

– Translation –

Gulf Energy Development Public Company Limited
Management Discussion and Analysis of the Company's Performance
For the Year Ended December 31, 2019



The Management Discussion and Analysis of the Company's Performance (the "MD&A") is intended to present and analyze the Company's results of operations and financial position at the end of the accounting period. Such information may change in the future. The MD&A is primarily prepared in Thai. In cases where the content in the translation contains any conflict or is interpreted differently from the Thai version, the Thai version shall prevail.

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Definition

Company	Gulf Energy Development Public Company Limited
Group	The Company, its subsidiaries, its associates and its joint ventures
7SPPs	7 SPPs under GJP consisting of GKP1, GKP2, GTLC, GCRN, GNNK, GNLL and GNK2
12SPPs	12 SPPs under GMP consisting of GVTP, GTS1, GTS2, GTS3, GTS4, GNC, GBL, GBP, GNLL2, GNPM, GNRV1 and GNRV2
EGAT	The Electricity Generating Authority of Thailand
EPC	Engineering, procurement and construction
EVN	Electricity Vietnam Corporation
GBL	Gulf BL Co., Ltd., a power project operator under the subsidiary of GMP
GBP	Gulf BP Co., Ltd., a power project operator under the subsidiary of GMP
GEC Group	Gulf Electric Public Company Limited and its subsidiaries, its associates and its joint ventures
GJP	Gulf JP Company Limited, an associate in which the Company has a 40.0% equity interest
GMP	Gulf MP Company Limited, a subsidiary in which the Company has a 70.0% equity interest
GNC	Gulf NC Co., Ltd., a power project operator under the subsidiary GMP
GNLL	Gulf NLL Co., Ltd., a power project operator under the subsidiary GJP
GNLL2	Gulf NLL2 Co., Ltd., a power project operator under the subsidiary GMP
GNS	Gulf JP NS Co., Ltd., a power project operator under the associate GJP
GPD	Gulf PD Co., Ltd., a power project operator under the subsidiary of IPD
GSRC	Gulf SRC Co., Ltd., a power project operator under the subsidiary of IPD
GTS1	Gulf TS1 Co., Ltd., a power project operator under the subsidiary GMP
GTS2	Gulf TS2 Co., Ltd., a power project operator under the subsidiary GMP
GTS3	Gulf TS3 Co., Ltd., a power project operator under the subsidiary GMP
GTS4	Gulf TS4 Co., Ltd., a power project operator under the subsidiary GMP
Gulf WHA MT	Gulf WHA MT Natural Gas Distribution Company Limited, a joint venture in which the Company has a 35.0% equity interest
GUT	Gulf JP UT Co., Ltd., a power project operator under the associate GJP
GVTP	Gulf VTP Co., Ltd., a power project operator under the subsidiary GMP
HITEC	Thai Industrial Estate Corp., Ltd.
IPD	Independent Power Development Company Limited, a subsidiary in which the Company has a 70.0% equity interest
IPP	Independent Power Producer in which capacity sold to EGAT is more than 90 megawatts
Mekong	Mekong Wind Power Joint Stock Company
Mitsui	Mitsui & Co., Ltd.
PEA	The Provincial Electricity Authority
SPP	Small Power Producer in which capacity sold to EGAT is more than 10 megawatts but not more than 90 megawatts
TFRIC 4	Revenue recognition standard applied for the IPPs to record revenue from availability payment as income from financial lease
TTCIZ-01	TTC Green Energy Investment Joint Stock Company
TTCIZ-02	TTC Energy Development Investment Joint Stock Company
WHA	WHA Energy Co., Ltd.

1. Executive Summary

1.1 Key events in 2019

Thailand

12 SPPs under GMP Group

9th to 12th SPP out of 12 SPP projects under GMP began commercial operation

In 2019, the last 4 SPP projects under GMP, namely GNLL2, GNPM, GNRV1 and GNRV2, with a total installed power generation capacity of 518.6 megawatts and total installed steam generation capacity of 55.0 tons per hour, gradually began commercial operation as scheduled. Each project has signed a 25-year PPA with EGAT to supply 90.0 megawatts of electricity and has entered into long-term agreements to supply the remaining electricity and steam to industrial users.

The Company holds 70.0% shares in GMP to invest in 12 SPP projects with a total installed power generation capacity of 1,563.4 megawatts and a total installed steam generation capacity of 225.0 tons per hour. (Equity installed power and steam generation capacity of 911.5 megawatts and 129.4 tons per hour, respectively). The 12 power projects are scheduled to begin commercial operation between 2017 and 2019 (4 power projects per year) per the details below.

Projects under GMP	Installed capacity		Equity installed capacity		Commerical operation year
	Electricity	Steam	Electricity	Steam	
	(Megawatts)	(Tons/hour)	(Megawatts)	(Tons/hour)	
Projects 1-4	534.9	105.0	280.8	55.1	2017
Projects 5-8	510.0	65.0	289.9	37.6	2018
Projects 9-12	518.6	55.0	340.8	36.7	2019
Total	1,563.4	225.0	911.5	129.4	

All 12 SPP projects under the GMP group have already commenced operation as of July 2019. The Group was able to complete construction of all 12SPPs by the scheduled commercial operation dates between 2017 to 2019 and within the budget for all projects.

Power distribution system and district cooling system for One Bangkok Project

The establishment of Bangkok Smart Energy Company Limited

On April 24, 2019, the Company's Board of Directors' Meeting resolved to approve the establishment of Bangkok Smart Energy Company Limited ("BSE") as a holding company investing in the power distribution system and district cooling system for One Bangkok Project which is a mixed used estate located in Central Bangkok with total area of 104 rais. On July 2, 2019, the Company entered into a Shareholders' Agreement with two investment partners, namely Mitsui & Co., Ltd. and Tokyo Gas Engineering Solutions Corporation, and as of July 10, 2019, each party holds 33.33% in BSE.

