Performance Evaluation Report

Philippines: Electricity Market and Transmission Development Project





Performance Evaluation Report March 2016

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NOTES

- (i) In this report, "\$" refers to US dollars.
- (ii) The fiscal year (FY) of the government ends on 31 December.
- (iii) For an explanation of rating descriptions used in Asian Development Bank evaluation reports, see Asian Development Bank. 2006. *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations*. Manila.

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Abbreviations

ADB – Asian Development Bank DOE – Department of Energy

design and monitoring framework **DMF** economic internal rate of return **EIRR Electric Power Industry Reform Act EPIRA Energy Regulatory Commission** ERC financial internal rate of return FIRR IED **Independent Evaluation Department** independent evaluation mission IEM IMO independent market operator

JBIC – Japan Bank for International Cooperation

independent power producer

M&E – monitoring and evaluation MERALCO – Manila Electric Company MMS – market management system

NGCP – National Grid Corporation of the Philippines

NPC – National Power Corporation PCR – project completion report

PEMC – Philippine Electricity Market Corporation PPER – project performance evaluation report

PSALM – Power Sector Assets and Liabilities Management Corporation

ROW – right-of-way

IPP

RRP – report and recommendation of the President

TransCo – National Transmission Corporation WESM – wholesale electricity spot market

Weights and Measures

GW – gigawatt
GWh – gigawatt-hour
km – kilometer
kWh – kilowatt-hour
MW – megawatt
MWh – megawatt-hour

Currency Equivalents

Currency Unit – Philippine peso (PHP)

				At Independent
		At Appraisal	At Completion	Evaluation
		(4 November 2002)	(3 August 2009)	(3 November 2015)
PHP1.00	=	\$0.0189	\$0.0208	\$0.0213
\$1.00	=	PHP53.00	PHP48.20	PHP46.83

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The evaluation was conducted under the supervision of Bob Finlayson, Director of IED's Division 2. Vinod Thomas, Director General, IED provided the overall guidance.

Basic Data

Electricity Market and Transmission Development Project (Loan 1984-PHI)

Project Preparation

TA No.	TA Name	Туре	Person-Months	Amount (\$)	Approval Date
4073	Transition to Competitive Electricity Market	ADTA	20	800,000	19 Dec 2002
Key Proje	ct Data (\$ million)		As per ADB Loan I	Documents	Actual
Total Pro	ject cost		106.0		90.3
Foreign e	xchange cost		85.5		66.9
Local cur	rency cost		20.5		23.5
ADB loan amount (utilization)			40.0		35.6
ADB loan amount (cancellation)			0.0		4.4
Key Date	S		Exp	ected	Actual
Fact findi	ng				2-26 Apr 2002
Loan negotiations					14 Nov 2002
Board approval					19 Dec 2002
Loan agreement				16 Dec 2003	
Loan effectiveness			15 Mar 2004		9 Mar 2004
Project completion			31 Dec 2008		15 April 2009
Loan closing			30 Jun 2009		3 Aug 2009
Months (effectiveness to completion)				58	61

Borrower National Power Corporation (NPC)

Executing Agency National Transmission Corporation (TransCo)

Mission Data

Type of Mission	No. of Missions	No. of Person-Days
Fact-finding	1	40
Special loan review Mission	1	2
Review	7	46
Project completion	1	9
Independent Evaluation	1	28

Executive Summary

After the East Asian financial crisis of 1997, the Government of the Philippines began a program to restructure the power sector and make the country's electricity reliable, accessible, affordable, and sustainable. This effort was embodied by the Electric Power Industry Reform Act (EPIRA) of 2001. The restructuring involved (i) disaggregating the industry into generation, transmission, and distribution; (ii) introducing competition in generation and supply; (iii) introducing a wholesale electricity spot market (WESM); (iv) privatizing generation and operation of transmission by a concessionaire; (v) introducing open access to distribution networks; and (vi) setting up an independent agency to regulate the industry.

The Asian Development Bank (ADB) approved the Electricity Market and Transmission Development Project in 2002 to support the government's restructuring and privatization plans. The estimated total project cost at appraisal was equivalent to \$106.0 million, comprising \$85.5 million in foreign exchange and the equivalent of \$20.5 million in local currency. ADB approved a \$40.0 million loan to National Power Corporation that was to account for 38% of project financing. The balance, equivalent to \$66.0 million, was to be financed by the Japan Bank for International Cooperation through an untied loan of \$45.5 million and an allocation of the equivalent of \$20.5 million in local currency by the government to meet its counterpart funding requirements. The National Transmission Corporation (TransCo), a government agency created under the EPIRA, was the executing and implementing agency for the loan-financed project.

The project's intended impacts were an improvement in the well-being of the country's people and a reduction in poverty, which was to be achieved through improvements in the national economy. The expected outcome of the project was to help the government improve the accessibility, quality, affordability, and sustainability of the national electricity supply. The project outputs were the development of a market management system for WESM to support a competitive wholesale electricity market and the appointment of an independent market operator (IMO), and two hard infrastructure outputs: reinforcement and upgrading of a 230 kilovolt (kV) overhead transmission network from single circuit-single conductor to double circuit-twin conductor lines between San Manuel and Mexico on the island of Luzon, with substations upgraded as necessary; and expansion of six transmission substations and the connection of households in semi-urban and rural areas to the grid on the island of Mindanao.

The project was approved in November 2002, and scheduled for implementation during 2002–2008. The loan became effective in March 2004 and closed in August 2009. The project completion report was circulated in January 2012 and the project completion validation report in June 2014; both rated the project successful.

The final project cost, including new items funded from savings, was \$90.4 million (85.3% of the estimate at appraisal). This comprised the equivalent of \$66.9 million in foreign exchange and \$23.5 million in local currency cost. A total of \$35.6 million (89%) was disbursed under the ADB loan, and \$31.3 million under the Japan Bank for International Cooperation loan account.

Major institutional changes occurred during the project implementation period from 2003–2009. Among these changes, the Philippine Electricity Market Corporation (PEMC) was incorporated in 2003 as a non-stock, non-profit corporation to operate the WESM, and in 2007, National Grid Corporation of the Philippines (NGCP), a private sector entity, was awarded the TransCo franchise to operate, manage, and expand the electricity transmission business of the country.

This report presents the findings of the project performance evaluation, which was based on the four core evaluation criteria of relevance, effectiveness, efficiency, and sustainability, as well as on development impact.

Relevance. The project was consistent with ADB's corporate strategy, country partnership strategy, and energy sector policies; the design of the project was relevant for the national plan to address the sector's main issues. It addressed key constraints to economic development in the Philippines. The introduction of a spot market for wholesale electricity was a central element of the power sector reform program in the Philippines. The investment in reinforcing and upgrading transmission facilities and substations responded to a need to improve system reliability in Luzon and expand rural electrification in Mindanao. The project is rated *relevant*.

Effectiveness. The expected outcome and most of the outcome indicator targets were achieved—i.e., the project improved grid reliability, reduced grid losses to below the system loss cap, enabled the electrification of about 5,000 households in Mindanao, and improved the industry's financial performance. Offsetting these results, a targeted reduction in the average retail electricity price within 5 years did not occur. This target was too optimistic, since the sector reforms removed subsidies that were embedded in the old tariff. The establishment of the WESM under the project has been credited with enabling the privatization program that is helping the Power Sector Assets and Liabilities Management Corporation resolve the National Power Corporation's payment obligations and stimulating investment in new generation capacity. The project is rated effective.

Efficiency. The project was implemented under budget, and nearly on schedule. Loan savings were used to support additional project components that were important for transmitting power from generation plants in southern Luzon to Metro Manila more reliably and efficiently. The transmission investments were made as part of WESM development to (i) ensure that the trading of power was not unduly affected by physical constraints in the transmission system, and (ii) facilitate WESM operations by enabling efficient and effective locational marginal pricing. These objectives were largely achieved. The project is rated *efficient*.

Sustainability. The evaluation's estimate of the financial internal rate of return for PEMC's total investments and operations during 2006-2014 is 16%, comfortably higher than the weighted average cost of capital of 5.3%. The NGCP is a private sector entity that does not make its financial statements public. As a result, a consolidated evaluation of the income from the TransCo's investment in transmission facilities and NGCP's transmission system operations was not available. However, NGCP has been paying its concession fees, and TransCo is debt-free and profitable. The evidence available to the evaluation team indicates that NGCP is providing adequate resources for the operations and maintenance of the transmission component of project. In 2017, PEMC is scheduled to replace the market management system with a new design and corresponding hardware and software upgrades. The project is rated likely to be sustainable.

Development impact. The project's long-term development impact will come from the contribution the power sector restructuring and reform program will make to the national economy. This program's main impact so far has been the transfer of the costs and risks of ensuring adequate and reliable power supply in the country from the public to the private sector. The restructuring and reforms achieved under the project led to successful privatization and debt management programs that laid the foundations for the reforms envisioned by the EPIRA. The project funded some of the essential components of the program and helped create an efficient, reliable, and sustainable power supply system. State involvement in the power supply industry no longer threatens the government's financial stability, and the sector is helping accelerate national economic growth. The development impact of the project is rated substantial.

The project is rated successful. The evaluation concluded that the intended impact, outcome, and outputs of the project were largely achieved.

All elements of EPIRA have now been implemented. The last remaining task was to permit open access to promote retail competition. This began in 2013. A reduction in the threshold for contestable consumers—i.e., eligible consumers who can choose to buy electricity from licensed retail electricity suppliers—is expected in June 2016, with further reductions planned to follow after 2 years. While the proportion of households with electricity connections has increased nationwide, it remains to be seen whether full implementation of EPIRA will lead to greater competition which could result in lower real retail prices for electricity.

The lessons from project implementation were (i) the need to allow sufficient time to assess and address issues related to acquiring right-of-way, and (ii) to reassess the need for an independent market operator.

Introduction

A. Evaluation Purpose and Process

- 1. This project performance evaluation report (PPER) provides the findings of an assessment by the Asian Development Bank (ADB) Independent Evaluation Department (IED) of ADB's Electricity Market and Transmission Development Project in the Philippines. ADB funded the project through a loan and an advisory technical assistance (TA) grant to the National Power Corporation (NPC). It aimed to support a key provision of the country's 2001 Electric Power Industry Reform Act (EPIRA).¹
- 2. The PPER was prepared 6 years after the loan closed in August 2009 and about 4 years after the project completion report (PCR) was circulated in January 2012.² This allowed enough time to pass for a proper assessment of the project's effectiveness, progress, and long-term sustainability. The PPER identifies key lessons that can help ensure that similar future projects are implemented successfully. In line with ADB's guidelines, the evaluation was based on four core criteria—relevance, effectiveness, efficiency, and sustainability—and on the project's development impact.³
- 3. The evaluation team gathered data and material from (i) a desk review of project documents and reports; (ii) a review of available annual reports and financial statements of the Power Sector Assets and Liabilities Management Corporation (PSALM), the Energy Regulatory Commission (ERC), the Philippine Electricity Market Corporation (PEMC), the National Transmission Corporation (TransCo), and the National Grid Corporation of the Philippines (NGCP); (iii) discussions with project staff; (iv) discussions with government agencies and other project stakeholders in the Philippines; and (v) visits to project sites on the Philippines' largest island, Luzon.⁴

B. Summary of Expected Impacts, Outcomes, and Outputs

4. The impact of the Electricity Market and Transmission Development Project was to be an improvement in the well-being of people in the Philippines and a reduction in poverty bought about by improvements in the national economy. The intended outcome was an improvement in the accessibility, quality, affordability, and sustainability of the national electricity supply (Appendix 1). The project outputs to be delivered to achieve this outcome were to be accomplished in two parts:

¹ ADB. 2002. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation and Technical Assistance Grant for Electricity Market and Transmission Development Project in the Republic of the Philippines. Manila.

² ADB. 2012. Completion Report: Electricity Market and Transmission Development Project in the Philippines. Manila.

³ Independent Evaluation Department. 2006. Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations (updated 2013.). Manila: ADB.

⁴ An independent evaluation mission (IEM) was fielded from 7–11, 21–23, and 25 September 2015.

- (i) Part A: Development of competitive wholesale electricity spot market. These activities were to deliver two outputs: (a) the development of a market management system (MMS) for a wholesale electricity spot market (WESM) in the Philippines, and (b) the appointment of an independent market operator
- (ii) Part B: Development of the transmission network. The outputs to be achieved under this component were (a) the reinforcement and upgrading of a 230 kilovolt (kV) overhead transmission network from single circuit-single conductor to double circuit-twin conductor lines between San Manuel and Mexico on Luzon,⁵ with substations upgraded as necessary; and (b) the expansion of six transmission substations and the connection of households in semi-urban and rural areas to the grid on the island of Mindanao. 6 Appendix 2 provides details of the transmission network.
- Introducing a spot market for wholesale electricity was central to the reform of the Philippines' power sector that had been envisioned by the 2001 EPIRA. Although disaggregation of power supply systems is common worldwide, only a few countries had implemented competitive power market solutions. This complex and sophisticated power supply model is designed to produce economically efficient investment and operational outcomes that include power prices that change depending on the time of day and location (known as nodal pricing).
- 6. To help provide a better understanding of the agencies and institutions involved and the terms used in this PPER, Appendix 3 presents an overview of the Philippines' power supply industry before and after the EPIRA was enacted.

⁷ Comparable market models have been implemented in eastern Australia; New Zealand; Singapore; and some parts of the United States, including Texas.

⁵ These were the San Manuel-Concepcion (80 km) and Concepcion-Mexico (37 km) transmission lines.

⁶ The substations were located in Sta. Clara, Butuan, Davao, Kibawe, Tindalo, Bislig.

Design and Implementation

A. Time, Cost, Financing, and Executing Arrangements

- 7. The project was approved in November 2002 and was scheduled to be implemented during 2002–2008. The loan became effective in March 2004 and closed in August 2009, nearly on schedule. NPC was the designated borrower.
- 8. The estimated project cost at appraisal was equivalent to \$106.0 million, comprising \$85.5 million in foreign exchange and the equivalent of \$20.5 million in local currency. ADB agreed to provide a \$40.0 million loan that was to account for 38% of project financing.⁸ The balance, equivalent to \$66.0 million, was to be financed by the Japan Bank for International Cooperation (JBIC) through an untied loan of \$45.5 million and an allocation of the equivalent of \$20.5 million in local currency from TransCo (a government agency created under the EPIRA) to meet the government's counterpart funding requirements.
- 9. The final project cost including new items funded from savings was \$90.4 million (85.3% of the appraisal estimate). Costs comprised the equivalent of \$66.9 million in foreign exchange and of \$23.5 million in local currency. A total of \$35.6 million of the ADB loan was disbursed (89%), along with \$31.3 million under the JBIC loan account. The project scope had been modified because the JBIC board of directors approved a loan of only \$40.0 million rather than \$45.5 million originally proposed. The MMS component's actual cost was only \$10.7 million, less than half of the appraisal estimate of \$25.0 million. This saving covered a shortfall in the estimated foreign currency requirement and thus avoided more than a slight modification in the project design. Details of estimated and actual project costs, and additional components funded from loan savings are presented in Appendix 4, Tables A4.1 and A4.2.
- 10. Although the total appraisal estimate and the actual total project costs are comparable, the items listed at appraisal and those items included in the actual base cost are not. The PCR did not itemize the \$10.4 million in savings in financial charges during construction. Data from project monitoring reports indicate that savings of \$14.0 million in hardware and software costs in the Part A component, plus this \$10.4 million reduction in financial charges during construction, were offset by increases in the costs of Part B activities (para. 4). The Luzon transmission upgrade was particularly affected due to costly right-of-way (ROW) issues and delays.
- 11. The project's piggybacked advisory TA aimed to support the transition to a competitive electricity market. Funds were allocated for 16 person-months of international and 4 person-months of domestic consulting services. The total TA cost

⁸ This loan from ADB's ordinary capital resources was to be provided under ADB's London interbank offered rate lending facility, with a 20-year term and a grace period of 6 years.

was estimated at \$1.15 million. ADB agreed to provide an \$800,000 grant, and the government was to contribute the equivalent of \$350,000 in local currency.

