Independent Power Producers in Thailand

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About The Experience of Independent Power Projects in Developing Countries Study

Private investment in electricity generation (so called "independent power producers" or IPPs) in developing countries grew dramatically during the 1990s, only to decline equally dramatically in the wake of the Asian financial crisis and other troubles in the late 1990s. The Program on Energy and Sustainable Development at Stanford University is undertaking a detailed review of the IPP experience in developing countries. The study has sought to identify the principal factors that explain the wide variation in outcomes for IPP investors and hosts. It also aims to identify lessons for the next wave in private investment in electricity generation.

PESD's work has focused directly on the experiences with IPPs in 10 developing and reforming countries (Argentina, Brazil, China, India, Malaysia, Mexico, the Philippines, Poland, Thailand and Turkey). PESD has also helped to establish a complementary study at the Management Program in Infrastructure Reform & Regulation at the University of Cape Town ("IIRR"), which is employing the same methodology in a detailed study of IPPs in three African countries (Egypt, Kenya and Tanzania).

About the Author

Pei Yee Woo is a Research Fellow with the Program of Energy and Sustainable Development. Her current research focuses on investment issues in the global energy sector. Admitted to the Bar in both Singapore and California, she has worked as an attorney in international transactions involving infrastructure privatization, investment and financing in Baker & McKenzie (Singapore) and White & Case LLP (San Francisco). She is now a doctoral student in Stanford, and pursuing further certification as a Chartered Financial Analyst.

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Disclaimer

Country Study: IPPs in Thailand

Pei Yee Woo[1]

I. INTRODUCTION

This paper is part of the wider Program on Energy and Sustainable Development study on the ongoing experience of Independent Power Producers (IPPs) in developing countries that are in the midst of restructuring their electric power sectors. The paper seeks to explain the historical experience of IPPs in Thailand in terms of the factors contributing to the general investment record and explaining underlying variations in investment outcomes. The ultimate objective is to provide a sound, accurate factual basis for assessing future trends in these power markets and the paths ahead for governmental institutions and investors in charting institutional reform and participating in investment opportunities. This paper follows the research methods and guidelines laid out in the project's research protocol.[2]

In analyzing how IPPs fared through the Asian Financial Crisis, we will make comparative references contrasting the experience of IPPs in Thailand with those in Malaysia since both economies were severely affected by the 1997 Asian Financial Crisis and the variation in the investment experience in each economy will allow us to isolate macroeconomic shock as an explanatory variable while controlling for a number of other country factors. Almost all Thai and Malaysian IPP projects encountered problems following the 1997 crisis, yet a closer examination of the outcomes suggests that investors in Thailand have emerged significantly better off than their counterparts in Malaysia. A major focus of this particular section of the paper is to analyze the impact of the 1997 crisis on the IPPs of Thailand and Malaysia, how their government-related offtakers—EGAT and Tenaga, respectively—and their IPPs dealt with the situation, and how the varying political systems and regulatory frameworks of these two countries could have contributed to differences in the project outcomes.

Part I of this paper provides an overview of the power market in Thailand in terms of: (A) the primary fuel mix for generating electricity; (B) the power supply-demand situation; (C) the interconnection of regional and state grids; and (D) the ownership structure and institutional framework of the industry. Part II of this paper explains the

[1] Erik Woodhouse conducted research in Thailand, including interviews with project sponsors and government officials, and incorporated this research into the final draft of this working paper.

[2] Victor, et al (2004). "The Experience with Independent Power Projects in Developing Countries: Introduction and Case Study Methods," PESD Working Paper #23, *available*

at http://pesd.stanford.edu/publications/workingpapers.html.

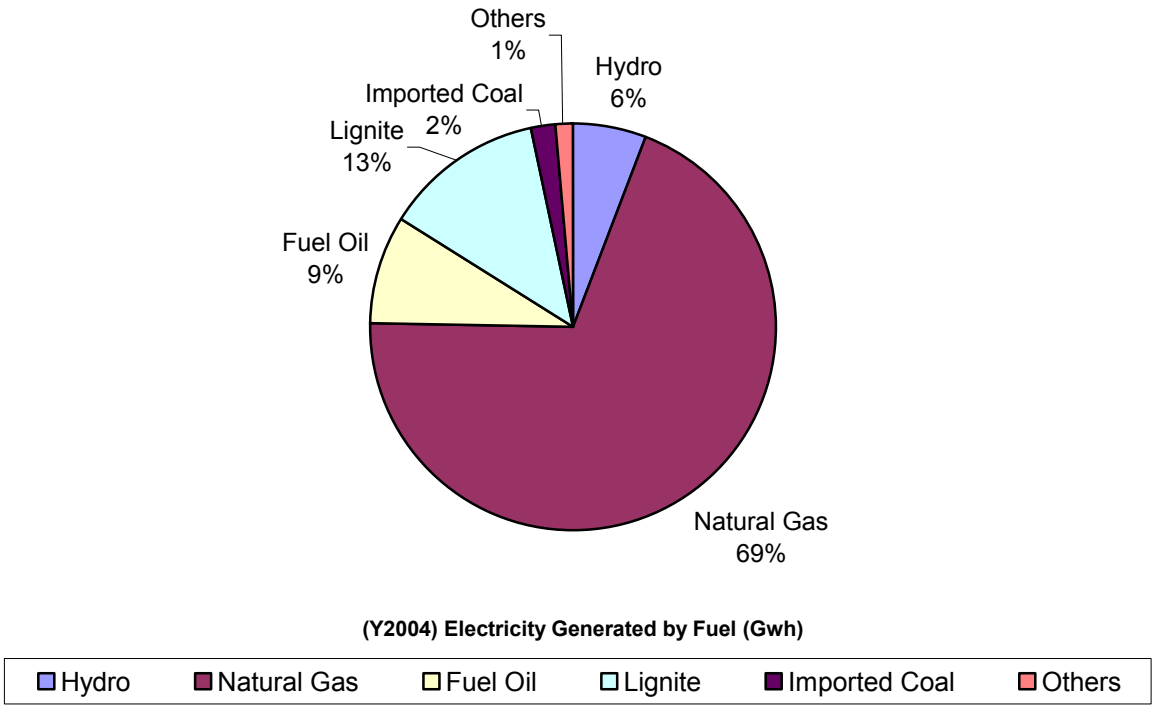
history of private investment in the power market and highlights issues relating to Thailand's investment climate which might have affected the investment strategies and operations of IPPs. This leads to the third section where we lay out our preliminary hypotheses of the impact of the Asian Financial Crisis on IPPs. The final section will append a table introducing the universe of IPPs in Thailand and discuss case selection in the context of the larger IPP study.

II. Overview of the Electric Power Markets in Thailand

A. Primary Energy Consumption Mix.

In 2004, Thailand's electricity supply was largely sourced from power plants fired on natural gas. In particular, natural gas-fired power plants produced over 65% of the country's 2004 electricity supply (see Figure 1).

Figure 1: EGAT's Electricity Generation by Energy Source in 2004



Source: EGAT PDP 2004

As a side note, Thailand's dependency on domestically available natural gas lends a higher degree of flexibility to retail tariffs pricing by EGAT, since gas-fired power plants can adjust their level of output more easily.[3] (Nonetheless, because fuel costs comprise roughly 70% of the tariff of a gas-fired power plant, and because EGAT bears

[3] World Energy Council, Pricing Energy in Developing Countries (2000).

the fuel supply risk for its IPPs (*see below*), the state utility would likely prefer to keep these plants running at full capacity if they can.)

Gas prices in Thailand are sensitive to currency fluctuation. Most of the domestic gas fields have been developed under concession to foreign firms such as Unocal, and are indexed to the Baht:US dollar exchange rate. In the aftermath of the crisis, PTT did renegotiate some of its gas supply agreements in order to relieve pressure on its balance sheet stemming from the Baht's devaluation.[4] Recently, the government has started requiring EGAT and PTT to absorb some of these costs by capping some of the fuel and foreign exchange costs that EGAT is allowed to pass-through to MEA and PEA in its bulk tariff charges to these two entities.[5]

B. Power Supply-Demand Situation.

Electricity demand in Thailand has enjoyed robust growth since the 1990s, brought about by high rates of GDP growth and a focus on energy-intensive industrialization (petrochemicals, refineries, steel mills and cement plants). As exhibited in Figure 2, electricity consumption grew by around 10% per annum until the Asian Financial Crisis of 1997 led to a decline in GDP for two years, followed by much slower than expected growth until 2001. Under these radically changed economic circumstances, expected growth in peak power demand did not materialize, and planned capacity expansions in the power sector led to a significant level of excess capacity between 2000 and 2004. This mismatch in supply and demand can be attributed to the unexpected plunge in demand growth during the crisis period.

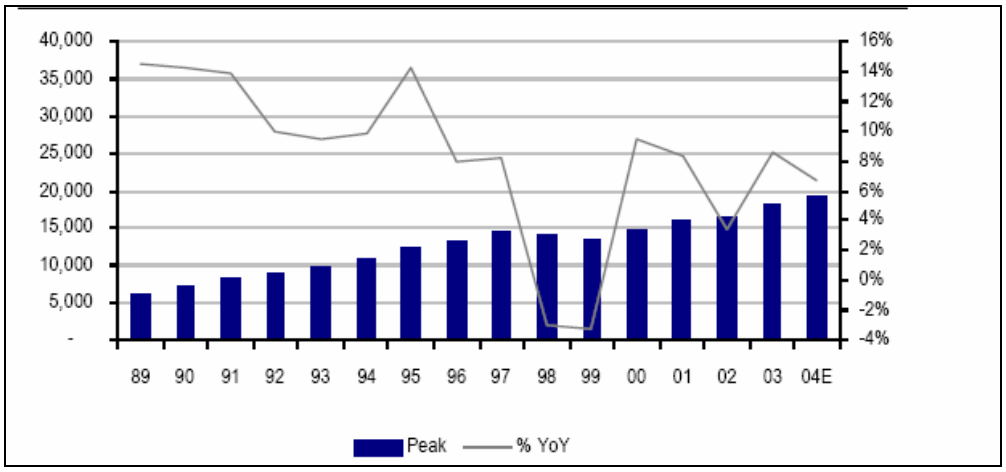
Figure 2 supports this view, showing how peak demand growth climbed rapidly since 1994, then sharply bottomed out during the crisis period of 1998-99. Moreover, in contrast to the optimistic supply-demand forecasts in the early 1990s, there were successive cuts in forecasted demand growth by the National Energy Policy Committee in the outlook for Thailand's power demand since the Asian Financial Crisis.[6]

FIGURE 2: PEAK POWER DEMAND IN THAILAND (IN MWS) (1989-2004)

[4] *See, e.g.,* Unocal Press Release, *PTT Amended Erawan and Unocal 2 and 3 Gas Sale Agreements*, April 2002, available at http://www.unocal.com/uclnews/2002news/042502b.htm.

