

**Opinion of the Independent Financial Advisor
Concerning the Asset Acquisition and
Connected Transactions**

(Supporting Document for Agenda Item 6 of
the 2019 Annual General Meeting of Shareholders)

of



Global Power Synergy Public Company Limited

The Independent Financial Advisor



Capital Advantage Company Limited

February 27, 2019

- TRANSLATION -

The English Translation of the Independent Financial Advisor's Opinion has been prepared solely for the convenience of foreign shareholders of Global Power Synergy Public Company Limited and should not be relied upon as the definitive and official document. The Thai language version of the Independent Financial Advisor's Opinion is the definitive and official document and shall prevail in all aspects in the event of any inconsistency with this English Translation.

No. 034/2019

February 27, 2019

Subject: Opinion of the Independent Financial Advisor concerning the Asset Acquisition and Connected Transactions of Global Power Synergy Public Company Limited

Attention: Shareholders
Global Power Synergy Public Company Limited

Attachment: 1) Business overview and operating performance of Thai Oil Public Company Limited.
2) Summary of material agreements related to the Energy Recovery Unit.
Business overview and operating performance of Global Power Synergy Public Company Limited is shown in Clause 5 of the Information Memorandum on Asset Acquisition and Connected Transactions of Global Power Synergy Public Company Limited under Schedule 2 (Attachment 4) and the 2018 Annual Report of the Company (Attachment 1), which are enclosed with the notice of the shareholders' meeting.

References: 1) Resolutions of the Board of Directors' Special Meeting of Global Power Synergy Public Company Limited No. 2/2019 held on January 21, 2019 and Meeting No. 3/2019 held on February 11, 2019.
2) Information Memorandum on Asset Acquisition and Connected Transactions of Global Power Synergy Public Company Limited dated January 22, 2019 (amended).
3) Annual registration statements (Form 56-1) of Global Power Synergy Public Company Limited for the years ended December 31, 2016 – 2017.
4) Audited financial statements of Global Power Synergy Public Company Limited for the 12-month period ended December 31, 2016 - 2018 and reviewed interim financial statements for the 9-month period ended September 30, 2018.
5) Resolutions of the Board of Directors' Meetings of Thai Oil Public Company Limited No. 6/2018 held on June 29, 2018 and No. 1/2019 held on January 21, 2019.
6) Information Memorandum on Asset Acquisition Transaction from the Investment in the Clean Fuel Project (CFP) of Thai Oil Public Company Limited dated July 5, 2018 and Information Memorandum of Thai Oil Public Company Limited on the Connected Transaction of Disposition of Assets to Transfer Ownership in the Energy Recovery Unit dated January 21, 2019.
7) Annual registration statements (Form 56-1) of Thai Oil Public Company Limited for the years ended December 31, 2016 – 2017.
8) Audited financial statements of Thai Oil Public Company Limited for the 12-month period ended December 31, 2016 - 2018.
9) Affidavit, Memorandum of Association, and other information and documents, including interviews with the management and relevant staff of Global Power Synergy Public Company Limited and Thai Oil Public Company Limited.

Disclaimers: 1) Results of the study conducted by Capital Advantage Company Limited ("CapAd" or the "Independent Financial Advisor" or "IFA") in this report are based on information and assumptions provided by the management of Global Power Synergy Public Company Limited and Thai Oil Public Company Limited, as well as information disclosed to the public on the websites of the Securities and Exchange Commission (www.sec.or.th) and the Stock Exchange of Thailand (www.set.or.th).
2) The Independent Financial Advisor shall not responsible for profits or losses and any impacts resulting from this transaction.

- 3) The Independent Financial Advisor conducted the study with knowledge, skills and cautiousness on the basis of professional ethics.
- 4) The Independent Financial Advisor considers and provides its opinion based on the situation and information at the present time. If such situation and information have changed significantly, the study results in this report may be affected.

