

1. Policy and Overall Business Operation

Overall Picture of Business Operation

Electricity Generating Public Company Limited or EGCO is a holding company. Its main source of revenues is from the dividend income from subsidiaries and share of profits from joint ventures which operates their business in accordance with EGCO's business plan. EGCO aims to develop power projects with either long- term or short-term power purchase agreement ("PPA") both in Thailand and the Asia Pacific region or conduct other related business.

The main responsibilities of EGCO as a holding company are business development, strategic and policy planning, human resources management, accounting and budgeting, and public relations of EGCO Group's companies. Besides, EGCO has also rendered internal audit and legal services to its subsidiaries which mainly take responsibilities on the power generation and sale, service provision, and operation and maintenance.

1.1 Business Target

EGCO focuses to continue building upon its portfolio of power generation assets within both the domestic and Asia Pacific markets by development of new power projects or acquisition of existing power plant projects under the company investment plan which concerns shareholders' return maximization with the acceptable level of risk. In essence, the Company's corporate vision is:

"To be a major sustainable Thai power company doing business in Thailand and the Asia Pacific region, with full commitment to environment protection and social development support"

In this regard, EGCO has identified its key target as follows:

- 1) Return: Achieve the return on equity (ROE) at 10%,
- 2) Growth: Maintain average earning growth at 6% per year,
- 3) Organizational Excellence: Be considerate to society and environment, be considerate to stakeholders, and be active in good corporate governance.

Based on the Company's vision, EGCO targets to enhance its sustainable growth with emphasis on investment in power business in which EGCO has expertise and experiences, as well as operating its business on corporate governance principles with the commitment to social, environment and stakeholders' responsibility. The Company also concerns benefits of shareholders by maintaining the return of equity at least 10%.

To achieve the targets, EGCO drives its business under the three main strategies covering business aspect, social and environment aspect and governance aspect. In term of business, EGCO focuses on well managing existing assets to ensure maximum efficiency,

monitoring performance of joint venture assets to make sure their highest performance and return as planned, managing projects under construction to be complete as scheduled and within the planned budget; and seeking new investment opportunities for long-term income generation. Apart from this, EGCO aims to increase its renewable portion in national and international markets up to 30% of its total portfolio in 2026.

Social and environment strategy will align EGCO business with environment care, decreasing negative impacts and promoting positive impacts on environment throughout business process. EGCO targets to enhance its environmental management and coexistence in harmony with local community. With respect to corporate governance strategy, EGCO conducts its management with good corporate governance representing well management with efficiency, fairness, transparency under the anti-corruption concept, with responsibility towards environment, society and every stakeholder.

1.2 Background and Major Development

EGCO is the first independent power producer in Thailand registered on May 12, 1992 by the Electricity Generating Authority of Thailand (“EGAT”). Such incorporation marked the commencement of the Thai government’s privatization initiatives to allow broader private sector investment in the electricity generating sector. On March 23, 1994, EGCO was transformed into a public company and then listed on the Stock Exchange of Thailand (“SET”) on January 16, 1995.

In order to support the private sector’s role in energy business, EGAT reduced its shareholding in EGCO by divesting part of shares to strategic shareholders. On June 30, 1998, CLP Power International Limited (“CLP”) engaging in energy business in the Asia region and being a subsidiary of CLP Holdings Limited which is listed on Hong Kong Stock Exchange, purchased EGCO’s 78 million shares or 14.92% from EGAT. On July 23, 2008, EGAT transferred the shares to CLP Power Projects (Thailand) Limited (“CLPT”) which engaged in energy business in Thailand and a subsidiary of CLP Power International Limited so that shareholding of EGAT and CLPT in EGCO accounted for 25.41% and 22.42% respectively.

In 2006, CLP, the major shareholder of CLPT changed its shareholding structure by transferring all of its shares in CLPT to OneEnergy Limited (“OneEnergy”). On March 23, 2006, Mitsubishi Corporation (“MC”) engaged in OneEnergy so that it became a joint venture owned by CLP and MC on a 50:50 basis and EGCO informed SET regarding change of CLPT’s major shareholder on March 27, 2006.

On February 23, 2011, EGCO informed SET that it was notified by OneEnergy, a major shareholder of OneEnergy holding 23.49 per cent of the total issued share capital of the Company, that CLP Holdings Limited would divest its approximately 50% effective

interest in OneEnergy while Tokyo Electric Power Company (“TEPCO”) would be joining Mitsubishi Corporation (“MC”) as its 50:50 partner.

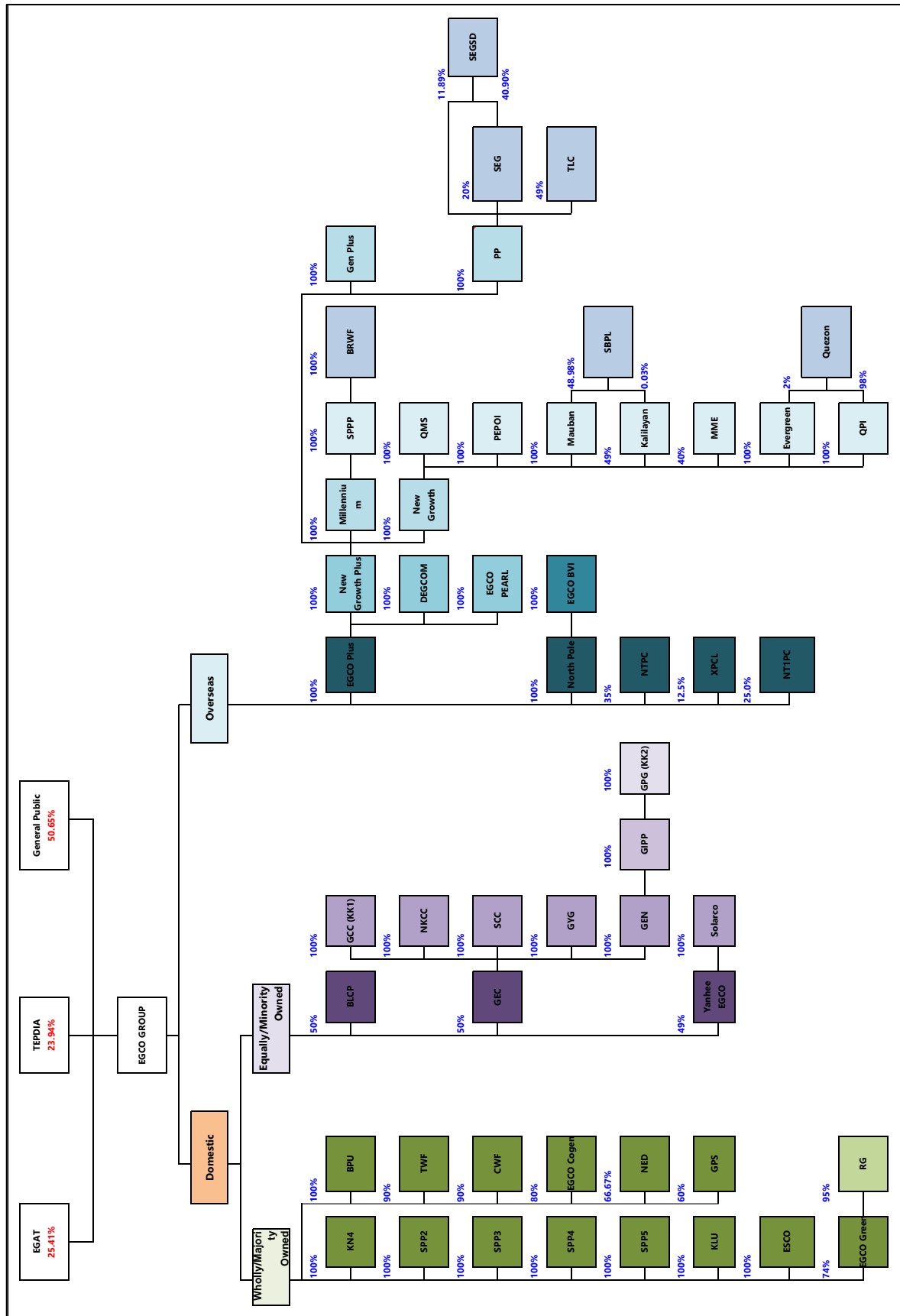
Significant Events in 2018

In 2018, EGCO Group operated 26 power plants in both Thailand and abroad with total contracted capacity of 4,260.48 MW equity. EGCO mainly sold 3,247.00 MW of power to EGAT, 85.07 MW to PEA, 137.39 MW to Industrial Users (IUs) and the rest 791.02 MW to overseas customers. Highlights in 2018 were as follows:

1. On March 14, 2018, EGCO has successfully divested all 18.72% Shares of Eastern Water Resources Development and Management Public Company Limited to Manila Water Company Inc., after the fulfillment of conditions precedent under Share Purchase Agreement executed on February 19, 2018.
2. On March 15, 2018, EGCO has successfully divested all 50% Shares of GIDEC Company Limited to IEC Green Energy Company Limited.
3. On March 21, 2018, EGCO has successfully divested all 49% indirect ownership interest in Masinloc Power Partners Co. Ltd. (MPPCL) to SMC Global Power Holdings Corp.
4. On November 15, 2018, Gen Plus B.V., a wholly owned subsidiary of EGCO, has enter into a Sale and Purchase Agreement to invest in a 49% ownership interest in Paju Energy Service Co. Ltd. owned by SK E&S Co., Ltd. The investment transaction is expected to be completed in January 2019 and will be subject to relevant closing conditions under the transaction documents.

Paju Energy Service Co. Ltd. owns and operates a combined cycle gas-fired power plant facility with an installed capacity of 2 x 911.5 MW which located in Paju City, Gyeonggi Province, South Korea. The Paju Power Plant commenced operation in February 2017. The facility supplies electricity to Korea Electric Power Corporation, the sole off-taker of wholesale power generation in South Korea, through Korea Power Exchange.

1.3 Shareholders' Structure (as of December 31, 2018)



2. Business Characteristics

Revenue Structure

EGCO Group business comprises a holding company, electricity generation and sale companies, operating and maintenance, engineering and construction companies. The revenue structure of EGCO Group can be summarized in the below table.

Unit : Million Baht						
Product Service	Transaction	% Share-holding	2018		2017	
			Revenue	%	Revenue	%
Electricity	EGCO Cogen	80.00%				
	Capacity Charge		251.73	0.43%	260.93	0.69%
	Energy Charge		1,887.09	3.24%	1,811.21	4.76%
	Solarco	49.00%				
	Energy Charge		359.50	0.62%	363.68	0.96%
	SPP 2	99.99%				
	Energy Charge		48.42	0.08%	47.88	0.13%
	SPP 3	99.99%				
	Energy Charge		49.10	0.08%	48.98	0.13%
	SPP 4	99.99%				
	Energy Charge		34.77	0.06%	35.96	0.09%
	SPP 5	99.99%				
	Energy Charge		50.34	0.09%	51.14	0.13%
	BRWF	100.00%				
	Energy Charge		995.80	1.71%	981.12	2.58%
	TWF	90.00%				
	Energy Charge		32.95	0.06%	31.85	0.08%
	CWF	90.00%				
	Energy Charge		344.01	0.59%	313.22	0.82%
	KLU ^{/A}	99.99%				
	Capacity Charge		392.52	0.67%	185.61	0.49%
	Energy Charge		1,839.02	3.16%	727.22	1.91%
	BPU ^{/B}	99.99%				
	Capacity Charge		839.39	1.44%	219.05	0.58%
	Energy Charge		3,850.55	6.61%	929.47	2.44%
Finance lease income under power purchase agreements	KEGCO	99.99%	3,062.51	5.26%	3,291.22	8.65%
	RG	70.30%	6.23	0.01%	9.59	0.03%
Operating lease income under power purchase agreements	Quezon	100.00%	3,432.99	5.90%	3,606.51	9.48%
Lease service income under power purchase agreements	KEGCO	99.99%	10,543.20	18.10%	9,835.44	25.84%
	RG	70.30%	204.81	0.35%	189.51	0.50%
	Quezon	100.00%	6,236.30	10.71%	6,170.27	16.21%
Service	ESCO	99.99%	1,060.97	1.82%	908.11	2.39%
Interest Income	EGCO PLUS		482.56	0.83%	1.25	0.00%
	EGCO		131.59	0.23%	91.60	0.24%
	KEGCO		25.93	0.04%	29.71	0.08%
	Quezon		15.04	0.03%	0.52	0.00%
	Solarco		8.95	0.02%	10.57	0.03%
	Rayong Power Plant, EGCO Cogen, RG, SPP2, SPP3, SPP4, SPP5, TWF, BRWF, BPU, KLU, CWF, ESCO, PEPOI and QMS		34.88	0.06%	24.50	0.06%
Unit : Million Baht						

Product Service	Transaction	%	2018		2017	
			Revenue	%	Revenue	%
Others	Solarco ^{/C}		881.73	1.51%	918.86	2.41%
	CWF ^{/C}		465.60	0.80%	434.38	1.14%
	SPP 2 ^{/C}		123.22	0.21%	135.87	0.36%
	SPP 3 ^{/C}		126.73	0.22%	127.82	0.34%
	SPP 4 ^{/C}		89.48	0.15%	93.53	0.25%
	SPP 5 ^{/C}		132.11	0.23%	132.83	0.35%
	EGCO		49.60	0.09%	215.19	0.57%
	EGCO PLUS		20.40	0.04%	0.00	0.00%
	Rayong Power Plant, EGCO Cogen, RG, Quezon, TWF ^{/C} , BRWF, BPU, KLU, KEGCO , ESCO, PEPOI and QMS		64.17	0.11%	51.59	0.14%
Share of profit (loss)	BLCP	50.00%	1,167.65	2.01%	1,217.79	3.20%
	GEC	50.00%	1,414.85	2.43%	1,256.21	3.30%
	NTPC	35.00%	1,576.64	2.71%	1,354.77	3.56%
	NED	66.67%	567.82	0.98%	558.24	1.47%
	GPS	60.00%	131.10	0.23%	129.33	0.34%
	Masin-AES ^{/D}	49.00%	-	0.00%	780.78	2.05%
	SEG ^{/E}	20.00%	341.29	0.59%	310.17	0.81%
	MME	40.00%	29.11	0.05%	6.73	0.02%
	SBPL	49.00%	(30.94)	(0.05%)	(5.69)	(0.01%)
	GIDEC ^{/F}	50.00%	(8.67)	(0.01%)	(48.72)	(0.13%)
	SEGSD ^{/G}	11.89%	316.11	0.54%	216.99	0.57%
	NTIPC ^{/H}	25.00%	(16.55)	(0.03%)	(4.06)	(0.01%)
Divestment	Net gain on disposal of Masin-AES ^{/D}		9,810.05	16.85%	-	0.00%
	Net gain on disposal of East Water ^{/I}		4,358.53	7.48%	-	0.00%
	Net gain on disposal of GIDEC ^{/F}		8.67	0.01%	-	0.00%
Dissolution	Net gain on dissolutions of EGCO BVI ^{/J} and TLC ^{/K}		395.32	0.68%	-	0.00%
Total revenues (revenues item in consolidated)			58,235.16	100%	38,058.71	100%

Remarks

- /A Klongluang Utilities Company Limited (KLU), which is EGCO holds a 99.99% stakes. The commercial operation date was on July 20, 2017.
- /B Banpong Utilities Company Limited (BPU), which is EGCO holds a 99.99% stakes. The commercial operation date was on October 1, 2017.
- /C Adder is an income, which is supported by the government.
- /D Gen Plus B.V., a wholly owned subsidiary of EGCO, divested all 49% indirect shares in Masin-AES Pte. Ltd (Masin-AES) on March 20, 2018.
- /E Star Energy Geothermal Pte. Ltd. (SEG), which is EGCO holds a 20% indirect ownership interest, acquired 8.18% stakes in Star Energy Geothermal (Salak-Darajat) B.V. (SEGSD) on March 31, 2017.
- /F EGCO divested all 50% shares in GIDEC Company Limited (GIDEC) on March 15, 2018.
- /G EGCO acquired 11.89% stakes in Star Energy Geothermal (Salak-Darajat) B.V. (SEGSD) on March 31, 2017.
- /H EGCO signed a Shareholder's Agreement of Nam Theun 1 Power Company Limited (NTIPC), which is EGCO holds a 25% stakes, in order to develop the Nam Theun 1 Hydropower Plant Project on September 4, 2017.
- /I EGCO divested all 18.72% shares in Eastern Water Resources Development and Management Public Company Limited (East Water) on March 14, 2018.
- /J EGCO International (B.V.I) Limited (EGCO BVI) , which is EGCO holds a 100% stakes, registered for dissolution and liquidation on December 26, 2018.
- /K PT Tenaga Listrik Cilegon (TLC) , which is EGCO holds a 49% stakes, registered for dissolution and liquidation on November 28, 2018.