[5] *See, e.g.,* Bangkok Post: Economic Review, Year End 2004, *available at* http://www.bangkokpost.net/ecoreviewye2004/energy.html.

[6] *See* Thailand's Power Development Plans drawn up by the National Energy Policy Committee in the last 5 years.



Source: UBS research (2004)

Nonetheless, the current rebound in the Thai economy has already spurred a strong recovery in peak power demand, which has grown by over 6% per year between 2000 and 2004. In its 2004 PDP, EGAT forecasted peak power demand for 2005 will increase by over 7.5% to 21,143 MW from the level of peak demand experienced in 2004 (19,600 MW).

C. Grid Interconnection.

Unlike the generation sub-sector, EGAT retains a monopoly over transmission services in Thailand. In the current market structure, electricity is transmitted from EGAT's power plants via high voltage transmission lines to the distribution systems of MEA and PEA, and to a few large-scale direct customers of EGAT. The overall power system is operated and controlled by the national control centre at EGAT headquarters and four regional control centers in Thailand.[7] This centralized transmission system helps avoid uneven electric supply-demand conditions throughout the country.

Thailand's grid is also interconnected with those of some of its neighbors, and it is involved in planning a regional grid to jointly develop a borderless electricity industry among Asean member nations.[8] Though the overall regional network is still in a nascent stage, Thailand's electricity industry is now effectively connected to that of Laos and Malaysia. Over the last few years, EGAT has consistently purchased electricity equivalent to roughly 1.5-3% of its consumption from Laos and 2% of its consumption from Malaysia.[9] The quantity purchased from Malaysia has increased in the last few years, with the completion of the 300MW HVDC interconnection project (the first stage went into commercial operation at the end of 2001 and the second stage, at the end of 2004).[10] Such inter-country electricity exchanges are undertaken by EGAT; none of the

[7] Information from EGAT.

[8] ASEAN Center for Energy, ASEAN Plan Of Action for Energy Cooperation 1999-2004.

[9] Various EGAT annual reports.

[10] *Id.*

Thai IPPs sold electricity outside Thailand or were developed with the anticipation of exporting electricity.

On an ongoing basis, the Laos interconnection promises to be increasingly important, particularly as Thailand tries to reduce dependence on natural gas for electricity generation. Several hydropower projects have been completed in Laos, selling most of their output to EGAT, and the well-known (and somewhat controversial) Nam Thun hydro project has been in development for years and is nearing completion. The earlier hydro projects were actually developed prior to the more prominent Thai IPPs, and faced a different set of challenges. With the impact of the Asian financial crisis, these projects were allowed to dissolve. Currently, several projects are being revived as EGAT seeks to meet demand and increase diversity its fuel base.

D. Industry Ownership Structure and Institutional Framework

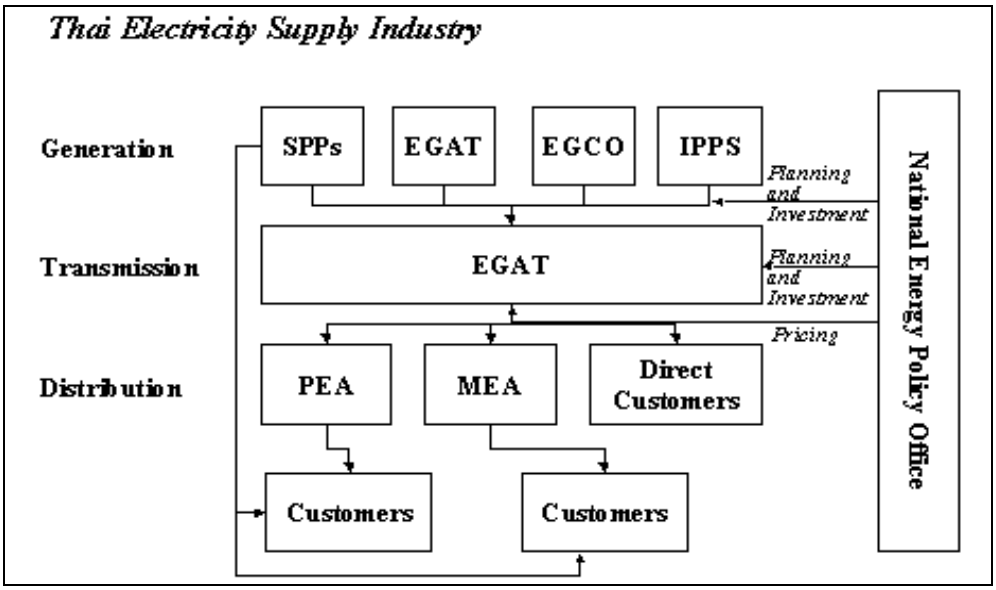
Thailand's electricity supply industry is predominated by three state-owned utilities – EGAT, the Provincial Electricity Authority (PEA) and the Metropolitan Electricity Authority (MEA). EGAT is responsible for over 60% of the electricity generated in Thailand and the entire transmission system in the country. It also is responsible for power and electricity distribution to a few large direct customers. On the other hand, MEA is responsible for distribution in the Metropolitan (Bangkok, Nonthaburi and Samut Prakan) and PEA is the distributor in all other areas.[11]

At the core of this institutional structure lies the Energy Policy and Planning Office (EPPO)—formerly the National Energy Policy Office (NEPO). EPPO, the implementation arm of the National Energy Policy Council (which is chaired by the Prime Minister and represents the final authority on energy strategy in the country), is responsible for all policies relating to supply-demand forecasts, tariff structure, privatization and IPPs. It is expected that, if the privatization of EGAT goes through, EPPO (or a successor named under a still being discussed Electricity Act) will take over EGAT's remaining planning and quasi- regulatory functions and become the independent regulator of this sector.

Currently, private participation exists only in the electricity generation side, with the Thai government keeping the rest of the value chain under its ownership and control. EGAT remains the sole purchaser/offtaker of electricity and continues to be responsible for electricity transmission. Small Power Producers ("SPPs"), IPPs and privatized generation companies sell electricity to EGAT, which in turn sells electricity to distributors and some large industry consumers. SPPs are, however, allowed to sell electricity directly to end-users (typically manufacturing plants in industrial parks). Figure 3 presents a graphic illustration of Thailand's electricity industry structure (*note that the National Energy Policy Office is now the Energy Policy & Planning Office*).

FIGURE 3: THAILAND'S POWER INDUSTRY STRUCTURE

[11] Information from EGAT.



Source: World Energy Council

Privatization initiatives began with a 1988 White Paper on Enterprises, which recommended that out of the 61 state-owned enterprises, 41 should be privatized by 2001. Consistent with this policy, EGAT was granted "Class A State Enterprise" status, which called for privatization.[12] In the meantime, privatization in the generation sector proceeded on two parallel tracks; the first entailing the gradual privatization of EGAT and the other SOEs in the power sector, and the second involving the addition of new industry players through asset sales and procurement of power from privately funded greenfield generation plants.

EGAT's partial 'privatization' began in May 1992, when it created a wholly-owned subsidiary, the Electricity Generating Company Limited ("EGCO"), to establish a vehicle to raise funds on capital markets and introduce competition to EGAT in the power generation business.[13] EGAT's stake in EGCO was reduced to 40.7 % when it was first offered to the public in 1995, then further reduced when it was offered to strategic investors in 1997—Hong Kong's China Light & Power won this bid with an offer reported to have been extremely aggressive. Later in 2000, Ratchaburi Electricity Generating Holding Public Co., Ltd. was established as a subsidiary of EGAT to hold generation assets and raise capital through capital markets listing—in which a major strategic stake was acquired by local coal supplier, Banpu Coal Company. In 2005, EGAT retains residual stakes of 25% in EGCO and 45% in Ratchaburi.

This track of partial privatization and divestment into EGCO and Ratchaburi never fully realized the objectives of the reform, namely increased competition. There is an informal agreement between these two companies not to directly compete for

[12] Pacudan, R., Overview Of The Power Sector Reform In Thailand (2001).

[13] *Id.*

acquisition of assets.[14] In fact, it is said that this agreement even sets out their prospective spheres of influence for investment in neighboring countries.[15]

In relation to the second track of privatization, the Thai government initiated the IPP and SPP programs, with three main goals in mind: (1) to attract private capital to meet demand growth in power generation; (2) to encourage introduction of new technology; (3) to catalyze a more efficient, better managed and more competitive electricity market. EGAT started purchasing electricity from SPPs in 1995/96 and from IPPs in 1999.

The IPP program launched in December 1994 represented a significant departure from the prior centrally coordinated and planned Thai electric power sector. Private developers were given responsibility for the development, construction and operation of power projects, with their rights and obligations relating to the sale of electricity to EGAT defined in power purchase agreements ("PPAs"). The IPP program was designed for large-scale power development, and led off with a highly competitive public tender in 1994. The bidding process attracted 88 bids from 50 participants who offered 39,000 MWs of firm, base load power plants. Out of these 88 proposals, EGAT selected seven winning bidders who agreed to supply around 6,345 MWs of power with commercial operating dates (CODs) ranging from 1999 to 2003..

TABLE 1: THAILAND'S EXISTING AND PLANNED CAPACITY (MW)

	2002	**2003**	**2004F**	**2005F**	**2006F**	**2007F**	**2008F**	**2009F**
EGAT	14,768	15,268	15,690	15,690	15,490	15,290	14,901	14,540
EGCO	2,056	2,056	2,056	2,056	2,056	2,291	2,291	2,291
RATCH	2,890	3,615	3,615	3,615	3,615	3,615	3,615	3,615
IPP	1,400	2,463	2,463	2,463	2,463	3,810	5,910	8,010
SPP	1,828	1,896	1,944	2,024	2,024	2,024	2,024	2,024
Other	640	647	647	647	647	647	647	647
Total	23,530	25,945	26,417	26,495	26,295	27,676	29,396	31,116

Source: EGAT (2002)

For smaller developments, EGAT and NEPO established the SPP program in 1992. This program allowed developers to propose projects with capacity sales up to 60 MW to EGAT. Remaining capacity could either be used "inside the fence" or sold to nearby industries. Eventually, The Government of Thailand agreed to allow EGAT to take, on a case-by-case basis, up to 90 MW of capacity from each SPP project. Under the SPP program, SPPs were required to propose power plants that utilized:

- non-conventional energy such as wind, solar and mini-hydro energy;
- waste or by-products from agricultural and industrial activities; or
- co-generation using natural gas or petroleum products under a number of conditions (e.g., efficiency > 45% and steam output > 10%).[16]

[14] World Energy Markets, *Thailand's Leading Power Producers Agree to Limit Direct Competition*, October 2003.

[15] *Id.*

[16] Information about the SPP Program from EGAT.

