

## 1. Overview of the Business

### 1.1 Vision and Mission of the Company

#### Glow Vision:

We are a leading power generation company providing sustainable and reliable energy solutions based on innovative use of diversified energy sources.

#### Glow Mission:

Create value for our shareholders and customers in a sustainable manner through reliable products, profitable growth and knowledgeable employees with network of expertise.

Perform the business by developing and implementing environmentally and socially responsible projects while improving the quality of life of communities in areas where we do business.

### 1.2 Development of the Company

Glow Energy Plc. was incorporated as “The Cogeneration Public Company Limited” (or “The Cogeneration Plc.”) in October 1993. SUEZ Tractebel S.A., currently subsidiary of GDF SUEZ S.A. (GDF SUEZ S.A. and its subsidiary collectively referred to as “GDF SUEZ”), acquired its initial interest in Glow Company Limited. (or “Glow Co., Ltd.”) in September 1997 and in Glow Energy Plc. in November 2000, after which the latter was de-listed. In December 2004, the Company’s majority shareholders adjusted their internal shareholding structure by acquiring shares of Glow Co., Ltd. Under the new structure, Glow IPP Company Limited (or “Glow IPP”), Glow SPP 1 Company Limited (or “Glow SPP1”) and Glow Demin Water Company Limited (or “Glow Demin”) became the Company’s subsidiaries.

In 2007, we formed two holding companies and one operating company: Glow IPP 2 Holding Company Limited (or “Glow IPP 2 Holding”), Glow IPP 3 Company Limited (or “Glow IPP 3”), and GHECO-One Company Limited (or “GHECO-One”). Glow IPP 2 Holding and Glow IPP 3 are holding companies. GHECO-One is an operating company. The principal business of these companies is the development and operation of power generation projects in Thailand.

In September 2008, GHECO-One signed a long-term power purchase agreement with EGAT and started construction of a 660 MW coal fired project located in MIE. Glow Group owns a 65 percent stake in this project; Hemaraj Land and Development Public Company Limited. (or “Hemaraj”) owns the remaining 35 percent stake.

In May 2009, Glow Co., Ltd acquired a 49 percent stake in Houay Ho Thai Company Limited (or “HHTC”) and a 55 percent stake in Houay Ho Power Company Limited (or “HHPC”) from GDF SUEZ. HHTC is a holding company with a 25 percent stake in HHPC. Therefore, we effectively hold a 67.25 percent stake in HHPC. HHPC owns and operates a 152 MW hydro power plant in Attapeu province, Lao PDR.

In July 2011, the Company acquired 100 percent stake in Thai National Power Company Limited (or “TNP”) from International Power Plc. (or “IPR”), our current major shareholder at that time, which

later became 100 percent owned by GDF SUEZ. TNP holds 100 percent stake in 2 subsidiaries; Thai National Power 2 Company Limited (or “TNP 2”) and Rayong National Power Company Limited (or “RNP”). TNP, TNP 2, and RNP changed their names to Glow SPP 11 Company Limited ( “Glow SPP 11” or “Glow SPP11 Phase 1”), Glow SPP 12 Company Limited (“Glow SPP 12” or “Glow SPP11 Phase 2”), and Glow SPP 13 Company Limited (“Glow SPP 13” or “Glow SPP11 Phase 3”) respectively in December 2011. In 2013, Glow SPP 12 and 13 were merged with Glow SPP 11, in which today operates gas-fired cogeneration facilities generating and supplying electricity to EGAT under SPP scheme and electricity and chilled water to industrial customers in SEIP (located in Pluak Daeng, Rayong).

**The following timeline is of key events in Glow Energy’s history and development**

<b>October 1993:</b>	Glow Energy incorporated under the name “The Cogeneration Public Company Limited”.
<b>February 1996:</b>	The Cogeneration Plc. listed on the Stock Exchange of Thailand (or “SET”).
<b>April 1996:</b>	The Cogeneration Plc.’s cogeneration plant began initial commercial operation.
<b>September 1997:</b>	GDF SUEZ formed a joint venture with Hemaraj, in which each party shared a 50 percent stake in Glow Co., Ltd. (Formerly known as H-Power Company Limited). At the time, H-Power owned 100 percent of Glow SPP 1 (formerly known as Industrial Power Company Limited) and 51 percent of Glow IPP (formerly known as Bowin Power Company Limited).
<b>February 1998:</b>	Glow SPP 1’s 124 MW cogeneration plant began commercial operation.
<b>March 1999:</b>	The Glow SPP 2 / Glow SPP 3 hybrid plant began commercial operation.
<b>May 1999:</b>	Glow Co., Ltd. acquired the remaining 49 percent stake in Glow IPP from International Generating Company Limited., increasing its interest to 100 percent.
<b>June 2000:</b>	GDF SUEZ increased interest in Glow Co., Ltd. to 75 percent.
<b>2000-2004:</b>	GDF SUEZ progressively increased its interest in Glow Co., Ltd. to 100 percent in a series of transactions involving the indirect sale of a 5 percent stake in Glow IPP to Hemaraj.
<b>November 2000:</b>	GDF SUEZ acquired a 62 percent stake in The Cogeneration from Sithe Pacific Holdings Limited.
<b>February/March 2001:</b>	GDF SUEZ increased its shareholding in The Cogeneration to 99 percent by purchasing Banpu’s shares and conducting a tender offer for the remaining outstanding shares.
<b>August 2002:</b>	The Cogeneration’s shares delisted from the SET.
<b>January 2003:</b>	Glow IPP’s 713 MW plant in Hemaraj Chonburi Industrial Estate (or “CIE”), Bowin began commercial operation.
<b>May 2003:</b>	Company name changed from The Cogeneration Public Company Limited to

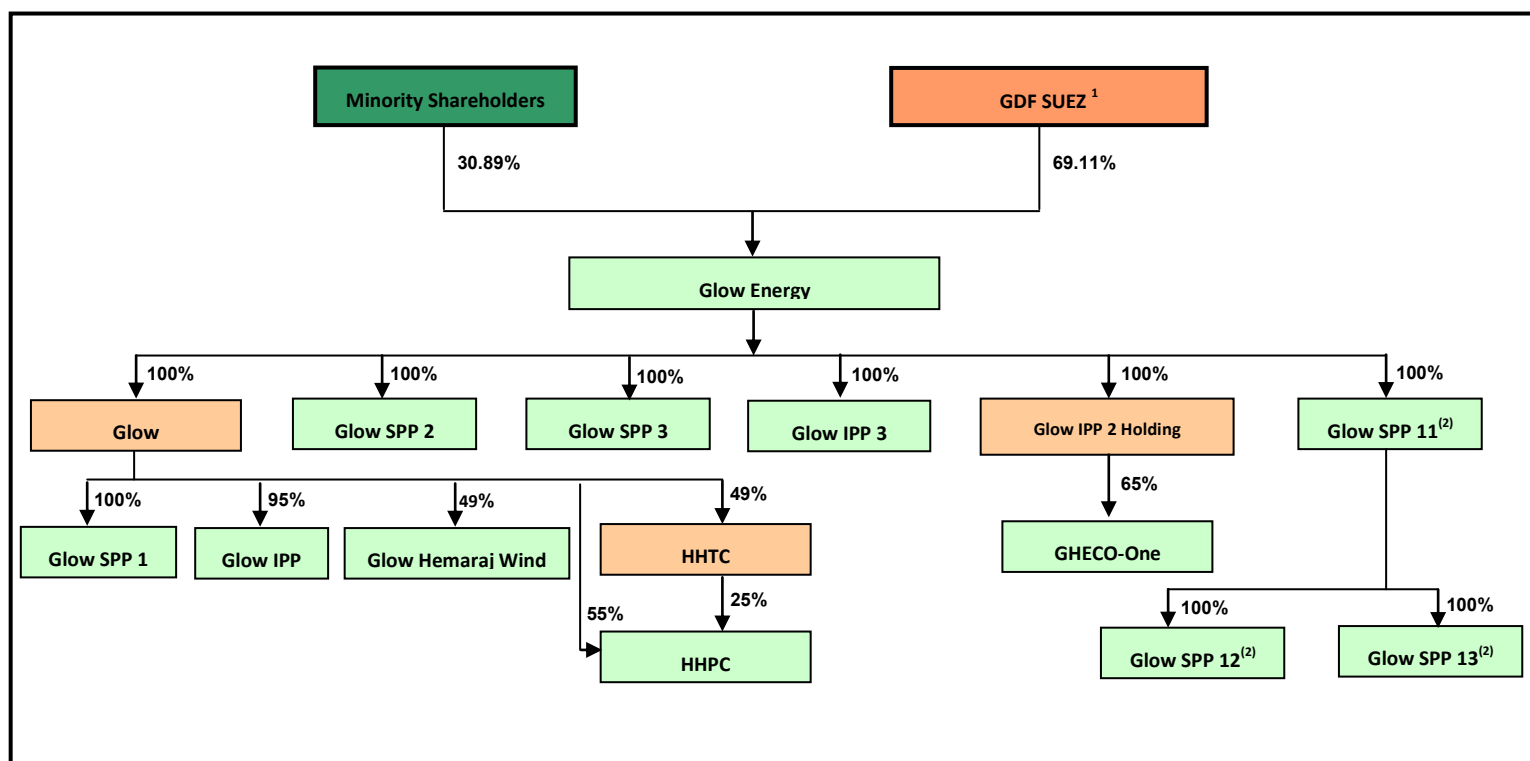
	Glow SPP Public Company Limited.
<b>December 2004:</b>	Glow SPP Public Company Limited (or “Glow SPP Plc.”) acquired 100 percent of Glow Co., Ltd. from GDF SUEZ.
<b>February 2005:</b>	Company name changed from Glow SPP Plc. to Glow Energy Plc.
<b>April 2005:</b>	Glow Energy Plc. listed shares on the SET.
<b>September 2008</b>	Signed Power Purchase Agreement with EGAT and started construction of GHECO-One project in October 2008.
<b>May 2009</b>	Glow Co., Ltd. acquired 49 percent stake in HHTC and 55 percent stake in HHPC from GDF SUEZ S.A. subsidiaries.
<b>November 2010</b>	Glow Energy’s 115 MWeq coal-fired plant (CFB 3) started commercial operation.
<b>December 2010</b>	SUEZ-Tractebel Energy Holding Cooperative U.A. was merged with GDF SUEZ Energy Asia, Turkey and Southern Africa B.V. holding 25 percent in Glow Energy.
<b>February 2011</b>	GDF SUEZ merged its Energy International Business with International Power Plc. (or “IPR”). Stake of Glow Energy held by GDF SUEZ is part of the merger. After the combination, GDF SUEZ holds 70 percent of enlarged IPR
<b>July 2011</b>	Glow Energy Plc. acquired 100 percent stake in TNP, which holds 100 percent stake in TNP 2 and Glow RNP.
<b>July 2011</b>	Glow Energy Plc. entered into Joint Development Agreement with Hemaraj, and established Glow Hemaraj Wind Company Limited (or “Glow Hemaraj Wind Project”), which the Company holds 49 percent stake, in order to develop a wind farm project in Chaiyaphum province.
<b>September 2011</b>	Glow Energy’s 382 MWeq gas-fired cogeneration plant (Phase 5) started commercial operation.
<b>October 2011</b>	Glow Energy Plc. started construction of 1.55 MW PV solar plant in Asia Industrial Estate (or “AIE”), Banchang, Rayong, with expected start of commercial operation in 1 August 2012.
<b>November 2011</b>	Glow Energy Plc. entered into Joint Development Agreement with Global Green Energy Company Limited (or “Global Green”), in order to develop a wind farm project in Nakorn Ratchasima province.
<b>December 2011</b>	TNP, TNP 2, and RNP changed names to Glow SPP 11, Glow SPP 12, and Glow SPP 13 respectively.
<b>June 2012</b>	GDF Suez completed buyout of the minority shareholders of IPR.

<b>August 2012</b>	GHECO-One's 660 MW coal-fired IPP plant started commercial operation.
<b>August 2012</b>	Glow's 1.55 MW PV-Solar plant started commercial operation.
<b>December 2012</b>	Glow SPP12's 110 MW gas-fired cogeneration plant started commercial operation.
<b>June 2013</b>	Glow SPP 12 and Glow SPP 13 transferred entire business to Glow SPP 11, and being under liquidation process.

### 1.3 Shareholding Structure of the Group

Glow Energy Public Company Limited (or "Glow Energy Plc." or "the Company"), together with its subsidiaries, is one of the largest private electricity generators and provider of industrial utilities in Thailand, with operations in Thailand and The Lao People's Democratic Republic (or "Lao PDR"). We operate Independent Power Producers (or "IPP") and cogeneration facilities, most of which operate as Small Power Producers (or "SPP") under Thailand's SPP program. Our core business is to produce and supply electricity to the Electricity Generating Authority of Thailand (or "EGAT"), and to produce and supply electricity, steam, processed water and chilled water to industrial customers in the Map Ta Phut Industrial Estate (or the "MIE"), other industrial estates in the immediate vicinity of the MIE (together, the "MIE Area"), and Siam Eastern Industrial Park (or "SEIP") in Pluak Daeng, Rayong.

The following diagram displays our current organizational and ownership structure as of 31 December 2013:



**Note:**

- 1) GDF SUEZ holds its interest in Glow Energy Plc. through its two wholly-owned subsidiaries, GDF SUEZ Energy (Thailand) Co., Ltd., which holds a 44.11 percent in Glow Energy Plc. and GDF SUEZ Energy Asia Turkey and Southern Africa B.V. (or “GDF SUEZ ATSA”), which holds a 25.00 percent in Glow Energy Plc.
- 2) Glow SPP 12 and Glow SPP13 transferred entire business to Glow SPP 11 in 2013 and being under liquidation process.

Although separate companies within our corporate group own our key operating assets, we maintain a single, centralized management structure for all of our group’s companies and assets. This allows us to effectively monitor and coordinate our production facilities’ operations.

#### **1.4 Relationships with Major Shareholders**

Glow Energy Plc. is 69.11% held by and considered as part of GDF SUEZ. GDF SUEZ, one of the leading energy providers in the world, is headquartered in Paris, France with energy-related businesses throughout North America, Latin America, UK-Europe, Australia, Asia and Middle East, Turkey & Africa (META). Our company is part of GDF SUEZ Energy International business unit.

GDF SUEZ activities are divided into five operational business lines:

- Energy Europe
- Energy International
- Global Gas & LNG
- Infrastructures
- Energy Services

The Company is the sole entity of GDF SUEZ for investment and operation of electricity generation business in Thailand, Laos, and Cambodia.

## 2. Business Descriptions

Glow Energy Plc. and its subsidiaries are one of the largest private electricity generators and providers of industrial utilities in Thailand. We operate Independent Power Producers (“IPP”) and cogeneration facilities, most of which also operate as Small Power Producers (“SPP”) under Thailand’s SPP program. Our core business is to produce and supply electricity to EGAT, and to produce and supply electricity, steam, processed water and chilled water to industrial customers in the MIE, MIE Area and SEIP.

We have operated in Thailand since 1993. Our six principal production facilities are located in the industrial eastern seaboard of Thailand in Rayong and Chonburi Provinces. We also own hydroelectric plant in Lao PDR’s Attapeu Province. As of December 31, 2013, we had a total generating capacity of 3,188 MW of electricity, 1,206 tons per hour of steam, 5,482 cubic meters per hour of processed water and 3,400 refrigerated ton per hour of chilled water.

Electricity generation and sales are the most important components of our business, accounting for 87.3 percent of total revenues in 2013. The generation and sale of steam is also a significant part of our business, accounting for 11.3 percent of total revenues in 2013. We currently own and operate eight principal production facilities. Their operating characteristics as of December 31, 2013, are:

- Glow IPP plant: Located in the Hemaraj Chonburi Industrial Estate (CIE), 713 MW of electrical generating capacity;
- Houay Ho hydroelectric IPP plant: Located in Attapeu Province, Lao PDR., 152 MW of electrical generating capacity;
- GHECO-One plant: Located in the Map Ta Put Industrial Estate (MIE), 660 MW of electrical generating capacity.
- Glow Energy cogeneration plants (Phase 1&2): Located in the Map Ta Phut Industrial Estate (MIE), 281 MW of electrical generating capacity; 550 tons per hour of steam; and 2,520 cubic meters per hour of processed water;
- Glow SPP 1 cogeneration plant: Located in the Hemaraj Eastern Industrial Estate (EIE) 124 MW of electrical generating capacity; 90 tons per hour of steam; and 190 cubic meters per hour of processed water;
- Phase 3 cogeneration plants: Located in the Map Ta Phut Industrial Estate (MIE). The complex consists of;
  - Glow SPP 2/ Glow SPP 3 plant: 513 MW of electrical generating capacity; 190 tons per hour of steam; and 150 cubic meters per hour of processed water;
  - Glow Energy Phase 4 plant: 77 MW of electrical generating capacity; 137 tons per hour of steam and 2,050 cubic meters per hour of processed water;

- Glow Energy CFB 3 plant: 85 MW of electrical generating capacity; 79 tons per hour of steam;
- Glow Energy Phase 5 plant: 328 MW of electrical generating capacity; 160 tons per hour of steam
- Pluek Daeng cogeneration plants: Located in the Siam Eastern Industrial Park (SEIP), consisting of;
  - Glow SPP11 Phase 1 plant (formerly known as Glow SPP 11 plant) : 120 MW of electrical generating capacity; 2,200 refrigerated tons of chilled water;
  - Glow SPP11 Phase 2 plant (formerly known as Glow SPP 12 plant): 110 MW of electrical generating capacity; 1,200 refrigerated tons of chilled water.
  - Glow SPP11 Phase 3 plant (formerly known as Glow SPP 13 plant): 23 MW of electrical generating capacity;
- Glow Energy Solar plant: Located in Asia Industrial Estate (AIE), 1.55 MW electrical generating capacity by Photovoltaic technology (solar cells).

In 2013, we had total consolidated revenues of Baht 69,772 million and a net profit of Baht 7,214 million. As of December 31, 2013 we had total assets of Baht 125,006 million.

#### **(A) Revenue structure**

We derive revenue primarily from sales of electricity to EGAT and sales of electricity, steam, clarified water, demineralized water and chilled water to industrial users in the MIE Area and SEIP. The following table breaks down our revenues by source for the periods indicated:

	Revenues					
	Year Ended December 31,					
	2011		2012		2013	
	(Baht millions)	%	(Baht millions)	%	(Baht millions)	%
Revenues from Sales of Goods and Rendering of Service						
Electricity						
Sales to EGAT by IPP.....	11,466.8	27.9	19,345.6	32.7	26,930.9	38.6
Sales to EGAT by SPPs.....	11,270.6	27.4	15,719.4	26.6	18,262.9	26.2
Sales to Industrial Customers.....	11,421.8	27.8	14,567.2	24.7	15,730.2	22.5
Total.....	34,159.3	83.1	49,632.2	84.0	60,924.1	87.3
Steam.....	5,826.5	14.2	7,160.8	12.1	7,856.9	11.3
Processed Water.....	373.2	0.9	410.8	0.7	426.0	0.6
Total.....	40,359.0	98.2	57,203.8	96.8	69,207.0	99.2
Other Income.....	725.7	1.8	1,869.0	3.2	564.6	0.8
<b>Total Revenue.....</b>	<b>41,084.6</b>	<b>100.0</b>	<b>59,072.8</b>	<b>100.0</b>	<b>69,771.5</b>	<b>100.0</b>

**(B) Business strategy**

Our vision is to optimize profitability through operational excellence and value-creating growth in Thailand and neighboring countries. We have crafted a business strategy that takes into account four perspectives: commercial, operational, financial and human resources.

We have balanced our short- and long-term objectives to create a well-defined set of priorities and action plans. For our existing operations, this involves enhancements in utilization, efficiency and reliability of existing generation units and distribution networks. This will assist us in reducing overall costs and improving profit margins. We also place strong emphasis on the timely completion of new facilities within their respective budgetary frameworks, optimizing capital costs, and strengthening internal reporting systems and procedures. We are also focusing additional resources on sustainable growth in the areas of renewable energy. With the assistance of GDF SUEZ, we will continue developing a highly motivated and competent team of Thai managers and workers to support these efforts.

*1) Commercial Perspective*

From a commercial perspective, we are focused on: (a) growing our core business; (b) proactively managing client relationships; (c) optimizing fuel costs and securing fuel supply; and (d), maintaining and enhancing our local knowledge and relationships.

*1.1) Pursue growth of our core business*

We intend to grow our core business by simultaneously increasing our capacity to meet growing industrial demand for electricity and steam, and by positioning ourselves to compete successfully for opportunities to install new generating capacity in Thailand.

With continued growing utility demand of industrial customers in Pluak Daeng, we are expanding our generation capacity. Our new gas engine units with a net capacity of 19.12 MW in SEIP are expected to be put in operation by early 2015. This expansion will not only facilitate growth of our customers but also increase the reliability and improve optimization of our generation fleet in SEIP.

We are also considering other opportunities to expand our IPP Business in Thailand and Laos. It is also our intention to continue to grow our cogeneration business by seeking new high-value industrial customers while simultaneously growing to meet the demand of existing customers, both in Thailand and South East Asia.

To achieve this, we will focus on maintaining and enhancing our operations, providing reliable and high-quality services to existing customers and new customers, meeting all obligations under the EGAT power purchase agreements, and strengthening our institutional relationships within Thailand (including regulators and policy makers). It is our belief that this will put us in a favorable position to bid for new electricity generation projects in Thailand and neighboring countries in the future.

*1.2) Proactively manage industrial customer relationships*

Our industrial customer base is a key component of our business. The majority of our industrial customers in MIE Area are in the petrochemical industry, which relies upon a stable supply of electricity and steam to avoid start-up costs associated with interruptions that occur during production. Our service



reliability sets us apart from our competitors, and has made us the electricity and industrial utility supplier of choice in our markets. In particular, we target steam and high-load electricity customers who value reliability of supply. The majority of our industrial customers in SEIP are producers of automotive and motorcycle parts. With our reliability of supply and services, all factories in SEIP are our customers.

We place a high-degree of importance on strengthening relationships with existing customers, not only by providing them with a reliable supply of electricity and industrial utilities, but also by working closely with them to better understand their needs and enhance the provision of services. To do this, we use a variety of customer service based action plans designed to improve customer satisfaction. These action plans help us to understand each customer's respective needs, and improve supply reliability, communication, incident handling and problem solving.

We firmly believe that customer satisfaction is the key to retaining and expanding contracts with existing customers and also acquiring new customers.

*1.3) Optimize our fuel management by reducing fuel cost and ensuring supply availability*

Our business is constantly exposed to fluctuations in the price and availability of fuel (and in particular coal). The nature of our business also requires that we have fuel supply arrangements that ensure a sufficient supply of fuel at all times. We also seek to maintain prudent levels of back-up fuel supplies. Both these factors are critical to our ability to operate.

As such, we commit significant resources to fuel management. We are perpetually seeking opportunities to enhance our coal procurement arrangements to reduce coal and freight costs, which directly affect our profitability. To do this, we will continue to examine our open positions on fuel costs. In line with our ongoing efforts to protect against fuel price fluctuations, we entered into a hedging agreement with coal suppliers in 2012 for part of the coal to be delivered in 2013, a hedging agreement with coal suppliers in 2013 for part of the coal to be delivered in 2014, and may enter into similar hedging arrangements in the future. In addition, we also have coal supply agreements that have natural hedge to the coal index for Energy Charge under the PPAs with EGAT.

*1.4) Maintain and enhance local knowledge and relationships*

Our core business is to generate and supply electricity and steam to customers in Thailand, and our business strategies reflect our long-term commitment to the country. In this light, we focus substantial resources on identifying and training key individuals to lead our company into the future. We also place a high priority on strengthening our institutional relationships with EGAT, the government, related government authorities, and regulators.

**2) Operational perspective**

From an operational perspective, our focus is on: (a) maintaining and improving reliability and availability and capacity utilization of generating units and distribution networks; (b) improving fuel consumption efficiency; (c) reducing operating costs; and (d), effectively managing projects under construction.

*2.1) Maintaining and improving reliability, availability and capacity utilization*

Our plant capacity utilization can be improved through capacity enhancement measures as well as by reducing the number of unplanned outages and days required for scheduled maintenance. We continually seek to improve our performance in all these areas through various measures, such as condition and performance monitoring, preventive and effective maintenance, and the reduction of forced outages through root cause analysis and enhanced operating procedures.

*2.2) Improving fuel consumption efficiency*

As fuel is a major cost item, fuel efficiency is an important driver of our profitability. Our aim is to continually improve operational efficiency by optimizing dispatch, monitoring the performance of critical equipment and work processes, optimizing the coal mixing prior to feeding to the boilers as well as energy loss monitoring and mitigation.

*2.3) Reduce operational costs*

It is our aim to minimize operational and maintenance costs without compromising plant reliability or contractual obligations to supply customers. We do this by ensuring the manner and timing at which costs are incurred is transparent and by exercising good judgment with respect to the need for those expenses. We use reliable systems and cost management procedures to ensure prudent cost management.

Since 2010 we have entered into long-term parts agreements with the original equipment manufacturers for the supply of gas turbine parts and reconditioning services to Glow IPP and Glow SPP 1 for the next three major inspection of each generating unit (approximately 8-9 years), which helps to reduce costs. In addition we have also obtained commitment from the original equipment manufacturer of the gas turbine of Glow Energy Phase 5 to supply both gas turbine parts and inspection services for approximately next nine years. Our relationship with, and technical support from, GDF SUEZ and the increase in the number of gas turbine units owned within the group enables us to negotiate more effectively with suppliers and to source equipment and parts on competitive terms.

In 2012, we have entered into another long-term parts and services agreement with IHI to cover the procurement of parts and inspection services scope for the three new gas turbines of Glow SPP12 plant.

*2.4) Execute projects effectively*

We are, on an ongoing basis, either constructing new power plants to serve new customers' demand, implementing projects to enhance performance, and/or constructing new distribution lines to our customers. A dedicated team of employees handles these projects in an organized and prudent manner to avoid delay, poor performance and the financial consequences thereof.

*3) Financial Perspective**Maintain and improve our financial position*

Our focus on excellence also includes financial management. We actively evaluate opportunities to minimize the weighted average cost of capital by optimizing our capital structure while reducing our exposure to financial risks. We seek to mitigate foreign exchange risks by matching the currency costs and debt service payments with the currency, direct or indirect linkage, of free cash flow. We have a prudent but flexible interest rate risk management system that is supported by the expertise of the GDF SUEZ finance departments, which assists us in determining the amount and timing of fixing interest rates. In addition, we also seek to maximize long term shareholder value by actively monitoring our cash balance in conjunction with our capital expenditure plans.

We also seek to improve our management reporting systems and procedures by enhancing the reliability of these systems, and continually perpetually reviewing and documenting the processes involved therein. To do this, we use GDF SUEZ's proven methodology of Internal Controls referred to as the Internal Control Management & Efficiency (INCOME) Program.

The appropriate implementation of the methodology developed for the INCOME Program ensures our Group's compliance with GDF SUEZ's, as well as with the laws and regulations of the jurisdictions that GDF SUEZ operates (such as France's "Loi de Sécurité Financière" ("LSF"), United Kingdom's Turnbull Report, European Union's directives on internal control).

The aforementioned laws and regulations seek to promote corporate responsibility, increase public disclosure, and improve the quality and transparency of financial reporting and auditing. They also make company executives explicitly responsible for establishing, evaluating, and monitoring the effectiveness of the company's internal control structure.

### **(C) Competitive strengths**

We believe that our principal competitive strengths are:

#### **(1) *Critical Scale and Reliability of Operations***

We believe that we have achieved a critical scale of operations in Thailand. Glow IPP has two electrical generators, GHECO-One has 1 electrical generators, our cogeneration facilities in MIE Area and EIE Area have an aggregate of 23 electrical generators and 19 steam generators, and our cogeneration facilities in SEIP have an aggregate of 10 electrical generators. Our size is critical to our competitiveness in MIE Area, as our cogeneration facilities in MIE Area are interconnected to provide a reliable supply of electricity and steam to our industrial customers. Our steam network is of a size that ensures a substantial reduction in the risk of supply interruption and pressure loss in the event that any one or more units fail.

The interconnection of our facilities provides us with a number of advantages: it enables us to dispatch our lowest-cost generating units and improve the reliability of our electricity and steam supply to customers; it allows us greater flexibility to coordinate and rotate maintenance schedules; and ensures our customers greater flexibility when scheduling maintenance outages and in supplying peak start-up demand. Overall, these factors have together allowed our cogeneration facilities to maintain high reliability rates and reduce operating costs.