TransCo was both the executing and the implementing agency for the loan-12. financed project. The Department of Energy (DOE) was the executing agency for the advisory TA, with TransCo closely coordinating implementation. TransCo appointed a project director to coordinate the work and implement all project components. For the loan-financed transmission and substation components, TransCo appointed project managers in each region to handle implementation in the field with the help of site managers. This arrangement complied with ADB requirements, but the PCR noted that the project director did not have enough authority to ensure timely implementation of the project. The director lacked the control needed to deal with procurement problems and the ROW issues. However, the PCR found that the project complied with the environmental requirements of ADB and the government and had little adverse environmental impact. Some people affected by project components were relocated and compensated financially (see Appendix 5).

Procurement, Construction, Consultants, and Scheduling B.

- All project items and consultant services financed by ADB and JBIC were procured in accordance with the relevant ADB's guidelines, but a protracted procurement process was a major cause of delay in delivering the transmission line and substation outputs. However, since the individual transmission project components were scheduled to be completed first, these delays did not impact the project's overall timeline for completion.
- The main cause of these delays was TransCo's failure to meet its commitment to acquire ROWs and complete payments for compensation before the works began. The scheduled start had to be postponed until the ROW issues were resolved and payments to the affected families were finalized.
- 15. About 48 person-months of international consulting services and 24 personmonths of domestic consulting services were allocated to the supervision of MMS development. TransCo supervised the construction and engineering design for the transmission and substation component.

C. Safeguard Arrangements

- TransCo provided 634 people affected by the project's transmission and substation component with disturbance compensation or compensation for property. The South Luzon Expressway was compensated for use of its road easement, and some changes were made to the layout and sizes of transmission lines to avoid interfering with the signage of roadside businesses. The land acquisition and resettlement plan finalized in April 2004 laid the basis for compensation and provision of support, which was budgeted to cost PHP79.5 million. An update to the plan in 2015 indicated that about PHP206.0 million was paid to compensate for land acquisition and relocation.
- Safeguard arrangement issues were the major reason for delays and cost increases during project implementation. The PCR noted several shortcomings in the initial assessments of safeguard requirements and in coordinating with local stakeholder groups. It indicated that the design and implementation of the safeguard arrangements were poorly managed and monitored.

Policy Framework D.

- 18. Before the 2001 EPIRA's enactment and the start of the power sector's restructuring, the government-owned NPC was responsible for developing and managing generation and transmission in the national power supply system. It owned and operated the national transmission system and a major proportion of the nation's power generating capacity.9 It was the main producer of electricity and the single buyer from independent power producers (IPPs) through take-or-pay contracts. The distribution system was owned and operated by distribution utilities and energy cooperatives. The Manila Electric Company (MERALCO) was the dominant distributor in Luzon (see Appendix 3, Power Sector Structure, Figure A3.1).
- The NPC's financial performance seriously worsened during the late 1990s. It was adversely affected by high debt payment and power purchase obligations. The deterioration was the result of several factors: the impact of the Asian financial crisis of 1997–1998, the subsequent depreciation of the peso, the high cost of take-or-pay power purchases from IPPs, and government reluctance to increase retail power prices. The government response was embodied in the EPIRA and called for radical reorganization and reform in the power supply industry. The plan involved (i) disaggregation of the industry into generation, transmission, distribution, and supply segments; (ii) introduction of competition in the generation and supply subsectors; (iii) introduction of a WESM; (iv) creation of the PSALM to manage the privatization of generation assets and transmission operations (but not of the ownership of the transmission facilities); (v) introduction of open access to distribution networks, and (vi) independent regulation (see Appendix 3, Figures A3.2 and A3.3).
- Major institutional changes occurred during the ADB project's 2003–2009 implementation. After public bidding in December 2007, the TransCo concession was awarded to NGCP, which eventually secured a franchise from the country's congress to operate the transmission network for 25 years. Large NPC power generation assets transferred to PSALM¹⁰ and sold to the private sector were turned over (to the private sector) starting in 2006.¹¹ PEMC was incorporated by the DOE as a non-stock, nonprofit corporation in 2003 and assigned responsibility in August 2004 to prepare the initial operations of the WESM.

Ε. **Design Changes**

The MMS and the services it provided to the electricity market were implemented mostly as designed. The MMS supported a gross pool, nodal pricing, and a real time 1-hour forward market. 12 The principal difference from the design was that the WESM market operator was not independent.

¹⁰ PSALM is a government-owned and controlled corporation established by the EPIRA to take ownership of all of the NPC's generation assets, liabilities, IPP contracts, real estate, and other disposable assets. PSALM was to manage the orderly sale, disposition, and privatization of these assets and use the proceeds to settle all of the NPC's financial obligations and stranded contract costs.

⁹ Exceptions were isolated private suppliers in mini-grid, off-grid, or captive production.

¹¹ Assets sold included small hydroelectric power plants in 2005, the 112 megawatt (MW) Pantabangan-Masiway hydroelectric power plants in November 2006, 360 MW Magat hydroelectric power plant in April 2007, the 600 MW Masinloc coal-fired thermal power plant in April 2008, and the 175 MW Ambuklao-Binga hydroelectric power complex in July 2008. Asset sales continued through 2015.

¹² Nodal pricing is locational marginal pricing at a specific node.

22. Cost savings from the part A wholesale market project component were used to finance construction of a part B transmission line segment. Part B was implemented with only minor alterations, such as adjustments to the height of transmission towers to avoid blocking business signs on the southern expressway near Metro Manila.

F. **Loan Covenants**

- 23. Several covenants of the ADB loan were not complied with. Appendix 6 provides details. NPC did not comply with its financial performance covenants in 2003-2005. The loan agreement was not amended to cover the transfer of assets and liabilities from NPC to PSALM and TransCo. The government did not meet its commitment to create an independent WESM operator. TransCo did not secure prior written approval from ADB for the transfer of the assets of the WESM and did not provide ADB with an end of project completion report.¹³
- 24. The evaluation team believes that TransCo was unable to meet all of its undertakings because of major change in its organization and modus operandi after its privatization in 2009, when many of its staff were let go or transferred to NGCP, the concessionaire.

G. **Technical Assistance**

- The advisory TA associated with the loan had two components. Part A involved assistance to TransCo for procurement activities, including preparation of bid documents for the MMS and bid evaluation. Part B was the provision of independent advice to the government prior to and during initial implementation of the WESM and support for preparing plans to implement the IMO.
- The March 2009 technical assistance completion report rated the TA relevant at the time of its design and *successful* overall. It was found to have achieved its objective.14

Monitoring and Reporting Arrangements Н.

- 27. Project implementation was monitored through quarterly reports from TransCo that provided information on procurement, safeguard arrangements, and physical progress until March 2009. In July 2009, TransCo's operations, key staff, and project records were transferred to the private transmission concessionaire, NGCP. NGCP submitted no quarterly reports to ADB.
- The loan agreement specified ADB's rights to receive information, but the PCR did not report on any of the NPC or TransCo's financial statements. The evaluation found no indication that ADB closely monitored compliance with financial performance covenants or other assurances. No financial data were gathered by ADB during project

¹³ ADB. 2002. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation and Technical Assistance Grant for the Electricity Market and Transmission Development Project in the Republic of the Philippines. Manila. Appendix 9 and Schedule 6, para. 2 of the loan agreement.

¹⁴ ADB. 2002. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation and Technical Assistance Grant for the Electricity Market and Transmission Development Project in the Republic of the Philippines. Manila. Appendix 9 and Schedule 6, para. 2 of the loan agreement.

implementation or at project completion, so the PCR does not present any financial statements of the borrower or the executing agency.

- 29. The PCR prepared in January 2012 rated the project successful overall, as well as relevant, effective, and efficient (footnote 2) It rated its outputs and outcome likely to be sustainable. It is likely that the inability of the executing agency to submit periodic reports to ADB after March 2009 was the main reason the PCR did not calculate the economic internal rates of return or review the impacts of the project or the financial performance of the borrower and the executing agency. The lack of data may explain why the PCR mission did not report on the transfer of the MMS from TransCo to PEMC.
- 30. IED's project completion validation report in June 2014 agreed with all of the PCR's overall and criteria ratings. 15 It rated the project's impact on poverty, institutional development, economic growth, environment, and social outcomes significant.

¹⁵ IED. 2014. Validation Report: Electricity Market and Transmission Development Project in the Philippines. Manila: ADB.

CHAPTER 3

Performance Assessment

A. Relevance

- 31. The project supported a key element in the government program to restructure and privatize the electric power industry, and its design was relevant to the plan to address the sector's main issues. The project was consistent with ADB's corporate strategy, country partnership strategy, and sector policies.¹⁶
- 32. The MMS, financed and implemented with project support, formed the core of the WESM. Establishing the WESM was meant to enable distribution utilities and electricity suppliers to purchase bulk electricity directly from the generating entities or to buy it on the spot market.¹⁷ The WESM would make it possible for generated power to be dispatched on the basis of prices bid into the market, with the lowest priced electricity dispatched first.¹⁸ A well-functioning WESM with nodal pricing would provide the economic signals needed to encourage efficient investment in new generation capacity.
- 33. The project's part A component to reinforce and upgrade transmission facilities and substations was relevant. It was relevant for improved power system reliability and efficiency in Luzon, and to help provide rural customers in Mindanao with an efficient, reliable power supply. The grid component was also integral to the WESM's success because it would make it possible for energy to be procured for immediate delivery. This in turn would allow locational marginal pricing to be used efficiently and effectively to set prices for energy transactions in the market and for transmission congestion costs to be priced. When the grid in Mindanao is integrated with the country's two other major regional grids and its operations are incorporated into the WESM, the substations the project upgraded there will help make the national grid and the WESM more effective.
- 34. The project is rated *relevant* due to its importance to the power sector restructuring and reform program, and relevant design.

B. Effectiveness

35. The design and monitoring framework (DMF) in the report and recommendation of the President (RRP)—or the project framework, which was the term then in use at ADB—provided the basis for evaluating the effectiveness of the project outputs and outcomes (see Appendix 1).

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¹⁶ ADB. 2000. Energy 2000: Review of the Energy Policy of the Asian Development Bank. Manila; ADB. 2009. Energy Policy. Manila.

¹⁷ For the first 5 years after the establishment of the WESM, no distribution utility was permitted to source more than 90% of its total electricity requirements from bilateral supply contracts.

¹⁸ Merit-order dispatch.

1. Outputs

- 36. The project DMF listed four intended outputs to be achieved by the part A and part B components (para. 4): (i) the establishment of a competitive wholesale electricity market, (ii) the appointment of an IMO, (iii) the development of a 230 kV double-circuit transmission line between San Manuel and Mexico on Luzon, and (iv) the expansion of capacity at six transmission substations in Mindanao.
- 37. Part A: Wholesale Market. The primary objective of the project's part A component activities was to provide the WESM market management hardware and software. The TA supported the procurement, installation, and operation of the MMS. The WESM for Luzon was established in 2006 and in the country's Visavas region in 2010. The Luzon and Visayas grids are not yet connected to the country's third major grid in Mindanao, and the WESM has not been established there. A day-ahead interim electricity market was introduced in Mindanao under the project, but it did not operate effectively and was suspended. The Philippines' WESM is an energy-only market, which is arguably the most sophisticated market type a country can establish to ensure reliability and adequacy of supply i.e., payments made to generation companies are only made for power that is generated, and not for holding capacity available.
- The evaluation found that the MMS has been highly effective. It has fulfilled its primary function of automatically enabling competitive market forces to help determine the amount, mix, and cost characteristics of generating plants to meet demand. Increased competition has led to the dispatch of power from the most efficient, and cost-effective power plants first, with the highest cost and least efficient plants being dispatched and providing energy to the market last. The MMS was scheduled to operate until 2012 but is still in service and not expected to be replaced until 2017. The WESM and MMS are described in more detail in Appendix 7.
- 39. The project did not deliver the output to establish an independent operator of the WESM. Instead, the DOE created PEMC to operate the market, with the secretary of the DOE as chairman of a board consisting of representatives from the various sectors of the electric power industry. The DOE justified this to ADB as a necessary transitional step taken to ensure that "all market dysfunctionalities (disorders in the operation of WESM) experienced during the initial years of WESM operations would be fully mitigated before handing over WESM administration to an independent operator." In 2012, PEMC said it had plans to establish the IMO but the operator's creation and structure would still be subject to deliberations by a commission dealing with the power sector in Congress.¹⁹ Stakeholders interviewed by the independent evaluation mission (IEM) said that public consultations regarding an IMO were ongoing, but no date had been determined for its establishment.
- 40. Part B: Transmission Network. The project's part B component had delivered its two outputs by the time the PPER was being prepared—i.e., expansion and improvement of transmission facilities in Luzon, and expansion of rural Mindanao substations. IEM verified the completed Luzon works on site.
- Luzon stakeholders told the evaluation team that the project investments had 41. (i) alleviated frequent breakdowns in the alternative 500 kV substations and lines, and (ii) prevented the overloading of 230 kV lines that had constrained the transfer of power in the northern Luzon transmission corridor to Metro Manila. The upgraded 230

¹⁹ PEMC. 2012. *Annual Report*. Quezon City.

kV double-circuit line improved the system's reliability and power transfer capacity. NGCP staff provided length estimates of 69.3 kilometers (km) for the San Manuel-Concepcion transmission line and of 34.8 km for the Concepcion–Mexico line. This was about 12.9 km (13%) less than the total length estimated at appraisal.²⁰

- 42. The development of the 18.2 km transmission line between Calamba tower 50 and Biñan was to have been a component of a previous ADB project.²¹ Because insufficient loan funds remained under that project to carry this component out and the loan was approaching closing date, ADB and JBIC agreed in March 2005 that this component would be implemented using the savings from the Electricity Market and Transmission Development Project (paras. 9-10).²² Completing this line concluded an upgrading of the transmission system in the provinces of Batangas and Laguna that was essential to transmit power from the Calaca, San Lorenzo, and Sta. Rita generating plants in southern Luzon to Metro Manila reliably and efficiently. 23
- 43. The project's substation expansion component was completed in 2011. After project approval, the list of project substations was revised based on an NGCP study commissioned to identify opportunities for shifting loads in some areas in Mindanao. Equipment was installed at six substations in Sta. Clara, Maco, New Loon, Matanao, Butuan, and Maramag. Greater capacity was needed at these substations to achieve a government program to fully electrify a number of rural communities by 2006. The goal of electrifying rural communities was achieved before the upgrades were completed, but the stations helped provide reliable power in six districts and comply with the transmission line redundancy grid requirement of the Philippine Grid Code.²⁴
- The transmission development components helped make the WESM effective by increasing transmission capacity and reducing the risks of congestion.

2. Outcome

- 45. The project's intended outcome—or purpose, as it was identified in the RRP's equivalent of the DMF—was the improvement of the accessibility, quality, affordability, and sustainability of the national electricity supply. Based on the outcome indicators, this was to be achieved by (i) a reduction in real terms of the average retail electricity price within 5 years; (ii) improvements in grid reliability to levels higher than the targets of the country's ERC, which were not specified; (iii) a minimizing of grid losses to below the ERC's system loss cap; (iv) improved power accessibility generally, and 100% village electrification by 2006, with about 5,000 households benefiting from the project in Mindanao; and (v) an improved and sustainable financial performance by the industry as measured at a national level.
- 46. Improvements in grid reliability. Although the PCR provided no quantitative data on grid reliability improvement, it reported that performance incentive awards were given in 2009 and 2010 to NGCP, the grid operator. This indicated to the evaluation team that the outcome indicator target was achieved. The IEM found no

²⁰ The RRP put the lengths at 80.0 km for San Manual–Concepcion transmission line and 37.0 km for the Concepcion-Mexico line.