The Board of Directors' Special Meeting of Global Power Synergy Public Company Limited (the "Company" or "GPSC") No. 2/2019, held on January 21, 2019, resolved to propose the 2019 Annual General Meeting of Shareholders to consider and approve the investment in the Energy Recovery Unit Project ("ERU Project") by the Company or a subsidiary to be incorporated by the Company (in which the Company will hold 100% of the total shares) (the "Subsidiary") through the acquisition of assets to transfer ownership in the ERU Project, which is a part of the Clean Fuel Project ("CFP") of Thai Oil Public Company Limited ("TOP") and the entry into the relevant agreements, including the Asset Sale and Purchase Agreement, the Fuel and Utilities Supply Agreement, the Power Purchase Agreement, the Operation and Maintenance Services Agreement, and the Land Sub-Lease Agreement (collectively, the "Relevant Agreements" or the "Investment in the ERU Project"), as well as a Novation Agreement and any other agreements which are necessary for and in connection with the sale and purchase of asset to transfer the ownership in the ERU Project; and the entry into the Relevant Agreements with TOP, which is considered as a connected person as TOP is a major shareholder of the Company, holding, directly and indirectly, more than 10% of the total issued shares of the Company. Total acquisition value shall not exceed USD 770.08 million or equivalent to approximately Baht 24,529.03 million.¹

Then, the Board of Directors' Meeting No. 3/2019, held on February 11, 2019, resolved to determine the date for the 2019 Annual General Meeting of Shareholders of the Company to be April 1, 2019, as well as the date to determine the list of shareholders who will be entitled to attend the shareholders' meeting (Record Date).

The investment in the ERU Project with respect to the entry into the Asset Sale and Purchase Agreement and the Land Sub-Lease Agreement is considered as an asset acquisition pursuant to the Notification of the Capital Market Supervisory Board No. TorChor. 20/2551 Re: Rules on Entering into Material Transactions Deemed as Acquisition or Disposition of Assets and the Notification of the Board of Governors of the Stock Exchange of Thailand Re: Disclosure of Information and Other Acts of Listed Companies Concerning the Acquisition and Disposition of Assets B.E. 2547 (and their amendments) ("Notifications on Acquisition or Disposition"). The highest transaction size is 38.16% according to the total value of consideration criteria as calculated based on the Company's reviewed consolidated financial statements for the period ended September 30, 2018. After combining with the Company's other acquisition transactions within the past 6 months prior to the date on which the Company's Board of Directors passed a resolution to seek an approval from the shareholders' meeting to enter into this transaction, the total transaction size is equivalent to 42.94%. Therefore, it is deemed as a Class 2 Transaction under the Notifications on Acquisition or Disposition, i.e. a transaction with a transaction size of higher than 15% but less than 50%. The Company, therefore, is not required to seek for an approval from the shareholders' meeting for the entry into the said transaction but the Board of Directors shall propose the shareholders' meeting to consider and approve such Asset Acquisition Transaction along with the Connected Transaction.

The investment in the ERU Project is considered as a connected transaction pursuant to the Notification of the Capital Market Supervisory Board No. TorChor. 21/2551 Re: Rules on Connected Transactions and the Notification of the Board of Governors of the Stock Exchange of Thailand Re: Disclosure of Information and Other Acts of Listed Companies Concerning the Connected Transactions B.E. 2546 ("Notifications on Connected Transactions") because TOP is the Company's major shareholder, holding, directly and indirectly through Thai Oil Power Co., Ltd. ("TP"), a total of 24.29%

¹ Consists of (1) value under the Asset Sale and Purchase Agreement of not exceeding USD 757.00 million or equivalent to approximately Baht 24,112.49 million and (2) value under the Land Sub-Lease Agreement of approximately USD 13.08 million or equivalent to approximately Baht 416.54 million, based on the weighted average selling rate announced by the Bank of Thailand on January 18, 2019 of Baht 31.8527 to USD 1 which is the exchange rate applied in this report.