The acquisition of Glow SPP 11 (formerly known as Thai National Power) has its upside by creating synergy with existing cogeneration facilities. Both locations are in a prime industrial zone of

Thailand and less than an hour travel between the locations. Having a critical scale of operations and advantage of locations there are various synergies which can be created, such as parts sharing to reduce size of inventory, plant operations and maintenance management sharing and advantage of combined purchasing volume to gain economy of scale.

It is our assertion that our competitors cannot replicate the scale of our cogeneration operations in the near term, limiting their opportunities to grow and giving us a distinct competitive advantage. The scale of our operations also allows us to capitalize on synergies between our various businesses, including but not limited to: the presence of system redundancies that limit the risk of system of failure; the presence of economies of scale that improve profitability; more efficient spare parts management; improved operational expertise; large-scale system automation; highly qualified, trained, and experienced personnel able to carry out tasks and procedures more effectively; and leverage with regard to suppliers.

Our size and long-term presence in the marketplace also allows us to attract a highly motivated and competent workforce that gives us key market know-how and credibility as a serious player in the Thai energy industry. We operate IPP and cogeneration facilities – most of which operate as SPPs under Thailand’s SPP program –, giving us a major presence in two distinct sectors of the Thai electricity supply market.

Our business “footprint” in Thailand is diverse, which allows us to attract high-value commercial customers while simultaneously sustaining and increasing cooperation with public sector customers in Thailand. Additionally, our full or near-full ownership and sole operational control of our key assets enables us to control strategic business decisions and react quickly and in a coordinated manner to market developments. We are confident that these factors place us firmly in a position to acquire new business in the future.

(2) *Strategic location and assets*

(2.1) *The MIE Area*

In addition to a critical scale of operations, the location and concentration of our assets also provides us with a key competitive advantage. We are the principal private electricity supplier in the MIE, which is the largest and most important industrial estate for petrochemical companies operating in Thailand, and one of the largest industrial utilities suppliers in the MIE Area.

We operate a centralized utility park that enables us to apply strategic resources in a focused manner reflected in operational strengths. Our presence in the MIE Area provides us with an established business presence in a key commercial area of Thailand. This has generated a number of significant opportunities to develop important business relationships with some of Thailand’s largest companies.

Our facilities are located centrally within the MIE and are surrounded by several key petrochemical producers. We have a supply infrastructure that connects our facilities to clients via an underground electrical network as well as an above-ground steam pipe network.

Our assets are also diversified. We operate both gas- and coal-fired generating units; sell to industrial customers as well as to EGAT; sell material amounts of both electricity and steam; and operate IPP, SPP and non- SPP cogeneration facilities. Together, this diversified portfolio of products, customers

and plants ensures our long-term competitiveness as a major player in the Thai energy supply market.

*(2.2) The SEIP Area*

The SEIP Area is located in industrial estate with high concentration on automobile and motorcycle parts manufacturing. Our advantage is that we are the only private utilities supplier in SEIP Area. We own generating units, power transmission lines and chilled water distribution pipeline. Any expansion of existing industrial users and/ or new clients will likely choose our reliable utility supply.

*(3) Established track record as a reliable supplier focusing on customer satisfaction*

Having operated in Thailand since 1993, we have an established reputation as a reliable provider of electricity and steam. Reliability of supply is particularly important to our industrial customers, especially in the petrochemical industry. As such, we focus on developing and constantly improving our supply reliability to differentiate ourselves from our competitors. For example, our generating park in the MIE Area is centralized and interconnected. We also have a dedicated transmission network. Our reliability of supply to industrial customers is further enhanced through the implementation of critical redundancies and underground cabling for electricity customers.

We also pride ourselves on providing a high level of customer service to clients, as we see customer satisfaction as a key driver to retaining and increasing business with existing clients, as well as acquiring new clients. We believe our track record of solid performance, particularly with industrial customers in the MIE Area and SEIP, has strengthened our reputation.

That our core business is the generation and supply of electricity and steam helps differentiate us from our competitors, many of whom have a broader scale of operations and lack our specialization. This allows us to focus management resources on business development and operational excellence in a manner that our competitors cannot, while simultaneously capitalizing on support from IPR and GDF SUEZ, which is also principally engaged in the supply and production of electricity and industrial utilities.

*(4) Relationship with GDF SUEZ*

As a subsidiary of GDF SUEZ, a worldwide group whose expertise spans most major areas of the global electricity and gas industries, we have access to their critical experience and technical know-how. This allows us to capitalize on, and benefit from, group-wide relationships.

We have formalized certain aspects of this relationship in a Support Service Agreement that Glow Group signed with a wholly-owned subsidiary of GDF SUEZ which, among other benefits, provides us with access to control, operational and project consulting support from GDF SUEZ. We have also signed a separate agreement with GDF SUEZ in which it has agreed not to compete directly with us in Thailand's electricity generation sector.

As GDF SUEZ's sole vehicle for investment in the electricity generation business in Thailand, we believe that we will continue to benefit from this relationship going forward, under the terms of these agreements and otherwise.

(5) *Stability of revenues and cash flows*

For MIE Area, most of our electricity and steam sales are made under long-term sales contracts with durations of approximately 15 years for industrial customers, and between 21 to 25 years for sales to EGAT. Although we had some contracts with industrial customers with original term having already expired or due to expire over the next few years, we have been able to extend majority of those agreements for additional 10-15 years term. Thus, only about 5 percent of our current MWeq sold to industrial customers in MIE Area will expire between 2014 and 2015 and we are currently negotiating to extend those contracts for additional 10-15 years. For the electricity and chilled water supply contracts with industrial customers in SEIP, approximately two third of our contracted capacity has the term that will be ended in 2016 and the rest of the contracted capacity has term that will be ended in 2023.

The EGAT power purchase agreements expire between 2017 and 2037 for SPPs and in 2028 for Glow IPP. The EGAT power purchase agreement with GHECO-One will be expired in 2037. This provides our business, as a whole, an element of stability and predictability that affords us some level of insulation from competition.

In addition and as previously noted, most of our industrial customers are in the petrochemical industry and, due to the nature of petrochemical production processes, have relatively high load factors and stable levels of demand.

## **2.1 Products and Production Facilities**

Our core business is the generation and supply of electricity to EGAT and PEA and the generation and supply of electricity and steam, with clarified, demineralized water and chilled water as secondary products, to industrial customers within the MIE Area and nearby industrial estates and SEIP.

### **2.1.1 Products**

(a) *Electricity*

We produce electricity for sale to EGAT, PEA (for our solar plant under the VSPP program) and to industrial customers. Electricity sold to EGAT, Thailand's single wholesale buyer of electricity, is routed into EGAT's national transmission system. EGAT sells this electricity to both the Provincial Electricity Authority and Metropolitan Electricity Authority (or the "PEA" and "MEA"), which distribute it through their respective distribution networks to end users throughout Thailand.

We also own and operate an interconnected system of supply sources and transmission lines. The various companies within our legal group have entered into contracts to sell electricity to industrial customers in the MIE Area and SEIP. Although the contracts of Glow Energy, Glow SPP 2 and Glow SPP 3 are principally with industrial customers in the MIE, each company also has additional industrial customers in the MIE Area. Glow SPP 1 sells to industrial customers in Thailand's Eastern Industrial Estate while Glow SPP 11 sells to industrial customer in the SEIP area. All electricity in MIE Area is supplied to customers through dedicated transmission lines. Our industrial customers use this electricity for a variety of industrial purposes, the majority of which relate to petrochemical, petrochemical-related and automobile/motorcycle manufacturing and production processes.

*(b) Steam*

We also supply steam to industrial customers in the MIE Area. Glow Energy, Glow SPP 2 and Glow SPP 3 sell primarily to industrial customers in the MIE and AIE, whereas Glow SPP 1 sells to industrial customers in the EIE. Steam is sold to our customers at varying pressure levels and used for a multitude of industrial purposes. Due to the inherent limitations of transporting steam over long distances, most of our steam customers are located within four kilometres of steam generating facilities.

*(c) Processed water*

We also sell clarified and demineralized water to industrial users in the MIE Area. Although this is not one of our group's core businesses, it is complementary to our electricity and steam generation businesses. As such, we initially entered into the business to generate water for our own production purposes. We do, however, sell excess processed water to industrial customers.

*(d) Chilled water*

At the SEIP, we supply chilled water to two industrial clients for cooling in their manufacturing processes. Unlike in the MIE Area the industries at the SEIP Area do not require steam in their manufacturing processes.

**2.1.2 Production facilities**

The following table lists our production facilities key capacity statistics as of December 31, 2013:

Plant Name	Location	Electricity (MW)	Steam (tons/hr)	Production Capacity			Power Plant Commercial Operation Date
				Chilled water (RT)	Processed (cu.m./hr)	Water	
Production Facilities					Clarified	Demin	
Glow IPP .....	CIE	713	-	-	-	-	Jan. 2003
GHECO-One	MIE	660	-	-	-	-	Aug. 2012
Houay Ho Power Plant...	Laos	152	-	-	-	-	Sep. 1999
Glow Energy Phase 1....	MIE	-	250	-	1,110	230	Jul. 1994
Glow Energy Phase 2 ....	MIE	281	300	-	900	280	Apr. 1996
Glow Energy Phase 4 ....	MIE	77	137	-	1,500	550	Jan. 2005
Glow Energy Phase 5	MIE	328	160	-	-	-	Sep 2011
Glow Energy CFB 3	MIE	85	79	-	-	-	Nov. 2010

Glow Energy Solar Plant	AIE	1.55	-	-	-	-	Aug. 2012
Glow SPP 1. ....	EIE	124	90	-	-	190 <sup>(1)</sup>	Feb. 1998
Glow SPP 2/ SPP 3 (Phase 3).....	MIE	513	190	-	-	150	Mar. 1999
Glow SPP 11 Phase 1	SEIP	120	-	2,200	300 <sup>(2)</sup>	60 <sup>(2)</sup>	Oct. 2000
Glow SPP 11 Phase 2	SEIP	110	-	1,200	200 <sup>(2)</sup>	12 <sup>(2)</sup>	Dec. 2012
Glow SPP 11 Phase 3	SEIP	23	-	-	-	-	Oct. 2006
<b>Total.....</b>		<b>3,187.55</b>	<b>1,206</b>	<b>3,400</b>	<b>4,010</b>	<b>1,472</b>	

Source: Glow Energy.

Note:

- 1) The COD of the aforementioned processed water treatment plants may not be the same as power plant COD.
- 2) Raw material for chilled water

Although separate legal entities within our corporate group own these plants, they are centrally managed through a single, coordinated management structure. This allows us to more effectively monitor and coordinate operation of our facilities and implement policies on a group-wide basis.

*(a) Glow IPP plant*

The Glow IPP plant is a natural gas-fired combined cycle plant that began commercial operation in January 2003. The plant, which generates and sells electricity to EGAT, operates as an independent power producer under Thailand's IPP program. The plant had an electrical generating capacity of 713 MW.

*(b) GHECO-One plant*

GHECO-One plant located at MIE Area is a supercritical coal-fired thermal plant that began commercial operation in August 2012. The plant, which generates and sells electricity to EGAT, operates as an independent power producer under Thailand's IPP program. The plant has a net electrical generating capacity of 660 MW.

*(c) Houay Ho Power plant*

The Houay Ho Power plant is a hydro-power plant that began commercial operation in September 1999. The plant is located in Attapeu province, southern part of the Lao People's Democratic Republic. It has a net electrical generating capacity of 152 MW. The plant, which generates and sells electricity of 126 MW to EGAT and 2 MW to EDL, operates as an independent power producer under Thailand's IPP program.

*(d) Glow Energy Phase 1 plant*

The Glow Energy Phase 1 plant, which began commercial operation in July 1994 and is located in



the MIE, consists of a natural gas-fired “D” type boiler for steam generation and a water production plant. The plant is capable of generating 250 tons per hour of steam, 1,110 cubic meters per hour of clarified water, and 230 cubic meters per hour of demineralized water. Because this facility uses relatively inefficient boilers for steam generation, we do not enter into long-term steam supply contracts with respect to this facility. Instead, it is used primarily to satisfy short-term and start-up demand, provide excess capacity, and to strengthen our overall system reliability. The processed water generated by this facility is sold to industrial customers in the MIE.

*(e) Glow Energy Phase 2 plant*

The Glow Energy Phase 2 plant located in the MIE is a combined cycle natural gas-fired cogeneration plant that began commercial operation in April 1996. As of December 31, 2011, the plant had an electrical generating capacity of 281 MW and a steam generating capacity of 300 tons per hour. Electricity generated by this plant is sold both to EGAT and to industrial customers in the MIE. Steam is sold to industrial customers in the MIE. The Glow Energy Phase 2 plant is also equipped with water treatment facilities capable of producing 900 cubic meters per hour of clarified water and 280 cubic meters per hour of demineralized water, which are either consumed by the Glow Energy Phase 1 plant and/or sold to industrial customers in the MIE and nearby industrial estates.

*(f) Glow Energy Phase 4 plant*

The Glow Energy Phase 4 plant is a natural gas-fired cogeneration plant located in the MIE that began commercial operation in January 2005. The Glow Energy Phase 4 Plant has increased its clarified and demineralized water plant capacities since 2010 to serve additional demand in the area of MIE. Plant had an electrical generating capacity of 77 MW, steam generating capacity of 137 tons per hour, clarified water generating capacity of 1,500 cubic meters per hour, and demineralized water generating capacity of 550 cubic meters per hour. Electricity generated by this plant is wholly sold to EGAT, steam and processed water from the plant are sold to industrial customers in the MIE and nearby industrial estates.

*(g) Glow Energy Phase 5 plant*

The Glow Energy Phase 5 plant is located adjacent to the Glow SPP 3 plant in the MIE. The plant consists of gas turbine, heat recovery steam generator and steam turbine. It can generate electricity maximum of up to 382 MW, designed to have 328 MW of electricity and maximum of 160 tons per hours of steam. Electricity and steam produced from this unit are supplied to the existing Glow distribute networks. This unit is comparatively a large cogeneration unit compared to the other existing cogeneration units we have in our fleet. Due to the size and its efficiency the Phase 5 power plant is operated as a base load unit while other small cogeneration units are utilized to fulfill EGAT PPAs and balancing industrial load. The plant has been in commercial operations since September 2011

*(h) Glow Energy CFB 3 plant*

The Glow Energy CFB 3 plant, which began commercial operation in November 2010, is located adjacent to the Glow SPP 3 plant in the MIE. The plant consists of coal-fired circulating fluidized bed boiler and steam turbine. The plant was designed for an electrical generating capacity of 85 MW at a steam generating capacity of 79 tons per hour or an 115 MWeq electrical generating capacity without steam extraction. Electricity and/ or steam generated by the Glow Energy CFB 3 plant are distributed to the current electricity and steam networks for our industrial customers In the MIE Area.

(i) *Glow Energy Solar plant*

The Glow Energy Solar plant is a photovoltaic solar power plant located at Asia Industrial Estate that began commercial operation in August 2012. The plant generates and sells electricity to PEA. The plant has a net electrical generating capacity of 1.55 MW.

(j) *Glow SPP 1 plant*

The Glow SPP 1 plant is a natural gas-fired combined cycle cogeneration facility. The plant is located in the EIE and began commercial operation in February 1998. As of December 31, 2011 it had an electrical generating capacity of 124 MW, a steam generating capacity of 90 tons per hour and a demineralized water production capacity of 70 cubic meters per hour. Electricity generated by the Glow SPP 1 plant is sold to EGAT, as well as industrial customers in the EIE. Steam produced at the plant is sold to industrial customers in the EIE. The Glow Demineralized Water plant is owned by Glow SPP 1 Company Limited and is located within the vicinity of the Glow SPP 1 plant in the EIE. It began commercial operation in November 1999 and is capable of producing a total of 120 cubic meters per hour of demineralized water. We sell processed water produced by the Glow Demineralized Water plant and Glow SPP 1 plant to industrial users in the EIE.

(k) *Glow SPP 2/ Glow SPP 3 plant (Phase 3)*

The Glow SPP 2/ Glow SPP 3 plant is a hybrid natural gas- and coal-fired cogeneration facility located in the MIE that began commercial operation in March 1999. Although we manage the plant as a single generation facility, Glow SPP 2 owns the gas-fired generation portion of the facility and Glow SPP 3 owns the coal-fired portion.

The plant is divided in two parts: (i) two 35 MW gas-fired gas turbines and two heat recovery units; and (ii), two 222 MW hybrid cogeneration units, each comprising a steam turbine and coal-fired circulating fluidized bed boiler. The Glow SPP 2/ Glow SPP 3 plant had an electrical generating capacity of 513 MW, a steam generating capacity of 190 tons per hour and a demineralized water production capacity of 150 cubic meters per hour. Electricity generated by the Glow SPP 2/ Glow SPP 3 plant is sold to EGAT and industrial customers in the MIE Area. The plant's steam and processed water are sold to industrial customers in the MIE and nearby industrial estates.

(l) *Glow SPP 11 Phase 1 plant*

The Glow SPP 11 Phase 1 plant is a natural gas-fired cogeneration plant located in the SEIP that began commercial operation in October 2000. The plant consists of two gas turbines, one steam turbine and an absorption chiller and electric chiller for a back up unit. The plant has electrical generating capacity of 120 MW and chilled water generating capacity of 2,200 refrigerant tons per hour. Electricity from the plant are sold to EGAT and electricity and chilled water sold to industrial customers in the SEIP via our own transmission network and chilled water pipelines, respectively.

(m) *Glow SPP 11 Phase 2 plant*

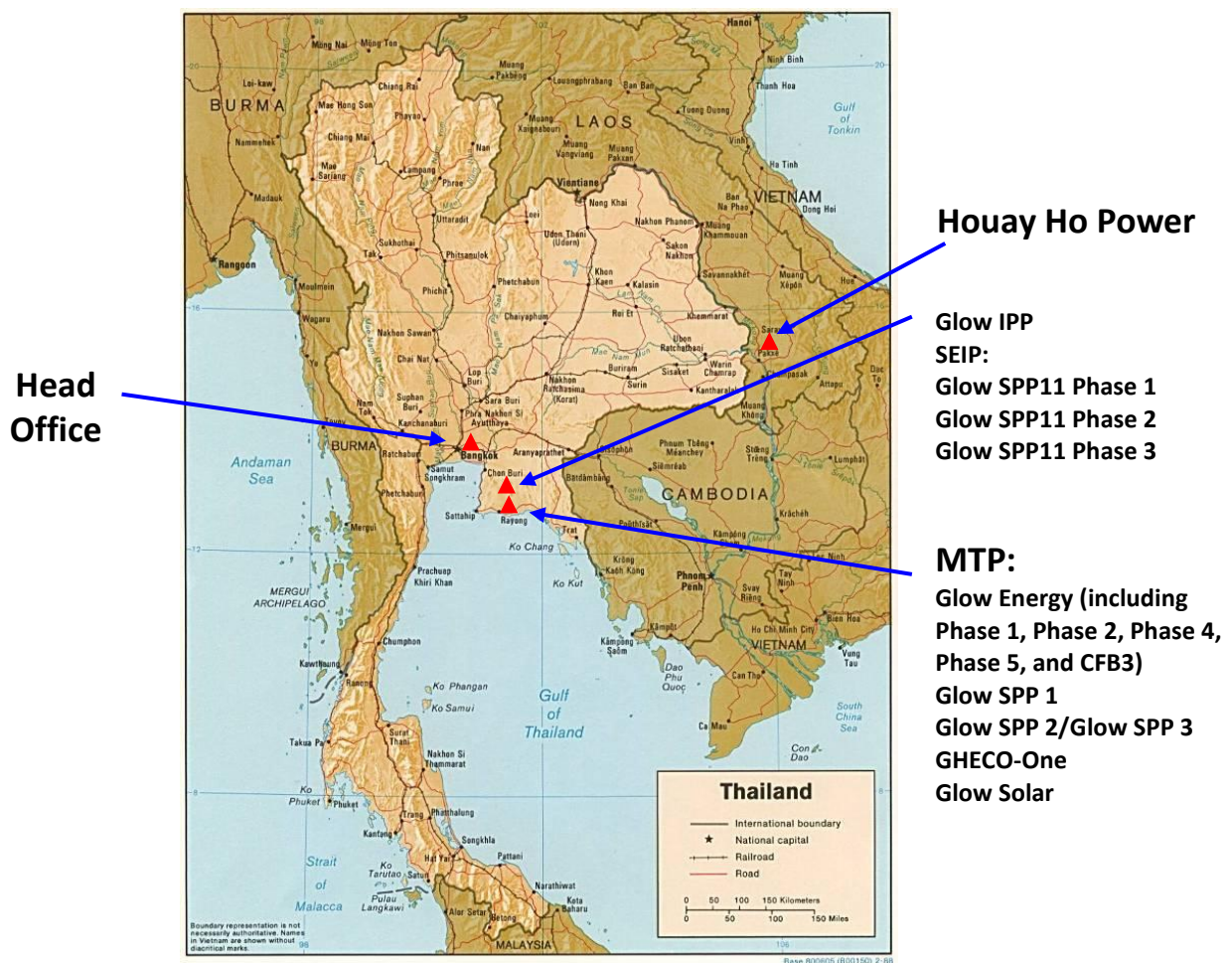
The Glow SPP 12 plant is a natural gas-fired cogeneration plant located in the SEIP that began commercial operation in December 2012. The plant consists of two gas turbines, one steam turbine, an absorption chiller and electric chiller for augmenting the gas turbines output. The plant has electrical

generating capacity of 110 MW and chilled water generating capacity of 1,200 refrigerant tons per hour. Electricity from the plant is sold to EGAT and electricity and chilled water sold to industrial customer in the SEIP via our own transmission network and chilled water pipelines, respectively.

(n) *Glow SPP 11 Phase 3 plant*

The Glow SPP 13 plant consists of four electricity generating reciprocating gas-fired engines located in the vicinity of Glow SPP 11 plant, at the SEIP. The plant can generate a total output of 23 MW into the common network. All four engines were installed and commenced commercial operation in October 2006.

### Head Office and Plant Locations



### 2.1.3 Production processes

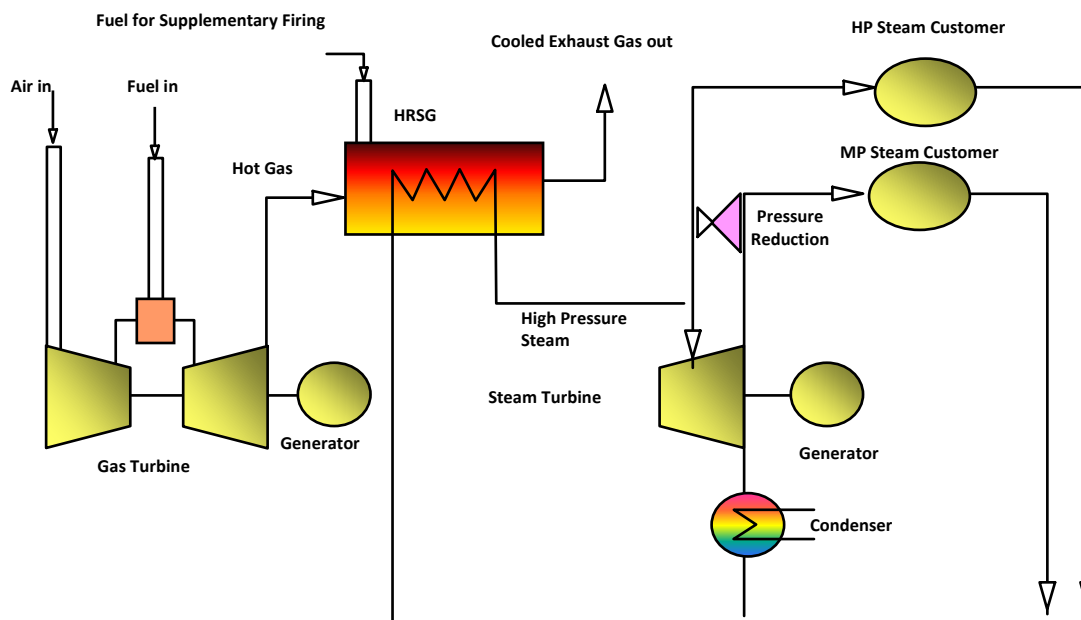
#### (a) Production processes of electricity, steam and demineralized water

##### *Production processes of electricity, steam*

In the combined cycle gas turbine cogeneration process, air is compressed and combined with fuel (natural gas or diesel). This mixture is then passed into the combustion chambers of gas turbine generating units. The fuel's ignition and combustion within these chambers generates high pressure and hot gas. The hot gas expands and is passed through the gas turbine, which turns electric generators that produce an electrical current and voltage. The turbine's exhaust gases then pass through a heat recovery steam generator, where water is heated to generate steam. A portion of the steam generated by the heat recovery steam generator is supplied directly to customers requiring high-pressure steam. The remaining steam is passed through a steam turbine, driving another generator to produce electricity. Steam extracted from an intermediate stage of the steam turbine is sold to customers requiring medium pressure steam. Medium pressure steam is also supplied to customers through pressure reduction and attemperation of high-pressure steam.

The following simplified diagram illustrates the combined cycle gas turbine cogeneration process.

**Combined Cycle Cogeneration Process**



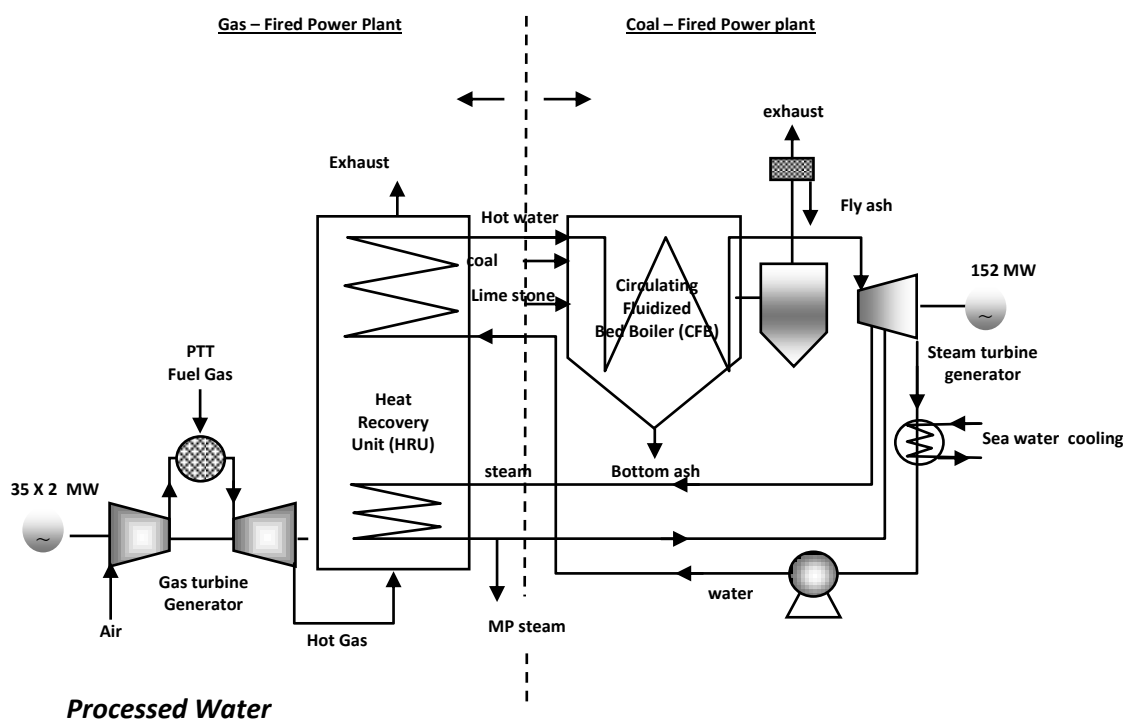
Our Glow IPP facility operates as a combined cycle electrical generating facility and produces electricity solely for EGAT.

Glow Energy and Glow SPP1 operate as combined cycle cogeneration facilities, and produce both electricity and steam. Glow SPP 2 also has two stand-alone combined cycle cogenerating units, in addition to its "hybrid" facilities discussed below.