EGCO's Business Line

I. IPP Group
<p>1.1 Khanom Electricity Generating Company Limited (KEGCO)</p> <p>EGCO holds 100% stake in KEGCO, which owns and operates Khanom power plant which is the largest private power plant in the southern Thailand, located in Nakhon Si Thammarat province. It consists of Khanom unit 4 project (KN4) to supply electricity to the national grid. KN4 is a 970 MW combined cycle power plant using natural gas as primary fuel to generate and sell electricity to EGAT under the 25 years PPA.</p> <p>In 2018, KN4 generated and sold 6,080.59 GWh electricity output to EGAT. Its annual average EAF was 91.42%.</p>
<p>1.2 BLCP Power Limited (BLCP)</p> <p>EGCO holds 50% stake in BLCP, which owns and operates an IPP coal-fired power plant located in Rayong province. It is a 1,434 MW power plant comprising two identical 717 MW pulverized coal-fired power units using high quality bituminous coal imported from Australia as the primary fuel to generate and sell all electricity output to EGAT under the 25 years PPA.</p> <p>In 2018, BLCP power plant generated and sold 10,383.58 GWh electricity output to EGAT. Its annual average EAF for unit 1 and unit 2 was 94.10% and 83.32%, respectively.</p>
<p>1.3 Gulf Power Generation Company Limited (GPG)</p> <p>EGCO indirectly holds 50% stake in GPG, which owns and operates an IPP gas-fired power plant, called Kaeng Khoi 2 (KK2), located in Saraburi province. It is a 1,510 MW power plant composed of two 755 MW combined cycle power blocks using natural gas as the primary fuel to generate and sell all electricity output to EGAT under the 25 years PPA.</p> <p>In 2018, KK2 power plant generated and sold 134.84. GWh electricity output to EGAT. Its annual average EAF for block 1 and block 2 was 95.09% and 87.77%, respectively.</p>
II. SPP Group
<p>2.1 EGCO Cogeneration Company Limited (EGCO Cogen)</p> <p>EGCO indirectly holds 80% stake in EGCO Cogen, which owns and operates a SPP cogeneration power plant located in Rayong province. It is a 117 MW cogeneration power plant with steam supply of 30 tons per hour using natural gas as the primary fuel. Under the SPP firm cogeneration program, it generates and sells 60 MW electricity output to EGAT under the 21 years PPA, and remaining electricity along with steam output to Industrial Users (IUs) in Rayong Industrial Park under the long-term PPAs.</p> <p>In 2018, EGCO Cogen power plant generated and sold 692.04 GWh electricity output to EGAT and IUs. Its annual average EAF was 96.40% and the steam output to IUs was 45,573.00tons.</p>
<p>2.2 Roi-Et Green Company Limited (RG)</p> <p>EGCO indirectly holds 70.30% stake in RG, which owns and operates a SPP renewable power plant located in Roi-Et province. It is a 9.9 MW biomass-fired power plant using rice husk as the primary fuel. Under the SPP firm renewable program, it generates and sells electricity output to EGAT under the 21 years PPA.</p> <p>In 2018, Roi-Et Green power plant generated and sold 58.07 GWh electricity output to EGAT. Its annual average EAF was 88.45%.</p>

2.3 Gulf Cogeneration Company Limited (GCC)

EGCO indirectly holds 50% stake in GCC, which owns and operates a SPP cogeneration power plant located in Saraburi province. It is a 110 MW cogeneration power plant with steam supply of 16 tons per hour using natural gas as the primary fuel. Under the SPP firm cogeneration program, it generates and sells 90 MW electricity output to EGAT under the 21 years PPA, and remaining electricity along with steam output to IUs under the long-term PPAs.

In 2018, GCC power plant generated and sold 694.08 GWh electricity output to EGAT and IUs. Its annual average EAF was 94.64% and the steam output to IUs was 116,539.86 tons.

2.4 Nong Khae Cogeneration Company Limited (NKCC)

EGCO indirectly holds 50% stake in NKCC, which owns and operates a SPP cogeneration power plant located in Saraburi province. It is a 126 MW cogeneration power plant with steam of 24 tons per hour using natural gas as the primary fuel. Under the SPP firm cogeneration program, it generates and sells 90 MW electricity output to EGAT under the 21 years PPA, and remaining electricity along with steam output to IUs under the long-term PPAs.

In 2018, NKCC power plant generated and sold 822.35 GWh electricity output to EGAT and IUs. Its annual average EAF was 93.14% and the steam output to IUs was 160,031.70 tons.

2.5 Samutprakarn Cogeneration Company Limited (SCC)

EGCO indirectly holds 50% stake in SCC, which owns and operates a SPP cogeneration power plant located in Samutprakarn province. It is a 126 MW cogeneration power plant with steam of 24 tons per hour using natural gas as the primary fuel. Under the SPP firm cogeneration program, it generates and sells 90 MW electricity output to EGAT under the 21 years PPA, and remaining electricity along with steam output to IUs under the long-term PPAs.

In 2018, SCC power plant generated and sold 805.59 GWh electricity output to EGAT and IUs. Its annual average EAF was 98.17% and the steam output to IUs was 144,507.45 tons.

2.6 Gulf Yala Green Company Limited (GYG)

EGCO indirectly holds 50% stake in GYG, which owns and operates a SPP renewable power plant located in Yala province. It is a 23 MW biomass-fired power plant using para-wood residue as the primary fuel. Under the SPP firm renewable program, it generates and sells electricity output to EGAT under the 25 years PPA.

In 2018, GYG power plant generated and sold 165.11 GWh electricity output to EGAT. Its annual average EAF was 92.96%.

2.7 Chaiyaphum Wind Farm Company Limited (CWF)

EGCO holds 90% stake in CWF, which owns and operates an 80 MW wind power plant located in Subyai district, Chaiyaphum province. CWF signed a non-firm PPA with EGAT under Small Power Plant scheme for 5-year term which can be renewed every 5 years.

In 2018, CWF power plant generated and sold 132.10 GWh electricity output to EGAT. Its annual average EAF was 99.29%.

2.8 Natural Energy Development Company Limited (NED) (Lopburi Solar Project)

EGCO holds 66.67% stake in NED, which owns and operates 55 MW thin film solar power plant Lopburi Solar Project (LSP) located in Lopburi province. NED signed a non-firm PPA for LSP with EGAT for the sale of electricity output generated. PPA is automatically renewed every 5 years. In addition to the wholesale tariff referred to EGAT, the projects receive adder 8 baht per kWh, applicable for 10 years from the COD.

In 2018, LSP generated and sold 106.34 GWh electricity output to EGAT. Its annual average

availability was 99.36%.

2.9 Klongluang Utilities Company Limited (KLU)

EGCO holds 100% stake in KLU, which owns and operates a SPP cogeneration power plant located in Pathum Thani province. It is a 121 MW cogeneration power plant with steam of 13 tons per hour using natural gas as the primary fuel. Under the SPP firm cogeneration program, it generates and sells 90 MW electricity output to EGAT under the 25 years PPA, and remaining electricity along with steam output to IUs under the long-term PPAs.

In 2018, KLU generated and sold 704.17 GWh electricity output to EGAT and IU. Its annual average availability was 90.30% and the steam output to IUs was 99,925 tons.

2.10 Banpong Utilities Company Limited (BPU)

EGCO holds 100% stake in BPU, which owns and operates a SPP cogeneration power plant located in Pathum Thani province. It is a 256 MW cogeneration power plant with steam of 100 tons per hour comprising two identical 128 MW using natural gas as the primary fuel. Under the SPP firm cogeneration program, it generates and sells 180 MW electricity output to EGAT under the 25 years PPA, and remaining electricity along with steam output to IUs under the long-term PPAs.

In 2018, BPU generated and sold 1,453.27 GWh electricity output to EGAT and IU. Its annual average availability was 95.60% and the steam output to IUs was 605,647 tons.

III. VSPP Group

3.1 Natural Energy Development Company Limited (NED) (Wang Ploeng Solar Project)

EGCO holds 66.67% stake in NED, which owns and operates 8 MW thin film solar power plant Wang Ploeng Solar Project (WSP) located in Lopburi province. NED signed a non-firm PPA for WSP with PEA for the sale of electricity output generated. PPA is automatically renewed every 5 years with the same as LSP pricing structure.

In 2018, WSP generated and sold 15.99 GWh electricity output to PEA. Its annual average availability was 99.37%.

3.2 SPP Two Company Limited (SPP 2)

EGCO holds 100% stake in SPP 2, which owns and operates the 8 MW solar power plant located in Saraburi province. SPP 2 has entered into a non-firm PPA with PEA under VSPP program. The PPA is automatically renewed every 5 years with the same as NED's pricing structure. SPP 2 is equipped with solar tracking system.

In 2018, SPP2 power plant generated and sold 15.25GWh electricity output to PEA. Its annual average availability was 99.53%.

3.3 SPP Three Company Limited (SPP 3)

EGCO holds 100% stake in SPP 3, which owns and operates the 8 MW solar power plant located in Srisaket province. SPP 3 has entered into a non-firm PPA with PEA under VSPP program. The PPA is automatically renewed every 5 years with the same as NED's pricing structure. SPP 3 is equipped with solar tracking system.

In 2018, SPP3 power plant generated and sold 15.73 GWh electricity output to PEA. Its annual average availability was 99.69%.

3.4 SPP Four Company Limited (SPP 4)

EGCO holds 100% stake in SPP 4, which owns and operates the 6 MW solar power plant located in Srisaket province. SPP 4 has entered into a non-firm PPA with PEA under VSPP program. The

PPA is automatically renewed every 5 years with the same as NED's pricing structure. SPP 4 is equipped with solar tracking system.

In 2018, SPP4 power plant generated and sold 11.10 GWh electricity output to PEA. Its annual average availability was 98.77%.

3.5 SPP Five Company Limited (SPP 5)

EGCO holds 100% stake in SPP 5, which owns and operates the 8 MW solar power plant located in Roi-Et province. SPP 5 has entered into a non-firm PPA with PEA under VSPP program. The PPA is automatically renewed every 5 years with the same as NED's pricing structure. SPP 5 is equipped with solar tracking system.

In 2018, SPP5 power plant generated and sold 16.01 GWh electricity output to PEA. Its annual average availability was 99.03%.

3.6 G-Power Source Company Limited (GPS)

EGCO holds 60% stake in GPS, which owns and operates 4 solar power plants under 4 non-firm PPAs with the PEA under VSPP program with installed capacity of 6.5 MW each, total capacity of 26 MW. The PPAs are automatically renewed every 5 years with the same as NED's pricing structure. GPS has 4 sites comprising 1) Ta Khit Solar Project, Nakhon Sawan province 2) Ta Sang Solar Project, Nakhon Sawan province 3) Dong Khon Solar Project, Chai Nat province, and 4) Bueng Sam Phan Solar Project, Phetchabun province.

In 2018, all GPS's solar power plants generated and sold 40.04 GWh electricity output to PEA. Its annual average availability was 99.39%.

3.7 Solarco Company Limited (Solarco)

EGCO indirectly holds 49% stake in Solarco, which owns and operates 6 solar power plants located in Nakhorn Pathom and Suphanburi provinces. Solarco has entered into 6 non-firm PPAs with PEA under VSPP program with the installed capacity of 9.5 MW each, total capacity 57 MW. The PPAs are automatically renewed every 5 years with the same as NED's pricing structure. Solarco has 6 power plants, namely 1) Sai Kiew Solar Project, 2) Sai Yai 1 Solar Project, 3) Sai Yai 2 Solar Project, 4) Sai Phet 1 Solar Project, 5) Sai Phet 2 Solar Project and 6) Sai Phet 3 Solar Project.

In 2018, all Solarco's power plants generated and sold 110.93 GWh electricity output to PEA. Its annual average EAF was 99.58%.

3.8 Theppana Wind Farm Company Limited (TWF)

EGCO holds 90% stake in TWF, which owns and operates the 7.5 MW wind power plant located in Chaiyaphum province. TWF has entered into a non-firm PPA with PEA under VSPP program. The PPA is automatically renewed every 5 years. In addition to the wholesale tariff referred to EGAT, the project receives adder 3.5 baht per kWh, applicable for 10 years from the COD.

In 2018, TWF power plant generated and sold 12.43GWh electricity output to PEA. Its annual average EAF was 98.13%.

IV. Overseas Group

4.1 Quezon Power (Philippines) Limited Company (Quezon)

EGCO indirectly holds 100% stake in Quezon, which owns and operates a 502.50 MW pulverized coal-fired power plant using the high quality coal imported from Indonesia as the primary fuel. Under the 25 years PPA, it generates and sells electricity output to Manila Electric Company (MERALCO), the country's largest power distribution company.

In 2018, Quezon power plant generated and sold 2,414.51 GWh electricity output to MERALCO. Its annual average EAF was 80.00%.

4.2 Nam Theun 2 Power Company Limited (NTPC)

EGCO holds 35% stake in NTPC, which owns and operates a 1,086.80 MW hydroelectric power plant located in Lao PDR. It generates and sells electricity output to EGAT, as well as Electricité du Laos (EDL) under the 25 years PPAs starting from its COD.

In 2018, NTPC power plant generated and sold 5,965.31 GWh electricity output to EGAT and 301.21 GWh electricity output to EDL. Its annual average EAF was 96.63% for EGAT and 97.43% for EDL.

4.3 Star Energy Geothermal Pte Ltd. (SEG)

EGCO indirectly holds 20% stake in SEG, which owns and operates a 227 MW geothermal power plant located in Indonesia. It comprises 2 units of 110 MW and 117 MW. Under the long-term PPA, it generates and sells electricity output to PT PLN (Persero), an Indonesian government-owned electricity corporation.

In 2018, SEG power plant generated and sold 1,895.59 GWh electricity output to its customers. Its annual average EAF was 99.98%.

4.4 Boco Rock Wind Farm Pty Limited (BRWF)

EGCO indirectly holds 100% stake in BRWF, which owns and operates a 113 MW wind power plant located in Australia under long-term PPA with EnergyAustralia Pty Ltd.

In 2018, BRWF power plant generated and sold 366.96 GWh electricity output to the Australian Energy Market Operator (AEMO) and EnergyAustralia Pty Ltd. Its annual average EAF was 98.54%.