In making the payment, the Company and TOP may specify the price and method of payment as being denominated in Thai Baht or USD currency. If the payment is agreed to be made in USD, the actual Thai Baht currency value of the transaction depends and may increase or decrease based on the exchange rate agreed by the parties.

of the total issued and paid-up shares of the Company.² Furthermore, the Company and TOP have common major shareholder and directors. The size of such connected transaction is equal to 1,000.90% of the net tangible assets ("NTA") of the Company and its subsidiaries as of September 30, 2018, which exceeds 3% of NTA of the Company and its subsidiaries. *(In the previous 6-month period, the Company did not entered into any connected transaction with TOP.)*

Therefore, the Company is required to disclose the information regarding such transaction to the SET, appoint an independent financial advisor to provide an opinion to shareholders, and obtain an approval for the entry into the Asset Acquisition and Connected Transactions from the shareholders' meeting with a required affirmative vote of not less than three-fourths of the total number of votes of shareholders attending the meeting and having the rights to vote, excluding the vote of shareholders having conflict of interest.

The Company has appointed Capital Advantage Co., Ltd. as an independent financial advisor ("Independent Financial Advisor" or "IFA" or "CapAd") to provide an opinion to shareholders concerning reasonableness and fairness of price and conditions of the Asset Acquisition and Connected Transactions.

CapAd has studied details of the Information Memorandum on Asset Acquisition and Connected Transactions of the Company, information obtained from interviews with executives and management of the Company and GPSC, and documents received from the Company and GPSC such as assumptions for financial projection, ERU Project operation plan, agreements related to the ERU Project and documents related to the transaction, information disclosed to the public, information disclosed on websites of the Stock Exchange of Thailand ("SET") and the Office of the Securities and Exchange Commission ("SEC"), and financial information available on various websites, as a basis for expressing our opinion on such transaction. CapAd is unable to certify or warrant the accuracy or completeness of all information provided to us by the Company and GPSC and/or executives and/or management of the Company and GPSC.

The opinion of CapAd in this report is based on the assumption that all information and documents received are accurate and complete, and reflects current operating environment and most up-to-date information at the time of issuance of this report. Any change or future incident may have material impact on the business operation and financial projection of the ERU Project, valuation and analysis by CapAd, and decision of the shareholders on the Asset Acquisition and Connected Transactions.

In rendering opinion for the shareholders, CapAd has studied and analyzed the aforementioned information and has considered the reasonableness, price and conditions of the transaction together with all relevant factors with due care and rationale in accordance with professional standards and in the interest of the shareholders.

The attachments to this report are deemed as part of this opinion report and are the information that shareholders should consider in conjunction with this report.

CapAd has considered and studied all information on the Asset Acquisition and Connected Transactions, details and results of which can be summarized as follows:

² Based on information from the close of shareholders register book (XD) of the Company as of August 29, 2018 provided by Thailand Securities Depository Co., Ltd.

Abbreviation

"The Company" or "GPSC"	Global Power Synergy Public Company Limited
"TOP"	Thai Oil Public Company Limited
"PTT"	PTT Public Company Limited
"PTT Group"	PTT Public Company Limited and its subsidiaries and associated companies
"TP"	Thai Oil Power Company Limited
"GLOW"	Glow Energy Public Company Limited
"CFP"	Clean Fuel Project of TOP
"ERU Project"	Energy Recovery Unit which is a part of the CFP of TOP
The "Subsidiary"	A new subsidiary to be incorporated by the Company (in which the Company will hold 100% of the total shares) with the objective to invest in the ERU Project
"APA"	Asset Sales and Purchase Agreement
"FUSA"	Fuel and Utilities Supply Agreement
"PPA"	Power Purchase Agreement
"CP"	Capacity Payment
"EP"	Energy Payment
"OMSA"	Operation and Maintenance Services Agreement
"Relevant Agreements" or	The investment in the ERU Project and the entry into the relevant agreements by the
"Investment in the ERU Project"	Company or Subsidiary
"PAC"	Provisional Acceptance Certificate
"EPC Contractor"	Engineering, Procurement and Construction Contractor
"ERC"	Energy Regulatory Commission
"EIA"	Environmental Impact Assessment Report
"Pöyry"	Pöyry Energy Limited
"kWh", "MWh", "GWh"	Kilowatt hour, Megawatt hour and Gigawatt hour, respectively
"Closing Date"	The date on which the Company or Subsidiary accepts the transfer of ownership in the ERU Project
"COD"	Commercial Operating Date
"Independent Financial Advisor" or	Capital Advantage Company Limited
"IFA" or "CapAd"	
"SEC"	The Securities and Exchange Commission, Thailand
"SET"	The Stock Exchange of Thailand
"Notifications on Acquisition or Disposition"	The Notification of the Capital Market Supervisory Board No. TorChor. 20/2551 Re: Rules on Entering into Material Transactions Deemed as Acquisition or Disposition of Assets and the Notification of the Board of Governors of the Stock Exchange of Thailand Re: Disclosure of Information and Other Acts of Listed Companies Concerning the Acquisition or Disposition of Assets B.E. 2547 and the amendments
"Notifications on Connected Transactions"	The Notification of the Capital Market Supervisory Board No. TorChor. 21/2551 Re: Rules on Connected Transactions and the Notification of the Board of Governors of the Stock Exchange of Thailand Re: Disclosure of Information and Other Acts of Listed Companies Concerning the Connected Transactions B.E. 2546 and the amendments
"NTA"	Net Tangible Assets
"IRR"	Internal Rate of Return
"NPV"	Net Present Value
"Payback Period"	The amount of time required to recover the original amount of investment
"WACC"	Weighted Average Cost of Capital