Moreover, in January 2020, BSE entered into the following agreements:

- 1) BSE entered into a Shareholders' Agreement with One Power Services Company Limited, a subsidiary of One Bangkok Company Limited, to operate the power distribution system for One Bangkok Project through Bangkok Smart Power Company Limited ("BSP"). BSE and One Power Services Company Limited have shareholding in BSP of 40.0% and 60.0%, respectively.

Moreover, on the same day, BSE also entered into a Shareholders' Agreement with One DCS Services Company Limited, a subsidiary of One Bangkok Company Limited, to operate the district cooling system for One Bangkok Project through Bangkok Smart DCS Company Limited ("BSD"). BSE and One DCS Services Company Limited have shareholding in BSD of 49.0% and 51.0%, respectively.

- 2) BSP and BSD entered into Utility Development Agreements with One Bangkok Company Limited to sell electricity with installed capacity of approximately 240 megawatts and chilled water with installed capacity of approximately 36,000 refrigeration tons to One Bangkok Project for 30 years, with project cost of approximately THB 3,570 million.

Natural Gas Distribution Project

Commercial operation of natural gas distribution project NGD4

WHA Eastern Seaboard NGD4 Company Limited ("NGD4"), a joint venture in which the Company indirectly holds 35.0% equity stake through Gulf WHA MT Natural Gas Distribution Company Limited ("Gulf WHA MT") and which operates a natural gas distribution project serving industrial users in the WHA Eastern Seaboard Industrial Estate 4, Pluak Daeng district, Rayong province, commenced commercial operation on June 11, 2019. The NGD4 project has a project cost of approximately THB 234 million and an installed capacity of 2,000,000 mmbtu/year. It entered into a gas sales agreement with PTT Public Company Limited and gas sales agreements with industrial users for a term of 10 years, with the option to renew every 10 years.

On the other hand, NGD2 which is the Company's first natural gas distribution project, has commenced commercial operation on December 1, 2018.

Map Ta Phut Industrial Port Development Phase 3 Project

Execution of the Public Private Partnership ("PPP") Contract for the Map Ta Phut Industrial Port Development Phase 3 Project

On October 1, 2019, Gulf MTP LNG Terminal Company Limited ("Gulf MTP"), a subsidiary in which the Company holds 70.0% shares, entered into a PPP contract with the Industrial Estate Authority of Thailand ("IEAT") for the Map Ta Phut Phase 3 Project with contract terms of 30 years. The total project cost is approximately THB 40,900 million, comprised of:

- 1) design and construction of the infrastructure, including dredging and land reclamation of approximately 1,000 rais with investment cost of approximately THB 12,900 million. The construction period of infrastructure will not exceed 3 years (or to be completed within 2023) and the private entity will receive fixed annual payments from IEAT for a period of 30 years, and
- 2) the right to construct the port and LNG terminal (superstructure) on approximately 200 rais of the reclaimed land to facilitate shipment of LNG volume of not less than 5 million tons per annum and up to 10.8 million tons per annum at a later stage. The LNG terminal phase 1 has an investment cost not exceeding THB 28,000 million which is expected to be completed by approximately 2025. The private entity will receive LNG terminal fee from off-takers.

Laem Chabang Port Development Phase 3 Project

Bid submission for the Laem Chabang Port Development Phase 3 Project

On March 29, 2019, the Company jointly submitted the bidding documents for the Laem Chabang Port Development Phase 3 Project with PPP Tank Terminal Company Limited and China Harbour Engineering Company Limited ("GPC Consortium") for the design, construction, and operation and maintenance of 2 container berths (F1 and F2 terminals) with capacity of approximately 4 million TEU (Twenty-foot equivalent unit) per year, with shareholding of 40.0%, 30.0% and 30.0%, respectively. GPC Consortium has passed the general requirements, technical and investment proposal, and is currently under benefit compensation consideration before entering into negotiation in the next stage.

Bang Pa-In – Nakhon Ratchasima (M6) and Bang Yai – Kanchanaburi (M81) Intercity Motorway Projects

Bid submission for the Bang Pa-In – Nakhon Ratchasima (M6) and Bang Yai – Kanchanaburi (M81) Intercity Motorway Projects

On June 27, 2019, the Company, together with BTS Group Holdings Public Company Limited, Sino-Thai Engineering and Construction Public Company Limited and RATCH Group Public Company Limited ("BGSR JV"), with shareholding of 40.0%, 40.0%, 10.0% and 10.0%, respectively, submitted the bidding documents for the joint investment in the operation and maintenance of the Bang Pa-In – Nakhon Ratchasima (M6) and Bang Yai – Kanchanaburi (M81) Intercity Motorway Projects. On August 19, 2019, the Department of Highways announced that BGSR JV was determined as the winning bidder.

Vietnam

Commercial operation and increase in the proportion of shares in TTCIZ-01 and TTCIZ-02 Solar Power Projects in Vietnam

TTCIZ-01 and TTCIZ-02 Solar Power Projects, a joint venture in which the Company indirectly holds 49.0% equity stake through Gulf International Holding Pte, Ltd. ("GIH"), with installed power generation capacity of 68.8 megawatts and 50.0 megawatts, respectively, began supplying power to Électricité du Vietnam ("Vietnam Electricity" or "EVN") in March and April 2019, respectively. The projects have 20-year PPAs with EVN under agreed tariff of US 9.35 cents/kWh. Both projects performed better than expected as the solar panel efficiency exceeded the performance guarantee and target.

Additionally, as the Company foresees the potential of the TTCIZ-01 and TTCIZ-02 Solar Power Projects, GIH, which is a subsidiary of the Company, entered into a Share Purchase Agreement and Shareholders' Agreement with Thanh Thanh Cong Group ("TTC Group") to increase its proportion of shares in TTCIZ-02 and TTCIZ-01 from 49.0% to 90.0%. The share transfer was completed in January and November 2019, respectively.