²¹ ADB. 1997. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation for the Power Transmission Reinforcement Project in the Philippines. Manila. (Loan 1590-PHI).

²² ADB. 2006. Completion Report: Power Transmission Reinforcement Project in Philippines. Manila.

²³ The three power plants have a combined total capacity of 2,100 MW.

²⁴ This requires that a back-up line is available to prevent system failure if one line is out.

evidence to suggest this performance has weakened in the time between the PCR and the preparation of the PPER.

- 47. Minimizing grid losses below the ERC's system loss cap. Transmission grid losses declined even further in Luzon and Mindanao during 2011-2013 from the lowered levels of indicators for 2010 reported in the PCR, and remained below the ERC's approved system loss rate caps of 2.98% for Luzon and 4.35% for Mindanao (Appendix 1).
- Improved power accessibility in Mindanao. The project's upgrading of six 48. substations in Mindanao was followed by substantial increases in electrification, and new connections were much higher than the 5,000 targeted in the DMF (Appendix 8). The project increased the transformer capacity at six substations in six of Mindanao's 22 provinces. The target of 100% rural electrification in Mindanao's districts was achieved in 2008,²⁵ almost 3 years before the last of the equipment was installed. Statistics provided by the DOE show that more than 263,045 new household connections were made during 2008-2015 in the areas where the six upgraded substations were located.
- 49. Improved and sustainable financial performance of the industry at the national level ADB did not gather any data during implementation or at completion on the project's performance in achieving the outcome indicator of improved and sustainable financial performance by the industry, which was to be measured at the national level. The PCR did not report on these objectives, but data gathered for the PPER indicates that the project's development of the WESM and the transmission facilities in Luzon contributed to (i) PSALM's privatization of 72% of NPC's assets by July 2015 (Appendix 9), (ii) significant resolution of the NPC's payment obligations (Appendix 10, Tables A10.1 and A10.2), (iii) the economic and efficient pricing of electricity in the spot market,²⁶ and (iv) investment in generation capacity to meet growth in demand for electricity (Appendix 11). Stakeholders interviewed by the IEM credit the WESM with enabling (i) the privatization program, which is helping PSALM pay the NPC's outstanding obligations, and (ii) a compound annual growth rate of 3.9% during 2001–2014 in the Philippines' electricity output (Appendix 11, Figure 11.1).
- 50. Reduction in real terms of average retail electricity price within 5 years. The outcome indicator target of a reduction in the average retail electricity price within 5 years was not achieved. The objective was unduly optimistic, since the sector reforms removed the subsidies that were embedded in the old tariff. While the PCR presented data to demonstrate a reversal of the rising trend in wholesale electricity spot market load weighted average prices, it was silent on retail electricity prices. A detailed evaluation by United States Agency for International Development concluded that consumer category prices for power had increased by averages of 6.7%-8.7% during

²⁶ The WESM is *reasonably competitive* by objective measures of market concentration and better performed than the New Zealand power market - one of its closest comparators.

²⁵ J. Berthelsen. 2008. A Tale of Two Devastated Countries. *Asia Sentinel*. 13 http://www.asiasentinel.com/index.php?option=com_content&task=view&id=1196&Itemid=31 The exceptions are six districts, all in an area covered by the nonperforming Maguindanao Electric Cooperative that has long defaulted on its payment obligations and is likely to be taken over by the DOE.

2004–2011, rising faster than the inflation rate during this period.²⁷ Although it was expected that competitive pressures would push power prices downward, this pressure was more than offset by the removal of subsidies as part of the commercialization of the power supply.

- 51. The evaluation study team comparison of the WESM with comparable power market systems internationally found it to be acceptably, if moderately, competitive with room for improved oversight, and the elimination of potential for anti-competitive behavior.²⁸ The evaluation found the costs and risks of power supply were shifted from the public to the private sector, which is a sound reason for the Philippines to persevere with its new model of power supply.
- 52. The project's help in establishing a wholesale electricity spot market and strengthening power transmission systems supported a major undertaking with national economic implications. The project has generally achieved the ambitious output and outcome targets presented in the DMF and discussed elsewhere in the RRP. The project component in Mindanao proved effective. In light of full achievement of three of four outputs, partial achievement of one output, and achievement of the outcome, the evaluation rates the project effective.

C. **Efficiency**

- 53. The RRP forecast of the economic internal rate of return (EIRR) of 24.1% for the investment in the MMS which is the core element of the WESM, and the associated transmission systems was evaluated by assuming benefits from the incremental energy consumption the project was to induce. The RRP estimated these benefits based on its presumption of a reduction in retail power prices relative to prices prevailing in a without-project, business-as-usual scenario. The PCR did not calculate any EIRRs, likely because periodic reports required from the executing agency were not provided after March 2009 (para. 27).
- 54. NGCP, which was awarded the TransCo franchise in 2007 to operate, manage, and expand the electricity transmission business of the country, is a private sector entity that has no legal obligation to share financial information or its financial statements with ADB or IED. The PPER team requested financial information from NGCP but was given none. Without this information, the evaluation could not estimate an EIRR for the project's transmission development components, operated by NGCP.
- 55. Without previous evaluations of and data on the efficiency of the MMS in particular and the WESM in general, the evaluation finds that the project's efficiency was ensured by the emergence of competition in the Philippines' power market.

²⁷ United States Agency for International Development, Philippines. 2013. Challenges in Pricing Electric Power Services in Selected ASEAN Countries. http://www.catif.org/wp-content/uploads/2013/10/Challenges-in-Pricing-Electric-Power-Services.pdf The report said: "The introduction of competition in the Philippine electricity market gave rise to expectations that more efficient supply and lower prices are forthcoming. But the first decade of reforms disappointed observers. Electricity tariffs for different consumer classes increased at an average annual rate of 6.7 to 8.7 per cent, exceeding average inflation of 4.8 per cent during the period."

²⁸ The evaluation team calculated the Herfindahl-Hirschman Index for the WESM to have been 1,000–1,800. The index is a measure of market concentration, and the WESM score suggests a moderately concentrated spot market. The index for New Zealand's spot market—one of WESM closest comparators—is about 2,000 i.e., less competitive than the market in the Philippines.

- 56. From the process perspective, the project was implemented efficiently. The selected MMS was a cost-effective purchase, procured on the open market, and well below budget.
- 57. The commissioning date targets were (i) to establish the WESM by December 2004, (ii) upgrade the transmission facilities in Luzon by June 2008, and (iii) complete the expansion of substations in Mindanao by December 2008. The WESM began commercial operations 18 months behind schedule in mid-2006 in Luzon, and operations in the Visayas region started in 2010. The Luzon transmission upgrade was completed in April 2009, about 9 months behind schedule. The Mindanao substations were completed in November 2011, about 3 years behind schedule. This was mainly due to delays in installation of metering equipment at three of the six substations (see Appendix 12). Despite these component delays, the ADB loan closed only 3 months behind the appraisal schedule. All components were completed by loan closing except for the installation of metering equipment in the Mindanao substations.
- The procurement process for the transmission line and substation facilities was 58. protracted. The PCR provided several explanations for this. It noted that supply (funded by JBIC) and installation (funded by TransCo) were procured separately, whereas a single turnkey contract would likely have minimized the delays. The PCR said TransCo did not assign dedicated full-time staff to handle bid evaluations, which lengthened the procurement process. It also found that ADB could have monitored the procurement better and helped generate timely responses by TransCo to issues that arose during project implementation.
- 59. The loan documents assumed that the following steps would all be taken within 1 year of the 2002 project approval: the transfer of transmission assets to TransCo, the start of the operation of transmission by a concessionaire, the privatization of the NPC's generation assets, and the creation of separate financial statements by PSALM and TransCo. The project depended for its progress on the completion of these tasks and the underlying functional, organizational, and structural changes at the NPC, even though they were all beyond its control. These processes were actually completely about 5 years beyond the original schedule.
- 60. Given that the project was implemented largely as outlined in the RRP, with cost savings that offset delays in the installation of metering equipment at substations in Mindanao, the evaluation rates the project *efficient*.

D. Sustainability

The PCR rated the project likely to be sustainable on the basis of its financial 61. internal rate of return (FIRR) estimates of 65% for the MMS component and of 9.9% for the transmission and substation component. Neither estimate assessed PEMC's and NGCP's institutional financial sustainability. The PPER team evaluated the financial performance of PEMC. It estimated the FIRR for PEMC's total investment and operational performance during 2006-2014 to be 16.0%, comfortably higher than PEMC's weighted average cost of capital of 5.3%²⁹ (Appendix 13). This result shows that the returns permitted to PEMC as a regulated entity are adequate, and its performance is sustainable. NGCP is a private sector entity that does not make its

²⁹ ADB. 2002. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation and Technical Assistance Grant for the Electricity Market and Transmission Development Project in the Republic of the Philippines. Manila. Appendix 13.

financial statements public and would not provide them to the IEM. This made a consolidated evaluation of the returns from TransCo's investment in transmission facilities and NGCP's transmission system operations impossible. However, NGCP has been paying its concession fees, and TransCo is debt-free and profitable (Appendix 14, table A14.1).

- 62. Annual audited financial statements show that TransCo, the owner of the transmission system and the project's executing agency, is a viable concern with stable earnings and a sound financial structure (Appendix 14, Tables A14.1 and A14.2). PSALM, which was created to take over and manage the substantial part of the NPC's assets and liabilities, successfully privatized generation assets and met the financial obligations that the NPC had incurred. PSALM has had a history of volatile earnings. This is due to movements in the value of debts denominated in foreign currency and fluctuations in the returns from privatizations. Financial statements show that PSALM has relied on bond issues to help sustain liquidity and remains highly geared (Appendix 15, tables A15.1, A15.2, and A15.3). Government support may be required from time to time until it completes its divestment program. While some residual risks remain, the evaluation has concluded that the restructuring of the power sector is financially sustainable. Based on the information available, the evaluation concluded that the industry's financial performance is sound and sustainable.
- 63. The PCR noted in 2012 that the MMS system infrastructure was nearing obsolescence and would need to be replaced in the near future. During discussions with the IEM team, PEMC reported that a new MMS design with the corresponding hardware and software upgrades has been planned and approved for 2017. Funds for new equipment will come from the market fees charged by PEMC. The new MMS is expected to make possible trading with a higher frequency than now, at intervals of either 5 or 15 minutes. The shorter trading interval will allow greater transparency and enable a more dynamic market response to changing circumstances. IEM discussions with stakeholders and visual inspection of equipment during field visits to project sites indicate that the assets provided under the project's transmission component are wellmaintained. The IEM heard no reports of budget constraints on or delays in the purchase of supplies for scheduled and unscheduled maintenance by NGCP.
- 64. During 2006-2014, WESM's first 9 years of operations, the Philippines' restructured power supply system has (i) maintained a reliable supply of electricity and improved the quality of its service, (ii) met the growing demand for electricity in Luzon and the Visayas, (iii) serviced and reduced the high levels of debt that had been incurred by NPC prior to the reforms, and (iv) changed from a fiscally dependent industry to a net taxpayer.
- 65. On the basis of this evidence, the evaluation found it probable that the project outputs and outcome will be sustained. The project is rated likely to be sustainable.

Other Assessments

A. Development Impact

- 66. The project's long-term development impact will arise from its contribution to the power sector's restructuring and reform program and the contribution this makes to national economic growth. The reform program's main impact has been the transfer of the costs and risks of ensuring adequate and reliable power supply from the public to the private sector. Responsibility for electrification in isolated and economically non-viable areas remains a public sector responsibility.
- 67. Before the 2001 EPIRA, power sector investments were determined by least-cost system development plans prepared by the DOE and the NPC, and power prices were set by the government. Since the legislation was enacted, competition and market forces have been determining investments in and the operation of generation and transmission facilities. This has resulted in power prices that are more economically efficient and highly responsive to changes in conditions, as well as more economical investments in and operation of the power supply system. This change has transformed the power supply industry from being fiscally dependent on the government and public finances, to a net taxpayer.
- 68. The project supported a government restructuring and privatization program that was comprehensive, innovative, and successfully addressed the power industry's insolvency issues and development problems. The project's role in financing critical components in the WESM and transmission systems helped the power supply industry achieve economically efficient and sustainable growth. The power sector is playing an important role in national economic development and the widespread improvement of the well-being of the country's people. The implementation of substation upgrades in Mindanao has made a particular contribution to increased rural electrification.
- 69. The project's stated goal in helping reform and restructure the power sector was to "support the Government's objective to improve the accessibility, quality, affordability, and sustainability of the national electricity supply." The DMF assumed that increasing the quality and affordability of the electricity supply would improve economic outcomes and that the economic benefits would accrue to all sectors of the economy, especially the poor. The impact performance indicators were an increase in per capita gross domestic product, a reduction of national debt, and a lowering of unemployment. These have all occurred since the start of the project, although the results are not solely attributable to the project. In light of these results, the PPER rates the development impact of the project *significant*.

³⁰ ADB. 2002. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation and Technical Assistance Grant for the Electricity Market and Transmission Development Project in the Republic of the Philippines. Manila. Loan and Project Summary.

Asian Development Bank's Performance В.

- 70. ADB performed well in its role to help the government design the restructuring and reforms of the power sector through this project. However, the follow-up monitoring and evaluation (M&E) of the project was not satisfactory. ADB received and reviewed progress reports from TransCo only until March 2009, shortly before NGCP took over operation of the transmission system. The evaluation found no evidence that ADB tried to make arrangements to ensure that NGCP would continue to provide the required information and monitoring reports after the significant changes in implementation arrangements occurred with the transfer of all liabilities and nontransmission assets from NPC to PSALM, the transfer of transmission and subtransmission assets from NPC to TransCo, and the TransCo franchise awarded to NGCP. In fact, the evaluation was unable to determine that ADB approval for these changes, which the RRP stated would be covered by a separate Board paper, was ever given.31
- 71. In addition, the assurance in the PCR that the project loan covenants had been generally complied with ignored the noncompliance with financial covenants and the unfulfilled assurances (Appendix 6). The NPC did not comply with its financial covenants in the initial years of the project. PSALM, the NPC's successor, did not comply with the debt service targets.
- 72. The RRP was clear on the M&E commitments. It stated that "TransCo will compile and analyze data to facilitate project performance monitoring and evaluation and it will forward this information to ADB in accordance with the agreed schedule of performance measurement indicators to assess the macroeconomic impact and achievement of sector development goals of the Project." Yet the PCR did not discuss M&E at all. The absence of the required M&E data could be the reason the PCR failed to include institutional financial analyses of NPC (the borrower), PSALM, and TransCo (the executing agency) or complete EIRR and FIRR evaluations.
- 73. The evaluation concluded that ADB's highly satisfactory performance in planning and preparing the project was offset by its unsatisfactory performance after approval. On balance, ADB performance is rated satisfactory overall.

C. **Borrower's Performance**

74. NPC was the borrower of record because TransCo, the executing agency, lacked authority to incur debt. TransCo appointed a project director and sufficient suitably qualified staff to implement the project. This included a project manager to oversee implementation of the project's part A component to develop the wholesale market. Part A made satisfactory progress with the support of the TA consultant. This allowed the WESM to begin operations as soon as enough of generating assets had been privatized. In contrast, the organizational arrangements for the part B component to develop the transmission network used standing arrangements. TransCo's existing regional project managers reported on the component activities to the project director. But TransCo's project director apparently lacked the authority to make the decisions

³¹ ADB. 2002. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation and Technical Assistance Grant for the Electricity Market and Transmission Development Project in the Republic of the Philippines. Manila. para. 35. The RRP said a paper would be submitted to the ADB Board for consideration after the various implications of the transfer of assets and liabilities from NPC to PSALM and TransCo have been properly reviewed.

needed when procurement and safeguard issues arose. These were then delayed by TransCo's cumbersome internal procedures. TransCo was therefore unable to complete the project's land acquisition resettlement plan within the agreed implementation schedule. These problems delayed completion of some component activities by up to 3 years and caused cost overruns in payments for the transmission line right- of- way.