Subsequently, with the advent of the Asian Financial Crisis, the call for further reforms of the Thai power sector became more urgent. As a condition to its emergency aid package, the International Monetary Fund ("IMF") called for the complete restructuring of Thailand's electricity industry.[17] At one point, it was suggested that EGAT should sell off all of its generation assets except for hydroelectric facilities. During this time, the Government prepared a blueprint for power sector reform, which outlined a long-term shift towards a competitive power pool, with competition being introduced at both wholesale and retail levels. Within this framework, it was proposed that EGAT remain a state-owned enterprise, responsible for the transmission network and hydroelectric facilities, with a limited stake in generation through its continued ownership of hydro-electric facilities and perhaps the Mae Moh lignite fired plant in the North. The thrust of the reforms was to increase private sector participation in order to reap the benefits from increased competition and efficiency in the power generation and retail supply points of the value chain.

In September 2003, with a change in government, Thailand reversed its intention to institute competitive power pooling into its electricity market structure. It is now concentrating its efforts on corporatizing and privatizing EGAT – which is planned to be listed on the Stock Exchange of Thailand in 2005. According to EGAT's management, the government (in this case, the Ministry of Finance) will maintain at least 50% in the company. The planned privatization of EGAT essentially signals the abandonment of market deregulation for the foreseeable future. For IPPs, this may be good news as it represents the continuation of a regulated-returns environment. However, even the more limited proposal to partially privatize EGAT through an SET listing has so far been held up by protests and demonstrations by more radical EGAT employees.[18]

III. THE INVESTMENT CLIMATE OF THAILAND'S POWER INDUSTRY

In analyzing the investment climate of Thailand's power industry, this paper does not seek to replicate various general studies and indicators such as the World Economic Forum indices.[19] Instead, this discussion will focus on three core issues that may have affected the development of IPPs in Thailand:

- The political and institutional climate for economic policy and privatization
- The financial viability of EGAT, which is the sole off-taker for the IPPs
- Economic growth and its relation to Thailand's electricity demand growth
- The rule of law, control of corruption and the value of contracts in Thailand

A. The Political and Institutional Climate.

[17] APEC, Electricity Sector Deregulation.

[18] For a more elaborate discussion, see Chuenchom Sangarasri Greacen and Chris Greacen, *Thailand's Electricity Reforms: Privatization of Benefits and Socialization of Costs and Risks*, PAC. AFF., Vol. 77, No. 3 (Fall 2004).

[19] See, for example, studies done by the EIU and data from the World Economic Forum, in particular, the public institutions index and macroeconomic environment index.

The shifting political situation in Thailand has played a significant role in electricity industry reforms and thereby the business environment in which IPPs operate. During the 1990s, the Thai government pursued an aggressive plan to reform the electricity sector. The first step was an effort to privatize EGAT, a politically sensitive proposition that muddled through several only partially successful attempts in the 1990s. Then, in the aftermath of the Asian crisis, the government led by Prime Minister Chuan Leekpai initiated a program aimed at the full privatization of EGAT, including an ambitious unbundling of the utility into eight competitive generation companies and the establishment of a competitive power pool.

However, when Prime Minister Thaksin Shinawatra took over, the plan was scaled back such that EGAT was to stay whole and retain a monopoly over transmission and distribution. While one may cite additional reasons supporting this revised logic, it is argued that this largely stemmed from Prime Minister Thaksin's political inclination to steer Thailand away from "its long-held embrace of the free market and towards more self-reliance and less foreign participation in achieving economic growth."[20] Industry participants also cite the failure of Enron, deep financial distress for number of American IPPs, and the California energy crisis (conspicuously related to poor implementation of its power pool), as important factors that drove many in the Thai official who had supported the move to a deregulated power sector to hesitate. This loss of confidence may have allowed nationalist forces, and particularly the EGAT labor union, to further derail the privatization effort.

B. EGAT's Financial Viability.

EGAT is the sole offtaker for IPPs in Thailand, and its financial viability affects the probability of default or of renegotiating its obligations to purchase power from the IPPs. Unfortunately, it is difficult to assess EGAT's historical financial viability as it is not a publicly-listed company. Nonetheless, at the end of 1997, EGAT issued bonds, which were rated at A- by S&P's.[21] This rating was later downgraded by S&P's to BBB+, upon concerns primarily focused on the possibility that ongoing electricity industry restructuring and EGAT's possible privatization could reduce government support for EGAT's financial position.

EGAT's credit standing is closely tied to government support and the Electricity Generating Authority of Thailand Act obliges the government to make appropriations to EGAT if funds to cover revenue deficiencies cannot be obtained from other sources. As such, we look to Thailand's sovereign ratings as a proxy for EGAT's historical financial viability. In 1991, Thailand's S&P sovereign ratings stood at A- and was later raised to A in 1995 as the economy showed signs of robust growth.[22] However, during the financial crisis, Thailand's S&P rating had sunk to a sub-investment grade of BBB-.[23] In

[20] A thorough and succinct analysis of the evolution of Thai electricity policy during this period is provided in Greacen & Greacen (2004), *supra* note 18.

[21] Standard & Poor's database.

[22] *Id.*

[23] *Id.*

fact, both Moody's and S&P's each downgraded Thailand's ratings 4 times over the two years of the crisis.

EGAT's financial viability depends on the electric supply-demand situation, efficiency gains and the level of retail tariffs. Among these factors, the setting of retail tariffs – which in Thailand are low by regional standards – has the most significant impact on EGAT's financial health. The tariff setting mechanism is overseen by EPPO, which reviews EGAT's mechanism for passing on increased operating costs annually. Although not an independent regulator in formal terms, EPPO enforced rational (non-political) tariff setting practices during the 1990s. However, a rough examination of EGAT's base rate tariffs[24] shows that while EGAT's tariffs were raised prior to the crisis, they were reduced by 2-3% by EPPO between 1999 and 2000. This was a time period with sluggish energy demand and consequent excess capacity, and EGAT's financial viability further deteriorated and the company recorded net losses in 1999 for the first time in the 5 years.[25]

TABLE 2: RETAIL ELECTRICITY TARIFFS ACROSS SELECTED ASIAN COUNTRIES (JUNE 1998)

Utility	Residential Tariff	Industrial Tariff
Perusahan Listrik Negara, *Indonesia*	0.63	0.66
Korea Electric Power Corp., *Korea*	4.83	1.95
Metropolitan Electricity Authority, *Thailand*	5.54	2.24
Tenaga Nasional Berhad, *Malaysia*	5.92	2.39
Taiwan Power, *Taiwan*	6.46	2.41
Singapore Power, *Singapore*	6.96	2.84
Manila Electric Company, *The Philippines*	9.51	3.84
China Light & Power, *Hong Kong*	11.46	4.63
Kansai Electric, *Japan*	12.18	4.92

Source: Myrna Velasco, Surviving a Power Crisis (2005), at 85.

Finally, some aspects of the IPP program itself undermined EGAT's financial status and credit rating. Tariffs for IPPs in Thailand include both availability payments (which are paid regardless of dispatch) and energy payments (which are paid only for energy actually delivered). During a period of slow demand, EGAT is nonetheless locked into availability payments to IPPs that are less pliable than payments to state-owned plants. As such, while tariff levels are set with the expectation of providing EGAT a pre-specified level of return on investment to sustain its financial viability (currently specified to be 8% per annum), problems in the tariff setting mechanism will impact EGAT's viability as an offtaker.[26]

C. The Economy and Electric Demand Growth.

Thailand's power demand growth correlates to GDP growth with an average electricity multiplier (average peak demand growth divided by GDP growth) of 1.46 – see Table 2. This means that each percentage point of GDP growth triggered power

[24] Department of Statistics, Thailand, Database for Industrial Statistics.

[25] See EGAT's 1999 annual report.

[26] World Energy Council, Pricing Energy in Developing Countries (2000).

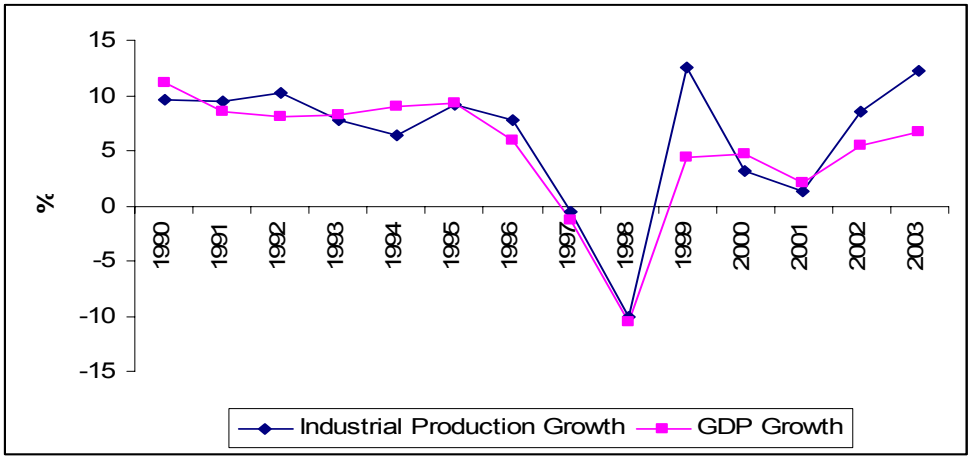
demand growth of 1.46%. This is in contrast to figures in Malaysia and China of 1.40 and 0.94, respectively. Generally, a higher number suggests a higher proportion of power-intensive industries and/or a higher pent-up demand for energy in the economy. As illustrated in Figure 5, Thailand's power demand seems largely driven by industrial production, with the 10-year average of industrial production growth/GDP growth being around 1, a figure that increases to around 1.3 in the post-crisis era. In this climate, rapid evaporation in industrial production such as that experienced by Thailand in the Asian crisis (shown in Table 2 & Figure 5) are likely to have drastic effects on energy demand in the near term.

TABLE 2: AVERAGE ELECTRICITY MULTIPLIERS

Year	Thailand	Malaysia	China
1991	1.52	1.21	1.04
1992	1.60	1.40	0.81
1993	1.39	1.16	0.75
1994	1.43	1.76	0.84
1995	1.47	1.52	0.90
1996	1.49	1.20	0.74
1997	2.66	1.83	0.53
1998	0.23	-0.35	0.39
1999	0.19	1.13	0.92
2000	2.01	1.34	1.21
2001	2.95	10.44	1.26
2002	0.76	1.40	1.29
Average	1.48	2.00	0.89

Source: CEIC database

FIGURE 5: THAILAND'S INDUSTRIAL PRODUCTION GROWTH VS GDP GROWTH



Source: EIU Country Data

In assessing economic growth and power demand as part of the investment climate, we observe that projections by Thailand's energy authorities and EGAT did not seem sufficiently forward-looking. Pre-crisis, EGAT and the energy authorities projected

high demand growth to follow projections of high economic growth (estimated during the early 1990s) – one of the main reasons for the government to elect to contract some 8,000 MW of power projects to the private sector in its IPP and SPP programs. Post-crisis, with the lower estimates of economic growth, EPPO has reduced the targeted peak power demand margin to 15% of available installed generating capacity, compared to a robust 25% in the pre-crisis years. This point is illustrated in Table 3, which shows successive reductions in EGAT's forecasted peak demand.[27] Until the beginning of 1996, EGAT was still forecasting higher peak demand than what it had previously. Nonetheless, post-crisis expectations of GDP growth and power demand have been successively downgraded since the financial crisis, despite recent reports of a rapidly-recovering economy.

