Following the Money Trail of Mekong Energy Industry

Mekong Energy and Ecology Network (MEE Net)
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Acronyms

ADB  
Asia Development Bank

AFD  
Agence Française de Développement

BECL  
Bangkok Expressway PCL

ECA  
Export Credit Agency

EDF  
Electricité de France

EDFI  
Electricité de France International

EDL  
Electricite du Laos

EGAT  
Electricity Generating Authority of Thailand

EGCO PCL  
Electricity Generating PCL

EIB  
Export-Import Bank of the United States

EPC Contract  
Engineering, Procurement and Construction Contract

EPDC  
Electric Power Development Co. Ltd.

EPEC  
Eastern Power and Electric Co. Ltd.

EPPO  
Energy Policy and Planning Office

EXIM  
Export-Import Bank of Thailand

GEC  
Gulf Electric PCL

GHC  
Gulf Holding Co. Ltd.

GMS  
Greater Mekong Subregion

GPG  
Gulf Power Generation Co. Ltd
1. Executive Summary

International financing of the energy industry in the Greater Mekong Subregion (GMS) has expanded rapidly after various countries adopted policies to increase energy imports. Thailand has fixed electricity purchases from neighbouring countries at no more than 25% of total energy production in the 2012-2030 Power Development Plan (PDP 2010). The Thai government has signed Memoranda of Understanding with Lao PDR, Burma/Myanmar and China to buy 7,000, 1,500 and 3,000 MW respectively. This policy has given rise to joint investments among Thai and foreign private companies and the government or state agencies of Lao PDR in 10 projects with a total value of US$ 13,570.5 million. Many more electricity production projects are undergoing consideration and feasibility studies in Lao PDR, Burma/Myanmar and Cambodia.

Investment by the Thai private sector in the energy industry in the GMS to increase the returns for the companies and shareholders by enabling Thai energy companies to increase production capacity or market share and other income, such as income from exploration and power station operation and maintenance. Construction contracting companies can earn additional income from construction contracts and/or capital gains from prices higher than investment costs or from diversifying into the energy business.

This report studies the models of financing energy projects in the GMS where private Thai companies have invested and EGAT purchases electricity from the projects. This is to create an understanding of financing mechanisms, of the benefits that Thai private companies participating in energy projects expect from their investment, of financing project development through loans from financial institutions and equity from the stock markets, and of the roles of those with an interest in projects. Data was collected from 56-1 reports listed company reports to the Stock Exchange of Thailand or the Securities and Exchange Commission, and sources of information from companies involved in each project both inside the country and overseas.

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1 56-1 forms are annual reports of listed companies which must disclose information according to criteria set by the Securities and Exchange Commission (SEC). Companies may also present annual reports (56-2) for shareholders, but 56-1 reports will contain more information.
2. Introduction

The energy industry in each Mekong country is different in terms of demand and production capacity. The large energy markets are China, Thailand and Vietnam, countries with relatively high electricity consumption and sufficient electricity production for domestic needs by buying electricity from other countries with smaller energy markets – Lao, Cambodia and Myanmar. There are also different fuels used to produce electricity. Yunnan and Guangxi provinces in China use coal and hydropower; Thailand mostly uses natural gas; Vietnam uses coal, natural gas and hydropower; Cambodia uses oil; and Lao and Burma/Myanmar use hydropower. Countries that invest relatively heavily in fuel for electricity generation are looking for energy projects with low investment costs by buying energy from other countries.

The initial motivation for energy trading among Mekong countries came from the rapidly increasing demand for energy in Thailand in 1990 coupled with economic growth in Thailand which gave rise to a search for additional energy from other countries. Memoranda of Understanding (MOUs) to promote and participate in energy development were signed with Lao PDR, Burma/Myanmar and China to buy 7,000 MW from Lao PDR by 2015, and 1,500 MW from Burma/Myanmar and 3,000 MW from China by 2017. Vietnam also signed an MOU with Lao PDR in 1998 to import 2,000 MW due to the rapid expansion of the Vietnamese economy since 1986 and a double-digit increase in electricity demand leading to a similar policy for import energy from neighbouring countries.

Motivations, other than the need for additional electricity, that support trade and investment in energy in the GMS include the search for low levels of investment in electricity generation in some countries. For example, Cambodia has a policy to import energy as a substitute for electricity generation using expensive oil. Private companies are also looking for opportunities for investment in the import and export of energy in China, Thailand and Vietnam.

Table 1 shows transnational energy trading contracts in the GMS with a total of 6,219.93 megawatts. Lao PDR and China produce and export electricity to Thailand and Vietnam, who are the big buyers. Thailand has contracts to buy 4,804 MW from Lao PDR and Vietnam has contracts to buy 572 MW from Lao PDR and 700 from China. As well as buying electricity, Thailand and Vietnam also sell 143.93 MW to Cambodia as a substitute for expensive electricity generation using diesel.
At present, Thailand is the big importer of energy from the GMS with power purchasing agreements with 7 projects installed in Lao PDR with 4,804 MW traded. 4 projects with 1,891 MW are in commercial production and 3 with 2,913 MW are in the construction phase. There are also projects in Lao PDR with 1,099 MW for which a Tariff MOU has been signed. Eventually Thailand will import from Lao PDR at least 5,903 MW not including projects still under feasibility studies.

### Table 1: Energy Projects Involving Transnational Trading in the Mekong Region

<table>
<thead>
<tr>
<th>Countries Trading Energy</th>
<th>Year Trading Started</th>
<th>Power Produced according to Agreement (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lao PDR to Thailand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theun Hinboun</td>
<td>1998</td>
<td>220.00</td>
</tr>
<tr>
<td>Houay Ho</td>
<td>1999</td>
<td>126.00</td>
</tr>
<tr>
<td>Nam Theun 2</td>
<td>2010</td>
<td>948.00</td>
</tr>
<tr>
<td>Nam Ngum 2</td>
<td>2011</td>
<td>597.00</td>
</tr>
<tr>
<td>Theun Hinboun – Expansion</td>
<td>2012</td>
<td>220.00</td>
</tr>
<tr>
<td>Hongsa Lignite</td>
<td>2015</td>
<td>1,437.00</td>
</tr>
<tr>
<td>Xayabouri</td>
<td>2019</td>
<td>1,220.00</td>
</tr>
<tr>
<td>Lao PDR to Vietnam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xekaman</td>
<td>2012</td>
<td>250.00</td>
</tr>
<tr>
<td>Xekaman 1</td>
<td>2015</td>
<td>322.00</td>
</tr>
<tr>
<td>Thailand to Cambodia</td>
<td>n.a.</td>
<td>32.68</td>
</tr>
<tr>
<td>Vietnam to Cambodia</td>
<td>n.a.</td>
<td>111.25</td>
</tr>
<tr>
<td>China to Vietnam</td>
<td>2007</td>
<td>700.00</td>
</tr>
</tbody>
</table>

Source: EGAT 2011 Annual Report
http://www.poweringprogress.org/index.php?option=com_jotloader&cid=10&Itemid=91
Report on Power Sector of the Kingdom of Cambodia
Cambodia Energy Status & Its Development. Presentation 2011
Facilitating Regional Power and Environmentally Sustainable Development of Electricity Infrastructure in the Greater Mekong Subregion, Final Report of ADB
With a total investment value of US$ 13,570.50 million and installed capacity of 6,636.80 MW, the 10 projects are looking for loans of US$ 10,195.40 million from foreign financial institutions and US$ 3,375.10 million from project owners or sponsors. The details appear in Table 2.

This report will study energy projects in the GMS which have power purchasing agreements with EGAT. Each project has a private Thai company providing part of the investment and is analyzed in terms of structure, model, investment mechanisms and principal objectives for investment so as to provide structural examples in the search for benefits from the investments of those involved in investment projects in the energy industry in the Mekong region.
Table 2: Energy Projects in the GMS where EGAT is the Purchaser

<table>
<thead>
<tr>
<th>No.</th>
<th>Project/Company Name</th>
<th>Sponsor/Investor</th>
<th>% Share of Investment</th>
<th>Installed Capacity (MW)</th>
<th>Power Purchase Agreement (MW)</th>
<th>Project Cost (US$ millions)</th>
<th>Debt/Equity</th>
<th>Total Debt (US$ millions)</th>
<th>Total Equity (US$ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Theun Hinboun Power Co. Ltd.</td>
<td>GMS Lao Co. Ltd.</td>
<td>60/20</td>
<td>240</td>
<td>220</td>
<td>240</td>
<td>54.17/45.83</td>
<td>130</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electricité du Laos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nordic Hydropower AB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Houay Ho Power Co. Ltd.</td>
<td>Houay Ho Thai Co. Ltd.</td>
<td>55/20</td>
<td>152</td>
<td>126</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Glow Energy Co. Ltd.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electricité du Laos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Nam Theun 2 Power Co. Ltd.</td>
<td>Electricité de France International (EDFI)</td>
<td>35/25</td>
<td>1,086.8</td>
<td>948</td>
<td>1,581.50</td>
<td>71.55/28.45</td>
<td>1,131.50</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EGCO PCL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lao Holding State Enterprise (LHSE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Nam Ngum 2 Power Co. Ltd.</td>
<td>SouthEast Asia Energy Co. Ltd. (SEAN)</td>
<td>75/25</td>
<td>615</td>
<td>597</td>
<td>1,000</td>
<td>71.50/28.50</td>
<td>715</td>
<td>285</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electricité du Laos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sub Total 2,093.80 1,891 2,821.50 1,976.50 845.00

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2 See detailed investment structure of each project in Appendix 1.
3 100% of shares held by GMS Power PCL, a subsidiary of MDX PCL which holds 52.01% of the shares of GMS Power PCL.
4 49% of the shares of Houay Ho Thai Co. Ltd. are held by Glow Energy PCL and 51% by Hemaraj Land and Development PCL.
5 EGAT holds 24.41% as an EGAT joint venture.
6 33.33% of shares held by Ratchaburi Holding PCL, 54.67% by CK Power Co. Ltd., 5.33% by Chalaphak Development Co. Ltd., 1.33% by TEAM Consulting Engineering and Management Co., Ltd., and the remainder in the name of Mr Nopadol. (See further details in Appendix 1)
<table>
<thead>
<tr>
<th>No.</th>
<th>Project/Company Name</th>
<th>Sponsor/Investor</th>
<th>% Share of Investment</th>
<th>Installed Capacity (MW)</th>
<th>Power Purchase Agreement (MW)</th>
<th>Project Cost (US$ millions)</th>
<th>Debt/Equity</th>
<th>Total Debt (US$ millions)</th>
<th>Total Equity (US$ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>Hongsa Power Co. Ltd.</td>
<td>Ratchaburi Electricity Generating Holding PCL(^7) Banpu PCL LHSE</td>
<td>40 40 20</td>
<td>1,878</td>
<td>1,473</td>
<td>3,710</td>
<td>75 : 25</td>
<td>2,783</td>
<td>927</td>
</tr>
<tr>
<td></td>
<td>Phu Fai Mining Co. Ltd</td>
<td>Ratchaburi Electricity Generating Holding PCL Banpu PCL LHSE</td>
<td>37.5 37.5 25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Xayabouri Power Co. Ltd.</td>
<td>Ratchaburi Electricity Generating Holding PCL PTT PCL(^8) Ch Karnchang PCL BECL PCL P.T. Construction &amp; Irrigation Co. Ltd.</td>
<td>12.50 25 50 7.50 5</td>
<td>1,285</td>
<td>1,220</td>
<td>3,667</td>
<td>78.18 : 21.82</td>
<td>2,867</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td><strong>Sub Total</strong></td>
<td></td>
<td></td>
<td><strong>3,423.00</strong></td>
<td><strong>2,913.00</strong></td>
<td><strong>8,097</strong></td>
<td></td>
<td><strong>6,362.50</strong></td>
<td><strong>1,734.50</strong></td>
</tr>
</tbody>
</table>

\(^7\) 45% of shares held by EGAT as an EGAT subsidiary.

\(^8\) PTT holds shares through Natee Synergy Co. Ltd., a subsidiary of PPT International Co. Ltd. with 100% of shares held by PTT
### Project with Tariff MOU Signed with EGAT

<table>
<thead>
<tr>
<th>No.</th>
<th>Project/Company Name</th>
<th>Sponsor/Investor</th>
<th>% Share of Investment</th>
<th>Installed Capacity (MW)</th>
<th>Power Purchase Agreement (MW)</th>
<th>Project Cost (US$ millions)</th>
<th>Debt/Equity</th>
<th>Total Debt (US$ millions)</th>
<th>Total Equity (US$ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sub Total</td>
<td></td>
<td></td>
<td>1,120.00 1,099.00</td>
<td>2,652.00</td>
<td>1,856.40</td>
<td>795.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grand Total</td>
<td></td>
<td></td>
<td>6,636.80 5,903.00</td>
<td>13,570.50</td>
<td>10,195.40</td>
<td>3,375.10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: The Nam Ngum 3 Power Project has received credit approval from the ADB for US$ 350 m and is in the process of securing the remaining funds. The Xe Pian - Xe Namnoy Power Project has set up a special legal entity in Lao with a registered capital of US$ 50 m.

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9 A subsidiary of EGAT through a 99.99% share-holding
In addition to the projects above, there are also projects in the process of securing financing and negotiating PPA with EGAT.

**Table 3: Energy Projects in the GMS in the Process of Securing Financing**

<table>
<thead>
<tr>
<th>No.</th>
<th>Project/Company Name</th>
<th>Sponsor/Investor</th>
<th>% Share of Investment</th>
<th>Installed Capacity (MW)</th>
<th>Power Purchase Agreement (MW)</th>
<th>Project Cost (US$ millions)</th>
<th>Debt/Equity</th>
<th>Total Debt (US$ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>KK Power Co. Ltd</td>
<td>Mr Ly Yong Pat Ratchaburi Electricity Generating Holding PCL</td>
<td>50 50</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>11</td>
<td>Dawei Project 1</td>
<td>Italian-Thai Development PCL</td>
<td>100</td>
<td>4,000</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

- KK Power Co. Ltd. is registered in Cambodia and has received the rights from the Cambodian government to develop and operate electricity power station projects Cambodia.
- Italian-Thai Development PCL has signed a Memorandum of Understanding with – MOU) with Ratchaburi Holding PCL for joint studies of a 400 MW and 2 X 1,800 MW coal-fired power projects on 14 November 2011. (Source: Italian-Thai Development PCL declaration to the Stock Exchange)

The general structure of financing for the energy industry shown in Figure 1 begins with the project sponsors arranging a feasibility study of a project in a country where it is thought there are fuel resources for electricity generation, and proceeding to obtain a concession or permit of some kind from the country where the project is situated (host country). This depends on the laws governing the energy business in each country. Power purchasers are identified for the project. Most purchase agreements are between countries in the Mekong Region, with a small within the host country.