4.6 Star Energy Geothermal (Salak – Darajat) B.V. (SEGSD)

EGCO indirectly holds 20.07% stake in SEGSD, which owns and operates a 647.27 MW two geothermal power plant projects located in Indonesia. It comprises of Salak project 6 units of 376.80 MW and Darajat project 3 units 270.46 MW. Under the long-term PPA, it generates and sells steam and electricity output to PT PLN (Persero), an Indonesian government-owned electricity corporation.

In 2018, Salak power plant generated and sold 3,018.33 GWh electricity output to its customers. Its annual average EAF was 98.30% and Darajat power plant generated and sold 1,971.30 GWh electricity output to its customers. Its annual average EAF was 81.40%

V. Other Businesses

5.1 EGCO Engineering & Service Company Limited (ESCO)

EGCO holds 100% stake in ESCO, which provides operation, maintenance, engineering and construction services to power plants, petrochemical plants, oil refineries and other industries.

5.2 Pearl Energy Philippines Operating, Inc. (PEPOI)

EGCO indirectly holds 100% stake in PEPOI (formally named Covanta Philippines Operating Inc.), which provides operation and maintenance services to Quezon power plant through a long-term operation and maintenance agreement.

5.3 Quezon Management Services Inc. (QMS)

EGCO indirectly holds 100% stake in QMS, which provides management services to Quezon power plant through a long-term management service agreement.

5.4 PT Manambang Muara Enim (MME)

EGCO indirectly holds 40% stake in MME, which owns and operates a coal mining project (an open-pit mine), located in Muara Enim, South Sumatra, Indonesia. It has the concession agreement from Indonesian government for 28 years since March 2010 to March 2038. It has mineable coal reserves of 140 million tons. The sales volume of MME in 2017 was at 1.24 million tons.

2.1 EGCO's Products and Services

EGCO invests in 2 business types, being power generation business and other business. EGCO's power business can be divided into 4 groups namely (1) Independent Power Producer ("IPP") Group, (2) Small Power Producer ("SPP") Group, (3) Very Small Power Producer ("VSPP"), (4) Oversea Power Generation Group. EGCO's other business comprises 3 types of business which are (1) operation and maintenance business, (2) management services business for power plant, and (3) coal mine business. EGCO Business is detailed as follows:

2.1.1 Power Generation Business

Electrical Power is a clean processing power that is easy to use and to transform into other types of energy. Electrical power is vital to all business operations, in industry, agriculture, communication or tourism. To generate sufficient electrical energy to satisfy demand is therefore important. The electricity generation in Thailand at present can be divided into two categories:

1. Non-fuel electricity such as hydro power plants, and natural energy power plants using sources of natural energy like solar power, wind power and geothermal power.
2. Fuel-based electricity such as thermal power plants, gas turbine power plants and combined cycle power plants.

A. Types of Power Plant

The types of power plant operated by the EGCO Group are as follows:

1. A hydro power plant generates electricity by the use of force and water compression to rotate water turbines.

A power plant under this category is NTPC Power Plant.

2. A thermal power plant produces electricity using heat derived from combustion. The fuels used in this type of plant can be natural gas, coal, or fuel oil which generate heat to water until it becomes high-pressure steam. This steam will later rotate the steam turbine attached to the shafts of the power generator where electricity is produced. It takes several hours each time to operate such a process from boiling the water in a kiln to start up the power generator. Therefore, it is suitable for using as a base load plant.

Power plants under this category are BLCP Power Plant 1 and 2, and Quezon.

3. A combined cycle power plant combines the use of a gas turbine machine and a steam turbine machine by transporting heat from exhaust gases coming out from a hot gas turbine machine to the boiler, then transferring the heat to water, boiling it, and turning it into steam. This steam will later rotate the steam turbine attached to the shafts of the power generator where electricity is produced.

Power plants under this category are Khanom Combined Cycle Power Plant 4 and GPG Power Plants 1 and 2.

4. A cogeneration power plant is a medium-size power plant producing both electrical power and thermal energy at the same time. At the plant, primary energy is converted to electrical power and the thermal energy which will become useful heat energy within the same process according to thermodynamics.

Power plants of this type are EGCO Cogen Power Plant, GCC Power Plant, NKCC Power Plant, SCC Power Plant, KLU Power Plant and BPU Power Plant.

5. A renewable energy power plant uses non-conventional energy such as wind energy, solar power, mini hydro and geothermal power. It can also use agricultural waste or waste materials, waste from agricultural or industrial product manufacturing, products made from agricultural waste or waste materials, garbage, woods from reforestation for fuel, or waste fuel, for example, steam left from the manufacturing process of industrial or agricultural products such as heat exhaust gases, or by-product energy such as dynamic power which is a product from reducing the pressure of natural gas.

Power plants under this type are RG Power Plant where rice husk is used as fuel, GYG Power Plant where parawood is used as fuel, NED, GPS, Solarco, SPP 2, SPP 3, SPP 4, and SPP 5 using solar power, TWF, CWF and BRWF using wind power, and SEG and SEGSD using geothermal power.

B. Renewable energy power plant

EGCO group prioritizes the investment in renewable energy sources in order to advocate clean energy for environmental conservation, reduce fossil fuel consumption causing greenhouse gases emission and enhance the reliability of electricity supply. Currently, EGCO has 5 types of renewable energy power plants which are;

1. Solar Power Plant: EGCO group has invested in various types of solar power technology, which can be identified as follows.
 - Thin film solar technology is adopted in NED. The cumulative irradiation is around 1,900 – 2,000 kWh/m² per year.
 - Polycrystalline with single axis solar tracking system technology i.e. SPP 2, SPP 3, SPP 4, and SPP 5. The cumulative irradiation is around 2,000 – 2,200 kWh/m² per year, respectively.
 - Polycrystalline solar technology is adopted in GPS and Solarco. The cumulative irradiation is around 1,900 – 2,000 kWh/m² per year, respectively.

All solar power plants of EGCO group have warranties for main equipment and performance ratio under long-term maintenance service agreement in order to ensure maximum efficiency.

2. Wind farm: EGCO group invest in wind farms both Domestic and International.

- Domestic: Power plants of this type are TWF and CWF. Direct Drive wind turbine technology (Gearless) is adopted in both power plants. The hubheight are 100 and 120 meters respectively. These turbines operate at maximum performance of 10.3 meters/sec wind speed.
 - International: Power plant of this type is BRWF located in New South Wales, Australia. This wind farm selected the gear system technology of GE with 80 meters of Hub height. The average wind speed is 7.1 meters/sec.
3. Biomass Power Plant: Power plants of this type are RG and GYG which use rice husk and parawood as primary fuel, respectively. The main sources of fuel from the local community and nearby area are sufficient to generate electricity. However, both power plants have fuel reserves for using in unforeseen circumstances.
 4. Hydro Power Plant: Power plant of this type is NTPC which uses falling water to generate electricity. The reservoir can store 3,530 million cubic meters of water with average water inflow from the rain of 7,521 million cubic meters per year. The main factor of generation is water supply to reservoir each year. NTPC has 25 years power purchase agreement with EGAT and Electricité du Laos (EDL).
 5. Geothermal Power Plant: Power plant of this type is SEG which use geothermal power to generate electricity. The plant use flash steam technology, with the steam generating electricity by driving the turbine directly. The steam is produced at more than 260°C. Furthermore, the plant was the world's largest single cylinder machine. There are two phase fluid pipelines with central separators, and integrated pressure control.

C. Tariff Rate

EGCO group has power purchase agreements in both Thailand and Asia Pacific region. In Thailand, IPP and SPP mainly sell power to EGAT, while VSPP mainly sells to PEA. Moreover, EGCO group sells power in the republic of Philippines, Laos PDR, Indonesia, and Australia. The detail is demonstrated as follows:

IPP Group – the rate is divided into the following 2 parts:

1. Availability payment is a payment, which EGAT makes the payment to the power plants on a monthly basis for maintaining the availability of the power plants, regardless of whether the electric power will be supplied to EGAT or not. The availability payment covers financial cost of investment in the power plants, principal repayments and interest, fixed operating and maintenance expenses, administrative expenses, major maintenance cost and return on EGCO's equity.
2. Energy payment is the payment for the actual net electrical output. It covers the variable operating (i.e. fuel cost and fuel management cost) and maintenance expenses.

SPP Group – the rate is divided into the following 2 parts:

1. Capacity payment is based on the monthly contracted capacity and charged on each customer regardless of whether such customer actually buys electricity or not. However, the capacity payment applicable to EGAT is different from that

applicable to customers in general (industrial users). The capacity payment in case of EGAT is based on its long run avoided capacity cost due to its purchase of power from SPPs while that applicable to industrial users is calculated from contracted capacity that varies to the tariff structure of PEA.

2. Energy payment is the payment for the actual net electrical output. Energy payment charged on EGAT covers variable operating cost while that applicable to industrial users is charged according to the tariff structure of PEA included discount rate under power purchase agreement between the power plant and each industrial user.

VSPP Group – the rate is divided into the following 2 parts:

1. Energy payment is the payment for the actual net electrical output. The purchase of power from VSPPs varies to the tariff structure of PEA.
2. The adder from power purchasing price of fuel and technology due to production cost of renewable energy varies to technology, fuel type, production capacity and investment details affecting variety of adder level.

Overseas Group

1. The Philippines

Power tariff to be charged from Meralco is divided into 4 main components as below:

- Capacity Payment is the remuneration paid by Meralco on a monthly basis. It covers financial cost of investment in the power plant.
- Fixed Operating Payment is the remuneration paid by Meralco on a monthly basis. It covers fixed operating and maintenance expenses of the power plant.
- Variable Operating Payment is the remuneration paid by Meralco on a monthly basis. It covers variable and maintenance expenses.
- Energy payment is the remuneration paid for the electricity actually delivered.

The tariff charged under the specified formula is calculated partially on USD and partially on Peso.

2. Laos PDR

Power tariff to be charged from EGAT is divided into 2 components as below:

- Primary Energy Payment is the remuneration paid by EGAT. It is calculated from the quantity of electricity declared to dispatch during on peak demand.
- Secondary Energy Payment is the remuneration paid by EGAT. It is calculated from the quantity of electricity declared to dispatch during off-peak demand.

3. Indonesia

Power tariff is paid by PT PLN (Persero) to SEG in the term of Energy Payment which is the actual measured quantity of electricity delivered. However, Energy payment will change according to factors in the tariff structure.

4. Australia

Power tariff is paid by EnergyAustralia to BRWF divided into 2 components as below:

- Energy Payment is the payment for the actual net electrical output.
- Renewable Green Certificate is the additional payment for the actual net electrical output, which is equivalent to adder.

D. Rights and Privileges

In addition to the PPA with EGAT and PEA, the Thai Board of Investment (BOI) also granted the tax privileges to all IPPs and SPPs in the Group under the Promotion Certificate Issuance no. 7.36 (Independent Power Producer) and 7.1 (Public utilities and infrastructure), respectively. The significant information is as follows:

Privileges

1. Exemption of corporate income tax (CIT) for net profit from promoted business for 8 years from the first date of income earnings.
2. Reduction of corporate income tax for net profit from investment by 50% of the normal rate for 5 years from the date following the end of the corporate income tax holiday.
3. Exemption of calculating dividend from the promoted business as taxable income throughout the period of corporate income tax holiday.

Conditions:

- Having shareholders who are Thai national holding shares in an aggregate amount of at least 51% of the registered capital.
- Having registered capital of at least as indicated.
- Power plant locating in the indicated areas for 15 years from the first date of operation. Relocation to other areas shall not be made unless with the BOI's prior approval.

Tax privileges to all IPPs are detailed as follows:

Power Plant	Promotion Certificate	Date of Promotion Granted	Privileges (8 Years)	Registered Capital of at Least	Location
KEGCO	No. 2509(2)/2013 dated October 29, 2013	May 17, 2013	January 14, 2016 – January 13, 2024 ^{/1}	6,000 million baht	Nakorn Si Thammarat Province
BLCP	No. 1499/2000 dated August 21, 2000	October 1, 1998	October 1, 2006-September 30, 2014	12,000 million baht	Rayong Province
GPG	No. 1660(2)/2005 dated July 25, 2005	June 3, 2005	November 3 2006 -November 2, 2014	1,850 million baht and shall increase the registered capital of at least Baht 9,030 million and fully paid before commencing the operation	Saraburi Province

Tax privileges to all SPPs are detailed as follows.

Power Plant	Promotion Certificate	Date of Promotion Granted	Privileges	Registered Capital of at Least	Location
EGCO Cogen	No. 1230/1999 dated June 7, 1999 and the revised version No. 5106/2000 (2-1230/2000, 6379/2002), (3-1230/1999), 6753/2002 (4/1230/2002) and 4063/2017 (5-1230/1999) dated May 31, 2000, October 3, 2002, November 2002 and 16 June 2007 ,respectively	June 7, 1999	January 10, 2003-January 9, 2011	Not less than 1 million baht and shall pay up the full amount of register capital of not less than 1,200 million baht before commercial operation date.	Rayong Province
RG	No. 1660(1) 2001 dated October 19, 2001 and revised version No. 6871/2003 (2-1660 (1) 2001) dated November 7, 2003	October 19, 2001	October 19, 2001 – October 18, 2009	Not less than 180 million baht and shall pay up the full amount of registered capital before commercial operation date	Roi-Et Province
GCC	No. 1279/1997 dated May 2, 1997 and 3 revised versions - No. 4553/1999 (2-1279/1997) dated April 8, 1999 - No 6013/1999 (3-1279/1997) dated December 2, 1999 - No. 5279/2000 (4-1279/1997) dated June 20, 2000	Mar 5, 1997	July 21, 1998 - July 20, 2006	N/A	Saraburi Province
NKCC	No. 1594/1998 dated December 28, 1998 and a revised version, No. 4735/2001	July 9, 1997	June 1, 2000 - May 31, 2008	N/A	Saraburi Province

Power Plant	Promotion Certificate	Date of Promotion Granted	Privileges	Registered Capital of at Least	Location
	(2-1594/1998) dated March 7, 2001				
SCC	No. 1761/1997 dated December 15, 1997 and a revised version, No. 4100/2000 (2-1761/1998) dated January 17, 2000	July 9, 1997	April 1, 1999 – March 31, 2007	N/A	Samut Prakan Province
GYG	No. 1549(2)/2004 dated July 9, 2004	November 19, 2003	November 7, 2006-November 6, 2014	Not less than 200 million baht and shall increase the registered capital of at least Baht 200 million and fully paid before commencing the operation	Yala Province
NED (LSP)	No. 1443(1)/2010 dated April 12, 2010	March 10, 2010	December 22, 2011 - December 21, 2019	Not less than 1,990 million baht	Lopburi Province
CWF	No. 2433(1)/2014 dated July 18, 2014	November 21, 2014	December 16, 2016 – December 15, 2024	Not less than 1,514 million baht	Chaiyaphum Province
KLU	No. 58-2443-0-00-1-0 dated November 9, 2015	May 29, 2015	May 29, 2015 – May 28, 2023	Not less than 1,000 million baht	Pathum Thani Province
BPU	No. 59-0294-0-00-1-0 dated February 24, 2016 and No. 59-0295-0-00-1-0 dated February 24, 2016	May 29, 2015 and May 29, 2015	4 September 2017 – 3 September 2025 and 28 August 2017 – 27 August 2025	Not less than 2,000 million baht	Ratchaburi Province

Tax privileges to all VSPPs are detailed as follows.