Increment in the proportion of shares in the Mekong Project in Vietnam

The Company foresees the rapid growth of electricity demand in Vietnam and has determined that the Mekong Project, operated by Mekong Wind Power Joint Stock Company, has the potential to support Vietnam's electricity demand in the future. As a result, on April 25, 2019, GIH entered into a Share Purchase Agreement and Shareholders' Agreement with Ms. Huynh Bich Ngoc to increase its proportion of shares in the Mekong Project from 49.0% to 95.0%. The share transfer was completed in June 2019.

The Mekong Project is located in Binh Dai district, Ben Tre province, Vietnam with an aggregate installed capacity of approximately 340 megawatts, comprising of an offshore wind farm project (310 megawatts) and a solar farm project (30 megawatts). The project cost is approximately USD 650 million and the project

will generate and sell electricity to EVN for a term of 20 years. The projects are expected to gradually commence commercial operation between 2020 and 2021.

The Company's current shareholding in renewable projects in Vietnam is summarized as follows:

Power project	Type of Project	Installed Capacity (Megawatts)	Province	Equity Stake (%)		Commercial operation date
				Old	New	
TTCIZ-01	Solar farm	68.8	Tay Ninh	49.0	90.0	March 6, 2019
TTCIZ-02	Solar farm	50.0	Tay Ninh	49.0	90.0	April 19, 2019
Mekong	Solar farm	30.0	Ben Tre	49.0	95.0	[2020-2021]
	Wind farm	310.0				
Total		458.8				

Mekong Wind Power Project entered into the power purchase agreement with EVN for Offshore Wind Power Project Phase 1 with installed power generation capacity of 30 megawatts, and entered into EPC contract and Long Term Program Service Agreement of the offshore wind farm project

In July 2019, Mekong Wind Power Joint Stock Company (in which the Company indirectly holds 95.0% shares), which operates the Mekong Offshore Wind Power Project with total installed power generation capacity of 310 megawatts, entered into the 20-year power purchase agreement with EVN for Offshore Wind Power Project Phase 1 with installed power generation capacity of 30 megawatts, under agreed terms of a USD-equivalent tariff of approximately US 9.80 cent/kWh.

Furthermore, in November 2019, Mekong Wind Power Joint Stock Company also entered into the Long Term Program Service Agreement (LTP Agreement) with Siemens Gamesa Renewable Energy LLC for a period of 10 years with the option to extend the agreement to 20 years, and the Engineering, Procurement and Construction Contract (EPC Contract) with PowerChina HDEC- INTL Consortium. The scope of work for EPC Contract involves design, engineering, procurement, construction and commissioning of the wind power plant for a total installed power generation capacity of 310 megawatts.

The Mekong offshore wind farm project is divided into 8 phases, with each phase to commence construction once the power purchase agreement has been signed with EVN. Phase 1 is scheduled to commence commercial operation within 2020, while phase 2 – 8 with total installed power generation capacity of 280 megawatts is scheduled to commence commercial operation within 2021.

Execution of the Cooperation Agreement to develop gas-fired power project and LNG terminal in Ninh Thuan province, Vietnam

On November 2, 2019, the Company entered into the Cooperation Agreement with the Ninh Thuan Provincial People's Committee for the development of a gas-fired power project with installed power generation capacity of up to 6,000 megawatts along with an LNG terminal with capacity of 6 million tons per annum to be located in Ca Na sub-district, Thuan Nam district, Ninh Thuan province in the Southeastern region of Vietnam. Under the Cooperation Agreement, both parties agree to extend their cooperation to the exchange of studies, expertise, and know-how in the field of gas-fired power plants and LNG terminal, financing capacities and any related matter, for the development of the Integrated LNG-to-power project up to the maximum capacity of the Project which approved to be located in Ca Na by the

government. Furthermore, both parties agree to accelerate the Project to be completed in order to meet the electricity demand in accordance with Vietnam's Power Development Plan.

Others

The issuances and offerings of debentures not exceeding THB 10,000 million

With reference to the Company's Extraordinary General Meeting of Shareholders dated on November 27, 2018 approving the Company to issue and offer debentures valued not more than THB 10,000 million in order to repurchase the existing debenture and fund the Company and its subsidiaries' investment plans, the Company appointed Bangkok Bank Public Company Limited, Kasikornbank Public Company Limited and the Siam Commercial Bank Public Company Limited as Joint Lead Underwriters and Standard Chartered Bank (Thai) Public Company Limited as Co-underwriter. The Company was assigned the company rating 'A' and the debentures were assigned rating 'A-' by TRIS Rating Company Limited. The Company offered the debentures valued THB 7,500 million to institutional investors and high net worth investors on January 23-24, 2019 and successfully allocated the debentures on January 25, 2019. A considerable number of institutional and high net worth investors expressed interest in the debentures and indicated their intention to subscribe in the offerings, resulting in an oversubscription approximately four times. The debentures are allotted in series of 4 tranches with term of 3, 5, 7 and 10 years. Average interest rate is 3.3% per annum and average debenture term is 5.7 years.


Annual dividend payment for the Company's operation in 2018 of THB 1.20 per share

The Annual General Meeting of Shareholders dated April 24, 2019 passed a resolution for the dividend payment in respect of the results of operation of the Company for the year ended December 31, 2018 at THB 1.20 per share out of the net profit and retained earnings for the total amount of THB 2,559,960,000 or equivalent to 78.9% of the net profit based on the separate financial statements of the Company. The dividend shall be paid to entitled shareholders whose names appear on the name list of shareholders as of the Record Date of May 3, 2019, and the dividend was paid on May 21, 2019.