Project sponsors will set up a Special Purpose Vehicle (SPV) for each project, which has a separate legal status from the companies sponsoring the project. The SPV is the signatory on contracts, including loan contracts, power purchase agreements, concessions, land use rights, fuel contracts, and power station construction contracts, enabling the project to conduct electricity generation and distribution.
Project sponsors will also look for capital from international institutions or financial institutions in their own country. Financial sponsors will release a syndicate loan to set up the SPV for the project, known as project finance, in the form of non-recourse debt where the SPV signs the loan agreement. The financial institution providing the loan cannot have recourse to the project sponsoring companies to take responsibility for the loan to the SPV or project if the project defaults on the debt or interest payments, because the SPV has a separate legal status from the project sponsoring companies. This loan is not part of the financial accounts of the project sponsoring companies. If a loan payment is missed, the institution will seize assets of the energy project to offset the outstanding payment. This means there is no impact on the financial status of the project sponsoring companies.

Energy projects in the Mekong region, such as the Nam Theun 2 power purchase agreement between Lao PDR and Thailand or the Xekaman 3 agreement between Lao PDR and Vietnam, can be seen to have the same characteristics as energy projects in general.

**Figure 2: Investment Structure of the Xekaman 3 Project**
The major players in power trading between Lao PDR and Thailand are:

**Key Power Buyer:** EGAT buys electricity from projects in Lao PDR (host country) by buying almost all the installed capacity. The small remainder is distributed inside Lao PDR.

**Key Financers:** The ADB and other International Financial Institutions have provided non-resource debt to project sponsors. Thai commercial banks also provide syndicate loans to energy projects in the GMS where many project sponsors are Thai companies.

**Key Sponsors:** Thai energy companies and/or Thai private companies make joint investments with transnational energy companies from outside the Mekong region. The Thai companies include Ratchaburi Holding PCL and EGCO. These are subsidiaries and joint ventures of EGAT, Glow Power PCL, Banpu PCL, PTT PCL, MDX PCL and EGAT International Co. Ltd., a company in the EGAT group. There are also construction contractors such as Ch Karnchang PCL and Italian-Thai PCL which can share production output in proportion to direct and indirect investment.
Ten energy projects in the GMS (Lao PDR) sell electricity to EGAT with a total installed capacity of 6,636.80 MW. Project sponsors investing in these projects can be divided...
into 3 groups: Thai private companies with a 64.25% share of installed capacity, or 4,263.93 MW; Lao PDR with 21.08% or 1,398.75 MW; and transnational private companies from outside the GMS with 14.67% or 974.12 MW. Ratchaburi Holding PCL has the largest share with 16.76% of the total installed capacity of the 10 projects.

Figure 6: Share of Installed Capacity of Thai Private Companies

Ratchaburi Holding PCL has the biggest share among Thai companies with 1,112.43 MW or 26.09% of total installed capacity, followed by Ch Karnchang PCL with 834.70 MW (19.58%) and Banpu PCL with 751.20 MW (17.62%). These 3 companies are supporting 2 large power plants under construction and development – Hongsa Power and Xayabouri Power – which together have an installed capacity of 3,163 MW.
Table 4: Investors in Energy Projects in the GMS

<table>
<thead>
<tr>
<th>Company</th>
<th>Direct Investment</th>
<th>Indirect Investment</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratchaburi Holding</td>
<td>958.70</td>
<td>153.73</td>
<td>1,112.43</td>
<td>16.76%</td>
</tr>
<tr>
<td>Lao Holding State Enterprise</td>
<td>914.60</td>
<td></td>
<td>914.60</td>
<td>13.78%</td>
</tr>
<tr>
<td>Ch Karnchang</td>
<td>738.88</td>
<td>95.82</td>
<td>834.70</td>
<td>12.58%</td>
</tr>
<tr>
<td>Banpu</td>
<td>751.20</td>
<td></td>
<td>751.20</td>
<td>11.32%</td>
</tr>
<tr>
<td>EGCO</td>
<td>541.01</td>
<td></td>
<td>541.01</td>
<td>8.15%</td>
</tr>
<tr>
<td>EDL</td>
<td>484.15</td>
<td></td>
<td>484.15</td>
<td>7.29%</td>
</tr>
<tr>
<td>EDFI</td>
<td>434.72</td>
<td></td>
<td>434.72</td>
<td>6.55%</td>
</tr>
<tr>
<td>PTT</td>
<td>321.25</td>
<td></td>
<td>321.25</td>
<td>4.84%</td>
</tr>
<tr>
<td>GMS Power</td>
<td>218.80</td>
<td></td>
<td>218.80</td>
<td>3.30%</td>
</tr>
<tr>
<td>Kansai Electric Power</td>
<td>130.50</td>
<td></td>
<td>130.50</td>
<td>1.97%</td>
</tr>
<tr>
<td>Marubeni Corporation</td>
<td>110.00</td>
<td></td>
<td>110.00</td>
<td>1.66%</td>
</tr>
<tr>
<td>Glow Energy</td>
<td>83.60</td>
<td>18.62</td>
<td>102.22</td>
<td>1.54%</td>
</tr>
<tr>
<td>SK Engineering</td>
<td>101.40</td>
<td></td>
<td>101.40</td>
<td>1.53%</td>
</tr>
<tr>
<td>Nordic Hydropower AB</td>
<td>100.00</td>
<td></td>
<td>100.00</td>
<td>1.51%</td>
</tr>
<tr>
<td>Korea Western Power</td>
<td>97.50</td>
<td></td>
<td>97.50</td>
<td>1.47%</td>
</tr>
<tr>
<td>PT Construction</td>
<td>88.83</td>
<td></td>
<td>88.83</td>
<td>1.34%</td>
</tr>
<tr>
<td>EGAT International</td>
<td>87.00</td>
<td></td>
<td>87.00</td>
<td>1.31%</td>
</tr>
<tr>
<td>BECL</td>
<td>-</td>
<td>75.65</td>
<td>75.65</td>
<td>1.14%</td>
</tr>
<tr>
<td>TTW</td>
<td>75.65</td>
<td>75.65</td>
<td>75.65</td>
<td>1.14%</td>
</tr>
<tr>
<td>Shalapak</td>
<td>24.58</td>
<td></td>
<td>24.58</td>
<td>0.37%</td>
</tr>
<tr>
<td>Hemaraj Land and Development</td>
<td>19.38</td>
<td></td>
<td>19.38</td>
<td>0.29%</td>
</tr>
<tr>
<td>Team Consulting</td>
<td>6.13</td>
<td></td>
<td>6.13</td>
<td>0.09%</td>
</tr>
<tr>
<td>Bangpa-In Land Development</td>
<td>5.04</td>
<td></td>
<td>5.04</td>
<td>0.08%</td>
</tr>
<tr>
<td>Nopadol</td>
<td>0.05</td>
<td></td>
<td>0.05</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Total Installed Capacity     | 6,192.90          | 443.90              | 6,636.80 | 100.00%|

11 Direct investment means that the company itself invests directly in the project as initial share-holder
12 Indirect investment means that the company invests through a subsidiary or joint venture which invests in the project. The company will hold shares at a higher level than the initial shares.
Summary Investment in energy projects in the GMS is shared by private companies from the same country buying the electricity, agencies of the host government and foreign private companies from outside the GMS.

EGAT is the main buyer of electricity from energy projects in Lao PDR. These projects have Thai private energy or construction companies as the main investors with further investment from foreign companies or Lao government agencies in many hydropower or large coal-fired power plants.
4. Financing

4.1 Sources of Finance

Energy projects seek financing for project development through long term bank loans for 70% of the investment and equity or ownership shares for 30% (Debt: Equity = 70:30). This is invested in assets to conduct business both at the power station and the company office.

4.1.1 Loans

Energy projects generally are financed in the form of project finance from domestic and international financial institutions, both multilateral and bilateral, or commercial banks, covering 70-85% of project value. Loans for project financing have limited debt liability in specially created legal entities, Special Purpose Vehicles (SPVs). If there is a problem is repaying debt, commercial banks have no recourse (non-recourse debt) against the companies supporting the project for them to pay off the debt.

When considering loans for project finance, financial institutions will look to see whether the cash flow from operations or income from project assets are sufficient to pay interest and principal and keep a reserve for servicing the debt of lenders. Financial institutions will consider the financial viability of the project as a project and not the financial status of those supporting the project. Most of the investment sought is used during the construction phase of the electricity plant, which comes from financial institutions. During this construction phase, the project will pay only interest on the loan. The principal will be repaid only when the project has begun commercial operations.

Energy projects can also obtain loans from the bond market by offering debentures for sale to general investors with a maturity of 5-10 years. The interest rate is linked with the creditworthiness of the company. If the creditworthiness is high, the interest rate is low. But of the creditworthiness is low with a relatively high risk of default on the debt, the interest rate is high to compensate for the risk.

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13 See Sections 3 and 4.1.2 for an explanation of SPVs and non-recourse debt.
4.1.2 Equity

Investment by owners or project sponsors is small at 30% or less of total investment. Debt to the project needs not appear in the accounts of the project sponsoring companies because banks provide project financing in the form of non-recourse debt to the SPV which signs the loan agreement. Financial institutions which provide the loan cannot claim against the project sponsoring companies for the debts of the SPV or project if the project defaults on the loan or interest because the legal status of the SPV is separate from the project sponsoring companies (as explained in Sections 3). Banks can however add conditions to reduce the risk of default by having the project sponsoring companies provide loan guarantees to the project, which are agreed in some cases.

When a project has begin commercial operations, the project sponsors still receive regular dividends from the surplus cash flow after capital repayment and interest to the financial institutions. This has attracted many project sponsors to invest in energy projects. The rate of return on investment in energy projects makes it worthwhile. Most energy projects in developing countries have rates of return to shareholders of 14% or higher (source: Tira Foran PhD, Timothy Wong MSc and Shawn Kelley MA 2010)

Project sponsors can obtain financing as project developers from the following sources.

- Company Equity

Most companies that have large accumulated profits or surplus cash will invest directly in new projects in order to create returns for the company or shareholders. But if a company does not have enough profits or surplus cash, it can borrow from financial institutions and use the loan to invest in projects. This will increase the debt:equity ratio of the project sponsoring company but not affect the debt:equity ratio of the project or the SPV that has been created since the loans obtained by the project sponsors become equity investments in the project. Project sponsors will normally set up SPVs with a separate legal status. If the project sponsors do not hold 50% of the shares in the SPV, the SPV is deemed to be a joint venture. The accounts of the project sponsoring companies will report assets and liabilities and revenue and expenditure only with respect to their share of the investment in the joint venture.
Raising Funds on the Stock Exchange

At present, energy projects raise funds through Initial Public Offerings (IPO) in shares, debentures or other forms of bonds, on the stock exchange in the case of share offerings and on the bond market in the case of bonds. If a project sponsoring company is listed on the stock exchange, it can offer stocks in different ways, such as additional ordinary shares, debentures or warrants offered to general investors (Public Offering) or it can offer private placements to institutional investors.

4.2 Role of International Financial Institutions in the Mekong Region

Multilateral and bilateral International Finance Institutions (IFIs) provide basic financial support to develop power projects in the GMS through direct loans to projects or syndicate loans with other financial institutions to the value of 70-80% of project investment. Apart from project loans, they also provide financial assistance as investors in project sponsors where these are governments or government agencies in the host country in the form of government loans or grants.

Electricity generation projects in the GMS have risk management through partial risk guarantees by financial institutions to guarantee part of the credit if the borrower defaults as a result of project operating risks such as fuel supply and demand shocks. There is also a Political Risk Guarantee in the case of war, revolution and civil disturbance to protect against losses from the destruction of assets and obstruction of business as a result of military action or civil disturbance in the country.

Benefits of Risk Guarantees

- Lower interest rates on loans
- Longer repayment periods
- Guarantees can help obtain financing or facilitate borrowing
- Reduced financial capital because low interest rates and longer repayment periods reduce the investment cost per unit of production.
Energy projects in the GMS also seek loans from Export Credit Agencies (ECA). These institutions have lower interest rates than commercial banks. Most are from the same country as the major project sponsors.

4.2.1 Key Factors for Success in Development Project Financing

This study found that major project sponsors who are companies from outside the GMS, have an advantage in easier financing. They can obtain financing from financial institutions in their own countries. This is seen from the following examples of successful financing.

The Theun Hinboun Project has support from Norway through Nordic Hydropower AB which is a subsidiary of the Norwegian public utility and was able to arrange financing for the project and investment for the Lao government from the Nordic Investment Bank. The Lao government, a shareholder in Electricité du Laos, also received a financial grant of US$ 7.1 million from NORAD, the Norwegian Agency for Development Cooperation, a directorate under the Norwegian Ministry of Foreign Affairs.
Figure 7: Theun-Hinboun Power Co Ltd Project Structure

The Nam Theun 2 Project has a French sponsor in Électricité de France International (EDFI). The project was able to obtain financing from the ECAs Coface (France), EKN (Sweden) and GIEK (Norway). The Lao state enterprise also received financial support for project development in the form of a grant from the Agencie Française de Développement (AFD).

Loan Details
- US$ 64.80 m in loans from commercial banks
- US$ 58.60 m in loans from Export Credit Agencies
- 50:50 US$:Baht blend of US$ loans from ECAs and Multilateral Finance Institutions

Details on 2002 Refinancing US$ 152 m Loan

Baht 3,000 million loans from Thai commercial banks (Bangkok Bank; CIMB; Siam Commercial Bank; Siam City Bank; Bank of Ayudhya; TMB; Thanachart Bank) with a 10 year term and with an interest rate of 8% p.a. for the first 3 years and then a floating interest rate of the minimum lending rate plus 1.25%.

Loan from the Export-Import Bank of Thailand of US$ 30 million over 10 years with an interest rate of LIBOR plus 2.375%.

Subordinated loan of US$ 42.7 million from the Asian Mezzanine Infrastructure Fund.
The Gulf JP NS Project is a large-scale private power producer in Thailand with its main sponsor being the J-Power Group, a Japanese power company holding 90% of shares in the large-scale power producer in Thailand. The Project received US$ 272 m in financial support from the Japan Bank for International Cooperation (JBIC) and financing from Mizuho Corporate Bank, which has a policy of financial support to Japanese private companies investing abroad.

Further details of the share-holding structure are in Appendix 1, Power Projects of Large-Scale Thai Private Power Producers.

Source: http://www2.adb.org/projects/project.asp?id=37734
EDF Presentation
4.2.2 Principal Project Lenders

Role of Multinational Financial Institutions

- The Asian Development Bank (ADB) supports projects directly through loans and gives support to governments/government agencies setting up projects in the form of loans or grants/technical assistance funding. The ADB allocates funds of different kinds.
  - Ordinary Capital Resources (OCR)
  - Asian Development Fund (ADF)
  - Technical Assistance Special Fund (TASF)
  - Japan Special Fund (JSF)


The International Development Association (IDA) and Multilateral Investment Guarantee Agency (MIGA) of the World Bank Group each provided Political Risk Guarantees of US$ 42 m to the Nam Theun 2 Project.