TABLE 3: CHANGES IN EGAT'S FORECASTED PEAK DEMAND (MW)

Power Dev't Plan	Announcement Date	Change
PDP 97-01	Oct-96	+28,518
PDP 97-02	Sep-97	-3,171
PDP 99-01	Dec-98	-7,700
PDP 99-03	Apr-99	-8,223

D. Rule of Law, Control of Corruption and Contracts.

The following set of statistics (estimates and standard deviations) provided by the World Bank shows that Thailand ranks moderately well in a regional comparison of rule of law but lags neighboring countries in controlling corruption. Thailand's rule of law scores have been decreasing gradually over the years since 1996. Although necessarily abstract, such data paints a general picture of the country and may differ for the electricity industry, where the presence of more political issues and public assets tend to complicate the situation.

TABLE 4: RULE OF LAW AND CONTROL OF CORRUPTION

Rule of Law								
	2002		**2000**		**1998**		**1996**	
	Est.	**S.E.**	**Est.**	**S.E.**	**Est.**	**S.E.**	**Est.**	**S.E.**
China	-0.22	0.13	-0.32	0.14	-0.22	0.18	-0.43	0.15
India	-0.80	0.13	-0.90	0.14	-0.97	0.18	-0.34	0.15
Indonesia	0.07	0.13	0.23	0.14	0.21	0.17	-0.01	0.15
Malaysia	0.58	0.13	0.55	0.14	0.82	0.17	0.80	0.15
Singapore	1.75	0.13	2.12	0.16	2.24	0.18	2.01	0.15
Sri Lanka	0.23	0.14	-0.17	0.16	-0.11	0.21	0.27	0.18
Thailand	0.30	0.13	0.43	0.15	0.40	0.17	0.46	0.15
Control of Corruption								
	2002		**2000**		**1998**		**1996**	
	Est.	**S.E.**	**Est.**	**S.E.**	**Est.**	**S.E.**	**Est.**	**S.E.**
China	-0.41	0.15	-0.34	0.16	-0.20	0.17	-0.01	0.17
India	-1.16	0.15	-1.09	0.16	-0.99	0.17	-0.44	0.17
Indonesia	-0.25	0.15	-0.21	0.16	-0.17	0.16	-0.29	0.17
Malaysia	0.38	0.15	0.18	0.17	0.75	0.16	0.48	0.17

[27] EGAT databases.

Singapore	2.30	0.16	2.50	0.17	2.52	0.18	2.04	0.17
Sri Lanka	-0.14	0.16	-0.05	0.19	-0.24	0.21	-0.21	0.24
Thailand	-0.15	0.15	-0.34	0.16	-0.12	0.16	-0.30	0.17

Source: World Bank

In terms of ease of contractual enforcement, Table 5 suggests that the time and resources necessary to enforce a contract are moderate in comparison to other countries in the region. This helps us place in context the occasional argument that Thailand's existing judiciary system is plagued by "undue delays, cumbersome procedures and relatively high costs."[28] However, thus far, mechanisms for contractual enforcement are relatively untested in the electric power industry, as disagreements and disputes over project arrangements (especially offtake agreements) were largely settled through renegotiations.

TABLE 5: COMPARISON OF EASE OF CONTRACTUAL ENFORCEMENT

Country	Number of Procedures	Time (days)	Cost (US$)	Cost (% income per capita)	Procedural complexity index
China	20	180	268	32.0	52
India	22	365	444	95.0	50
Malaysia	22	270	671	19.4	41
Philippines	28	164	1086	103.7	75
Thailand	19	210	589	29.6	53
United States	17	365	120	0.4	46

Source: Doing Business,World Bank (2004)

D. General Remarks.

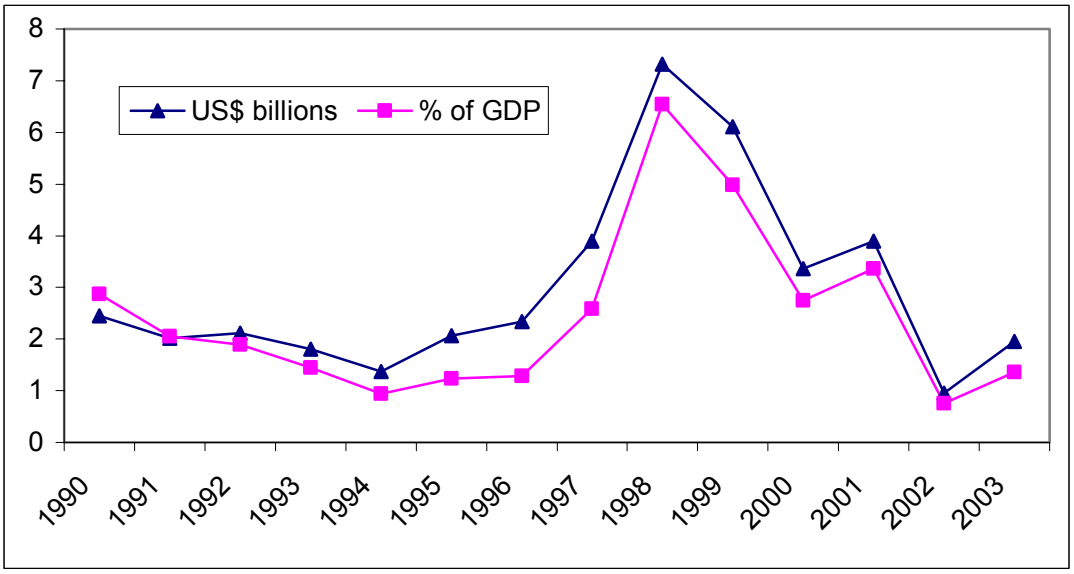
There is a notable disconnect between the image of Thailand's investment climate implied by analysis of the government management of the IPP sector and the fallout from the Asian crisis (*described below*) and the image implied by the behavior of foreign investors. Consistent and robust growth in the overall level of FDI during the 1990s suggest that Thailand's investment climate was viewed to be on a steady upward trend till it turned the corner in 1998. In response to the crisis, Thailand implemented a number of important reforms and undertook a number of adjustments. The IMF played a very active (some would say coercive) role in shaping the Thai government's reforms in the electric power industry

The reforms were controversial and met with resistance, yet reform is continuing and thus far has been considered to be successful. The Thai government has since embarked on a program to privatize a number of state economic enterprises and state monopolies with the view to encourage capital inflows and relieve resource constraints in many key sectors of the economy.[29] Nonetheless, if FDI is an indicator, the investment climate in Thailand has not improved much post-crisis.

[28] Rajenthran, A., Thailand as a FDI Oasis, *The Business Times*, 18 November 2004.

[29] PRS Services, Thailand Report (January 2003).

FIGURE 6: NET INFLOWS OF FOREIGN DIRECT INVESTMENT



Source: World Bank, World Development Indicators, 2004

In the power sector, investor skepticism is driven by a couple of factors. Despite the fact that the contractual arrangements between EGAT and the IPPs were renegotiated in good faith and such renegotiations allowed for certain concessions to IPPs to pass through currency risks (i.e., higher regulatory quality), the power sector in Thailand presents a different profile to investors now than in the mid-1990s.

First, the decrease in economic growth and power demand meant that delays in projects and renegotiated levels of offtake have engendered lingering pessimism regarding the business environment and accompanying operating risks. Second, the corollary to Prime Minister Shinawatra's economic nationalism has been the proliferation of state controlled entities, such as EGCO, Ratchaburi and PTT (the national natural gas company) investing in the IPP sector. Of the original seven IPPs, only two remain entirely in private hands. This curious market retrenchment presents a series of concerns to potential investors in the next round of IPP tenders.

IV. INDEPENDENT POWER PRODUCERS IN THAILAND.

The IPP experience in Thailand began in 1994, with the government offering up to 5,934MW of generating capacity for competitive bidding from private companies. This first round attracted 88 bids from 50 bidders – out of which only seven were selected. Appendix A sets forth the basic details of the Thai IPPs. The bids were evaluated on the basis of levelized cost. These seven IPPs then proceeded to arrange the full details of their projects, including finalizing the terms of the PPA with EGAT, the fuel supply arrangements, and the financing. The basic terms of these agreements are as follows:

TABLE 6: BASIC TERMS OF 1994 IPP TENDER

Term	Features …

Type and Duration	20-25 year BOT arrangement
Foreign Exchange	Payments denominated in baht (*but see discussion of the crisis, below*)
Fuel Supply	For the gas fired plants, state gas monopoly PTT provided fuel, while coal fired plants secured their own fuel arrangements.
Fuel Risk	Not clear during the tender. Fuel risk was eventually assumed by EGAT in a master gas supply agreement with PTT (*see below*).
Tariff Structure	Availability payments covering fixed costs and energy payments covering variable costs.
Minimum offtake	None – revenue guaranteed with availability payments, EGAT retained full discretion on dispatch (*May have varied for coal-fired plants*).
Credit support to EGAT	No explicit guarantees or comfort letters, but Section 45 of the EGAT Act provided government responsibility for all EGAT liabilities generally, and was seen as covering IPP payments.

The major issue during this process was arranging an acceptable fuel supply for the gas-fired projects. Neither the IPPs nor PTT were willing to assume the risks involved in long term fuel supply. Eventually, it was EGAT that managed to settle the issue, by signing a Master Gas Sales Agreement with PTT. This agreement essentially allocated EGAT the majority of the fuel supply risk implied by the IPP contracts. The critical terms are as follows: (1) for *gas availability risk* – so long as the IPP has an appropriate gas contract and secondary fuel supply arrangement, unavailability of the plant due to lack of gas from PTT will not affect EGAT's availability payments to the IPP; and (2) for *plant availability risk* – even if a plant was not available *due to operator fault*, EGAT would cover take-or-pay obligations to PTT under the MGSA. EGAT is arguably able to hedge this risk because the MGSA provides room for EGAT to aggregate the minimum offtake and shift gas deliveries to any of its gas consuming units.