Financial close of Gulf PD Company Limited

In November 2019, Gulf PD Company Limited ("GPD"), a subsidiary in which the Company indirectly holds 70.0% shares through Independent Power Development Company Limited ("IPD") and the operator of Gulf Pluak Daeng power project ("GPD power project"), an Independent Power Producer (IPP) with an installed power generation capacity of 2,650 megawatts with an approximate project value of THB 50,000 million, has entered into financing agreements to obtain long-term loan facilities in the amount of approximately THB 41,000 million for a term of 23 years, in which 50% is denominated in Thai Baht and 50% is denominated in the U.S. dollar, with a group of both onshore and offshore financial institutions, totaling 16 lenders. Furthermore, GPD power project entered into interest rate swap to convert floating interest rate to fixed interest rate during the low interest rate environment, which resulted in GPD power project having lower interest rate compared to GSRC power project, which entered into financing agreement and commenced construction at the end of 2018.

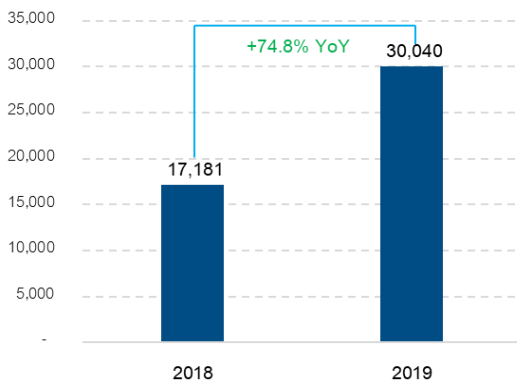
1.2 Progress of projects under construction and development

	<ul style="list-style-type: none"> • The GCG biomass SPP, located in Chana district, Songkhla province with an installed power generation capacity of 25.0 megawatts, began construction as scheduled, with progress at approximately 95.1% at the end of December 2019. The project is expected to begin commercial operation in March 2020 as scheduled.
	<ul style="list-style-type: none"> • The 2,650-megawatt gas-fired IPP power project, GSRC, began construction on December 3, 2018, with progress at approximately 52.2% as of the end of December 2019. The project has a scheduled commercial operation date between 2021 and 2022.
	<ul style="list-style-type: none"> • The 2,650-megawatt gas-fired IPP power project, GPD, has entered into financing agreements to obtain long-term loan facilities with lenders consisting of both Thai and overseas lenders including Japan Bank for International Corporation (JBIC) and Asian Development Bank (ADB) for a term of 23 years in November 2019, to support the project's cost of approximately THB 50,000 million. The project has a scheduled commercial operation date between 2023 and 2024.
	<ul style="list-style-type: none"> • The gas-fired Duqm Independent Power and Water Project (DIPWP), located in Oman with an installed power generation capacity of 326 megawatts, began construction in August 2018 with progress at approximately 52.2% as of the end of December 2019.
	<ul style="list-style-type: none"> • The Mekong Wind Power Project with an installed power generation capacity of up to 310 megawatts, located in Vietnam, is divided into eight construction phases with scheduled commercial operation dates ("SCOD") as follows: <ul style="list-style-type: none"> • Phase 1: 30 megawatts approx. SCOD in end 2020 • Phases 2-3: 98 megawatts approx. SCOD in mid 2021 • Phases 4-8: 182 megawatts approx. SCOD in end 2021 <p>Phase 1 has already signed the PPA with EVN on July 17, 2019, has started constructing the transmission lines and substations since July 2019, and the power plant is currently under the engineering design process. The other phases of the project are in the process of applying for various permits as planned.</p>

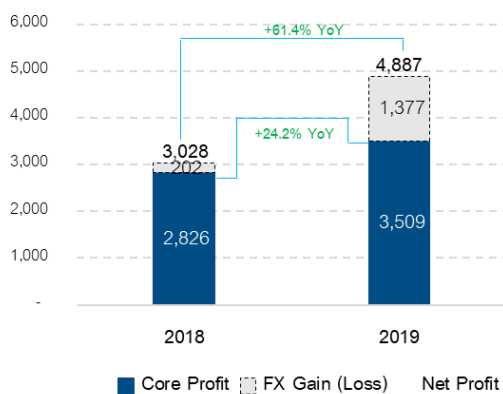
1.3 Summary of performance for 2019

Key financial information	2018	2019	Change
	THB million	THB million	% YoY
Revenue from sales and management fee	17,181.1	30,039.7	74.8%
Share of profit from an associate and joint ventures	2,615.5	3,205.4	22.6%
Profit attributable to owners of the parent	3,028.1	4,886.6	61.4%
Less: gain (loss) on exchange rate attributable to owners of the parent	201.7	1,377.2	582.9%
Profit attributable to owners of the parent before gain (loss) on exchange rate (Core profit)	2,826.5	3,509.4	24.2%
Share of profit (loss) from an associate – GJP exclude gain (loss) on exchange rate	2,508.9	2,356.6	-6.1%
Basic earnings per share (THB)	1.42	2.29	61.3%

Revenue from sales and management fee (THB mn)



Core Profit/ Profit attributable to owners of the parent (THB mn)



- **Revenue from sales and management fee increased 74.8% YoY from THB 17,181 million to THB 30,040 million** from the revenue recognition of 12SPPs under GMP group and 2 Solar Power Projects in Vietnam, compared to 8 SPPs in 2018.
- **Core profit increased 24.2% YoY from THB 2,826 million to THB 3,509 million** from:
 - Profit recognition from 12SPPs under GMP group and TTCIZ-01 and TTCIZ-02 Solar Power Projects which have commenced commercial operation in entirety in 2019.
 - Electricity sold to EGAT and industrial users by the 12SPPs in this year were significantly higher than the previous year, both from the existing customer base and new customers of the 4 SPPs which commenced commercial operation during the year.
 - Increase in profit from GMP group in 2019 was able to offset the decrease in profit from GJP group, from the lower availability payment rate (APR) according to the PPA of 2 IPPs, namely GNS and GUT, and from the major overhaul for 6 power projects of the 7 SPPs during the second half of 2019, as well as offset the loss from other projects under development.
- **Net profit increased by 61.4% YoY from THB 3,028 million to THB 4,887 million** due to the recognition of unrealized gain on exchange rate which increased from the appreciation of the Thai Baht by 2.2835 THB/USD compared to the previous year. The recording of such profit is an accounting transaction which has no impact on the cash flow and performance of the Group at all.