Executive Summary

The Board of Directors' Special Meeting of Global Power Synergy Public Company Limited (the "Company" or "GPSC") No. 2/2019, held on January 21, 2019, resolved to propose the 2019 Annual General Meeting of Shareholders' to consider and approve the investment in the Energy Recovery Unit Project ("ERU Project") by the Company or a subsidiary to be incorporated by the Company (in which the Company will hold 100% of the total shares) (the "Subsidiary") through the acquisition of assets to transfer ownership in the ERU Project, which is a part of the Clean Fuel Project ("CFP") of Thai Oil Public Company Limited ("TOP") and the entry into the relevant agreements, including the Asset Sale and Purchase Agreement, the Fuel and Utilities Supply Agreement, the Power Purchase Agreement, the Operation and Maintenance Services Agreement, and the Land Sub-Lease Agreement (collectively, the "Relevant Agreements" or the "Investment in the ERU Project"), as well as a Novation Agreement and any other agreements which are necessary for and in connection with the sale and purchase of asset to transfer the ownership in the ERU Project; and the entry into the Relevant Agreements with TOP, which is a connected person of the Company.

The Company or Subsidiary will accept the transfer of ownership in the ERU Project, with a total value of not exceeding USD 770.08 million which is equivalent to approximately Baht 24,529.03 million³, after the construction of the ERU Project is completed, the Provisional Acceptance Certificate ("PAC") is issued under the CFP, and the conditions precedent set out in the Asset Sale and Purchase Agreement are fulfilled ("Closing Date"). In this regard, the Company expects that the construction of the ERU Project will be completed and the PAC will be issued in Q3/2023 and the Closing Date is expected to be within 2023.

Then, the Board of Directors' Meeting No. 3/2019, held on February 11, 2019, resolved to determine the date for the 2019 Annual General Meeting of Shareholders of the Company to be April 1, 2019, as well as the date to determine the list of shareholders who will be entitled to attend the shareholders' meeting (Record Date).

The investment in the ERU Project has the highest transaction size of 38.16% according to the total value of consideration criteria as calculated based on the Company's consolidated financial statements for the period ended September 30, 2018. After combining with the Company's other acquisition transactions within the past 6 months, the total transaction size is at 42.94%. The Company, therefore, is not required to seek for an approval from the shareholders' meeting but the Board of Directors shall propose the shareholders' meeting to consider and approve such Asset Acquisition Transaction along with the Connected Transaction.

However, the investment in the ERU Project is considered as a connected transaction as TOP is the Company's major shareholder, holding, directly and indirectly, more than 10% of the total issued shares of the Company. The size of such connected transaction is equal to 1,000.90% of the net tangible assets ("NTA") of the Company and its subsidiaries as of September 30, 2018, which exceeds 3% of NTA of the Company and its subsidiaries.