Our Glow SPP 2/ SPP 3 plant employs a hybrid cycle cogeneration process, in which both gas turbines and steam turbines generate electric power and a circulating fluidized bed boiler generates steam. In contrast to our other electricity generation plants, which rely on gas as their primary fuel source, the Glow SPP 2/ SPP 3 plant is fuelled by both coal and gas. While the specific cycle arrangement used in this process is not common, the equipment used is standard in the international power generation industry. We chose to install a hybrid facility in order to increase our use of coal, a lower-cost fuel, and to reduce our reliance on natural gas as a fuel source.

The following simplified diagram illustrates the Glow SPP 2/ SPP 3 plant's hybrid electricity generation process:

### Hybrid Cogeneration Process



Demineralized and clarified water is produced using relatively simple processes. To produce clarified water, raw water is pumped into a clarifier and treated using a combination of coagulation, flocculation, sedimentation and filtration processes. Coagulation involves adding a coagulant to the water (such as aluminum chlorohydrate) that causes fine particles to form as suspended material in the raw water. A flocculant (such as anionic polymer) is then added to aggregate these fine particles together so that they will sink (or agglomerate) to the bottom of the clarifier. This forms sediment, which is removed in the form of sludge and processed for further water removal. The clarified water is then taken off the top of the clarifier with minimal suspended solids and sent to sand filters. The final stage of this process is filtration, during which the water is filtered to remove any existing small particles that were not removed in the final sedimentation process. The final clarified water is then sold to customers or used internally for the production of demineralized water, service water or fire water.

Production of demineralized water from clarified water involves a chemical process. Clarified water is introduced into a series of deionization tanks called cation, anion and mixed bed exchange vessels. Once in these vessels, the water comes into contact with hydrogen and hydroxide ions present on the resin beads layered within these vessels. Over 99 percent of all ions in the water are removed as the water passes through the series of resin vessels. This is achieved through a chemical reaction whereby the cations in the water are exchanged for the hydrogen in the cation resin vessel, and the anions in the water are exchanged for hydroxide in the anion vessel. The resulting water is then “polished” in the mixed bed vessel to remove trace ions. The final effluent from the mixed bed vessel is essentially “pure” water.

We also use a reverse osmosis membrane technology to make demineralized water. In this process, the effluent water is also “polished” using a mixed bed resin vessel to produce essentially “pure” water. Demineralized water is used for internal steam production and also sold to customers for use in their various production processes.

**(b) Operational management**

All of our facilities are managed under a single management structure that optimizes our operational performance by ensuring our ability to provide a high-quality, reliable supply of electricity and industrial utilities to our customers while simultaneously increasing profit margins. Although all of our plants are managed under a single organizational structure, the Glow IPP plant, Houay Ho plant and GHECO-One plant are under a separate operational structure from our cogeneration facilities. This is primarily due to the fact that these plants are under the IPP program and sell entire electrical generation to EGAT directly through EGAT transmission network. The IPP plants are independently operated from dedicated control rooms.

Effective management of our facilities and operations is fundamental to our success. Our ability to increase revenue from existing customers is limited, as the revenue structure of most contracts fluctuates over the life of the contract due to the built-in adjustment mechanisms contained therein. The price structure of our long-term contracts does, however, allow us to capitalize on increases in efficiency that reduces operating costs.

As fuel is our major cost item, increases in operational efficiency (i.e. the quantity of fuel needed to supply a given amount of energy to our customers) contribute significantly to our profitability. We are therefore constantly seeking to improve operational efficiency by optimizing dispatch procedures, monitoring critical equipment and streamlining work processes, maximizing utilization of coal fired units and the Glow Energy Phase 5 plant at MIE as well as monitoring and mitigating energy loss.

Our key operational strategies are:

- **Improve reliability, capacity utilization and performance:** The reliability of electricity and steam generating units and their corresponding distribution networks is of critical importance to our industrial customers. We are currently implementing recommendations from a reliability improvement study to reduce the amount of unplanned outages and using a dispatch optimizer to optimize our capacity utilization. We will continue seeking to improve our performance through various actions in every area of our organization and operations.
- **Operational cost reduction:** We seek to minimize operational and maintenance costs by ensuring the manner and timing at which costs are incurred is transparent and by exercising



good judgment with respect to the need for those expenses. We also focus on improving cost management through reliable systems and cost control procedures.

- **Project execution.** We are perpetually constructing new power plants and distribution lines to serve new customers and improving performance of existing plants and distribution systems for the benefit of existing customers. A dedicated team of employees handle these projects in an organized and prudent manner that is designed to avoid delays, ensure performance and the financial consequences thereof.

We focus on the following key areas to optimize our facilities' operations:

**(c) *Performance of our electrical generating facilities***

Our ability to market and sale electricity hinges upon the effectiveness with which we are able to operate our generating facilities. This requires us to focus on operational elements that include but are not limited to: the fuel efficiency of electricity generation processes; the percentage of time that our facilities are available to produce electricity; and the amount of time and number of unplanned outages experienced. For example, under the terms of our EGAT power purchase and power supply agreements, we are penalized for any failure to make our generation facilities available for dispatch and/or to supply electricity at certain times of the day at the contracted rates. Our EGAT power purchase agreements also contain contracted heat rates that penalize poor fuel efficiency and reward high fuel efficiency.

We measure the fuel efficiency of generating facilities by calculating their "heat rates". Heat rates measures the amount of fuel required to produce one kWh of energy, and are converted at a standard rate for different types of fuel (i.e. natural gas, coal and diesel oil) into British thermal units ("BTUs"). A lower heat rate is indicative of a more efficient production process. The heat rates at our electricity generating units vary due to differences in equipment and design, and in part due to the varying generating capacities of the different fuel sources used. Generally, coal-fired plants have higher heat rates than natural gas-fired plants, and larger generating facilities produce electricity more efficiently, which results in lower heat rates.

We use the following measurements to gauge operational performance:

- **Availability factor ("AF"):** the percentage of hours in a given period for which a unit was available for service, whether or not it was actually operated;
- **Planned outage factor ("POF"):** the percentage of hours in a given period for which a unit experienced planned outages. A planned outage is an outage, scheduled well in advance, incurred to perform testing, inspection or overhaul work. Planned outages typically occur once or twice per year;
- **Maintenance outage factor ("MOF"):** the percentage of hours in a given period for which a unit experienced maintenance outages. A maintenance outage is defined as a maintenance related outage that can be deferred for a period extending beyond the next weekend, but requires the unit to be removed from service prior to the next planned outage;
- **Forced outage factor ("FOF"):** the percentage of hours in a given period for which the unit was in a forced outage. A forced outage is an outage that requires that the unit to be removed from service

(a trip or a shutdown) before the end of the next weekend. A forced outage also results when an attempt to bring a unit into service is unsuccessful, which is also referred to as a starting failure.

The availability and outage factors for plants consisting of more than one turbine generator are based on the arithmetic average of the availability and outage factors of those generators. A high availability factor generally indicates that the facility is capable of generating during a large portion of the period measured, while a low unplanned outage factor, (consisting of maintenance outages and forced outages), generally indicates that our facilities are well maintained and reliable.

The table below summarizes our electricity generating facilities' Availability Factor (AF) for the periods indicated.

Availability Factor	Year ended December 31		
	2011	2012	2013
Glow IPP plant	96.26	85.51	96.78
GHECO-One plant	-	83.23	80.00
Glow Energy plant <sup>(1)</sup>	95.25	96.81	97.13
Glow SPP 2 plant	95.03	96.23	95.52
Glow SPP 3 plant	96.68	89.40	98.22
Glow SPP 1 plant	98.26	94.30	95.38
Houay Ho Power Plant	99.18	96.53	66.52
Glow SPP 11 Phase 1 Plant	94.97	90.77	98.84
Glow SPP 11 Phase 2 Plant	-	96.84	97.21
Glow SPP 11 Phase 3 Plant	94.67	97.12	99.56

Source: Glow Energy.

**Notes:**

- 1) Excludes Glow Energy Phase 1, which operates relatively inefficient boilers, is principally used for short-term and back-up supply purposes and includes Glow Energy Phase 5 plant

We believe that our system-wide performance is enhanced significantly by the interconnection of our cogeneration facilities, which allows us to back up individual facilities with multiple other facilities, greatly reducing the risk of supply interruptions to customers. For additional data regarding the historical reliability of our supply to industrial customers refer to Section 4.2.2 (b) regarding industrial customers.

Our power and steam supply agreements with industrial customers typically contain conditional liquidated damages provisions that generally require us to compensate customers for service interruptions.

We have entered into back-up power purchase agreements with EGAT pursuant to which EGAT will supply us with electricity during periods in which we are unable to supply electricity to our industrial customers during outages. Pricing under these agreements is based on the standard PEA electricity tariff for large-scale electricity purchasers. As this is typically higher than the price at which we sell electricity



to our industrial customers, we lose money when we are required to rely on these arrangements. In the past, we have not been required to rely on these back-up arrangements for any material length of time.

**(d) Utilization of production facilities**

In addition to the performance indicators set out above, a key determinant of operating performance is the level at which generating facilities are operated. Generally, the closer a facility is to operate at full capacity, the more quickly we are able to recover investment costs and operate from a position of profitability.

A capacity factor is another measurement used to determine a facilities operating performance. A capacity factor, which is expressed as a percentage represents the net actual energy produced compared to nominal capacity in a given period.

The table below displays the capacity factor information for our electricity and steam production facilities.

	Year ended December 31,		
	2011	2012	2013
<b>Capacity Factor</b>			
Glow IPP plant			
Electricity:	77.50	77.20	81.75
GHECO-One plant <sup>(4)</sup>			
Electricity:	-	63.24	71.27
Glow Energy (2) plant			
Electricity:	79.16	63.84	62.95
Steam:	91.66	100.10	103.55
Glow Energy (4) plant			
Electricity:	60.09	61.55	76.16
Steam:	64.45	65.33	82.61
Glow Energy (5) plant <sup>(1)</sup>			
Electricity:	66.60	87.51	83.71
Steam:	73.80	72.87	60.34
Glow Energy (CFB 3) plant <sup>(2)</sup>			
Electricity:	88.17	91.85	93.71
Steam:	51.94	72.68	74.68
Glow SPP 1 plant			
Electricity:	74.35	73.18	70.21

	Year ended December 31,		
	2011	2012	2013
<b>Capacity Factor</b>			
Steam:	53.76	52.40	47.67
Glow SPP 2 plant			
Electricity:	72.95	55.60	52.53
Steam:	60.50	22.23	12.31
Glow SPP 3 plant			
Electricity:	76.41	65.93	71.16
Steam:	216.75	302.80	351.07
Houay Ho Power plant <sup>(3)</sup>			
Electricity:	6.72	41.01	25.18
Steam:	-	-	-
Glow SPP 11 Phase 1 plant <sup>(3)</sup>			
Electricity:	78.00	77.96	83.79
Steam:	-	-	-
Glow SPP 11 Phase 2 plant <sup>(4)</sup>			
Electricity:	-	74.94	76.97
Steam:	-	-	-
Glow SPP 11 Phase 3 plant <sup>(3)</sup>			
Electricity:	32.43	36.03	24.48
Steam:	-	-	-

**Source:** Glow Energy.

**Notes:**

- 1) Includes Glow Energy Phase 5 as of September 2011
- 2) In 2010, we includes Glow Energy CFB 3 as of November 2010
- 3) In 2011, includes Houay Ho Power plant, Glow SPP 11 Phase1 plant and Glow SPP 11 Phase 3 plant
- 4) In 2012, includes GHECO-One and Glow SPP 11 Phase 2 plant
- 5) Excludes Glow Energy phase 1

As noted above, one of our key competitive strengths is our system reliability, as reflected in our ability to offer industrial customers a secure and constant supply of industrial utilities.

The table below displays our cogeneration facilities' supply reliability data for the periods indicated:

MIE facilities' supply reliability data for our operation:

	Year ended December 31,		
	2011	2012	2013
<b>Average reliability</b>			
<b>Electricity</b>			
Glow Energy, Glow SPP 2, Glow SPP 3			
22 kV supply .....	100.000	99.996	99.926
115 kV supply .....	99.809	100.000	99.854
Glow SPP 1			
22 kV supply .....	99.999	100.000	99.798
115 kV supply .....	100.000	100.000	99.883
<b>Steam</b>			
Glow Energy, Glow SPP 2, Glow SPP 3			
High pressure supply .....	99.995	100.000	99.951
Medium pressure supply .....	99.999	100.000	99.966
Glow SPP 1			
Medium and low pressure supply .....	100.000	100.000	99.966

**Notes:**

- 1) Reliability factor is a measurement of Glow's ability to perform its utility supply obligations under the conditions specified in its agreements with its customers during each contract year. Reliability factor in respect of each customer is generally calculated by taking the sum of the actual number of hours that Glow's utility is made available to that customer and equivalent partial available hours (calculated over partial restriction of utility supply) that Glow utility has made available to its customer during the period, divided by the total number of hours in such contract year (excluding force majeure events and schedule maintenance). Average reliability for each product is calculated by taking a mathematical average of the reliability factors in respect of each customer.

SEIP facilities supply reliability data for our operation:

	Year ended December 31,		
	2011	2012	2013
<b>Average reliability</b>			
<b>Electricity</b>			
Glow SPP11			
22 kV supply.....	99.999	99.987	99.626

## 2.2 Market and Competition

### 2.2.1 Marketing and Sales

Our marketing and sales function is central to our business, as it allows us to maintain and strengthen our relationships with our existing customer base and acquire new customers for the growth of our business.

EGAT is our largest and most important customer. We strive to strengthen our relationship with EGAT by fully complying with the terms of our EGAT power purchase agreements and wherever possible working closely with EGAT to resolve differences or disagreements. We market our products to industrial customers on the basis of our ability to provide superior reliability. As noted earlier, this is of critical importance to industrial customers, particularly those in the petrochemical industry. It is our firm belief that our supply reliability is superior to that of our competitors.

Generally, we seek customers with high and stable load requirements for electricity, steam and chilled water. This enhances our ability to predict and manage load requirements while simultaneously allowing us to capitalize on our cogeneration facilities to achieve maximize efficiency. We price electricity, steam and chilled water sales to industrial customers using both an “avoided-cost” model and “cost plus margin model” that allow us to more effectively price products and optimize profit margins.

We have a dedicated industrial sales department to identify potential business, both from new and existing customers. The department is also responsible for preparing and negotiating new sales agreements.

For MIE Area, we operate primarily under long-term contracts with a relatively small group of key, repeat electricity, steam and water products customers. For SEIP Area, contracts term is shorter (most of the contract has 5 years term); however, these customers have been repeated electricity and chilled water products customers similar to MIE Area. As such, we employ a dedicated account manager in our industrial customer relations department to manage relationships with existing customers. We

maintain positive and professional working relationships by cooperating closely with customers. In addition, we strive to develop complementary services and products that we expect will benefit our customers in the future.

It is our philosophy that the quality of our products and services is directly related to our ability to understand and meet each customer's unique needs. With this aim in mind, our marketing department works closely with our industrial sales and customer relations departments to prepare individualized customer action plans. Our customer relations department also handles contract management as well as technical and commercial complaints and incidents.

Together, these unique organizational characteristics help us to maintain a level of operational excellence and deliver high quality products and services consistently and reliably.

### **2.2.2 Customers**

Our customer base is composed of both private and public sector clients that include EGAT and industrial customers.

#### **(a) EGAT**

We sell a significant portion of the total electricity generated at our plants to EGAT, a state enterprise created under, and subject to, the Electricity Generating Authority of Thailand Act. EGAT is the dominant participant in the Thai electricity market. It owns and manages the majority of Thailand's electricity generating capacity, as well as the nation's transmission network. EGAT is also Thailand's largest electricity generator, with a total generating capacity of 15,010 MW as of December 2013.

Sales of electricity to EGAT accounted for 64.8 percent of our total revenues in 2013 (See "Risk Factors—We are highly dependent on EGAT", and "—We operate in a highly regulated industry that is subject to change".) To date, we have not experienced any material problems with EGAT regarding payments for capacity made available and electricity delivered under existing EGAT power purchase agreements.

#### **(1) Sales to EGAT by Glow IPP and GHECO-One**

#### **General:**

We sell electricity to EGAT under long-term power purchase agreements. The contracts for EGAT power purchase agreements are different for IPPs ("IPP power purchase agreements") and SPPs ("SPP power purchase agreements"). Our IPP power purchase agreements have a term of 25 years from the IPPs' commercial operation date. The agreements stipulate that IPPs are responsible for financing, constructing and commissioning power plant facilities in compliance with agreed technical characteristics. The agreement also stipulates that Glow IPP is responsible for operating and maintaining these facilities upon their successful commission. EGAT has the exclusive right to dispatch the generation of electricity from our IPPs into the transmission network (subject to certain minor limitations).

#### **Payments:**

Under the IPP power purchase agreement we receive two principal types of payment from EGAT:

- “Availability Payments,” which EGAT is required to make if IPP plants are available to generate electricity with the agreed characteristics at agreed levels in response to dispatch instructions from EGAT, regardless of whether or a dispatch instruction is issued. These payments ensure a return on our investment in the facility and cover fixed operating and maintenance costs; and
- “Energy Payments,” which EGAT makes for electricity supplied to EGAT in response to dispatch instructions. These payments are designed to cover fuel, fuel transportation and variable operation and maintenance costs incurred by IPPs in the production of electricity supplied to EGAT.

We also earn an “added facility charge” from EGAT for Glow IPP, which is a payment used to reimburse Glow IPP for amounts advanced to EGAT to build new transmission facilities and cover other access costs incurred on behalf of EGAT to connect the Glow IPP plant to EGAT’s transmission grid.

### **Costs and pass-throughs**

Under the IPP power purchase agreement, EGAT compensates IPPs for changes in fuel and fuel transportation costs in the form of higher or lower energy payments. Although EGAT’s payments to IPPs under the IPP power purchase agreement are denominated in Baht, the portion of availability payments with regard to our fixed capital investment, fixed operation and maintenance costs are indexed to Baht/US dollar exchange rates.

EGAT bears the cost for increases in taxes (except for income taxes) or other changes in law that increase operating costs at IPP plants. Any reduction in taxes (except for income taxes) or other costs due to changes in law is also passed through to EGAT.

### **Force majeure**

Our IPP power purchase agreement also contains extensive *force majeure* provisions constituting nine separate types of events, including:

- severe weather;
- plague;
- war;
- strikes;
- changes in law;
- failure to obtain government approvals (other than due to Glow IPP’s failure or omission);
- accident, earthquake, sabotage, fire or explosion;
- expropriation; and
- a *force majeure* affecting the performance of any person that is party to a material maintenance, fuel supply, service or other contract.

A separate term, “governmental *force majeure*”, is defined to apply *force majeure* events of war, changes in law, failures to obtain government approvals and expropriation in which the action or inaction of the government is the controlling and/or contributing force.

Our IPP power purchase agreements provide that: (i) if IPPs are unable to make its generating facilities available due to a *force majeure* event that is not a governmental *force majeure*, EGAT is only required to make availability payments to IPPs to the extent IPPs' facilities are actually available; (ii) if EGAT is unable to perform its obligations due to a *force majeure* event that is not a governmental *force majeure*, it must for the first six months of the *force majeure* event pay to IPPs their debt service costs and, after six months, it must make full availability payments to IPPs (including for payments not made during the initial six months); and (iii) if a governmental *force majeure* prevents either IPPs or EGAT from performing the obligations under the agreement, EGAT is still required to make its availability payments to IPPs (subject to certain modifications in their calculation to reflect the fact that a *force majeure* may render the original calculation formula inapposite).

*Force majeure* can also give rise to termination rights under the IPP power purchase agreements. Either party may terminate the agreement if a *force majeure* event other than a governmental *force majeure* event affects IPPs for a period exceeding one year. EGAT may terminate the agreement if a governmental *force majeure* affects either party for a period exceeding one year.

Certain termination provisions require EGAT to purchase IPPs' generating plant if EGAT terminates the agreement due to a *force majeure* event. This is the case for a non-governmental *force majeure* event that affects EGAT for more than one year and a governmental *force majeure* event affecting either party that continues for more than one year. The agreement contains a basic framework for the compensation to be paid in this situation.

### **Events of default**

Our IPP power purchase agreements contain provisions for a number of events that could potentially lead to termination pursuant to an event of default or the occurrence and continuation of a *force majeure* event. The termination provisions for events of default provide both Glow IPP and EGAT with the right to terminate the agreement after applicable cure periods in respect of the other party's event of default having expired.

Events of termination that entitle EGAT to terminate the agreement include: a payment default by IPPs; severe damage to IPPs' plants (as specified in the IPP power purchase agreement); the occurrence of specified insolvency-related events relating to IPPs; certain material deadlines being missed; certain changes in control of IPPs; and the consistent failure to achieve expected availability (to the degree specified in the IPP power purchase agreements). Events of termination that entitle Glow IPP to terminate the agreement include: EGAT's payment default; EGAT's breach of a material provision of the IPP power purchase agreements; and certain insolvency events relating to EGAT.

Our IPP power purchase agreements contain specific provisions that ensure IPPs are paid a certain amount in the event that the agreement is terminated for reasons of *force majeure*. If any *force majeure* event (other than a governmental *force majeure*) affects IPPs and continues for more than one year, either IPPs or EGAT may terminate the agreement without any payment requirements.

If a *force majeure* event (other than a governmental *force majeure*) affects EGAT, continues for more than one year, and results in EGAT's termination of the agreement, EGAT is required to pay IPPs an amount equal to the sum of: (i) all amounts outstanding under IPPs' financing documents; (ii) IPPs' paid-up share capital and share premiums; and (iii), IPPs' retained earnings, less the amount of any related insurance proceeds received.

If a governmental *force majeure* event affects either IPPs or EGAT, continues for more than one year, and results in EGAT's termination of the agreement, EGAT is required to pay an amount that: (i) is not less than all amounts outstanding under IPPs' financing documents; and (ii), takes into account the condition and historical performance of the plant, its remaining useful life, the economic value of the plant's generating capacity, the depreciated cost of the plant, IPPs' historical returns, and the nature and ability to cure the *force majeure* event.

### **Technical and other provisions**

The IPP power purchase agreement sets forth pertinent terms such as: scheduled commercial operation dates and other critical milestones (all of which have been met); detailed operating characteristics the plant must achieve; damages in the event of delays in completion; testing protocols; step-in rights; and environmental requirements.

The Glow IPP power purchase agreement requires Glow IPP to maintain sufficient supplies of backup fuel. All IPP power purchase agreements require EGAT to provide standby electricity to Glow IPP. The agreement also sets out specific liquidated damages for either party's failure to perform its obligations.

In addition, the IPP power purchase agreements also require that following any privatization, the privatized entity remain government owned or controlled, or, if neither, that it remains capable of performing the obligations of its predecessor.

#### **(2) Sales to EGAT by our SPPs**

### **General**

We also sell electricity to EGAT under a total of eleven<sup>1</sup> SPP power purchase agreements. Our SPP power purchase agreements generally carry terms of 21 to 25 years, under which we are responsible for financing the construction and commissioning of power plant facilities in compliance with the agreed technical characteristics set out in the SPP power purchase agreement and, thereafter, for operating and maintaining these facilities.

SPP power purchases are standard-form agreements with uniform substantive terms that apply to all SPPs; there was no opportunity for us to negotiate these agreements.

### **Payments:**

Under our SPP power purchase agreements, EGAT is obligated to make minimum monthly capacity payments (subject to monthly foreign exchange rate adjustments), which generally allow us to recover fixed capital expenditures and fixed operating costs. In contrast to Glow IPP Power purchase agreements, under which our availability and energy payments are calculated with regard to specific operating circumstances, capacity and energy payments for our SPPs are determined by the SPP program's specific guidelines without reference to our specific SPPs.

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<sup>1</sup> Included Glow SPP 11 and Glow SPP12



EGAT is required to purchase a minimum amount of energy from our SPPs. EGAT also pays us separately for the electricity that we actually generate on its behalf and that which is sold. EGAT has make-up rights that permit it to demand delivery of any electricity it pays for but does not use for a period of two years following any year in which it uses less electricity than its minimum purchase obligation.

Under the terms of the SPP power purchase agreements, our SPPs are entitled to reduce EGAT's minimum entitlement to facilitate sales to third parties. In the case of such a reduction, EGAT's fixed payment obligations are reduced by a corresponding amount and EGAT is entitled to a refund of any payments made (plus interest on such payments) for electricity not supplied.

Conversely, any failure by our SPPs to meet capacity requirements for a period of 18 months could lead to termination of the power purchase agreement by EGAT, but only with respect to the amount of capacity that we have failed to deliver, and require us to refund capacity payments in respect of the shortfall amount.

Our SPPs are also required to generate and sell a certain amount of steam in order to meet applicable "thermal ratios", which measure the ratio of thermal energy to electricity energy produced. Any failure to generate the prescribed amounts of steam to meet the thermal ratios set forth in the power purchase agreement results in a reduction in payments to us.

### **Costs and pass-throughs**

Energy payments are subject to adjustments that reflect changes in natural gas and coal prices. These adjustments are uniform and applicable to all SPPs in Thailand rather than to our SPPs specifically, and therefore may not accurately reflect changes in our actual fuel costs. There is currently no material open position with respect to purchases of natural gas. There is, however, a significant coal pricing risk. The pass-through mechanisms do not incorporate the freight costs of coal shipments.

### **Force majeure**

Under our SPP power purchase agreements, either party may claim *force majeure*. The occurrence of a force majeure can excuse a party's non-performance under the agreement and can, under certain circumstances, result in the extension of the agreement to make up the *force majeure* period.

*Force majeure* includes:

- acts of government such as a change in energy policy;
- blockades or acts of enemies in warlike situations;
- riots, insurrections, sabotage, strikes, evictions, accidents, earthquakes, storms, fires, floods, plagues and explosions;
- a failure of the SPP to renew permits;
- expropriation; and
- any event constituting a "*force majeure*" under the SPP's gas supply agreement with PTT.

The term governmental *force majeure* is defined to mean acts of government, blockades or acts of enemies in warlike situations, a failure of the SPP to renew permits and expropriation where the *force*

*majeure* event has been caused by the government. Equipment breakdown is specifically stated not to constitute a *force majeure* event.

Under our SPP power purchase agreements, EGAT must continue making full capacity payments to us in the case that it is affected by a *force majeure* event. In the case of any *force majeure* event affecting EGAT, or any governmental *force majeure* event affecting our ability to perform under the agreement (other than a *force majeure* event relating to PTT), EGAT will continue making full capacity payments to us for a period not exceeding six months.

The agreements contain no further adjustments to payment provisions in the event of *force majeure*, meaning that we are not entitled compensation for our failure to supply electricity to EGAT in any other circumstances arising from a *force majeure* event. Where EGAT continues to make capacity payments during periods of *force majeure*, the relevant SPP power purchase agreement may be extended for a period equal to the *force majeure* period. During an extension period resulting from such circumstances, EGAT is only required to pay the energy payment for the purchase of electricity and not capacity.

#### **Events of default**

Under the SPP power purchase agreements, events of default include: payment default by either party; the SPP's inability to deliver electricity for more than 15 consecutive days (excluding permitted exceptions or circumstances for which EGAT is directly responsible); the SPP's non-compliance with material conditions as stipulated in the agreement; and the SPP's failure to meet stipulated standards of electricity to be delivered.

#### **Technical and other provisions**

To ensure that we meet our contracted capacity requirements, the SPP power purchase agreements impose financial penalties and disincentives for our failure to meet said capacity requirements. EGAT is also entitled to request additional electricity, which our SPPs are not obligated to provide and for which EGAT is required to pay relatively high rates.

The SPP power purchase agreements also contain change in law provisions which provide that, if there is a change in law which requires material changes to be made to the facility or has a material impact on expense or revenues, the details of such change shall be submitted to the appropriate regulatory body for consideration on whether and how to amend the arrangements under the power purchase agreement appropriately.

#### ***(b) Industrial customers***

In the MIE Area, our industrial customers are mostly large-scale industrial companies, comprised of mainly upstream and downstream petrochemical producers. Our industrial customers generally have strong business backgrounds and many of them are subsidiaries or affiliates of international corporations. In the SEIP Area, our industrial customers are mostly medium-scale industrial companies, consisting mainly of producers of i) food packing and ii) automotive/motorcycle parts and related products. Sales to our industrial customers accounted for 34.4 percent of our total revenues in 2013. Sales of electricity to our industrial customers accounted for 22.5 percent of our total revenues in 2013,

while sales of steam and water together accounted for 11.3 percent. See “Risk Factors—We are highly dependent on a small number of industrial customers”.