Thailand is often identified as a country that succeeded in attracting extremely low priced IPPs. While this reflects to a certain extent the market conditions at the time—interest in IPPs, in Asia, and in Thailand in particular was nearing its peak in 1995. However, Thailand also conducted a well designed and transparent bidding and negotiation process that continually levered down the tariffs.

First, the tender was wide open. Rather than bidding for specific projects, Thailand announced an IPP tender, invited bids that were arranged by substation (the point in the grid where IPP electricity would enter), not by a particular project. Consequently, competition was largely between all fifty bidders and eighty bids, rather than between smaller numbers of bids for particular projects.

Second, Thailand shortlisted projects based on the original bids—this shortlist was announced in late 1995. A sponsor's position on the list was only an invitation to continue negotiating the PPA; if EGAT and the sponsor could not agree on terms, there was a long line of alternatives. With the lowest initial bid, Independent Power led the way, crafting an agreement that became a blueprint for the rest of the sector.

Some subsequent projects that came in to negotiate were asked to further lower their tariff. In the original bid, one of the conditions was that no more than 80% of the

NPV of project revenues be recovered during the first 75% of term of contract. This requirement, driven by EGAT's interest in encouraging long-term commitment, led to backended tariffs, with IPPs recovering substantial costs in the last five years of the contracts. Later, when bidders came in to negotiate, they were asked to further lower their tariff—initial payments could not be lowered, because the IPPs needed enough revenues to pay debt service, so the rising tail end of the tariff payments was lowered.

In late 1997, when the financial crisis swept over the Thai economy, only two of the original seven projects had signed PPAs with EGAT. While discussed in more detail in the next section, the impact of the crisis created difficulties for some IPPs in achieving financial close, which led to some mutually agreed delays with EGAT to their CODs. Additionally, two coal-fired projects representing one third of the awarded IPP capacity– which were under development by Union Power and by Gulf Electric, respectively – were delayed by violent protests by local NGOs opposing the environmental implications of coal burning power.[30]

V. THE ASIAN FINANCIAL CRISIS: THE MORNING AFTER

The central event in the development of the IPP sector in Thailand was the Asian financial crisis of 1997. In evaluating the impact that the crisis had on the IPP sector in Thailand, this section also looks to the experience in Malaysia, which faced comparable challenges from the crisis and which also had an IPP market that appeared on the surface to be similar. This section will explain the implications for outcomes of IPPs during the crisis period in general, before moving on to a discussion of the different outcomes for IPPs in Thailand and Malaysia.

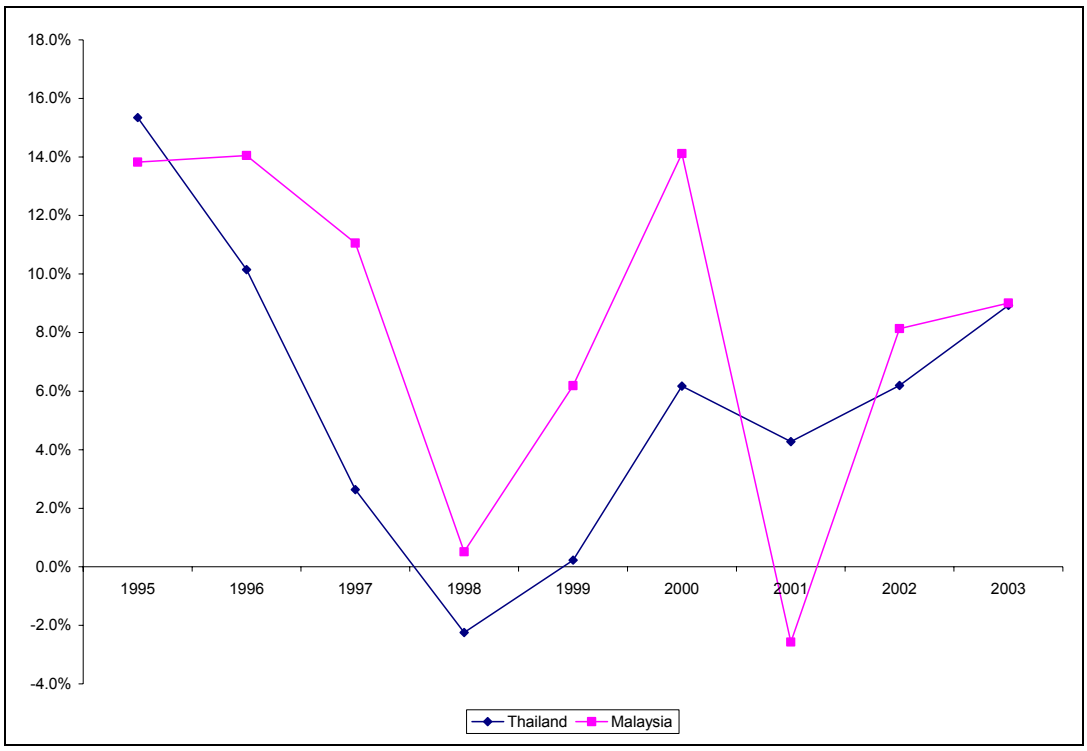
A. Impact of the Crisis.

The financial crisis affected the energy sector in Thailand and Malaysia in very similar ways, including: (1) prompting a massive economic slowdown that affected primary energy consumption and power demand; (2) causing rapid currency depreciation and interest rate hikes, sharply increasing the cost of new investment, existing debt repayments and imported materials; and (3) generally fostering an unfavorable investment climate, discouraging new foreign investment. This section reviews each in turn.

1. *A Hard Landing for the Economy*. With the onset of the Asian Financial Crisis, both Thailand and Malaysia suffered a steep decline in economic growth (see chart on GDP growth rates). The contraction in the economies resulted in a dramatic reduction in power demand.

[30] *Economic Review 1999,* Bangkok Post, *available at* http://www.bangkokpost.net/99year-end/20energy2.htm.

FIGURE 7: GDP GROWTH RATES IN THAILAND AND MALAYSIA



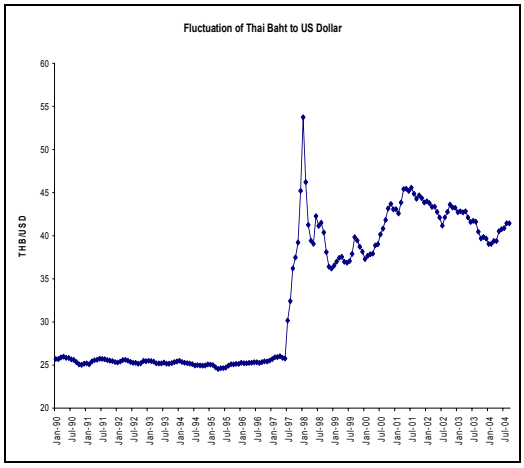
Source: CEIC database

In Thailand, power demand declined by around 2.7% in 1998 - a sharp contrast to the double-digit growth rates of the prior decade. In Malaysia, the reduction in demand resulted in overcapacity as high as 55% in the year following the crisis. The economic downturn and consequent decline in energy demand in Thailand and Malaysia had direct implications for the financial ability of the national utilities (EGAT and Tenaga, respectively) to make contractual payments to their IPPs. Additionally, several projects in both countries were postponed, delayed or (in rare cases) cancelled.

2. *Financing Difficulties*. Malaysia and Thailand experienced currency depreciations of 83.6% and 67.4% in 1998.[31] This situation was exacerbated by soaring interest rates. The impact of these factors on the power industry is manifold. First, where local utilities and generation companies had high levels of foreign debt, currency depreciation resulted in heavy foreign exchange losses in servicing that debt, eroding their financial positions. Both EGAT and Tenaga borrowed extensively in hard currency, and faced ballooning debt service payments in the aftermath of the crisis.

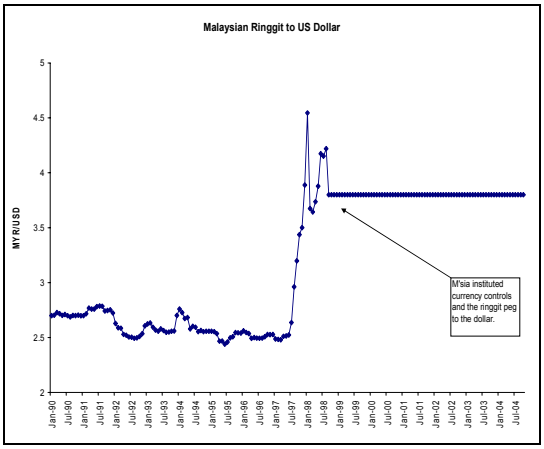
[31] CEIC database.

FIGURE 8: FLUCTUATION OF THAI BAHT DURING THE CRISIS



Source: CEIC database

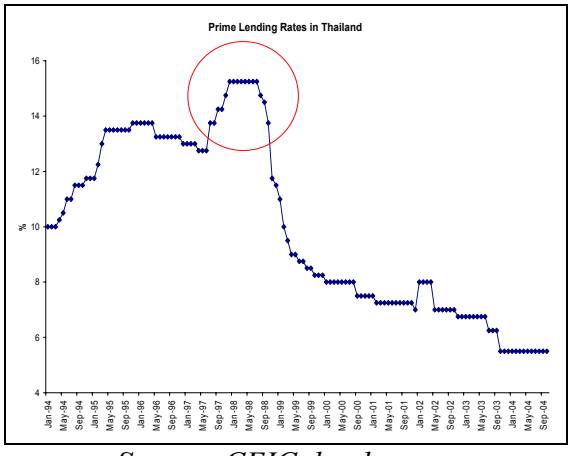
FIGURE 9: FLUCTUATION OF MALAYSIAN RINGGIT DURING THE CRISIS



Source: CEIC database

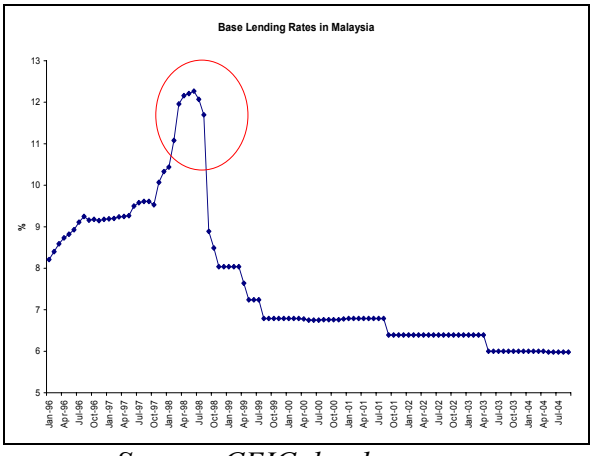
Second, the risks of currency mismatch affected IPPs with foreign debt. This stemmed from the fact that revenues based on PPAs were typically denominated in local currencies, while debt payments were typically denominated in hard currency. The impact of currency fluctuations on IPPs is determined by the currency arrangements in their project documentation. In both countries, foreign exchange risk was not handled with classic methods common in the IPP sector in other countries, such as denominating or indexing payments in hard currency – rather in Malaysia and Thailand, payments were denominated in local currency with no indexation or other apparent protection. In Thailand, this stemmed from the government's policy of maintaining a peg between the Baht and a basket of currencies, thereby appearing to eliminate currency risks (provided the real value of the Baht did not fluctuate wildly). In Malaysia, substantial local financing of projects meant that the IPPs did not have significant exposure to currency risks.