Therefore, the Company is required to disclose the information regarding such transaction to the SET, appoint an independent financial advisor to provide an opinion to shareholders, and seek for an approval for the entry into the Asset Acquisition and Connected Transactions from the shareholders' meeting with a required affirmative vote of not less than three-fourths of the total number of votes of shareholders attending the meeting and having the rights to vote, excluding the vote of shareholders having a conflict of interest.

Capital Advantage Co., Ltd. has been appointed by the Company as an independent financial advisor ("Independent Financial Advisor" or "IFA" or "CapAd") to provide an opinion to shareholders concerning reasonableness and fairness of price and conditions of the Asset Acquisition and Connected Transactions.

CapAd has considered the reasonableness of the Asset Acquisition and Connected Transactions and opined that the investment in the ERU Project, which is a part of the CFP of TOP, is a promising project which is likely to generate favorable returns for the Company. Such investment is in accordance with the Company's business policy, target, and strategic plan that emphasize inorganic growth both within and outside the PTT Group. A focus is also placed on ensuring energy security to cater for

³ Please refer to Footnote 1.

growth of the PTT Group and other industries and seeking investment opportunities in power projects in the country and overseas. In new project developments, the Company has a strategic plan to grow together with the PTT Group's investment, expand customer base to cover the entire PTT Group, including electricity business so as to serve the group's power demand, and create an opportunity to further develop the electricity generating business that uses non-conventional fuels in a bid to ensure energy security in the future.

The Company will gain the following benefits from the entry into the Asset Acquisition and Connected Transactions:

- (1) The Project is consistent with the Company's business policy to become the PTT Group's power flagship and will create added value to the Company.
- (2) The Project will create an opportunity to further develop the electricity generating and other fuel businesses and enhance the Company's competitiveness in the electricity generating business.
- (3) The Project helps to expand the Company's electricity generating capacity.
- (4) It will improve the Company's ability in power project development in an oil refinery plant from the initial stage to the commercial production stage and create an opportunity to develop personnel's capability and potential.
- (5) It is, as of the Closing Date, an investment in a completed power project that already obtain all permits, thus minimizing financial risk, technical risk and project management risk.
- (6) This is an investment in a sound and potential project because:
 - (6.1) The Project will commercially generate income immediately as of the Closing Date and is supported by the long-term Power Purchase Agreement throughout the project life;
 - (6.2) The Project will deliver a reasonable internal rate of return;
 - (6.3) The Project is undertaken through cooperation between the PTT Group members, which is beneficial to the Company; and
 - (6.4) The Project is eligible for the BOI promotion.
- (7) The Project provides social and environmental benefits through appropriate management of by-products for environmental conservation.

However, the transactions have the following disadvantages and risks:

- (1) The Company shall have increasing debt, interest expenses and debt to equity ratio;
- (2) Risk involved with adequacy of funds in the event that the Company fails to obtain loans as planned;
- (3) Risk associated with heavy reliance on Thai Oil PCL. (TOP)
- (4) Risk associated with changes in the relevant government sector's policies or rules and regulations.

After considering objective and necessity of the transaction together with the advantages, disadvantages, benefits and risk factors, the IFA is of the opinion that the Company will be able to expand its production capacity and grow its revenue and profit, which is consistent with its strategic plan, while risks are at an acceptable and manageable level. The transaction will also be beneficial to society, the environment and the country as a whole. Therefore, **the Asset Acquisition and Connected Transactions is considered reasonable.**

In determining the appropriateness of the ERU Project of the Company, CapAd is of the views that the ERU Project is able to generate a reasonable return to the Company as the net present value of the ERU Project is USD 23.75 – 25.76 million (approximately Baht 756.51 – 820.43 million), the Internal Rate of Return (IRR) of the ERU Project is 8.00% per annum which is higher than average WACC of 7.25% per annum, and the payback period is 10.09 years from the commercial operation date of the ERU Project (approximately January 1, 2024 according to the financial projection). Therefore, **the IFA is of the opinion that the acquisition of assets to transfer ownership in the ERU Project is feasible and appropriate.**

After considering the rationality and appropriateness of price and conditions of the Asset Acquisition and Connected Transactions, **the IFA is of the opinion that shareholders should resolve to APPROVE the said Asset Acquisition and Connected Transactions.**

Shareholders should study the information in all documents attached to the notice of the shareholders' meeting before making the decision. The consideration to approve the Asset Acquisition and Connected Transactions rests primarily and is the sole discretion of the shareholders.