As discussed in para. 27, TransCo submitted the required quarterly progress reports to ADB until about 3 months before NGCP took over the operation of the transmission system in July 2009, when this reporting ended permanently. TransCo may also have provided financial reports, but the evaluation was unable to determine whether this was the case. NGCP either transferred or terminated the former TransCo staff members who had been preparing the reports for ADB. One result was TransCo's inability to prepare its required end of project completion report for ADB. The evaluation found TransCo's inability to keep ADB informed after July 2009 understandable. Based on IEM discussions, it is clear that NGCP did not assume this responsibility from TransCo. The borrower, TransCo, and NGCP were dealing with disruptive organizational change, including the release and transfer of staff and records and the redevelopment of their organizations' functions and systems. Despite these problems, the NPC and TransCo, together with the new organizations that were created (PSALM, PEMC, and NGCP), played their parts in realizing a successful outcome to the power sector development program, including this project. The evaluation rates the performance of the borrower *satisfactory*.

CHAPTER 5

Overall Assessment, Issues, and Lessons

A. Overall Assessment

76. The evaluation found the project support for the EPIRA to be commendable. The MMS, the Luzon transmission facilities, and the substation expansions in Mindanao it helped provide all met needs that were critical to the success of the government's overall power sector restructuring and reform program. The project also contributed to the full electrification of Mindanao. The project had its shortcomings, however. Monitoring of and reporting on the project were confined to procurement and the topics covered by quarterly reports that ended when TransCo was reorganized in mid-2009. This meant that ADB could not determine the financial and economic impacts of the project and was unaware of changes in the ownership of assets and the financial performances of the key players. These issues were reflected in the PCR, which provided incomplete analyses. Despite ADB's limited monitoring and the poor reporting by the executing agency, the ADB project and the wider power sector program proceeded more or less as planned and achieved most of the ambitious outcome targets in the DMF.

77. Given the success of the asset sales and the restructuring of the power sector and the program's place as an essential requirement for economic growth (a relevant theme of ADB's program for the Philippines), the project is rated *successful*. The overall rating is based on the ratings of *relevant*, *effective*, *efficient*, and *likely to be sustainable*.

Table 7: Rating Matrix for Core Evaluation Criteria

Criterion	Weight (%)	Assessment	Rating Value	Weighted Rating
Relevance	25	Relevant	2	0.5
Effectiveness	25	Effective	2	0.5
Efficiency	25	Efficient	2	0.5
Sustainability	25	Likely to be sustainable	2	0.5
Overall Rating	100	Successful		2.0

Note: Highly successful (\geq 2.5), successful (2.5>S \geq 1.5), less than successful (1.5>LS \geq 0.75), unsuccessful (<0.75).

Source: Asian Development Bank Independent Evaluation Department.

B. Issues

78. Implementation of the EPIRA. Most of its important elements have been implemented since the EPIRA was passed in 2001. The electricity market has been disaggregated into generation, transmission, and distribution components. Competition has begun in the generation and supply of power, and a wholesale electricity spot market is at work in Luzon and the Visayas. Transmission is now operated by a concessionaire, and an independent agency regulates the industry. Implementation of the final component began in 2013 with the introduction of retail competition and open access to distribution networks. Open access is intended to create greater competition in the purchase of electricity in the spot market and give retail consumers a choice of suppliers. The thresholds for these contestable consumers are expected to be lowered in June 2016, and further reductions are expected 2 years later.³² While the proportion of households with electricity connections has increased nationwide under the EPIRA, it remains to be seen whether its full implementation will result in the expected but not yet achieved lowering of real retail prices for electricity.³³

C. Lessons

- 79. Time needed to deal with rights-of-way. Projects such as this one need to allow sufficient time to assess and address the issues in acquiring right-of-way. The project's compensation and resettlement problems could have been resolved more quickly if those affected had been made better aware of the property valuation process and the impact the project would have on them. The project could have established a mechanism to deal with disputes, and local government institutions could have been engaged to help resolve them. The project could also have activated its external monitoring group earlier to give it enough time to prepare for assisting those affected.
- Reassessment and careful choice of independent marker operator. The government should look carefully again at the need for an IMO (paras. 25 and 39), As far as the evaluation could ascertain, use of the PEMC, which is not an IMO, has had no obvious adverse repercussions to date. This finding suggests that it could be counterproductive to force the pace of change to establish the IMO that the EPIRA and project design called for, and the government undertook to create but did not.

32 Retail competition and open access began in December 2013 for the largest electricity customers, with peak demand greater than or equal to 1 megawatt. They can choose their electricity suppliers by entering into a retail supply contract with a licensed retail electricity supplier. Electricity prices for these so-called contestable consumers—i.e., electricity purchasers for whose business suppliers can complete for—is not regulated. The next phase is expected to start in June 2016, when the threshold for contestable consumers will be lowered to 750 kilowatts..

³³ As of September 2015, 90% of households in Luzon, 89% in the Visayas, and 70% in Mindanao had electricity connections.

Appendixes

APPENDIX 1: DESIGN AND MONITORING FRAMEWORK

The following design and monitoring framework from the RRP¹ has been supplemented at both PCR² and PPER by adding the columns titled PCR Assessment and PPER Comment.

Design Summary	Performance Indicators/Targets	PCR Assessment	PPER Comment	
Impact				
	Increased gross national product per	Gross Domestic Product (GDP) grew	Indicator Trends ³	
Improved well-being of Filipino	capita	by 1.1% in 2009 and 7.3% in 2010.	2002 2006 2014	
people and reduce poverty			1 47,638 54,229 72,648	
through improvements to the	Reduced national debt	External debt, as of 30 June 2011,	2 63.3% 51.6% 36.4%	
national economy		was at \$53.9 billion against \$56.0	3 11.4% 8.0% 6.8%	
	Reduce unemployment	Unemployment rates in 2009 and 2010 are 7.5% and 7.3%, respectively.	1= GDP per capita in constant peso. 2 = Gov't gross debt /GDP %. 3 = Unemployment rate.	
Outcomes				
	A reduction in real terms, of the average retail electricity price within 5 years	The operation of the WESM contributed to reverse the rising trend of electricity rates in the country (Appendix 10).	No analysis in Appendix 10 or elsewhere in the PCR supports the conclusion of reduction in retail electricity rates. Overall trend: retail electricity rates increased in real terms during the project period. ⁴	
Assist the government improve	Reliability remains better than Energy	Performance incentive award for		
the accessibility to, quality of,	Regulatory Commission (ERC) targets	surpassing the ERC's reliability		

¹ ADB. 2002. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation and Technical Assistance Grant for the Electricity Market and Transmission Development Project in the Republic of the Philippines. Manila. (TA 4073-PHI).

² ADB. 2012. Completion Report: Electricity Market and Transmission Development Project in the Philippines. Manila. (Loan 1984-PHI).

³ International Monetary Fund: World Economic Outlook Database, accessed October 2015.

⁴ USAID, Philippines. 2013. *Challenges in Pricing Electric Power Services in Selected ASEAN Countries.* Manila.

Design Summary	Performance Indicators/Targets	PCR Assessment	PPER Comment
affordability of, and sustainability of the national electricity supply		indicators was awarded to the grid operator in 2009 and 2010.	
	Grid losses remain below ERC's system loss cap	Grid losses are below the ERC approved rates. The historical transmission system loss was 2.87% (2009) and 2.47% (2010) for Luzon, and 4.69% (2009) and 3.81% (2010) for Mindanao. The ERC approved system loss rates are 2.98% for Luzon and 4.35% for Mindanao	Transmission Losses ⁵ Region 2011 2012 2013 Luzon 2.46% 2.40% 2.33% Mindanao 2.99% 2.85% 2.78%
	Improve accessibility, achieving 100% village electrification by 2006. About 5,000 households could benefit from the project in Mindanao	The project greatly improved the system reliability and ensured adequate power supply in Luzon and Mindanao in support of the Department of Energy's rural electrification project. By 2009, 100% district electrification had been achieved in Mindanao	100% village electrification was achieved in 2008, before the project substation capacity had been commissioned. During 2008–2015, 263,045 new connections have been provided in the cooperatives served by the Mindanao substation investment. ⁶
	Improved and sustainable financial performance of the industry as measured at a national level	No data in the PCR	Analysis of national institutions financial statements shows that the financial performance of public sector energy organizations has improved and is likely sustainable.
Outputs			
A competitive wholesale electricity market	Commissioning of limited functionality market management system (MMS) by end 2003	Because of delays encountered during the procurement stage, a system availability test was not completed until 31 December 2005.	The commercial operation of the WESM began 26 June 2006. ⁷

National Grid Corporation of the Philippines.
 Department of Energy. 2014 *Philippine Power Statistics*. https://www.doe.gov.ph/electric-power-statistics/philippine-power-statistics
 WESM. 2013. WESM Market Report June 2012–June 2013. Manila.

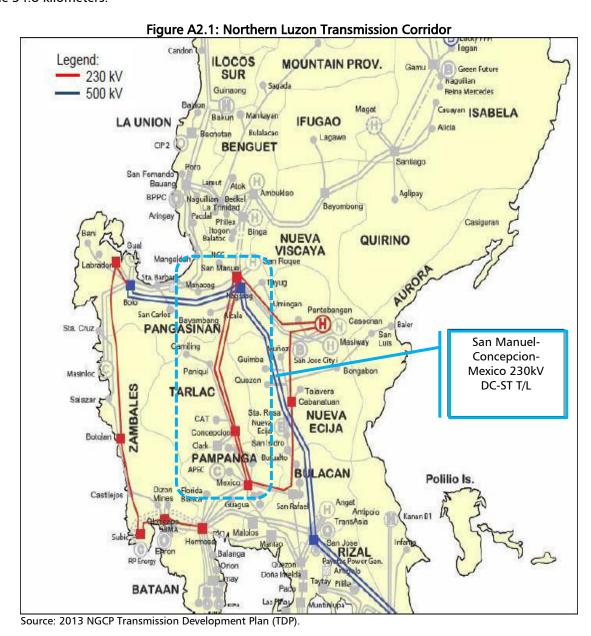
Design Summary	Performance Indicators/Targets	PCR Assessment	PPER Comment
	Timely production of dispatch schedules, calculation of market prices, and preparation of settlement statements	Being done regularly by Philippine Electricity Maket Corporation	The commercial operation in the Visayas commenced on 26 December 2010.(footnote 7)
	Successful phased implementation of MMS from interim market to a fully functional final solution by December 2004	After the market trial operation, the commercial WESM operation in Luzon started on 26 June 2006.	
Appointment of an Independent Market Operator	Transfer of responsibility for day-to- day operation of the wholesale electricity spot market (WESM) to an independent market operator (IMO) by 31 December 2004	PEMC is the market operator. The Department of Energy (DOE) has yet to develop the design of an IMO, as envisaged in the Electric Power Industry Reform Act, 2001 (EPIRA).	Stakeholders interviewed during the independent evaluation mission (IEM) indicated that public consultations are ongoing, and no date has been determined yet for the appointment of an IMO.
230 kilovolt (kV) double circuit transmission line between San Manuel and Mexico	Commissioning of new San Manuel– Concepcion–Mexico transmission line by 31 December 2008	Final commissioning of the San Manuel–Concepcion–Mexico line and its associated substation expansion was on 15 April 2009. Delay due to right-of-way (ROW) issues and delayed delivery of the transformer for Concepcion substation (not part of the loan but part of the substation expansion).	Physical outputs confirmed during IEM site visits in Luzon.
Six increased capacity transmission substations in Mindanao	Completion of six Mindanao substation expansions by 31 December 2008	Substation expansions in Mindanao were completed on 13 November 2011. The procurement of contracts for both the supply of the substation equipment and installation contracts was delayed.	No IEM site visits scheduled to confirm physical outputs.

ADB = Asian Development Bank, DUs = distribution utilities, ECs=Electric Cooperatives, ERC = Energy Regulatory Commission, , IMO = independent market operator, JBIC = Japan Bank for International Cooperation, JCPC=Joint Congressional Power Commission, MMS = market management system, NEA = National Electrification Administration, NPC = National Power Corporation, PUs=Production Utilities, SPUG=Small Power Utilities Group, TransCo=National Transmission Corporation, WESM= wholesale electricity spot market.

APPENDIX 2: SYSTEM DEVELOPMENT MAP OF LUZON TRANSMISSION CORRIDOR

A. Northern Luzon Transmission Corridor and San Manuel, Concepcion, and Mexico Substations Connection Layout

1. Figure A2.1 shows the system development map used as a reference for the San Manuel–Concepcion–Mexico 230 kV double circuit steel tower transmission line that was completed for this project. The San Manuel–Concepcion transmission line is 69.3 kilometers long, and Concepcion-Mexico line 34.8 kilometers.



2. The northern Luzon transmission corridor consists of several flow paths for transferring power from the generation sources located in northern Luzon to Metro Manila.

- The 500 kV double-circuit Bolo-San Manuel-San Jose line is rated at 2,850 MVA per circuit and is capable of transferring more than 1,800 MW generation from the Masinloc and the Sual coal-fired power plants to Metro Manila. The Bolo and San Manuel 500 kV substations are the receiving ends of generation from the north. The power is then delivered to Metro Manila mainly via the Mexico and San Jose substations.
- 4. Other underlying paths are 230 kV transmission lines: (i) the Labrador-Hermosa single-circuit line, (ii) the San Manuel-Concepcion-Mexico double-circuit line, and (iii) the San Manuel-Pantabangan-Cabanatuan-Mexico single-circuit line. The upgraded San Manuel-Concepcion-Mexico 230 kV line is an alternate corridor that also caters to the generation capacity of the hydroelectric plants delivering power to the San Manuel 230 kV substation.
- Without the upgrading of the old single-circuit San Manuel-Concepcion-Mexico line, there 5. would have been congestion along the lines and the N-1¹ contingency criteria in the transmission line operation would be violated. This congestion along the line would limit the dispatch from the plants in Northern Luzon, and the supply gap would have to be filled by other plants using high-cost fuel. This limitation would result in high prices for electricity in the spot market.
- Figure A2.2 is a single-line diagram showing the San Manuel, Concepcion, and Mexico substations with the connecting double-circuit transmission lines, which are made up of bundles of two thermal wires with a capacity of 1100 MVA per circuit.

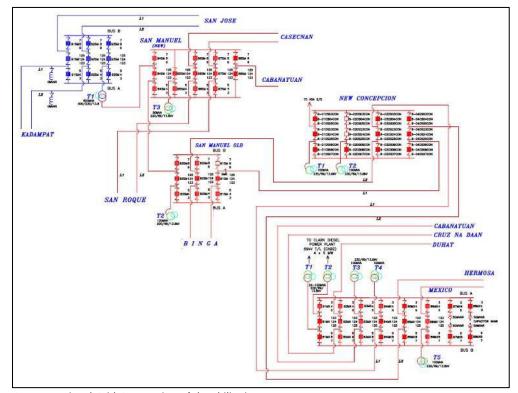


Figure A2.2: San Miguel, Concepcion, and Mexico Substation Connection Layout

Source: National Grid Corporation of the Philippines.

¹ The N-1 criteria requires that all loads can be restored if any single component fails (i.e. N-1 components still available). Note that this does not mean no short-term outage should occur, only that the load be quickly (definitions vary on how quick) restorable.