In the MIE Area, we typically enter into contract terms of 15 years with industrial customers, although we can also accommodate shorter and longer contract periods. In the SEIP Area, we typically enter into contract terms of 5 years with industrial customers; however, similar to MIE Area, we can also accommodate longer contract periods. This helps us stabilize cash flow and reduces future off-take risks. For electricity sales most of the contracts are priced with reference to the PEA tariff, which contains adjustment mechanisms to account for changes in prevailing fuel costs (other than coal). Note that PEA tariff structure is periodically reviewed by ERC. We do not know how the tariff will be revised in the future and that could have a material adverse effect on our business. For steam and chilled water sales, contracts are priced with reference to the customer’s avoided costs or Glow’s cost plus margin.

As of December 31, 2013, we were supplying: 751MW of electricity to industrial customers under an aggregate of 74 power supply agreements; 1,174 tons per hour of steam to industrial customers under an aggregate of 30 steam supply agreements; 2,050 RT of chilled water to industrial customers under an aggregate of 2 chilled water supply agreements; and a total of 1,669 cubic meters per hour of clarified and demineralised water to industrial customers under an aggregate of 17 water supply agreements.

Our ten largest industrial customers ranked in order of revenue for combined sales of all industrial utilities are:

- PTT Global Chemical Plc.;
- Dow Chemical Thailand Ltd.;
- Vinythai Plc.;
- AGC Chemical (Thailand) Co., Ltd.
- Bayer Thai Co. Ltd.;
- Thai Polycarbonate Co., Ltd.;
- Thai Polyethylene Co., Ltd.;
- Map Ta Phut Olefins Co., Ltd.;
- Siam Styrene Monomer Co. Ltd.;
- Bangkok Synthetics;
- Siam Mitsui PTA Co., Ltd.

### *Electricity*

Electricity sales to our ten largest industrial customers accounted for 16.0 percent of our total revenues in 2013. Our largest industrial electricity customers in 2013 included:

- Vinythai Plc.;
- Dow Chemical Thailand Ltd.;
- AGC Chemical (Thailand) Co., Ltd.;
- PTT Global Chemical Plc.;
- Thai Polyethylene Co., Ltd.;
- Bayer Thai Co., Ltd.;

- Thai Polypropylene
- Map Ta Phut Olefins Co., Ltd.;
- Thai Polycarbonate Co., Ltd.;
- Siam Mitsui PTA Co., Ltd.

Power supply agreements with industrial customers are generally negotiated on a customer-specific basis, although most use a similar form.

We typically price our sales of electricity to industrial customers by referencing to the prevailing retail tariff charged by PEA for industrial users and may include discount. The PEA tariff includes a base charge and a fuel transfer charge, or Ft. The current Ft structure is intended to cover fluctuations in the costs to EGAT of purchasing fuel to produce and purchase electricity, as well as, to a certain extent, transmission and distribution costs and other fluctuations including foreign exchange rate changes and inflation.

The price of electricity sold to most industrial customers usually includes a capacity and energy charge, the latter of which is adjusted in accordance with the Ft. The capacity charge is payable on a monthly basis and expressed as a fixed Baht amount per kilowatt for peak demand. It represents a small portion of the overall electricity tariff and does not cover capital, fixed operation or maintenance costs.

The energy charge, which is also payable monthly, is expressed in Baht per kWh and adjusted with reference to the PEA tariff. Discounts to the capacity charge, energy charge, or both are applied on a customer-specific basis depending on the load factor, contracted capacity, minimum take obligation, interconnection costs and other factors.

In the MIE Area, most of the contract term for power supply agreements are for a period of 15 years from the commercial operation date of the customer. Although a number of our original agreements have already expired or are to expire over the next few years, most of agreements were extended for additional 10-15 years term. We have also secured several contracts with new industrial customers and for new projects of existing customers.

Subject to the specific terms and conditions of the power supply agreements, we are required to supply up to the total contracted capacity and industrial customers are obliged to purchase minimum specified amounts of electricity (which mostly are expressed as a percentage of contracted capacity). In practice and normal situation, most of our industrial customers purchase electricity in amounts well in excess of their minimum take obligations.

We are liable under the terms of certain power supply agreements to pay liquidated damages for any failure to meet customer supply obligations. We entered into a back-up supply agreement with EGAT to meet supply obligations to industrial customers during planned and unplanned outages pursuant to which EGAT is required, in certain prescribed circumstances, to supply electricity to us.

For the electricity supply contract with industrial customers in the SEIP Area, we were able to extend contracts that were to expire in 2013. Approximately two thirds of the contracted capacity is to expire in 2016 (with the early termination clause) while the remaining is scheduled to expire in 2023. No liquidate damages are applied for power supply contracts with industrial customers in SEIP Area at the

moment. In addition, majority of the power supply contracts with industrial customer in SEIP do not have minimum take obligation.

### *Steam and Chilled Water*

Steam and Chilled water sale to our ten largest industrial customers (listed below) accounted for 9.5 percent of total revenues in 2013.

- PTT Global Chemical Plc.;
- Dow Chemical Thailand Ltd.;
- Bangkok Synthetics Co., Ltd.;
- Siam Styrene Monomer Co. Ltd.;
- Bayer Thai Co.,Ltd.;
- Thai Polycarbonate Co., Ltd.;
- Thai Polyacetal Co. Ltd.;
- Vinythai Plc.;
- Thai Plastic & Chemicals Plc.;
- Thai MMA Co., Ltd.;

Steam supply agreements are generally negotiated on a customer-specific basis. In most cases, steam supply agreements are valid for a period of 15 years from the customer's commercial operation date. Numbers of our original agreements have already expired or are to expire over the next few years, most of agreements were extended for additional 10-15 years term. We have also secured several contracts with new industrial customers.

As with power supply agreements, steam supply agreements ensure customers that they will be provided with certain quantities of steam. We are liable under the terms of certain steam supply agreements to pay liquidated damages for any failure to meet contractually agreed upon steam supply obligations.

Industrial customers generally pay for steam that is delivered; for the capacity of the steam supply generated that is made available to them; for unreturned condensate; and for steam transmission. Often, these separate and unique but related components are expressed as a single "bundled" price. In some instances, the pricing structure of the steam supply agreement calculates each of these components separately. Steam sales are priced using an "avoided costs" model whereby the steam price is adjusted to reflect changes in certain indices, including the gas price and the Thai consumer price index.

Generally contract term for chilled water supply agreements are for a period of 5-7 years from the commercial operation date of the customer. Neither minimum take obligations nor liquidated damages are applied for chilled water supply agreements at the moment. Sales of chilled water to industrial customers are priced on an "avoided costs" basis. Chilled water supply agreements are structured so that industrial customers are charged based on equivalent refrigeration ton usage. The price of chilled water is mainly linked to electricity price and adjusted with reference to the PEA tariff.

*Processed Water*

Our major customers of clarified and demineralised water in 2013 included:

- PTT Global Chemical Plc.;
- Thai Polycarbonate Co., Ltd.;
- Siam Styrene Monomer Co., Ltd.;
- AGC Chemicals Co. Ltd.;
- Thai Polyacetal Co., Ltd.;
- Thai Plastic and Chemicals Plc.;
- TPC Paste Resin Co., Ltd.;
- Carbide Chemical Co., Ltd.

As with electricity and steam sales, water supply agreements are negotiated on a customer specific basis and carry a validity period of 15 years from the commercial operation date of the customer. In some cases, the water supply agreements are included as part of an overall utility agreement covering sales of both steam and water. Water supply agreements are structured similarly to electricity and steam supply agreements; we guarantee a minimum supply of water, and are liable to pay liquidated damages should we fail to meet these obligations.

Sales of processed water to industrial customers are priced on a “cost plus margin” or “avoided costs” basis. Water supply agreements are typically structured so that industrial customers are charged for water delivered, for the capacity of water supply made available to them, and for transportation. These components are sometimes expressed as a single “bundled” price, and in other circumstances priced separately. The contracted price of water is mainly adjusted to reflect changes in the Thai consumer price index and raw water costs.

**2.2.3 Contracted Capacity**

Our contracted capacity provides an indication of our generating facilities’ utilization levels. The following table includes the installed and contracted capacity of our generating facilities as of December 31, 2013:

<b>As of December 31, 2013</b>	<b>Installed Capacity</b>	<b>Contracted Capacity</b>	<b>No. of Contracts</b>
Cogeneration facilities			
Electricity .....	1,661	EGAT: 844 Indust. Cust: 714	11 70
Steam .....	1,206	1,009	27
Chilled Water .....	3,400	2,050	2
Processed Water .....	5,270	1,576	15

## IPP facilities

Electricity .....	Glow :	713	EGAT-IPP:	713	1
	GHECO-One :	660	EGAT-GHECO-One	660	1
	HHPC:	152	EGAT-HHPC	126	1
			EdL-HHPC:	1.5	1
Glow Solar (Electricity)		1.55	PEA:	1.55	1

**Note:** 1. Contracted capacity for steam is significantly lower than total installed capacity, as 250 tons per hour of the overall steam capacity is generated using Glow Energy Phase 1's relatively inefficient package boilers, which are used principally for short-term and back-up supply purposes as opposed to long-term sales.

### 2.2.4 Competition

We do not currently face any competition with regard to electricity sales to EGAT, as these are contracted under long-term EGAT power purchase agreements. We do, however, expect increased levels of competition for future electricity generation projects when they arise. Our ability to compete effectively with other major global and Thai energy companies with regard to future projects will be a function of our ability to meet the projects' technical requirements and our previous performance under EGAT power purchase agreements.

For new industrial customers, our principal competitors are the PEA both in SEIP and MIE Area. However, in MIE Area, in addition to PEA, we are competing with Global Power Synergy Company Limited (or "GSPC"), merged company between PTT Utility and Independent Power Thailand, and PTT Global Chemical utility division, both of which are affiliates of PTT. We do not compete with PEA for sales of steam and water, as it only provides supply of electricity. To a certain extent, we also compete with our industrial clients themselves, many of whom already have, or have the ability to install, steam and water production facilities.

There are three other groups operating electricity and steam co-generation plants in the MIE Area in addition to the two already mentioned above. These groups include: (i) Bangkok Cogeneration ("BCG"); (ii) Indorama Group; and (iii) Star Petroleum Refining Company;.

We are relatively insulated from direct competition for our existing customers for the following reasons: (i) we have long-term sales contracts with nearly all existing customers, (PEA does not have long-term contracts); (ii) we own the electrical transmission cables connecting directly to each of our customers' facilities and re-connection costs are high; (iii) our transmission and distribution system provides a reliable supply of power to each of our customers; and (iv), our proximity to customers purchasing steam coupled with the heat loss that occurs when steam is transported over long distances. We believe that certain of our competitors are also insulated from competition to a certain degree for some of these same reasons. We do, however, compete for new customers, the acquisition of which is important for the growth of our business.

A number of important contracts with key industrial customers have initial term expired or to be expired in the next few years; however, majority of these contracts have already been extended, including those with PTT affiliates and we have secured several new contracts with industrial customers.

We expect the majority of our existing customers to renew their contracts with us once their contracts mature.

Global Power Synergy Company Limited (or “GSPC”) is located in the vicinity of the MIE and generates electricity and steam. GSPC is aimed at supporting the future growth of the petrochemical business of the PTT group of companies, and also serving the utilities needs of nearby factories in the Map Ta Phut Industrial Estate. Currently, PTT has planned a number of projects in Map Ta Phut Industrial Estate and some of them are under construction and GSPC will certainly have the advantage of selling utilities for those projects.

We believe that the presence of GSPC will significantly increase the level of competition we face for sales of electricity and steam to industrial customers in the MIE Area. See “Risk Factors—We face significant competition”.

### ***2.2.5 The electricity supply industry in Thailand***

Certain of the information contained in this section has been extracted from sources which we generally believe to be reliable, including information made public by Thai government and private sector participants. Neither we nor the initial purchasers nor any of our or their respective affiliates or advisors have independently verified this information. Information contained in this section may not be consistent with other information compiled within or outside Thailand.

#### ***(1) Overview***

EGAT and private power producers are the principal generators of electricity for commercial sale in Thailand. EGAT sells all of the power that it generates independently, as well as that which it purchases from private power producers and from neighboring countries, to two state enterprises: the Metropolitan Electricity Authority (“MEA”) and the Provincial Electricity Authority (“PEA”). The MEA and PEA distribute power to retail, commercial and industrial consumers throughout Thailand and own the electricity distribution networks in their respective regions of operation.

Although EGAT is the sole wholesale purchaser of electricity in Thailand, private power producers also produce and sell electricity directly to industrial users. As the national system operator, EGAT owns, operates, maintains and develops Thailand’s national wholesale electricity transmission network – the national electricity grid.

Private power producers in Thailand fall into three general categories: (i) producers that participate in, and sell electricity to EGAT under Thailand’s IPP program (“IPPs”); (ii) producers that participate in, and sell electricity to EGAT under Thailand’s SPP program (“SPPs”); and (iii), producers that generate and sell electricity to industrial customers. While IPPs sell electricity exclusively to EGAT, private power producers participating in Thailand’s SPP program typically sell a portion of their generated electricity to industrial customers. There are also companies in Thailand that produce electricity for their own internal consumption; however, for the purposes of discussion these companies will not be considered as “private power producers”.

According to information published by the Electricity Generating Authority of Thailand (“EGAT”), as of December 2013, Thailand’s total electricity generation capacity was 33,681 MW compared to



32,600 MW in December 2012 (these figures only include electricity generated by private power producers sold to EGAT under the IPP or SPP programs). Of that amount, approximately 15,010 MW, or 45 percent, represents EGAT's capacity; approximately 12,742 MW, or 38 percent, represented IPP generating capacity; approximately 3,524 MW, or 10 percent, represented SPP generating capacity; and 2,405 MW, or 7 percent, was available to be imported from Laos and Malaysia.

In 2013, the total amount of electricity generated in Thailand was approximately 173,142 GWh. Of that amount, approximately 71,732 GWh, or 42 percent was generated by EGAT; approximately 66,361 GWh, or 38 percent, was generated by IPPs; and approximately 22,468 GWh, or 13 percent, was generated by SPPs. Additionally, a combined total of approximately 12,581 GWh of electricity was imported from Laos and Malaysia for sale within Thailand in 2013.

According to information made available by the EGAT, as of December 2013, the total electricity generating capacity of SPPs in Thailand supplying to the grid was 6,931 MW (5,344 MW "firm" and 1,587 MW "non-firm"). Of this, SPPs sold a total of production capacity 4,376 MW of electricity to EGAT (3,525 MW "firm" and 851 MW "non-firm"). Based on Glow Energy's capacity after acquisition of Glow SPP 11 as of December 31, 2013, Glow Energy's SPP facilities represented approximately 22.3 percent of total SPP capacity and approximately 23.9 percent of sales under firm contracts by SPPs to EGAT.

## **(2) Market Dynamics**

The sustained growth of the Thai economy since the end of the 1997 Asian Financial Crisis has led to a significant increase in demand for electricity over the past 10 years. In the two years following the Asian Financial Crisis, which began in 1997, electricity demand in Thailand decreased as the Thai economy contracted. Between 1999 and 2013, however, peak power demand in Thailand increased at a compound annual growth rate of 4.9 percent, from approximately 13,712 MW in 1999 to approximately 26,598 MW in 2013, or at 1.18 times the compound annual growth rate of real Gross Domestic Product ("GDP") at 4.10 percent from 1999 to 2013. In late 2011, there was contraction in the demand due to flooding in Thailand. However, peak electricity demand increased by 1.8 percent year on year to 26,598 MW in 2013 and Electricity Production raised by 0.01 percent year on year to 173,142 kWh versus the 2.9 percent in real GDP.

The following table displays statistics regarding Thailand's Real GDP, as related to the country's total generation capacity, annual electricity production, and peak demand for electricity for the fiscal years indicated.

Year <sup>(1)</sup>	Installed Capacity	Change <sup>(2)</sup>	Peak Electricity Demand	Change <sup>(2)</sup>	Electricity Production	Change <sup>(2)</sup>	Real GDP <sup>(3)</sup>	Change <sup>(2)</sup>
	(MW)	(%)	(MW)	(%)	(Gwh)	(%)	(Baht billions)	(%)
1994	12,969		10,709		69,651		2,693.0	9.0
1995	14,672	13.1	12,268	14.6	78,880	13.3	2,941.7	4.2
1996	15,648	6.7	13,311	8.5	85,924	8.9	3,115.3	5.9
1997	16,980	8.5	14,506	9.0	92,725	7.9	3,072.6	-1.4
1998	18,177	7.1	14,180	-2.3	92,134	-0.6	2,749.7	-10.5
1999	19,110	5.1	13,712	-3.3	90,413	-1.9	2,872.0	4.4
2000	22,269	16.5	14,918	8.8	96,781	7.0	3,008.4	4.8
2001	22,035	-1.1	16,126	8.1	103,165	6.6	3,073.6	2.2
2002	23,754	7.8	16,681	3.4	108,389	5.1	3,237.0	5.3
2003	25,646	8.0	18,121	8.6	116,743	7.7	3,468.2	7.1
2004	25,969	1.3	19,326	6.6	125,319	7.3	3,688.2	6.3
2005	26,450	1.9	20,538	6.3	133,695	6.7	3,858.0	4.5
2006	27,107	2.5	21,064	2.6	141,919	5.4	4,054.5	5.1
2007	28,530	5.2	22,586	7.2	147,026	3.6	4,259.0	5.0
2008	29,891	4.8	22,568	-0.1	148,221	0.8	4,364.8	2.5
2009	29,212	-2.3	22,045	-2.3	148,364	0.1	4,263.1	-2.3
2010	30,920	5.8	24,010	8.9	160,138	7.9	4,596.1	7.8
2011	31,447	1.7	23,900	-0.5	158,900	-0.8	4,598.4	0.1
2012	32,600	3.7	26,121	9.3	175,085	10.2	4,898.2	6.5
2013	33,681	3.3	26,598	1.8	173,142	0.01	5,038.8	2.9

**Note:**

- 1) Figures from 1994 to 2006 are based on fiscal year basis, and after 2006 on calendar year basis.
- 2) Year on year
- 3) Revised figure for 2005 onward

**Source:** PDP 2004, EGAT, EPPO and National Economic and Social Development Board

Demand for electrical power in Thailand experiences fairly predictable seasonal cycles. Annual peak demand generally occurs during the summer months (March through May) when yearly temperatures are highest. The lowest loads are generally experienced during the winter months (December and January), when temperatures are cool. In 2013, peak demand, which occurred in May 2013, was 26,598 MW.

	<b>2009</b> (MW)	<b>2010</b> (MW)	<b>2011</b> (MW)	<b>2012</b> (MW)	<b>2013</b> (MW)
<b>Monthly Peak Generation in Thailand</b>					
January.....	18,603	20,970	21,288	22,251	23,391
February.....	20,754	21,872	22,207	23,554	24,589
March.....	21,318	23,304	23,156	24,572	26,423
April.....	22,045	23,898	23,322	26,121	26,325
May.....	20,828	24,010	23,900	25,207	26,598
June.....	20,845	23,237	23,029	23,927	25,038
July .....	20,506	22,866	23,351	23,933	24,568
August.....	21,258	21,893	23,443	24,156	23,942
September .....	20,957	22,215	22,809	24,009	24,364
October .....	21,020	21,774	22,062	24,131	23,742
November .....	21,804	22,295	20,955	24,658	24,251
December .....	20,886	22,302	21,105	24,074	22,905
Annual Peak .....	22,045	24,010	23,900	26,121	26,598
Annual Average .....	20,902	22,553	22,552	24,216	24,678
Annual Low .....	18,603	20,970	20,955	22,251	22,905

Source: EPPO and EGAT as of December 2013

Over the past two decades, Thailand's daily peak demand has gradually shifted from early evenings, to a significantly longer period of time extending from 9:00 AM to 10:00 PM. Peak demand during this period falls between the hours of 2:00 PM and 4:00 PM. According to the EPPO, this change in power consumption patterns is a result of the country's gradual shift from an agricultural to an industrial-based economy. This transformation is also reflected in the fact that industrial customers demand for electricity has grown at a pace more rapid than demand for residential and commercial consumers.

The table below displays the power consumption breakdown for different categories of end users for the periods indicated.

<b>Year</b>	<b>Residential (GWh)</b>	<b>% of Total</b>	<b>Commercial (GWh)</b>	<b>% of Total</b>	<b>Industrial (GWh)</b>	<b>% of Total</b>
<b>Electricity Consumption by Category</b>						
2001	23,329.55	21.8	26,109.66	24.4	51,844.91	48.5
2002	24,538.32	21.3	28,009.11	24.3	56,442.76	49.0
2003	23,329.55	21.8	26,109.66	24.4	51,844.91	48.5
2004	24,538.32	21.3	28,009.11	24.3	56,442.76	49.0
2005	25,481.90	21.0	29,675.17	24.5	59,669.40	49.2
2006	26,847.38	21.0	31,655.63	24.8	62,432.42	48.8
2007	27,937.98	21.0	33,197.66	24.9	64,552.61	48.5
2008	28,691.22	21.2	34,781.60	25.7	64,147.63	47.3
2009	30,256.50	22.4	35,683.54	26.4	60,873.53	45.0
2010	33,216.49	22.2	38,590.38	25.8	67,952.49	45.5
2011	32,799.46	23.5	39,077.39	27.9	67,784.91	48.5
2012	36,447.12	22.5	44,097.94	27.3	72,295.57	44.7

Year	Residential (GWh)	% of Total	Commercial (GWh)	% of Total	Industrial (GWh)	% of Total
<b>Electricity Consumption by Category</b>						
2013	37,657.38	22.9	48,797.09	29.7	72,535.61	44.1

Source: EPPO as of February 2014.

Note: - The information in the above table excludes power consumed by “direct customers”, end users in the agricultural sector and others.

- Revised figure for 2003 onward

### ***(3) Structure of the Electricity Supply Industry of Thailand***

Thailand’s electrical supply industry is divided into three general segments, each with its own respective participants:

Industry Segment	Key Participants
Generation .....	EGAT, IPPs, SPPs, Cogenerators
Transmission .....	EGAT
Distribution .....	MEA, PEA

In December 2003, the Cabinet approved a long-term plan to reform Thailand’s electricity supply industry by adopting an “enhanced single buyer” (“ESB”) model, under which EGAT became Thailand’s sole wholesale purchaser of electricity. Under this model, EGAT retained its generation and transmission responsibilities as Thailand’s sole wholesale vendor and transporter of electricity (excluding certain industrial consumers in designated industrial estates possessing power purchase agreements with private power producers). The MEA and PEA also retained their respective roles as the sole distributors of electricity in the Bangkok metropolitan area and provincial areas, (excluding a limited number of large volume customers that are connected directly into EGAT’s electricity grid).

The Ministry of Energy (“MoE”) also remained the key decision-maker with regard to all energy sector matters. To improve transparency within the MoE, responsibility for all policy-making functions were transferred to the Energy Policy and Planning Office (“EPPO”). Additionally, EGAT’s system operation function, which before 2003 was managed and monitored independently by EGAT, was brought under the monitoring authority of the MoE. Regulatory functions have been placed under the authority of the Energy Regulatory Commission (“ERC”) – a new regulatory body established on February 1, 2008. As a caveat, the ESB model also requires that a process of competitive bidding be used for the allocation of all new electricity generating capacity.

### ***Electricity Generating Authority of Thailand (EGAT)***

The adoption of the ESB model has not resulted in any significant changes to EGAT’s business operations. Under the ESB model, EGAT continues to generate electricity from its generating facilities, which, in 2012, accounted for approximately 46 percent of the total electricity generated in Thailand. EGAT remains the sole purchaser of electricity from IPPs, subsidiaries of its associated IPP companies – namely Ratchaburi Holdings (“RATCH”) and Electricity Generation Company (“EGCO”) – and neighboring countries. Additionally, EGAT continues to own and operate the national grid network and retains the sole right to sell electricity to the MEA and PEA on a wholesale basis.

### ***Independent Power Producers***

In 1994, the Thai government introduced an independent power producer (“IPP”) program to commission the construction, ownership and operation of power plants by private sector participants, with EGAT agreeing to purchase the output of these plants once their construction had been completed. The program was designed to promote increased private sector participation in the power generation industry. Various government bodies including the National Energy Policy Office (or “NEPO”, which is the predecessor to EPPO), and the National Economic and Social Development Board (“NESDB”) were at that time given responsibility to review proposals from approximately 50 interested private sector producers.

In 2007, the Thai government opened a new round of IPP competitive bidding with an initial plan to purchase up to 3,200 MW of electrical generating capacity from private sector producers. After having received all the bids, a total of 4,400 MW was awarded to four bidders. This included 1,200 MW of capacity from coal-fired plants and 3,200 MW of capacity from natural gas fired plants, all with originally scheduled commercial operations (“SCOD”) between 2011 and 2014.

In 2012 government opened third round of competitive bidding with a plan to purchase 5,400 MW natural gas fired power generating capacity from private sector producers, with scheduled commercial operating dates between 2021 and 2026. The bidding is resulted into award of new IPP contracts for 5,000 MW to one single bidder, whereas power purchase agreements for this capacity were signed in 2014.

As of 2013, EGAT had signed power purchase agreements with fourteen IPPs with a total projected contracted capacity of 16,551 MW and individual contracted capacities ranging from 350 MW to 1,600 MW. The table below lists the names, sizes, sponsors, and status of each of the IPP projects in Thailand.

<b>Project</b>	<b>Installed Capacity (MW)</b>	<b>Primary Fuel Type</b>	<b>Investors/Shareholders<sup>(1)</sup></b>	<b>Commercial Operation Date</b>
Rayong Electricity Generating Co., Ltd.	1,175	Natural gas	The Electricity Generating Plc.	1994
Khanom Electricity Generating Co., Ltd.	818	Natural gas	The Electricity Generating Plc.	1996
Ratchaburi Electricity Generating Co., Ltd.	3,481	Natural gas	Ratchaburi Electricity Generating Holding Plc.	2000

**IPP Program Participants (1<sup>st</sup> Round)**

Tri-energy Company Limited (TECO) .....	700	Natural gas	Ratchaburi Gas Co. Ltd. Texaco Thailand Energy Co. Ltd.	2000
Independent Power (Thailand) Company Limited .....	700	Natural gas	Thai Oil Power <sup>(2)</sup> Thai Oil Plc. PTT Plc.	2000
Glow IPP Company Limited .....	713	Natural gas	Glow Energy Plc. Hemaraj	2003
Eastern Power and Electric Company Limited .....	350	Natural gas	GMS Power Plc Marubeni Corp. TOTAL Gas and Power Thailand China Development Industrial Marubeni Corporation	2003
BLCP Power Company Limited <sup>(3)</sup> .....	1,347	Coal	Banpu Plc. CLP Power Project (Thailand)	2006 for first unit, 2007 for second unit
Ratchaburi Power (Union Power Development Co., Ltd.) <sup>(4)</sup> .....	1,400	Natural gas	Hongkong Electric Holdings Ratchaburi Plc. PTT Plc. Chubu Electric Power Company International B.V. Toyota Tsusho Corp. Union Energy Ltd.	March 2008 for first unit, June 2008 for second unit
Gulf Power Generation Company Limited <sup>(5)</sup> .....	1,468	Natural gas	Gulf Electric Public Company Limited	May 2007 for first unit, March 2008 for second unit

**IPP Program Participants (2<sup>nd</sup> Round)**

GHECO-One	660	Coal	Glow Energy Plc. Hemaraj	July 2012
Gulf JP UT Co., Ltd. (formerly known as Siam Energy)	1,600	Natural gas	Gulf JP	June 2015 for first unit, December 2015 for second unit <sup>(6)</sup>

National Power Supply (NPS)	540	Coal	Advance Agro Plc. Soon Hua Seng Group	November 2016 for first unit March 2017 for second unit
Gulf JP NS Co., Ltd. (formerly known as Power Generation Supply)	1,600	Natural gas	Gulf JP	June 2014 for first unit December 2014 for second unit

Source: EPPO, EGAT

**Note:**

- 1) Principal investors/ shareholders as of December, 2013.
- 2) Thai Oil Power shareholders include Thai Oil Plc 55 percent, PTT Plc 26 percent and J-Power 19 percent
- 3) The BLCP Power generating facility includes two generating units. The first unit had a commercial operation date of August 2006 and the second unit had a commercial operation date of November 2006.
- 4) Ratchaburi Power generating facility includes two generating units, the first unit had a commercial operation date of March 2008 and the second unit had a commercial operation date of June 2008.
- 5) The Gulf Power Generation generating facility includes two generating units. The first unit had a commercial operation date of May 2007 and the second unit had a commercial operation date of March 2008.
- 6) Siam Energy and National Power Supply have been revised SCOD due to EHIA process based on Section 67 (2)

### ***Small Power Producers (SPPs)***

In 1992, under a policy to promote greater participation by the private sector in the power generation industry, the Government introduced the SPP program under which EGAT was authorized to purchase power from privately held producers that either operate generating facilities powered by renewable sources, such as wind, solar, geothermal or agricultural residue, or that operate cogeneration plants.