Power Plant	Promotion Certificate	Date of Promotion Granted	Privileges	Registered Capital of at Least	Location
SPP2	No. 1502(1)/2011 dated April 26,	May 7, 2010	May 2, 2012 - May 1, 2020	Not less than 196.7 million	Saraburi Province

Power Plant	Promotion Certificate	Date of Promotion Granted	Privileges	Registered Capital of at Least	Location
	2011			baht	
SPP3	No. 1503(1)/2011 dated April 26, 2011	May 7, 2010	February 21, 2012 - February 20, 2020	Not less than 197.5 million baht	Srisaket Province
SPP4	No. 1504(1)/2011 dated April 26, 2011	April 27, 2010	January 24, 2012 - January 23, 2020	Not less than 148.7 million baht	Srisaket Province and Ubon Ratchathani Province
SPP5	No. 1505(1)/2011 dated April 26, 2011	May 7, 2010	June 22, 2012 - June 21, 2020	Not less than 198.4 million baht	Roi Et Province
GPS (Ta Khit)	No. 1884(1)/2011 dated June 28, 2011	March 22, 2011	March 1, 2012 - February 28, 2020	Not less than 750 million baht	Nakhon Sawan Province
GPS (Ta Sang)	No. 1883(1)/2011 dated June 28, 2011	March 22, 2011	March 2, 2012 - March 1, 2020	Not less than 750 million baht	Nakhon Sawan Province
GPS (Dong Khon)	No. 1882(1)/2011 dated June 28, 2011	March 22, 2011	March 5, 2012 - March 4, 2020	Not less than 750 million baht	Chai Nat Province
GPS (Bueng Sam Phan)	No. 1881(1)/2011 dated June 28, 2011	March 22, 2011	February 1, 2013 - January 31, 2021	Not less than 750 million baht	Petchabun Province
NED (WSP)	No. 1142(1)/2011 dated February 3, 2011	July 9, 2010	May 2, 2013 - May 1, 2021	Not less than 2,281 million baht	Lopburi Province
TWF	No. 2499(1)/2012 dated October 10, 2012	June 26, 2012	July 18, 2013 - July 17, 2021	Not less than 114 million baht	Chaiyaphum Province
Solarco (Sai Yai 1)	No. 1181(1)/2013 dated February 5, 2013	December 26, 2012	November 18, 2013 - November 17, 2021	Not less than 825 million baht	Nakhon Pathom Province
Solarco (Sai Yai 2)	No. 1182(1)/2013 dated February 5, 2013	December 26, 2012	November 18, 2013 - November 17, 2021	Not less than 825 million baht	Nakhon Pathom Province
Solarco (Sai Kyo)	No. 1183(1)/2013 dated February 5, 2013	December 26, 2012	December 16, 2013 - December 15, 2021	Not less than 825 million baht	Suphan Buri Province
Solarco	No. 1184(1)/2013 dated February 5, 2013	December 26, 2012	December 16, 2013 - December 15, 2021	Not less than 1,650 million	Nakhon Pathom

Power Plant	Promotion Certificate	Date of Promotion Granted	Privileges	Registered Capital of at Least	Location
(Sai Phet 1)	2013		2021	baht	Province
Solarco (Sai Phet 2)	No. 1186(1)/2013 dated February 5, 2013	December 26, 2012	December 16, 2013 - December 15, 2021	Not less than 1,650 million baht	Nakhon Pathom Province
Solarco (Sai Phet 3)	No. 1185(1)/2013 dated February 5, 2013	December 26, 2012	November 18, 2013 - November 17, 2021	Not less than 1,650 million baht	Nakhon Pathom Province

Notes

^{/1} KEGCO has no authorization for the reduction of corporate income tax by 50% of the normal rate for 5 years from the date following the end of the corporate income tax holiday.

2.2 Marketing and Competition

Electricity generating and transmission system

EGAT is responsible for electricity generation and transmission to respond to demand countrywide. It has its own power plants for power generation and also purchases power supply from private producers, Lao PDR and Malaysia. It then sells electricity to Metropolitan Electricity Authority (MEA), Provincial Electricity Authority (PEA), and other direct customers (some industrial plants designated by the Royal Decree). EGAT dispatches electricity through high-voltage power stations. MEA and PEA will undertake the distribution and retailing to the general public. Electricity is purchased from EGAT at the interconnection point and then transmitted to substations for further distribution to consumers.

At present, EGAT's power plants have total capacity of 15,518.13 MW scattering in many regions across the country. Most of them are combined cycle power plants and the second and the third are thermal power plants and hydroelectric power plants respectively.

Since 1992, the government has encouraged private sector to take part in electricity generating. The National Energy Policy Council approved the establishment of Electricity Generating Co., Ltd. (EGCO) and the regulations for the purchase of power from Small Power Producers (SPP) as well as policy regarding the purchase of power from Independent Power Producers (IPP). Power purchase from SPPs and IPPs helps relieve EGAT's investment burden in power generating facility. EGAT holds 25.41% of EGCO's outstanding shares.

Competitive Situation

1. Electricity industry and Economic situation in Thailand

In 2018, Thailand's peak demand in Electricity Generating Authority of Thailand (EGAT)'s system was 28,338 megawatts, occurred on April 24, 2018 at 01.51 pm, lower than the peak demand of 28,578 megawatts in 2017 by 0.85 percent while the peak demand in 3 power authorities system (EGAT, Metropolitan Electricity Authority (MEA) and, Provincial Electricity Authority (PEA)) was 29,968 megawatts, lower than the peak demand of 30,303 megawatts in 2017 by 1.11 percent. A decrease in the peak demand was the consequence of cold weather in the beginning of the year and continuous raining as well as the increase of Independent Power Supply (IPS) and SPP outside the EGAT system. Peak demand for electricity consumption is shown in Figure 1. In the meantime, electricity consumption of the country in EGAT system as of December 2018, including electricity consumption outside EGAT system as of November 2018 stood at 203,006 gigawatt-hours which were 1,840 gigawatt-hours or 0.91 percent increase from 201,166 gigawatt-hours in 2017. A growth of electricity consumption was mainly driven by the expansion of economy and thriving tourism.

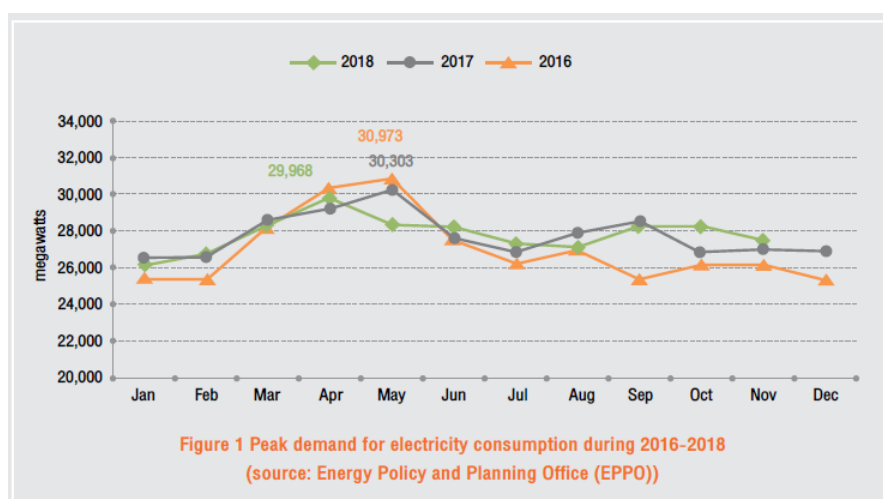


Figure 1 Peak demand for electricity consumption during 2016-2018 (source:EGAT)

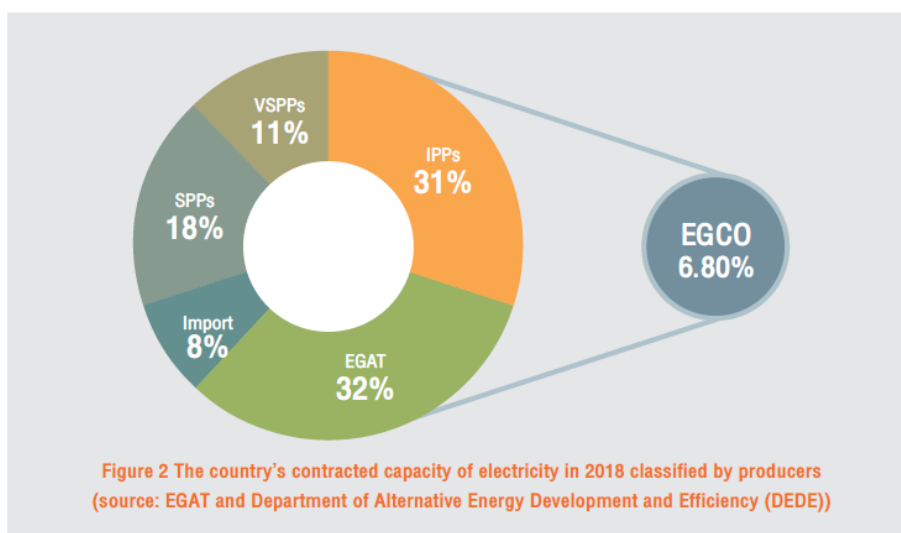
As for economic outlook in 2019, National Economic and Social Development Board (NESDB) forecasted Thailand's economy to expand in the range of 3.50 to 4.50 percent (Mean 4.00), lower than the expansion of 4.2 in 2018. A lower projection is mainly resulted from the uncertainty of trade protection and reciprocal retaliation between the U.S. and China along with an increase in federal funds rate, which negatively affect trading-partner economies, world trade volume, global economy, and Thai exports to grow slower than expected

As of December 31, 2018, the country's contracted capacity in 3 power authorities system was 48,990 megawatts, 15,790 megawatts or 32.23% of which were generated by EGAT power plants, and the remaining from other producers, i.e.

- Independent Power Producers (IPPs) 14,948 megawatts or 30.51 percent
- Small Power Producers (SPPs) 8,757 megawatts or 17.88 percent
- Import from neighboring countries 3,878 megawatts or 7.92 percent

- Very Small Power Producers (VSPPs) as of October 2018 5,617 megawatts or 11.46 percent

EGCO's contracted capacity of electricity sold to EGAT was 3,332.08 megawatts, representing 6.80% of the country's contracted capacity in 3 power authorities system, as presented in Figure 2



In the recent year, the National Energy Policy Council (NEPC) had a plan to draft the new Power Development Plan (PDP) to portray a clear picture of power sector development since some planned power plants in PDP 2015 could not be constructed as planned along with electricity consumption behavior change, influenced by disruptive technology. The objectives of the new PDP aim to strengthen security of power supply for each region, maintain appropriate costs of power generation and focus on reducing environmental and social impacts by lessening carbon dioxide intensity in power generation. The new PDP has been approved by NEPC on January 24, 2019 after public hearing to obtain opinions and comments from private sector and others authorities has already been done.

Regarding the Alternative Energy Development Plan of 2015-2036 (AEDP 2015), power generation from renewable energy (including large hydropower) is targeted to be 19,684 megawatts in 2036. In 2018, the government has announced the plan to suspend the purchase of renewable power during the next five years because the country has sufficient reserve margin. According to the Department of Alternative Energy Development and Efficiency, the current status of renewable energy power plants as of October 2018, which achieved COD was 10,798 megawatts, increased from which of 2017 by 560 megawatts or 5.47 percent.

2. Electricity industry in Asia-Pacific countries

EGCO has envisioned slight growth prospect for domestic electricity industry. Therefore, EGCO has thus worked out expansion plans in Asia-Pacific countries such as Philippines, Lao PDR, Indonesia and Australia, where the Company has established business bases. Investment of EGCO in each country is shown in Figure 3. To secure sustainable growth, EGCO has also been seeking for investment opportunities in other countries in the Asia Pacific region such as Vietnam, Myanmar, Cambodia, South

Korea and Taiwan. To be well prepared for such endeavors, EGCO has consistently kept abreast of electricity industry situation in those targeted countries.

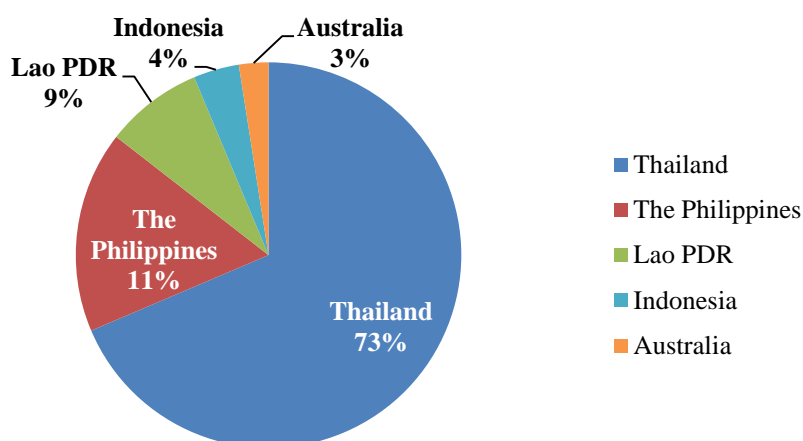


Figure 3 EGCO's equity contracted capacity of electricity in 2017 classified by country

The overview of electricity situations for each country is briefed below.

2.1 The Philippines

The Philippines's installed capacity is approximately 23,000 megawatts, which are primarily from coal-fired power. Peak demand in the Philippines is estimated to increase 5.60 percent annually. Regarding to Power Development Plan 2016-2040, the Philippines plan to expand its generating capacity by 31,000 megawatts by 2025, which focus on power generation from coal-fired power plant. Additionally, the Philippines set target renewable energy generation of 20,000 megawatts by 2025. The investments in renewable energy will be emphasized on solar and wind power.

2.2 Lao People's Democratic Republic (Lao PDR)

Lao PDR's installed capacity is approximately 6,800 megawatts, which are for domestic consumption of 2,400 megawatts and for export to Vietnam and Thailand of 800 megawatts and 3,600 megawatts respectively. The electricity generation is mainly from hydropower plants because of its abundant water resource and mountainous geography, which are suitable for construction of hydroelectric dams. The demand growth of whole country is forecasted to increase 13.20% annually. Moreover, Lao PDR's promotes the investment in power generation from hydropower and alternative renewable energies, such as solar and wind from private sectors, both domestically and overseas.

Presently, Thailand has signed Memorandum of Understanding (MOU) to purchase electricity of 9,000 megawatts from Lao PDR.

2.3 Indonesia

Indonesia's installed capacity is approximately 60,000 megawatts. Coal-fired power plants play an important role as base load generation. Demand growth is estimated to increase 6.80% annually. According to 2018-2027 Power Supply Business Plan (RUPTL), the government has laid down a plan to expand its electricity generating

capacity by 56,000 megawatts, which decrease from 2017-2028 Power Supply Business Plan (RUPTL) by 22,000 megawatts as a result of lower demand growth than forecasted in the previous RUPTL. In overall, the additional electricity generating capacity is mainly from coal, geothermal and hydropower, which are the major resources.

2.4 Australia

Australia's installed capacity is approximately 52,000 megawatts. Australia plans to retain 47 percent of total installed capacity from coal-fired power plants in order to maintain energy security and affordable price. Due to energy efficiency and a continuous increase in rooftop PV capacity, demand growth in Australia is estimated to be flat over the 20-year outlook period. Furthermore, the government of Australia puts an effort to increase renewable energy generation to 33,000 gigawatt-hours by 2020, which focus on power generation from wind power and rooftop PV. Power generation from wind power and rooftop PV are forecasted to be more than triple from present by 2028.

2.5 Vietnam

Installed capacity of Vietnam is approximately 42,000 megawatts, which are primarily from coal-fired power and hydropower. Demand growth is estimated to increase 8.40 percent annually. According to revision of power master plan VII, Vietnam's electricity generating capacity is forecasted to increase to 130,000 megawatts by 2030, which mainly focus on investment of coal-fired power plants and natural gas power plants. Additionally, the government of Vietnam put an effort to develop power generation from renewable energy to achieve target of 48,000 megawatts by 2030, with emphasis on solar power, hydropower and wind power.