- The San Manuel substation is a big complex of old 500 kV and new 230 kV substations. The old substation is still in operation and has the connection to the Concepcion substation. The San Manuel 500 kV substation is the receiving end of the generation from Sual (1,200 MW) and Masinloc (600 MW), via Bolo 500 kV substation. The new San Manuel 230 kV substation is the receiving end of the generation flowing from the 500 kV substation, the San Roque hydro plant (410 MW), the Casecnan hydro plant (165 MW), and part of the generation output of the Pantabangan hydro plant (120 MW). The old San Manuel 230 kV substation is transmitting this electricity toward Metro Manila via the Concepcion substation.
- 8. On the load side, the substation transformers serving customers are as follows:
 - San Manuel substation—1x100 MVA 230/69 kV, 3x200 MVA 500/230 kV, 1x50 MVA 230/69 kV:
 - (ii) Concepcion substation—2x100 MVA 230/69 kV; and
 - Mexico substation—3x300 MVA 230/69 kV, 3x100 MVA 230/69 kV. (iii)
- 9. The Mexico substation is under district 6. With a capacity of 1,200 MVA, it is the largest substation with the biggest load and is the highest revenue earner near Metro Manila.

В. Biñan–Calamba (Tower #050) Connection Layout

Figure A2.3 is a single-line diagram showing the Biñan and Makban substations connected via a 230 kV double-circuit transmission line. Along the Biñan-Makban transmission line is tower #050, located in Calamba 18.2 kilometers from Biñan substation.

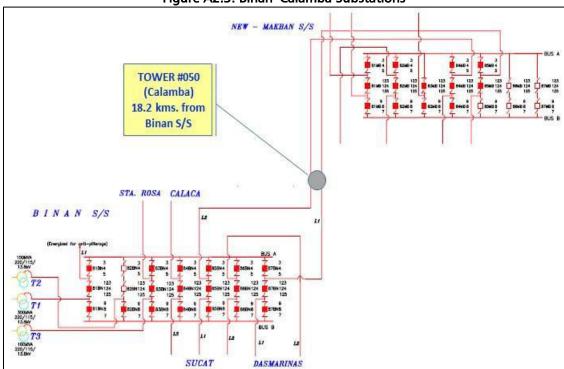


Figure A2.3: Biñan-Calamba Substations

Source: National Grid Corporation of the Philippines.

11. The 18.2 kilometer transmission line from Biñan to tower number 050 in Calamba is part of the 34 kilometer Biñan–Makban line. This segment was left out in the Biñan–Makban project² and was accommodated in the Electricity Market and Transmission Development Project.

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² ADB.1997. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation for the Power Transmission Reinforcement Project in the Republic of the Philippines. Manila. (Loan 1590-PHI).

APPENDIX 3: POWER SUPPLY INDUSTRY STRUCTURE

A. Pre-EPIRA Power Supply System

1. Prior to the passage of the EPIRA in 2001 and the subsequent restructuring of the Philippine power sector, the National Power Corporation (NPC) was responsible for developing and managing the generation and transmission in the national power supply system in the Philippines (Figure A3.1). The NPC is a wholly owned government corporation.

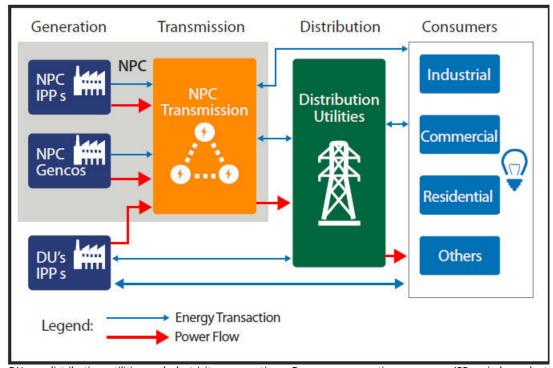


Figure A3.1: Pre-EPIRA Power Supply Operation

DUs = distribution utilities and electricity cooperatives, Gencos = generation company, IPP = independent power producer, NPC = National Power Corporation,

Source: KPMG. 2013. The Energy Report Philippines, 2013-2014. Manila

Post EPIRA Power Supply System В.

2. Figure A3.2 illustrates the operations of the reformed power industry.

Distribution/ Generation Pool Transmission Consumers Supply **Privatized WESM** Gencos Contestable > 750kw Retail **Privatized** Supply consumer **NPC-IPPs** (and ability to aggregate contiguous loads) System DU's Control **IPPs** Distribution Own Generation Wires Captive **Business**) Transmission → Energy Transaction Regulated Legend: Power Flow

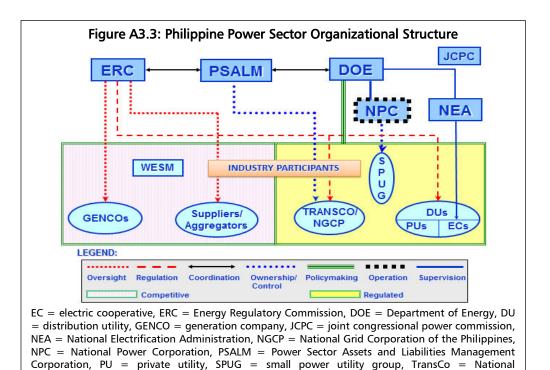
Figure A3.2: Power Supply Operations after the EPIRA

Genco = generation company, IPP = independent power producer, NPC = National Power Corporation, WESM = wholesale electricity spot market.

Note: TransCo is the public sector asset owner and the National Grid Corporation of the Philippines the private operator and concessionaire for the transmission system.

Source: KPMG. 2013. The Energy Report Philippines, 2013–2014. Manila

New agencies were created to oversee the transition from the pre-EPIRA mode of operation to the new one. The functions and responsibilities of the various government agencies and private entities are shown in Figure A3.3.



- The restructured electricity industry is composed of both competitive and regulated elements. The competitors are the generation companies and the electricity suppliers, while the regulated elements are the natural monopolies, the National Transmission Corporation (TransCo), and the distribution utilities.
- 5. The restructured industry has the following key players:

Source: Department of Energy.

Transmission Company, WESM = Wholesale Electricity Spot Market.

- The Department of Energy (DOE) oversees the implementation of the EPIRA, including the formulation of policies for the efficient supply and economical use of energy.
- The Energy Regulatory Commission (ERC) is an independent, quasi-judicial regulatory (ii) body that promotes competition, encourages market development, ensures customer choice, and penalizes abuse of market power.
- (iii) The Power Sector Assets and Liabilities Management Corporation (PSALM) is a government-owned and controlled corporation. Its principal purpose is to manage the orderly sale, disposition, and privatization of NPC generation and other disposable assets, and its IPP contracts; as well as liquidate all the NPC's financial obligations and stranded contract costs in an optimal manner.
- The Philippine Electricity Market Corporation (PEMC). The PEMC is a non-stock and non-(iv) profit corporation established by the DOE. It is not independent but performs the market operator (MO) functions in the WESM: establish and govern an efficient, competitive, transparent, and reliable market for the wholesale purchase of electricity and ancillary services;
- (v) The state-owned NPC is responsible for the missionary electrification function for the government in areas that are not connected to the main grids through the small power utilities group, manage watershed areas supporting power plants, manage dams nationwide and coordinate with all stakeholders to ensure safety of its communities and environs, and manage undisposed power generating assets.
- TransCo was formed to take over electrical transmission from the NPC, pending the (vi) spin-off of the transmission operation function (but not asset ownership) to the

- National Grid Corporation of the Philippines. TransCo retains asset management and oversight functions.
- The National Grid Corporation of the Philippines is the private sector concessionaire (vii) that is operating the national transmission system.
- The National Electrification Administration is a government agency mandated to (viii) develop and implement programs to prepare and strengthen electric cooperatives for the deregulated electricity market.

1. Items funded by the project are shown in Table A4.1.

Table A4.1: Electricity Market and Transmission Development Project, Estimated and Actual Project Cost (\$ million)

Item		isal Cost E Illion equi		Actual Cost (\$ million equivalent)			
item	Foreign	Local	Total	Foreign	Local	Total	
	Base ("Constant	") Costs	"Cı	ırrent" Co	osts	
Part A: MMS / WESM							
1. Hardware and Software	21.0	1.0	22.0	8.4	0.0	8.4	
2. Project Management	2.0	1.0	3.0	2.1	0.2	2.3	
3. Metering Instruments ^a	0.0	0.0	0.0	2.7	0.0	2.7	
Subtotal (Part A)	23.0	2.0	25.0	13.2	0.2	13.4	
Part B: Transmission Development							
1. Luzon Transmission Upgrade	26.0	12.0	38.0	28.8	19.1	47.9	
2. Calamba Tower 50 to Biñanª	0.0	0.0	0.0	10.8	3.4	14.2	
3. Mindanao Substation Expansion	11.0	1.5	12.5	10.7	8.0	11.5	
Subtotal (Part B)	37.0	13.5	50.5	50.3	23.3	73.6	
Base Costs 2002 values	60.0	15.5	75.5	NA	NA	NA	
Contingencies and FDC							
1.Physical Contingencies	6.0	1.5	7.5	0.0	0.0	0.0	
2. Price Escalation	5.7	3.5	9.2	NA	NA	NA	
3. FDC	13.8	0.0	13.8	3.4	0.0	3.4	
Subtotal Contingencies and FDC	25.5	5.0	30.5	3.4	0.0	3.4	
Total Cost	85.5	20.5	106.0	66.9	23.5	90.4	

FDC = financial charges during construction.

Source: Asian Development Bank Southeast Asia Department; ADB. 2012. *Completion Report: Electricity Market and Transmission Development Project in the Philippines*. Manila. (Loan 1984-PHI).

2. Items added to the project and financed from cost savings are summarized in Table A4.2.

Table A4.2: Additional Components Funded from the Loan Savings

Additional Components	Approved	Amount (\$ million)	Source of Funds
Part A			
(i) WESM Training	7 Sept. 2006	0.2	JBIC Part A, WESM Project Management
(ii) Meters (at NPC generating plants)	10 June 2004	3.5	JBIC Part A, WESM Hardware and Software Installation (foreign costs)
Part B			,
Calamba Tower 50 to Biñan	28 March 2005	12.0	JBIC Part A, WESM Project Management (\$6 million) and
Transmission Line	7 March 2005	4.0	JBIC Unallocated (\$6 million) ADB Unallocated (\$4 million)

ADB = Asian Development Bank, JBIC = Japan Bank for International Cooperation, NPC = National Power Corporation, WESM = wholesale electricity spot market.

Source: TransCo.2009. Annex A: Quarterly Progress Report No. 21 for January-March 2009. Manila.

^a New item added during project implementation, funded from the loan savings – see below.

APPENDIX 5: STATUS OF RIGHT-OF-WAY COMPENSATION PAYMENTS

Total Affected	Stage 1 (San Manuel– Concepcion with 79.66km Transmission Line)	Paid as of 16 March 2007 (%)	Stage 2 (Concepcion–Mexico with 37.42 km Transmission Line)	Paid as of 16 March 2007 (%)	Paid as of 8 Oct 2015 (%)
634 houses and structures to be demolished	371	99	263	92	100
284 landowners' property to be acquired	194	99	90	86	76
340 to be paid for tower occupancy fee	86	99	254	71	100
1,874 persons to be compensated for crops, plants, and trees	1,420	99	454	40	93

Source: ADB. 2009. Completion Report: Electricity Market and Transmission Development Project in the Philippines. Manila. (Loan 1984). Extracted from EA's report. Appendix 14; and October 2015 updates from NGCP to ADB.

A. Actual Performance

- 1. The PCR for this ADB project said that "generally NPC and TransCo complied with the covenants listed in the project and loan agreements" and that both fulfilled their safeguard, procurement, and other undertakings. The project performance evaluation conducted by ADB's Independent Evaluation Department has found this not to be the case. The notable exceptions are (i) the NPC's failure to comply with its financial performance covenants during 2003–2005, (ii) NPC's failure to amend the loan agreement to cover the transfer of assets and liabilities from NPC to PSALM and TransCo, (iii) the government's failure to meet its undertaking to create an IMO, and (iv) TransCo's failure to secure prior written approval from ADB for the transfer of assets of the WESM. TransCo also failed to provide ADB with a project completion report.
- 2. The project's report and recommendation (RRP) said that the NPC had made assurances that it would maintain a debt service coverage ratio of at least 1.3 times and a return-on-rate base of at least 8%¹ in accordance with the financial covenants of its existing loans. The RRP did report in para. 37 that the NPC had not met these financial performance covenants since 1997 but asserted that the power sector restructuring that the project was to support would address these problems through the transfer in 2003 of NPC's liabilities to PSALM. The NPC's financial statements during 2003–2008 showed losses during 2002–2004 and it likely² defaulted on the ADB's financial covenants.
- 3. The transfer of the NPC assets and liabilities to PSALM, including the residual balances of 12 existing ADB loans, was expected to occur in 2003, prior to privatization³. The transfer actually took place on 1 October 2008, by which time the privatization program was already under way. The evaluation found no indication that an omnibus amendment agreement had been prepared or that the ADB Board had approved the transfers.
- 4. The undertaking to create an IMO remains outstanding. As described in the section on design changes in the main text, the PEMC was established by the DOE as an interim vehicle for managing market operations. It is a non-stock, nonprofit corporation governed by a body of 15 members headed by the secretary of energy. Plans have been made to transform PEMC into an IMO. No firm date has been set for the transformation.
- 5. The assets of the MMS were physically transferred from TransCo to PEMC in 2004. PEMC took over ownership of the MMS and accepted the associated MMS payment obligations in 2007. Statements in the PCR and PVR show that ADB was still unaware in 2012 that this transfer had taken place and had in fact been given a verbal assurance to the contrary (PCR Appendix 9). The requirement to obtain ADB's prior written approval was overlooked by TransCo.
- 6. The evaluation found that one possible explanation for TransCo's inability to honor several of its undertakings to ADB is the disruption caused to its operations by the major change in TransCo's organization and modus operandi that occurred when its operations were privatized in 2009. At that time, many Transco staff were either let go or transferred to NGCP, the concessionaire. ADB also bears

¹ ADB. 2002. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation and Technical Assistance Grant for the Electricity Market and Transmission Development Project in the Republic of the Philippines. Manila. para. 82. Specific Assurances.

² A review of actual payments made from cash flow statements does not show whether all debt service obligations were met, only that payments were made.

³ ADB. 2002. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation and Technical Assistance Grant for the Electricity Market and Transmission Development Project in the Republic of the Philippines. Manila. para. 33. Implementation Arrangements.

responsibility for not monitoring the companies' performance, much of which was described in public documents on the companies' websites, and by not following up on TransCo's undertaking to amend the loan agreement. ADB did not ensure that its interests were respected and safeguarded.

B. Covenants and Assurances

- 7. The following lists the covenants and assurances provided in the RRP.
- TransCo will provide ADB with quarterly progress reports concerning the project's financial aspects, resettlement and environmental issues, procurement, manufacturing and construction activities, and all civil works. To facilitate post-evaluation of the project, TransCo will provide ADB within 3 months of physical completion of the project, a completion report that will comprehensively cover details of project implementation, benefits and costs, and any other information that may be requested by ADB concerning the project.
- TransCo will compile and analyze data to facilitate project performance monitoring and evaluation. It will forward this information to ADB in accordance with the agreed schedule of performance measurement indicators to assess the macroeconomic impact and achievement of sector development goals of the project.
- Annual ADB review missions will monitor the progress of the project. The focus of these reviews will be to determine a need for any deviation from the project design or implementation; cost overruns; loan reallocations; and any other factors, including assumptions and risks that might constrain the satisfactory implementation of the project and achievement of its development objectives.
- 11. TransCo, being the executing agency and operator of the transmission assets, has given the following assurances, which are incorporated in the legal documents:
 - Financial covenant. In the event TransCo incurs any debt, maintain a debt service (i) coverage ratio of at least 1.0 until 31 December 2008 and at least 1.3 thereafter,
 - Counterpart funds. Provide and release, in a timely manner, sufficient funds to meet (ii) the counterpart funding requirements of the Project, including if necessary, loans and other sources acceptable to ADB.
 - Project implementation. Ensure that there will be at all times a project director, assisted (iii) by a sufficient number of suitably qualified and experienced staff, to effectively implement the Project.
 - Asset transfer. Seek ADB's consent prior to transferring the assets of the WESM to an (iv) IMO.
 - Land acquisition and resettlement. Take appropriate action to acquire prior to (v) construction, all land and ROWs required for upgrading the Luzon transmission lines and implement the approved resettlement plan in accordance with ADB's Policy on Involuntary Resettlement to ensure that affected persons will be at least as well off as they would have been in the absence of the Project. Should the transmission line easements change during construction, revise the resettlement plan, including full details of the losses of land, crops, houses, and other structures resulting from such changes, submit the revised resettlement plan to ADB for approval, and increase the resettlement budget as necessary to meet any additional cost.