**Bilateral Financial Institutions**

- Agence Française de Développement (AFD). PROPARCO is an agency of the AFD which arranges credit for the French private sector in three main areas (banking; industry and service; and public utilities) for operations in Thailand, Vietnam, Cambodia, Lao PDR and Indonesia.
- Nordic Investment Bank from the Nordic group of countries (Denmark, Finland, Iceland, Norway and Sweden)
- Japan Bank for International Cooperation (JBIC) provides financial support to large-scale electricity producers in Thailand.

**Commercial Banks and Financial Institutions**

- Foreign commercial banks: Mizuho, Fortis, ING Group, ANZ, Citigroup
- Thai commercial banks which have given major loans to energy projects in the GMS, especially to power projects in Lao PDR, are Bangkok Bank PCL, Krung Thai Bank PCL, Kasikornbank PCL, Siam Commercial Bank PCL, TMB Bank PCL, Thanachart Bank PCL, Bank of Ayudhya PCL where the GE Group are large shareholders, the Government Savings Bank and CIMB Thai PCL (formerly Bank Thai PCL)

**Exports Credit Agencies**

- Coface (France)
- Export-Import Bank of Thailand
4.3 Role of Thai Commercial Banks in the Greater Mekong Subregion

In the initial period of power projects in Lao PDR, financing was sourced from international financial institutions. Thai commercial banks together provided credit in US dollars and Thai baht at a ratio of 50:50. This is seen in the Nam Theun 2 projects where 9 Thai commercial banks together gave loans amounting to US$ 631.5 m. Later power projects all took loans from Thai commercial banks.

Table 5: Credit Provided by Thai Banks to Energy Projects in the GMS

<table>
<thead>
<tr>
<th>Bank</th>
<th>Thuen-Hinboun</th>
<th>Nam Thuen 2</th>
<th>Nam Ngum 2</th>
<th>Thuen-Hinboun Extension</th>
<th>Hongsa Power</th>
<th>Xayabori</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank of Ayudhya</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Bangkok Bank</td>
<td>×</td>
<td>×</td>
<td></td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>4</td>
</tr>
<tr>
<td>CIMB Thai</td>
<td>×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Kasikornbank</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Krung Thai Bank</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Siam Commercial Bank</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Thanachart Bank</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>TMB Bank</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Export-Import Bank</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Government Savings Bank</td>
<td></td>
<td></td>
<td>×</td>
<td>×</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Total (US$ m)</strong></td>
<td><strong>79.30</strong></td>
<td><strong>631.50</strong></td>
<td><strong>705.00</strong></td>
<td><strong>464.28</strong></td>
<td><strong>3,003.00</strong></td>
<td><strong>2,867.00</strong></td>
<td><strong>7,750.08</strong></td>
</tr>
</tbody>
</table>

Notes: CIMB Thai bought Bank Thai PCL. Thanachart Bank bought Siam City Bank PCL.

The current value of Thai commercial bank support for energy projects in Lao PDR is approximately US$ 7,750.08 m. Many more projects are under consideration.

Remarks: In the Hongsa Power Plant project, the Krung Thai Bank and the Government Savings Bank, which are Thai state enterprise banks, have considered providing credit to the Lao government to be used as investment in Lao state enterprises. The investment the Hongsa Power Plant project totals US$ 220 m (US$ 150 m from the Krung Thai Bank and US$ 70 m from the Government Savings Bank)

15 These projects are the Nam Ngum 2, Theun-Hinboun Extension, Xayabori hydropower projects and the Hongsa lignite power plant.
with a loan contract over 17.5 years, a grace period on repayment of principal of 6 years and an interest rate of 1.5% per year. (Source: Financial Performance and Projection of LHSE by ADB and information presented by Lao State Enterprises)

**Summary:** In the initial period, loans were provided by both foreign financial institutions and Thai commercial banks for energy projects in Lao PDR. Nam Theun 2 had a financial structure that included risk protection through political risk guarantees by financial institutions in the World Bank group and many international financial institutions providing substantial loans together with many Thai commercial banks which were interested in providing credit to energy projects in Lao PDR where Thai private companies invested. These banks had experience in managing and protecting against risk in the Nam Theun 2 projects and were confident of the cash flow from energy projects, which guaranteed the ability to repay loans to the banks.
5 Investment Model

Energy projects in the GSM are joint investments between energy companies within and outside the GSM, collectively known as projects sponsors.

5.1 Project Sponsors

Most companies in the energy industry are registered on the Stock Exchange and manage the projects of groups of companies in the form of a holding company. This is a company which conducts little or no business but which has the major function of holding shares in other companies whose basic business is the production and distribution of electricity and/or other related forms of business. The main income of holding companies comes from dividends from investments the company has made in subsidiaries and of profit/loss balance in investments in associated companies. The purpose of setting up holding company structure is to make it easier for subsidiaries or associated companies to procure financing in the form of project loans. New projects can be developed without any impact on a former project and a holding company can be used as a means and for the benefit of cross-holding shares within and outside company groups.

Project sponsors will invest equity in Special Purpose Vehicles which are set up to engage in the business of producing and distributing electricity. An SPV is a subsidiary if a sponsor holds 50-100% of its shares or a joint venture if a sponsor holds 20-50%. The sponsor assumes the profit/loss in proportion to its shareholding without any of this debt appearing in company accounts.
Figure 10: Structure of Large-Scale Private Power Producers in Thailand
J-Power, a company listed on the Tokyo Stock Exchange, has set up a subsidiary, Electric Power Development Co. Ltd. (EPDC), for joint investment (49%) in Gulf Electric PCL (GEC), which has the structure characteristic of a holding company, together with EGCO PCL (50%) and Mit-Power (Thailand) Co. Ltd. (1%). A SPV, Gulf Power Generation Co. Ltd. (GPG), was set up to invest in an independent power producer in Thailand with an installed capacity of 1,510 MW and in other companies in the electricity generation industry.

In addition, J-Power also set up a subsidiary holding company registered in Thailand, J-Power Holdings (Thailand) Co. Ltd. (JPHT), which, in a joint investment with Gulf Holding Co. Ltd. (GHC), set up an SPV called Gulf JP Co. Ltd., with 90% of shares held by JPHT and 10% by GHC. Gulf JP Co. Ltd. has the structure of a holding company with the purpose of investing in 2 independent power producers in Thailand, namely Gulf JP UT Co. Ltd. and Gulf JP NS Co. Ltd., each with 1600 MW installed capacity.

It can be seen that all 3 independent power production projects (Gulf Power Generation, Gulf JP UT and Gulf JP NS) have J-Power as a major shareholder and shared company board members.\(^ \text{16} \) The companies in Figure 10 are shown to be connected.

\(^ \text{16} \) See further details on the names of board members in Appendix 1
According to the business code of conduct that is applied in most cases, sharing figures and interconnection between businesses can create an opportunity for the use of internal information which may then assist in obtaining permits to operate as independent power producer business in various projects.

**Figure 11: Structure of Nam Ngum 2 Hydropower Project in Lao PDR**

South East Asia Energy Co. Ltd. (SEAN) is a holding company created by joint investment between Ratchaburi Holding PCL, CK Power, PT Construction, Shalapak Development, Team Consulting and Mr Nopadol Intralib. SEAN invested jointly with Electricite du Laos, in the ratio of 75:25, in a subsidiary, Nam Ngum 2 Power Co. Ltd. to serve as the recipient of an electricity generation concession in Lao PDR and distribute electricity to EGAT.

### 5.2 Joint Investment Mechanisms in Energy Projects in the Mekong Region

#### 5.2.1 Project Development Phase

The first phase of project development is mostly done by a large public infrastructure construction contractor from Thailand with experience in taking on

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17 See further details in the case study in Section 5.2
projects on the basis of Build-Transfer-Operate (BTO), Build-Operate-Transfer (BOT), Build-Own-Operate (BOO) or Acquire-Operate-Transfer (AOT). These companies will use limited investments of their own to initiate the energy project development. A location for operations is identified, an electricity generation concession or permit is requested from the host government, and a Special Purpose Vehicle is established and registered. During this period the project has no income but only expenses in initiating project development and conducting a feasibility study.

When project development is assured at a certain level, project developers will seek strategic partners, most of whom are energy companies, by selling ordinary shares in the Special Purpose Vehicle set up with other investors. They will also seek a buyer for the electricity who has links to the investing energy companies. This can be seen from EGAT which buys electricity from Lao PDR and is the majority shareholder in Ratchaburi Holding PCL and EGCO PCL. Both companies support many energy projects in the GSM where they jointly invest.

5.2.2 Construction Phase

In the construction phase, the project still has no income from operations. It has only expenses in construction and machinery to be used in the power plant and office, while project sponsors who are contractors will have income and profit from the company or its subsidiaries being hired for project construction.

**Nam Theun 2 Project:** Electricité de France (EDF) was the main contractor in the Nam Theun 2 Project and hired subcontractors for civil engineering work, transmission work and electrical machinery. It is linked to Electricité de France International (EDFI), a project sponsor and a subsidiary of EDF. (Source: WEC International Forum on The Grand Inga Project of EDF)
**Nam Ngum 2 Project:** CH Karnchang (Lao) Co. Ltd., a subsidiary of CH Karnchang PCL, is the contractor for construction of the Nam Ngum 2 hydropower project worth Baht 22,472 m. (Source: 2011 Annual Report of CH Karnchang PCL)

**Xayabouri Project:** CH Karnchang (Lao) Co. Ltd., a subsidiary of CH Karnchang PCL, has the Engineering, Procurement and Construction Contract for the Xayabouri Power Project (EPC) to construct the Xayabouri hydropower project with a value of Baht 51,824.64 m and US$ 711.04 m. (Source: Stock market announcement of CH Karnchang PCL, 17 April 2012 [http://www.set.or.th/set/companynews.do?symbol=CK&currentpage=1&language=th&country=TH](http://www.set.or.th/set/companynews.do?symbol=CK&currentpage=1&language=th&country=TH))
5.2.3 Operations Phase

Projects will have income from electricity distribution and expenses in the form of fuel used in electricity generation and maintenance costs. Project sponsors who are energy companies or their subsidiaries will have income from supplying fuel and conducting maintenance of power plants. They will also receive dividends from the project as shareholders. Project sponsors who are construction companies will reduce their shareholdings in the project by selling their shares to other investors whose main business is energy or to new investors interested in the energy business, at a price that takes into account the differences from past risk and future income from the project. Companies selling shares will receive cash, which is used to invest in further projects.

**Nam Ngum 2 Project:** RATCH-Lao Services Co. Ltd., a subsidiary of Ratchaburi Electricity Generating Holding PCL, has a 27-year Operating and Maintenance contract for the power station with Nam Ngum 2 Electricity Co. Ltd. to operate and maintain machinery and the dam and also to maintain buildings and management services. The service fee during the operational phase (1 November 2010 to the expiry date of the concession) is calculated at Baht 115 m per year with 3% annual increases (initial value of approximately Baht 3,200 m). RATCH-Lao Services Co. Ltd. has an Operating and Maintenance subcontract for Nam Ngum 2 hydropower plant with EGAT. The service fee during the operational phase
(1 November 2010 to the expiry date of the concession) is calculated at Baht 71.04 m per year with 3% annual increases (initial value of approximately Baht 2,000 m). Ratchaburi Electricity Generating Holding PCL explains that since RATCH-Lao Services Co. Ltd. does not have personnel to work in this field while EGAT does have personnel with the specialized skills. (Source: Ratchaburi Electricity Generating Holding PCL 2011 Annual Report: Related Activities Report and Note on Financial Statement)

The details are the Operating and Maintenance contract between Nam Ngum 2 Electricity Co. Ltd. RATCH-Lao Services Co. Ltd. and RATCH-Lao Services Co. Ltd. and the sub-contract between RATCH-Lao Services Co. Ltd. and EGAT are not publicly available. If they cover the same responsibilities, then the questions arise:

(1) Why did Nam Ngum 2 Electricity Co. Ltd. make a contract with a company which lacked the required skilled personnel (RATCH-Lao Services Co.) when a properly qualified contractor (EGAT) was available?

(2) Why was RATCH-Lao Services Co. allowed to make a windfall profit of 37.5% on the difference between the value of its contract with Nam Ngum 2 Electricity Co. Ltd. and that of its sub-contract with EGAT?
**Figure 14: Structure of Nam Ngum 2 Electricity Co. Ltd. Project**

Electricité du Laos – 25%

Soth East Asia Energy Co. Ltd. (SEAN) 75%

**SEAN Shareholders**
- Ratchaburi Holding 33.33%
- CK Power 54.67%
- PT Construction 5.33%
- Shalapak Development 5.33%
- Team Consulting 1.33%
- Noppadol Intrathik 0.01%

**EPC Contract**
CH Karnchang (Lao)

**Plant Operating and Maintenance Agreement**
RATCH-Lao Services Co. Ltd.
Approximate Value Baht 3,200 m

**Plant Operating and Maintenance Subcontract**
with EGAT. Approximate Value Baht 2,000 m

**Loan details**
- Tranche 1: Baht 15,003 m
- Tranche 2: US$ 180 m
- Tranche 3: US$ 25 m Bank Guarantee Facility

**Notes**: CH Karnchang PCL and BECL sold all shares to CK Power, a related company.
Exchange rate Baht 30 = US$ 1
Source: Ratchaburi Holding PCL 2011 Annual

**Hongsa Lignite Project**: EGAT has a Baht 16,850 m Operating and Maintenance contract for Hongsa Power Plant with Hongsa Power Co. Ltd.
(Source: Ratchaburi Holding PCL 2011 Annual Report)
Summary  In all phases of project development, project sponsors have other income, such as construction contracts and Operating and Maintenance fees, in addition to dividends from investments, by having subsidiaries take contracts in different operations. This may include electricity purchasers who receive dividends as major shareholders in the energy company and income from contract fees at different phases from their own subsidiaries or joint ventures in the project. This situation may lead to a conflict of interest in business operations between those giving out contracts and those taking them as to whether the agreed price is reasonable or not. In the case of EGAT, this may be an issue of good governance of a state enterprise agency which may have overlapping interests from being the
purchaser of electricity, from being an indirect co-investor through subsidiaries or joint ventures and from related parties transactions as Operating and Maintenance contractor or subcontractor in each project. The question of conflict of interest is dealt with in Section 8.

5.3 Joint Investment Proportions and Prices

Project sponsors will consider holding a share of investment in a project according to the project’s returns and risks (as shown in Figure 16: Investment Cycle in Energy Projects in the GMS)

- Sponsors will invest 10-25% of the registered capital of a company for a ‘green field’ project, i.e. investment from the beginning of feasibility studies until issuance of a concession, permit, etc. to produce and distribute electricity. The project still has risks in securing funding, project development, power plant construction, and operational risks. At the same time, projects of this kind must give worthwhile returns to investors. The price or value of shares is the par value of the joint venture.

\[
\text{Price} = \text{Par Value}
\]

Apart from paying a price equal to par value for their investment, investors in some projects must also pay a fee to join the project development and may have to give investment assistance to other project sponsors who have not invested enough.