FIGURE 10: PRIME LENDING RATES IN THAILAND



Source: CEIC database

FIGURE 11: BASE LENDING RATES IN MALAYSIA



Source: CEIC database

Third, the rise in domestic interest rates made debt repayment and refinancing of existing projects difficult. Implementation of many programs and investment in new projects were substantially affected as new lending in the financial system almost dried up. Finally, with the currency depreciation, the costs of imported materials, especially fuel, rose sharply. This constitutes a serious issue as fuel can represent about 30% of the costs of a coal project and 75% of the costs of a gas or oil project. The shock from these increases were somewhat ameliorated by the fact that fuel prices in US dollar terms dropped to their lowest levels in decades between 1997 and 2002.

3. *Unfavorable Investment Climate*. Cumulatively, the reduction in power demand and the financing difficulties created an unfavorable investment climate for the country and the energy sector. In particular, the cost of capital for new projects rose sharply as investors and financiers assessed additional premiums to compensate for higher perceived risks in the region. Investors, even those who retained confidence in the region's economy, faced a major obstacle in obtaining financing for power projects as lenders increasingly doubted the ability of EGAT and Tenaga to uphold their commitments under the PPAs. This difficulty reflected the fact that that the utility's financial position could deteriorate further if the economic slowdown led to low power sales, or if government officials refused to allow the utilities to adjust retail power tariffs correspondingly.

B. Examining the differences in impact.

1. *What happened to the Projects during the Crisis?* In terms of planned projects which were still under negotiations, the outcome common to projects in both countries was substantial delay or indefinite postponement. This stemmed partly from the difficulty in gauging the future course of the economy and thereby the extent of investment reduction required. In Thailand, EGAT also cancelled a number of power projects such as the construction of the 2000MW Tab Sakae power plant and 2 additional units at the Ratchaburi plant.[32] In Malaysia, the 2,400MW Bakun Dam hydropower project (which was already beset with problems and investor disputes) was shelved as the drop in exchange rates increased the project's prospective costs by more than 1 billion ringgit (i.e., about US$260 million).[33] Another coal-fired power plant on Penang Island has been postponed indefinitely owing to increased construction costs.

For projects in a more mature stage – with signed PPAs, under construction or in operations (in Malaysia) – the crisis had a more severe impact. In both countries, the

[32] NEPO, Energy and Development Report 1999. The two additional units at Ratchaburi are now being implemented as part of the relocated Him Krut project.

[33] Lefevre and Todoc (2000). "IPPs in APEC Economies: Issues and Trends." Paper presented at "The Clean and Efficient Use of Fossil Energy for Power Generation in Thailand," APEC Clean Fossil Energy Experts' Group, Bankgkok, Thailand, 30 October – 3 November 2000, *available at* http://rru.worldbank.org/Documents/PapersLinks/thierry.doc.

payments from state utility to IPP were denominated in local currency (and not indexed), meaning that without some change, the private investors would bear the brunt of the liability for and hard currency exposure. However, even without the foreign exchange exposure falling immediately on the state utilities, both EGAT and Tenaga had problems of their own stemming from hard currency denominated debt and from falling electricity demand. Both countries proceeded to reevaluate their IPP commitments.

In Thailand, renegotiations of the IPP projects began shortly after July 1997 when the government, facing a financial crisis, elected to float the Thai baht. Over the course of the next few months, the baht depreciated around 40% (see figure 8). This was a major problem for the IPPs because PPAs in Thailand (in contrast to those signed in most other countries) specified tariffs denominated in Baht, while the investments were financed in hard currencies. As such, even if EGAT continued to honor the offtake clauses, the private investors would be badly hit by the currency depreciation. Nonetheless, the Thai government and EGAT took steps to renegotiate the foreign exchange provisions of all its PPAs shortly after the Baht collapsed in July 1997, in a manner which allowed the Thai IPPs to continue with development of their projects. The Government's proactive moves also showed IPP investors that the Thai Government and EGAT were responsive to their needs in time of real crisis..

From 1985 to mid-1997, the Baht was fixed to a band of plus or minus 2% when traded against a basket of currencies that closely matched the U.S. dollar. Thus, the 1997 decision to float the Baht freely was captured as an event of "change in law" under the many investment contracts, including the PPAs, which triggered renegotiations.[34] Had the Thai government simply opted for an upfront devaluation by between 10 per cent and 15 per cent with a wider trading band, renegotiations would have been avoided and private investors might have been left to bear the brunt of the depreciation themselves. (In reality, most of the IPPs could not have obtained financing at all without an adjustment to compensate them for the depreciated Baht). The change in law clause required the government to make whole any loss imposed on the IPPs by reason of adverse legal or regulatory decisions by the Thai government. Applied automatically, this implies that upon floating the currency the Thai government became liable for the loss of value to the IPPs.

The positive resolution of this episode was by no means assured. At the time of the crisis, only two of the PPAs had been actually approved and signed. While the government was arguably bound by the change-in-law provision after several years of bidding and negotiations, the contracts were not strictly enforceable. Additionally, some industry participants recall that the actual discussion of whether or not this clause would apply faced resistance from EGAT until government officials stepped in to mediate a solution. This was driven by a couple of factors. First, government officials overseeing the IPP program, notably Dr. Piyasvasti as head of NEPO, were determined that the privatization of the electricity sector would be "done right." The IPPs were extremely high-profile projects for Thailand, and with global attention focused on the region in the

[34] NEPO, Privatisation and Liberalisation of the Energy Sector in Thailand (1999).

wake of the crisis, the country could not afford a messy dispute with investors. Second, the IPP program would have basically just disappeared had the government not indexed the tariffs. Without indexation, only Independent Power (which had secured financing and currency hedges) would have survived. Nevertheless, many participants acknowledge that Thailand could have likely driven a far harder bargain than it did—rather, the price index was set to cover all project costs reasonably expected to be denominated in hard currency in a gas- or coal-fired project.

In the end, EGAT agreed to assume a considerably larger fraction of the costs of the currency depreciation than it would have assumed under the original PPAs. This was done by indexing part of the capacity payments to a fixed exchange rate of 27 baht per dollar. This was close to the pre-crisis rate of about 25 baht per dollar, despite the fact that in early June 1997, the baht traded at 40-42 per dollar.[35] IPPs lost value for the two-baht difference between the pre-crisis level of 25:1 and post-crisis reference of 27:1. The calculation of this indexing varied between categories of availability payment and between coal and gas fired plants to reflect the differing exposure of coal- versus gas-fired facilities (coal plants having larger domestic costs from building, materials, etc). An example of the equation used to calculate the FX cover for Availability Payment 1 (AVP1) (used to recover capital charges), for gas-fired plants is:

$$APR_{1\ adjusted} = [.90 \times APR_{1\ unadjusted} \times (FXM/27)] + [.10 \times APR_{1\ unadjusted}].$$

(NOTE - In this equation, FVM refers to the Baht:dollar exchange rate that prevails at the end of each month of the PPA period). Amended and restated PPAs with each of the IPPs were signed in November 1997.

Nonetheless, even with this support from EGAT, the IPPs still faced the daunting task of obtaining financing in the midst of a tumultuous economic environment. The Independent Power and Tri-Energy projects were the furthest along, having signed PPAs prior to the impact of the crisis. Independent Power had closed its financing in March 1997, along with currency hedges that protected the project from foreign exchange liability. Although well positioned to meet the originally scheduled commercial operations date in September 1999, the project experienced technical difficulties and came online in 2000. The Tri-Energy plant, developed by ChevronTexaco, BANPU and Edison Mission Energy , actually reached financial close in early 1998, after having to start basically from scratch with lenders who were now reluctant to accept Thai exposure. Both Bowin Power (now "Glow IPP") and Eastern Power postponed commercial operations for an extra year, until 2002.[36] Projects that secured financing after the crisis (basically all of the IPPs other than Independent Power) secured loans with substantially higher interest rates, and were often required to obtain political risk insurance as well, in light of EGAT's increasingly precarious position and the now unfavorable supply-demand conditions in the electricity sector.

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[35] Gray, R. David and John Schuster, The East Asian Financial Crisis—Fallout for Private Power Projects, Viewpoint Note No. 146, The World Bank (1998).

[36] *Economic Review 1999,* Bangkok Post, *available at* http://www.bangkokpost.net/99year-end/20energy2.htm.

In addition to the challenges flowing from renegotiating the PPA terms and in securing financing, the timeline for the projects had to be adjusted. Both sides were interested in delaying commercial operations—EGAT no longer needed electricity, and the projects could not obtain financing and move ahead with construction. However, project documentation had specified timelines, and delays imposed costs that would have to be born by someone. Each side wanted the other to make the first move—the IPPs wanted EGAT to ask for a delay so they could claim costs, while EGAT wanted the IPPs to request the delay so that EGAT would not have to pay for it. The first settlement on this issue involved an agreement by EGAT to allow a 3% tariff increase in exchange for a one-year delay. Every IPP except Independent Power agreed. Even with the extra year, some projects did not close financing, so there was another round of delay on the same terms. In this round, every IPP participated except for Tri-Energy participated, but by differing amounts. For example, Eastern Power delayed for only an additional six months, and did not receive compensation.

Additionally, two of the coal-fired plants – Gulf Electric/Bo Nok (now "Khaeng Koi II") and Union Power (now "Ratchaburi Power") – were delayed by violent protests instigated by anti-coal NGOs against coal burning power projects. Each plant has subsequently been substantially been moved to a new location and converted to natural gas. In both cases, EGAT's subsidiaries have taken a sizeable equity stake in these reformulated projects – EGCO now owns 50% of the reconstituted Bo Nok project, now known as Khaeng Koi 2 and Ratchaburi Electric owns 25% of the reconstituted Hin Krut project, now called Ratchaburi Power. The third coal plant, BLCP Power, delayed its operations for a few years, but is now in an advanced stage of construction and nearing commercial operations albeit several years later than anticipated. In most cases (with the exception of the two coal plants that faced protests), these delays resulted from a combination of financing difficulty and EGAT's reluctance to have new power come online during a period of uncertainty and sluggish demand growth. In summary, the outcomes in hindsight were mutually beneficial. IPPs through these delays were able to surmount major hurdles related to financing their projects and EGAT was able to postpone the CODs for plants that clearly were not needed during 2000-2004, but would be needed by 2006-2008.