1.3.1 Revenue from sales and services

- **Revenue from sales and services increased by 74.8% YoY** from THB 17,181.1 million in 2018 to **THB 30,039.7 million in 2019** from the revenue recognition of all 12 SPPs under GMP group which gradually commenced commercial operation between 2017 – 2019, combined with the revenue recorded from Solar Power Projects TTCIZ-01 (capacity of 68.8 megawatts) and TTCIZ-02 (capacity of 50.0 megawatts) in Vietnam which commenced commercial operation on March 6, 2019 and April 19, 2019, respectively, while in 2018 there were only revenue realized from the 8 power projects of 12 SPPs.

1.3.2 Share of profit from the associate GJP before gain (loss) on exchange rate

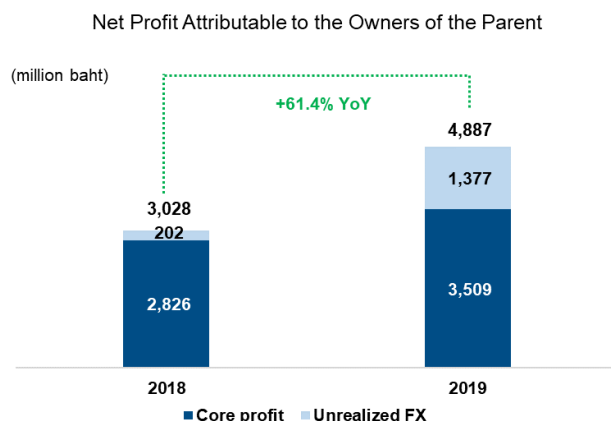
- **Share of profit from the associate GJP before gain (loss) on exchange rate decreased 6.1% YoY** from THB 2,508.9 million in 2018 to **THB 2,356.6 million 2019** primarily due to the major overhaul of the 6 power projects under the 7SPPs, namely GKP1, GKP2, GTLC, GNNK, GNLL and GNK2 during the second half of 2019. Moreover, availability payment rate of the 2IPPs, namely GNS and GUT, declined from 2018 according to the PPA, although the 2 IPPs were able to sell 91.5% more electricity to EGAT, and recorded a better heat rate.

1.3.3 Core profit

- **Core profit increased 24.2% YoY** from THB 2,826.5 million in 2018 to **THB 3,509.4 million** in 2019 from:
 - 1) Profit from GMP group which increased 75.8% YoY from the operation of 12 SPPs under GMP group, compared to 8 SPPs in 2018. The 12 SPPs on average recorded a superior performance from the higher electricity sold to industrial users, from both existing customer base and new customers, despite the higher natural gas cost from 258.0 THB/mmbtu in 2018 to 272.9 THB/mmbtu in 2019 while Ft rate only adjusted slightly upward by THB 0.43 from (0.1590) THB/kWh in 2018 to (0.1160) THB/kWh in 2019.
 - 2) Realized profit from 2 Solar Power Projects in Vietnam in 2019, while both projects were still under construction in the previous year.
 - 3) Share of profit from GJP group which decreased by 6.1% YoY as discussed in Section 1.3.2.

In summary, the significant profit increment from GMP group in 2019 was able to offset the softened profit from GJP group as well as the loss from expenses recorded of other projects under development such as GSRC or GCG in entirety.

1.3.4 Net profit attributable to the owners of the parent



FX Rate at End of Period (THB / USD)	
2017	32.8472
2018	32.6148
2019	30.3313

Net profit attributable to the owners of the parent increased 61.4% YoY from THB 3,028.1 million in 2018 to **THB 4,886.6 million** in 2019 partly due to the recognition of unrealized gain (loss) on exchange rate resulting from the translation of USD-denominated loans to Thai Baht using the exchange rate at the end of the period compared to that of the previous period. In 2019, the Group recognized unrealized profit of **THB 1,377.2 million**, compared to THB 201.7 million in 2018 from the slight appreciation of the Thai Baht by 0.23 THB/USD in 2018, while in 2019, Thai Baht appreciated by 2.28 THB/USD (from 32.61 THB/USD at the end of 2018 to **30.33 THB/USD** at the end of 2019).

1.3.5 The Company's financial position

- **Total assets as of December 31, 2019 was THB 134,277.5 million, an increase of THB 10,608.9 million or 8.6%** from December 31, 2018. The increase was mainly from the increase in power plants value of the SPPs under GMP group and power plant projects in Vietnam, as well as an increase in value of power plant construction of GSRC and GCG.
- **Total liabilities as of December 31, 2019 was THB 85,237.6 million, an increase of THB 6,357.2 million or 8.1%** from December 31, 2018. The increase was mainly attributable to increase in long-term loan drawdowns for the construction of GSRC and the aforementioned power projects, including the increase in debentures of approximately THB 1,500 million from the issuances and offerings of debentures of THB 7,500 million in Q1'19 to repurchase the existing debentures of THB 6,000 million, and the liabilities of the TTCIZ-01 project which was consolidated in 2019.
- **Total equity as of December 31, 2019 was THB 49,039.9 million, an increase of THB 4,251.7 million baht or 9.5%** from December 31, 2018 mainly from the increase in net profit for the period and from the increase in paid-up capital from non-controlling interests.
- **Debt to equity ratio of 1.74 times reduced from 1.76 times** as of December 31, 2018.