Under the program, EGAT was originally authorized to purchase a maximum of 60 megawatts per SPP. These limits were later revised to an aggregate of 3,200 megawatts and a maximum of 90 megawatts per SPP. SPPs are not exclusive suppliers of EGAT and are also allowed to sell electricity to industrial customers.

In 2007, Thai government opened up a 2<sup>nd</sup> round of bidding to increase the total volume of electricity purchases from SPPs from the level of approximately 2,000 MW to 4,000 MW. Originally, the electricity supply from these new SPPs was expected to come online gradually between 2009 and 2016. The government decided to move forward the SPP SCODs following the delay of three IPP units' SCODs to be between 2015 and 2017. In addition, in 2010, 3<sup>rd</sup> round of bidding for new SPP licenses have been opened for combined output of another 3,500 MW.

According to information made publicly available by the EPPO and EGAT, there were a total of 66 SPP projects supplying power to EGAT's transmission grid as of December 2013. Of that total 58 SPP projects held 'firm contracts', which implies: (i) a firm obligation to sell and purchase electricity; (ii) a specified contracted capacity; and (iii), a total electricity production supplied of no less than 7,008 hours per year. For electricity generated using renewable energy, the annual hours must be no less than 4,672 hours per year.

According to information made publicly available by the EPPO and EGAT, as of December 2013, EGAT had agreed under firm contracts with 58 SPPs to purchase annually 3,525 MW and had also entered into non-firm agreements with 24 SPPs to purchase 851 MW.

As of December 31, 2013, Glow Energy's SPP facilities represented approximately 22.3 percent of total SPP capacity supplying power to EGAT's transmission grid and approximately 23.9 percent of sales under firm contracts by SPPs to EGAT.

### ***Distributors***

Electricity in Thailand is distributed by two state enterprises, the MEA and the PEA, which together accounted for approximately 98 percent of EGAT's sales in the year ending December 31, 2013. EGAT also transmits and sells electricity directly to various large volume customers, principally industrial users, as well as to electricity distributors in neighboring countries. Private generators often have their own distribution networks to supply industrial customers directly.

### ***Metropolitan Electricity Authority***

Established in 1958, the MEA is the state enterprise responsible for distributing electricity to retail and industrial consumers in the Bangkok metropolitan area and its two neighboring provinces (Nonthaburi and Samutprakarn). It provides service to approximately 30 percent of Thailand's population. The MEA purchases all of its electricity directly from EGAT.

### ***Provincial Electricity Authority***

Established in 1960, the PEA is the state enterprise responsible for distributing electricity to retail and industrial consumers in the 73 provinces not serviced by the MEA. It provides service to approximately 68 percent of Thailand's population. The PEA purchases all of its electricity from EGAT.

## ***(4) Regulatory Framework***

Since 1992, the NEPC and its secretariat, the NEPO (now the EPPO), have been the principal Government bodies responsible for formulating and implementing energy policy and regulating the power industry in Thailand. The principal duties of the NEPC consist of recommending national energy policies as well as national energy management and development plans to the Cabinet, and establishing the tariff structure for energy sales in Thailand. The NEPC is overseen by the Prime Minister, several ministers, and other senior government officials. The NEPO was originally the secretariat to the NEPC, but was renamed the Energy Policy and Planning Office ("EPPO") in 2002 and transferred to be under the authority of the Ministry of Energy.

The Ministry of Energy was created in 2002 pursuant to the Act for Reorganizing Government Ministries, at which point the NEPO was replaced by EPPO, which thereafter became a MoE department. The MoE, in consultation with the NEPC, is responsible for setting energy policy and regulating the energy sector through the EPPO. The MoE consists of two Offices (the Office of the Minister and the Office of the Permanent Secretary) and four departments (the EPPO, the Department of Mineral Fuels, the Department of Energy Business, and the Department of Alternative Energy Development and Efficiency). The MoE is authorized to formulate, make recommendations on, and oversee the implementation of, policies related to the country's present and future energy requirements. These policies include the management of the country's indigenous resources through the granting of



concessions to explore and produce natural gas in the Gulf of Thailand. In addition, the MoE is also responsible for the Government's restructuring of the energy industry (electricity and oil & gas).

Pursuant to the December 9, 2003 Cabinet resolution, the government approved the establishment of a new regulatory body, the BOC, to be responsible for: (i) monitoring industry participants' operational and financial performance; (ii) regulating electricity tariffs; and (iii), monitoring and planning the country's energy requirements within the context of the nation's energy security and predicted economic growth. The National Energy Policy Council ("NEPC") was appointed the interim regulator pending the establishment of the BOC.

On August 24, 2004, the Cabinet passed a resolution approving the NEPC's recommendation to appoint the Electricity Regulatory Commission ("ERC") as the interim regulatory body responsible for overseeing electricity industry operations as well as the NEPC. The Office of the Prime Minister issued a notification on March 7, 2005 expanding the ERC authority and responsibilities to include: (i) regulating the tariffs of electricity industry operators; (ii) encouraging competition and preventing abusive monopolistic practices; (iii) inspecting the operations of the power network system operator; (iv) establishing the bidding and monitoring processes for the construction of new power plants; (v) regulating the operations of electricity providers; and (vi), performing any other necessary tasks related to the electricity industry's regulation.

On November 22, 2005, the cabinet passed a resolution approving the NEPC's recommendation to appoint an interim regulatory body to oversee the electricity industry operations pending the establishment of the ERC. The interim regulators later resigned on October 18, 2006, and their responsibilities were transferred to the EPPO pending the official establishment of an energy regulatory body.

The Energy Industry Act was promulgated on December 10, 2007, paving the way for the establishment of a new independent regulatory body. The Energy Regulatory Board ("ERB") was subsequently established on February 1, 2008. This agency's key responsibilities include:

- Regulating the electricity and the gas supply industries;
- Regulating tariffs, standards and service quality;
- Ensuring competition and preventing abusive monopolistic practices;
- Protecting consumers and managing consumer complaints;
- Making recommendations to the NEPC regarding energy procurement policies, policies on the diversification of fuel sources, and best types of power generation to simultaneously ensure efficiency and energy security; and
- Consider the power development plan, investment in the electricity industry, natural gas procurement, and energy network system expansion.

#### ***(5) Electricity tariff***

The tariff structure for electricity sales in Thailand is determined by the NEPC and subject to Cabinet approval. Tariff rates have historically been revised at three to five-year intervals. The current tariff structure consists of both a fixed and a variable component. The fixed, or base, component

generally remains in effect for the duration of tariff structure, while the variable component is subject to adjustment every four months. There are also different tariff rates: a wholesale rate that EGAT charges to the MEA and the PEA, and a series of retail tariffs charged by the MEA and the PEA to end users.

Existing tariffs are based on a number of factors including but not limited to: forecast demand for electricity; fuel prices; EGAT, the MEA and PEA's expected operating expenses and capital expenditures; and a variety of other factors. The current tariff structure was designed, and tariff prices set, at levels intended to permit EGAT, the MEA and PEA to achieve certain financial ratios. The tariff structure in Thailand has since 1990 consisted of base wholesale and retail tariffs that are fixed, and a variable component that is added to the wholesale and retail tariffs.

The tariff structure consists of:

- A wholesale, or "bulk supply" tariff that EGAT charges to the two state-owned electricity distributors - namely the MEA and PEA;
- A series of retail tariffs charged by the MEA and PEA to end users nationwide, and by EGAT to direct purchasers; and
- an  $F_T$  adjustment, or surcharge, added to base tariffs.

The fixed or base components generally remain in effect for the duration of the tariff structure. The variable component or  $F_T$  is subject to adjustment every four months pursuant to an adjustment mechanism intended to adjust aggregate tariff levels to reflect: changes in the price of fuel; payments made by EGAT to IPPs; the impact of exchange rate fluctuations on EGAT, the MEA and PEA; inflation; and other relevant factors. The  $F_T$  adjustment is added into the base tariffs for a future four-month period and designed to provide consumers with reasonable tariff stability.

Following the review of electricity tariff structure by ERC in 2011, effective from July 2011 onward, ERC and NEPC decided to incorporate the  $F_t$  of 0.9581 THB/kWh ( $F_t$  of June 2011) into the base tariff and changed the  $F_t$  calculation to the following formula

$$F_T = FAC_T^G + Af_{T-1}^G$$

$FAC_T^G$  = The Fuel Adjustment Charge, the estimate expenses for month T which deviate from the average expenses of May – August 2011 composing of fuel cost expenses, electricity purchases payable from IPP/ SPP and import from neighbor countries, and pass-through cost to state policy (e.g. Power Development Fund, renewable incentive and adder)

$Af_{T-1}^G$  = The accumulated of the amount difference between actual  $F_t$  of month T-1 and  $F_t$  that announced and used for month T-1

In addition, there are two special items impacting the tariff:

- i) Claw back of unused budget – As EGAT/MEA/PEA had not fully used their declared investment budgets, ERC then decided to reduce  $F_t$  by 6 Satang/ kWh for a period from July 2011 until December 2011 and from May 2012 until August 2012 to claw back such unused budget; and

- ii) Subsidy to household users – Due to resolution of NEPC and cabinet to grant free electricity for household users who have only 5-Ampere meters and consume less than 90 kWh per month, extra compulsory contribution was imposed on the industrial sector whereby tariff (Energy Charge) was increased by 12 Satang/kWh since July 2011, to fund the free electricity scheme. This additional charge to industrial customer is passed-on to power development fund. Later, NEPC and cabinet resolved to reduce threshold for free electricity for household users consumption from 90 kWh per month to only 50 kWh per month and subsidy burden was decreased to 2.65 satang/kWh since June 2012

The following table displays  $F_T$  adjustments for the periods indicated:

	$F_T$ EGAT Generatio n	$F_T$ EGAT Transmission	$F_T$ PEA/MEA Distributio n	Total $F_T$	Increase / decrease in $F_T$ amount
(Baht/kWh)					
<b>Ft adjustment since July 2011</b>					
<b>Period</b>					
July 2011 – August 2011				-0.0600	
September 2011 – December 2011				-0.0600	0.0000
January 2012 – May 2012				0.0000	+0.0600
June 2012 – August 2012				0.3000	+0.3000
September 2012 – December 2012				0.4800	+0.1800
January 2013 – April 2013				0.5204	+0.0404
May 2013 – August 2013				0.4692	-0.0512
September 2013 – December 2013				0.5400	+0.0708
January 2014 – April 2014				0.5900	+0.0500

**Note:**

- 1) The adjustment period changed when EGAT's accounting period shifted from a fiscal to calendar year
- 2) The ERC froze the  $F_T$  from May 2009 through December 2010 to reduce electricity bills and the corresponding consumer burden due to the prolonged economic stagnation resulting from the 2008 global financial crisis

The average electricity price as of December 31, 2013 for 115 kV and 22 kV is shown below.

Type of structure		Baht/kWh
Schedule 4: Large General Service	TOU 115 kV	3.32
	TOU 22 kV	3.45
	TOD 115 kV	3.50
	TOD 22 kV	3.62
Schedule 3: Medium general Service	Normal 22 kV	3.50

***(6) Energy Dispatch***

As the operator of Thailand's electrical system, EGAT is responsible for determining the volume of electricity respectively supplied by each individual generating facility to the national transmission network. EGAT selects generating units based primarily on each facility's marginal variable cost of generation, however a number of other factors are also taken into account, including environmental laws and standards as well as the stability and reliability of the electricity system.

***(7) Power Development Plan***

EGAT has historically assisted the Thai government with the planning and development of Thailand's energy infrastructure in accordance with a national energy policy that aims to ensure a secure supply of energy (i.e., energy security) in a cost-efficient and environmentally sound manner. EGAT periodically formulates a long-term power development plan ("PDP") that addresses the future development of the Thai electricity industry over a 10 to 15 year period. The power development plan is based on load forecasts supplied to EGAT by the Thailand Load Forecast Subcommittee ("TLFS"), and is revised periodically in response to changing economic and social conditions, as well as changes in forecasted demand for electricity, as reported to EGAT by the TLFS.

The latest Power Development Plan of 2010 ("PDP 2010 revision 3") was approved by NEPC in June 8, 2012 and endorsed by the cabinet in June 19, 2012.

The PDP 2010 revision 3 was formulated within following government energy policies framework:

- The 20-Year Energy Efficiency Development Plan 2011-2030 (EE Plan 2011-2030): to reduce energy consumption to GDP by 25 percent within 20 years.
- The 10-Year Alternative Energy Development Plan 2012-2021 (AEDP 2012-2021): to increase renewable energy and alternative energy proportion usage to be 25 percent instead of fossil fuels within the next 10 years.

With these government energy policies, key assumptions made for PDP 2010 revision 3 formulation are listed below:

- Load forecast is incorporates energy saving programs and energy efficiency promotions in accordance with the 20-Year Energy Efficiency Development Plan 2011-2030 formulated by the Ministry of Energy and approved by the National Energy Policy Council.
- Reserve Margin should be not less than 15 percent of peak demand and it should be higher than 20 percent of peak demand to avoid the risk of no natural gas supply from sources in the Western part of Thailand.
- Fuel type diversification is considered in order to reduce natural gas dependency in power generation.
- The proportion of renewable energy should increase by not less than 5 percent from PDP 2010 revision 2 within 2030 by taking the 10-Year Alternative Energy Development Plan 2012-2021 into account. And then in 2022-2030, it will be expanded in accordance with its potential and advanced technology development.

- Proportion of nuclear power generation should not be greater than 5 percent of total generating capacity.

- Coal fired power plant should be considered in appropriate proportion as necessity for Thailand power system using clean coal technology

- Proportion of power purchase from neighbouring countries should not be greater than 15 percent of total generating capacity.

- Cogeneration systems shall be promoted- The target of CO<sub>2</sub> emission reduction in this version is still set to be in line with the previous version.

The key projects were summarized as follows:

Year	Power Plants		
2012	SPP- Renewable	498	MW
	SPP- Cogeneration	254	MW
	VSPP- Renewables	201	MW
	VSPP- Cogeneration	8	MW
	GHECO-One	660	MW
	Chao Phraya Dam Units 1-2	12	MW
	Naresuan Dam	8	MW
	Khun Dan Prakarnchon Dam	10	MW
	Power purchase from Lao PDR (Theun Hinboun exp.)	220	MW
2013	SPP- Renewable	249	MW
	SPP- Cogeneration	1,170	MW
	VSPP- Renewables	772	MW
	VSPP- Cogeneration	16	MW
	Mae Klong Dam Units 1-2	12	MW
	Pasak Jolasid Dam	7	MW
2014	SPP- Renewable	420	MW
	SPP- Cogeneration	270	MW
	VSPP- Renewables	181	MW
	VSPP- Cogeneration	16	MW

Year	Power Plants		
	Renewable Energy (additional)	60	MW
	Gulf JP NS Units 1-2	1600	MW
	Wang Noi Combined Cycle Power Plant Block 4	769	MW
	Chana Combined Cycle Power Plant Block 2	782	MW
	Thap Sakae Solar Cell	5	MW
	Sirindhorn Dam Solar Cell	0.1	MW
	SPP- Renewable	369	MW
2015	SPP- Cogeneration	540	MW
	VSPP- Renewables	83	MW
	VSPP- Cogeneration	17	MW
	Renewable Energy (additional)	230	MW
	Gulf JP UT Units 1-2	1600	MW
	North Bangkok Combined Cycle Power Plant Unit 2	900	MW
	Bang Lang Dam (Renovated)	12	MW
	Kwae Noi Dam Small Hydro Units 1-2	30	MW
	Khao Yai Thiang Wind Turbine (North)	18	MW
	Chulabhorn Hydropower	1	MW
	Klong Tron Hydropower	3	MW
	Kiew Kohma Hydropower	6	MW
	Mae Karm Solar Cell	0.1	MW
	Power purchased from Lao PDR (Hongsa unit 1-2)	982	MW
2016	SPP- Renewable	635	MW
	SPP- Cogeneration	450	MW
	VSPP- Renewables	79	MW
	VSPP- Cogeneration	21	MW
	Renewable Energy (additional)	270	MW
	National Power Supply Units 1-2	270	MW

Year	Power Plants		
	New Power Plant (South)	900	MW
	Phayaman Hydropower	2	MW
	Lan Pao Hydropower	1	MW
	Lan Ta Khong Hydropower	2	MW
	Bhumipol Dam Solar Cell	0.1	MW
	Power purchased from Lao PDR (Hongsa unit 3)	491	MW
2017	SPP- Renewable	153	MW
	SPP- Cogeneration	900	MW
	VSPP- Renewables	77	MW
	Renewable Energy (additional)	280	MW
	National Power Supply Co., Ltd. Units 3-4	270	MW
	Lam Ta Khong Pumped Storage Units 3-4	500	MW
	That Noi Hydropower	2	MW
	Rawai Stadium Wind Turbine	3	MW
	Rajjaprabha Dam Solar Cell	0.1	MW
	Pha Chuk Hydropower	20	MW
2018	SPP- Cogeneration	720	MW
	VSPP- Renewables	86	MW
	VSPP- Cogeneration	1	MW
	Renewable Energy (additional)	280	MW
	Mae Moh Thermal power plant Units 4-7 (replaced)		
	Yaso Thorn-Pranom Prai Hydropower	4	MW
	Khao laem Hydropower Units 1-2	18	MW
	Kra Seao Hydropower	2	MW
	Power purchase from Lao PDR (Nam-Ngiep 1)	269	MW
	Power purchase from Lao PDR (Xe-Pian)	390	MW

Year	Power Plants		
2019	SPP- Renewable	60	MW
	SPP- Cogeneration	720	MW
	VSPP- Renewables	72	MW
	VSPP- Cogeneration	5	MW
	Renewable Energy (additional)	310	MW
	EGAT-Coal-Fired Unit 1	800	MW
	Huai Sataw Hydropower	1	MW
	Bang Pakong Hydropower	2	MW
	Sirindhorn Dam Solar Cell	1	MW
	Khao Yai Thiang Wind Turbine (South)	50	MW
	Power purchase from Lao PDR (Xaiyaburi)	1,220	MW
2020	SPP- Renewable	45	MW
	SPP- Cogeneration (additional#1)	90	MW
	VSPP- Renewables	81	MW
	Renewable Energy (additional)	310	MW
	Mae Saruay Hydropower	2	MW
	Thatako Solar Cell Unit 1	1	MW
	Klong See Yud Hydropower	3	MW
2021	SPP- Cogeneration (additional #2-3)	180	MW
	VSPP- Renewables	79	MW
	VSPP- Cogeneration	1	MW
	Renewable Energy (additional)	360	MW
	New gas-fired power plant	900	MW
	Bang Pakong Combine Cycle Unit 1 (replaced)	900	MW
	Chonnaboat Hydropower	2	MW
	Thatako Solar Cell Unit 2	1	MW
	Power purchase from neighboring countries	300	MW



Year	Power Plants		
2022	SPP- Cogeneration (additional #4-5)	180	MW
	VSPP- Renewables	67	MW
	VSPP- Cogeneration	5	MW
	Renewable Energy (additional)	220	MW
	New gas-fired power plant	900	MW
	Bang Pakong Combine Cycle Unit 2 (replaced)	900	MW
	EGAT-Coal-Fired Unit 2	800	MW
	Maharakam Hydropower	1	MW
	Chulabhorn dam Solar Cell	0.1	MW
	Power purchase from neighboring countries	300	MW
2023	SPP- Cogeneration (additional #6-7)	180	MW
	VSPP- Renewables	47	MW
	Renewable Energy (additional)	220	MW
	New gas-fired power plant	900	MW
	South Bangkok Combine Cycle Units 1-2 (replaced)	1800	MW
	Low Wind Speed Wind Turbine	10	MW
	Huai Nam Sai Hydropower	2	MW
	Rasisalai Hydropower	2	MW
	Ubonrat Dam Solar Cell	0.1	MW
	Power purchase from neighboring countries	300	MW
2024	SPP- Cogeneration (additional #8-9)	180	MW
	VSPP- Renewables	53	MW
	VSPP- Cogeneration	1	MW
	Renewable Energy (additional)	220	MW
	New gas-fired power plant	900	MW
	South Bangkok Combine Cycle Units 3 (replaced)	900	MW
	Bang Pakong Combine Cycle Unit 3 (replaced)	900	MW

Year	Power Plants		
	Hua Na Hydropower	1	MW
	Lamtapearn Hydropower	1	MW
	Sirikit Dam Solar Cell	0.1	MW
	Power purchase from neighboring countries	300	MW
2025	SPP- Cogeneration (additional #10-11)	180	MW
	VSPP- Renewables	37	MW
	VSPP- Cogeneration	5	MW
	Renewable Energy (additional)	220	MW
	New gas-fired power plant	900	MW
	Bang Pakong Combine Cycle Unit 4 (replaced)	900	MW
	EGAT-Coal-Fired Unit 3	800	MW
	Pranburi Hydropower	2	MW
	Tabsalao Hydropower	2	MW
	Power purchase from neighboring countries	300	MW
2026	SPP- Cogeneration (additional #12-13)	180	MW
	VSPP- Renewables	32	MW
	Renewable Energy (additional)	220	MW
	New gas-fired power plant	900	MW
	Bang Pakong Combine Cycle Unit 4 (replaced)	900	MW
	EGAT-Nuclear Power Plant Unit 1	1,000	MW
	Kamalasai Hydropower	1	MW
	Numpung Dam Solar Cell	1	MW
	Power purchase from neighboring countries	300	MW
2027	SPP- Cogeneration (additional #14-15)	180	MW
	VSPP- Renewables	33	MW
	VSPP- Cogeneration	1	MW
	Renewable Energy (additional)	220	MW

Year	Power Plants		
	Wang Noi Combine Cycle Unit 1 (replaced)	900	MW
	Bang Pakong Combine Cycle Unit 6 (replaced)	900	MW
	EGAT-Nuclear Power Plant Unit 2	1,000	MW
	Mae Wong Hydropower	12	MW
	Vajiralongkorn Dam Solar Cell	0.1	MW
	Chaiyaphum and Nakhon Ratchasima Wind Turbine	50	MW
	Power purchase from neighboring countries	300	MW
2028	VSPP- Renewables	32	MW
	VSPP- Cogeneration	5	MW
	Renewable Energy (additional)	220	MW
	EGAT-Coal-Fired Unit 4	800	MW
	Wang Noi Combine Cycle Unit 2-3 (replaced)	1800	MW
	Gas Turbine Unit 1	250	MW
	Mae Khan Hydropower	16	MW
	Huai Samong Hydropower	1	MW
	Mae Moh Solar Cell	1	MW
	Power purchase from neighboring countries	300	MW
2029	VSPP- Renewables	32	MW
	Renewable Energy (additional)	220	MW
	South Bangkok Combine Cycle Unit 4 (replaced)	900	MW
	EGAT-New Combined Cycle Power Plant	900	MW
	Gas Turbine Unit 2	250	MW
	Ao Phai Wind Turbine	10	MW
	Lam Dome Yai Hydropower	1	MW
	Kamphaeng Phet Solar Cell	3	MW
	Power purchase from neighboring countries	300	MW
2030	VSPP- Renewables	33	MW

Year	Power Plants		
	VSPP- Cogeneration	1	MW
	Renewable Energy (additional)	220	MW
	EGAT-New Combined Cycle Power Plant	900	MW
	Gas Turbine Unit 3	250	MW
	Solar Cell (Southern)	10	MW
	Samut Sakhon Wind Turbine	30	MW
	Klong Luang Hydropower	1	MW
	Power purchase from neighboring countries	300	MW

### IPP Bidding for New Gas-Fired Power Plant

On 24 June 2013, ERC has announced the winner for IPP Bidding for New Gas-Fired Power Plant for the supply of 5,000 MW and SCOD during March 2021-October 2024.

### Nuclear Power Plants in PDP 2010 Revision 3

After severe damage on Fukushima Daiichi Nuclear Power Plant, the PDP 2010 Revision 3 was shifted the scheduled commercial operation date (SCOD) of the first unit on nuclear power plant project forward by 6 years from 2020 to 2026. As stated in the PDP 2010 Revision 3, the portion of nuclear power production in Thailand is targeted to be 5 percent of entire capacity.

## 2.2.6 Tariffs

Electricity sales tariffs vary for IPPs and SPPs, and in the case of SPPs, whether sales are being made to EGAT or industrial customers. While our IPPs' and SPPs' power purchase agreements contain specific pricing mechanisms related to electricity sales tariffs, our electricity sales to industrial customers are based on the PEA retail tariff.

### ***(1) Electricity pricing for EGAT under our IPP power purchase agreement***

The price at which we sell electricity to EGAT under our IPPs power purchase agreement is comprised of the three components: availability payments, energy payments and an added facility charge.

#### ***Availability payment***

The availability payment under IPP's power purchase agreement for any given period of time is calculated by multiplying IPP's base availability credit (expressed in Baht per MWh) and Glow IPP's dependable contracted capacity (which is the maximum continuous net generating capacity measured in MW, up to the contracted capacity). The availability payment is subject to downward adjustments for

reduced availability, short notice of reduced capability and dispatch failure. Additional availability payments are earned for temporary increases in capacity made available pursuant to a request by EGAT.

### ***Energy payment***

The energy payment consists of a fuel charge and a variable operation and maintenance charge. Under the IPP power purchase agreement, fuel charges vary depending on whether the facility is operated using a primary fuel (natural gas) or secondary fuel (diesel). The “primary fuel rate” and “secondary fuel rate” are determined in part by reference to our fuel procurement arrangements.

The primary fuel rate based on higher heating value (“HHV”) agreed additional energy required to produce one additional MW of net electrical energy) applicable for each month, m, is determined in accordance with the PTT gas supply agreement or coal supply agreement relating to such facility and is equal to the generator unit’s actual price of fuel (in Baht per million Btu) under such gas supply agreement or coal supply agreement (less any applicable fixed tariff charge).

The secondary fuel rate for Glow IPP based on HHV applicable for each month m is determined on the basis of invoices relating to secondary fuel purchased by the electricity generator during such month m to replace the secondary fuel that was used during or prior to such month m for which the generator has not yet been compensated for the cost of fuel, and is equal to the generator’s actual price of fuel (in Baht per million Btu) under the secondary fuel sales agreements (and include up to a 37-day carrying charge levied by the second fuel supplier).

### ***Added Facility Charge***

The Glow IPP power purchase agreement also includes an added facility charge through which we are reimbursed for loans made to EGAT to cover certain access-related payments. This charge is composed of costs associated with the construction of new transmission facilities to connect Glow IPP facilities to the EGAT transmission grid (including costs of procuring relevant access rights and right of way costs). It is added to our availability payments, which are reimbursed on a monthly basis over the term of the power purchase agreement.

## ***(2) Electricity pricing for EGAT under our SPP power purchase agreements***

The price at which we sell electricity to EGAT under our SPP power purchase agreements is comprised of two components: capacity payments and energy payments.

### ***Capacity payment***

The capacity payment is a fixed charge payable regardless of usage and is set at: Baht 302 per kW per month (excluding value-added tax) for electricity produced by our gas-fired units except Glow Energy Phase 4 and Glow SPP 11 Phase 2; and Baht 422 per kW per month (excluding value-added tax) for electricity produced by our coal-fired unit. In each case, the capacity payment is adjusted monthly to reflect changes in the Baht/US dollar exchange rate, with 80 percent indexation for electricity produced by our gas-fired units and a 70 percent indexation for electricity produced by our coal-fired unit.

For Glow Energy Phase 4 and Glow SPP 11 Phase 2, the capacity payment is set at Baht 383.66 per kW per month (excluding value-added tax). The capacity payment is also adjusted monthly to reflect changes in the Baht per US Dollar exchange rate, with 50 percent indexation.

### ***Energy payment***

The energy payment is a fixed charge in Baht per kilowatt hour regardless of usage and is currently set at: Baht 0.85 per kWh for electricity generated by gas-fired units except Glow Energy Phase 4 and Glow SPP 11 Phase 2; and Baht 0.62 per kWh for electricity generated by coal-fired units.