APPENDIX 7: WHOLESALE ELECTRICITY SPOT MARKET AND MARKET MANAGEMENT SYSTEM

A. Wholesale Electricity Spot Market

- 1. The WESM is a gross pool real time market similar to electricity markets in Australia and New Zealand, where generators offer their capacity to the market in order to be dispatched and paid for their sales. The market establishes prices according to location. Each generator's output is sold at their connection point's nodal price. Every hour, each generation offer is stacked in ascending order of prices and the clearing price is set by the last offer that matches forecasted demand. The market nodal prices are then determined an hour ahead for each hour, by adjusting the clearing price to reflect the economic cost of losses or congestion at each location.
- 2. The WESM's operations encourage competition in the long-term market for contracts, as generators and buyers generally negotiate outside of the WESM to fix an electricity selling price that will reduce their exposure to volatile spot market prices. The market participants therefore participate in two transactions. The first is for the electricity supplied through the spot market, where the purchaser will pay the market operator at the nodal price for its purchases. The market operator will in turn pay the generators the nodal price for the electricity they supplied. The second transaction is the bilateral off-market transaction where the traded electricity is priced at the contracted price. The net effect is that the purchaser pays and the generator receives the electricity price set by the bilateral off-market contract. The WESM initially covered the country's most populous region, Luzon, and was later extended to the second of its three major regions, the Visayas. Figure A7.1 shows the organizational structure of the WESM.

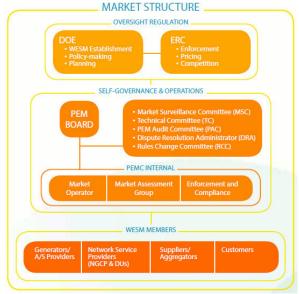


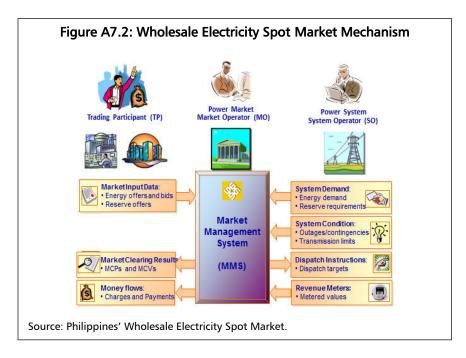
Figure A7.1 Wholesale Electricity Spot Market Structure

DOE = Department of Energy, DU = distribution utility, ERC = Energy Regulatory Commission, NGCP = National Grid Corporation, PEMC = Philippine Electricity Market Corporation.

Source: Wholesale Electricity Spot Market report for 26 June 2012–25 June 2013.

Market Management System В.

3. The market management system (MMS) provided under the project and cofinanced by ADB and JICA is the core of the WESM. It uses state of the art technology and interfaces with the different systems of the system operator, metering service providers, electronic fund transfer facility provider, and the trading participants and other WESM members. Its central role and functions are shown in Figure A7.2.



4. The trading participant offers the output of its plant up to 10 blocks with the corresponding price (PHP perMWh) and volume (MW) every hour. The MMS matches the generation offers of the trading participant with the demand, while considering system conditions and comes up with a schedule of hourly generation quantities to be dispatched with prices at each location. This is the realtime dispatch (RTD) schedule, which the market operator (MO) submits to the system operator (SO) for implementation in real-time. The SO, however, can supersede the RTD when necessary, or when the system so requires this to ensure the stable and reliable operation of the system. The trading participant will then inform the generators of their dispatch schedules. The next day, participants (Suppliers and Buyers) settle their transactions through the WESM settlement system, or among themselves, for quantities covered by bilateral contracts.

WESM Generator Members C.

5. Efficient and effective power markets are adversely affected by insufficient competition, i.e., when a small number of generators or buyers dominate the supply and sales markets. These markets are also affected negatively by anticompetitive behavior by market players. Table A7.1 details the main generator groups and their shares of total generating capacity.

Group	Share %	Full Name
SMC	19.0	San Miguel Corporation
Aboitiz	16.0	Aboitiz Power Corporation
First Gen	14.9	First Gen Corporation
PSALM	13.7	Power Sector Assets & Liabilities Management Corporation
10 Other Generators	31.9	5%<10 generators >1% each
11 Small Generators	3.9	11 small generators < 1% each
Other IPPs	0.6	
Total	100.0	

Table A7.1: Generator (Supply) Market Share

IPP = independent power producer.

Source: PEMC. The Annual Report Magazine of the Philippine Electricity Market Corporation, June 2014 – June 2015.

6. The WESM has 68 registered generators for Luzon and the Visayas but is dominated by four major players who account for 64.0% of total registered capacity. The next 10 generators account for 31.9% of registered capacity. The Herfindahl-Hirschman Index (HHI)¹ showed the WESM to be a moderately concentrated market an HHI score of 1,000-1,800 during 1 January-30 June 2015. This is a reasonable performance when compared with other power markets.² Further, the HHI showed a favorable trend over time, due to the entry of new players into the market. This trend should continue, partly as a result of PSALM's efforts to bring the successor generators into the market and the planned extension of the market to incorporate the grid in Mindanao, the third of the nation's three major population regions.

D. **Anticompetitive Behavior**

- 7. The market surveillance committee (MSC) of the PEMC is mandated under the WESM rules to monitor and report activities conducted by the WESM participants and breaches of the WESM rules. It also defines and reviews market monitoring data and indices. In May 2006, the MSC, pursuant to MSCEM, promulgated a Catalogue of Market Monitoring Data and Indices (CMMDI) that will be used to process and analyze the monitoring data collected. These market monitoring indices are used as a tool to measure or assess competition and to help identify when a market design, market rule, or sector structure impedes competition or produces, promotes inefficient or anticompetitive behavior or outcomes, or leads to distortions. The WESM Rules, MSCEM, and CMMDI are all available on the WESM website.
- 8. The Energy Regulatory Commission (ERC) is mandated under section 43 of the Electric Power Industry Reform Act (EPIRA) of 2001 to promote competition, encourage market development, ensure customer choice, and penalize abuse of market power in the restructured electricity industry. The ERC has the original jurisdiction to impose the rules and regulations of the electricity spot market and to investigate and act against any participant or player in the electricity industry for violations of any law, rule or regulation governing the same, including the rules on cross-ownership, anti-competitive behavior, abuse of market positions, and other similar or related acts. In compliance with its responsibility under the EPIRA, the ERC promulgated in August 2006 competition rules and complaint procedures.

1 The HHI is a measure of market concentration. It is calculated by squaring the market share of each firm competing in a market and summing the results. The HHI ranges from close to zero (perfect competition) to 10,000 (monopoly). The closer a market is to a monopoly, the higher the market concentration (and the lower the competition). A market with an HHI that is less than 1,000 is considered competitive. Markets with results of 1,000-1,800 are moderately concentrated, and those with an HHI of 1,800 or more are highly concentrated.

² The HHI for New Zealand's electricity spot market, which is similar in model to the WESM, is about 2,000. New Zealands's market is therefore more concentrated and less competitive than the WESM.

- Enforcement is targeted towards two types of breach that are believed to have the most impact on efficiency of the market and its ability to achieve its objectives, namely compliance with offer rule and with dispatch schedules, and dispatch tolerance by scheduled generating units. Deterrence of breach is anticipated to be achieved through regular monitoring of compliance and immediate initiation of investigations for probable breach; and imposition of stiff financial penalties. Minimum financial penalty is PHP100,000 for each count of breach.
- Since the monthly monitoring of noncompliance and initiation of investigations began on 10. December 2013, 1,613 investigations had been started as of 30 June 2015. These involved 36 scheduled generation companies operating or transacting 31 scheduled generation facilities in Luzon and 20 facilities in the Visayas. Of these, 708 cases were for noncompliance with the must-offer rule, where noncompliance by scheduled generation companies were monitored on an average of 35% of the total possible intervals. These are the intervals subject of ongoing investigations. Another 688 cases were for noncompliance with dispatch schedules or instructions, where noncompliance was monitored in about 10% of total possible intervals. These are also subject of ongoing investigations.
- Targeted enforcement will continue focusing on the must-offer rule and dispatch compliance. Depending on rule changes, coverage will likely expand to other categories of generating units, and compliance standards may also change. Other categories of generating units include must-dispatch, preferential dispatch, and non-scheduled generating units. Compliance standards may change depending on changes in scheduling and dispatch processes. Reporting protocols are being reviewed to simplify reporting and encourage self-reports of noncompliance and significant events affecting operations through possible adoption of a common reporting system by the different agencies—ERC, DOE, and PEMC.

Ε. **Electricity pricing**

- A key aim of the ADB project was to ensure economic pricing of electricity. Nonetheless, the 12. Philippines' electricity tariffs are among the highest in the world and subject to some public criticism.³ In a study commissioned by MERALCO and prepared by International Energy Consultants (IEC) in 2012,⁴ MERALCO's average retail tariff was estimated to be PHP8.82 (\$0.2026) per kWh and was ranked ninth highest in the world and second highest in Asia (after Japan). The biggest component of this tariff is the generation component, at 65% of the overall retail tariff—the part of the tariff that is determined by the interplay of supply and demand in the WESM developed under the project.
- The IEC study contended that the comparatively high tariffs in the Philippines—higher than in other Southeast Asian countries except Singapore—reflect the requirement of a commercial privatized system to recover the actual costs of supply. The same applied in Singapore, IEC said. The study noted that governments in other countries in Southeast Asia provide subsidies that reduce their average tariffs. IEC noted that the privatized utilities in the Philippines pay more in taxes, including a universal charge that funds the deficit in the costs of servicing debts incurred prior to the reforms. Another significant factor cited was the high cost of producing and delivering electricity in the Philippines, because of the country's high roughly 50% dependence on imported fossil power generation fuels at full international prices and its fragmented archipelagic geography. Similar findings were reached in a 2013 USAID study.⁵ This study said that the comparatively high prices charged in the residential sector in the Philippines reflected the fact that its Southeast Asian neighbors were charging rates in this sector that were low compared with actual costs.

³ People Opposed to Warrantless Electricity Rates (Power). Power Failure: 10 Years of EPIRA. June 2011.

⁴ International Energy Consultants. "Regional Comparison of Retail Electricity Tariffs" June 2012.

⁵ USAID. 2013. *Challenges in Pricing Electric Power Services in Selected ASEAN Countries*. Manila.

14. While ADB had endorsed the reforms on the basis that they would bring economic power prices, the goal of making retail power cheaper was clearly a chimera, given the high debts and the unsustainable embedded subsidies of the old model. However, as noted in the USAID study (and the RRP for ADB's 2015 energy program loan for Indonesia),⁶ some stakeholders in other Southeast Asian countries recognize that current tariff structures and fuel subsidies are unsustainable, encourage uneconomic use of electricity, cause their public utilities to underperform, and in these and other ways are adversely affecting economic growth. Due to the limited results boundaries in the original project framework, no sound evaluation was done at project completion on the success of the government's overall reform program in producing economically efficient pricing—and such work is well beyond the scope of this PPER. However, given that the overall reformed system is designed to achieve economic prices and is providing a reasonable degree of competition and a reliable supply, the conclusion of the project performance evaluation is that the industry restructuring is producing an effective, economically efficient wholesale power pricing system. As it evolves and the move to greater open access are completed, it should also enable more effective competition at the retail level and could result in lower retail electricity prices. Extension of open access and moves to mitigate anticompetitive behavior should be strongly encouraged at the highest level.

ADB. 2015. Report and Recommendation of the President to the Board of Directors: Proposed Programmatic Approach and Policy-based Loans for Subprogram 1 to Indonesia for the Sustainable and Inclusive Energy Program. Manila.

APPENDIX 8: INCREASE IN HOUSEHOLD CONNECTIONS IN MINDANAO

1. As shown in Table A8, around 80% of the total potential household connections in Zamboanga have been achieved by 2015. The project has made a contribution to the overall increase of 263,045 connections within the cooperatives served by substation investment under the project.

Table A8: Increase in Household Connections in Mindanao by Cooperatives Connected with Project Investment

Substation	Cooperative (Acronym)	Connections (2008)	Connections (2015)	Connections Increase	Increase %
Sta. Clara	Zamboanga del Sur I Electric Cooperative, Inc. (ZAMSURECO I)	84,812	112,858	28,046	33.1
Maco	Davao Oriental Electric Cooperative, Inc. (DORECO)	74,354	93,296	18,942	25.5
iviaco	Davao del Norte Electric Cooperative, Inc. (DANECO)	141,443	173,315	31,872	22.5
New Loon Matanao	Davao del Sur Electric Cooperative, Inc. (DASURECO)	99,005	144,971	45,966	46.4
	Agusan del Norte Electric Cooperative, Inc. (ANECO)	111,884	147,106	35,222	31.5
Butuan	Agusan del Sur Electric Cooperative, Inc. (ASELCO)	75,956	123,906	47,950	63.1
	First Bukidnon Electric Cooperative, Inc. (FIBECO)	99,578	134,172	34,594	34.7
Maramag	Bukidnon II Electric Cooperative, Inc. (BUSECO)	66,877	87,330	20,453	30.6
Total	al Flactuification Administration Sta	753,909	1,016,954	263,045	34.9

Source: National Electrification Administration Status of Energization accessed 2 August 2015.

APPENDIX 9: PRIVATIZATION OF NATIONAL POWER CORPORATION

A. Privatization

- 1. PSALM was formed in 2001 to undertake, among other things, an orderly and transparent privatization of the NPC's disposable assets (i.e. NPC's generation companies, TransCo's transmission operations, and assignment of IPP contracts) and to help liquidate NPC's financial obligations. PSALM was further directed to support the development of the WESM by using procedures that: broaden the ownership base of generation assets, help develop a reliable and secure power supply with transparent and reasonable electricity prices, and foster "competitive operation of the electricity market to provide electricity consumers the power of choice."
- The RRP anticipated that, "a qualified private concessionaire will be selected in the first half of 2. 2003 to operate TransCo's transmission assets," and that "the generation assets will be privatized through international competitive bidding in the second half of 2003.1" The project schedule proved over-optimistic, as regulatory and other uncertainties led to the failure of the initial privatization efforts. Substantive progress with privatization only started in 2007, four years later than planned, with the appointment of a transmission operator (NGCP) for the TransCo concession. The sale of the Masinloc power station, the first major power station to be privatized also happened in 2007. The success of these key privatizations was due to the successful launch of the WESM in 2006 as well as various changes in the terms and conditions of the sales that reduced the risks and uncertainties faced by prospective investors. After the initial privatizations had succeeded the rest of the program made satisfactory progress. A key milestone was reached in 2011 when sales on the Luzon and Visayas grid of generating capacity (80%) and assignment of IPP contracts (77%) met the ERC's requirements for open access and retail competition—the final (but as yet incomplete) stage in the power sector reform program. As of July 2015, 8,177 MW of power plant capacity has been privatized leaving a remaining balance of 3,113 MW to be privatized. Much of the remaining capacity is either strategic or its disposition subject to prior consultation with Congress (Table A9.1)

Table A9.1: Disposition of Power Plants and IPP Contracts, as of July 2015 (MW)

Item	Privatized	Balance	Total	Privatized (%)
Generation companies	4,569	1,664	6,234	73
IPP contracts	3,608	1,449	5,056	71
Total	8,177	3,113	11,290	72

MW = megawatt.