**Hongsa Lignite Project:** Ratchaburi Holding PCL agreed to pay a fee of US$ 20 m to join development of the Hongsa Lignite Project with the condition of financial assistance equal to Banpu Power Co. Ltd. (a subsidiary of Banpu PCL) to Lao State Enterprises in the form of a loan to be used for expenses in management during project development until Lao State Enterprises receives dividends from the project (Source: Ratchaburi Holding PCL 2011 Annual Report, Financial Statement Notes)

**Nam Ngum 3 Project:** Ratchaburi Holding PCL and Marubeni Corporation signed an agreement to give financial support to GMS Lao Co. Ltd. (a subsidiary of MDX PCL) to be used to pay for shares in the Nam Ngum 3 hydropower project. The support was given in the form of a guarantee or surety and/or loan to GMS Lao Co. Ltd. (Source: Ratchaburi Holding PCL 2011 Annual Report, Financial Statement Notes)
• Investments are made of 25-50% of the registered capital of a ‘brown field’ project, i.e. a project with a high feasibility of development or a new project that needs to be built to replace a former project. For example, there is a power purchase agreement, the source of loans and capital is clear, appropriate technology for the power plant has been chosen, etc. However, the project still has risks in securing loans, construction according to plan and operational risks. The price or value of co-investing may equal par value or may increase by the difference in risk which the project has already managed (risk premium).

\[ \text{Price} = \text{Par Value or Value equal to Par Value plus Risk Premium} \]

• Investments of over 50% registered capital occur when projects begin commercial operations (Commercial Operation Date – COD). Companies can know the income from electricity distribution immediately on investment. Therefore the price or value of investment in projects of this type has a relatively high premium.

\[ \text{Price} = \text{Par Value plus Risk Premium and future income from the project} \]

**Figure 16: Investment Cycle in Energy Projects in the GMS**
Xayabouri Project

CH Karnchang signed a Project Development Agreement (PDA) with Lao PDR in 2008 for a feasibility study for the construction of a weir on the Mekong in Xayabouri Province. On 25 March 1990, the company set up a subsidiary for the purpose of winning concessions for electricity production and distribution from Lao PDR under the name of Xayabouri Power Co. Ltd., which registered as a juristic person under Lao PDR law with a registered capital of Baht 800 m, with 100% of shares held by CH Karnchang PCL and initially 30% paid up shares.

On 10 June 2010, the subsidiary had a registered capital of US$ 25,000,000 of which CH Karnchang PCL held 95% and PT Construction and Irrigation Co. Ltd. held 5%. A Memorandum of Understanding was signed with EGAT on 5 July 2010. The details of the MOU specify a sale of an average of 1,220 MW of electricity and a levelized tariff equal to 2.159 Baht per kWh. An EGAT resolution approved this on 12 March 2010.

On 1 March 2011, CH Karnchang PCL sold 20,000,001 shares in Xayabouri Power Co. Ltd., or 25% of the registered capital, to Natee Synergy Co. Ltd., a subsidiary of PTT International Co. Ltd. (a subsidiary of PTT PCL which holds 100% of shares) at a price of Baht 10 per share, totalling Baht 200,000,010, and sold 10,000,000 shares, or 12.5% of the registered capital, to EGCO PCL at a price of Baht 10 per share, totalling Baht 100,000,000.

Later, on 4 March 2011, CH Karnchang PCL sold shares in Xayabouri Power Co. Ltd. equal to 7.5% of the registered capital, to BECL PCL at a price of Baht 10 per share, totalling Baht 59,999,990, thereby giving the following shareholdings in Xayabouri Power Co. Ltd.:

<table>
<thead>
<tr>
<th>Shareholder</th>
<th>% Shareholding</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CH Karnchang PCL</td>
<td>50.00%</td>
</tr>
<tr>
<td>2. Natee Synergy Co. Ltd.</td>
<td>25.00%</td>
</tr>
<tr>
<td>3. EGCO PCL</td>
<td>12.50%</td>
</tr>
<tr>
<td>4. PT Construction and Irrigation Co. Ltd.</td>
<td>5.00%</td>
</tr>
<tr>
<td>5. BECL PCL</td>
<td>7.50%</td>
</tr>
</tbody>
</table>
On 17 April 2012, CH Karnchang Lao Co. Ltd., a subsidiary of CH Karnchang PCL, signed an Engineering, Procurement and Construction (EPC) Contract for the Xayabouri Power Project to construct the Xayabouri hydropower plant in Lao PDR with Xayabouri Power Co. Ltd., with an approximate value of Baht 51,824,640,000 and US$ 711,040,000 over a 96 month period. (Source: CH Karnchang PCL Stock Exchange Announcement)

**Figure 17: Xayabouri Project Investment Cycle**

- CH Karnchang PCL set up SPV Xayabouri Power Co., Ltd., holding 100% of shares.
- CH Karnchang PCL reduces shareholding to 50% by selling 7.5% of shares to BECL PCL, where CH Karnchang holds 15.15% of shares.
- CH Karnchang PCL reduces shareholding to 95% by selling 5% of shares to PT Construction Co., Ltd.
- CH Karnchang PCL reduces shareholding to 57.5% by selling 25% of shares to a subsidiary of PTT PCL and 12.5% to EGCO PCL.
6 Benefits of Investment in Energy Projects in the GMS

Thai private companies who invest in energy projects in the GMS have the aim of increasing company income and maximising returns to shareholders.

- **Thai energy companies** can increase overseas production capacity to maintain market share or increase opportunities to create business related to electricity production and distribution, such as power plant maintenance or fuel supplies for the projects where they invest. This is seen with various companies and is specified as a goal or policy of company business operations.

**Ratchaburi Holding PCL** aims to build production capacity to meet the company business plan goal of 7,800 MW by 2016. At present, the company has invested in a capacity of 5,311.78 MW (Source: Ratchaburi Holding PCL 2011 Annual Report)

**EGCO PCL** has a policy to increase investment in the electricity generation business both in Thailand and the ASEAN region by developing new projects or joining projects in operation as well as increasing investment in other projects related to fuel and renewable energy under a company investment policy which recognizes maximum returns to shareholders and acceptable risk to meet EGCO’s vision:

“To be the leading Thai integrated electric power company with comprehensive energy services in Thailand and in the ASEAN region, with full commitment to environment protection and social development support.”

From this vision, EGCO sets the following important long-term objectives:

- For the rate of increase in electricity supply to be higher than that of average demand in Thailand
- For the return on investment for shareholders to be higher than the average return on the energy industry in Thailand
- For excellence in corporate administration, good governance and corporate image

(Source: EGCO PCL 2011 Annual 56-1 Form)
PTT PCL: PTT is engaged in the energy industry in foreign countries to locate new sources of energy and sources of renewable energy in order to create national energy security. It expands existing business by relying on the knowledge, expertise and experience of individuals in expanding foreign investment by PTT investments through 100% shareholdings in both PTT International Co. Ltd. and PPT Green Energy Co. Ltd. PTT International currently has investments in coal mining in Indonesia and Australia and hydropower in Lao PDR. (Source: PTT PCL 2011 Annual 56-1 Form)

Company executives have presented information on the strategic plan and direction of operations on the PTT group, noting that the electricity generation industry is one where PTT PCL will engage more over the next 8 years (2012-2019) and will become the industry leader in the Asian region with at least 6,000 MW more capacity than at present. The PTT has approximately 1,500 MW, including projects both where PTT has funded construction and where it is a shareholder in various power plants. (Source: Than Sethakij newspaper, 23-5 February 2012)

- Construction Companies  Apart from developing projects, companies, as construction contractors for projects where they also co-invest, have income from construction contracts and from dividends from electricity sales. After a certain period of commercial operation, construction companies will sell their shareholdings to other co-investors or to new investors interested in investing in the energy business in order to recoup their investment. The companies profit from the sale of shares. (See further details in the Nam Theun 2 case study below)

Meanwhile some construction companies have a policy of diversifying their business. They have seen that the energy production industry has a secure and regular income from the sale of electricity to EGAT by setting up subsidiaries in the form of holding companies and transferring shares from the parent company for the power production business. They plan to list the subsidiaries that they have set up on the Stock Exchange to mobilize funds from the general public. (See further details in the Nam Theun 2 case study below)
6.1 Case Study of Nam Thuen 2 – Profits from Share Sales

The Nam Thuen 2 Power Co. Ltd. was established on 28 August 2002 with the shareholders comprising EGCO PCL (25%), Electricité de France International (35%), Italian-Thai PCL (15%) and Lao State Enterprises (25%) to engage in the energy production business in the Nam Theun 2 project through a concession received from Lao PDR on 2 October 2002. It signed a Power Purchase Agreement with EGAT on 8 November 2003 and began commercial operations on 30 April 2010.

After 4 months of commercial operation, Italian-Thai PCL sold its entire shareholding of 675,000 shares in Nam Theun 2 Power Co., equivalent to 15% of Nam Theun 2 Power Co. shares. 450,000 shares were sold to EGCO PCL and 225,500 to Electricité de France International. Italian-Thai PCL made a profit on the share sale of Baht 1,379.17 m, or a return on equity of approximately 62.96%. Italian-Thai PCL initially invested US$ 67.5 m and sold its shares for US$ 110 m. Nam Theun 2 Power Co. currently has the following shareholder structure (see figure 12):

- EGCO PCL – 35%, increased by 10% from the Italian-Thai PCL share sale
- EDF International – 40%, increased by 5% from the Italian-Thai PCL share sale
- Lao State Enterprises – 25%

6.2 Case Study of Nam Ngum 2 – Profits from Share Sales and Diversification into the Energy Business

A group of Thai, US and German private companies formed a Project Development Group comprising CH Karnchang PCL, Shalapak Development PCL, Siemens AG, Voith Hydro GmbH and Preussag Noell Inc. The group jointly applied for a concession for the Nam Ngum 2 hydropower production project from Lao PDR and set up Southeast Asia Energy Co. Ltd. to operate the 615 MW Nam Ngum 2 hydropower project concession. The concession was for a Build Own Operate and Transfer (BOOT) project with a term of 25 years from the beginning of commercial operation. The project will be transferred to Lao PDR at the end of the concession, although the agreement includes the right to extend the concession under mutually agreed conditions. A Power Purchase Agreement was signed with EGAT, allocating all output to EGAT, with a term of 25 years from the beginning of commercial operation.
Nam Ngum 2 Electricity Co. Ltd. was later set up under Lao law, with SEAN holding 75% of share and Electricite du Lao 25%. SEAN transferred to Nam Ngum 2 Electricity Co. Ltd. all rights to benefits and obligations under the main Nam Ngum 2 power production agreement and rights to the feasibility studies for the Nam Bak 1 and 2 hydropower projects (see figure 13).

Figure 18: Shareholding Structure before CH Karnchang PCL Group
Shareholding Restructuring

At present, SEAN has a registered capital of Baht 6,606,750,000 divided into 660,675,000 ordinary shares with a par value of Baht 10. The shareholders are identified in Figure 18.
Table 6: SEAN Board of Directors as of 23 January 2012

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Virabongsa Ramangkura</td>
<td>Chair</td>
</tr>
<tr>
<td>Mr. Plew Trivisvavet</td>
<td>Director</td>
</tr>
<tr>
<td>Mr. Narong Sangsuriya</td>
<td>Director</td>
</tr>
<tr>
<td>Mr. Kamphui Jeerararuensak</td>
<td>Director</td>
</tr>
<tr>
<td>Mr. Prasert Marittanaporn</td>
<td>Director</td>
</tr>
<tr>
<td>Mr. Noppol Milinthanggoon</td>
<td>Director</td>
</tr>
<tr>
<td>Mr. Milton William Shlapak</td>
<td>Director</td>
</tr>
<tr>
<td>Mr. Van Hoang Dau</td>
<td>Director</td>
</tr>
<tr>
<td>Mr. Supong Chayutsahakij</td>
<td>Director</td>
</tr>
<tr>
<td>Mr. Peerawat Pumthong</td>
<td>Director</td>
</tr>
</tbody>
</table>

Source: Opinions of the Independent Financial Advisor on the Sale of Ordinary Shares of SEAN proposed to the Shareholders of BECL

The original shareholders, CH Karnchang PCL and BECL PCL sold all their shareholdings to CK Power Co. Ltd., a company linked to CH Karnchang PCL and BECL PCL at a price higher than par value. The two companies made a profit on the share sale of Baht 3,766 and 1,652 respectively. (Source: Interim Financial Note of CH Karnchang PCL for the quarter and half-year ending 30 June 2011, Point 11 - Investment in Joint Ventures; and Interim Financial Note of CH Karnchang PCL for the quarter and half-year ending 30 June 2012, Point 6 - Other Long-Term Investments)
CH Karnchang had a policy of joint investment in primary utility projects, such as electricity generation, under government concessions both inside and outside the country, in order to increase opportunities for additional income and value for the company. Primary utility projects provide a secure income and can create long-term profits for the company. The policy specifies that investment in projects should have an Internal Rate of Return (IRR)\textsuperscript{18} of 10-15%. The share of joint investment is approximately 10-30% of the registered capital. It also planned to list a company on the Stock Exchange of Thailand as a holding company.


Investor Relations Section of CH Karnchang

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\textsuperscript{18} The rate of return on investment in a project as a percentage of total project investment.
To fulfil its business policy, CH Karnchang PCL set up CK Power Co. Ltd., whose main function is to hold shares in other companies with the aim of restructuring shareholdings in the energy business group, with shareholdings of CH Karnchang PCL coming under a single holding company to underpin the future expansion of the energy business. Shareholders in CK Power comprised:

<table>
<thead>
<tr>
<th>Shareholder</th>
<th>Shareholding (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CH Karnchang PCL</td>
<td>38.00</td>
</tr>
<tr>
<td>2. BECL PCL</td>
<td>30.00</td>
</tr>
<tr>
<td>3. Thai Tap Water Supply PCL</td>
<td>30.00</td>
</tr>
<tr>
<td>4. Bangpa-in Land Development Co.</td>
<td>2.00</td>
</tr>
</tbody>
</table>

Notes: Thai Tap Water Supply PCL bought 11% of ordinary shares in CK Power Co. Ltd. from CH Karnchang PCL, 12% from BECL PCL, and 7% from Bangpa-in Land Development Co., at a price equal to par value of Baht 10 per share.

CH Karnchang holds 15.15% of shares in BECLPCL and 30% of shares in Thai Tap Water Supply PCL.

BECL PCL holds 9.24% of shares in Thai Tap Water Supply PCL.

On 21 June 2010, CH Karnchang PCL sold 251,056,499 ordinary shares or 38% of the registered capital of SEAN, where it was the sole shareholder, to CK Power Co. Ltd. at a price of Baht 25, totalling Baht 6,276,412,475. CH Karnchang made a profit of Baht 3,765,847,485.

