



<b>1. Project Data:</b>		<b>Date Posted :</b> 08/15/2002	
<b>PROJ ID:</b> P004799		<b>Appraisal</b>	<b>Actual</b>
<b>Project Name:</b> Lam Takhong Pumped Storage	<b>Project Costs (US\$M)</b>	585.6	318.64
<b>Country:</b> Thailand	<b>Loan/Credit (US\$M)</b>	100.0	88.4
<b>Sector(s):</b> Board: EMT - Power (95%), Central government administration (5%)	<b>Cofinancing (US\$M)</b>	184.0	111.4
<b>L/C Number:</b> L3884			
	<b>Board Approval (FY)</b>		95
<b>Partners involved :</b> JBIC	<b>Closing Date</b>	12/31/2000	12/31/2001
<b>Prepared by :</b>	<b>Reviewed by :</b>	<b>Group Manager :</b>	<b>Group:</b>
Alvaro J. Covarrubias	Fernando Manibog	Alain A. Barbu	OEDST
<b>2. Project Objectives and Components</b>			
<b>a. Objectives</b>			
The objectives of the project were to:			
(i) assist the Electricity Generating Authority of Thailand (EGAT) in optimizing its investment decisions and help meet the system's peak power demand from year 2000 onward at least-cost; (ii) strengthen the environmental capabilities of EGAT; and (iii) assist the Government in rationalizing the bulk supply tariff to the Provincial Electricity Authority (PEA) and the Metropolitan Electricity Authority (MEA) as a prelude to the corporatization of the generation/transmission and distribution utilities. In addition, the Bank expected during the Project's tenure to continue rendering technical advice to the Government in the implementation of power sub-sector and environmental reforms.			
<b>b. Components</b>			
The project had three main components:			
(i) The first stage (2x250 MW) of the 4x250 MW Lam Takhong Storage Scheme (with civil works for the entire 1,000 MW development), the transmission system, consulting services for design and construction management, and an Environmental Impact Mitigation and Development Plan (EMDP);			
(ii) Procurement and implementation of environmental management and monitoring systems/equipment and training of environmental staff; and			
(iii) A consulting study – "Rationalization of Bulk Supply Tariff for the Metropolitan Electricity Authority (MEA) and the Provincial Electricity Authority (PEA)".			
<b>c. Comments on Project Cost, Financing and Dates</b>			
The project was completed with a delay of one year at an estimated cost of US\$318.64 million or 46 percent below the US\$585.6 million appraisal estimate. The decrease in cost was caused by a very conservative estimate for civil works by the project consultants and the extraordinarily tough competition prevailing in the international market for the supply of power plant equipment at the time of bidding. The Bank loan financed the civil works of the pumped storage plant (US\$88.0 million) and the consulting services for the tariff study. The Japan Bank for International Cooperation (JBIC), the co-financier, financed the electro-mechanical equipment and project management totaling US\$111.4 million equivalent. The Electricity Generating Authority of Thailand (EGAT) financed the cost of the preliminary civil works, the environmental equipment and services, the administration, and interest during construction plus duties and taxes, amounting to US\$118.84 million equivalent. The US\$100			

million Bank loan was closed on December 31, 2001 following an extension of the loan closing date by one year at which time the undisbursed amount of US\$11.6 million was canceled.

**3. Achievement of Relevant Objectives:**

The project objectives were fully achieved as follows: (a) The Bank assisted EGAT in optimizing its investment program, particularly at the time Thailand had been severely affected by economic and financial crises. EGAT modified its power development plans, deferred many Independent Power Producer projects (IPPs), reduced operating costs and scaled down its 1997-2001 investment program from US\$10.5 billion to US\$4.7 billion; however, contractual commitment forced EGAT to continue with Lam Takhong pumped storage plant; (b) EGAT adopted sound policies and strategies for environmental and social management, and defined a framework and guidelines for environmental assessment of power development plans; (c) the recommendations of a study on economic regulation, tariffs, and development of bulk supply were implemented by EGAT in 2000 after the economic/financial crises had faded out; these include efficiency considerations in determining revenue targets, transparent mechanisms for transfer of subsidies, and the restructuring of the consumer billing system to provide for accounting of transmission and distribution charges; and (d) the Bank acted as a facilitator and played an informal role in advising the Government on the reform of the power sector, especially while the country experienced the economic and financial crises. During this period the Bank, through ESMAP, had a more formal participation in an independent review of the Power Pool and Electricity Supply Industry Reform Study conducted by National Energy Policy Office (NEPO). A further review by a new Administration and the California power crisis acted as a damper to conversion of the system to Pool operation.