The energy payment is subject to periodic adjustment, calculations for which differ slightly for gas and coal fired units. For gas-fired units, this adjustment is calculated based on the net energy delivered during the applicable period multiplied by increases in the cost of natural gas. For coal-fired units, this adjustment is calculated based on the net energy delivered during the applicable period multiplied by increases in the cost of coal. In both cases, the increases in fuel prices for natural gas and coal are calculated using base prices set in August 1995, while the Glow Energy Phase 4 and Glow SPP 11 Phase 2 are calculated using the gas base prices set in December 2006.

### ***(3) Electricity pricing for industrial customers***

Sales of electricity to industrial customers are generally priced with reference to the retail tariffs charged by the PEA. The tariff structure in Thailand has since 1990 consisted of base wholesale and retail tariffs, both of which are fixed, and a variable component that is added to the wholesale and retail tariffs.

### ***Base tariff***

The ERC announced the base tariff periodically. The current base tariff has been in place since June 2012. The rate varies for different types of end users. We price our almost entire power sales agreements by referencing the rate charged for “large general services”. The applicable base tariff rates for this category of users are either charged a “time of day” or “time of use” tariff, both of which are summarized in the tables below.

*Time of Day Tariff*

	Demand Charge (Baht / kW)			Energy Charge (Baht / kWh)	Service Charge (Baht/ month)
	1*	2*	3*		
69 kV and over	224.30	29.91	0	2.6506	312.24
22 – 33 kV	285.05	58.88	0	2.6880	312.24
Below 22 kV	332.71	68.22	0	2.7160	312.24
1* On Peak:	Everyday from 06.30 pm to 09.30 pm;				
2* Partial Peak:	Everyday from 08.00 am to 06.30 pm (only the amount of maximum demand that is out of the On Peak period will be charged at this rate); and				
3* Off Peak:	Everyday from 09.30 pm to 08.00 am.				

*Time of Use Tariff*

	Demand Charge (Baht / kW)		Energy Charge (Baht / kWh)		Service Charge (Baht/month)
	1*		1*	2*	
69 kV and over	74.14		3.5982	2.1572	312.24
22 – 33 kV	132.93		3.6796	2.1760	312.24
Below 22 kV	210.00		3.8254	2.2092	312.24
1* On Peak:	Monday – Friday from 09.00 am to 10.00 pm; and				
2* Off Peak	Monday – Friday from 10.00 pm to 09.00 am Saturday – Sunday and normal public holiday (excluding substitution holiday).				

Billing demand is defined as the maximum 15-minute integrated demand during an on-peak and partial-peak period over the monthly billing period that is measured to the nearest full kilowatt discarding the fraction of 0.5 kW. A monthly minimum charge of any billing period shall not be less than 70 percent of the maximum billing demand charge for the preceding 12 months.

## 2.3 Service and Raw Material Supply

### 2.3.1 Fuel supply

Excluding hydropower plant in Laos, our principal raw materials are natural gas and coal, both of which are used as fuel to generate electricity and steam. Majority our electricity generating facilities in Thailand use natural gas as their principal fuel source, with the exception of our Glow SPP 2/ Glow SPP 3 plant which uses both natural gas and coal, and our CFB 3 of Glow Energy which uses coal. Purchases of natural gas and coal together accounted for 83.2 percent of our total costs of sales, or 80.6 percent of our total expenses in 2013. Several of our gas-fired facilities are also designed to run on diesel fuel (alternative fuel), but diesel is much more expensive fuel.

#### (A) Natural gas

Purchases of natural gas accounted for 68.5 percent of our total cost of sales in 2013. To date, we have not experienced any material disruptions of natural gas supplied by PTT, with which we have entered into ten separate gas supply agreements.

PTT enters into four principal types of gas supply agreements:

- IPPs gas supply agreements;
- SPPs gas supply agreements;
- cogeneration gas supply agreements; and,
- industrial gas supply agreements.

The average price of natural gas for Glow IPP, expressed in terms of Baht per mmbTU, was 249.2 in 2011, 303.2 in 2012, and 313.3 in 2013. The average effective price of natural gas for our other generating facilities, expressed in terms of Baht per mmbTU, was 257.5 in 2011, 310.7 in 2012 and 323.0 in 2013.

The terms and pricing of these agreements differ significantly. Generally, gas prices for IPPs are the lowest, followed by SPPs, cogeneration facilities, and industrial gas supply (which is the highest gas price).

#### (1) IPP gas supply agreement

PTT has a standard form gas supply agreement for sales of natural gas to all IPPs (the “IPP gas supply agreement”). Glow IPP’s gas supply agreement is a requirements-based contract with a 25-year term that follows this form. Under the terms of this agreement, Glow IPP is not subject to any minimum take obligations. PTT is, however, subject to a “reasonable endeavours” obligation to supply requested quantities of natural gas to Glow IPP.



Because all IPPs operating in Thailand sell all of their generated electricity to EGAT, (and EGAT controls when and to what extent such generation facilities are dispatched and consequently how much gas they consume), EGAT has entered into a master gas supply agreement with PTT. EGAT therefore assumes the take-or-pay obligation with respect to the gas supply agreements of Glow IPP and other IPPs. PTT's "reasonable endeavours" obligation requires that it supply natural gas sufficient to meet each respective IPPs' contractual delivery capacity ("CDC"), which may be changed by Glow IPP providing advance notice to PTT.

Pricing under the IPP gas supply agreement is standard for all IPPs and is fully passed through to EGAT as part of the energy charge under the EGAT power purchase agreements on the basis of a contracted heat rate. If PTT is not able to supply adequate quantities of gas, we are reimbursed (principally by EGAT) for our increased fuel costs. The technical specifications of the natural gas that PTT is required to deliver are set out in the IPP gas supply agreement.

(2) *SPP gas supply agreement*

PTT has a standard form gas supply agreement that it uses for sales of natural gas to SPPs (the "SPP gas supply agreement"). The gas supply agreements between PTT and Glow Energy Phase 2, Glow Energy Phase 4, Glow SPP 1, Glow SPP 2, Glow SPP 11 Phase 1 and Glow SPP 11 Phase 2 follow this form. Our SPP gas supply agreements have terms of 21 years for Glow Energy Phase 2, Glow SPP1, Glow SPP 2 and Glow SPP 11 Phase 1 and terms of 25 years for Glow Energy Phase 4 and Glow SPP 11 Phase 3 that require PTT to make available gas in the amount equal to the contractually stipulated daily contracted quantity ("DCQ"). Each year, we have the option to increase or decrease the DCQ by a maximum of 15 percent of the prior year's DCQ, subject to a maximum DCQ stipulated in each contract. The terms of these agreements require that our respective SPPs purchase no less than 85 percent of the DCQ submitted to PTT each year.

The net annual contracted quantity ("Net ACQ") is calculated by first establishing the Annual Contract Quantity ("ACQ"), which is the sum of each month's Monthly Contract Quantity ("MCQ") for a given year, from which is subtracted: (i) the volume of gas that PTT was unable to supply in accordance with the DCQ; (ii) the volume of gas we were unable to take due to *force majeure*; and (iii), the volume of gas we refused to accept due to quality or pressure shortfalls.

Even if we do not take all of our minimum required Net ACQ (85 percent thereof) we are required to pay for it. We have a two-year make-up right in respect to any quantities paid for but not taken, which matches EGAT's make-up rights in respect of its take-or-pay obligations under the EGAT power purchase agreements for our SPPs. Pricing under the SPP gas supply agreements is standard for all SPPs.

The SPP gas supply agreements require PTT to compensate us if it is unable to deliver natural gas at agreed levels provided that PTT was at fault for delivery failure, but only to the extent that this affects our generation of electricity for sales to EGAT. Although subject to certain ceilings, compensation amounts are calculated to equal the difference between the price of natural gas under the SPP gas supply agreement and the price of diesel fuel. (As noted early, our facilities use diesel as a substitute fuel when unable to procure sufficient quantities of natural gas). The technical specifications of the natural gas that PTT is required to deliver are set out in the SPP gas supply agreements.

*(3) Cogeneration gas supply agreement*

PTT has a standard form gas supply agreement used for sales of natural gas to non-SPP cogeneration facilities (the “Cogeneration gas supply agreement”). The gas supply agreements between PTT and Glow Energy Phase 5 and Glow SPP 11 Phase 3 follow this form and have terms of 10 years and 15 years, respectively. Under these terms, PTT is required to make gas available in the amount equal to a specified mean daily contract quantity (“MDCQ”). For agreement with Glow (Phase 5), the MDCQ is subject to adjustment based upon the actual daily contract quantity (“ADQ”) over the preceding six month period. The six month average of the ADQ is then applied as the new MDCQ. There are no minimum take obligations under the Cogeneration gas supply agreements of Glow Energy (Phase 5). However, for the agreement with Glow SPP 11 Phase 3, there is no automatic adjustment over the preceding six month period as mentioned above. The DCQ is depending on the figure that we submit to PTT each year, which we have the option to increase or decrease the DCQ by a maximum of 15 percent of the submitted figure. There are monthly minimum take obligations under the Cogeneration gas supply agreements of Glow SPP 11 Phase 3 at the level of 100 percent. However, they also have 12 months period make-up account from the date of deposit under the agreement for us to utilize the quantities that we paid for but not taken. We also have one time right to adjust the DCQ by maximum of 15 percent of the DCQ for such year if we are subject to minimum take for 3 consecutive months.

Pricing is based on standard gas prices for cogeneration facilities, which is higher than prices paid by SPPs and those in the industrial power sector. In the case of any future decisions to re-enact industrial power sector gas pricing policies (or any gas pricing structure with prices lower than the current price for cogeneration facilities), PTT has agreed to allow gas sales for Glow’s Phase 5 unit to fall under this new pricing structure. Additionally, if Glow’s Phase 5 unit is contracted to sell electricity to EGAT under the SPP program, both parties have agreed to amend related agreements to reflect standard SPP gas supply agreements.

*(4) Industrial gas supply agreement*

PTT has a standard form gas supply agreement for sales of natural gas to industrial customers (“Industrial gas supply agreements”). The gas supply agreements between PTT and Glow Energy follow this form and have a term of four years and 2 months

Under this agreement, PTT is required to make available quantities of natural gas equal to a specified mean daily contract quantity (“MDCQ”), which is subject to adjustments based upon the actual daily contract quantity (“ADQ”) over the preceding six month period. The six month average of the ADQ is then applied as the new MDCQ. There are no minimum take obligations under the Industrial gas supply agreements. Pricing is based on standard industry gas prices and incorporates a volume discount.

*(B) Coal*

Purchases of coal accounted for 17.5 percent of our total cost of sales in 2013. We consume coal at the CFB 1&2 at Glow SPP 3 plant, CFB 3 at Glow Energy, and GHECO-One. In 2010, 2011, 2012, and 2013, our coal purchase (measured by mass) was approximately 1,084,941 tons, 1,566,097 tons, 2,624,549 tons and 3,290,200 tons respectively. In 2013, for our CFBs, we purchased approximately 33 percent of our coal consumption under a long-term coal supply agreement with Banpu and approximately 67 percent of our coal consumption under medium-term contracts with international and

Thai coal suppliers. Our 15-year coal supply agreement with Banpu will expire at the end of 2014. We are discussing with Banpu to extend such coal supply agreements. Banpu sources this coal from mines in Indonesia. We purchased all of GHECO-One's coal consumption under medium-term contracts with two international coal suppliers.

Under each coal supply agreements, coal supplier is responsible for guaranteeing the quality of coal in accordance with the specifications set out in the coal supply agreement. If the quality requirements are not met, we can either accept the non-conforming coal and make deductions from payments on terms specified in the coal supply agreement, or require such to replace the non-conforming coal.

Coal suppliers are also required to supply specific quantities of coal as set out in the coal supply agreement. If there is any shortfall in the quantity of coal supplied due to default by coal suppliers, they must compensate us for any additional cost incurred in acquiring the shortfall amount from another source. If necessary, we acquire the balance of our coal requirements through spot purchases from commodity traders or coal suppliers in the open market.

The prices of coal under coal supply agreements are expressed in US dollars per ton, and include both the FOB coal price and freight costs. As the sale price of our products is not fully hedged for changes in coal prices, such changes directly impact our profitability. It is also important to note that freight prices are not pass-through costs under the terms of our SPP electricity sales agreements with EGAT, and are therefore absorbed entirely by us.

**(C) Diesel**

Diesel oil is the back-up fuel for the natural gas turbines supplying electricity under our Glow IPP's electricity sales contracts. The close proximity of our facilities to the Rayong Refinery and Star Refinery, both of which are located in the MIE Area, as well as the PTT oil depot in Sriracha district, Chonburi Province, provide us with relatively convenient access to diesel oil.

Under the terms of its IPP power purchase agreement, Glow IPP is required to maintain backup supplies of diesel oil sufficient to generate contracted electricity amounts for three days. Note that for our GHECO-One facility, we use diesel oil for start-up purpose only and no requirement to maintain backup supplies of diesel oil as per Glow IPP's power purchase agreement. To date, we have not experienced any material disruptions in our natural gas supply and as such, have not been required to operate facilities using diesel oil, except under limited circumstances, and principally for testing.

**(D) Raw water and other public utilities**

Our GHECO-One, Glow Energy and Glow SPP 2/ SPP 3 plants are located within the MIE, which is owned and administered by the Industrial Estate Authority of Thailand ("IEAT"), a state enterprise operating under the supervision of the Ministry of Industry. The IEAT was established under the Industrial Estate Authority of Thailand Act of 1979. The act also established that the government, through the IEAT, must provide infrastructure and public utilities (raw water, waste treatment, etc.) to operators within its estates. IEAT is therefore responsible for providing our production facilities with water and other public utilities.

Sea-water, which is used as cooling water, is delivered through underground pipes from the harbour to our condensers and returned to the sea via a discharge canal. We produce the clarified and demineralised water used in operations at our own water treatment facilities.

Our Glow IPP and Glow SPP 1 facilities are located in industrial estates owned and administered by Hemaraj. Hemaraj provides basic utilities for operations located in their industrial estates, including raw and potable water, waste treatment, telephone connections and common utilities. In addition to payments for basic utilities, Hemaraj charges an adjustable monthly fee for the management and maintenance of common utilities and facilities within its industrial estates.

Our Glow SPP 11 Phase 1, Glow SPP 11 Phase 2 and Glow SPP 11 Phase 3 facilities are located in SEIP. SEIP provides waste water treatment and other public utilities. East Water provides raw water.

**(E) Other raw materials**

We use small amount of biomass and limestone sourced from Thailand in connection with our coal-fired facilities as well as various other chemicals to produce clarified and demineralised water. These chemicals include aluminium sulphate, sodium hydroxide, sodium hydrochlorite, hydrochloric acid and trisodium phosphate, all of which are primarily sourced and supplied in Thailand.

**2.3.2 Maintenance**

The maintenance of production facilities is a critical aspect of our business. Proper maintenance not only allows us to operate more efficiently, and thereby generate more electricity and steam using less fuel, but is also important to protect our facilities against major breakdowns and failures. Following fuel costs, maintenance costs are the most significant component of our operating expenses, accounting for 2.3 percent of our total cost of sales in 2013.

We manage plant maintenance with the primary aim of minimizing business disruptions. This includes coordinating maintenance outages with customers, as well as planning and scheduling maintenance activities to achieve maximum efficiency. We also strive to work within the parameters of our EGAT power purchase agreements, which provide allowances for scheduled maintenance.

We and other electricity generators typically enter into long-term service agreements with respect to certain components of our facilities. Although there is some variation in the terms of these long-term service agreements, they typically involve the use of a third party contractor to maintain, service, and supply spare parts for these components. The major material, long-term service agreements we have entered into include:

- Glow Energy Phase 2: Long-term maintenance services for Glow Energy's gas turbines and related equipment, components and parts are provided by Wood Group Heavy Industrial Turbines (Thailand) Ltd., ("Wood Group"). Our long-term service agreement with Wood Group took effect on January 1, 2005 and expires after 192,000 plant operating hours, or the completion of four maintenance cycles.
- Glow SPP 2 and Glow Energy Phase 4: The long-term maintenance arrangements for the natural gas-fired portion of our Glow SPP 2/ SPP 3 plant and Glow Energy Phase 4 are substantively the same as those outlined above for Glow Energy.

- Glow Energy and Glow SPP 3: Have a maintenance contract with EGAT for 115 kV and 230 kV overhead transmission lines and a maintenance support agreement with MEA for all underground 115 kV and 22 kV transmission lines.
- Glow IPP: In 2010 we have entered into a long term Alstom GT26 gas turbine parts supply and reconditioning services agreement with Alstom (Switzerland). The agreement covers the period over the next three major inspections (approximately over 8-9 years) for each generating unit.
- Glow SPP 1: In 2010 we have entered into a long term Alstom GT8C gas turbine parts supply and reconditioning services agreement with Alstom Power (Thailand). The agreement covers the period over the next three major inspections (approximately over 8-9 years) for each generating unit.
- Glow Energy Phase 5: In 2010 we have entered into a long term maintenance services and parts supply agreement for the gas turbine Siemens 4000F model of the Phase 5 project with Siemens Thailand. The agreement covers the term over 75,000 EOH (approximately over 9-10 years).
- Glow SPP11: In early 2012 we have re-negotiated with Wood Group the existing long-term parts supply and maintenance services for the Glow Group's Frame 6B gas turbines (14 engines) by including the two Frame 6B gas turbines of Glow SPP11 into the existing package (total of 16 engines). This agreement covers two major inspections per gas turbine (approximately 12 years) for Glow SPP11.
- Glow SPP12: In 2012 we have entered into a long term maintenance services and parts supply agreement for the gas turbine General Electric LM6000 gas turbines of the Glow SPP12 power plant with IHI Corporations. The agreement covers three gas turbines for the term of 50,000 OH per gas turbine (approximately over 9-10 years).

Any other maintenance is contracted on a project-specific basis. It should be noted that we often contract with the original equipment manufacturer for maintenance needs outside of those covered by existing long term maintenance arrangements, as the machinery and equipment we use is highly specialized.

### **2.3.3 Insurance**

We currently have the following principal insurance policies:

All of our operational generating units are insured under one collective property damage and business interruption insurance policy. We have placed the renewable policy in year 2013 for the two-year cover period which is from 1 June 2013 to 31 May 2015. The current policy covers all of the plants and relates to major machinery, plants and plant equipment and is placed jointly with some other GDF SUEZ Energy International entities.

Our property damage insurance covers, on an all-risks basis, any physical loss or damage to our property and any property which is in our care, custody and control, including machinery, plant, equipment, turbines, generators, boilers, electronic data processing equipment and property in transit.

This policy contains standard exclusions that are customary in the international insurance market. The property damage insurance also covers the estimated new replacement value of insured assets.

Our business interruption insurance covers certain financial losses, including the loss of gross profit (as well as the loss of BOI tax privileges) and increased operating costs, (such as additional expenditures for the sole purpose of preventing or minimizing the loss of gross profit), incurred as a result of an interference or interruption to our business caused by damage to the insured property. The policy includes deductibles, waiting periods, exclusions and coverage extensions that are customary in the international insurance market.

Our business interruption insurance is based on an indemnity period of 12 months, except in the case of Glow SPP 3, Glow Energy (CFB 3) and Glow IPP, which have indemnity period of 18 months, and Glow Energy (Phase 5) and GHECO-One, which have indemnity period for 24 months. The policy has a combined property damage and business interruption insurance limit of US\$ 750 million per event. In addition, we have procured additional limit of indemnity (currently up to June 2015) for a combined property damage and business insurance of US\$ 820 million per event in excess of US\$ 750 million per event, for the plants located in the same area in Map Tha Phut comprising of Glow Energy Phase 1, Glow Energy Phase 2, Glow SPP2/SPP3 (Phase 3), Glow Energy CFB 3, Glow Energy Phase 4, Glow Energy Phase 5, and GHECO-One,

Glow also has partial terrorism coverage jointly with other GDF-Suez assets.

We also have an annual group-wide third-party liability insurance policy that is procured and held jointly with other companies within the GDF SUEZ Energy International group. This policy indemnifies the respective entities within Glow Group, as the insured party, against legal liability for: (i) bodily injury to any person; and/or (ii), damage to property, subject to a limit of US\$ 50,000,000 per occurrence, and in aggregate with respect to product liability. Additionally, the US\$ 50,000,000 limit is subject to Glow's group-wide application for the occurrence of a single event (in the case that a single event results in a claim to more than one covered entity). This policy contains standard exclusions that are customary in the international insurance market. The policy period is from November 30, 2012 to February 28, 2014, after which a new policy will be placed until November 30, 2014

We also have employer's liability insurance and property all-risk insurance for our head office facility as well as insurance policies relating to marine cargo and motor vehicle liability.

#### **2.3.4 Environmental, health and safety management**

We are subject to the Enhancement and Conservation of National Environment Quality Act B.E. 2535 (1992). The Office of Natural Resources and Environmental Policy and Planning (ONEP) has approved the environmental impact assessments ("EIA") for each of our operating facilities and expansion projects as required by this act. We are also liable for breaches of environmental laws and responsible for making any improvements and/or modifications to our facilities to ensure continued compliance with environmental laws.

Currently, each of our plants is in compliance, in all material respects, with existing environmental regulations and related applicable standards. Our operations also comply fully with World Bank guidelines set forth for power generation. We have not been party to any litigation, arbitration, suit or proceeding in relation to environmental matters or compliance with any environmental regulation.

We work continuously to supervise, control and improve our processes to ensure that regulated emissions from our operations are within and/or below stipulated maximum levels. We use continuous emission monitoring systems (CEMS) to monitor emissions resulting from the combustion processes of our plants. We also monitor ambient air quality at several locations within the vicinity of our plants as required by EIA mitigation and monitoring programs. For each combustion process, we monitor and control oxides of nitrogen and sulphur and particulate matter. The temperature and the fuel/air ratio are controlled during the combustion process in order to maintain emissions within applicable limits.

Minimizing the environmental impacts of our coal-fired facilities is important to us. We use coal dust suppression systems and employ clean coal combustion technology and fabric filters to reduce emissions from coal-fired facilities. We periodically monitor the quality of effluent discharge and compare it to the EIA's mitigation and monitoring programs to ensure compliance with regulatory standards.

We are one of the first companies in the MIE to install environmental display board that report actual emissions to the public and IEAT. This is to demonstrate that our environmental reporting systems are transparent. For most of our emissions and discharge, we are well within regulatory requirements

We also participate in the "Environmental Good Governance Project", which is a program organized by Map Ta Put Industrial Estate to reduce air emissions and industrial waste.

We have implemented policies, procedures and control mechanisms to reduce the risk of chemical leakages and employee exposure to hazardous materials. We carefully select and seek to rely only on chemicals that have a minimal adverse impact on the environment and employee health. Additionally, our coal yard management system is designed to minimize the risk of environmental contamination and fire. We have also implemented a proactive program of coal ash management that includes the utilization of fly ash in the manufacture of ready-mixed cement.

We have put in place an environmental, health and safety training program to heighten employee awareness of environmental, health and safety issues. In 2011 we had two lost time accident cases to our employees, one at Glow SPP 2/ Glow SPP 3 facilities, and the other being traffic accident. We have taken measures by immediately conducting a thorough accident review to establish the root causes of the accident and review prevent future accidents.

We prepare regular reports for government agencies on the disposal of our hazardous and non-hazardous waste, and have waste management procedure to separate, collect and storage each type of waste before the off-site disposal. We also monitored noise level during operations by qualified third party following the EIA mitigation and monitoring programs to ensure compliance with government regulations.

## **2.4 Expansion and Potential Expansions**

With continued growing utility demand of industrial customers in Pluak Daeng, we are expanding our generation capacity. Our new gas engine units with a net capacity of 19.12 MW in SEIP are expected to be put in operation by early 2015. This expansion will not only facilitate growth of our customers but also increase the reliability and improve optimization of our generation fleet in SEIP.



### 3. Risk Factors

#### *We are exposed to fluctuations in fuel prices*

Fuel is our most significant operating cost, accounting for 80.7 percent of our total expenses in 2013. Whether and to what extent we can pass fuel price fluctuations through to our electricity and steam customers depends on the specific terms of our sales agreements.

- Under the terms of Glow IPP's and Gheco-One's power purchase agreement with Electricity Generating Authority of Thailand (or "EGAT"), which accounted for 20.7 percent and 17.2 percent respectively of our total revenues in 2013, our fuel costs are fully passed through to EGAT at contracted heat rates.
- Under the terms of our SPP power purchase agreements with EGAT relating to our gas-fired facilities, which together accounted for 22.8 percent of our total revenues in 2013, our fuel costs are passed through to EGAT at contracted heat rates.
- Under the terms of our SPP power purchase agreements with EGAT relating to two of our coal-fired facilities (90 MW contracted capacity each), which together accounted for 3.4 percent of our total revenues in 2013, our fuel costs are only partially passed through to EGAT at contracted heat rates and certain benchmark of coal price, as relating to our purchase of coal. The freight charges, which are an important component of fuel costs, are not passed through to EGAT. Increase in overall coal costs, including freight costs, may have an adverse effect on our profit margins.
- Under the terms of our power supply agreements with industrial customers, which together accounted for 22.5 percent of our total revenues in 2013, we mainly sell electricity at prices that are based on the retail electricity tariff charged by the Provincial Electricity Authority of Thailand (or the "PEA"), the state-owned electricity distribution authority for the areas of Thailand in which we operate. Although the PEA tariff is designed to reflect fluctuations in fuel prices through a fuel transfer charge (or the "Ft"), it does so by reference to a fuel index, which is not designed to and may not necessarily reflect our actual fuel costs and only factors in the costs of coal (which we also use to generate up to 248 MWeq of electricity that we supply to our industrial customers) to a very limited extent. In addition, the Ft does not always function as designed. See "—We price a portion of our electricity sales by reference to the PEA tariff, which does not reflect our actual costs and may not be adjusted as designed to reflect fluctuations in, among other things, fuel costs and inflation".
- Under the terms of our steam supply agreements with industrial customers, which together accounted for 11.3 percent of our total revenues in 2013, we sell steam based on prices that are indexed to fluctuations in the price of natural gas, but not coal (which we also use to produce the steam that we sell).

Because we cannot pass through all of the changes in our fuel costs to our customers, we are exposed to fluctuation in the prices of fuel (and in particular coal). If there are material increases in our cost of fuel and we are unable to pass these increases through to our customers, this will directly reduce our profit margins and could have a material adverse effect on our business, results of operations,



financial condition and prospects.

***We price a portion of our electricity sales by reference to the PEA tariff, which does not reflect our actual costs and may not be adjusted as designed to reflect fluctuations in, among other things, fuel costs and inflation***

Under the terms of our electricity supply agreements with our industrial customers, which together accounted for 22.5 percent of our total revenues in 2013, we mostly sell electricity at prices that are based on the retail tariff charged by the PEA. The PEA's tariffs are regulated by the Energy Regulatory Commission (or the "ERC") and take into account the electricity generation, purchase, transmission and distribution costs of the PEA, the Metropolitan Electricity Authority of Thailand (or the "MEA") and EGAT, the major electricity utilities in Thailand. Since our cost structure is different, the PEA tariff rates, and consequently the prices at which we sell electricity to our industrial customers, do not necessarily reflect our actual costs of producing and supplying this electricity.

The PEA tariff is designed to reflect fluctuations in fuel prices, inflation, foreign exchange rates and other factors by application of the Ft. However, the most significant component of the Ft, the fuel cost component, refers to a general fuel index that does not necessarily reflect our actual fuel costs and only factors in cost of coal, which we also use to generate electricity that we supply to our industrial customers, to limited extent. In addition, the Ft, which is normally adjusted only every 4 months, does not always function as designed. When the Ft adjustment is not applied or not fully applied to the PEA tariff in a rising fuel cost environment, the prices at which we sell electricity to our customers are not increased to reflect higher prevailing fuel prices, and consequently, our profit margins are reduced, and vice versa. For the foregoing reasons, our reliance on the PEA tariff could have a material adverse effect on our business, results of operations, financial condition and prospects.

***We are highly dependent on EGAT***

EGAT is our largest and most important customer and is committed to purchasing electricity from us under our EGAT power purchase agreements, which are long-term contracts with durations from 21 to 25 years. The EGAT power purchase agreements are material to our business, accounting for 64.8 percent of our revenues in 2013. EGAT is the dominant participant in the Thai electricity market. In addition to being the single wholesale buyer and controlling all of the wholesale transmission of electricity in Thailand, EGAT is also Thailand's largest electricity generator. A number of our important contracts contain unclear terms which have led to disagreements with EGAT regarding the operation of our business, as discussed below in "—We have had a number of significant disputes with EGAT in the past" and which could result in further disputes in the future. Any material disputes or disagreements that we have with EGAT could have a material adverse effect on our business, results of operations, financial condition and prospects.