Vietnam is being under power sector reform, in order to create competitive wholesale and retail power market and to reform power generation corporations of Electricity of Vietnam (EVN).

2.6 Myanmar

Myanmar's installed capacity is approximately 5,700 megawatts, which are mainly generated by hydropower plants. Demand growth in Myanmar is forecasted to increase 9.60 percent annually. With an effort to achieve 100% electrification by 2030, Myanmar is moving forwards to increase energy access in rural areas and secure reliable supply in urban areas and special economic zones (SEZs). Therefore, the government plans to expand its electricity generating capacity to 14,000 megawatts in 2030, which focuses on the development of hydropower plants and coal-fired plants. Thailand has signed Memorandum of Understanding (MoU) for the purchase of electricity from Myanmar, expiration in 2020 with no specific capacity.

2.7 Cambodia

Installed capacity of Cambodia is approximately 2,000 megawatts. Hydro and coal are primary source of fuel supply in Cambodia. Demand growth in Cambodia is forecasted to increase 9.50 percent annually. Cambodia plans to increase 2,600 megawatts of electricity generating capacity, which promote power generation from hydropower and coal-fired power. Thailand has signed Memorandum of Understanding (MoU) for the purchase of electricity from Cambodia, with no specific capacity.

2.8 South Korea

South Korea's installed capacity is approximately 120,000 megawatts, which are significantly from natural gas and coal-fired power. Demand growth is estimated to increase 1.30 percent annually. South Korea's electricity generating capacity is estimated to increase to 174,000 megawatts. Overall of additional capacity is generated by natural gas power plants and coal fired power plants. Moreover, the government of South Korea has a plan to develop power generation from renewable energy to achieve 20 percent of total capacity by 2030, with target of 31,000 megawatts and 15,000 megawatts from solar power and wind power respectively.

2.9 Taiwan

Taiwan's installed capacity is approximately 42,000 megawatts, which are mainly from natural gas and coal-fired power. The government of Taiwan plans to expand 32,000 megawatts of electricity generating capacity with emphasis on development of natural gas power plant and coal-fired power plant as a based load generation. Furthermore, Taiwan plans to generate 20 percent of total capacity from renewable energy, with significant portion of solar power and wind power to replace existing nuclear power plants, which will be decommissioned in 2025. In 2020, power generation from renewable energy in Taiwan is expected to be 27,000 megawatts.

3. Competition

Overall picture in 2018 illustrated the active movements of power sector. On the government sector, the National Energy Policy Council or NEPC is drafting the new PDP. On the private sector, power companies are actively seeking for investment opportunities outside Thailand due to limited growth prospect for domestic electricity industry. This resulted in the intensified competition in overseas market. Despite the high competition in power industry, EGCO successfully enhanced its investment in a new project. On November 15, 2018, EGCO by Gen Plus B.V., has signed sale and purchase agreement to invest in a 49 percent ownership interest in Paju Energy Service Co.Ltd. (Paju ES), which owns and operates the Paju combined cycle power plant with an installed capacity of 2x911.5 megawatts, which is located in Paju city, Gyeonggi Province, South Korea. The transaction is expected to be completed by January 2019. Such acquisition not only enables EGCO to receive the immediate income, but also adds the economic value to the company in the long term. EGCO is satisfactorily competitive in power business which was resulted by favorable factors as follows;

- **Human resources**

Competence and expertise of EGCO personnel, experiences of its Board members, and good relationship with business alliances are the keys. EGCO personnel have dependable capabilities and experiences in power industry. Board members are competent persons from diverse business areas, many of whom are knowledgeable and long-time experienced in energy and electricity areas.

- **EGCO's trustworthy**

EGCO has planned to expand its investments to ensure a consistent and sustainable growth. The Company selected to invest in projects that generate good returns at an acceptable risk level, which has resulted in its satisfactory financial status, liquidity, and profit growth. This has helped the Company earn trust and confidence from banks and financial institutions in financially supporting its ongoing investments.

- Good relationship with communities surrounding power plants**
 As power generation may cause impact to nearby communities, EGCO always operates its power plants with full responsibility towards society and environment. EGCO discloses information without concealment, encourages public participation and maintains good relationship with nearby communities. Moreover, it supports local employment for income distribution and the well-being of local people. So far, EGCO has faced no complaints from communities surrounding its power plants
- Innovation**
 Since EGCO realizes the importance of organizational development to prepare for the disruptive changes in the future, EGCO aims to incubate EGCO personnel with creative and innovative ideas, which can be applied to work process, increase work efficiency and obtain the competitive advantages over competitors.

2.3 Products and Services

Electricity

The company has the policy to supply electricity or to provide related services with high quality. The Company will honor its promise to the customers and will continue to operate its business safely with environmental friendliness. In this regard, the description of the service of IPPs in EGCO Group, the major power plants in EGCO Group, is provided as an example:

1) Capacity, Net Generation and Capacity Factor

The capacity, net generation and capacity factor of IPPs during 2016-2018 is as shown below:

	Units	2018	2017	2016
KEGCO				
Available capacity ^{1/}	Million kWh	7,614	7,812	7,425 ^{3/}
Dispatching net generation ^{2/}	Million kWh	6,081	6,205	5,637
Capacity Factor (%)	%	81.54	79.95	75.92
Increasing rate of net generation (%)	%	(2.00)	10.08	17.98
BLCP				
Available capacity ^{1/}	Million kWh	10,484	10,309	11,117
Dispatching net generation ^{2/}	Million kWh	10,384	10,092	10,164
Capacity Factor (%)	%	99.05	97.89	91.43
Increasing rate of net generation (%)	%	2.89	(0.71)	(5.75)
GPG				
Available capacity ^{1/}	Million kWh	11,204	11,273	12,506
Dispatching net generation	Million kWh	135	1,360	2,610
Capacity Factor (%)	%	1.20 ^{4/}	10.58 ^{4/}	20.87 ^{4/}
Increasing rate of net generation (%)	%	(90.09)	(47.89)	(48.55)

Notes

- ^{/1} Available capacity of each plant in each year is calculated from the total number of hours deducted by the number of hours of planned maintenance outage.
- ^{/2} Dispatching net generation in each year depends on the generating availability of the plant and the order from the control center of EGAT based on the electricity requirement at each period of time.
- ^{/3} The Capacity Factor of KEGCO in 2016 is the total available capacity of unit 2 and 3, which expired on June 19, 2016, and unit 4, which started COD on the same day.
- ^{/4} The Capacity Factor of GPG in 2016-2018 is significantly low due to lower dispatch from EGAT. However, GPG still gained from full availability payment.

2) Raw Material

In case of fuel-based electricity, major raw material for power generation is fuel, which comprises natural gas and coal which are primary fuels and diesel oil, the secondary fuel, other raw materials required for the generating process are water and chemicals, water treatment agent and fuel additive. Major raw materials for power generating can be summarized as follows:

(1) Natural gas

Natural gas is a primary fuel used for both thermal and combined cycle plants. Both KEGCO and GPG are supplied fuel by PTT under the contracted amount and price as indicated in the Fuel Supply Agreement between PTT and the power plant. The fuel cost will be passed through in the Energy Payment based on the contracted heat rate as stated in the PPA with EGAT

(2) Coal

Bituminous coal is the primary fuel for BLCP power plant. This high quality coal is shipped to the deep sea port of BLCP from overseas contracted suppliers. Its price varies from shipment to shipment depending on its calorific value. According to PPA with EGAT, BLCP is obliged to stock the coal for 30 days continuous operation.

(3) Diesel oil

Diesel oil is reserved to cope with primary oil shortage and for use in case of machinery test-run and for operation after repair and maintenance. According to the PPAs, KEGCO and GPG have to make available diesel oil reserve to serve 3 days of full generation. They will operate the facility with the use of diesel oil only upon the instruction of EGAT. Moreover, diesel oil is used in BLCP for a start-up or lower-than 25% operation load, so the diesel oil is only reserved as necessary each year.

(4) Water

Each power plant procures the water for consumption as detailed below:

KEGCO's primary source of water used in the thermal plant comes from Ban Klang canal and the secondary source comes from Tha Tok canal. A reservoir had been built to accommodate water reserve of 0.4 million cubic meters upon area of 111 rai 3 ngan 42 square wah along the Ban Klang canal, about 10 kilometers. From the power plant, which can well cope with shortage of water during dry season. Moreover, the additional reservoir, Ban Bang Koo, was located 6

kilometers from the plant with the capacity of 0.4 million cubic meters upon area of 114 rai 1 ngan 19.10 square wah.

BLCP purchases the water from the Industrial Estate Authority of Thailand (“IEAT”) with the reserve of 3 day service. Moreover, BLCP has the desalination plant as the backup source to be used in case of IEAT’s incapability to provide its service, to meet the need of water use.

GPG’s primary source of water used in the power plant comes from Pasak River. A reservoir has also been built to accommodate water reserve of 1.3 million cubic meters upon area of 120 rai. Within this reserved capacity, the power plant is able to sustain its normal operation for 30 days. Moreover, GPG has water treatment plant to produce tap water with the capacity of 54,413 cubic meters per day.

(5) Chemicals

Most chemicals used in power plants are for improving water quality, such as, hydrazine for boilers, and hydrochloric acid (HCL), sulfuric acid (H₂SO₄) and sodium hydroxide (NaOH) for use in regenerating resin and treating wastewater, as well as polyaluminium chloride (PAC) and ferric chloride (FeCl₃) for tap water system.

Other Businesses

There are 3 types of other business comprise 1) operation and maintenance business, being EGCO Engineering & Service Co., Ltd. (“ESCO”) and Pearl Energy Philippines Operating, Inc. (“PEPOI”); 2) management services business for power plant, being Quezon Management Services Inc. (“QMS”); and 3) coal mine business, being PT Manabung Maura Enim Co., Ltd. (“MME”).

1) Operation and Maintenance Business – ESCO and PEPOI

A. ESCO

ESCO is EGCO’s wholly owned subsidiary which provides operation, maintenance, engineering and construction services to power plants, petrochemical plants, oil refineries and other industries.

Service

Power Plant Operation and Maintenance Services (O&M)

ESCO aims to provide comprehensive operation and maintenance services with high efficiency, i.e., high equivalent availability factor and low heat rate with reasonable O&M cost. ESCO has extensive experiences to provide a full scope services to both thermal and combined cycle plants

Maintenance Services

ESCO has extensive expertise in mechanical maintenance, electrical maintenance, and control and instruments maintenance services and can be on called on 24-hour basis. With the strong and competent workforce, ESCO can

provide a variety of professional maintenance services for power, petrochemical and oil & gas industries which covers the following areas:

- Planned Outage maintenance
- Contract maintenance services
- Individual equipment maintenance
- Field service and emergency troubleshooting

Engineering & Construction Services

ESCO has a qualified team of engineer to provide services on civil, mechanical, electrical and control and the testing and installation. The particular strength lies in installation and conducting test on power plant main system such as gas turbine, steam turbine, generator, HRSG, boiler and balance of plant. ESCO services also cover turnkey of small to medium projects such as pumping stations and power distribution substations.

In addition, ESCO also provides other services such as on demand side management, technical and field testing and technical training, etc.

B. PEPOI

EGCO holds 100% stake in PEPOI (formally named Covanta Philippines Operating Inc.), which provides operation and maintenance services to Quezon power plant through a long-term operation and maintenance agreement.

2) Management Services Business for Power Plant – QMS

EGCO holds 100% stake in QMS, which provides management services to Quezon power plant through a long-term management service agreement.

3) Coal mining company - MME

EGCO indirectly holds 40% stake in MME, which owns and operates a coal mining project (an open-pit mine), located in Muara Enim, South Sumatra, Indonesia. It is awarded a concession agreement from Indonesian government for 28 years since March 2010 to March 2038. It has mineable coal reserves of 140 million tons.

2.4 Undelivered works

There are 3 power plant projects under developing as follows:

Power Plant Project	Province/ Country	Fuel Type	EGCO Shares (%)	Equity Contracted Capacity (MWe)	SCOD
1. XPCL	Laos PDR	Hydro	12.50	160.00	2019
2. SBPL	Philippines	Coal	49.00	223.00	2019
3. Masinloc Unit 3	Philippines	Coal	49.00	164.15	2019

3. Risk Factors

Electricity Generating PCL or EGCO Group, realizes that the prudent risk analysis and risk management are crucial in building stakeholders' confidences. To ensure that the corporate risk management is effective throughout the organization, the Board of Directors entrusts the Audit Committee to review with Management about risk management policy and compliance, EGCO Group's risk management guidelines, and potential risks as well as preventive measures of such risks.

At the Management level, the appointed Risk Management Committee comprises EGCO's top executives with the President as the chairman of the Committee, all Senior Executive Vice President as members and the Executive Vice President - Asset Management as the secretary. The Risk Management Committee's duties and responsibilities include the oversight of EGCO's risk management compliance with risk management policy and guidelines, promotion and support of enterprise risk management policy as well as regular report to the Audit Committee and the Board of Directors. In the case of significant risk factors arising, the Risk Management Committee shall promptly report to the Audit Committee and the Board of Directors.

In addition, EGCO Group has established Risk Assessment Division that serves as assistant secretary of the Risk Management Committee. The Division has responsibilities for monitoring, and reporting of EGCO Group's risk management practice, cooperating with the risk owners on risk identification, risk assessment, risk response, and reporting matters about EGCO Group's risk management practice to the Risk Management Committee 4 times in 2018. To ensure that the risk management processes are implemented throughout the organization and all divisions are fully aware of risk management importance. EGCO Group announces Risk Management Philosophy which declares that: "EGCO Group believes that despite the risks implicit in doing business, we strive to manage risk efficiently with consideration of balancing risk and return for all stakeholders' benefits. Our risk management shall increase opportunity for achieving corporate goals and creating sustainable corporate values." aims to be applied throughout the organization to support the enterprise risk management, following risk management framework set by the Board of Directors.

In 2018, EGCO Group applied COSO Enterprise Risk Management Framework (COSO ERM) which classified as strategic risk management, operating risk management, financial risk management and compliance risk management. EGCO Group prepared "Risk Management Manual" to be a practical guideline for the organization. Moreover, the organization established Key Risk Indicators which were Leading and Lagging Indicators in risk management, and encouraged EGCO Group's employees to apply Key Risk Indicators with their operations appropriately.

EGCO Group realizes that organization risk management culture is a key factor to achieve enterprise risk management therefore EGCO Group communicates the importance of enterprise risk management through various channels such as annual risk seminar, Risk Management Manual, journals and news, risk management activities, EGCO radio, EGCO billboard and EGCO Group Net. Moreover, EGCO Group is developing E-Learning to extend knowledges and advantages of applying COSO ERM to employees in the future.

A summary of EGCO Group's key risk factors and associated mitigation measures is as follows:

1. Investment Expansion Risk

EGCO Group invests in energy business and related business in both domestic and international markets. The primary sources of income are dividends from subsidiaries and joint ventures. In maintaining and increasing shareholders' value, EGCO Group's strategic plan includes the continuous investment in new projects. Such acquiring and developing projects may entail risks that may affect EGCO Group's investment target as follow:

1.1 Risk from Project Selection

EGCO Group plans to expand its investment to maintain continuous growth. Potential projects of both domestic and overseas are listed in the yearly investment plan including expansion in power generation from fossil and renewable energy. Since project selection is highly important, EGCO Group incorporates project selection process which is responsible by Business Development Units. They are assigned to analyze related factors which include economic policies, political and social policies of the targeted countries, economic situation, industry, financial cost, equipment and construction cost as well as government laws and regulations. Moreover, analysis of the changing environmental factors (Sensitivity Analysis) that affect the projects is also considered so that risk prevention and compensation are accounted in the return of investment analysis.