Source: PSALM. Presentation to the Asian Development Bank (ADB) dated 11 September 2015.

3. As of July 2015, PSALM reported income of \$19.9 billion from privatization of the assets taken over from the NPC. Of this, \$9.8 billion had been collected, and the balance of \$10.2 billion was in outstanding receivables that were to fall due for payment to PSALM over the subsequent 14 years. The \$9.8 billion already come to hand had been used for debt service—\$5.2 billion (57%) for regular debt service, payment of BOT lease payments [\$2.6 billion = 28%], and for debt prepayment [\$1.3 billion = 14.1%]). The balance of PSALM's income has been used to cover privatization expenses. Figure A9.1 shows the impact of the payments on the debt and lease obligations that PSALM acquired from the NPC.

¹ ADB. 2002. Report and Recommendation of the President to the Board of Directors: Proposed Loan to the National Power Corporation and Technical Assistance Grant for the Electricity Market and Transmission Development Project in the Republic of the Philippines. Manila. para. 17.

---BOT Lease **Total** -- Debts **USD Billion** 25.0 16.79 19.33 2 19.4319.0619.3718.6817.1416.4715.9815.8516.0814.5613.0512.30 20.0 15.0 10.0 5.0 0.0 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2nd Q Total Obligations 16.79 19.33 22.33 19.43 19.06 19.37 18.68 17.14 16.47 12.30 **BOT Lease** 13 63 12 88 12 01 11 70 10.94 10 27 9.52 8 98 7 93 7 22 6.52 5.49 7.00 6.81 Debts 6.37 7.46 8.70 6.55 7.05 7.66 7.74 6.87 6.95 7.92 8.85 8.04 51.404 53.096 55.569 56.267 53.067 49.132 41.401 47.485 46.356 43.907 43.928 41.192 44.414 45.200 Forex

Figure A9.1: PSALM Outstanding Financial Obligations, January 2001 —June 2015

BOT = build-operate-transfer.

Source: PSALM in a presentation to the Asian Development Bank on 11 September 2015.

4. The payments had reduced PSALM's financial obligations (debt and BOT lease) from a peak of USD22.3 billion in 2003 to USD12.3 billion in the second quarter of 2015.

APPENDIX 10: NATIONAL POWER CORPORATION FINANCIAL STATEMENTS

1. Tables A10.1 and A10.2 summarize the NPC's audited financial statements. The transfer of the bulk of the NPC's assets and liabilities to PSALM and TransCo took place in 2008. This can be seen from the decrease in the scale of operations from 2007 to 2008. The NPC's results from 2008 are not directly relevant to the project and are not comparable with the previous financial years. Results for 2013 and 2014 have been included to show that NPC's performance has stabilized at the much lower level of turnover.

Table A10.1: National Power Corporation Income Statement

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	_	2013	2014
NATIONAL POWER (ORPORA	TION													
Capacity (MW) Electricity Sales (GWh)	37,321	36,987	37,320	37,042					13,039 35,534	12,844 37,583					
						NPC's	INCOME	STATEM	ENT (PHP	billion)					
Net Operating Revenue	86.6	89.7	100.1	115.7	116.4	119.2	167.3	165.4	175.1	187.4	3.9	4.0	_	9.5	10.8
Operating Expenses	79.7	81.2	94.7	108.9	115.9	124.5	145.1	143.6	141.7	149.9	10.2	6.9		7.1	7.5
Operating Income	6.9	8.5	5.4	6.8	0.5	(5.3)	22.1	21.9	33.4	37.6	(6.3)	(2.9)		2.4	3.2
Net Income (Loss)	(3.6)	(6.0)	(13.0)	(10.4)	(33.7)	(117.0)	(29.9)	86.0	90.0	136.1	(2.9)	(7.2)	_	1.5	2.5
Ratio Rate of Return (Covenant > 8%)	3.2%	3.4%	2.2%	2.9%	0.1%	-2.6%	6.7%	5.8%	10.5%	12.8%	-84.4%	-54.9%	_	11.5%	12.8%

Source: NPC. Annual financial statements 1998-2014.

Table A10.2: National Power Corporation Balance Sheet (PHP Billion)

As at 31 December	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	_	2013	2014
ASSETS - billion PHP															
Non-Current Assets	609.8	828.2	948.6	965.2	1,092.7	916.6	862.5	888.4	915.2	875.2	9.8	9.2		10.1	10.3
Total Current Assets	36.3	34.2	41.2	40.8	60.3	73.4	174.2	168.9	202.3	207.9	4.6	6.6		18.6	22.2
TOTAL ASSETS	646.1	862.4	989.8	1,006.0	1,153.0	990.0	1,055.6	1,078.7	1,117.6	1,083.0	44.1	38.4	_	39.6	43.2
Equity	129.1	124.2	109.7	92.1	60.8	(327.2)	(137.3)	(21.4)	55.6	180.0	40.6	30.7		33.5	36.0
Non-Current Liabilities	444.5	445.0	777.8	795.1	971.4	1,177.1	1,029.3	942.1	902.1	731.4	0.9	1.1		1.6	2.4
Current Liabilities	69.4	90.3	98.4	113.2	118.4	133.6	152.1	145.9	159.8	171.6	2.6	6.6		4.5	4.8
EQUITY & LIABILITIES	646.1	862.4	989.8	1,006.0	1,153.0	990.0	1,055.6	1,078.7	1,117.6	1,083.0	44.1	38.4	_	39.6	43.2
Ratios															
Debt / Equity	77 :22	58 :16	87 :12	89 :10	94 :6	137 :-38	114 :-15	101 :-2	94 :6	80 :20	2 :98	4 :96	_	4 :96	6 :94
Current	0.5	0.4	0.4	0.4	0.5	0.5	1.1	1.2	1.3	1.2	1.7	1.0	_	4.1	4.6

Note: The available financial statements are insufficient to determine whether or not NPC met the debt service covenant ratio. However, given that NPC's current ratio has been below 1.0 this implies that there has been insufficient liquid assets by the way of current assets to meet current liabilities that fall due for payment in the following year - more so when operating cash profitability is negative.
Source: NPC. Annual Financial Statements 1998–2014.

A. Demand and Supply

1. One objective of the power sector restructuring and reforms was to encourage enough investment in generation capacity and power output to meet growing demand for electricity. The following figure summarizes the actual performance in growth of national generating capacity in MW (right axis) to meet the demand (right axis), and growth in output of electricity energy in GWh during 2001–2014 (left axis).

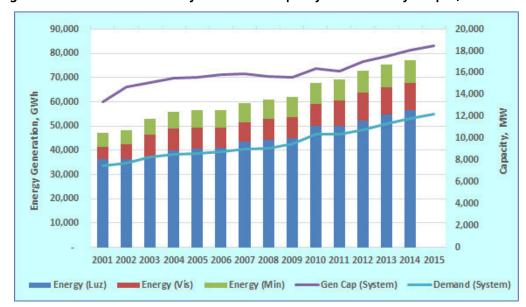


Figure A11.1: National Electricity Generation Capacity and Electricity Output, 2001–2014

Source: IED from Department of Energy statistics and 2014 Philippine Power Statistics. https://www.doe.gov.ph/electric-power-statistics/philippine-power-statisticsNotes:

- a Electricity output (vertical bars) has increased from 47,049 GWh in 2001 to 77,261 GWh in 2014, at a compound annual growth rate (CAGR) of 3.9%.
- b In Luzon, electricity output grew at a CAGR of 2.7% from 2001 to 2006. Following the start of the WESM in mid-2006 the CAGR increased to 3.8%.
- c The national generating capacity (MW), which at project approval exceeded requirements, remained virtually unchanged from 2004 to 2009 until the growth in demand was able to absorb the capacity overhang. Since 2012 investment in generating capacity has resumed and has averaged 4% per year; almost identical to the rate of growth in demand for electricity.
- 2. When supply has been adversely affected by unexpected events, such as power plant outages, fuel shortages, or line constraints the demand/supply balance has generally been resolved by increased dispatch of oil fired generation and high market clearing prices. There have been some instances of tight electricity supply when there were abnormally high outages of generation capacity and the market failed to clear. On these occasions supply was rationed by manual load dropping. However, generally speaking the WESM is fulfilling its function of establishing prices that clear the market, even if its operations have on occasion been disrupted. In summary, the power sector reforms and the investments funded under the project have enabled increased output of electricity, and are successfully attracting added investment in generating capacity.

Projected Power Demand, 2016–2025 В.

3. Power demand in Luzon grid is expected to grow at an average annual growth rate (AAGR) of 4.4% during 2016–2025. The demand is expected to increase from 9,477 MW in 2016 to 13,866 MW in 2025. Of the total load on the Luzon grid, 70% is for MERALCO, 22.5% for the northern part of the grid, and 7.5% for the southern portion. Power demand in the Visayas grid is expected to grow at an AGR of 5.5% during 2016-2025. Mindanao has the highest project AGR for the period, at 6.9%. The annual demand projection for Luzon, Visayas, and Mindanao grids is shown in Table A11.1.

50 a	70.55.27	House -	2380			00000000	
	LUZ	ON	VISA	YAS	MIND	ANAO	
YEAR	MW	%AAGR	MW	%AAGR	MW	%AAGR	
2015	8,974		1,712		1,566		
2016	9,477	5.6	1,793	4.8	1,699	8.5	
2017	9,859	4.0	1,885	5.1	1,808	6.4	
2018	10,294	4.4	1,991	5.6	1,934	7.0	
2019	10,751	4.4	2,105	5.7	2,070	7.0	
2020	11,230	4.5	2,226	5.8	2,209	6.7	
2021	11,710	4.3	2,350	5.6	2,357	6.7	
2022	12,213	4.3	2,482	5.6	2,514	6.7	
2023	12,739	4.3	2,623	5.7	2,683	6.7	
2024	13,290	4.3	2,772	5.7	2,863	6.7	
2025	13,866	4.3	2,932	5.8	3,054	6.7	
AVERAGE G	ROWTH RA	TES, %					
2016-2020		4.6		5.4		7.1	
2021-2025		4.3		5.7	6		
2016-2025		4.4		5.5		6.9	

Table A11.1: Luzon, Visayas, and Mindanao Grids Demand Forecast, 2016-2025

AAGR = annual average growth rate.

Source: Government of the Philippines, Department of Energy.

C. Proposed Capacity Additions, 2016–2025

- The latest Department of Energy list of private sector-initiated power projects expected to be undertaken during 2016-2025 on the country's three major grids was updated on August 2015 and is shown in Table A11.2.
- The proposed capacity addition for the Luzon grid is 11,125 MW, of which 1,723 MW are committed projects and 9,402 are indicative projects. Coal and natural gas plants have the largest shares at 68% (7,570 MW) and 22% (2,400 MW), respectively. The remaining 10% (1,155 MW) is to come from oil-based, geothermal, hydro, wind, solar, and biomass plants.
- In the Visayas, from the total of 1,543 MW proposed capacity additions for 2016-2025, the total committed capacity is 426 MW. Of this generation, 64% is to come from coal (990 MW) and 17% is to come from solar power (265 MW).
- Out of a total of 3,674 MW in added capacity proposed for the Mindanao grid, the total 7. committed capacity is 1,804 MW. The bulk of the overall capacity mix is to come from coal at 83% (3,060 MW) and hydro at 13% (487 MW).

LUZON VISAYAS MINDANAO **Fuel Type** % Share сом IND Total % Share IND Total % Share COM IND Total COM Coal 1,170 6,400 7,570 68% 270 720 990 64% 1,660 1,400 3,060 83% Oil-Based 0 150 150 1% 0% 0% 0% NatGas 450 1,950 2,400 22% 0% Geo 0 111 111 1% 10 50 4% 40 40 1% 60 14 88 7% 352 487 Hydro 66 518 584 5% 102 134 13% Wind 0 249 249 2% 50 50 3% _ 0.0% 0.3% 76 5% 10 **Biomass** 7 22 28 76 49 59 2% 133 Solar 30 3 0.3% 133 265 17% 29 29 1% 33 100% Total 1,723 9,402 11,125 100% 426 1,116 1,543 1,804 1,870 3,674 100%

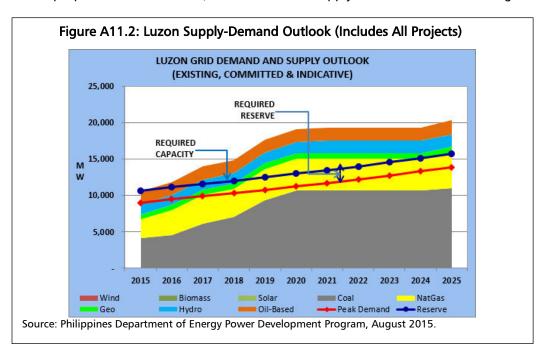
Table A11.2: Summary of Proposed Capacity Additions, 2016–2025

COM = committed projects, IND = indicative projects.

Source: Government of the Philippines, Department of Energy.

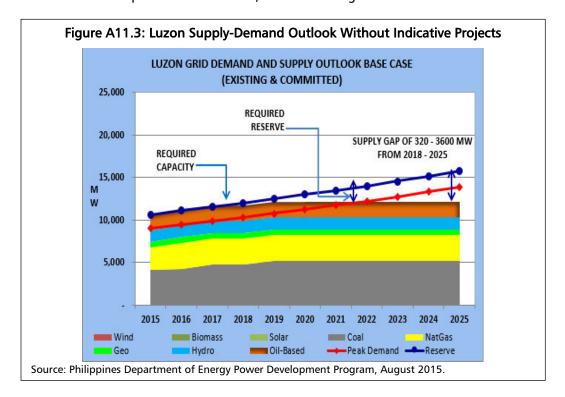
Demand and Supply Outlook, 2015–2025 D.

8. In Luzon, the aggregate capacity of the base load and mid-merit plants is enough to serve the demand and the required ancillary reserve of the grid. The oil-based plants are for standby operations. With all the existing and operational plants in Luzon grid, including the committed and indicative plants that are proposed for 2016–2020, the demand and supply outlook is as shown in Figure A11.2

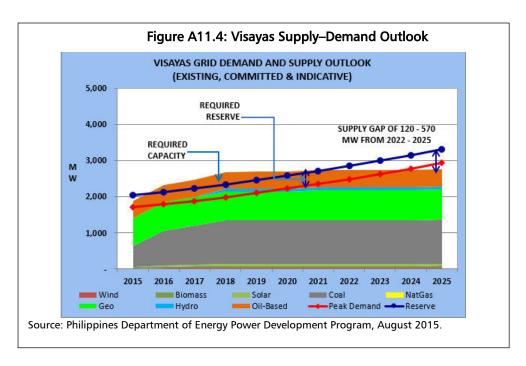


As shown in Figure A11.2 the grid will experience an oversupply of power if all the committed and indicative plants are implemented as proposed. Under this generation scenario, the required capacity will be fully satisfied by the existing and committed plants in the long-term. However, this oversupply of power will affect the decision making of the proponents in pursuing their projects. Thus,

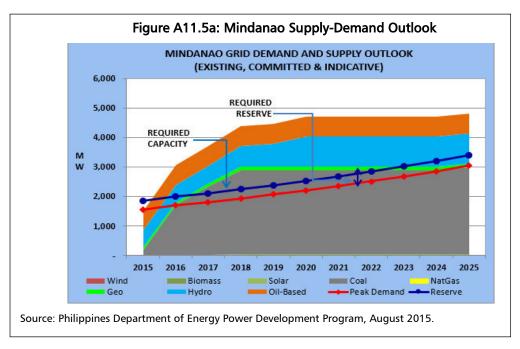
if all the indicative projects are not implemented, there will be a supply deficit from 2015 to 2020, of 320 to 3600 MW over the period 2018 to 2025, as shown in Figure A11.3.