***We are highly dependent on a small number of industrial customers concentrated in the petrochemicals sector***

In addition to EGAT, we are also highly dependent on a small number of industrial customers. Our ten largest industrial customers (which, for the avoidance of doubt, exclude EGAT) accounted for 24.7 percent of our total revenues in 2013 or 69.4 percent of total sales to industrial customers, whereas total sale to industrial customers accounted for 34.4 percent of our total revenue in 2013. A

disruption of our relationship with one or more of our industrial customers could have a material adverse effect on our business, results of operations, financial condition and prospects. Further, our industrial customers are highly concentrated both geographically and in terms of industrial classification. Most of our industrial customers are located in the Map Ta Phut Industrial Estate (or “MIE”) or elsewhere within the MIE Area, accounted for 76.1 percent to total sales to industrial customers. This exposes us to increased risk of regulatory changes in respect of operation in MIE, an accident, natural disaster, infrastructure or other failure or breakdown disrupting the facilities of the MIE, the other industrial estates in which our industrial customers are located or the MIE Area generally.

In addition to their geographic concentration, many of our industrial customers are companies operating in petrochemical or petrochemical-related industries. This exposes them, and indirectly us, to the performance of the petrochemical sector. Many petrochemical products are commodities and the petrochemical industry is highly competitive. In addition, significant price fluctuations and business cyclicality are common in many petrochemical-related industries. These factors may affect our ability to conclude new agreements with these customers or negatively affect our demand and load factor, customer creditworthiness, the timing of our customers’ expansions and thereby the terms on which we are able to reach any such new agreements and may, for these reasons or otherwise, have a material adverse effect on our business, results of operations, financial position and prospects.

Despite that, we have successfully extended majority of the long term contracts with industrial customers that initial term were already expired or due to expire in coming years but, we cannot assure that we will be able to retain all of them that are expiring in medium term or find new customers to replace them on commercially reasonable terms when our existing sales agreements with them expire. In addition, it is important to our business to maintain minimum levels of steam sales in order to meet applicable generating efficiency requirements (and failure to do so could result in termination of certain of our SPP power purchase agreements with EGAT). If we are unable to retain our customers or to find new customers to replace them on commercially reasonable terms and along the product lines that we require, this could have a material adverse effect on our business, results of operations, financial position and prospects.

Under our power supply and steam supply agreements with industrial customers, our companies may be subject to liquidated damages liability in an event of interruption in the supply of power and/or steam and/or a failure to meet an annual guarantee of availability of power or steam, subject to the conditions indicated in each agreement, which may vary from one to another. We cannot assure you whether there would be such liabilities incurred to us or not, or if incurred how materiality it would be, throughout the terms of our existing and future agreements.

### ***We face significant competition***

We face significant competition, particularly in respect to our supply of electricity and steam from our cogeneration facilities to industrial customers in the MIE Area and in the Siam Eastern Industrial Park (or “SEIP”). In MIE Area, although our customers are party to long-term agreements with us, we compete with PEA and the utility business units of Global Power Synergy Company Limited (or “GSPC”), merged company between PTT Utility (“PTTUT”), PTT Global Chemical (“PTTGC”) utility division, and Independent Power Thailand (“IPT”). GSPC and PEA have certain competitive advantages over us. GSPC is affiliated with PTT, the principal natural gas supplier in Thailand and, through this relationship, with a number of companies in the MIE Area (including many of our important customers). PTT also has an equity interest in a number of our industrial customers (most significantly PTTGC), sales

to PTTGC accounted for 8.3 percent of our total revenue from electricity sold to industrial customers, 24.3 percent of our total revenue from sales of steam and 4.8 percent of our total revenues in 2013. PEA, on the other hand, does not require its customers to enter into long-term contracts. However, it is appearing that PEA may require its customers to enter into short to medium term contracts. In SEIP Area, we complete with only PEA.

We believe the level of competition that we face for industrial customers in the future will be maintained, particularly in the following respects: (i) certain of our important customers are PTT affiliates and (ii) certain of our existing customers already do business with PTT and its affiliates. See “Business—Competition” for more discussion of the competitive risks that we believe GSPC poses to our business.

***We are subject to significant contractual risks under our SPP power purchase agreements***

EGAT is our largest and most important customer, and sales to EGAT from our SPPs accounted for 26.2 percent of our total revenues in 2013 (see “—We are highly dependent on EGAT”). EGAT is the sole purchaser of wholesale electricity in Thailand. Due in part to the foregoing, our SPP power purchase agreements with EGAT are standard form contracts that we were not given an opportunity to negotiate. This means that these contracts are not tailored to our specific operating circumstances and contain a number of ambiguous provisions. Certain of the terms of our SPP power purchase agreements from first round of SPP contracts (COD before 2012) that we believe present risks to our business are as follows:

- A power purchase agreement may be terminated before the end of its term due to the default of either party and our only remedy may be to bring a claim in arbitration and prove damages;
- Although the power purchase agreements do not include liquidated damages provisions, penalties are imposed in the form of reduced capacity or energy payments from EGAT or refunds by us where (i) we supply less than the contracted capacity, (ii) we provide electricity for less than 7,008 hours in a year, (iii) the cogeneration efficiency is less than 45 percent or (iv) thermal energy accounts for less than 10 percent of our total energy sold;
- If a force majeure event affecting EGAT or a governmental force majeure event (as defined in the power purchase agreement) prevents us from supplying electricity to EGAT, EGAT will continue to make its capacity payment (the payment that is designed to allow us to recover our fixed costs for constructing and operating the power generating facility over the life of the contract) to us for only up to six months. In addition, failure by PTT to deliver gas to us is not considered to be a governmental force majeure event for these purposes, so in the event of a PTT supply failure EGAT will only pay us for capacity actually made available and energy actually delivered; and
- Our SPP power purchase agreements with EGAT contain only a general commitment for both parties to negotiate in good faith to amend to our contractual arrangement in response to any adverse change in law, including changes in environmental standards, which provide us with only limited change-in-law protection. This is particularly relevant if new laws were to impose more stringent environmental conditions on our existing facilities, which could require significant operational and capital expenditure.

We also have operational SPP power purchase agreements with EGAT from the second round of SPPs. In 2009 we have entered into a 74 MW power purchase agreement (for Glow Energy), which

became operational in June 2012 and a 90 MW agreement (for Glow SPP 11 Phase 2), which became operational in December 2012. These agreements have some different terms, in addition to the general provisions described above, and certain new provisions, such as:

- The SPP requirement for thermal energy production and efficiency will be defined once a year in a test and calculated by a third party
- In case we do not meet the thermal energy production and/or efficiency requirement mentioned above, there is no penalty for that, but we will not receive the Primary Energy Savings component, which is introduced in the tariff.

These contractual risks could have a material adverse effect on our business, results of operations, financial condition and prospects.

***We operate in a highly regulated industry that is subject to change***

The regulatory framework applicable to electricity generating companies in Thailand has undergone significant structural changes in the past and may undergo significant changes in the future. In addition, there have been a variety of proposals for reform of the Thai electricity industry in the past which, once made, have subsequently been delayed, cancelled, or significantly modified prior to their implementation.

Thailand has been considering deregulation of the electricity industry for a number of years, , the EGAT power purchase agreements for our SPPs do not contain any provisions dealing with the potential future privatization of EGAT or the restructuring of the electricity sector. We are unable to predict what impact deregulation or privatization would have on our contractual arrangements and on the electricity sector in Thailand in general. If such deregulation were to have the impact of abolishing the PEA tariff, for example, which is the reference price that we use to price our electricity sales to most of our industrial customers, we would likely have to attempt to renegotiate the pricing structure with our industrial customers, which we may not be able to do on reasonable commercial terms or at all.

Because we operate a number of SPPs (and our companies account for a material portion of all SPP electricity sold to EGAT), which are higher-cost wholesale electricity generators compared to IPPs and many of EGAT's generating facilities, we are exposed to regulatory changes that seek to increase generating efficiency or to penalize high-cost generating facilities. This could take the form of changes in law and many of our key sales contracts do not contain specific mechanisms for compensating us in the event of adverse changes in law.

To facilitate continued reform, the Energy Industry Act B.E. 2550 (2007) was published on the 10<sup>th</sup> of December 2007. Under such act, an independent regulatory body, ERC, has already been established on February 1, 2008 in order to regulate both the electricity and natural gas supply industries and to ensure fair competition.

These or other regulatory or structural changes affecting the Thai electricity industry could require us to significantly change the way that we operate our business and could have a material adverse effect on our business, results of operations, financial condition and prospects.

***We have had significant disputes with EGAT in the past***

In the past, we have been involved in discussions with EGAT regarding important aspects of our business. Although we do not characterize these as material disputes, we believe that, because of the structure of the Thai electricity supply industry and the nature of our power purchase agreements, we will likely continue to maintain an ongoing dialogue with EGAT to resolve these and similar types of issues in order to continue to clarify certain aspects of our contractual relationship. There is the potential for disputes to arise in connection with any such issues or points of discussion. Because EGAT is our most important customer and disputes with EGAT may involve some of our most important contracts, any disputes that we may have with EGAT in the future may require us to materially change the way in which we operate our business and could have a material adverse effect on our business, results of operations, financial condition and prospects.

***Our business operations are dependent on the availability of fuel***

Our business is dependent on the availability of fuel, in particular natural gas and coal. In 2013, purchases of natural gas accounted for 65.5 percent of our cost of sales and purchases of coal accounted for 17.6 percent of our total cost of sales. Shortages in natural gas or coal, or an inability of our suppliers to provide these fuels to us, could prevent some or all of our facilities from being able to generate electricity and steam, which could prevent us from fulfilling our contractual obligations.

We have entered into long-term natural gas supply agreements with PTT. Because of the structure of the Thai fuel supply industry, PTT currently operates as an effective monopoly and is the only entity that is able to supply us with natural gas to allow us to operate our business. In the event that PTT fails to supply us with adequate quantities of natural gas under our gas supply agreements, we could face significant disruptions to our business. Although there is a compensation provision in the gas supply agreements between our SPPs and PTT which require PTT to compensate us for its inability to deliver contracted quantities of natural gas to us, this compensation only extends to natural gas that we use to produce electricity to sell to EGAT and not to our industrial customers. Most of our gas-fired facilities are designed to be able to run on diesel fuel as an alternative fuel source, but we could incur significant costs and operating inefficiencies in switching to and operating by using diesel fuel. Moreover, our cogeneration facilities may not be able to operate on diesel fuel for sustained periods of time, as, when operating on diesel fuel, we consume diesel fuel faster than we are able to re-fill our diesel fuel storage tanks.

There is a risk of natural gas supply disruption resulting from defects in or the requirement for maintenance of the pipeline including the change in the quality of natural gas supply, over which we have no control. The current limitations on the supply of natural gas to the areas in which we operate, or any disruption in the supply of natural gas, or change in the quality of natural gas supply could have a material adverse effect on our business, results of operations, financial condition and prospects.

We have entered into a long-term coal supply agreement between Banpu International Limited (or “Banpu”) and Glow SPP 3 Company Limited (or “Glow SPP 3”) to supply part of our coal requirement to our three CFBs (including the new 115MWeq cogeneration unit of Glow Energy). In addition, we have also entered into medium term coal supply agreement with few international and Thai coal suppliers/traders for the remaining coal requirement of our three CFBs and GHECO-One. Our coal risk management policy for our CFBs is to diversify our procurement to at least 3 contracts with different expiry years, subject to market condition. Our policy is also to aim to procure at least 87 percent of coal

required for the next year (N), 66 percent of coal required for the following year (N+1) and 33 percent of coal required for the next 2 years (N+2)

There is a risk of coal supply disruption resulting from various circumstances, including a situation where our long-term or medium-term coal supplier could not fulfill its obligations and we could not arrange substitute supply from our other suppliers or spot market. In such situation, we also cannot assure that the cost of substitute supply would be commercially competitive.

***We are highly dependent on PTT***

As discussed under “—Our business operations are dependent on the availability of fuel”, we rely heavily on PTT for the supply of natural gas to our operating facilities. Purchases of fuel gas, which were almost all purchased from PTT, accounted for approximately 65.5 percent of our total cost of sales in 2013. In addition to being a key supplier, PTT has an equity interest in PTTGC and GSPC, two of our principal competitors (as discussed above under “—We face significant competition”). PTT also has an equity interest in a number of our industrial customers (most significantly PTTGC). Sales to this customer accounted for 8.3 percent of our total revenue from electricity sold to industrial customers (in MWh), 24.3 percent of our total revenue from sales of steam and 4.8 percent of our total revenues in 2013. See “—We face significant competition”.

If our competitive position with PTT adversely affects its willingness to, or the terms on which it will, enter into new agreements to supply natural gas to us, or if our relationship with PTT deteriorates for any other reason, this could have a material adverse effect on our business, results of operations, financial condition and prospects.

***We are subject to significant contractual risks under our SPP gas supply agreements with PTT***

PTT is our largest and most important fuel supplier (see “-We are highly dependent on PTT”). PTT is majority-owned by the government and currently has an effective monopoly with respect to supply of natural gas in Thailand. Due in part to the foregoing, our gas supply agreements with PTT are standard form contracts that we were not given an opportunity to negotiate. This means that, among other things, our gas supply agreements with PTT are not tailored to our specific operating circumstances and contain a number of ambiguous provisions. Although the terms of our PTT gas supply agreements vary from each other, certain of the terms contained in at least some of our PTT gas supply agreements that we believe present risks to our business are as follows:

- A gas supply agreement may be terminated before the end of its term due to the default of either party and our only remedy may be to bring a claim in arbitration and prove damages (rather than allowing us to require PTT to continue to supply gas to us pending resolution of the dispute);
- PTT only undertakes to use its “best efforts” to deliver the specified daily quantity and is not under an absolute obligation to deliver gas to us;
- The terms relating to PTT’s requirement to compensate us if PTT fails to deliver gas meeting contractually-designated specifications are unclear and in any case the amount of any compensation that it would pay to us is capped;
- Non-compliance with any term in a gas supply agreement by either party that is not remedied within 60 days of a notice of default thereof constitutes an event of default and enables the non-defaulting party to terminate the gas supply agreement;
- Specifications of gas are standard form with wide specification range. Even though we design our unit to be able to operate under current gas quality of PTT, we cannot ensure that current



design will be applicable if there is a change in PTT's gas quality, or if we would be fully compensated for modification required due to any change of gas quality.

These contractual risks could have a material adverse effect on our business, results of operations, financial condition and prospects.

***Opposition of expansion in Map Ta Phut, declaration of Map Ta Phut Pollution Control Zone and related Administrative Court ruling***

In March 2009 Rayong Administrative Court declared Map Ta Phut as a "Pollution Control Zone", which was later confirmed also by National Environmental Board. In June 2009 certain individuals together with some NGOs filed a petition to Central Administrative Court ("CAC") claiming that certain permits issued after revision of Thai constitution in 2007 were issued illegally and requested revoking such permits. In addition the claimants requested the CAC to provide temporary protection by suspending 76 projects in MIE Area. CAC's ruling to order injunction was enforced by the Supreme Administrative Court while reducing the number of suspended projects to 65. Although our operations have all necessary permits and are not included in the suspended projects, some of our existing new and/or potential customers may have been affected by the court orders.

Our operations comply with current regulations and have all necessary permits needed for operating the plants. In June 2010, we learned from Industrial Estate Authority of Thailand ("IEAT") that The Stop Global Warming Association had filed a complaint with the CAC and GHECO-One's and Glow SPP 3's Project names are in the list attached to the complaint (the "Second NGO Complaint"). Even though we are not named as defendant, the complaint involved, among other things, motion to suspend the projects named in the complaint.

In addition to the above cases, Stop Global Warming Association (Plaintiff) filed the statement of claim to Rayong Administrative Court against the competent authorities, namely Energy Regulatory Commission (ERC), Industrial Estate Authority of Thailand (IEAT), National Environment Board (NEB), Secretary of Office of Natural Resources and Environmental Policy and Planning (ONEP), alleging that such authorities unlawfully approved and granted permits to GHECO-One for operating thermal plant in the pollution control area. The statement of claim also requests the court to order the relevant authorities to revoke any permits granted to GHECO-One and suspend any activities of GHECO-One. The court eventually ordered to include GHECO-One as co-defendant of the case, since it is the owner of the power plant and could be affected by court order and verdict. All defendants of the cases prepared their statement of defenses and separately submitted to the court in October 2013. As of today, the case is at Rayong Administrative Court's process in reviewing relevant documents. GHECO-One has applied and obtained all permits in accordance with relevant laws and regulations, and has operated our plant in-line with the requirements in approved Environmental and Health Impact Assessment report and relevant permits.

***We are exposed to foreign exchange risk***

We are exposed to foreign exchange risk in a number of aspects. Many of our operating costs are denominated in US dollars and other currencies. Most of our US dollar-denominated operating costs can be serviced by US dollar-linked income. However, we also purchase parts and equipment for our plants in US dollars, and Glow IPP incurs a significant amount of Euro-denominated costs relating to maintenance. Moreover, our coal and coal freight costs, are US dollar-based and we cannot fully pass

the fluctuations in these costs (including as a result of currency fluctuations) through to our customers. Further, while our revenues are partially linked to the US dollar, a significant amount of our indebtedness is Baht-denominated. We have in the past targeted a substantial degree of US dollar content or linkage in cash flows (and thus normalized net earnings) available to distribute to shareholders and, if we continue to do so, any appreciation of the Baht compared to the US dollar would reduce the Baht amount of dividend payments to our shareholders. For these reasons, significant fluctuations in exchange rates could have a material adverse effect on our business, results of operations, financial condition and prospects.

***Our insurance coverage may not adequately protect us against possible risk of loss***

Our operations are subject to operating and other risks typically associated with electricity generation. Insurance markets are cyclical. As a result, we may at times be unable to obtain appropriate insurance on commercially reasonable terms or at all, which may subject us to potentially significant financial loss upon the occurrence of a large uninsurable event.

We have all-risk and business interruption, third party liability, terrorism and other insurance coverage. Our principal insurance covers loss arising out of physical loss or damage to our plants and generating machinery as well as financial loss resulting there from, but contains certain customary exclusions and deductibles. If we suffer a large uninsured or excluded loss or any insured loss suffered by us significantly exceeds our insurance coverage, our business, financial condition and results of operations may be materially adversely affected.

***Operation of one of our subsidiaries is exposed to hydrology risks***

Houay Ho Power Company Limited (or “HHPC”) is operator of 152 MW hydro power plant in Attapeau province, Lao PDR., while Houay Ho Thai Company Limited (or “HHTC”) is a holding company holding 25 percent stake of HHPC. Currently, we effectively hold 67.25 percent stake in HHPC, through both direct holding in HHPC and indirect holding through HHTC.

As a general characteristic of hydro power plant, its operation highly depends on amount of rainfall and, in case of HHPC, amount of water stored in its dedicated reservoir. Also, the power purchase agreement between HHPC and EGAT contains provision dictating minimum amount of electricity to be sold to EGAT. In case that HHPC could not supply such minimum amount, it may be subject to penalty, except for limited number of times and with certain conditions when HHPC could declare in advance inability to supply minimum generation due to drought (“Drought Year”). For these reasons, negative variance in rainfall in the area of HHPC plant could adversely and materially affect operation of HHPC.

***Fresh Water Drought risk in Thailand Eastern Seaboard Areas (Chonburi and Rayong)***

Power generation business requires large consumption of fresh water for cooling of equipment and production of clarified water and demineralized water for internal usage and industrial consumptions. Lack of fresh water supply could lead to shutdown of our power generating units. In 2004 and 2012 we experienced very low rainfall level in Thailand Eastern Seaboard areas. The low rainfall in 2004 led to a serious drought situation the areas in the following year (2005). We managed to build fresh water pond and secured fresh water supply contracts via sea freight to mitigate the drought situation in 2005. By the end of August 2005 the combined water volume in the main reservoirs reached



the level of dead volume. Fortunately major rainfall arrived in September 2005 and increased the water level in the reservoir to a safe position. In 2012 similar low rainfall to 2004 occurred again creating a concern of a potential drought situation in 2013. Several meetings among concerned parties such as East Water Public Company Limited, Royal Irrigation Department of Thailand, Water Institute of Sustainability (WIS), Industrial Estate Authority of Thailand (IEAT), Glow Group and Map Ta Put industrial clients were organized to brainstorm on the mitigation plans and following up with the situations. Another fortunate circumstance that the major rainfall came into the areas around October 2012 increasing the reservoir level up to sufficient level.

The drought in Thailand Eastern Seaboard areas can be mitigated by adding capability of water transfer among the key reservoirs and increasing water supplies into the industrial areas. East Water and Royal Irrigation Department of Thailand are the main parties who are responsible to implement the mitigation plans as presented. However, the risk of drought depends upon how effective the aforementioned key players can implement the plans.

#### 4. Assets Used in Business Operations

##### 4.1 Main fixed assets of the Company and its subsidiaries

As at December 31, 2013, the Company and its subsidiaries had main fixed assets used in business operations with net book value of Baht 97,300,771,947 detailed as follows:

Unit : Baht		
Category	2013	2012
Land	702,951,304	702,951,304
Power plant, including machinery and distribution system	139,641,278,576	137,868,848,467
Tools and equipment	471,787,135	458,199,251
Building and Leasehold improvement	477,777,798	469,409,653
Furniture, fixture, office equipment and motor vehicles	410,369,515	407,554,684
Construction in progress	526,860,963	721,300,160
<b>Total</b>	<b>142,231,025,291</b>	<b>140,628,263,519</b>
<u>Less</u> Accumulated depreciation	(44,930,253,344)	(39,858,744,862)
Provision for impairment	-	-
<b>Total net book value</b>	<b>97,300,771,947</b>	<b>100,769,518,657</b>

**4.1.1 Land**

Category		Ownership	Net book value (Baht)	
			2013	2012
<u>The company</u>		Owned  <		

**Remark:**

- 1) Land of Glow IPP Company Limited has been mortgaged and pledged to financial institutions lending to the company.
- 2) All of constructions, machinery and equipment of the power plants of Glow IPP Company Limited, Houay Ho Power Company Limited and GHECO – One Company Limited have been mortgaged and pledged to financial institutions lending to each company.

**4.1.2 Power plant, building, machinery and distribution system**

Category		Ownership	Net book value (Baht)	
			2013	2012
<u>The company</u>				
2.1	Plant, building, machinery and distribution system – no commitment	Owned	28,461,932,092	29,250,324,602
2.2	Plant, building, machinery and distribution system – mortgaged	Owned	-	-
Total			28,461,932,092	29,250,324,602
<u>Subsidiaries</u>				
2.3	Plant, building, machinery and distribution system – no commitment	Owned	25,646,798,895	22,306,374,454
2.4	Plant, building, machinery and distribution system – mortgaged	Owned	41,482,132,548	47,279,179,983 <sup>(2)</sup>
Total			67,128,931,443	69,585,554,437
Grand total			95,590,863,535	98,835,879,039

**Remark:**

- 1) See detail in respect of commitment in No. 4.1.1 remark (2)

**4.1.3 Building and leasehold improvement**

Category	Ownership	Net book value (Baht)	
		2013	2012
<u>The company</u>			
3.1 Building and leasehold improvement – no commitment	Owned	256,868,230	273,371,603
3.2 Building and leasehold improvement – mortgaged	Owned	-	-
<b>Total</b>		<b>256,868,230</b>	<b>273,371,603</b>
<u>Subsidiaries</u>			
3.3 Building and leasehold improvement – no commitment	Owned	70,592,840	67,963,286
3.4 Building and leasehold improvement – mortgaged	Owned	-	-
<b>Total</b>		<b>70,592,840</b>	<b>63,437,841</b>
<b>Grand total</b>		<b>327,461,070</b>	<b>341,334,889</b>

**4.1.4 Tool and equipment**

Category	Ownership	Net book value (Baht)	
		2013	2012
<u>The company</u>			
4.1 Tool and equipment – no commitment	Owned	9,473,355	14,130,640
4.2 Tool and equipment - mortgaged	Owned	-	-
<b>Total</b>		<b>9,473,355</b>	<b>14,130,640</b>
<u>Subsidiaries</u>			
4.3 Tool and equipment – no commitment	Owned	59,202,385	65,155,302
4.4 Tool and equipment – mortgaged	Owned	-	-
<b>Total</b>		<b>59,202,385</b>	<b>65,155,302</b>
<b>Grand total</b>		<b>68,675,740</b>	<b>79,285,942</b>

**4.1.5 Furniture, fixture, office equipment and motor vehicles**

Category	Ownership	Net book value (Baht)	
		2013	2012
<u>The company</u>			
5.1 Furniture, fixture, office equipment and motor vehicles – no commitment	Owned	20,549,051	23,755,736
5.1 Furniture, fixture, office equipment and motor vehicles – mortgaged	Owned	-	-
<b>Total</b>		<b>20,549,051</b>	<b>23,755,736</b>
<u>Subsidiaries</u>			
5.2 Furniture, fixture, office equipment and motor vehicles – no commitment	Owned	63,410,284	65,011,587
5.3 Furniture, fixture, office equipment and motor vehicles – mortgaged	Owned	-	-
<b>Total</b>		<b>63,410,284</b>	<b>65,011,587</b>
<b>Grand total</b>		<b>83,959,335</b>	<b>88,767,323</b>

**4.1.6 Construction in progress**

Category	Ownership	Net book value (Baht)	
		2013	2012
<u>The company</u>			
6.1 Construction in progress – no commitment	Owned	97,593,953	406,924,742
6.2 Construction in progress – mortgaged	Owned	-	-
<b>Total</b>		<b>97,593,953</b>	<b>406,924,742</b>
<u>Subsidiaries</u>			
6.3 Construction in progress – no commitment	Owned	117,053,104	92,044,659
6.4 Construction in progress – mortgaged	Owned	312,213,906	222,330,759 <sup>(2)</sup>
<b>Total</b>		<b>429,267,010</b>	<b>314,375,418</b>
<b>Grand total</b>		<b>526,860,963</b>	<b>721,300,160</b>

**Remark:**

- 1) See detail in respect of commitment in No. 4.1.1 remark (2)

## 4.2 Intangible Assets

As at December 31, 2013, the Company and its subsidiaries have intangible assets for their business operations at net book value of Baht 1,059,100,360 detailed as follows

Main Category	Net book value (Baht)	
	2013	2012
Deferred right to use grid system	95,717,638	109,168,315
Deferred right to use transmission line	98,735,903	105,743,215
Deferred land lease	47,242,352	52,964,921
Deferred land leasehold right	147,118,786	154,101,940
Deferred financial service fee	414,526,901	400,179,906
Deferred right to use pipe rack	46,137,366	70,626,346
Deferred right of way	172,194,725	187,775,178
Deferred right of use gas pipeline	37,426,689	40,596,611
<b>Total net book value</b>	<b>1,059,100,360</b>	<b>1,121,156,432</b>

### 4.2.1 Deferred right to use grid system

Deferred right to use grid system represents right to use grid system of Glow SPP 2 Co., Ltd. and Glow SPP 3 Co., Ltd., whereby on September 27, 2000, both subsidiaries handed over and transferred the ownership of certain parts of the grid system to EGAT. The transfer of the ownership was made in order to comply with the power purchase agreement, under the regulation of purchasing electricity from small power producers.

### 4.2.2 Deferred right to use transmission line

Deferred right to use transmission line represents the costs paid by Glow IPP Co., Ltd. for construction of transmission line in order to comply with the power purchase agreement, under the regulation of purchasing electricity from independent producers. The ownership of the transmission line belongs to EGAT and Glow IPP Co., Ltd. has the right to use the transmission line over the period of the power purchase agreement of 25 years.

### 4.2.3 Deferred land lease

Glow SPP 2 Co., Ltd. and Glow SPP 3 Co., Ltd. has the co-right to use the land at industrial harbour in Map Ta Phut Industrial Estate for a period of 28 years, from December 1, 1996 to November 30, 2024 in order to construct power plant project - Phase III. The proprietary rights on construction still belong to Glow SPP 2 Co., Ltd. and Glow SPP 3 Co., Ltd. after the expiration of the contract. In 2008, a part of land leasehold right of 35 rais was assigned to GHECO One Co., Ltd. in order to construct its coal-fired power plant.

