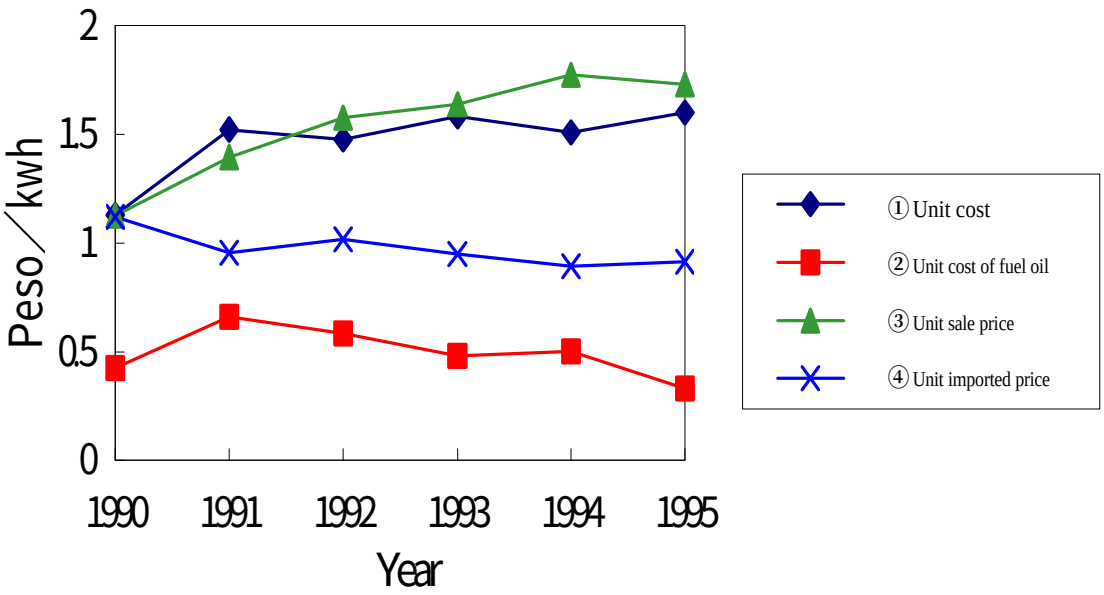
Looking at the financial statements for the NPC for the year to December 1995, the balance sheet shows long-term foreign borrowing of 98,500 million Pesos. When corporate bonds and other short-

term debts are taken into account, the total foreign debt is 106,000 million Pesos. The NPC's liquidity ratio (current assets/current liabilities) is 54%, which means the corporation's cash flow is also severe. Against this, their net income, from the income statements, was 3,900 million Pesos. The existence of the Oil Price Stabilization Fund was, apparently, a major factor behind this profit. This fund serves to regulate the difference between the market price of crude oil purchased from overseas and its sale price in the country. If the market price of crude oil purchased from overseas is higher than the domestic sale price, the Oil Price Stabilization Fund suffers losses. These losses are ultimately borne by the government. The diagram below shows movements in the following over the past six years:

① Unit cost per Kwh of electricity.
② Unit cost of fuel oil within the above cost.
③ Unit sale price.
④ Unit price of crude oil imported.

Comparing ② and ④, the latter has been consistently higher throughout the six years. From this fact it can be inferred that the Oil Price Stabilization Fund must have suffered a considerable loss for the NPC to be able to make a profit. (However, as was mentioned in section 3.2 Taxation above, the Oil Price Stabilization Fund is moving towards abolition).

【Figure 4-2　The Relationship between Crude Oil Cost and the NPC's Unit Sale Price for Electricity】



4.5 Pending Tasks

The above shows that the restructuring of the electricity industry, including privatization of the NPC, demands the creation of a new framework for buying and selling electricity after restructuring, and the smooth introduction of private-sector capital. In addition to those tasks, it is important to evaluate how prices set by market mechanisms will be kept low without government subsidies, reflecting NPC's improved operating efficiency through privatization .

5. Afterword

The above report raises the following characteristics of the financial situations of Philippine GOCCs and points to consider in examining them.

1) In many cases GOCCs rely on procuring funding from foreign sources. As a result, the profits and losses from exchange translations and the interest payments have a major impact on their income statements. In particular, in developing countries with incomplete economic bases, the local currency is expected to be weak. This means that enormous exchange losses can be incurred on debts based in foreign currencies. Therefore, it is important to consider how exchange movements are handled in its financial statements and how great is its exposure to exchange risks.
2) Ideally, GOCCs are expected to be self-sufficient, but most are receiving subsidy support from the government, or support of other kinds through regulations or tax exemptions. These are clearly not enterprises with a high level of independent profitability. Therefore, even when net income appear in income statements, care is required to note how much subsidy is included in the sources of this profit. The real operating net income and net income on the term, stripped of their subsidy elements, must be seen. In particular, in cases where corporation tax is exempted, there may be a supposed net income, but only around half is real net income. The remainder should be viewed as a subsidy from the state in the form of an exemption from corporation tax.
3) The accounting principles and practices employed by GOCCs are close to international accounting standards, which is desirable if they plan to obtain funding from international sources. However, the accuracy of the underlying accounting data must be treated with caution, and reference must be made to any problems noted in the accompanying audit reports. The examples of findings shown in this report demonstrate that, in many cases, the internal control systems and organization needed for asset management are sadly lacking. Therefore, in aid projects which are directed for the procurement of equipment and materials, or for the rehabilitation of fixed assets, special attention must be given to the internal control systems and organization for asset management.
4) The system of taxation of GOCCs is prone to reflect government policies. Even if the GOCC records a profit, it is important to be aware of the government's policy direction on taxation in cases of corporation tax exemption or other such measures. Considering future restructuring, including privatization, as much information as possible must be gathered on how the project under consideration will be able to continue after reorganization.

Condenser at Generation Plant

Stem Pipe is seen left side

Cooling Tower at Generation Plant