Furthermore, EGCO Group identifies that new investment opportunities must be reviewed and scrutinized by EGCO Management Committee, a sub-committee of the Board of Directors, as well as Investment Committee to ensure that all material risks are identified and managed before new investment opportunities are submitted to the Board of Directors for consideration.

In 2018, EGCO Group realized gain on disposal of assets (extraordinary) from 3 projects and succeeded in investment in a new project as following:

- On 14 March, 2018, EGCO Group disposed its all 18.72 percent ownership interest in Eastern Water Resources Development and Management Public Company Limited ("EASTW") to Manila Water Company Inc.
- On 15 March, 2018, EGCO Group disposed its all 50 percent ownership interest in GIDEC Company Limited ("GIDEC") to IEC Green Energy Company Limited.
- On March 20, 2018, Gen Plus B.V., a wholly-owned subsidiary of EGCO Group, disposed its all 49 percent indirect holding in Masin-AES Ptd., Ltd, (MPPCL) to SMC Global Power Holdings Corp.
- On 15 November, 2018, Gen Plus B.V., a wholly-owned subsidiary of EGCO Group, entered into a sale and purchase agreement to invest in 49 percent ownership interest in Paju Energy Service Co., Ltd. which owned and operated a combined cycle gas-fired power plant facility.

1.2 Overseas Asset Management Risk

Overseas investment creates opportunities for long-term growth of EGCO Group. Nevertheless, there are various factors that may impact the performance of such assets such as economic circumstance, political factors, business environment and local community. EGCO Group's forecasted earnings can be affected by the unfamiliar business environment in each country. In mitigating these risks, EGCO Group engages competent personnel, who have experience in such particular market, to work at overseas assets to ensure that assets are efficiently managed and earnings are met as targeted.

EGCO Group has assigned competent personnel to work at the assets such as Nam Theun 1 Power Co., Ltd. (“NT1PC”), Nam Theun 2 Power Co., Ltd. (“NTPC”), Quezon Power (Philippines) Ltd., Co. (“Quezon”), San Buenaventura Power Ltd. Co. (“SBPL”), Star Energy Geothermal (Salak - Darajat) and New Growth Plus B.V. (“NGP”). In addition, EGCO Group has hired external specialists who are familiar with the market in Australia to work at Boco Rock Wind Farm Pty Ltd. (“Boco Rock”).

2. Construction Project Management Risk

EGCO Group is well aware of the risk from delays in project construction, which could be caused by contractors, local communities’ resistance or natural disasters. The measurements to lower the likelihood and impacts of such risks include the selection of reputable EPC contractors with tight contracts, the proactive community relations activities, the secure insurance policies which cover the impact from natural disaster. EGCO Group assigns Project Management Team to closely monitor project progress to ensure that project completion is as scheduled.

In 2018, there were three projects under construction: Xayaburi Hydro Power Plant, San Buenaventura Coal-Fired Power Plant and Nam Thuen 1 Hydro Power Plant. The mentioned projects are expected to complete construction and COD as scheduled.

3. Operating Risks

3.1 The risk of obtaining lower forecasted earnings than target

Because EGCO Group has given high priority to the risk related to operating assets, to ensure that the invested assets meet the expected performance, Asset Management Unit is assigned to follow up and monitor the performance of each invested project. The accountabilities include the analysis and comparison between the actual return and the planned target. Typical measures imposed to mitigate relevant risks are as follows:

- Establish asset management policies and, where possible, delegate management and personnel to be representatives’ directors or management of subsidiaries and invested projects.
- Prepare joint venture companies’ performance analysis report to senior management and the Board of Directors consistency to take appropriate actions timely.
- Coordinate with partners for joint-audit activities in invested companies to ensure the adequacy and effectiveness of internal control system.

In 2018, EGCO Group could manage the risk to achieve return on investment according to target.

3.2 Plant Performance Risks

In meeting the PPAs’ commitment, EGCO Group’s power plants may encounter plant performance risks, caused by personnel, equipment and management approach. The significant performance risks are as summarized below:

3.2.1. Plant efficiency

PPAs stipulate various plant efficiency indicators such as heat rate and failure to meet performance requirements. Unmaintainable efficiency indicators will result in higher cost than specified contract. The cause of such risk can be the malpractice in power plant maintenance. Therefore, EGCO Group sets the

plant management policies and systems so that preventive maintenance is carried out continuously in the professional manner. Work procedures placed by plants' management also ensure that all relevant risks are under control. These procedures include as follows:

- Timely inspect and maintain by skillful staffs.
- Set up early warning systems for critical information in plant operation.
- Adequate and well reserve of spare parts.
- Implement quality management systems (ISO 9001:2015) to 14 Power plants to ensure quality operation and comply with PPA such as Khanom, GPG, GCC, KCC, SCC, GYG, NED SPP Two, SPP Three, SPP Four, SPP Five, GPS, Solarco and SEG.
- Continuously develop personnel competencies.

The implementation of such mitigation measures in the previous year resulted in the satisfactory performance of EGCO Group's power plant.

3.2.2. Raw Water Shortage

Raw water shortage can result in power plant stoppages. The risk can be caused by climate change or the delay of rainy season. Using water in operation may affect the public and environment. Consequently, EGCO Group's power plants have to assess their yearly water usage, analyze their water situation, plan for power plant water usage and reserve sufficient water quantities by having their own reservoir with adequate volume to continuously keep power plant fully operation. Moreover, 3Rs principle (Reduce, Reuse and Recycle), is implemented to the organization to maximize water usage efficiency and to reduce environment and public effects. However, there were no raw water shortage problem and public water consumption in prior year.

3.2.3. Fuel Shortage

Fuel shortage can result in plant stoppages, revenue shortfall or penalty payments. The shortage of "coal and biomass" fuel, in particular, could be caused by the increasing demand or price fluctuation.

EGCO Group's measures are implemented to prevent and mitigate such risk as follows:

- EGCO Group's coal fired power plants, BLCP and Quezon have long term coal supply agreement which is adequate for power generation. The suppliers are obliged to supply coal with the quantity and quality as specified in the agreement. In addition, each power plant has reserved coal sufficient for 30-day and 45-day continuous operation respectively.
- EGCO Group's biomass power plants using rice husks and para wood chips as fuel for power generation may face the fuel risk of both inadequate supply and volatile pricing due to uncertainty nature of agricultural product. To mitigate such risk, the power plants expand the fuel sourcing area and procure large amount in the high season at lower price. Roi-Et Green power plant using rice husks and Gulf Yala Green Power Plant consuming para wood chips also reserve the fuel sufficient for 20-day and 14-day continuous operations respectively. Besides, Roi-Et Green has supplied alternative fuels such as sawdust and cassava rhi-

zome to mix with rice husk; similarly, Gulf Yala has supplied chopped para wood roots to mix with para wood chips to reduce fuel costs and diversify the risk of fuel in electricity generation.

3.2.4. Safety, Health, Environment and Social Risk that must comply with International Standards

EGCO Group realizes that the electricity generation process could incur certain risks on the safety, health, environment of staffs and surrounding communities. Consequently, the management has taken the following actions to mitigate any potential negative impacts and reduce the likelihood of such risks:

- Follow corporate social responsibility schemes under EGCO Group's policies.
- Conform to safety, health and environment management manual which specifies guidelines for implementation, monitoring and audit.
- Strictly comply with work manuals and emergency plan, implement training and testing of plan, equipment and warning system.
- Implement Environment Management Systems (ISO 14001:2015) to 10 power plants: Khanom, GPG, BLCP, GCC, NKCC, SCC, GYG, Theppana Wind Farm, Nam Thuen 2 and SEG to continuously develop environmental management system.
- Implement Occupational Health and Safety Assessment Series (OHSAS 18001:2015) to 5 power plants: Khanom, BLCP, NED, Nam Thuen 2 and SEG to decrease and control health and safety risks associated with employees and stakeholders and to improve company reputation.
- Implement Environmental Standards of UA (EMSCOP) to Queson Power Plant in Republic of the Philippines.

As the result of constant implementation of such measures, such risks are properly managed.

3.2.5. Risk from Accident, Resistance, Sabotage and Natural Disaster

In conducting its business, EGCO Group may cope with natural disaster risks and accidents which occur from human errors or low machine efficiency. Possibly, the community resistance may occur when the production negatively affects community. Furthermore, there is sabotage risk which will cause severe loss to power plants.

The Management has set the following measures to mitigate and reduce the likelihood of those risks.

- Communicate with staffs to avoid carelessness.
- Timely maintain of all equipment.
- Strengthen relationship with surrounding communities.
- Collaborate with government agencies and local authorities.
- Deploy security plan including regular drills and security equipment such as closed circuit TV and monitoring various devices to always be in use.
- Prepare fire drills and fire evacuation every year to respond to emergency in the EGCO Group's power plants and its Head Office Building.

- Set up business Continuity Plan for Crisis Management with EGCO Head Office Building to ensure that EGCO Group's business operation is continuous and sustainable.
- Secure the insurance policy that covers all risks, property damage, machinery breakdown, business interruption, third party liability and political violence (e.g. the effects of loss from terrorism, sabotage, riot, political conflict, revolution and coup d'état) and disaster events (e.g. flood, storm, earthquake, landslide) to assure that loss from damages in the unexpected case would be properly and adequately protected, covering majority owned power plants and EGCO head office building.

4. Financial Risks

EGCO Group's investment is capital-intensive. Since the partial funding sources are loans from domestic and international financial institutions, foreign exchange rate fluctuation and interest rate fluctuation are important risks. Therefore, the mitigation measures are established as follows:

4.1 Foreign Exchange Rate Fluctuation

EGCO Group has a policy to mitigate currency mismatches for each invested project to prudent levels by matching currencies from funding source and revenue structure. During construction phase, EGCO Group applies an appropriated financial instrument, cross currency swap, to manage the loan currency to match with the development and construction costs.

4.2 Interest Rate Fluctuation

EGCO Group has interest rate fluctuations management policy which is to set the guideline of interest rate exposure mitigation by swapping floating interest rate to fixed interest rate at appropriate level when the swap market is favorable.

4.3 Cash Management from Overseas Investments

Most of EGCO Group's revenues are in US dollars resulting from the excess cash from offshore account which may affect the US dollars cash management. Nevertheless, EGCO Group attempts expansion to overseas for many projects to maximize firm value from US dollars. In addition, cash flow status is regularly forecasted on monthly basis to monitor the balance of cash inflow and outflow as well as to maintain cash in overseas accounts for new potential investments.

5. Corporate Tax Legislation Risk

EGCO Group prioritizes compliance with corporate tax legislation and tax planning to ensure that its tax management has due regard to relevant regulations. Currently, EGCO Group invests in both domestic and international businesses, while each country has different tax criteria, legislation, regulation, tax tariffs, etc. Without well prepared risk analysis and intensive study, EGCO Group may cope with risk extensive damage to its reputation and operations. Therefore, it is vital for the organization to prepare well tax planning and accurate tax payment in compliance with corporate tax legislation. For new investment, EGCO Group must carry out the equivalent analysis and calculate the potential tax liability for that investment before proceeding. Nevertheless, committees will be designated to particularly response to tax and investment legislation in those countries as well.

In addition, EGCO Group has announced tax policies and practices in company website which has been published to acknowledge its stakeholders and to serve as a guideline for EGCO Group's tax management system.

6. Compliance Risk

With operation business in both domestic and overseas, EGCO Group is regulated under related various local laws and regulations as well as international laws. Because the disputation can affect EGCO Group's operation and its corporate image, EGCO Group strictly complies with all related laws and regulations, as well as environment laws and SHE regulations. Moreover, the organization will closely monitor to new issues of governing laws and regulations.

In 2018, EGCO Group had no record of failures to comply with related laws and regulations that involved in its business. In addition, EGCO Group followed up the related new laws and regulations to acknowledge all concerned units on the issues in order to comply with the newly issued conditions and monitored through the legal database for their further compliance.

7. Human Resources Risk

EGCO Group believes that personnel are their most valuable asset and the success factor of the organization. Losing the valuable employees will lead to efficiency impairment and business continuity, not mentioning the increased cost from recruitment, training and development. More importantly, employees' knowledge and expertise in power business are crucial, thus losing competent employees is one of EGCO Group's major concerns. In order to mitigate such risk, EGCO Group introduces.

- Set up Succession Plan Program aiming to develop competent employees for succeeding the key positions including the individual development plan and job rotation.
- Set up Knowledge Sharing and Knowledge Center through the EGCO Group Net.
- Provide fair remuneration in return for employees work performance and efforts contributing to the organization success. EGCO Group compensates its employees with salary according to its salary structure as well as other fringe benefits, designed to be appropriate and competitive in the market with the consideration of employees' knowledge, competency and expertise proper to their job positions. In order to retain good and talented personnel.
- Support activities between management and employees to encourage good relationship within corporation which leads to be a happy workplace.

Such measures are to ensure that EGCO Group's personnel required knowledge and competency relate to the organization which will lead to be a sustainable growth organization.

8. Procurement Procedure Risk

Because EGCO Group determines to make sustainable operations, the providing procedures will be focused on "Suppliers" risk management to cover 3 aspects (ESG), Environment, Social and Governance. Since 2016, the "EGCO Group's Suppliers Codes of Ethics" has been prepared to encourage our suppliers to be an ethical business in many parts such as anti-corruption, social responsibilities, occupational health and safety and sustainable environmental concerns. Furthermore, EGCO Group has monitored and assessed suppliers' ESG aspects by Self-Declaration questionnaire to motive our suppliers to consistently maintain ESG standard.

In 2018, EGCO Group held a “Supplier Day” to strengthen relationship among major suppliers aimed to share any necessary information and to improve ESG potential for sustainable business operations. Certainly, EGCO Group determines to organize this activity continuously.

Emerging Risk

1. Global Economic Growth Slowdown Risk

Decreasing region economic growth forecasts in United States of America, People’s Republic of China, Europe and Emerging market, such as Thailand, Republic of Korea, People’s Republic of China, Republic of India, Malaysia, Republic of Philippines, Taiwan, Republic of Indonesia and Islamic Republic of Pakistan are caused by Tariff, U.S.-China trade war, Brexit and rising interest rate. Definitely, EGCO Group concerns about the situations and prepares the mitigations as follows:

- Assign the authorized operators to invested countries such as Republic of Philippines and Republic of Indonesia to closely monitor, report and assess the situation to prepare risk mitigation action and to alert the related parties to response with all possible risks.
- Diversify investment portfolio in many countries.
- Invest in various fuels utilization power plants and seek for new business opportunities.

2. Government Policy, Legislative Change and Compliance Risk due to Climate Change

Due to the extreme weather over the world, the 23rd United Nations Framework Convention on Climate Change held on 6 – 17 November 2018 has launched new agreement aimed to fight climate change by reducing greenhouse gas emissions. Thailand not only participated in this conference and signed the agreement which aimed to reduce greenhouse gas emissions around 20 – 25 percent by 2030 (Compared to the based year 2015) but also committed to review and participate in climate change problem solving every 5 years. Regarding to the agreement, the Government could consider relevant laws and regulations, related to greenhouse gas emissions, within 3-5 years. Also, Thailand Power Development Plan (PDP) could be revised to be aligned with the agreement. To mitigate such risk, EGCO Group not only closely monitors and analyzes the impacts but also aims to increase renewable energy portfolio to achieve 30 percent by 2026 from both domestic and overseas. In 2018, EGCO Group’s renewable energy portfolio was 20.49 percent of total electricity generating capacity which could reduce approximately 4.68 hundred thousand tons of carbon dioxide equivalent emissions per year (14 EGCO subsidiaries) and aligned with the Government policy. In addition, EGCO Group will invest in environmental-friendly technology for future investments, promote energy conservation in EGCO Group and reduce greenhouse emission indirectly by doing the business with environmental-friendly partners.