**4. Significant Outcomes/Impacts:**

Remarkable outputs of the project are:

- The completion of the 2x250 MW first stage of the Lam Takhong 2x250 pumped storage plant. It will enter in commercial operation in August 2002. The second stage of adding 2x250 MW has been postponed for commissioning in 2010.
- Completion of the key studies which are guiding the environmental and social management of EGAT: “EGAT: Corporate Environmental Policy (June 1999)”, “Strategic Implementation Framework (November 1999)”, and the “Power Sector Environmental Assessment”. Also, the Integrated Environmental Information Management System was installed and is now used for analyzing different data required for environmental studies and analysis.
- NEPO completed in 1996 the study to determine a Uniform Tariff Compensation Payment. This study also included the development of criteria for economic regulation and a contract for bulk supply. The recommendations of this study were implemented in year 2000.
- Passing of legislation related to: Regulatory framework for the Energy Sector (1998); Thailand Power Pool and Supply Industry Reform (1999); and Energy Act (2000).
- Agenda for privatization of State Owned Enterprises, announced by the new Government (2001)
- Restructuring of EGAT, PEA and MEA, and the creation of the Electricity Generation Company (EGCO) and dilution of EGAT’s equity.

**5. Significant Shortcomings (including non-compliance with safeguard policies):**

None

<b>6. Ratings:</b>	<b>ICR</b>	<b>OED Review</b>	<b>Reason for Disagreement /Comments</b>
<b>Outcome:</b>	Satisfactory	Highly Satisfactory	The project was rated High on the relevance, efficacy and efficiency components of the Outcome criterion. This corresponds to OED's definition of a Highly Satisfactory rating.
<b>Institutional Dev .:</b>	High	High	
<b>Sustainability:</b>	Likely	Highly Likely	The physical sustainability is highly

			assured by EGAT's long experience in operating complex hydro projects. The environmental sustainability is considered high and the social development of persons affected has been carried out at high levels of excellence. The institutional-strengthening measures under the project (environmental management strengthening and bulk supply tariff reform), plus the commitment and capacity of the Government to carry through the restructuring and privatization of SOEs including EGAT, MEA and PEA, also support the Highly Likely rating.
<b>Bank Performance :</b>	Satisfactory	Highly Satisfactory	OED concurs with the Borrower that overall Bank performance was Highly Satisfactory.
<b>Borrower Perf. :</b>	Highly Satisfactory	Highly Satisfactory	
<b>Quality of ICR :</b>		Exemplary	

**NOTE:** ICR rating values flagged with '\*' don't comply with OP/BP 13.55, but are listed for completeness.

#### **7. Lessons of Broad Applicability:**

- Large pumped storage schemes can be constructed at much lower capital costs than hitherto imagined and could provide an economic source of peaking power for systems in which surplus off-peak energy can be drawn from large efficient thermal or combined cycle plants.
- Under sudden economic/financial crises in a country, the utilities need to exercise great financial discipline, cutting down operating expenses drastically and striking an appropriate balance between curtailing and carrying on with investments.
- The Bank standard cash generation covenant (or self financing ratio, SFR) may not be appropriate for utilities either undertaking large divestment, or moving towards privatization, or stopping investments.
- The Bank could best play the role of advisor and facilitator for countries that have already embarked on the path of power sector reforms, recognizing that restructuring proposals do not conform to rigid schemes but depend principally on the thinking and commitment of the Government and utilities.
- It is of paramount importance that persons affected by building under a project – as well as those nearby but not affected by the project – be consulted and involved very early in project design and execution in order to consider in a timely way all their reasonable demands and to avoid disparities between those who are affected and those who are not.
- Fisheries require eminent consideration in hydropower projects, particularly by adopting all means to enhance fish migration and catches. Baseline conditions must be studied and established on fisheries, considering the socioeconomic conditions of the fishermen as well.

#### **8. Assessment Recommended? Yes No**

**Why?** Because the Lam Takhong project is the first and largest successful pumped storage project built in Asia (1,000 MW) from which valuable good project implementation practices could be drawn in the technical and environmental fronts. An audit would contribute to validate those practices. Moreover, the Thai power sector reform is at the point of being fully implemented, from which good or best practices can be derived, particularly with respect to the Bank's ESW/AAA role and contributions.

#### **9. Comments on Quality of ICR:**

The ICR complies fully with the Bank guidelines for ICRs. In 12 pages (supported by 10 annexes packed in 30 pages) the ICR presents a concise but excellent and articulated description and evaluation of the project results. It includes several excellent lessons learned, the Aide-Memoire of the ICR mission carried out one month before the loan closing date, a very good contribution to the ICR by the Borrower, comments on the ICR by the co-financier (JBIC) and the Borrower, valuable additional information on

the environmental and social aspects of the project, and a comprehensive list of supporting documents. In sum, the ICR quality is rated as exemplary.