2. Analysis of the Group's Results of Operations for 2019

2.1 Revenue structure

Revenue structure	2018	2019	Change
	<i>THB million</i>	<i>THB million</i>	<i>% YoY</i>
Revenue from sales	16,881.1	29,721.1	76.1%
<i>Revenue from electricity sold to EGAT and PEA</i>	12,684.6	22,578.1	78.0%
<i>Revenue from electricity sold to EVN</i>	-	210.1	<i>n.a.</i>
<i>Revenue from electricity sold to industrial users</i>	3,661.2	6,291.3	71.8%
<i>Revenue from steam sold to industrial users</i>	535.4	641.6	19.8%
Revenue from management fee	300.0	318.6	6.2%
Share of profit from an associate and JVs	2,615.5	3,205.4	22.6%
Dividend income	107.2	100.5	-6.3%
Interest income	181.2	188.9	4.2%
Other income	9.4	14.3	51.3%
Total revenues	20,094.5	33,548.8	67.0%

2.1.1 Revenue from sales

Revenue from sales in 2019 increased 76.1% YoY from the revenue recognition of the entire 12 SPPs under GMP group, after the 9th - 12th power plants with a total installed power generation capacity of 518.6 megawatts gradually commenced commercial operations between January – July 2019, compared to 8 SPPs in operation in 2018. As a result, the Company was able to expand the industrial customer base as well as increase the volume of electricity and steam sold.

In addition to Thailand's power plants, the Company also recorded revenue from solar power plants TTCIZ-01 (installed power generation capacity of 68.8 megawatts) and TTCIZ-02 (installed power generation capacity of 50.0 megawatts) in Vietnam, which had commenced commercial operation in March and April 2019, respectively. Revenue from TTCIZ-01 project has been consolidated to the Company's consolidated financial statements from November 2019 onwards, after the Company increased its shareholding in the project from 49.0% to 90.0%.

Volume of electricity and steam sold by SPPs under GMP

Volume of electricity and steam sold	2018	2019	Change
			<i>% YoY</i>
Power projects under GMP			
Volume of electricity sold to EGAT (gigawatt-hour)	4,088.8	7,073.1	73.0%
Volume of electricity sold to industrial users (gigawatt-hour)	1,152.4	1,944.9	68.8%
Volume of steam sold (thousand tons)	563,096	728,975	29.5%

Volume of electricity sold by solar power projects TTCIZ-01 and TTCIZ-02 in Vietnam

Volume of electricity sold (megawatt-hour)	2018	2019	Change
			<i>% YoY</i>
TTCIZ-01	-	87,842.0	<i>n.a.</i>
TTCIZ-02	-	54,880.0	<i>n.a.</i>

2.1.2 Revenue from management fee

In 2019, the Company recorded revenue from management fee, which is revenue received from the provision of management services by the Company to its associate GJP and to SPPs under GEC Group, in the amount of THB 318.6 million, an increase of 6.2% YoY.

2.1.3 Dividend income

Dividend income in 2019 was THB 100.5 million, from dividend paid by SPCG and EDL Gen, a slight decrease compared to THB 107.2 million in the previous year.

2.2 Cost and expense structure

Cost of sales structure	2018	2019	Change
	<i>THB million</i>	<i>THB million</i>	<i>% YoY</i>
Cost of sales	(12,515.8)	(22,631.1)	80.8%
<i>Fuel cost</i>	(10,303.1)	(18,543.7)	80.0%
<i>Operations and maintenance cost</i>	(232.8)	(711.4)	205.5%
<i>Depreciation</i>	(1,374.2)	(2,401.1)	74.7%
<i>Other costs</i>	(605.6)	(974.9)	61.0%
Cost of service	(165.0)	(160.0)	-3.0%
Total cost of sales and service	(12,680.8)	(22,791.1)	79.7%
Selling and administrative expenses	(1,489.6)	(1,713.1)	15.0%
Total operating costs and administrative expenses	(14,170.3)	(24,504.2)	72.9%

2.2.1 Cost of sales

Cost of sales in 2019 was THB 22,631.1 million, an increase of 80.8% YoY from the realization of cost of sales from 4 additional SPPs under GMP group which commenced commercial operation in 2019. However, average price of natural gas increased slightly from 258.0 THB/mmbtu in 2018 to 272.9 THB/mmbtu in 2019.

Operations and maintenance costs in 2019 stood at THB 711.4 million, an increase of 205.5% YoY, in line with the increase in the number of power projects under GMP group. Moreover, in Q4'18, there was an adjustment of maintenance costs under the Long-Term Service Agreement (LTSA) for the power projects under GMP group, resulting in a reversal of the long-term maintenance cost overbooked in the past in 2018.

2.2.2 Cost of service

Cost of service is a cost incurred from the Company providing management services to its associate GJP and to SPPs under GEC Group. In 2019, cost of service was THB 160.0 million, a decrease of THB 5 million or 3.0% YoY, due to the Company's ability to allocate personnel providing management services to GJP more efficiently, resulting in the aforementioned lower cost.

2.2.3 Administrative expenses

In 2019, administrative expenses were THB 1,713.1 million, an increase of 15.0% YoY primarily from the increase in provision for employee benefits in accordance with the Labour Protection Act (No. 7), B.E. 2562 which stipulates that employees who are terminated by the Company and have served for a continuous period of 20 years or more shall be paid a compensation in the amount not less than the last rate of wages for 400 days (from 300 days), which became effective on May 5, 2019.

Moreover, the Company saw increases in expenses to support CSR activities and advertising and public relations activities.

2.3 Finance costs

Finance costs	2018	2019	Change
	<i>THB million</i>	<i>THB million</i>	% YoY
Interest expense	(1,710.2)	(2,663.2)	55.7%
Guarantee fee	(103.3)	(38.9)	-62.4%
Commitment fee	(54.9)	(94.5)	72.2%
Others	(69.9)	(99.2)	41.8%
Total finance costs	(1,938.3)	(2,895.7)	49.4%

Finance costs in 2019 were THB 2,895.7 million, an increase of 49.4% YoY mainly attributable to an increase in interest expense from the issuances and offerings of debentures on January 25, 2019, the recognition of interest expenses after commencing commercial operation of additional SPPs under GMP group from 8 SPPs in 2018 to 12 SPPs in 2019, and increase in GSRC's commitment fee for the financial facilities to invest in the project's construction.