3. Emerging / Disruptive Technology Risk

According to the rapidly change in technologies such as micro grid system, renewable energy system, energy storage system and big data system, the Government aims to achieve commercial smart grid by 2021. Regarding the Thailand Smart Grid Development Master Plan 2016-2021, the Ministry of Energy is assigned to take primary accountability through 3-pillar: (1) Demand Response and Energy Management System, (2) Renewable Energy Forecast and (3) Micro Grid and Energy Storage System. This Government policy will gradually change user behaviors from consumer to be prosumer and peer to peer. Furthermore, Smart grid could reasonably be expected to influence the industries due to production cost and energy trading scheme that may impact not only the Government authorities that includes Electricity Generating Authority of Thailand, Metropolitan Electricity Authority and Provincial Electricity Authority but also Independent Power Plants. In the other hand, this transformation may provide

an opportunity to create value to the organizations also. To mitigate such risk, EGCO Group closely monitors regarding technological changes to develop new businesses by running “Innovation Team Challenge”. This contest is aimed to improve teamwork, creativity and competency of EGCO Group employees which will provide sustainable growth and business survival to the organization.

4. Operational Assets

4.1 Fixed Assets

The fixed assets of the company and subsidiaries as at December 31, 2018 comprise the following items.

Items	Value ¹ (Million Baht)
1. Land and Building	8,069.11
<u>Less</u> Accumulated Depreciation	(2,430.59)
Impairment	<u>(84.36)</u>
Total	5,554.16
2. Power Plant and Transmission System	74,424.59
<u>Less</u> Accumulated Depreciation	(21,526.49)
Impairment	<u>(2,366.47)</u>
Total	50,531.63
3. Office Equipment and Cars	654.38
<u>Less</u> Accumulated Depreciation	<u>(517.91)</u>
Total	136.47
4. Work under construction	139.10

Remark : ¹ The number was shown in EGCO Group's consolidated financial statement . EGCO Group has recorded interest in equity method from joint ventures in the financial statement. Therefore, the values of land, buildings and pledged of joint ventures were not shown in the financial statement.

Subsidiaries

Khanom Electricity Generating Co., Ltd. has mortgaged land, buildings, and pledged power plant equipment to secure its loan from financial institutions worth 311 million USD and 11,616 million Baht.

SPP 2 Co., Ltd. has mortgaged land, buildings, and pledged power plant equipment to secure its long-term loan worth 868 million Baht.

SPP 3 Co., Ltd. has mortgaged land, buildings, and pledged power plant equipment to secure its long-term loan worth 904 million Baht.

SPP 4 Co., Ltd. has mortgaged land, buildings, and pledged power plant equipment to secure its long-term loan worth 684 million Baht.

SPP 5 Co., Ltd. has mortgaged land, buildings, and pledged power plant equipment to secure its long-term loan worth 830 million Baht.

Theppana Wind Farm Co., Ltd. has mortgaged land, buildings, and pledged power plant equipment to secure its long-term loan worth 4 million USD and 275 million Baht.

Chaiyaphum Wind Farm Co., Ltd. has mortgaged land, buildings, and pledged power plant equipment to secure its long-term loan worth 30 million USD and 4,010 million Baht.

Solarco Co., Ltd. has mortgaged land, buildings, and pledged power plant equipment to secure its long-term loan worth 35 million USD and 3,960 million Baht.

Quezon Power (Philippines) Limited Co. has mortgaged company's assets to secure its long-term loans worth 365 million USD.

Boco Rock Wind Farm Pty Limited has mortgaged company's assets to secure its long-term loan worth 210 million AUD.

Joint Ventures

BLCP Power Co., Ltd. has mortgaged land, buildings, and pledged equipment to secure its long-term loan worth 558 million USD and 20,663 million Baht.

Gulf Power Generation Co., Ltd. has mortgaged land, buildings, and pledged equipment to secure its long-term loan worth 323 million USD and 17,138 million Baht.

Gulf Cogeneration Co., Ltd. has partially mortgaged their land, buildings, and power plant machinery and equipment as collateral for Working Capital Facilities.

Gulf Yala Green Co., Ltd. has mortgaged land, buildings, and pledged all power plant machinery and equipment to secure its long-term loans worth 23 million USD and 192 million Baht.

Nam Theun 1 Power Co., Ltd. has mortgaged company's assets to secure its long-term loans worth 6 million USD.

Nam Theun 2 Power Co., Ltd. has mortgaged company's assets to secure its long-term loans worth 462 million USD and 18,470 million Baht.

Natural Energy Development Co., Ltd. has mortgaged land, buildings, and pledged all power plant machinery and equipment to secure its long-term loans worth 5,213 million Baht.

G-Power Source Co., Ltd. has mortgaged land, buildings, and pledged all power plant machinery and equipment to secure its long-term loans worth 2,381 million Baht.

PT Manambang Muara Enim has mortgaged company's assets to secure its short-term loans worth 58,400 million IDR.

4.2 Intangible Assets

Right in long-term power purchase agreements, Right to use transmission facilities and Licenses for operating power plants

Right in long-term power purchase agreements, right to use transmission facilities and licenses for operating power plants from the acquisitions of subsidiaries, associate and joint ventures at the date of acquisition which EGCO Group expected to receive benefits and bonus in return. Hence, right in long-term power purchase agreements, right to use transmission facilities and licenses for operating power plants are amortized using the straight-line method over its estimated useful life. Management determines the estimated useful life within 15-25 years.

The net value of right in long-term power purchase agreements, right to use transmission facilities and licenses for operating power plants arising from the acquisitions of subsidiaries are presented in EGCO's consolidated statement of financial position as at 31 December 2018 in the amount of 4,347 million Baht. The amounts arising from the acquisitions of joint ventures and associate are included in investments in joint ventures and associate in the consolidated statement of financial position.

4.3 Investment and Management Policy in Subsidiaries, Associate and Joint Ventures

EGCO aims to grow sustainably by developing new projects and acquiring equities from power producers in Thailand and the Asia Pacific region. New projects consideration is based on return on investment, EGCO's experience and expertise to create value added, optimizing financing cost and being within acceptable project risks. Also, EGCO manages and monitors its operating assets to gain benefit as planned. EGCO has identified its key long term objectives as follows.

1. Invest in the business in which EGCO Group has expertise to maximize profit and create growth with the acceptable risks,
2. Allocate the appropriate shareholding proportion in its investment to possess the governing right over joint venture companies,
3. Uphold the investment basis of non-recourse or limited recourse project finance with clear sponsor support and contingent liability,
4. Support project's corporate social responsibility activities and strictly comply with all governing laws and regulations.

EGCO expects all of its subsidiaries, affiliated companies and joint ventures to operate their business with the following values:

- To conduct sustainable business which correspond with EGCO Group's vision, mission, code of conduct, the acceptable risk profiles and good governance.
- To implement core policies via EGCO Group's representative directors and management. Meanwhile, representative directors must seek advance concurrence from EGCO's Board of Directors upon the substantial matter of events
- To monitor the progress and performance of the subsidiaries, affiliate companies and joint ventures via the Asset Management and Group with monthly reports to the Board. Urgent matters for which the immediate action is required shall be duly reported to the Board on the first occasion.

5. Dispute

In 2018, EGCO and its subsidiaries had no litigation based on the definition of SEC as follows:

- Legal case that has negative impact on EGCO and its subsidiaries with the size larger than 5% of the shareholders' equity as at the end of the accounting year.
- Legal case that has significant impact of which the value can not be assessed.
- Legal case which is not related to EGCO's normal business.

6. General Information

EGCO Information

Name	: Electricity Generating Public Company Limited (EGCO)
Business	: Holding Company focusing on power business and other related business
Registration	: 0107537000866 (Previously Number Listed Co. 333)
Sector	: Energy and Utilities
Industry	: Resources
Registered Capital	: 5,300 million baht
Paid up capital	: 5,264.65 million baht
Par Value	: 10 baht
Foreign Limit	: 44.82%
% Free Float	: 50.01% as of September 3, 2018
Head Office	: EGCO Tower, 222 , Vibhavadi Rangsit Rd., Tungsonghong, Laksi, Bangkok 10210, Thailand.
Home Page	: www.egco.com
Tel.	: 0 2998 5000
Fax.	: 0 2955 0956-7
Board of Directors	: Email address : directors@egco.com
Audit Committee	: Email address : auditcommittee@egco.com
Corporate Secretary	: 0 2998 5020-5 Email address : cs@egco.com
Investor Relations Contact	: 0 2998 5147-8 Email address : ir@egco.com

Reference Persons

Regulator	<p>Securities and Exchange Commission, Thailand 333/3 Vibhavadi Rangsit Road, Chomphon, Chatuchak, Bangkok 10900, Thailand Tel +66 (0) 2695 9999 Fax. +66 (0) 2695 9660 E-mail: info@sec.or.th Website: www.sec.or.th</p>
Regulator	<p>The Stock Exchange of Thailand The Stock Exchange of Thailand Building, 93 Ratchadaphisek Road, Dindaeng, Bangkok 10400, Thailand Tel +66 (0) 2009 9000 Fax. +66 (0) 2009 9991 SET Call Center +66 (0) 2009 9999 E-mail: SETCallCenter@set.or.th Website: www.set.or.th</p>
Share and Debenture registrar	<p>Thailand Securities Depository Company Limited The Stock Exchange of Thailand Building, 93 Ratchadaphisek Road, Dindaeng, Bangkok 10400, Thailand Tel +66 (0) 2009 9000 Fax. +66 (0) 2009 9991 Call Center +66 (0) 2009 9999 E-mail: TSDCallCenter@set.or.th Website: www.set.or.th/tsd</p>
Auditor	<ol style="list-style-type: none"> 1. Mr. Vichien Khingmontri Certified Public Accountant (Thailand) No. 3977 2. Mr. Prasit Yuengsrikul Certified Public Accountant (Thailand) No. 4174 3. Mr. Pongthavee Ratanakoses Certified Public Accountant (Thailand) No. 7795 <p>PricewaterhouseCoopers ABAS Limited 15th Floor, Bangkok City Tower, 179/74-80 South Sathorn Road, Bangkok 10120, Thailand Tel +66 (0) +66 (0) 2844 1000 Fax. +66 (0) 2286 5050</p>

General Information

Company		Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+Indirect) (%)
Electricity Generating Public Company Limited (EGCO)						
Registration	0107537000866 (No.BorMorJor.333)	Holding Company focusing on Power business and others related to power business	5,300	10	5,264.65	-
Head Office	14 th , 15 th Floor EGCO Tower, 222, Moo 5, Vibhavadi Rangsit Road, Tungsonghong, Laksi, Bangkok 10210, Thailand Tel. +66 (0) 2998 5000 Fax +66 (0) 2955 0956-9					
Sector						
Industry	Resources					
Foreign Limit	44.81 %					
Share of Minor Shareholders (%) Free Float)	50.01 %					
Website	www.egco.com					

Subsidiaries

Company		Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+Indirect) (%)
Khanom Electricity Generating Company Limited (KEGCO)						
Office	12 th Floor, EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2955 0932	IPP Electricity Generating and supply business	8,395	10	8,395	99.99
Site Office	112 Moo 8, Tongnean District, Amphur Khanom, Nakhon Sri Thammarat 80210, Thailand Tel. +66 (0) 7552 9173, +66 (0) 7552 9179 Fax +66 (0) 7552 8358					
EGCO Engineering & Service Company Limited (ESCO)						
Office	13 th Floor, EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2955 0933	Engineering, operation and maintenance services for power plants and manufacturers	400	10	400	99.99
Site Office	35 Rayong Highway No. 3191 Huay Pong District, Amphur Muang, Rayong 21150, Thailand Tel. +66 (0) 3868 2611-4 Fax +66 (0) 3868 2823					
North Pole Investment Company Limited (North Pole)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	Holding company focusing on investment in electricity generating companies in foreign countries	49,290.55 ^{/1}	32.364 ^{/1}	49,290.55 ^{/1}	100
Overseas office	6 th Floor, Tower A, 1 CyberCity, Ebene, Republic of Mauritius		(1,523,005,389 USD)	(1 USD)	(1,523,005,389 USD)	
Dawei Electricity Generating Company Management Pte., Ltd. (DEGCOM)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	Holding company focusing on investment in electricity generating companies in Myanmar	1.94 ^{/1} (60,000 USD)		1.94 ^{/1} (60,000 USD)	
Overseas office	60 Paya Lebar Road, #08-43, Paya Lebar Square, Singapore, 409051					
New Growth Plus B.V. (NGP) (EGCO Plus is the company's 100% indirect shareholder)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	Holding company focusing on investment in electricity generating companies in foreign countries	49,939.57 ^{/1} (1,543,059,337 USD)		49,939.57 ^{/1} (1,543,059,337 USD)	100
Overseas office	Gustav Mahlerlaan 1236, 1081 LA, Amsterdam The Netherlands					

Company	Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+Indirect) (%)
New Growth B.V. (New Growth) (North Pole is the company's 100% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office Atrium Building, 8th Floor, Strawinskylaan 3127, 1077 ZX, Amsterdam The Netherlands	Holding company focusing on investment in electricity generating companies in foreign countries	1.03 ¹ (31,713 USD)		1.03 ¹ (31,713 USD)	100
Quezon Power, Inc. (QPI) (North Pole is the company's 100% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office 14th Floor Zuellig Building Makati Avnue corner Paseo de Roxas 1225 Makati City, Philippines	Holding company focusing on investment in electricity generating companies in Philippines	6.47 ¹ (200,000 USD)		6.47 ¹ (200,000 USD)	100
Quezon Power (Philippines), Limited Co. (Quezon) (North Pole is the company's 98% indirect shareholder) Overseas Office 14 th Floor Zuellinh Building Makati Avenue corner Paseo de Roxas 1225 Makati City, Philippines Site Office Barangay, Cagsiay I, Mauban, Quezon Province, 4330, Philippines	IPP Electricity Generating and supply business	6,720.10 ¹ (207,641,268 USD)		6,720.10 ¹ (207,641,268 USD)	100
Pearl Energy Philippines Operating, Inc. (PEPOI) (North Pole is the company's 100% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office Barangay, Cagsiay I, Mauban, Quezon, 4330, Philippines	Operation and Maintenance of QPL	6.47 ¹ (200,000 USD)		6.47 ¹ (200,000 USD)	100
Quezon Management Service Inc. (QMS) (North Pole is the company's 100% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office 14 th Floor Zuellinh Building Makati Avenue corner Paseo de Roxas 1225 Makati City, Philippines	Management service for Quezon Power Plant	3.23 ³ (5,260,000 PESO)		3.23 ³ (5,260,000 PESO)	100