As in Thailand, the Malaysian government floated the ringgit in 1997. In one account, however, the renegotiation process was vastly different. First, upon Tenaga's request, the government put all new IPP projects on hold, including those which had already obtained governmental approval and signed PPAs.[37] Second, Tenaga renegotiated for a 12% reduction in existing PPA payments and a 90-day deferment for capacity and variable payments to IPPs at no surcharge.[38] The PPAs originally imposed a surcharge of 2% above the base lending rate for any payment delay, which would have rendered deferment useless, given the soaring lending rates (see Figure 11). Similar renegotiations

[37] Henisz, Witold J. and Bennet A. Zelner, The Political Economy of Private Electricity Provision in Southeast Asia, A Working Paper of the Reginald H. Jones Center, WP 2001-02 (2001).

[38] *Id.*

for deferral of payments happened again in 1998, when Tenaga continued to face cash flow problems. Finally, the process was managed with a relative lack of transparency, and clouded by hints of favoritism and discrimination against the few foreign participants.[39]

2. *Explaining the Outcomes*. The relative pressure on IPPs in Thailand and Malaysia was dictated by several factors. First, the exogenous shock—as detailed above, the macro-economic crisis was the most obvious factor which triggered problems in the projects. The extent to which the crisis affected the IPPs can be attributed to an additional element - the proportion of IPPs operating in the particular system at that time. Second, project management—the different ways in which IPP projects were structured in the two countries played a significant role in determining the risks realized by the investors and the utilities. As discussed in more detail below, this factor has some correlation with the specific regulatory and market structure in the country. Finally, the investment climate and institutional arrangements – the different ways in which the governments of the two countries renegotiated the contracts with the IPPs, correlated with the particular institutional arrangement in the country. This can also be broadly classified under investment climate - a factor detailed in our IPP research protocol.

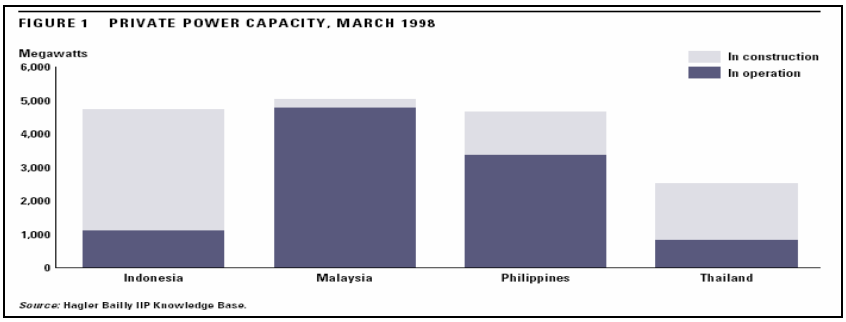
2.1. **Exogenous Shock—Capacity & Timing of IPPs**. A major reason underlying why Malaysia's Tenaga faced more serious pressure in the Crisis relates to the higher proportion of IPP projects which had come online in Malaysia, compared to Thailand (see Figure 12). In 1998, about 35% of Malaysia's total installed capacity (which stood at 13,696 MW) was comprised of capacity from privately-invested plants in operation.

In contrast, the private-investor owned power plants in operation in Thailand were mainly small power projects (SPPs). These accounted for less than 5% of Thailand's total installed capacity (which stood at 17,261 MW in 1998[40]). None of Thailand's seven IPPs was operational. Even before being delayed, the most advanced plants would not have come online until 2000. Thus, unlike the case in Malaysia, the crisis imposed no immediate payment burdens on the state offtaker.

FIGURE 12: PRIVATE POWER CAPACITY (1998)

[39] Henisz and Zelner, *supra* note 37.

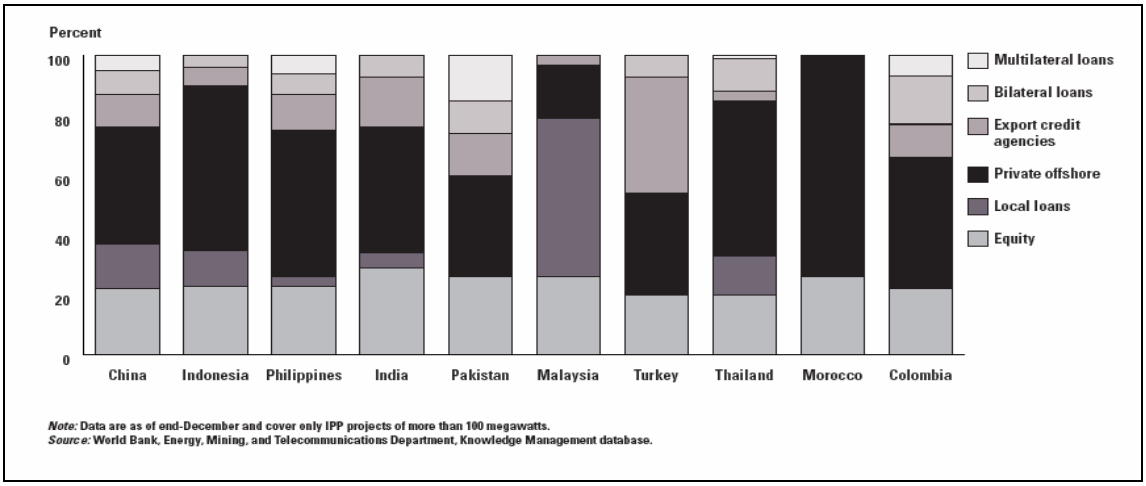
[40] US Department of Energy, *An Energy Overview of the Kingdom of Thailand*, 2005.



Source: Hagler Bailly

2.2. **Project Management—Foreign Exchange Risk Management**. Though Malaysian and Thai power projects were structured with payments under the PPAs denominated in the local currency, investors in both countries did not bear a huge extent of the currency depreciation for different reasons. In Thailand, the Thai government and utility agreed, shortly after the June 1997 collapse of the Thai Baht, to take on most of the currency risks previously being carried by IPPs by allowing relevant portions of the IPPs' payments from EGAT to be indexed against the Baht:US$ exchange rate. In Malaysia, IPP financing was characterized by high levels of local debt finance, meaning that the capital costs of the projects were also ringgit-based and the projects enjoyed natural hedge against currency fluctuation. In both cases, fuel prices were treated as a pass-through from the IPP to EGAT and TNB so any fluctuations in the price of fuel due to currency fluctuations were already addressed in the PPAs of both countries.

FIGURE 13: PROPORTION OF LOCAL FINANCING IN EMERGING MARKETS PROJECTS



Source: World Bank

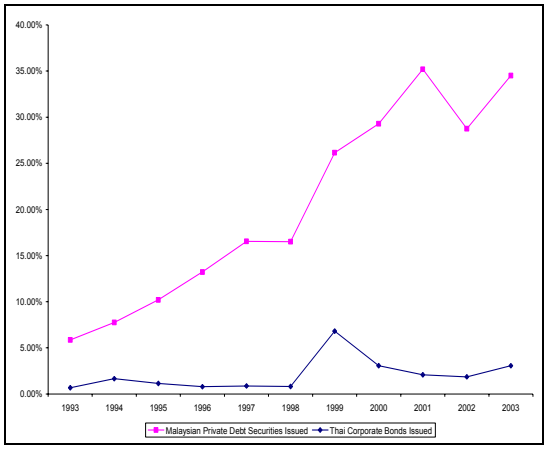
In Malaysia, the financial structure of an IPP project typically involves part of the debt being raised from a bond issue at a fixed interest rate and the remainder being structured as a floating rate loan facility. There are two major aspects in the Malaysian regulatory and market structure which influenced this particular financial structure.

First, there was a restriction on foreign participation in IPP projects, with foreign ownership being capped at 30%. This policy is rooted in economic nationalism, and may

be the by-product particularly of the so-called "bumiputra economic policy" that favors ethnic Malays. In any event, such policies are radioactive to foreign investors – in fact, of the major IPPs present in Malaysia, only the project of Segari Power had foreign participation.

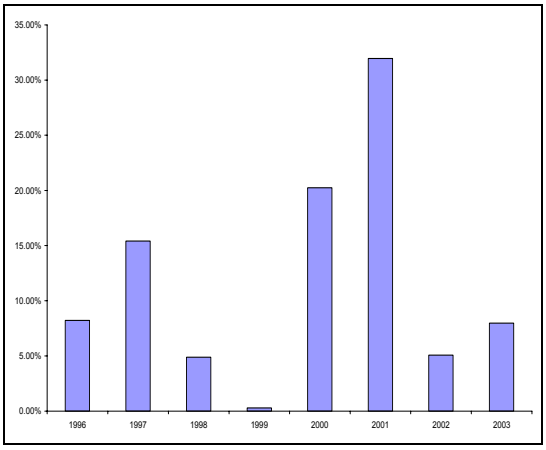
Second, Malaysia's domestic bond market was more developed than that in Thailand prior to the crisis.[41] As exhibited in the chart below, the multiple of private debt securities over GDP in Malaysia was 16.5%, while the multiple for Thailand was less than 1%. As such, private debt securities provided a significant source of financing for power projects, making Malaysian IPPs less dependent on loan facilities or foreign funding. The second chart below shows the proportion of bonds issued in relation to power projects, which hit 15.4% in 1997, before this source of funds dried up temporarily upon the occurrence of the crisis. Moreover, Malaysia's domestic capital market development has often been associated with the rise of Islamic finance. For example, the 350MW Prai SKS project was financed with an Islamic bond issue.

FIGURE 14: PRIVATE BONDS VERSUS GDP MULTIPLE



Source: CEIC Database

FIGURE 15: PROPORTION OF POWER PROJECT BONDS



Source: CEIC Database

2.3. **Project Management—Offtake Risk**. A significant factor affecting the renegotiation process involves the national utility/offtaker's financial ability to honor the PPAs and make payments accordingly. There are two main dimensions to this issue: (i) the level of wholesale tariffs contracted for under the PPAs; and (ii) the margin between wholesale tariffs and retail tariffs.

[41] Yusof, Development of the Capital Market in Malaysia (2000), available at http://www.tcf.or.jp/data/20020307-08_Zainal-Aznam_Yusof_-_Ranjit_Singh.pdf.

In Thailand, wholesale tariffs increased after the onset of the crisis as a result of increased fuel costs, which was a pass-through item under the PPAs. While Thailand has indigenous sources of natural gas (which fueled most of the IPPs), the gas fields have been developed under concession to foreign firms, meaning that gas prices are denominated in hard currency. Thus, fuel prices for IPPs rose to about 50% in 1998 than in 1997 (partly a result of currency depreciation).[42] This observation points to another critical factor – the Thai government lacked any attractive alternatives to IPPs under the circumstances. If EGAT did not assume this risk, the project companies would have abandoned their plans, leading to a possible capacity shortfall in the medium term once the financial crisis had abated and peak demand started to grow again. Moreover, the country would have further fed concerns of the international investment community and possibly had a damaging effect on overall FDI flows. Having EGAT or private Thai companies assume these projects was also not attractive – power plants in Thailand at the time were built with imported equipment, with dollar denominated fuel supply and large hard-currency denominated loans. The currency mismatch would have still existed, even for public builders.