To list CK Power Co. Ltd. on the Stock Exchange, it had to meet the criterion for a holding company in that it must hold shares in its core company of at least 51% of the registered capital for investment in a basic public utility project, in accordance with Announcement ThorJor 28/2551 of the Capital Market Supervisory Board. CK Power Co. Ltd. therefore had to buy additional ordinary shares in SEAN from other shareholders so that its shareholding would meet this criterion.

On 25 April 2012, shareholders of BECL PCL passed a resolution authorizing BECL PCL to sell its entire shareholding of 110,112,500 ordinary shares in SEAN, or 16.67% of the registered capital at a price of Baht 25 per share, totalling Baht 2,752,812,500. BECL PCL made a profit on the sale of Baht 1,651,687,500.

(Source: Opinions of the Independent Financial Advisor on the Purchase of Additional Ordinary Shares of CK Power Co. proposed to the Shareholders of Thai Tap Water
These share transactions are believed to be related in that each company has an interest, since BECL PCL and Thai Tap Water Supply PCL have the same major shareholder in CH Karnchang PCL. BECL PLC also holds shares in Thai Tap Water Supply PCL and CK Power Co. Ltd.

CK Power Co.Ltd. still needed investment to pay Baht 9,029,224,975 for the SEAN ordinary shares from CH Karnchang PCL and BECL PCL by increasing its registered capital from Baht 100 m to Bahr 9,200 m. The two companies share responsibility for paying for the additional shares in proportion to their shareholdings in CK Power Co. Ltd. Calculations show that the two companies paid for the additional CK Power Co. Ltd. ordinary shares and still have a profit or cash balance from selling SEAN ordinary shares, but Thai Tap Water Supply PCL, which was not involved in the SEAN ordinary share transaction, needed to find Baht 2,760,00,000 in financing to pay for the additional shares in CK Power Co. Ltd. in line with their 30% share of the registered capital. Thai Tap Water Supply PCL acquired this financing from loans by issuing and offering for sale debentures of Baht 3,000 m to the general public to increase their investment in CK Power Co. Ltd. to maintain their shareholder rights at the same proportion. If CK Power Co. Ltd increases its investment in other projects which require project development financing and if shareholders have to maintain their share or rights to control CK Power Co. Ltd., shareholders will have to acquire additional investment in CK Power Co. Ltd. in the future.

**Summary.** The share structure in the energy industry of CH Karnchang PCL increases its financial liquidity and can procure financing for activities from the capital market and loans from financial institutions. These financial institutions will consider the financial status of CK Power Co. Ltd. which has been newly established to work in energy as its main business.
7 Electricity Generation Business in Thailand

7.1 Installed Capacity

The System Installed Capacity of Thailand as of 31 December 2011 totalled 31,446.72 MW. EGAT power plants had 14,998.13 MW capacity, or 47.69% of total capacity, and bought 12,081.69, or 38.42% of total capacity, from large-scale independent power producers (IPP), 2,182.30 MW, or 6.94% of total capacity, from small-scale power producers (SPP), and 2,184.60 MW, or 6.95% of total capacity, from foreign countries.

Figure 20: System Installed Capacity of Thailand

7.2 Electricity Generating Authority of Thailand

EGAT is state enterprise involved in energy under the control and supervision of the Ministry of Energy, whose main business is the generation and transmission of electricity to meet the energy demands of the whole country. EGAT has 39 power plants distributed around the regions of the country. The majority are combined cycle the rest being thermal, hydropower, renewable energy and diesel.
EGAT also invested in electricity generation and related businesses through companies where it holds shares.

- Ratchaburi Holding PCL is primarily an electricity generation and distribution company. EGAT holds 45% of its registered capital.

- EGCO PCL is primarily an electricity generation and distribution company. EGAT holds 25.41% of its registered capital.

- District Cooling System and Power Plant Co. Ltd. produces electricity and cold water for distribution. EGAT holds 35% of its shares, PTT PCL 35% and the Metropolitan Electricity Authority 30%.

- EGAT holds 99.99% of shares in EGAT International PCL with a policy of conducting business through direct investment or by setting up companies in the group for joint investment in power production projects in foreign countries in order to obtain electricity and export it to Thailand. At present it has joined Kansai Electric Power Co. Inc and Lao State Enterprises in developing the Nam Ngiap 1 project in Lao PDR.

- EGAT Diamond Service Co. Ltd., a joint investment by EGAT, Mitsubishi Heavy Industries, Mitsubishi Corporation and Ratchaburi Holding PCL, conducts business in the repair of Hot Gas Path parts of gas turbines.
7.3 Independent Power Producers

The state sector has a policy of supporting private business to invest in power plant projects in the form of large-scale private power producers by inviting them to propose power production projects. The aim is to promote competition in technology, sites, source of production, type of fuel and price of electricity for sale. Tenders to buy electricity from large-scale private power producers were held in 1994 and 2007. At present 11 IPP (Independent Power Producer) projects with an installed capacity of 12,508 MW sell commercially to the grid and 4 projects with an installed capacity of 4,400 MW have not yet made sales.

Table 7: Installed Capacity of Large-Scale Private Power Producers in Commercial Operation

<table>
<thead>
<tr>
<th>Power Producers</th>
<th>Capacity (MW)</th>
<th>Remaining Life of Contract (Years)</th>
<th>Amount (m Baht)</th>
<th>Availability Payment (AP) (m Baht)</th>
<th>Energy Payment (m Baht)</th>
<th>Shareholders/Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rayong Electricity Generating Co. Ltd. (REGCO)</td>
<td>1,232</td>
<td>3 yrs (2012 – 2014)</td>
<td>32,154</td>
<td>6,043</td>
<td>26,111</td>
<td>- EGCO PCL</td>
</tr>
<tr>
<td>2. Khanom Electricity Generating Co. Ltd. (KEGCO)</td>
<td>824</td>
<td>5 yrs (2012 – 2017)</td>
<td>59,057</td>
<td>7,448</td>
<td>51,609</td>
<td>- EGCO PCL</td>
</tr>
<tr>
<td>3. Tri Energy Co. Ltd. (TECO)</td>
<td>700</td>
<td>9 yrs (2012 – 2020)</td>
<td>83,037</td>
<td>7,241</td>
<td>75,796</td>
<td>- Ratchaburi Holding PCL (50%) - Chevron Texaco Corporation (50%)</td>
</tr>
</tbody>
</table>
## Following the Money Trail of Mekong Energy Industry

### Power Producers

<table>
<thead>
<tr>
<th>Power Producers</th>
<th>Capacity (MW)</th>
<th>Remaining Life of Contract (Years)</th>
<th>Amount (m Baht)</th>
<th>Availability Payment (AP) (m Baht)</th>
<th>Energy Payment (m Baht)</th>
<th>Shareholders/Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Independent Power Producer (Thailand) Co. Ltd. (IPT)</td>
<td>700</td>
<td>14 yrs (2012 – 2025)</td>
<td>143,803</td>
<td>20,408</td>
<td>123,395</td>
<td>- Thai Oil PCL (24%) &lt;br&gt; - PTT PCL (20%) &lt;br&gt; - Thai Oil Power Co. Ltd. (56%)</td>
</tr>
<tr>
<td>6. Ratchaburi Electricity Generating Co. Ltd. (RGCO)</td>
<td>3,645</td>
<td>16 yrs (2012 – 2027)</td>
<td>832,026</td>
<td>100,815</td>
<td>731,211</td>
<td>- Ratchaburi Holding PCL (100%)</td>
</tr>
<tr>
<td>7. Glow IPP Co. Ltd. (GIPP)</td>
<td>713</td>
<td>16 yrs (2012 – 2027)</td>
<td>177,786</td>
<td>27,043</td>
<td>150,743</td>
<td>- Glow Energy PCL (100%)</td>
</tr>
<tr>
<td>8. Gulf Power Generation Co. Ltd. (GULF)</td>
<td>1,510</td>
<td>22 yrs (2012 – 2033)</td>
<td>515,647</td>
<td>88,588</td>
<td>427,059</td>
<td>- Gulf Electric PCL (100%)</td>
</tr>
<tr>
<td>9. Ratchaburi Power Co. Ltd.</td>
<td>1,400</td>
<td>22 yrs (2012 – 2033)</td>
<td>514,991</td>
<td>74,495</td>
<td>440,496</td>
<td>- Ratchaburi Holding PCL (25%) &lt;br&gt; - PTT PCL (15%) &lt;br&gt; - Hong Kong Electric Co., Ltd. (25%) &lt;br&gt; - Shobu Electric Co., Ltd. (15%) &lt;br&gt; - Union Energy Co., Ltd. (10%) &lt;br&gt; - Toyota Tshusho Corporation (10%)</td>
</tr>
<tr>
<td>10. BLCP Power Co. Ltd. (BLCP)</td>
<td>1,434</td>
<td>21 yrs (2012 – 2032)</td>
<td>275,719</td>
<td>101,427</td>
<td>174,292</td>
<td>- EGCO PCL (50%) &lt;br&gt; - Banpu PCL (50%)</td>
</tr>
<tr>
<td>11. Gheco One Co. Ltd. (GHECO-One)</td>
<td>660</td>
<td>25 yrs (2012 – 2036)</td>
<td>359,942</td>
<td>115,342</td>
<td>244,600</td>
<td>- Glow IPP 2 Ltd. Co. (65%) &lt;br&gt; - Hemaraj Land and Development PLC. (35%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13,168.00</strong></td>
<td></td>
<td><strong>3,057,652</strong></td>
<td><strong>559,926</strong></td>
<td><strong>2,497,726</strong></td>
<td></td>
</tr>
</tbody>
</table>

Note: The Gheco power plant began commercial operation on 26 July 2012.

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19 Thai Oil Power Co. Ltd. shares are 55% owned by Thai Oil PCL, 26% by PTT PCL and 19% by J-Power.
20 Gulf Electric PCL shares are 50% owned by EGCO PCL, 49% by Electricity Power Development, a subsidiary of J-Power, and 1% by Mit-Power (Thailand) Co. Ltd.
Table 8: Installed Capacity of Large-Scale Private Power Producers not yet in Commercial Operation

<table>
<thead>
<tr>
<th>Power Producers</th>
<th>Capacity(^{21}) (MW)</th>
<th>Remaining Life of Contract (Years)</th>
<th>Amount (m Baht)</th>
<th>Availability Payment (AP) (m Baht)</th>
<th>Energy Payment (m Baht)</th>
<th>Shareholders/Sponsor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gulf JP UP Co. Ltd. (GUT)</td>
<td>1,600</td>
<td>25 yrs (2015 – 2039)</td>
<td>667,053</td>
<td>114,577</td>
<td>552,476</td>
<td>- Gulf JP Co. Ltd.(^{22}) (100%)</td>
</tr>
<tr>
<td>2. Gulf JP NS Co. Ltd. (GNS)</td>
<td>1,600</td>
<td>25 yrs (2015 – 2039)</td>
<td>663,740</td>
<td>102,942</td>
<td>560,798</td>
<td>- Gulf JP Co. Ltd. (100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,740.00</strong></td>
<td></td>
<td><strong>1,330,793</strong></td>
<td><strong>217,519.00</strong></td>
<td><strong>1,113,274.00</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Source: EGAT 2011 Annual Report*

\(^{21}\) Capacity according the Power Purchase Agreement with EGAT

\(^{22}\) Gulf JP Co. Ltd. shares are 90% held by J-Power Holdings (Thailand) Co. Ltd., a subsidiary of J-Power, and 10% by Gulf Holdings Co.
The installed capacity of IPP totals 16,908 MW which the state offered for tender twice in 1994 and 2007. It can be seen that there is joint investment between Thai and foreign companies in developing IPP projects with an investment structure that is the same as that presented in Section 3.

Figure 22: Total IPP Installed Capacity in Thailand

Note: Gulf UT, Gulf NS and National Power Supply are under construction and awaiting sale to the grid.

Figure 23: Composition of Production Capacity of IPP Sponsors in Thailand
Project sponsors or investors in large-scale private power production projects in Thailand include Thai and foreign private companies. Thai companies have 11,911.52 MW or a 70.44% share, with Ratchaburi Holding PCL having the largest share with 4,345 MW or 36.48% of Thai-owned capacity, followed by EGCO PCL with 3,528 MW or 29.62% and Glow Energy PCL with 1,142 MW or 9.59%.

Foreign companies have 4,997.48 MW or a 29.56 share, led by Japanese companies with 4,059.48 MW or 81.23% of foreign-owned capacity, of which J-Power has 3,694.38 MW or 73.92%.

Among all large-scale private power production projects selling electricity in Thailand, Ratchaburi Holding PCL has a greatest installed capacity at 25.70% (4,345 MW) as it owns the largest private power plant in Ratchaburi Power Co. Ltd. with 3,645 MW, followed by J-Power with 21.85% (3,694 MW) since it owns 90% of shares in the Gulf JP UT and Gulf JP NS projects with (1,600 X 2 ) 3,200 MW and EGCO PCL with 20.87% (3,528 MW) of installed capacity of all IPP projects.

**Figure 24: Installed Capacity of IPP Projects in Thailand of Thai Private Companies**

![Bar chart showing installed capacity of IPP projects in Thailand of Thai private companies.]