2.4 Net profit and net profit before gain on exchange rate (Core profit)

Profit for the period	2018	2019	Change
	<i>THB million</i>	<i>THB million</i>	% YoY
Gross profit	4,500.4	7,248.6	61.1%
<i>Gross profit from sales</i>	4,365.3	7,090.0	62.4%
<i>Gross profit from services</i>	135.0	158.6	17.4%
Profit for the period	4,141.2	7,166.1	73.0%
Profit attributable to owners of the parent	3,028.1	4,886.6	61.4%
Less: gain (loss) on exchange rate attributable to owners of the parent	201.7	1,377.2	582.9%
Profit attributable to owners of the parent before gain on exchange rate (Core profit)	2,826.5	3,509.4	24.2%
<i>Gross profit margin (Sales)</i>	25.9%	23.9%	-2.0%
<i>Gross profit margin (Services)</i>	45.0%	49.8%	4.8%

2.4.1 Profit attributable to owners of the parent and Core Profit

Please see more details in Section 1.3.

2.4.2 Gross profit

Gross profit in 2019 was THB 7,248.6 million, an increase of THB 2,748.3 million or 61.1% YoY. The increase was caused primarily by an increase in gross profit from the electricity and steam sales business whereby there was 4 additional projects under GMP which commenced commercial operation compared to 2018. Nonetheless, gross profit margin from sales marginally softened from 25.9% to 23.9%, affected by the rise in natural gas price from 258.0 THB/mmbtu in 2018 to 272.9 THB/mmbtu while Ft rates only increased slightly by 0.43 THB/kWh. Also, there was a higher maintenance cost from the larger number of power plants in operation.

Gross profit from services increased by THB 23.6 million or 17.4% YoY from the increase in revenue from management fee, and the Company was able to manage cost of services more efficiently, despite the provision for employee benefits in Q2'19 as mentioned in the cost section. As a result, gross profit margin from services improved from 45.0% in 2018 to 49.8% in 2019.

2.4.3 Share of profit from an associate and joint ventures

Share of profit from an associate and joint ventures	2018	2019	Change
	<i>THB million</i>	<i>THB million</i>	<i>% YoY</i>
Share of profit from the associate GJP	2,629.1	3,196.8	21.6%
Share of profit from the joint venture Gulf WHA MT	(1.0)	(6.4)	-523.4%
Share of profit from the joint venture BSE	-	(1.1)	<i>n.a.</i>
Share of profit from the joint venture for projects in Vietnam	2.0	33.9	1627.0%
Share of profit from the joint venture for a project in Oman	(14.6)	(17.7)	-21.7%
Total share of profit from an associate and joint ventures	2,615.5	3,205.5	22.6%
Less: gain on exchange rate from share of profit from the associate GJP	120.1	840.3	599.5%
Share of profit from an associate and joint ventures before gain on exchange rate	2,508.9	2,356.6	-6.1%

The Group recorded a share of profit from an associate and joint ventures in 2019 of THB 3,205.5 million, an increase of 22.6% YoY. The majority of the share of profit was from the contribution from GJP, of which, before effects from exchange rate, the Group's share of profit in 2019 was THB 2,356.6 million, a decrease of 6.1% YoY.

The softened share of profit from the associate GJP before effects from exchange rate was a result of the major overhaul of the 6 power projects under 7SPPs, namely GKP1, GKP2, GTLC, GNNK, GNLL and GNK2 during the second half of 2019, resulting in the lower electricity sales to EGAT from the SPPs when compared to 2018. Moreover, availability payment rate of the 2IPPs declined from 2018 according to the PPA, although the 2 IPPs were able to sell 91.5% more electricity to EGAT and recorded a better heat rate from the previous year.

The volume of electricity sold to industrial users by the SPPs increased by 2.6% YoY from the increase in electricity demand from customers. Nonetheless, the volume of steam and chilled water sold to industrial users decreased by 3.1% YoY and 7.6% YoY from the major overhaul of the power projects as mentioned previously.

The following table shows volume of electricity, steam and chilled water sold by power projects under GJP

Volume of electricity, steam and chilled water sold	2018	2019	Change
			% YoY
IPPs			
Volume of electricity sold (gigawatt-hour)	5,332.2	10,213.5	91.5%
7 SPPs			
Volume of electricity sold to EGAT (gigawatt-hour)	4,464.4	4,245.3	-4.9%
Volume of electricity sold to industrial users (gigawatt-hour)	1,124.9	1,154.4	2.6%
Volume of steam sold (thousand tons)	268,802.6	260,344.0	-3.1%
Volume of chilled water (million refrigeration tons)	29.0	26.8	-7.6%

2.4.4 Gain from exchange rate

Gain (loss) on exchange rate primarily results from loans for the power projects under the GMP and IPD group that were denominated in a foreign currency (USD), in which the Group is required to record unrealized gain (loss) on exchange rate incurred from translating long-term debts denominated in USD to Thai Baht using the exchange rate at the end of the accounting period. In cases where the Thai Baht appreciates against USD, the Group will record a gain on exchange rate, as the Group's amount of outstanding debts converted to Thai Baht is lower. The reverse will occur if the Thai Baht depreciates against USD. However, since the long-term debts have not reached the due dates yet, such gain (loss) on exchange rate is only recognized as unrealized gain (loss).

The exchange rates at the end of 2018 and 2019 were equal to 32.6148 and 30.3313 THB/USD, respectively (the Thai Baht in 2019 appreciated compared to 2018). As a result, the Group recognized a gain on exchange rate in 2019 of THB 1,377.2 million, an increase of 582.9% YoY from the gain on exchange rate of THB 201.7 million in 2018.