On the other hand, Malaysian IPPs tend to use entirely indigenous fuel (so do Thai IPPs that use gas, but Thai gas reserves are largely developed under concession to foreign companies who sell in hard currency). This factor, while seemingly part of project management, is related to the market structure in Malaysia, which is dominated by Petronas, the state utility that operates in local currency terms. Nonetheless, despite the fact that wholesale tariffs in Thailand were increased by fuel costs while fuel costs did not affect Malaysian IPPs to the same extent because of local currency sourcing, Tenaga's financial ability to pay wholesale tariffs in Malaysia was more strained than that of EGAT. This can be attributed to the fact that wholesale tariffs under PPAs in Malaysia were much higher than Tenaga's own production prices, whereas the opposite was true in Thailand.[43] The lower tariffs contracted for in Thailand was probably obtained as a result of the competitive bidding process which IPPs had to go through. On the other hand, IPPs in Malaysia went through a less transparent and competitive process whereby contracts were awarded via negotiations.[44]

Moreover, Tenaga's financial ability to make payments was also stretched by the fact that the Malaysian energy authorities exerted heavy arbitrary control on retail tariffs in Malaysia. In Thailand, though the government was still in control of the electricity tariffs, there is an automatic adjustment mechanism which operates semi-independently of the government. This mechanism has allowed three upward adjustments in the retail tariffs by a total of 15% to reflect the increased costs of debt and fuel during the period of 1997-8. This has kept the margins between wholesale and retail tariffs in Thailand sufficiently wide, enabling EGAT to maintain a relatively healthy financial position.[45] In

[42] Grey and Schuster, *supra* note 35.

[43] Albouy, Yves and Reda Bousba, The Impact of IPPs in Developing Countries—Out of the Crisis and Into the Future, Public Policy for the Private Sector Note No. 162, The World Bank (Dec. 1998).

[44] Handley, P., BOT Privatisation in Asia: Distorted goals and processes (1997).

[45] Thailand Report: Economic Crisis, Policy Response and Future Direction of Thailand's Energy Sector, a paper submitted for the 17th ASEAN Ministers on Energy Meeting (1999).

contrast, the Malaysian Energy Commission, the sector regulator, has frozen retail levels since 1997; it would not allow any upward revision of tariffs, despite higher operating costs, unless such move is strongly justified.[46] Unlike Thailand, Tenaga does not have the benefit of a cost pass-through formula and the government has said that it would want to see efficiency raised before tariffs are reviewed.[47] Therefore, this points to the fact that regardless of how strong contracts can be, the outcomes of projects are ultimately determined by the ability of the utility/offtaker to raise retail tariffs to sustain its financial viability.

2.4. **Institutional Arrangements**. The varying institutional arrangements in the two countries also provide a possible explanation as to why the renegotiations proceeded differently. Theoretically, institutional arrangements with stronger checks and balances impose stronger constraints on political actors, thereby restraining institutional acts of contractual abrogation. This hypothesis appears to be correlated to the institutional arrangements in both Malaysia and Thailand and their impacts on the IPP experience.

During the crisis in Thailand, the lower house of the Thai legislature was divided among 10 parties and the ruling party had been brought to power through coalition politics. This heterogeneity of partisan affiliations in the legislature ensured that any new policy proposal or change in the status quo policy required the approval of multiple parties with their own competing interests.[48] However, Malaysia had a less democratic system of government, dominated by the UMNO party. While internal divisions within the political leadership in Malaysia during the crisis generated some policy uncertainty, the then Prime Minister, Mahathir, who had been in power since 1982, had extremely strong control over the UMNO party and was able to assert his authority to push through unpopular policies and acts.

V. FUTURE PRIVATE INVESTMENT IN THE THAI ELECTRICITY MARKET.

Thailand is currently engaged in preparing for another round of bidding for IPP contracts to help meet electricity demand in the coming years. Both government and investors look back at the first round as a qualified success. The first round IPPs weathered the storm of the Asian crisis, and have begun to deliver electricity to EGAT and returns to investors, largely as planned. However, both sides are proceeding cautiously on a number of fronts.

On the government side, the concerns focus on the management of foreign exchange risk and on increasing the contribution of private power generators to renewable fuel development and general sustainable development in the country. By the time the first IPPs came online in 2000, the baht had recovered somewhat to about 38:1,. However, the Asian crisis has undeniably inflated the Baht-denominated costs of power

[46] UBS, Tenaga: Lifting ROE will be a likely challenge, August 2004.

[47] *Id.*

[48] Henisz and Zelner, *supra* note 37.

purchases from IPPs. There is considerable debate within the Thai electricity industry currently regarding how this risk can be better allocated and managed in the coming round of bids.

On the investor side, there is now substantial interest in the Thai power market, based at least in part on the positive experience of the first round of IPPs and the government's credibility as counterparty. However, substantial concerns exist as well, primarily revolving around the uncertain political economy of the electricity market, and the emergence of quasi-public electricity companies such as EGCO, Ratchaburi Electric and IPT, who may enjoy an advantage due to their combination of political connections and market strength.

The political and institutional context for private investment in electricity has shifted since the mid-1990s. In particular, Dr. Piyasvasti is no longer part of the equation. Piyasvasti, as head of NEPO from the early 1990s to the early 2000s, drove the power sector privatization efforts from within the Thai Government. He was critical to the formulation of all IPP-related policies and regulation and was instrumental in ensuring their effective implementation. The current Prime Minister Thaksin Shinawatra has emphatically backed away from the ambitious liberalization of the electricity sector espoused by his predecessor, Chuan Lekpai, and by Piyasvasti.

Second, the market context has shifted in tandem with the political winds. While in the first round of IPP tenders ECGO was barred from participating, in the upcoming round there is growing unease about potential bids by EGAT's two subsidiaries, ECGO and Ratchaburi and by PTT's subsidiary, IPT. The emergence of EGAT subsidiaries (EGCO and Ratchaburi) and of state gas company PTT and its subsidiary, IPT as players in the IPP market has been dramatic. Of the seven original IPPs, only Eastern Power and Glow Power remain independent of these two state-owned enterprises. (*See Appendix A for details on changed shareholding*).

Of particular concern in the next round is whether PTT and EGAT will be allowed to bid and/or whether EGAT will be allocated a share of available capacity on a "no-bid" basis. In the first IPP tender, neither EGAT nor its subsidiaries were allowed to bid. Today, they control almost all of the IPPs. In the case of PTT, the issue of fuel arrangements was particularly contentious and difficult to sort out. With PTT potentially participating in the bidding in the second round – either directly or through its IPT subsidiary – there may be an even more difficult situation. First, PTT may demand far more difficult terms for the IPPs than in the first round. Second, it may bid low because of its ability to manage the fuel risk better than anyone else. Third, PTT may favor its own IPP subsidiary in fuel allocations and prices once the plants are operating. If investors are not comforted that PTT (and EGAT) will be restricted from making such moves, the second round of investment may be far less convincing than the first.

Nevertheless, the market in Thailand has in many ways come full circle. In 2005, banks are again eager to lend to project companies—several projects have begun refinancing with uncovered debt, as political risk insurance is no longer required by

lenders. The Laos hydro deals are beginning to move forward again. Electricity sector reform is beginning to move forward again, albeit with a less ambitious focus—plans to float EGAT stock in public markets are anticipated within the year and attempts to establish independent regulatory authority continue. Thus, while Thailand remains an attractive host for investment, uncertainty clouds the prospects for private developers of major power plants.

VI. CASE SELECTION AND HYPOTHESES.

The primary determinants of project outcomes in Thailand are country-level factors such as the structure of the fuel markets, the method of project selection, and the 1997 macroeconomic shock. IPPs in Thailand were (originally) all partnerships between foreign and local investors, firing on natural gas as a main fuel, with similar power sales and fuel supply arrangements. Two coal-fired projects have failed in the face of public environmental opposition. A third coal-fired project (CLP's BCLP project) is only approaching commercial operations in 2006.

In light of these variations, field research in Thailand focused on illuminating the interaction and impact of factors affecting the majority natural-gas fired plants, particularly in exploring the adjustments that investors and government's made in the aftermath of the 1997 crisis. Independent Power Thailand ("Independent Power" or "IPT") is discussed in the text of the full IPP report as capturing in this experience in broad terms. IPT was the first IPP to reach agreement with Thai authorities on terms for power sales and fuel supply that became the blueprint for the IPP sector. While in-depth discussions were conducted with investors, project advisors and government officials in Thailand, in-depth case studies on particular projects were not conducted.

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APPENDIX A

Project	Original Investors	Current Investors	MW	Fuel	US$M	PPA	Finance Close	Status
BLCP	Banpu Gas Power 25%, Powergen 25%, CLA 25%, Loxley 25%	Banpu Gas Power 50% CLP 50%	2x673.25	Coal	1,285	25	Feb-03	Construction.
Gulf Power Bo Nok Khaeng Koi II	Edison Mission 40%, Siam City Cement 30%, Lana Lignite 30%	EGCO 50%, J Power 49%, Mitsui 1%	2x367	Coal	880	25	N.A.	Changed to nat'l gas; not operational
BW II	Intergen 49% Hemaraj Dev't Corp. 51%	Glow Co., Ltd. (100%)	2x365.5	Nat'l Gas	370	25	Sep-00	COD 31 Jan 2003
Eastern Power	GMS Power PLC 67% Marubeni 33%	GMS Power PLC. 32%, Marubeni 28% TOTAL 28%, China Dev't Ind. Bank 12%	350	Nat'l Gas	250	20	Mar-00	COD 25 Mar 2003
Independent Power	Thai Oil Co. 56%, Unocal 24%, Westinghouse 20%	Thai Oil Co. 55%, PTT 34%, J Power 11%	700	Nat'l Gas	369.2	25	Apr-97	COD 15 Aug 2000
Ratchaburi Tri-Energy	Banpu 50%, Texaco 40% Black & Veatch 10%	ChevronTexaco 50%, Ratchaburi Gas 50%,	700	Nat'l gas	467	20	Jul-98	COD 1 Jul 2000
Union Power ("Hin Krut")	Union Energy 51%, Tomen Corp. 34%, IVO 15%	Union Energy Co. 10%, Hong Kong Electric 25%, Toyota Tshusho 10%, Chubu Electric Co. 15%, Ratchaburi Alliances 25%, PTT Public Co. 15%	2x700	Coal	1,200	25	N.A.	Changed to nat'l gas; not operational