**4.2.4 Deferred land leasehold right**

Deferred land leasehold right represents the fees of the Glow Energy Plc., Glow SPP 2 Co., Ltd. and GHECO-One Co.,Ltd paid in relation to the assignment of the leasehold right of land on the pro rata basis of the amount land area of 12 rais, 0.259 rais and 44.736 rais, respectively.

**4.2.5 Deferred financial service fee**

Deferred financial service fees represents the financial fees paid in connection with long term loans of the company and its subsidiaries and are amortized over the period of the related agreements.

**4.2.6 Deferred right to use pipe rack**

Glow Energy Plc., Glow SPP 1 Co., Ltd. and Glow SPP 3 Co., Ltd. have the right to use pipe racks under agreements made with various companies. The right is amortized over the period of those agreements.

**4.2.7 Deferred right of way**

Deferred right of way represents the right under the Memorandum of Understanding dated May 13, 1998 and Amendment dated May 11, 2005 of Glow SPP 11 Co., Ltd. to use easement and right of way within the Siam Eastern Industrial Park ("SEIP") for the construction, operation and maintenance of gas pipeline and network for the distribution of electricity, steam and other services over the period GSPP11 own land in SEIP.

**4.2.8 Deferred right to use gas pipeline**

Deferred right to use gas pipeline represents the costs of gas pipeline and all related facilities that was transferred to PTT Public Company Limited ("PTT") by GSPP2 and GSPP11 in exchange for the right to use such assets throughout the term of the gas supply agreements.

**4.2.9 Concession for Undertaking Electricity Business**

The Company received license for electricity generating, distribution system, and electricity sales as per following details;

On June 11, 2009, the ERC has approved the electricity generation license for Glow IPP Co., Ltd. for the period of 18 years.

On December 25, 2009, the ERC has approved the licenses for the Company, Glow SPP 1 Co., Ltd., Glow SPP 2 Co., Ltd. Glow SPP 3 Co., Ltd. and Glow Energy Plc. to operate the business of electricity generation , distribution system and supply for the period of 12 years, 15 years, 15 years and 16 years respectively.

On February 18, 2010 the ERC has approved the licenses for the Company, Glow SPP 11 Co., Ltd. Phase 1, to operate the business of electricity generation, distribution system, and electricity sales for the period of 16 years.

On December 18, 2010 the ERC has approved the generation licenses for the Company, Glow SPP 11 Co., Ltd. Phase 3, to operate the business of electricity generation for the period of 25 years.

On April 5, 2012 the ERC has approved the generation licenses for the Company, GHECO-One Co., Ltd., to operate the business of electricity generation for the period of 25 years.

On September 18 and December 3, 2012 the ERC has approved the generation licenses and distribution licenses for the Company, Glow SPP 11 Co., Ltd. Phase 2, to operate the business of electricity generation for the period of 25 years and 5 years, respectively.

#### **4.2.10 Promotional Privileges**

The Company and its subsidiaries have been granted various promotional privileges under the Investment Promotional Act, B.E. 2520 by the Board of Investment for the generation and distribution of electricity, steam and water for industrial use.

Subject to certain imposed conditions, the privileges include the following:

- a) Permission to own land in order to carry on the promoted activities as the Board may deem appropriate.
- b) Exemption of import duty on machinery, materials and supplies imported for production for domestic sales as approved by the Board.
- c) Exemption of corporate income tax on net profit for a period of eight years commencing from the date of earning operating income. In cases where the business incurs a loss during that period of exemption, the loss incurred in such period can be taken as a deduction from net profit of the years after the period of exemption, not exceeding five years.
- d) Exemption of income tax on dividends paid from the profit of the promoted operation over the above corporate income tax exemption period.
- e) An allowance of fifty percent of the normal rate of corporate income tax on net profit for a period of five years after the expiry date of the corporate income tax exemption period as described in c) above.
- f) Permission to deduct double the cost of transportation, electricity and water supply for corporate income tax purpose for a period of ten years commencing from the date of earning operating income.
- g) Permission to deduct the cost of installation or construction of public utilities at the rate of twenty-five percent in addition to normal depreciation charges.

Glow IPP Co., Ltd. has been granted all the above privileges, except e).

The privileges related to corporate income tax of the Company and its subsidiaries are summarized as follows:



	Certificates Date	Expiry Date of Corporate Income Tax Exemption Period	Expiry Date of Corporate Income Tax Allowance Period
<b>The Plants obtained promotional privileges</b>			
Glow IPP Co., Ltd.	Nov 1999	Jan 2011	N/A
Glow Energy Plc.			
Stage 1 .....	Jul 1994	Apr 2003	Apr 2008
Stage 2 .....	Jun 1995	Dec 2003	Dec 2008
Expansion project stage 1 .....	Mar 2004	Jun 2012	Jun 2017
Expansion project stage 2 .....	Aug 2004	Sep 2013	Sep 2018
CFB 3 .....	Jun 2007	Oct 2018	Oct 2023
Phase 1 Water plant .....	Nov 2007	-	-
Phase 5 .....	Feb 2009	Jul 2019	Jul 2024
Glow SPP 1 Co., Ltd			
Stage 1 .....	Jan 1996	Aug 2005	Aug 2010
Stage 2 .....	Jul 1996	Jun 2006	Jun 2011
Stage 1 Water Plant .....	Nov 2009	May 2007	May 2012
Stage 2 Water Plant .....	Nov 2009	Jul 2014	Jul 2019
Glow SPP 2 Co., Ltd.	Nov 1996	Jul 2005	Jul 2010
Glow SPP 3 Co., Ltd	Aug 1997	Jul 2007	Jul 2012
GHECO-One Co., Ltd	Jul 2008	July 2020	July 2025
Glow SPP 11 Co., Ltd Phase 1	Mar 1999	Aug 2008	Sep 2013
Glow SPP 11 Co., Ltd Phase 2	Jul 2010	Nov 2020	Nov 2025
Glow SPP 11 Co., Ltd Phase 3	Nov 2006	Oct 2014	Oct 2019

**4.2.11 Rights under Land Lease Agreement**

Description	Lessor	Lease Period	Objectives
<b>Glow Energy Plc.</b>			
1. Partial Land Lease Agreement in Map Ta Phut Industrial Estate (Port) Dated 6th December 1996, Memorandum Dated 11th July 2003 – Phase 3 (No. 4/2539 NorPor)	Industrial Estate Authority of Thailand (IEAT)	28 years	For installation of plant building and undertaking industrial business on generating power, steam and industrial water
2. Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 4 <sup>th</sup> April 1994 – Phase 2 (No.2/2537-NorPor)	IEAT	26 years and can be extended for another 20 years	For installation of plant building and undertaking industrial business on generating power, steam and industrial water
3. Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 5 <sup>th</sup> June 2007 – Phase 1 (No.1/2550-NorPor)	IEAT	13 Years and can be extended for another 20 years	For installation of plant building and undertaking industrial business on generating power, steam and industrial water
4. Partial Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Undertaking in Map Ta Phut Industrial Estate Dated 23 <sup>rd</sup> January 2007 – Underground cable (No.2/2550-NorPor)	IEAT	28Years and can be extended for another 20 years	For installation of Underground Transmission Line
5. Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 30 <sup>th</sup> April 2010 – Car Park (No. 2/2553 - NorPor)	IEAT	3 Years extendable	For car parking
6. Partial Land Lease Agreement in Map Ta Phut Industrial Estate Dated 19 <sup>th</sup> December 2007 – Coal Stock Yard (No.2/2550-NorPor)	IEAT	30 Years and can be extended for another 20 years	For installation of coal stock yard
7. Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 2 <sup>nd</sup> January 2008 – Underground cable to RIL (No.NorPor 004/2551)	IEAT	16 Years	For installation of underground cable
8. Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 8 <sup>th</sup> December 2008 – Underground cable to RIL (No. NorPor 009/2551)	IEAT	16 Years	For installation of underground cable
9. Partial Agreement of servitude Dated 7 <sup>th</sup> October 2009 - Underground cable in AIE	AIE	15 Years	For installation of underground cable
10. Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 23 <sup>rd</sup> August 2012- Pipe Bridge (No. NorPor 010/2556)	IEAT	1 Year extendable	For installation of pipe bridge at I-6 road
11. Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 14 <sup>th</sup> September 2011 – Pipe Rack (No. 2/2554-NorPor)	IEAT	3 Years extendable	For installation of pipe rack at I-2 road

Description	Lessor	Lease Period	Objectives
12. Partial Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 23 <sup>th</sup> September 2011 – Underground Cable (No. 3/2554-NorPor)	IEAT	13 Years	For installation of underground cable (115 kv bundle)
13. Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 4 <sup>th</sup> November 2011 – Pipe Bridge (No. 4/2554-NorPor)	IEAT	3 Years extendable	For installation of pipe bridge (for customer – Vinythai)
14. Partial Land Lease Agreement for industrial Purpose Map Ta Phut Industrial Estate Dated 8 March 2013 – Underground Cable (No.3/2556-NorPor)	IEAT	11 Years	For installation of underground cable
<b>Glow SPP 1 Co., Ltd.</b> 1. Right of Way Agreement Dated 11 February 2013 – Underground transmission system	EIE	4 Years extendable	For installation of the underground transmission system
<b>Glow SPP 2 Co., Ltd.</b> 1. Partial Land Lease Agreement in Map Ta Phut Industrial Estate (Port) Dated 6 <sup>th</sup> December 1996 – Phase 3 (No. 4/2539-NorPor)	IEAT	28 Years	For installation of plant building and undertaking industrial business on generating power, steam and industrial water
2. Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Undertaking in Map Ta Phut Industrial Estate Dated 13 <sup>th</sup> August 1998 – Sub Station near Thasco Plant (No.1/2541-NorPor)	IEAT	28 Years	For installation of substation
3. Partial Land Lease Agreement in Map Ta Phut Industrial Estate Dated 19 <sup>th</sup> December 2007 – Coal Stock Yard (No.2/2550-NorPor)	IEAT	30 Years and can be extended for another 20 years	For installation of coal stock yard
4. Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Dated 12 <sup>th</sup> February 2002 – Underground transmission system	EIE	3 Years extendable	For installation of the underground transmission system
<b>Glow SPP3 Co., Ltd.</b> 1. Partial Land Lease Agreement in Map Ta Phut Industrial Estate (Port) Dated 6 <sup>th</sup> December 1996 – Phase 3 (No. 4/2539-NorPor)	IEAT	28 Years	For installation of plant building and undertaking industrial business on generating power, steam and industrial water.
2. Partial Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Undertaking in Map Ta Phut Industrial Estate Dated 23 <sup>rd</sup> January 2007 – Underground cable (No.2/2550-NorPor)	IEAT	28 Years and it can be extended for another 20 years	For installation of Underground Transmission Line
3. Partial Land Lease Agreement for Undertaking Business which are Beneficial to or Relates to Business Undertaking in Map	IEAT	29 Years	For installation of 230 kV Transmission Line

Description	Lessor	Lease Period	Objectives
Ta Phut Industrial Estate Dated 2 <sup>nd</sup> October 2000 –230 KV Transmission Line (No.1/2543-NorPor)			
4. Partial Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Undertaking in Map Ta Phut Industrial Estate Dated 2 <sup>nd</sup> October 2000 – 230 KV Transmission Line (No.4/2543-NorPor)	IEAT	29 Years	For installation of 230 kV Transmission Line
5. Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Undertaking in Map Ta Phut Industrial Estate Dated 2 <sup>nd</sup> October 2000 – 230 KV Transmission Line (No.5/2543-NorPor)	IEAT	29 Years	For installation of 230 kV Transmission Line
6. Joint Agreement to develop an area to construct a shipping berth in the Industrial Estate Dated 7 <sup>th</sup> August 2000 – Coal Harbor (No.2/2543)	IEAT	30 years and it can be extended.	For development of area to construct a dedicated berth in Map Ta Phut Industrial Estate for transportation services of coals to be used in business of power plant and steam of the Company.
7. Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Undertaking in Map Ta Phut Industrial Estate Dated 23 <sup>rd</sup> January 2012 – Intake Sea Water (No. 003/2555-SorTorRor)	IEAT	1 Year extendable	For maintenance sea water intake structure for cooling system
8. Partial Land Lease Agreement in Map Ta Phut Industrial Estate Dated 19 <sup>th</sup> December 2007 – Coal Stock Yard (No.2/2550-NorPor)	IEAT	30 and it can be extended for another 20 years	For installation of coal stock yard.
9. Land Lease Agreement in Map Ta Phut Industrial Estate (Port) Dated 30 <sup>th</sup> September 2009 – Sea Water Intake underground tunnel (No.ForKorMor.TorLor.1/2552)	IEAT	27 Years and it can be extended	For installation of Sea Water Intake underground tunnel
10. Land Lease Agreement in Map Ta Phut Industrial Estate (Port) Dated 30 <sup>th</sup> September 2009 – Sea Water Discharge underground tunnel (No.ForKorMor.TorLor.2/2552)	IEAT	25 Years and it can be extended	For installation of Sea Water Intake underground tunnel
11. Land Lease Agreement for Industrial Purpose Dated 30 <sup>th</sup> January 2003 – Underground cable in AIE	PTT	16 Years	For installation of underground cable
12. Agreement of servitude Dated 1 <sup>st</sup> August 2005 - Underground cable in AIE	AIE	14 Years	For installation of underground cable
13. Partial Agreement of servitude Dated 7 <sup>th</sup> October 2009 - Underground cable in AIE	AIE	15 Years	For installation of underground cable

Description	Lessor	Lease Period	Objectives
14. Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Undertaking in Map Ta Phut Industrial Estate Dated 1 <sup>st</sup> July 2009 –230 KV Transmission Line (No.1/2552)	PTT	20 Years and it can be extended	For installation of 230 kV Transmission Line
15. Partial Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 23 <sup>rd</sup> September 2011 – Underground Cable (No. 3/2554-NorPor)	IEAT	13 Years	For installation of underground cable (115 kv bundle)
16. Partial Land Lease Agreement for Industrial Purpose Map Ta Phut Industrial Estate Dated 8 March 2013 – Underground Cable (No.3/2556-NorPor)	IEAT	11 Year	For installation of underground cable to
<b>GHECO-One Co., Ltd.</b>			
1. Partial Land Lease Agreement in Map Ta Phut Industrial Estate (Port) Dated 6 <sup>th</sup> December 1996, Memorandum Dated 11 <sup>th</sup> April 2008 – Phase 3 (No. 4/2539-NorPor)	IEAT	28 Years	For installation of plant building and undertaking industrial business on generating power, steam and industrial water.
2. Partial Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Undertaking in Map Ta Phut Industrial Estate Dated 2 <sup>nd</sup> October 2000 – Air right of 230 KV Transmission Line (No.1/2543-NorPor)	IEAT	29 Years	For undertaking business on air right of 230 kV Transmission Line
3. Partial Land Lease Agreement in Map Ta Phut Industrial Estate Dated 19 <sup>th</sup> December 2007, Memorandum Dated 11 <sup>th</sup> April 2008 – Coal Stock Yard (No.2/2550-NorPor)	IEAT	30 Years and it can be extended for another 20 years	For installation of coal stock yard.
4. Partial Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Undertaking in Map Ta Phut Industrial Estate Dated 2 <sup>nd</sup> October 2000 – 230 KV Transmission Line (No.4/2543-NorPor)	IEAT	29 Years	For installation of 230 kV Transmission Line
5. Partial Land Lease Agreement for Undertaking Businesses which are Beneficial to or Related to Business Undertaking in Map Ta Phut Industrial Estate Dated 2 <sup>nd</sup> October 2000 – 230 KV Transmission Line (No.5/2543)	IEAT	29 Years	For installation of 230 kV Transmission Line
6. Land Lease Agreement in Map Ta Phut Industrial Estate (Port) Dated 30 <sup>th</sup> September 2009 – Sea Water Discharge underground tunnel (No.ForKorMor.TorLor.3/2552)	IEAT	15 years and it can be extended.	For installation of Sea Water Discharge underground tunnel.

Description	Lessor	Lease Period	Objectives
7. Land Lease Agreement in Map Ta Phut Industrial Estate (Port) Dated 19 <sup>th</sup> March 2010 - Coal Handling System (No.2/2553-NorPor)	IEAT	14 years and it can be extended	For installation of coal handling system
<b>Glow SPP 11 Co., Ltd.</b> 1. Land Lease Agreement dated 12 <sup>th</sup> February 1999	Amata City	1 Years	For the construction, testing commissioning, ownership, operation, maintenance, repair, replacement, or modification of the gas pipeline
<b>Glow SPP 11 Co., Ltd.</b> 1. Land Lease Agreement dated 23 <sup>rd</sup> August 2006	Glow SPP 11 Co., Ltd.	30 Years	For installation, own, operate and maintain the generating units on the site

**5. Disputes and Legal proceedings**

We are currently party to some pending litigations and engaged in the following disputes that could have adverse effect on our business.

***EGAT***

We are currently involved in a dispute with EGAT regarding different interpretations of a provision in our IPP Power Purchase Agreement regarding offline water wash. We filed a Statement of Claim with the Thai Arbitration Institute (TAI) on October 31, 2006 and received the award rendered by the Arbitral Tribunal on 27 April 2011 which was in Glow IPP's favour as claimed. However, EGAT did not follow the award but filed the Petition Setting Aside of the arbitral award (the "Petition Setting Aside") against Glow with the Central Administrative Court ("Administrative Court") on July 26, 2011 and a final date for Glow IPP's submission of objection to the Central Administrative Court is on February 23, 2012. Meanwhile on August 26, 2011, Glow IPP filed the Petition for the enforcement of award ("Petition") against EGAT with the Civil Court ("Civil Court"). As appealed by EGAT, on 23 April 2012 the Civil Court granted the order of staying the trial of the above case until the Petition Setting aside has been heard and decided by the Central Administrative Court. On 8 May 2012, GIPP received a copy of objection to Glow's statement of defense filed by EGAT with the Central Administrative Court and submitted the petition for the answer to EGAT's objection to Central Administrative Court on June 7, 2012. As of today, the case is at Central Administrative Court's process in reviewing relevant documents submitted by the two parties.

**Stop Global Warming Association**

Stop Global Warming Association (Plaintiff) filed the statement of claim to Rayong Administrative Court against the competent authorities, namely Energy Regulatory Commission (ERC), Industrial Estate Authority of Thailand (IEAT), National Environment Board (NEB), Secretary of Office of Natural Resources and Environmental Policy and Planning (ONEP), alleging that such authorities unlawfully approved and granted permits to GHECO-One for operating thermal plant in the pollution control area. The statement of claim also requests the court to order the relevant authorities to revoke any permits granted to GHECO-One and suspend any activities of GHECO-One. The court eventually ordered to include GHECO-One as co-defendant of the case, since it is the owner of the power plant and could be affected by court order and verdict. All defendants of the cases prepared their statement of defenses and separately submitted to the court in October 2013. As of today, the case is at Rayong Administrative Court's process in reviewing relevant documents.

GHECO-One has applied and obtained all permits in accordance with relevant laws and regulations, and has operated our plant in-line with the requirements in approved Environmental and Health Impact Assessment report and relevant permits.

**Revenue Department**

GHECO-One is currently involved in dispute and pending litigation with Revenue Department. The issue is related to tax liability of unrealized FX gain/loss during construction, which derived from translation of foreign currency denominated loan into Thai Baht accounting figure in financial statement. Revenue Department has given the opinion that FX gain during construction shall be taxable while FX loss shall be capitalized as cost of the plant and not be used as taxable expense, whereas GHECO-One disagrees on such opinion. However, in order to mitigate exposure to additional surcharge and penalty during dispute and litigation process, in 2013 GHECO-One re-filed tax application to pay corporate income tax and surcharge derived from FX gain/loss during 2008-2011, with reservation of position that such payment is not deemed as agreeing with Revenue Department's opinion. In December 2013, GHECO-One started litigation process by submitting statement of claim to Central Tax Court for tax and surcharge paid for year 2008-2009, and plan to submit statement of claim in 2014 for tax and surcharge paid for year 2010-2011.



**6. General Information**

<b>Initial</b>	GLOW
<b>Registered Number</b>	0107538000461
<b>Type of Business</b>	Generate and supply of electricity to, steam and water for industrial use and electricity to Electricity Generating Authority of Thailand (EGAT)
<b>Registered Capital</b>	14,828,650,350 Baht (as of December 31, 2013)
<b>Paid up Capital</b>	14,628,650,350 Baht (as of December 31, 2013)
<b>Head Office Location</b>	195 Empire Tower, 38 <sup>th</sup> Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120 Telephone: 66 (0) 2670-1500-33 Fax: 66 (0) 2670-1548-9 Web Site: <a href="http://www.glow.co.th">http://www.glow.co.th</a>
<b>Plant Location</b>	5, I-4 Road, Map Ta Phut Industrial Estate, Map Ta Phut, Muang District, Rayong 21150 Telephone: 66 (0) 3868-4078-80 Fax: 66 (0) 3868-4789
<b>Other References</b>	
<ul style="list-style-type: none"><li>• <b>Registrar</b></li></ul>	Siam Commercial Bank Public Company Limited Tower 2, 3 <sup>rd</sup> Floor, 1060 New Petchaburi Road, Makkasan, Rajatevee Bangkok 10400 Telephone: 66 (0) 2256-2323-27
<ul style="list-style-type: none"><li>• <b>Auditor</b></li></ul>	Deloitte Touche Tohmatsu Jaiyos Audit Company Limited 183 Rajanakarn Building 25 <sup>th</sup> , 26 <sup>th</sup> , 28 <sup>th</sup> Floor, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120

**Other Subsidiary Companies that the Company holds shares of more than 50 percent****1. Glow Company Limited**

**Head Office Location** 195 Empire Tower, 38<sup>th</sup> Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120  
Telephone: 66 (0) 2670-1500-33  
Fax: 66 (0) 2670-1548-9

**Type of Business** Provide management services, consultant services and management advisory for related companies

**2. Glow IPP Company Limited**

**Head Office Location** 195 Empire Tower, 38<sup>th</sup> Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120  
Telephone: 66 (0) 2670-1500-33  
Fax: 66 (0) 2670-1548-9

**Plant Location** 42 Moo 8, CIE - 8 Road, Hemaraj Chonburi Industrial Estate Bowin, Sriracha District, Chonburi 20230  
Telephone: 66 (0) 3834-5900-5  
Fax: 66 (0) 3834-5906

**Type of Business** Generate and supply electricity to EGAT

**3. Glow SPP 1 Company Limited**

**Head Officer Location** 195 Empire Tower, 38<sup>th</sup> Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120  
Telephone: 66 (0) 2670-1500-33  
Fax: 66 (0) 2670-1548-9

**Plant Location** 10, Soi G-2, Pakornsongkrawhrat Road, Hemaraj Eastern Industrial Estate (Map Ta Phut), Huaypong, Muang District, Rayong 21150  
Telephone: 66 (0) 3868-5589  
Fax: 66 (0) 3868-5104

**Type of Business** Generate and supply electricity, steam and water for industrial use and electricity to EGAT

**4. Glow SPP 2 Company Limited**

<b>Head Office Location</b>	195 Empire Tower, 38 <sup>th</sup> Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120 Telephone: 66 (0) 2670-1500-33 Fax: 66 (0) 2670-1548-9
<b>Plant Location</b>	11, I - 5 Road, Map Ta Phut Industrial Estate, Map Ta Phut, Muang District, Rayong 21150 Telephone: 66 (0) 3869-8400-10 Fax: 66 (0) 3868-4789
<b>Type of Business</b>	Generate and supply electricity and steam for industrial use and electricity to EGAT

**5. Glow SPP 3 Company Limited**

<b>Head Office Location</b>	195 Empire Tower, 38 <sup>th</sup> Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120 Telephone: 66 (0) 2670-1500-33 Fax: 66 (0) 2670-1548-9
<b>Plant Location</b>	11, I - 5 Road, Map Ta Phut Industrial Estate, Map Ta Phut, Muang District, Rayong 21150 Telephone: 66 (0) 3869-8400-10 Fax: 66 (0) 3868-4789
<b>Type of Business</b>	Generate and supply electricity, steam, water for industrial use and electricity to EGAT

**6. Glow IPP 3 Company Limited**

<b>Head Office Location</b>	195 Empire Tower, 38 <sup>th</sup> Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120 Telephone: 66 (0) 2670-1500-33 Fax: 66 (0) 2670-1548-9
<b>Type of Business</b>	Develop power generation projects

**7. Glow IPP 2 Holding Company Limited**

<b>Head Office Location</b>	195 Empire Tower, 38 <sup>th</sup> Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120 Telephone: 66 (0) 2670-1500-33 Fax: 66 (0) 2670-1548-9
<b>Type of Business</b>	Invest in other companies

**8. GHECO-One Company Limited**

<b>Head Office Location</b>	11, I - 5 Road, Map Ta Phut Industrial Estate, Map Ta Phut, Muang District, Rayong 21150 Telephone: 66 (0) 3869-8400-10 Fax: 66 (0) 3868-4789
<b>Branch</b>	195 Empire Tower, 38th Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120 Telephone: 66 (0) 2670-1500-33 Fax: 66 (0) 2670-1548-9
<b>Plant Location</b>	11, I - 5 Road, Map Ta Phut Industrial Estate, Map Ta Phut, Muang District, Rayong 21150 Telephone: 66 (0) 3869-8400-10 Fax: 66 (0) 3868-4789
<b>Type of Business</b>	Generate and supply electricity to EGAT

**9. Houay Ho Power Company Limited**

<b>Head Office Location</b>	Vieng Vang Tower (Unit 15), 5 <sup>th</sup> Floor, No.502A, Boulichan Road, Dongpalan Thong Village, Sittasanak District, Vientiane Capital, Lao PDR Telephone: (856) 21 414932-3 Fax: (856) 21 414 934
<b>Plant Location</b>	P.O. Box 661 Pakse, Lao PDR. Telephone: (856) 36 211720-1 Fax: (856) 36 211719
<b>Type of Business</b>	Generate and supply electricity to EGAT and the Electricite Du Laos ("EDL")

**10. Glow SPP 11 Company Limited (formerly known as Thai National Power Company Limited)**

<b>Head Office Location</b>	60/19 Moo 3, Siam Eastern Industrial Park, Mabyangporn, Pluak Daeng, Rayong 21140 Telephone: 66 (0) 3889-1324-8 Fax: 66 (0) 3889-1330
<b>Plant Location</b>	60/19 Moo 3, Siam Eastern Industrial Park, Mabyangporn, Pluak Daeng, Rayong 21140 Telephone: 66 (0) 3889-1324-8 Fax: 66 (0) 3889-1330
<b>Type of Business</b>	Generate and supply electricity and water for industrial use and electricity to EGAT

**11. Glow SPP 12 Company Limited (formerly known as Thai National Power 2 Company Limited and under liquidation process)**

**Head Office Location** 60/19 Moo 3, Siam Eastern Industrial Park, Mabyangporn, Pluak Daeng, Rayong 21140  
Telephone: 66 (0) 3889-1324-8  
Fax: 66 (0) 3889-1330

**Plant Location** 250 Moo 3, Siam Eastern Industrial Park, Mabyangporn, Pluak Daeng, Rayong 21140  
Telephone: 66 (0) 3889-1324-8  
Fax: 66 (0) 3889-1330

**Type of Business** Generate and Supply electricity and water for industrial use and electricity to EGAT

**12. Glow SPP 13 Company Limited (formerly known as Rayong National Power Company Limited and under liquidation process)**

**Head Office Location** 60/19 Moo 3, Siam Eastern Industrial Park, Mabyangporn, Pluak Daeng, Rayong 21140  
Telephone: 66 (0) 3889-1324-8  
Fax: 66 (0) 3889-1330

**Plant Location** 60/19 Moo 3, Siam Eastern Industrial Park, Mabyangporn, Pluak Daeng, Rayong 21140  
Telephone: 66 (0) 3889-1324-8  
Fax: 66 (0) 3889-1330

**Type of Business** Generate and supply electricity for industrial use

**Other Affiliate Companies that the company holds shares of less than 50 percent****1. Houay Ho Thai Company Limited**

**Head Office Location** 195 Empire Tower, 38<sup>th</sup> Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120  
Telephone: 66 (0) 2670-1500-33  
Fax: 66 (0) 2670-1548-9

**Type of Business** Invest in other companies

**2. Glow Hemaraj Wind Company Limited**

**Head Office Location** 195 Empire Tower, 38<sup>th</sup> Floor-Park Wing, South Sathorn Road, Yannawa, Sathorn, Bangkok 10120  
Telephone: 66 (0) 2670-1500-33  
Fax: 66 (0) 2670-1548-9

**Type of Business** Develop a wind farm project