In terms of installed capacity expressed as shares held directly and indirectly by project sponsors, it is found that Ratchaburi Holding PCL has the largest capacity equal to 36.48% of all IPP capacity, followed by EGCO PCL with 29.62% and Glow Energy with 9.59%.
Table 9: Installed Capacity by IPP Investment in Thailand

<table>
<thead>
<tr>
<th>IPP Sponsors in Thailand</th>
<th>Direct</th>
<th>Indirect</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratchaburi Holding</td>
<td>4,345</td>
<td>4,345</td>
<td>25.70%</td>
<td></td>
</tr>
<tr>
<td>J-Power</td>
<td>3,620</td>
<td>74</td>
<td>3,694</td>
<td>21.85%</td>
</tr>
<tr>
<td>EGCO</td>
<td>3,528</td>
<td></td>
<td>3,528</td>
<td>20.87%</td>
</tr>
<tr>
<td>Glow Energy</td>
<td>1,142</td>
<td></td>
<td>1,142</td>
<td>6.75%</td>
</tr>
<tr>
<td>Banpu</td>
<td>717</td>
<td></td>
<td>717</td>
<td>4.24%</td>
</tr>
<tr>
<td>PTT</td>
<td>350</td>
<td>102</td>
<td>452</td>
<td>2.67%</td>
</tr>
<tr>
<td>Thai Oil</td>
<td>168</td>
<td>216</td>
<td></td>
<td>2.27%</td>
</tr>
<tr>
<td>Hongkong Electric</td>
<td>350</td>
<td></td>
<td>350</td>
<td>2.07%</td>
</tr>
<tr>
<td>Chevron</td>
<td>350</td>
<td></td>
<td>350</td>
<td>2.07%</td>
</tr>
<tr>
<td>Yothin Dumnernchanvanit</td>
<td>345</td>
<td></td>
<td>345</td>
<td>2.04%</td>
</tr>
<tr>
<td>Gulf Holding</td>
<td>320</td>
<td></td>
<td>320</td>
<td>1.89%</td>
</tr>
<tr>
<td>Hemaraj</td>
<td>231</td>
<td></td>
<td>231</td>
<td>1.37%</td>
</tr>
<tr>
<td>Shobu Electric</td>
<td>210</td>
<td></td>
<td>210</td>
<td>1.24%</td>
</tr>
<tr>
<td>Saha Union</td>
<td>140</td>
<td></td>
<td>140</td>
<td>0.83%</td>
</tr>
<tr>
<td>Toyota Tshusho</td>
<td>140</td>
<td></td>
<td>140</td>
<td>0.83%</td>
</tr>
<tr>
<td>GMS Power</td>
<td>112</td>
<td></td>
<td>112</td>
<td>0.66%</td>
</tr>
<tr>
<td>Advance Agro</td>
<td>98</td>
<td></td>
<td>98</td>
<td>0.58%</td>
</tr>
<tr>
<td>Total Gas S.A.</td>
<td>98</td>
<td></td>
<td>98</td>
<td>0.58%</td>
</tr>
<tr>
<td>Axia Power - Marubeni Corporation</td>
<td>98</td>
<td></td>
<td>98</td>
<td>0.58%</td>
</tr>
<tr>
<td>AA (1991)</td>
<td>97</td>
<td></td>
<td>97</td>
<td>0.57%</td>
</tr>
<tr>
<td>China Development Industrial Bank</td>
<td>42</td>
<td></td>
<td>42</td>
<td>0.25%</td>
</tr>
<tr>
<td>Mitsui</td>
<td>15</td>
<td></td>
<td>15</td>
<td>0.09%</td>
</tr>
<tr>
<td>Total</td>
<td>16,561</td>
<td>392</td>
<td>16,908</td>
<td>100%</td>
</tr>
</tbody>
</table>

The state’s policy of promoting private investment in the energy industry requires relatively large amounts of capital to invest in large-scale power plants and leads to joint investment between Thai and foreign companies. Most Thai investors are companies listed on the Stock Exchange of Thailand in the Energy and Utilities group. There are only 3 main companies in the electricity generation business: Ratchaburi Holding PCL, EGCO PCL and Glow Energy PCL. Other investors are energy companies whose main business is trading fuel, such as natural gas and coal, or listed companies in other groups such as Real Estate Development or Consumer Goods. These companies have tried to increase the value of the company by expanding investment into the electricity production business through IPP projects.
Foreign investors supporting IPP projects in Thailand are mostly transnational energy companies from Japan, Hong Kong, Taiwan, France and The US with a policy of increasing foreign investments in order to increase production capacity and expand the company. They aim to invest in developing countries or those with large energy resources.

7.3.1 Operational Results

The income structure of energy production companies consists of income from the sale of electricity, other income, and/or a share of the profit (loss) of related companies. Figure 24 shows that Ratchaburi Holding PCL and Glow Energy PCL have a relatively large proportion of their income from the sale of electricity, but relatively little other income. EGCI PCL, meanwhile, has approximately the same income from the sale of electricity and other income from a share of the profit (loss) from investments in related companies, because Ratchaburi Holding PCL and Glow Energy PCL invested 50-100% of the registered capital in IPP projects held by subsidiaries. It can be understood as income from the sale of electricity on the consolidated balance sheet. But the proportion of investment by EGCO PCL in IPP projects is in the range of 25-50%. These are then held to be joint ventures and the income is recorded as profit (loss) from joint ventures in EGCO PCL financial reports.
Ratchaburi Holding PCL has a fairly regular income from electricity sales in the range of Baht 42,000-44,000 m per year. In 2009, its income from electricity sales fell to Baht 35,490.26 m since the Ratchaburi power plant was shut down for planned maintenance. Glow Energy PCL has income from electricity sales in the range of Baht 32,000-41,000 per year, trending upwards since it is an expanding producer of electricity and steam for industrial plants.
EGCO’s income from electricity sales tend to fall each year from Baht 10,939.40m in 2007 to Baht 7,661.04 m in 2011 while other income in the form of a share of the profit from joint ventures has also fallen to Baht 5,670.78 m in 2011. The Availability Payment (AP) portion of the income from electricity from the Rayong, Khanom, PLCP and Gulf Power Generation power stations was reduced to Baht 1,400 m as specified in the electricity purchase contract. The electricity fee for IPP power plants divides the price into 2 parts. One is an Availability Payment, or compensation that EGAT pays to the power plants to maintain the availability of electricity from the plants without regard to whether EGAT buys electricity from the plants or not. The AP (according to each case) covers the capital costs of investing in the plants, including both principal repayment and interest charges, production and maintenance costs, management costs, basic maintenance costs and shareholder compensation. The second is the Energy Payment which is payment for the amount of electricity which is actually transmitted. This covers the variable costs of production and plant maintenance.

Analysis of the profitability from operations, which is an analysis of the rate of profit from sales and the rate of return on assets and equity of all 3 companies finds that this is declining. This is seen from the Gross Profit Margin, Net Profit Margin, Return on Asset and Return on Equity which show a downward tendency as a result of the Net Profit Margin in the past 3 years among power producers has tended to go down so that in 2011 the Net Profit Margin of EGCO PCL had fallen 37.12%, of Ratchaburi Holding PCL 28.18% and Glow Energy PCL 16.55% compared with 2009.

The Gross Profit Margin and Net Profit Margin of EGCO PCL are the highest in the group since it has less production capital or lower operations and the debt-to-equity ratio is low, making the burden of interest charges less than it is for Glow Energy PCL and Ratchaburi Holding PCL which have high ratios. This is because of loans to finance expanded capacity or the purchase power plant assets.
Following the Money Trail of Mekong Energy Industry

Figure 26: Profitability Ratios from Operations of Thai Private Power Production Companies

Source: www.setsmart.com

Figure 27: Net Profits of Thai Private Power Production Companies

Source: www.setsmart.com
7.3.2 Trends in the Thai Electricity Generation Industry

The reduced turnover of power production companies, especially EGCO PCL and Ratchaburi Holding PCL, which are the big power producers in Thailand, has led to an expansion of investment within and outside the country, including Asia, the Pacific and Oceania (Australia and New Zealand) which use a variety of fuels and have policies of investment in renewable and alternative energy so as to increase capacity and electricity sales and to invest in businesses related to the energy industry. This is to create company growth and maximize returns to shareholders.

- Increased investment in domestic capacity

Large-scale private power producers have increasingly offered to sell electricity in Small Power Producer (SPP) projects. They also make joint investments with renewable energy entrepreneurs who have begun to develop projects and already have power purchase agreements, specially in solar energy where there is an addition to the income from sales (adder) of Baht 8 per unit in cases where a licence or a response from an electricity buyer was received before 28 June 2010. The EPPO passed a resolution to change this adder on electricity sales from solar energy to Baht 6.50 per unit for 10 years. Wind power with a capacity of more than 1 MW receives an adder of Baht 3.50 per unit over 10 years. Investment is 25-50%, a relatively high proportion since there is no risk in the planning and project development stage.

- Increased investment in foreign capacity

Large-scale private power producers have expanded foreign investments using a policy of buying, directly or indirectly, no more than 50% of shares of companies in the energy production business or related activities as well as buying the business of energy companies or the capital invested in basic public energy utilities in various countries. This is to realize the income from electricity sales and receive dividends from companies or activities in which they have invested. The proportion of activities bought or investments made depends on the operational risk of different kinds of power plant and the foreign exchange risk in the country where they are investing.

With joint investments in the GMS, EGAT is the purchaser of electricity in line with the Thailand’s 2010-2030 power development plan (PDP 2010) which sets the volume of electricity purchased from neighbouring countries at no more than 25% of the entire
grid’s installed capacity. Thailand has signed MOUs to promote and participate in electricity development with Lao PDR, the Union of Myanmar/Burma and the People’s Republic of China under a policy of purchasing from these countries 7,000 MW by 2015 from Lao PDR, 1,500 MW by 2011 from Myanmar/Burma and 3,000 MW by 2016 from the People’s Republic of China.

**Ratchaburi Holding** bought additional ordinary shares in EDL-GEN PCL which were offered on the Lao stock exchange to the amount of 10.108% of the total registered capital of EDL-GEN and bought 80% of the investment activities of Transfield Service Infrastructure, which were investments in basic public utilities in Australia (with 8 power plants). (Source: Ratchaburi Holding 2011 Annual Report and Thai stock market announcement of 16 July 2012)

**EGCO PCL** invested 52.13% in Quezon Power (Philippines) Co. Ltd. with 503 MW capacity.
(Source: EGCO PCL 2011 Annual Report and Thai stock market announcement)
8 Conflict of Interest

Subsidiary/joint venture companies and the major shareholders of principal project sponsors have been involved in project development at every stage from concept to construction and operations (as described in Section 5). The functions of electricity purchasers, construction contractors, maintenance service providers and project sponsors have the potential to create conflicts of interest and a lack of transparency in various transactions.

8.1 State Agencies Engaging in Business Related to Project Sponsors

EGAT is a state enterprise under the supervision of the Ministries of Energy and Finance with the functions of generating, procuring and distributing electricity. It buys electricity from large-scale private electricity producers and neighbouring countries in the GMS. EGAT also invests in power production companies and is the major shareholder of Ratchaburi Holding PCL. With EGAT holding a 45% share, Ratchaburi Holding PCL is considered its subsidiary, whereas EGCO PCL is a joint venture with EGAT holding 25.41%.

These companies are managed by EGAT through its board. EGAT’s managerial staffs, who are senior government officials, sit on the board or hold positions in both Ratchaburi Holding PCL and EGCO PCL. The EGAT board comprise mainly high-ranking government officials from Ministries of Energy and Finance. Representatives of EGAT also sit on various sub-committees that consider various investment projects to expand the capacity of both companies.

Table 10: EGAT Board Members who Hold Positions in Companies in the EGAT Group

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Term</th>
<th>Other Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EGCO PCL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Mr Pornchai Rujiprapa</td>
<td>Chair</td>
<td>1 Jan 11 – 31 Dec 11</td>
<td>Permanent Secretary, Ministry of Science and Technology</td>
</tr>
<tr>
<td>2. Mr Kulit Sombatsiri</td>
<td>Director</td>
<td>3 Dec 11 – 31 Dec 11</td>
<td>Inspector-General, Ministry of Finance, Director, Thailand Asset Management PCL</td>
</tr>
<tr>
<td>3. Mr Kurujit Nakornthap</td>
<td>Director</td>
<td>8 Feb 11 – 13 Dec 11</td>
<td>Deputy Permanent Secretary, Ministry of Energy</td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
<td>Term</td>
<td>Other Positions</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------</td>
<td>-----------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Ratchaburi Holding PCL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Mr Witoon Simachokedee</td>
<td>Chair</td>
<td>1 Jan 11 – 30 Nov 11</td>
<td></td>
</tr>
<tr>
<td>2. Mr Kurujit Nakornthap</td>
<td>Chair</td>
<td>19 Dec 11 – 31 Dec 11</td>
<td>Deputy Permanent Secretary, Ministry of Energy</td>
</tr>
<tr>
<td>4. Mr Trakul Winitnaiyapak</td>
<td>Director</td>
<td>29 Mar 11 – 31 Dec 11</td>
<td>Deputy Attorney General, Office of the Attorney General</td>
</tr>
<tr>
<td>5. Mr Vitavas Srivihok</td>
<td>Director</td>
<td>29 Mar 11 – 30 Nov 11</td>
<td></td>
</tr>
<tr>
<td>6. Mr Lae Dilokvidhyarat</td>
<td>Director</td>
<td>1 Jan 11 – 28 Mar 11</td>
<td></td>
</tr>
<tr>
<td>7. Mr Sutat Patmasiriwat</td>
<td>Director</td>
<td>30 Mar 11 – 31 Dec 11</td>
<td>Governor, EGAT</td>
</tr>
<tr>
<td><strong>EGAT International</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Mr Sutat Patmasiriwat</td>
<td>Chair</td>
<td>28 Feb 11 – 31 Dec 11</td>
<td>Governor, EGAT</td>
</tr>
<tr>
<td><strong>EGAT Diamond Service Co.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Mr Sutat Patmasiriwat</td>
<td>Chair</td>
<td>1 Jan 11 – 24 Feb 11</td>
<td>Governor, EGAT</td>
</tr>
</tbody>
</table>

*Source: EGAT 2011 Annual Report*
Table 11: EGAT Executives who Hold Executive Positions in Companies in the EGAT Group

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Term</th>
<th>Other Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGCO PCL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Sahust Pratuknukul</td>
<td>Director and President</td>
<td>Ex officio since appointment as President 1 Oct 2011</td>
<td>Deputy Governor, Policy and Planning, EGAT</td>
</tr>
<tr>
<td>Ratchaburi Holding PCL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr. Noppol Milinthanggoon</td>
<td>Chair</td>
<td>1 Jan 11 – 30 Nov 11</td>
<td>C 14 Engineer (equivalent to Deputy Governor), EGAT</td>
</tr>
</tbody>
</table>

Former EGAT officials are also currently holding important executive positions in Ratchaburi Holding and EGCO. These people have been involved in preparing national power policies, such as the 2010 PDP and could make use of internal information to the benefit of both companies.

It can be seen that EGAT directors and key executives perform two decision-making functions: electricity buying and selling. There are conflicting interests in the pricing of electricity and how to ensure transparency and appropriateness. As high-ranking government officials, their role is to negotiate the lowest price to protect the interests of consumers so that the people can access electricity at an affordable price. At the same time these officials have to promote the interests of their companies in gaining maximum profit so that shareholders can earn dividends and also cover the cost of salaries, fees, meeting fees and bonuses as directors who add value to the business.

EGAT also gains other benefits or income in addition to dividends from acting as a contractor to Ratchaburi Holding for operating and maintaining the Nam Ngum 2 hydropower plant. This is considered as a connected transaction which earns EGAT Baht 71.04 m per year from service fees with a 3% increase per year. The dividends received from Ratchaburi Holding at Baht 2.25 per share (2011 figure) for a total received Baht 1,539.17 m. (EGAT holding 652,500,000 shares).

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23 Notification of Capital Market Supervisory Board TorJor. 21/2551 Re: Connected Transaction Notification
8.2 State Agencies as Project Sponsors

At present, EGAT has set up a subsidiary, EGAT International (with a 99.99% shareholding) to make investments in various projects abroad. This company joined in the development of the Nam Ngiap 1 hydropower project in Lao PDR, which sells electricity to EGAT. A Tariff MOU has been signed.

As EGAT changes the orientation of its business toward activities that involve conflicting interests in the selling and buying of electricity, how transparent is its pricing structure?