Nonetheless, in this report, the Group separates effects from unrealized exchange rate of the associate (GJP) in 2019 of THB 840.3 million and the Company's subsidiaries (mainly GMP) of THB 536.9 million, resulting in a total unrealized gain (loss) from exchange rate attributable to the owners of the parent of THB 1,377.2 million. This will explain the Group's performance accurately and appropriately. Details of which are set forth as follows:

Gain (loss) on exchange rate	2018	2019	Change
	<i>THB million</i>	<i>THB million</i>	% YoY
Gain (loss) on exchange rate	134.8	1,003.5	644.6%
Less: Gain (loss) on exchange rate attributable to non-controlling interests	(53.2)	(466.6)	776.8%
Gain (loss) on exchange rate attributable to the owners of the parent	81.5	536.9	558.4%
Add: Gain (loss) on exchange rate attributable to share of profit from an associate	120.1	840.3	599.5%
Total gain (loss) from exchange rate attributable to owners of the parent	201.7	1,377.2	582.9%

3. Analysis of the Group's Financial Position as of December 31, 2019

The following table shows the Group's financial position in respect to the consolidated financial statements

Financial position	As of December 31, 2018	As of December 31, 2019	Change
	<i>THB million</i>	<i>THB million</i>	%
Cash, cash equivalents and short-term investment	18,793.5	14,810.1	-21.2%
Trade accounts receivable	3,512.1	5,199.0	48.0%
Investments in an associate and joint ventures	21,658.9	21,247.2	-1.9%
Advance payments for land and power plant construction	5,417.5	3,069.9	-43.3%
Property, plant and equipment, net	67,664.2	80,960.7	19.7%
Other assets	6,622.4	8,990.6	35.8%
Total assets	123,668.7	134,277.5	8.6%
Accounts payable for power plant construction	5,504.0	2,772.6	-49.6%
Trade accounts payable	1,177.6	1,689.1	43.4%
Interest-bearing debts due in 1 year	9,649.2	3,214.1	-66.7%
Interest-bearing debts due over 1 year	59,882.5	73,946.6	23.5%
Other liabilities	2,667.0	3,615.2	35.6%
Total liabilities	78,880.4	85,237.6	8.1%
Issued and paid-up capital	10,666.5	10,666.5	0.0%
Share premium	20,889.3	20,889.3	0.0%
Unappropriated retained earnings	3,923.9	6,084.3	55.1%
Other equity	1,057.2	787.0	-25.6%
Total equity attributable to owners	36,536.9	38,427.1	5.2%
Non-controlling interests	8,251.3	10,612.8	28.6%
Total equity	44,788.2	49,039.9	9.5%
Debt to equity	1.76	1.74	-1.24%

3.1 Total assets

Total assets as of December 31, 2019 was THB 134,277.5 million, an increase of THB 10,608.9 million or 8.6% from December 31, 2018. The increase was attributable to the following factors:

- 1) Significant increase in assets include:
 - An increase in property, plant and equipment, net of 19.7% or THB 13,296.5 million, from the increase in value of 12SPPs power plants under GMP group and solar power plants TTCIZ-01 and TTCIZ-02 in Vietnam, as well as the power plant construction work of gas-fired IPPs GSRC and GCG.
 - An increase in trade accounts receivable of 48.0% or THB 1,687.0 million primarily from the SPPs under GMP group in which 4 power projects began commercial operation in 2019.
- 2) Significant decrease in assets include:
 - A decrease in cash and cash equivalents and deposits at financial institutions used as collateral of 21.2% or THB 3,983.4 million from the dividends paid and loans to related companies for the investments in Vietnam and Oman projects.
 - A decrease in advance payments for land and power plant construction of 43.3% or THB 2,347.6 million from the payment of construction costs per milestone for GSRC.

3.2 Total liabilities

Total liabilities as of December 31, 2019 was THB 85,237.6 million, an increase of THB 6,357.2 million or 8.1% from December 31, 2018. The increase was attributable to the following factors:

- 1) Significant increase in liabilities include:
 - An increase in long-term loans from financial institutions of THB 6,570.2 million primarily from the drawdowns for the construction of GSRC power project under IPD group, and the consolidation of TTCIZ-01 solar power plant's loan, after the Company increased its shareholding in the project from 49.0% to 90.0%.
 - Increase in debentures of THB 1,502.6 million from the issuances of new debentures of THB 7,493.9 million which offset with the repayments of existing debentures of THB 5,991.4 million (net of transaction fees).
 - Increase in trade accounts payable of THB 511.5 million from SPPs under GMP group in which 4 additional power projects commenced commercial operation compared to 2018.
- 2) Significant decrease in liabilities include:
 - Accounts payable for power plant construction decreased by THB 2,731.5 million from the payment of construction costs per milestone for GSRC during the period.

3.3 Total equity

Total equity as of December 31, 2019 was THB 49,039.9 million, an increase of THB 4,251.7 million or 9.5% from December 31, 2018 due to two main factors:

- An increase in non-controlling interests of THB 2,361.5 million was from the increase in paid-up capital of Mitsui group, WHA group and HITEC group as well as the increase in non-controlling interests of TTC Group from the additional investment in TTCIZ-01, TTCIZ-02 and Mekong Project, and the increase in net profit from operations during the period.

- Total equity attributable to owners of the parent increased by THB 1,890.2 million as the Group recorded an increase in net profit for the period of THB 4,886.6 million, offset with dividend payment of THB 2,559.9 million.

3.4 Capital structure

As of December 31, 2019, the Group had a debt to equity ratio of 1.74 times, a slight decrease from 1.76 times as of December 31, 2018 primarily as the Company had increased liabilities from the loan drawdowns for construction of GSRC and the issuances of debentures in Q1'19. Nonetheless, the Company also recognized profits from 12 SPPs under GMP group which gradually commenced commercial operation, resulting in a lower debt-to-equity ratio compared to the end of the previous year. Furthermore, most of the Company's liabilities have terms of over 15 years, which reflects the Company's strong financial position and ability to take out more loans to support future growth opportunities for the Company.