Company	Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+Indirect) (%)
Mauban Holdings Company Inc. (Mauban) (North Pole is the company's 100% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office 14th Floor Zuellig Building Makati Avenue cor. Paseo de Roxas 1225 Makati City, Philippines	Holding company focusing on investment in electricity generating companies	193.16 ³ (315,000,100 PESO)	61.32 ³ (100 PESO)	193.16 ³ (315,000,100 PESO)	100
Evergreen Power Venture (Evergreen) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office Gustav Mahlerlaan 1212, 1081 LA, Amsterdam, The Netherlands	Holding company focusing on investment in electricity generating companies in foreign countries	0.00 ¹ (1 USD)	32.364 ¹ (1 USD)	0.00 ¹ (1 USD)	100
Millennium Energy (Millennium) (North Pole is the company's 100% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office Gustav Mahlerlaan 1212, 1081 LA, Amsterdam, The Netherlands	Holding company focusing on investment in electricity generating companies in foreign countries	0.00 ¹ (1 USD)	32.364 ¹ (1 USD)	0.00 ¹ (1 USD)	100
South Pacific Power Pty Limited (SPPP) (North Pole is the company's 100% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office One International Towers, Waterman Quay, Barangaroo, New South Wales 2000, Australia Tel. +61 2 8266 0000 Fax. +61 2 8286 3128	Holding company focusing on investment in electricity generating companies in Australia	2,503.68 ⁴ (110,366,987 AUD)	22.685 ⁴ (1 AUD)	2,503.68 ⁴ (110,366,987 AUD)	100
Boco Rock Wind Farm Pty Limited (BRWF) (North Pole is the company's 100% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office One International Towers, Waterman Quay, Barangaroo, New South Wales 2000, Australia Tel. +61 2 8266 0000 Fax. +61 2 8286 3128	Electricity Generating and supply business	1,967.88 ⁴ (86,747,980 AUD)	22.685 ⁴ (1 AUD)	1,967.88 ⁴ (86,747,980 AUD)	100

Company	Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+Indirect) (%)
Gen Plus B.V. (Gen Plus) (North Pole is the Company's 100% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office Gustav Mahlerlaan 1212, 1081 LA, Amsterdam, The Netherlands	Holding company focusing on investment in electricity generating companies in foreign countries	0.00 ¹ (1 USD)	32.364 ¹ (1 USD)	0.00 ¹ (1 USD)	100
Phoenix Power B.V. (PP) (North Pole is the Company's 100% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Overseas office Gustav Mahlerlaan 1212, 1081 LA, Amsterdam, The Netherlands	Holding company focusing on investment in electricity generating companies in foreign countries	0.00 ¹ (100 USD)	32.364 ¹ (1 USD)	0.00 ¹ (100 USD)	100
EGCO Cogeneration Company Limited (EGCO Cogen) Office 13th Floor, EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2998 5999 Site Office 222 Moo 8, Mabkha District, Amphur Nikhom Phattana, Rayong 21180, Thailand Tel. +66 (0) 3863 7051-57 Fax +66 (0) 3863 7063	Small Power Producer (SPP) Electricity and steam generating and supply business	1,060	10	1,060	80
EGCO Green Energy Company Limited (EGCO Green) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2955 0956-9	Holding company focusing on power business	175	10	175	74
Roi-Et Green Company Limited (RG) (EGCO Green is the company's 95% shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Site Office 222 Moo 10, Nua-Muang District, Amphur Muang, Roi-et 45000, Thailand Tel. +66 (0) 4351 9825-6 Fax +66 (0) 4351 9827	SPP utilizing Biomass as primary fuel	180	10	180	70.30
SPP Two Company Limited (SPP2) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999 Site Office Salangpan District, Amphur Wang Muang, Saraburi 18220, Thailand	VSPP Electricity Generating and Supply Business using Solar Power	196.7	10	196.7	99.99
SPP Three Company Limited (SPP3) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	VSPP Electricity Generating and Supply Business	197.5	10	197.5	99.99

Company		Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+Indirect) (%)
Site Office	Tha-Klor District, Amphur Benjaluck, Srisaket 33110, Thailand	using Solar Power				
SPP Four Company Limited (SPP4)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	VSPP Electricity Generating and Supply Business using Solar Power	148.7	10	148.7	99.99
Site Office	Tha-Klor District, Amphur Benjaluck, Srisaket 33110, Thailand					
SPP Five Company Limited (SPP5)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	VSPP Electricity Generating and Supply Business using Solar Power	198.4	10	198.4	99.99
Site Office	Koomueng District, Amphur Muengsuang, Roi-et, 45220, Thailand					
Theppana Wind Farm Company Limited (TWF)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	VSPP Electricity Generating and Supply Business using Wind Power	157.32	100	145.23	90
Site Office	555 Moo 1 Watabaek, Thepsathit, Chaiyaphum 36230, Thailand					
Yanhee EGCO Holding Company Limited (Yanhee EGCO)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	Holding company investing in electricity generating from Solar Power	10.01	100	10.01	49
Solarco Company Limited (Solarco) (Yanhee EGCO is the company's 100% shareholder)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	VSPP Electricity Generating and Supply Business using Solar Power	1,650	100	1,650	49
<u>Site Office</u>						
- Branch 1	317, 318 Moo 1, Bang Ta Then, Song Pee Nong Suphanburi 72110					
- Branch 2	155, 156 Moo 17, Bang Luang, Bang Lane, Nakhonpathom 73190					
- Branch 3	157, 158 Moo 17, Bang Luang, Bang Lane, Nakhonpathom 73190					
- Branch 4	94, 95 Moo 1, Hin Mool, Bang Lane, Nakhonpathom 73190					
- Branch 5	96, 97 Moo 1, Hin Mool, Bang Lane, Nakhonpathom 73190					

Company		Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+Indirect) (%)
- Branch 6	98, 99 Moo 1, Hin Mool, Bang Lane, Nakhonpathom 73190					
Chaiyaphum Wind Farm Company Limited (CWF)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	Small Power Producer (SPP) Electricity Generating and Supply Business using Wind Power	1,514	100	402.85	90
Site Office	190 moo9, Subyai, Subyai Chaiyaphum 36130, Thailand					
Klongluang Utilities Company Limited (KLU)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	Small Power Producer (SPP) Electricity and steam generating and supply business	1,000	10	257.50	99.99
Site Office	1/9 Moo 3, Klongnung, Klongluang, Pathumthani 12120, Thailand					
Banpong Utilities Company Limited (BPU)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2995 5999	SPP Electricity and steam generating and supply business	2,000	10	507.5	99.99
Site Office	19/300 Moo 19 Tha Pha, Banpong, Ratchaburi 70110, Thailand					
EGCO Plus Company Limited (EGCO Plus)						
	11th Floor, EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2998 5999	Holding company focusing on investment in electricity generating companies in foreign countries	510	10	510	100
EGCO Pearl Co., Ltd. (EGCO Plus is the company's 100% direct shareholder)						
Office	EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2998 5999	Holding company focusing on investment in electricity generating companies in Taiwan	0.16 ⁵ (150,000 TWD)	1.0545 ⁵ (10 TWD)	0.16 ⁵ (150,000 TWD)	100
Overseas office	4F No.200, Sec.1, Keelung Rd., Xinyi Dist., Taipei City110, Taiwan					

Joint Ventures

Company		Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+ Indirect) (%)
Gulf Electric Public Company Limited (GEC)						
Office	No.87, 11 th Floor, M. Thai Tower 1, All Seasons Place, 87 Wireless Road, Lumpini, Pathumwan, Bangkok 10330, Thailand Tel. +66 (0) 2654 0155 Fax +66 (0) 2654 0156-7	Holding company focusing on IPP and SPP	14,000	10	13,784.35	50
Website	http://www.gulfelectric.co.th					
Gulf Energy Company Limited (GEN) (GEC is the company's 100% shareholder)						
Office	No.87, 11 th Floor, M. Thai Tower 1, All Seasons Place, 87 Wireless Road, Lumpini, Pathumwan, Bangkok 10330, Thailand Tel. +66 (0) 2654 0155 Fax +66 (0) 2654 0156-7	Holding company focusing on IPP and SPP	9,782	10	9,782	50
Gulf IPP Company Limited (GIPP) (GEC is the company's 100% shareholder)						
Office	No.87, 11 th Floor, M. Thai Tower 1, All Seasons Place, 87 Wireless Road, Lumpini, Pathumwan, Bangkok 10330, Thailand Tel. +66 (0) 2654 0155 Fax +66 (0) 2654 0156-7	Holding company focusing on IPP	9,779	10	9,779	50
Gulf Power Generation Company Limited (GPG) (GEC is the company's 100% shareholder)						
Site office	64 Moo 2 Ban Pa, Kaeng Khoi, Saraburi 18110, Thailand Tel. +66 (0) 3624 8305 Fax. +66 (0) 3624 8314, +66 (0) 3625 1344	Independent Power Producer (IPP) Electricity Generating and supply business	9,607	10	9,607	50
Gulf Cogeneration Company Limited (GCC) (GEC is the company's 100% shareholder)						
Site office	79 Moo 3, Tandeow, Kaeng Khoi, Saraburi 18110, Thailand Tel. +66 (0) 3624 6531 Fax +66 (0) 3624 8020	SPP Electricity and steam generating and supply business	850	10	850	50
Nong Khae Cogeneration Company Limited (NKCC) (GEC is the company's 100% shareholder)						
Site office	111/11 Moo 7 Nongplamor, Nong Khae, Saraburi 18140, Thailand Tel. +66 (0) 3637 3676 Fax +66 (0) 3637 3691	SPP Electricity and steam generating and supply business	1,241.72	74	1,241.72	50

Company	Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+ Indirect) (%)
Samutprakarn Cogeneration Company Limited (SCC) (GEC is the company's 100% shareholder) Office 745 Moo 2 Bang Pu Mai, Amphur Muang, Samutprakarn 10280, Thailand Tel. +66 (0) 2709 0751 Fax +66 (0) 2709 1842	SPP Electricity and steam generating and supply business	981.54	76	981.54	50
Gulf Yala Green Company Limited (GYG) (GEC is the company's 100% shareholder) Site 80 Moo 1, Pron, Office Amphur Muang, Yala 95160, Thailand Tel. +66 (0) 7325 2721 Fax +66 (0) 7325 2722	SPP Electricity Generating and supply business	460	10	460	50
BLCP Power Limited (BLCP) Office No. 9, I-8 Road, Map Ta Phut Industrial Estate, Amphur Map Ta Phut, Rayong 21150, Thailand Tel. +66 (0) 3892 5100, Fax. +66 (0) 3892 5199	IPP Electricity Generating and supply business	12,010	100	12,010	50
Nam Theun 2 Power Company Limited (NTPC) Office Unit 9, Tat Luang Road Nongbone Village, P.O. Box 5862 Vientiane, Lao PDR Tel. (856-21) 263 900 Fax. (856-21) 263 901	IPP Electricity Generating and supply business	14,563.8 ^{/1} 450,000,000 USD)	3,236.4 ^{/1} 100 USD)	12,087.95 ^{/1} 373,500,000U SD)	35
Natural Energy Development Company Limited (NED) Office 188 Moo 3, Wang Ploeng, Khok Samrong, Lopburi 15120, Thailand Site 188 Moo 3, Wang Ploeng, Office Khok Samrong, Lopburi 15120, Thailand Tel. +66 (0) 3641 8400 Fax +66 (0) 3641 8401	SPP Electricity Generating and Supply Business using Solar Power	2,304	10	2,283	66.67
G-Power Source Company Limited (GPS) Office 1046 Nakornchaisri Rd., Nakornchaisri, Dusit, Bangkok 10300 Thailand Tel +66 (0) 29985000 Fax +66 (0) 29985999 <u>Site Office</u> -Branch 1 11/1,111,111/1 Moo 11 Dong Khon, Sankhaburi, Chai Nat 17140 -Branch 2 11/1, 11/11 Moo 5 Ta Khit, Banphot Phisai, Nakhon Sawan 60180	VSPP Electricity Generating and Supply Business using Solar Power	930	100	930	60

Company	Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+ Indirect) (%)
-Branch 3 - 11,11/1 Moo 2 Tambon Ta Sang, Banphot Phisai, Nakhon Sawan 60180					
-Branch 4 311,311/1 Moo 2 Tambon Sap Samo Thot, Amphoe Bueng Sam Phan, Phetchabun 67160					
PT Manambang Maura Enim (MME) (North Pole is the company's 40% indirect shareholder) Head Office Puri Matari 2, 1 st Floor JL.HR. Rasuna Said Kav. H1-2, South Jakarta 10210, Indonesia Site Office Lawang Kidul and Tanjung Enim, Muara Enim City, Sumatera Selatan (South Sumatra) Province, Indonesia	COAL MINING industry, covering coal mining, coal concession development, coal trading and shipping.	1,640.93 ² 750,000,000 (Thousand Rupiah)	2,187.9 ² 1,000 (Thousand Rupiah)	410.23 ² 187,500,000 (Thousand Rupiah)	40
Kalilayan Power Holding Inc. (Kalilayan) (North Pole is the company's 49% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2998 5999 Overseas office 62 H. Dela Costa Street, Barangay Daungan Mauban, Quezon Province, Philippines	Holding company investing in San Buenaventura Power Ltd	5.52 ³ (9,000,000 PESO)		5.52 ³ (9,000,000 PESO)	49
San Buenaventura Power Ltd (SBPL) (North Pole is the company's 49% indirect shareholder) Office EGCO Tower Tel. +66 (0) 2998 5000 Fax +66 (0) 2998 5999 Overseas Office 62 H. Dela Costa Street, Barangay Daungan Mauban, Quezon Province, Philippines	Electricity Generating and supply business	1,728.28 ³ (2,818,453,000 PESO)		1,728.28 ³ (2,818,453,000 PESO)	49
PT Tenaga Listrik Cilegon (TLC) Overseas Office Wisma Barito Pacific Tower B, 5th Floor, Jl. Let. Jend. S. Parman Kav. 62-63, Jakarta 11410, Indonesia	Development of Coal Power Plant in Indonesia	80.91 ¹ (2,500,000 USD)	323.64 ¹ (10 USD)	80.91 ¹ (2,500,000 USD)	49
Nam Theun 1 Power Company Limited (NT1PC) Overseas Office Unit 15, Sithong Road, Pak Thang Village, Sikhottabong District, P.O. BOX 1808, Vientiane, Lao PDR Tel. +856 (0)21 550497 Fax +856 21 550 498	IPP Electricity Generating and supply business using Hydro power	10,863.99 ¹ (335,681,267 USD)	40.46 ¹ (1.25 USD)	10,863.99 ¹ (335,681,267 USD)	25

Associate

Company	Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+Indirect) (%)
Star Energy Geothermal Pte Ltd (SEG) (North Pole is the company's 20% indirect shareholder) Office 9 Battery Road, #15-01, Straits Trading Building, 049910 Singapore	Holding company focusing in geothermal power plants in Indonesia	3,404.50 ¹ (104,436,650 USD)		3,404.50 ¹ (104,436,650 USD)	20
Star Energy Geothermal (Salak - Darajat) B.V. (SEGSD) (EGCO Plus is the company's 20.07% indirect shareholder) Office Atrium Building, 8th Floor, Strawinskylaan 3127, 1077 ZX, Amsterdam The Netherlands	Holding company focusing on investment in geothermal power plants in Indonesia	0.33 ¹ (10,000 USD)		0.33 ¹ (10,000 USD)	20.07

Others

Company	Business	Registered Share Capital (Million Baht)	Par Value (Baht)	Paid-up Share Capital (Million Baht)	Ownership Interest (Direct+Indirect) (%)
Xayaburi Power Company Limited (XPCL) Office 215 Lanexang Avenue, Ban Siang Yuen Chantaburi District, Vientiane, Lao PDR Tel. (856-21) 223 215, 252 060 Fax (856-21) 215 500	Feasibility study on Hydroelectric project in Lao PDR	26,861	10	25,577.07	12.5

Note : The Exchange rate as at December 28, 2018

¹	1 USD	= Baht	32.364
²	1,000 Rupiah	= Baht	2.1879
³	1 PESO	= Baht	0.6132
⁴	1 AUD	= Baht	25.685
⁵	1 TWD	= Baht	1.0545