8.3 Construction Contractors as Project Sponsors

A power plant project involves a long period of construction before it can start commercial operations and generate income and profit that can be paid to shareholders as dividends. Investors in the construction business would involve their subsidiaries or joint ventures in obtaining construction contracts or sub-contracts so as to earn income during the construction period when the project has not yet yielded any income. It is the task of other investors in the project to ensure that the construction contracts are reasonable and appropriately priced in accordance with project income.
9 Capital Market and the Energy Business

Capital markets are an important source of initial financing of the energy industry and other private business in Thailand as well as for additional financing for business expansion. Companies can issue securities to sell to investors in these markets according to their financing structures.

9.1 Issuance of Ordinary Shares

Apart from obtaining loans from domestic and foreign financial institutions to finance project development, developers can also mobilize funds in the capital markets by issuing ordinary shares. There are two categories of shares:

- Initial Public Offerings (IPOs) issued by business groups

A business entity sells shares to the public for the first time. These ordinary shares have not been traded before in the capital market. This means that they have previously been in the possession of a group of individuals such as members of a family or state agencies. The price offered in the IPO is calculated from the future growth projections discounted to Net Present Value.

- Seasoned Equity Issues

A business who shares are already traded in the stock market offers new shares for sale to the public. The purpose is to raise additional capital and increase the number of traded shares. The price of the new shares is close to the market price of existing shares.
### 9.2 Summary of Conditions for Stock Exchange Listing

Table 12: Summary of Conditions for Stock Exchange Listing

<table>
<thead>
<tr>
<th>Issue</th>
<th>General Conditions</th>
<th>Companies Investing in Basic Public Utility Projects</th>
<th>Holding Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Company Status</strong></td>
<td>Public Company Limited or Juristic Entity Established under Specific Law</td>
<td>It is not necessary to wait for 3 years of trading. However, the company must meet the other criteria specified for general cases. In order to reduce the risk in project construction and investment, the stock exchange sets criteria for this kind of project (an example follows).</td>
<td>‘Holding company’ means a company holding shares in other companies and conducting no other significant business of its own with the following important qualifications.</td>
</tr>
<tr>
<td><strong>Fully Paid Up Registered Capital</strong></td>
<td></td>
<td>Concession from a government agency or state enterprise with a term of &gt; 20 years with &gt; 15 years remaining on the concession counting from the date that completed forms are submitted to the stock exchange correctly following the required steps according to the concession and/or</td>
<td>All general qualifications with the exception of those related to turnover.</td>
</tr>
<tr>
<td><strong>Distribution of Minority Shareholdings</strong></td>
<td><em>(after shares offered to the public)</em>  &gt; 1,000 persons</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of Minority Shareholders</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shareholding Structure</strong></td>
<td>Combined shareholding &gt; 25% of paid-up capital if shares &lt; Baht 3,000 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Combined shareholding &gt; 20% of paid-up capital if shares &gt; Baht 3,000 m</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each person must hold at least 1 trading unit as specified by the stock exchange</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minority shareholders are those who are not strategic shareholders, i.e. directors, managers and executives and those related to them, and those holding &gt; 5% of shares and those related to them.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Offering shares to the public</strong></td>
<td>Permission received from the SEC to offer shares for sale (except for Juristic Entity Established under Specific Law)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Permission</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issue</td>
<td>General Conditions</td>
<td>Companies Investing in Basic Public Utility Projects</td>
<td>Holding Companies</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Number of shares offered for sale</td>
<td>• 15% of Paid up Capital</td>
<td>Permission to operate the project from a government agency or state enterprise or Sale/service contract with a government agency, state enterprise or private enterprise which can create secure future income</td>
<td>Most executives are the same as in the core company for &gt; 1 year before request except where a holding company is a financial institution under the supervision of another regulatory agency, or the core company has investments in basic utility projects.</td>
</tr>
<tr>
<td>Paid up Capital</td>
<td>• Whichever is the greater of 10% of Paid up Capital, or Value of ordinary shares at par value &gt; Baht 75 m</td>
<td>Clear and sufficient sources of financial support for operations.</td>
<td>It has the authority to regulate the activities of the core company.</td>
</tr>
<tr>
<td>&lt; Baht 500 m</td>
<td></td>
<td>Permission to operate the project from a government agency or state enterprise or Sale/service contract with a government agency, state enterprise or private enterprise which can create secure future income</td>
<td>It must have held shares in the core company continuously since registration. The core company can change after 3 years counting from the day ordinary shares are traded on the stock exchange.</td>
</tr>
<tr>
<td>Paid up Capital</td>
<td></td>
<td>Clear and sufficient sources of financial support for operations.</td>
<td>‘Core company’ means a limited company or public company limited with the following qualifications:</td>
</tr>
<tr>
<td>&gt; Baht 500 m</td>
<td></td>
<td>Permission to operate the project from a government agency or state enterprise or Sale/service contract with a government agency, state enterprise or private enterprise which can create secure future income</td>
<td>all general qualifications with the</td>
</tr>
<tr>
<td>Method of Sale</td>
<td>Through an underwriter</td>
<td>Permission to operate the project from a government agency or state enterprise or Sale/service contract with a government agency, state enterprise or private enterprise which can create secure future income</td>
<td></td>
</tr>
<tr>
<td>Operating Results</td>
<td>&gt; 3 years of operating results under the management of largely the same executive team &gt; 1 year before request where the operating results can demonstrate the ability of the executive team. (State enterprises may include operating results before restructuring.)</td>
<td>Permission to operate the project from a government agency or state enterprise or Sale/service contract with a government agency, state enterprise or private enterprise which can create secure future income</td>
<td></td>
</tr>
<tr>
<td>Financial Status and Liquidity</td>
<td>Participation of shareholder &gt; Baht 300 m. Ability to prove that the company has secure financial status with sufficient revolving funds.</td>
<td>Permission to operate the project from a government agency or state enterprise or Sale/service contract with a government agency, state enterprise or private enterprise which can create secure future income</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Managers and supervisors have the following qualifications. Must not be an individual banned by Capital Market Supervisory Board announcement. Must not be an individual in breach of stock exchange</td>
<td>Permission to operate the project from a government agency or state enterprise or Sale/service contract with a government agency, state enterprise or private enterprise which can create secure future income</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Permission to operate the project from a government agency or state enterprise or Sale/service contract with a government agency, state enterprise or private enterprise which can create secure future income</td>
<td>Permission to operate the project from a government agency or state enterprise or Sale/service contract with a government agency, state enterprise or private enterprise which can create secure future income</td>
<td></td>
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</tbody>
</table>
regulations that may have an effect on the privileges or decision-making of shareholders and investors or changes in the share price.

- The authority and duties of the executive committee are restricted in accordance with the criteria announced by the Capital Market Supervisory Board.

exception of those concerning minority shareholding and audit committees; and no stock exchange listing; and conducting its own business. (In cases where the core company is established according to foreign law and conducts its business in foreign countries it must use Thai accounting standards or IAS or AICPA or FASB and must meet special conditions as specified by the stock exchange to protect stock exchange investors.)

Note: Capital Market Supervisory Board Announcement ThorJor.28/2551 on Requests for Permission and Permission for an Initial Public Offering (Compilation) [http://capital.sec.or.th/webapp/nrs/data/4594s.pdf](http://capital.sec.or.th/webapp/nrs/data/4594s.pdf)

Note: 'Basic public utilities' means construction and services necessary for economic and social development comprising electricity production and distribution systems, piped water systems, surface transportation systems to facilitate travel and solve traffic problems, ports, airports, communications, telecommunications systems, pollution control systems
Organizing the financial structure is the form of a company that holds shares in other companies (holding company) is a very popular method for businesses that need to grow constantly and has the tendency to expand into related business. Most energy companies employ this method. The shareholding structure has to comply with established criteria, i.e. the holding company must hold at least 51% of the shares of its core electricity generating company.

9.3 Rewards of Stock Exchange Listing

Returns from investment in shares come in 2 parts: cash dividends paid by the share-issuing company to its shareholders; and profit (loss) from the sale of shares at higher (or lower) prices than the purchase price, or what is called profit or loss from price differentials. Shares of public utilities businesses involving electricity are regarded secure Defensive Stocks. This means that the business performs better in terms of returns and dividend payments than others in times of economic downturn. Investors are interested in investing in such shares when the stock market is falling (bear market) and if they expect consistent returns from dividend payments.
Figure 28: Dividend Payments of Companies Primarily in the Electricity Generation Business

Source: www.setsmart.com

Figure 28 shows that Dividend Payout Ratios (percentage of earnings paid to shareholders in dividends calculated as dividend per share divided by net income per share) of Ratchaburi Holding and EGCO have increased since 2009. This is because operating income is decreasing and the companies need to use profits to expand generating capacity in various projects while the policy is to maintain dividends at Baht 2.25 and 5.25 per share respectively. This policy is like a guaranteed minimum payment to shareholders. In other words, EGAT as a major shareholder still receives at least Baht 1,468,125,000 per year in dividend payments from Ratchaburi Holding and Baht 702,311,726 from EGCO. It can be concluded that these two companies must earn a net income or profit that is at least the same as the dividends paid to EGAT.
Shares of Ratchaburi Holding, EGCO and Glow Energy are all considered defensive stocks without much fluctuation in prices. However, in the latest period their price and market capitalization values, which reflect the value of their businesses, have risen significantly. After 4 April 2012 when it was announced in the news that the Ministry of Energy might open a third round of bidding for IPPs for 5,000 – 6,000 MW once the new 2010 PDP has been submitted for approval to the Energy Policy and Planning Office. Later on 8 June 2012, the Office approved the revised PDP which includes a third round of bidding for 5,000 – 6,000 MW to be supplied to the grid in 2021, higher than the earlier round of bidding of 4,400 MW. Investors believe that this shows a trend of increasing IPP production capacity and, as a result, increasing returns for energy companies that win the bidding. Consequently, share prices of Ratchaburi Holding,
EGCO and Glow Energy rose continuously. As of 10 August, the increase in shares prices and market capitalization of these companies were as follows:

- Ratchaburi Holding’s share price increased 12.73%, an increase of Baht 7,612.5 m in market capitalization\(^{24}\) from Baht 59,812.50 m on 4 April to Baht 67,425 m on 12 August 2012.

- EGCO’s share price increased 22.43%, an increase of Baht 11,187.38 m in market capitalization from Baht 49,882.56 m on 4 April to Baht 61,069.94 m on 12 August 2012.

- Glow Energy’s share price increased slightly by 2.10%, an increase of Baht 1,828.58 m in market capitalization from Baht 87,040.47 m on 4 April to Baht 88,869.05 m on 12 August 2012.

During this same period, total market capitalization of the stock market increased only 2.54% by the amount of Baht 250,835.80 m. It is clear that the increase for Ratchaburi Holding and EGCO is higher than for the market in general. This reflects public expectations that they would enter the IPP bidding process and win contracts that would increase their capacity and returns.

### 9.4 Effect on the Rights of Minority Shareholders

Among the findings of the study is that almost all of the Thai private companies that invest in or sponsor electricity generation projects in the GMS and are large private power producers are listed companies and that they conduct related-party transactions with subsidiaries and/or with shareholders. If the related-party transactions are within the scope of normal business operations and in support of the normal business of the company, approval can be given by the company’s board without the participation of minority shareholders in decision making. Minority shareholders can only examine the transparency of the transactions by querying the company executives or board on the criteria used in pricing transactions after the company has disclosed the information.

**EGAT** is the main operations and services sub-contractor for the Ngam Ngum 2 power plant. The contractor is Ratch Lao Service Co. Ltd., a subsidiary of Ratchaburi Holding.

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\(^{24}\) Market Capitalization is the total value of issued shares of a publicly traded company; it is equal to the (closing) share price times the number of outstanding shares. It can be used a proxy for the public opinion of a company’s net worth
The contract value is Baht 2 billion and is considered a related-party transaction in support of normal business and was approved by the board of Ratch Holding. The minority shareholders of Ratchaburi Holding are at a disadvantage. EGAT, the major shareholder, received a Baht 2.25 dividend per share (2011 figures) plus an income on the subcontract of Baht 71.04 m in 2011 totalling Baht 2.36 per share. There is an inequality among shareholders.
10. Conclusion and Recommendations

The stock exchange of Thailand is an important source of capital for Thai private business, especially those in the energy sector, which need high capital outlays to develop projects. Few investors can afford to own energy businesses through investments in the stock market; they form a tiny minority of the Thai population. The stock market is also a source of profit for shareholders or for company directors or executives engaged in related-party transactions and using insider information.

If energy companies engaging in electricity generation, considered a basic essential utility of the country, are supplying electricity to EGAT at high prices in order to increase their profit or share prices, it directly affects the people who rely on EGAT for electricity and who have to pay high prices for the benefit of certain groups of people. Therefore it is recommended that the people who are consumers of electricity monitor investment information in each electricity generation project being developed or implemented in the future, paying attention to issues of transparency and conflict of interest among state agencies or officials whose duty is to look after the public interest, which may affect the price of electricity.
APPENDIX 1: STRUCTURE OF ENERGY PROJECTS IN THE MEKONG REGION
1. Theun Hinboun Power Co. Ltd

- NORAD $7.1m
- UNDP $0.4m
- ADB $57.7m
- Nordic Development Fund $7.3m

- $65.6m Loan
- $72.5m Grant

Government of Lao PDR (GOL)

Electricity Generating Authority of Thailand (EGAT)

- Shareholder Agreement
- $110m Equity investment

Theun Hinboun Power Co. Ltd.
(TIMC – 210 MW)

Creditors

$130.3m Loan

Loan Details
- US$ 64.80 m in loans from commercial banks
- US$ 58.60 m in loans from Export Credit Agencies
- 50:50 US$:Baht blend of US$ loans from ECAs and Multilateral Finance Institutions

Details on 2002 Refinancing US$ 152 m Loan

Baht 3,000 million loans from Thai commercial banks (Bangkok Bank; CIMB; Siam Commercial Bank; Siam City Bank; Bank of Ayudhya; TMB; Thanachart Bank) with a 10 year term and with an interest rate of 8% p.a. for the first 3 years and then a floating interest rate of the minimum lending rate plus 1.25%.

Loan from the Export-Import Bank of Thailand of US$ 30 million over 10 years with an interest rate of LIBOR plus 2.375%.

Remark: Capital reduction US$ 55 million in 2002
Source: MDX 2011 Annual Report
ADB 2000 Project Completion Report p33
ADB 2002 Project Performance Audit Report p10
THPC Presentation
2. Houay Ho Power Co. Ltd.

- Electricité du Laos
- Glow Energy 55%
- Houay Ho Thai Co. Ltd. 25%
- Glow Energy 49%
  - Hemaraj Land and Development PCL 51%

- Government of Lao PDR (GOL)
- Electricity Generating Authority of Thailand (EGAT)
- Concession Agreement
- EGAT
- Creditors ADB
- EPC Contract
  - Daewoo E&C
3. Nam Theun 2 Power Co. Ltd.