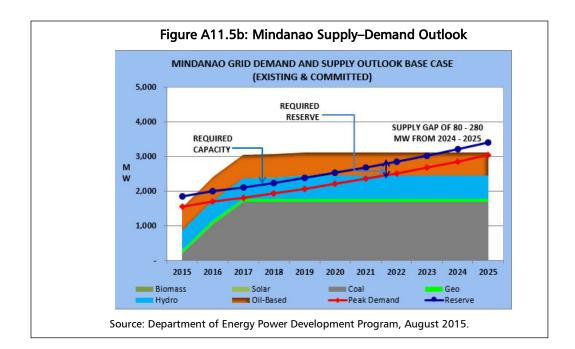
As shown in Figure A11.4, the Visayas grid is critically short of supply. During peak hours, the Luzon grid can transfer only up to 150 MW of available power to the Visayas grid via a high-voltage direct current interconnection. The Visayas grid does not have the required reserve capacity. This situation will prevail until early 2016 when 270 MW is proposed to come on line from coal generation plants, but the supply will be stabilized only in the medium term. A supply gap of about 120 MW-570 MW is projected for 2022–2025.



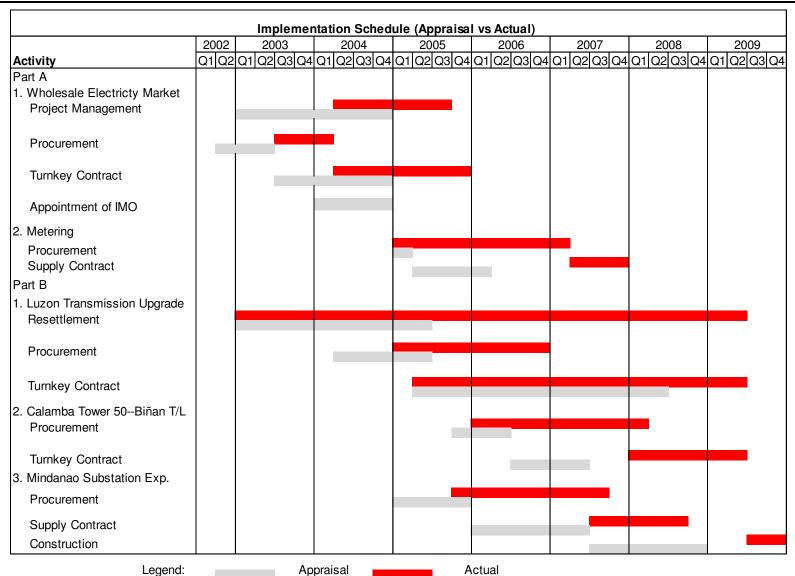
As Figure A11.5a shows, the supply situation on the Mindanao grid is also critical. However, it 11. will have an oversupply in the long term if all the committed and indicative plants are implemented.



12. On the other hand, as shown in Figure A11.5b, if the indicative projects are not implemented, there will be a supply deficit of 80 MW to 280 MW from 2024-2025.



APPENDIX 12: IMPLEMENTATION SCHEDULE



Source: ADB. 2012. Completion Report: Electricity Market and Transmission Development Project in the Philippines. Manila (Loan 1984-PHI).

APPENDIX 13: PHILIPPINE ELECTRICITY MARKET CORPORATION FINANCIAL RETURN

1. Table A13 presents the financial internal rate of return for the investments made by PEMC including the MMS that was transferred from TransCo to PEMC in 2007.

Table A13: PEMC Return on Investment and Operations (Constant [2002] PHP '000)

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Economic data										
Gross domestic product deflator index	1.15	1.21	1.25	1.34	1.38	1.44	1.49	1.52	1.56	1.61
Inflation Rate (GDP deflator)	5.8%	4.9%	3.1%	7.5%	2.8%	4.2%	4.0%	2.0%	2.1%	3.2%
PEMC - Institutional Costs and Benefits										
Operating Cash flow (after tax)	(85,762)	(118,836)	141,344	188,894	289,985	285,159	13,259	259,490	261,091	161,971
PEMC Investment	(29,106)	(23,721)	(36,648)	(33,847)	(23,529)	(22,488)	(12,034)	(26,504)	(46,546)	(70,186)
MMS Cost & Residual Values 1/ 2/			(546,402)							114,861
Net Cash Flow	(114,868)	(142,557)	(441,705)	155,046	266,456	262,671	1,224	232,986	214,544	206,646
FIRR	16.4%									

GDP = gross domestic product, PEMC = Philippine Electricity Market Corporation, MMS = market management system, FIRR = financial internal rate of return.

Source: IED from (i) Annual Reports and Annual Financial Statements of PEMC for the financial years 2005 to 2014, and (ii) IMF 2015. World Economic Outlook Database. Washington, DC.

Notes:

¹ Inflation Index – gross domestic product deflator with 2002 = 1.00

² Residual values of assets from PEMC investment estimated by assuming they have a 5 year economic life.

APPENDIX 14: NATIONAL TRANSMISSION CORPORATION FINANCIAL STATEMENTS

A. NGCP Concession

1. The National Grid Corporation of the Philippines (NGCP) won the concession for the right to operate TransCo's power grid with a bid of \$3.95 billion in a government auction in December 2006.

B. Transco Operations

- 2. Following the turnover of TransCo's transmission operations to the NGCP on 15 January 2009, TransCo was reorganized and started operations as a new corporation on 15 July 2009. Its mandate was to
 - (i) ensure compliance by the concessionaire (NGCP) with the terms and conditions of the concession contract and the policies and guidelines of the Department of Energy;
 - (ii) handle all existing cases, including right-of-way claims, that had accrued prior to the commencement date of 15 (January 2009;
 - (iii) divest itself of its remaining subtransmission assets to qualified distribution utilities; and
 - (iv) undertake operation and maintenance, management, consultancy, and other technical services for the power distribution systems under the Philippine Economic Zone Authority.

C. TransCo Financial Performance

3. TransCo's financial performance is summarized in Tables A14.1 and 14.2.

Table A14.1: National Transmission Corporation Income Statements (PHP million)

Year to 31 December	2007	2008	2009	2010	2011	2012	2013	2014
Revenues								
Transmission Services	33,686	36,333	_	_	_	_	_	_
Concession Income	_	-	18,037	18,139	17,299	17,064	13,659	10,922
Other Income (subsidies etc.)	_	2,827	420	1,025	174	1,020	86	100
Other Utility Income	1	0	1,623	284	80	71	74	43
Net Operating Revenue	32,248	37,732	20,084	19,447	17,553	18,155	13,819	11,066
Total Operating Expenses	8,771	9,861	7,279	4,746	4,841	6,744	5,792	5,850
Net Operating Income	23,477	27,872	12,805	14,701	12,712	11,411	8,027	5,215
Other Income	13,899	793	0	_	_	_	_	_
Net Income	30,642	7,538	12,805	14,701	12,712	11,411	8,027	5,215
Return on Capital Employed	13.6%	15.0%	3.5%	4.2%	3.7%	3.1%	2.3%	1.5%

Source: National Transmission Corporation audited financial statements, 2007–2014.

- 4. TransCo's main source of revenue prior to 2009 was the sale of transmission services. The main revenue source changed to concession income from 2009 onward after the concession for operations was awarded to NGCP.
- 5. Transco's returns on its assets of 15% in 2008, declined to an average of 3.1% per year for the ensuing 5 years, notwithstanding payment of subsidies by the government in 2010 and 2012, shown under "Other Income."

Table A14.2: National Transmission Corporation Balance Sheets (PHP million)

Assets/Liabilities	2007	2008	2009	2010	2011	2012	2013	2014
Non-current Assets								
Utility Plant - net	144,391	163,824	145,825	144,804	146,367	178,120	173,700	167,622
Non-Utility property - net	732	116	116	116	116	0	30	30
Construction Work in Progress	18,425	600	16,209	13,298	9,462	7,883	7,422	6,406
Investments	6	6	7	7	7	1	1	1
Concession fee receivables	_	_	124,241	121,708	118,795	115,629	54,319	54,319
Other non-current receivables - net	1,757	1,319	279	3,996	5,172	4,937	4,885	5,268
Deferred charges	4,564	4,672	18,396	19,570	14,941	12,560	2,872	622
Other non-current assets	8	929	42,919	42,699	41,362	43,011	105,564	105,939
Total Non-Current Assets	169,883	171,466	347,992	346,197	336,222	362,139	348,793	340,208
Current Assets								
Cash and cash equivalents	2,309	13,041	1,212	778	595	757	497	417
Interest on concession fee receivables		-	2,406	2,533	2,913	3,166	-	2,111
Accounts receivable - net	13,438	12,904	5,456	4,828	4,730	4,617	2,111	2,163
Materials and supplies for operation	3,520	2,776	6,656	3,009	2,803	2,569	2,491	1
Advances	420	694	15,774	4,995	3,882	8,754	2,231	1,354
Prepayments and other current assets	408	602	830	1,588	1,873	1,392	2,495	2,848
Total Current Assets	20,095	30,016	32,342	17,737	16,850	21,308	9,878	8,894
Total Assets	189,978	201,483	380,333	363,935	353,072	383,447	358,671	349,102
Equity	171,852	185,269	200,476	189,654	185,570	217,988	213,616	208,357
Non-current Liabilities								
Unearned concession fees	_	_	159,386	152,446	145,528	138,611	120,258	113,941
Deferred credits	183	366	3,521	7,856	7,811	9,388	8,845	10,851
Other non-current liabilities	-	_	-		834	4,935	4,935	4,897
Total Non-Current Liabilities	183	366	162,907	160,301	154,174	152,934	134,037	129,689
Total Horr Call City Elabilities					,.,	,	,	.25,005
Current Liabilities								
Accounts payable & accruals	17,038	15,058	9,610	6,711	5,999	4,865	4,345	4,382
Unearned concession fees	_	_	6,917	6,917	6,917	6,917	6,317	6,317
Retention on contract payments	698	583	423	347	408	356	356	356
Deposits and trust funds	205	206	0	3	4	386	1	1
Total Current Liabilities	17,942	15,848	16,950	13,979	13,328	12,526	11,018	11,056
Total Equity and Liabilites	189,978	201,483	380,333	363,935	353,072	383,447	358,671	349,102

Source: National Transmission Corporation audited financial statements, 2007–2014.

TransCo is presumably meeting its debt service cover ratio covenant by virtue of the prohibition that prevents it from borrowing. Non-current liabilities comprise unearned concession fees and deferred credits rather than loans. The other-non-current-liabilities category, which has been growing since 2008, provides no details. TransCo did not provide the evaluation team with the notes accompanying its financial statements.

APPENDIX 15: POWER SECTOR ASSETS LIABILITIES MANAGEMENT CORPORATION FINANCIAL STATEMENTS

1. As shown in Table A15.1, PSALM's net income has been highly volatile during the 2008 to 2014 period, with profits in some years and losses in other years. The profitability reflects the variable income arising from sales of assets and the major influence of changes in exchange rates on debts denominated in foreign currency.

Table A15.1: PSALM Income Statement (PHP million)

Items	2008	2009	2010	2011	2012	2013	2014
Income Statement Data							
Sale/disposal of assets	33,598	16,255	(14,571)	846	3	80	15,040
Universal Charge—SCC	0	18,057	0	0	0	11,219	13,463
Dividend Income	0	0	25,750	11,349	6,095	14,484	6,098
IPPA, net	0	0	5,109	6,055	7,879	3,671	3,109
Power generation	(2,889)	(12,739)	(14,549)	(1,047)	2,756	5,232	(4,156)
Income	33,438	21,573	1,738	17,202	16,733	34,686	33,554
Operating Expenses							
Cash operating expenses	3,180	2,118	1,461	1,215	1,334	625	2,956
Depreciation	18	13	13	13	13	14	15
Net Operating Income	30,240	19,442	123	15,820	15,386	34,047	30,584
Financial expenses & Financial Charges	877	2,138	2,506	2,308	4,394	4,190	3,518
Amortization of assumed REP, etcetera	1,823	0	0	0	0	0	0
Interest expense	4,968	20,412	(23,191)	(22,873)	20,816	20,925	22,093
Income ex operations after financial expenses	22,468	(3,236)	(25,574)	(9,361)	(9,824)	8,932	4,808
Subsidy from Government	0	0	0	0	16,545	8,135	7,282
Gain/(loss) on foreign exchange	(6,693)	17,242	19,205	(2,274)	28,897	(18,078)	3,395
Net income/(loss)	16,815	15,417	(5,459)	(10,529)	36,454	(8,442)	16,591
Dividend Paid to Government	0	0	0	0	0	1,000	1,000

() = negative.

Source: PSALM audited financial statements, 2008–2014.

2. As shown in Tables A15.2 and A15.3, PSALM's debt service capability has only been greater than 1 in one out of the seven years, and liquidity has been sustained at satisfactory levels by successful bond issues, supplemented by government subsidies. The net effect of the bond issues however, is reflected by the continuance of PSALM's relatively high gearing (see debt to equity ratio) albeit down from a peak of 95% debt financing in 2008 to 84% in 2014.

Table A15.2: PSALM Balance Sheet (PHP million)

Items	2008	2009	2010	2011	2012	2013	2014
Balance Sheet Data (at end of period):							
Current assets	212,625	257,885	197,711	205,773	282,309	343,214	274,756
Non-current Assets							
BOT power plants under capital lease, net	456,778	237,205	51,424	49,465	47,506	45,547	43,587
Investment in Transco	115,693	185,474	185,784	182,298	222,831	222,086	219,888
Concession receivable	0	124,241	404,058	386,079	349,729	337,884	310,099
Asset sale receivable	2,455	10,704	43,512	58,930	48,412	36,533	20,380
Investment in bonds	0	0	0	0	0	7,102	14,051
Property and equipment	32,601	36,467	35,761	39,599	34,595	29,693	41,143
Total Non-current Assets	607,527	594,091	720,540	716,371	703,073	678,845	665,846
Total Assets	871,442	1,109,000	931,550	936,251	997,388	1,040,762	940,602
Current liabilities	179,012	155,118	20,472	192,007	182,582	255,643	238,356

Items	2008	2009	2010	2011	2012	2013	2014
Non-current liabilities	735,864	903,563	687,178	689,862	656,930	664,758	586,483
Total liabilities	914,876	1,058,681	707,650	881,869	839,512	920,499	824,838
Total Equity	(43,434)	50,319	223,901	54,382	157,876	120,362	115,763
Total Liabilities and Equity	871,442	1,109,000	931,550	936,251	997,388	1,040,762	940,602

() = negative. Source: PSALM audited financial statements, 2008–2014.

Table A15.3: PSALM Financial Ratios

PSALM	2008	2009	2010	2011	2012	2013	2014
Financial Performance Ratios							
Net Operating Income/Income (%)	90	90	7	92	92	98	91
Debt Service (Covenant > 1.0 from 2009)		0.95	0.88	0.14	0.51	1.51	0.77
Financial Status Ratios							
Current	1.2	1.7	9.7	1.1	1.5	1.3	1.2
Debt: equity		95:5	75:25	93 :7	81 :19	85 :15	84 :16

Notes:

Source: PSALM audited financial statements, 2008–2014.

¹ NPC's transfer of its assets and liabilities to PSALM (with the exception of rural electricity supply assets) was on 1 October 2008.

² Transco is a wholly owned subsidiary of PSALM.
³ Changes in exchange rates have influenced the cost of PSALM's foreign currency debt and overall financial performance, which is primarily denominated in US dollars and JPY Yen.