Electricité de France International (EDFI) - 45%

Electricity Generating PCL (EGCO) – 35%

Lao Holding State Enterprise (LHSE) – 25%

Share holder agreement

Goverment of Lao PDR (GOL)

Electricité du Laos (EDL)

Electricity Generating Authority of Thailand (EGAT)

Concession Agreement

EDL PPA*

EGAT PPA

Head Contractor - EDF

Creditors

Nam Theun 2 Power Co. Ltd.

NTPC – 1,086 MW

Notes: * 5% of electricity production sold to EDL

Italian-Thai PCL sold all shares to EGCO and EDFI in 2010

Source of FI Structure: http://www2.adb.org/projects/project.asp?id=37734
EDF Presentation
Following the Money Trail of Mekong Energy Industry

**Nam Theun 2 Power Co Ltd**

- **ADB Loan** US$ 42 m
- **IDA Loan** US$ 42 m
- **MIGA Loan** US$ 42 m

**Guarantees**

- **ADB**
- **IDA**
- **MIGA**

**Loans from ECAs**

- **Proparco** US$ 30 m
- **AFD** US$ 30 m
- **ADB** US$ 50 m
- **NIB** US$ 34 m
- **Exim Bank**

**Total US$ Loans – US$ 500 m**

**Thai Commercial Banks**

- (Bangkok Bank; Krung Thai; Kasikornbank; Siam Commercial; Bank of Ayudhya; Siam City;

**Total Baht Loan Facility**

- US$ 500 m

**US$ 1,131.5 m Loans**

**EDFI**

**LHSE**

**EGAT PCL**

**US$ 450 m Equity**

**Source:**

- [http://www2.adb.org/projects/project.asp?id=37734](http://www2.adb.org/projects/project.asp?id=37734)
- EDF Presentation
4. Nam Ngum 2 Power Co. Ltd.

Electricite du Laos 25%
South East Asia Energy Co. Ltd. (SEAN) 75%

- RATCH 33.33%
- CK Power 54.67%
- P.T. Construction 5.33%
- Shalapak Development 5.33%

1 CK and BECL sold all shares to their associated company CK Power Co. Ltd.

Remark: Baht 30 : USD 1
Source: Loan Details Ratch 2011 Annual Report p126

Loans Details
Tranche A: in Thai Baht Currency, THB 15,003 million
Tranche B: in USD Currency, 180 million
Tranche C: Bank Guarantees Facility Agreement of USD 25 million
5. Theun Hinboun Power Co. Ltd. – Expansion

- Electricite du Laos (EDL) - 60%
- GMS Lao Co. Ltd. - 20% (MDX Thailand)
- Nordic Hydropower AB - 20%
- Statkraft S.F. 100%
  National Utility of Norway

Government of Lao PDR (GOL)
Concession Agreement
$7.5 m Equity investment

Electricite du Laos (EDL)
EDL PPA 60 MW

Electricity Generating Authority of Thailand (EGAT)
EGAT PPA 230 MW
$712.5m Loan

Contractor

Creditors

Thuen Hinboun Power Co. Ltd.
(THPCX – 290 MW)

Loan Details
Tranche A: US$ 187.50 m from international financial institutions and Thai banks (BNP Paribas, ANZ, KBC and Thai EXIM Bank totalling US$ 50)
Tranche B: Baht 13,940 m (KBANK, SCIB, BAY, TCAP, Thai EXIM Bank totalling Baht 1,750 m)
Tranche C: US$ 112.50 m from international financial institutions (PROPACO, FMO, DEG)

Note: Baht 33.7939 : US$ 1
Source: MDX 2011 Annual Report as p13
BANKTRACK by International Rivers
http://www.esaanvoice.net/esanvoice/know/show.php?Category=news&No=6430
6. Hongsa Power Co. Ltd.

- Government of Lao PDR (GOL)
- Electricité du Laos (EDL)
- Electricity Generating Authority of Thailand (EGAT)

**Shareholder Agreement**

- Banpu PCL 40%
- Ratch PCL 40%*
- Lao Holding State Enterprise (LHSE) 20%

**Power Concession**

- Hongsa Power Co. Ltd. HSP – 1,878 MW

**Investment**

- $927m Equity Investment

**Creditors**

- 9 Thai Commercial Banks (KTB/SCB/BBL/Kbank/BAYSCIB/TMB/BSB/Thai Exim Bank)

**EPC Contract**

- O & M Agreement EGAT (Baht 16,850 m)

**Loan**

- $2,783m Loan

**Fuel Supply Agreement**

- Phufai Mining Co. Ltd.

**Shareholder Agreement**

- Phufai Ratch PCL 37.5%
- Lao Holding State Enterprise (LHSE) 25%

**Mining Concession**

Note: * Ratchaburi Holding paid a US$ 20 m fee to join project development.
Source: Letter to SET; Ratchaburi Holding 2011 Annual Report p143-144; LHSE Presentation
7. Xayabouri Power Co. Ltd.

- Shareholder agreement
  - PTT 25%
  - EGCO 12.50%
  - P.T. Construction 5%
  - C.H. Karnchang 50%
  - BECL 7.50%

- Concession Agreement
  - Government of Lao PDR (GOL)
  - Electricity Generating Authority of Thailand (EGAT)

- EPC Contract
  - C.H. Karnchang 50%
  - P.T. Construction 5%
  - BECL 7.50%

- Investment
  - $800m Equity
- Loan
  - $2,867m
  - $2,439m

- Creditors
  - KTB/SCB/BBL/KBank

- EPC Contract Details
  Approximate Contract Value: Baht 51,824.64 m and $ 711.04 m excluding VAT
  

Note: Baht 30 = US$ 1
8. Nam Ngum 3 Power Co. Ltd.

Ratchaburi Holding 25%
Marubeni Corporation 25%
GMS Lao 27%
Lao Holding State Enterprise (LHSE) 23%

Shareholder agreement

$115.02 m Equity Loan

ADB
- OCR $98.12 m
- ADF $16.9 m

Equity Investment

Concession Agreement

Government of Lao PDR (GOL)

Electricity Generating Authority of Thailand (EGAT)

EGAT PPA

Loan

EPC Contract

Nam Ngum 3 Power Co. Ltd.

NN 3 – 440 MW

Creditors
ADB; Thai Banks

ADB Loan Details
Tranche A : $200 m direct loan
Tranche B : $150 m unfunded risk participation

Note: ADB approved loan on 3 Nov 2011
http://pid.adb.org/pid/PsView.htm?projNo=40906&seqNo=01&typeCd=4
9. **Nam Ngiap 1 Power Co. Ltd.**

Note: Awaiting Private Sector Credit Committee meeting on Apr 30, 2012 and Board approval on May 1, 2012

http://pid.adb.org/pid/PsView.htm?projNo=41924&seqNo=01&typeCd=4

Environment-related Documents: EIA Draft, Annexes to the EIA and IEE Transmission Lines Draft

APPENDIX 2: STRUCTURE OF ENERGY PROJECTS OF THAI LARGE-SCALE INDEPENDENT POWER PRODUCERS
1. **Independent Power Producer (Thailand) Co. Ltd. (IPT)**

   - **Thai Oil PCL.**
   - **J-POWER**
   - **PTT PLC.**

   ![Diagram](image)

   - Thai Oil Power Co. Ltd.
   - **Independent Power Producer (Thailand) Co. Ltd (IPT)**
   - Installed Capacity 700 MW

2. **Eastern Power & Electric Co. Ltd.**

   - **MDX PCL**
   - **Total Gas and Power Thailand S.A.**
   - **GMS Power PLC.**
   - **Axia Power**
   - **China Development Industrial Bank Inc.**

   ![Diagram](image)

   - Eastern Power & Electric Co. Ltd.
   - Installed Capacity 350 MW

Note: Total Gas and Power Thailand is a subsidiary of Total S.A. (France)
Axia Power Holding B.V. is a subsidiary of Marubeni Corporation
3. **Ratchaburi Electricity Generating Co. Ltd.,**

   ![Diagram]

   - EGAT
     - 45%
   - RATCH PLC.
     - 100%
   - Ratchaburi Electricity Generating Co. Ltd.
     - Installed Capacity
     - 3,645 MW

4. **Ratchaburi Power Co. Ltd.**

   ![Diagram]

   - EGAT
     - 45%
   - RATCH PCL
   - PTT PCL
   - Hong Kong Electric Co. Ltd.
   - Shobu Electric Co. Ltd.
   - Union Energy Co. Ltd.
   - Toyota Tshusho Corporation
     - 51.15%
   - Ministry of Finance
     - 25%
     - 25%
     - 15%
     - 15%
     - 10%
     - 10%
   - Ratchaburi Power Co. Ltd.
     - Installed Capacity
     - 1,400 MW

Remark: Union Energy is a subsidiary of Saha Union PCL.
5. **Tri Energy Co. Ltd. (TECO)**

<table>
<thead>
<tr>
<th>Company</th>
<th>Shareholding</th>
<th>Installed Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGAT</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td>RATCH PCL</td>
<td>50%</td>
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<tr>
<td>Tri Energy Co. Ltd.</td>
<td>50%</td>
<td></td>
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<tr>
<td>Chevron Texaco Corporation</td>
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6. **Rayong Electricity Generating Co. Ltd. and Khanom Electricity Generating Co. Ltd.**

<table>
<thead>
<tr>
<th>Company</th>
<th>Shareholding</th>
<th>Installed Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEPCO</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Mitsubishi Corporation</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>TEPCO International</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>DGA Thailand</td>
<td>50%</td>
<td></td>
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<tr>
<td>EGAT</td>
<td>25.41%</td>
<td></td>
</tr>
<tr>
<td>TEPDIA Generating B.V.</td>
<td>23.94%</td>
<td></td>
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<tr>
<td>Electricity Generating PCL (EGCO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rayong Electricity Generating Co. Ltd.,</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Khanom Electricity Generating Co. Ltd.,</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td><strong>Installed Capacity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rayong Electricity Generating Co. Ltd.,</td>
<td>1,232 MW</td>
<td></td>
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<tr>
<td>Khanom Electricity Generating Co. Ltd.,</td>
<td>824 MW</td>
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*Source: [https://www.clpgroup.com/ourcompany/news/Pages/2011022305.aspx](https://www.clpgroup.com/ourcompany/news/Pages/2011022305.aspx)*
7. Gulf Power Generation Co. Ltd.

*TEPCO*  
- **Mitsubishi**  
  - **J POWER**  
  - Mitsui & Co.,

- **TEPCO International**
- **DGA Thailand**  
  - **EGAT**
- **TEPDIA Generating B.V.**
- **Electricity Generating PCL (EGCO)**  
  - **Electricity Power Development Co. Ltd.**
  - **Mit-Power (Thailand) Limited**

**Gulf Electric PCL (GEC)**  
- **Gulf Power Generation Co. Ltd.**
  - Installed Capacity  
  - 1,510 MW
Company Directors

<table>
<thead>
<tr>
<th>Gulf Electric PCL</th>
<th>Gulf Power Generation Co. Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mr Masahide Takaraya (Representative of J-Power)</td>
<td>1. Mr Sarath Ratanavadi (Director of GEC)</td>
</tr>
<tr>
<td>2. Mr Sarath Ratanavadi</td>
<td>2. Mrs Porntipa Chinvetkitvanit</td>
</tr>
<tr>
<td>3. Mr Akihiko Sakurai (Representative of Mitsui)</td>
<td>3. Mr Narong Wongpaiboon</td>
</tr>
<tr>
<td>4. Mr Piya Jetasanon (Deputy Managing Director, EGCO)</td>
<td>4. Mr Chankij Jearaphunt (Senior Deputy Managing Director, EGCO)</td>
</tr>
<tr>
<td>5. Mr. Sahust Pratuknukul (Managing Director, EGCO)</td>
<td>5. Mr Akihiko Sakurai (Representative of Mitsui)</td>
</tr>
<tr>
<td>6. Mr Toshiaki Matsukuma (Representative of J-Power)</td>
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<tr>
<td>7. Mr Jun Harada</td>
<td></td>
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<tr>
<td>8. Mr Gumpanart Bumroonggit</td>
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<tr>
<td>9. Mr Sakul Pochanart (Senior Deputy Managing Director, EGCO)</td>
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</tr>
</tbody>
</table>

Source: Department of Business Development, the information accessed in October 4, 2012 through its website, www.dbd.go.th

8. BLCP Power Co. Ltd.

```
EGAT

25.41%

TEPDIA Generating B.V.

23.94%

Electricity Generating PCL (EGCO)

50%

BLCP Power Co. Ltd.

Installed Capacity

1,434 MW

Banpu PCL

50%
```


9. **Gulf JP UT Co. Ltd.** (formerly Siam Energy until change of name on 15 February 2011) and **Gulf JP NS Co. Ltd.** (formerly Cogeneration Supply Co. Ltd. until change of name on 17 July 2007 to Power Generation Supply Co. Ltd. and further change of name on 15 February 2011)
Gulf JP NS Co. Ltd.

[http://pid.adb.org/pid/PsView.htm?projNo=44946&seqNo=01&typeCd=4\_\_Power](http://pid.adb.org/pid/PsView.htm?projNo=44946&seqNo=01&typeCd=4\_\_Power)
Directors

**J-Power Holdings (Thailand) Co. Ltd.**

1. Mr Toshiaki Matsukuma
2. Mr Masahide Takaraya
3. Mr Shinichi Kawatani
4. Mr Masahiro Toki
5. Mr Yoshiki Onoi

**Gulf Holding Co. Ltd.**

1. Mrs Porntipa Chinvetkitvanit (Director of Gulf Power Generation, a subsidiary of Gulf Electric)
2. Mr Ratthaphol Cheunsomchit
3. Mrs Duangjai Somboon
4. Mrs Chotikun Sukphiromkasem

**Gulf JP Co. Ltd.**

1. Mr. Viset Choopiban
2. Mr Seikou Mizunuma
3. Mr Yoshiki Onoi (Representative of J-Power)
4. Mr Masahide Takaraya (Representative of J-Power)
5. Mr Shinichi Kawatani (Representative of J-Power)
6. Mr Sarath Ratanavadi, Director of Gulf Electric and Gulf Power Generation
7. Mrs Porntipa Chinvetkitvanit

*Source: Department of Business Development, the information accessed in October 4, 2012 through its website, [www.dbd.go.th](http://www.dbd.go.th)*

10. **Glow IPP Co. Ltd.**
11. GHECO-One Co. Ltd.

GDF SUEZ S.A.  
69.11%  

Glow Energy PCL  
65%  

GHECO-One Co. Ltd.  
Installed Capacity  
660 MW  

Hemaraj Land And Development  
35%  


Mr. Yothin Dumnernchanvanit  
Directly and indirectly holds 89.11% of shares in Double A and Advance Agro.  
63.80%  

18.00%  

Advance Agro PCL  
18.20%  

100%  

National Power Supply Co. Ltd.  

100%  

National Power Supply Co. Ltd.  
Installed Capacity  
600 MW