CapAd, as the Independent Financial Advisor, hereby certifies that it has provided the above opinion with due care in accordance with professional standard for the benefit of the shareholders.

Details of the IFA's opinion are presented as follows:

Part 1: General Information on the Asset Acquisition and Connected Transactions**1. Nature and Details of the Transaction****1.1 Objective and Background of the Transaction**

The Board of Directors' Special Meeting of Global Power Synergy Public Company Limited (the "Company" or "GPSC") No. 2/2019, held on January 21, 2019, resolved to propose the 2019 Annual General Meeting of Shareholders' to consider and approve the investment in the Energy Recovery Unit Project ("ERU Project") by the Company or a subsidiary to be incorporated by the Company (in which the Company will hold 100% of the total shares) (the "Subsidiary") through the acquisition of assets to transfer ownership in the ERU Project, which is a part of the Clean Fuel Project ("CFP") of Thai Oil Public Company Limited ("TOP"); and the entry into the relevant agreements, including the Asset Sale and Purchase Agreement, the Fuel and Utilities Supply Agreement, the Power Purchase Agreement, the Operation and Maintenance Services Agreement, and the Land Sub-Lease Agreement (collectively, the "Relevant Agreements" or the "Investment in the ERU Project"), as well as a Novation Agreement and any other agreements which are necessary for and in connection with the sale and purchase of asset to transfer the ownership in the ERU Project; and the entry into the Relevant Agreements with TOP, which is considered as a connected person as TOP is a major shareholder of the Company, holding, directly and indirectly, more than 10% of the total issued shares of the Company.

The Company or Subsidiary will accept the transfer of ownership in the ERU Project, with a total value of not exceeding USD 770.08 million which is equivalent to approximately Baht 24,529.03 million⁴, after the construction of the ERU Project is completed, the Provisional Acceptance Certificate ("PAC") is issued under the CFP, and the conditions precedent set out in the Asset Sale and Purchase Agreement are fulfilled ("Closing Date"). In this regard, the Company expects that the construction of the ERU Project will be completed and the PAC will be issued in Q3/2023 and the Closing Date is expected to be within 2023.

Then, the Board of Directors' Meeting No. 3/2019, held on February 11, 2019, resolved to determine the date for the 2019 Annual General Meeting of Shareholders of the Company, to be April 1, 2019, as well as the date to determine the list of shareholders who will be entitled to attend the shareholders' meeting (Record Date).

Background of the Project

The Energy Recovery Unit ("ERU") is an electricity and steam generating unit which is a part of the Clean Fuel Project ("CFP") of TOP. The CFP aims to enhance production efficiency of TOP's existing refinery by increasing its heavy crude oil refining capacity from 275,000 barrels per day to 400,000 barrels per day, leading to an increase in its future electricity demand of around 180 - 200 MW. The ERU Project will mainly use petroleum pitch, which is a by-product of the refinery process of the CFP, as a main source of fuel to generate electricity of approximately 250 MW⁵ and steam which will be delivered back to use in the CFP production process. Overview of the CFP and the ERU Project is as follows:

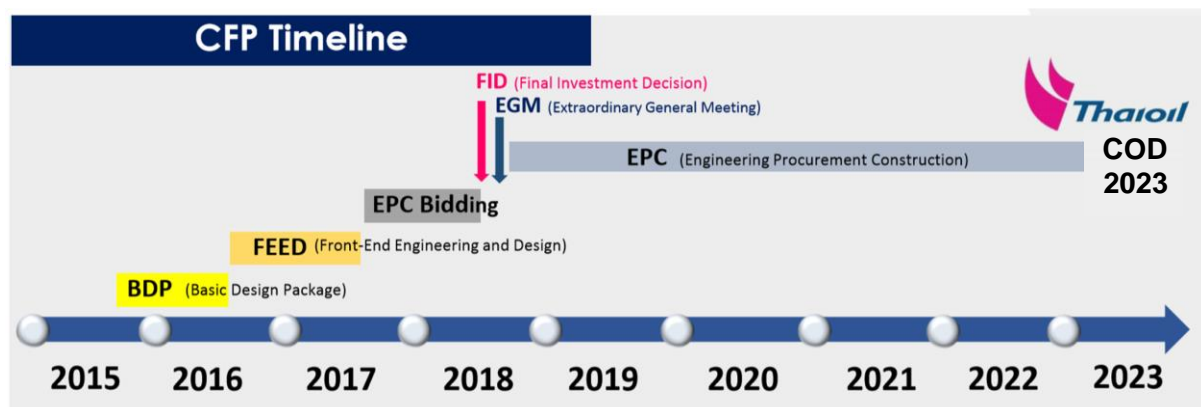
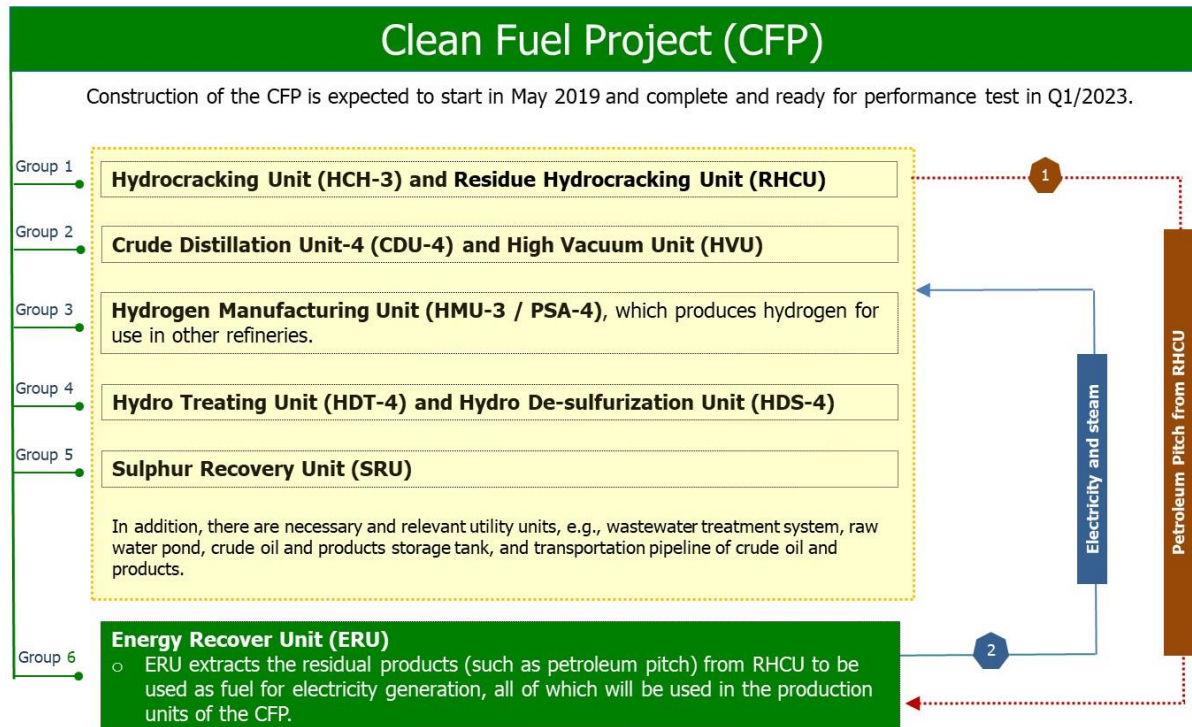
The CFP was approved by the Extraordinary General Meeting of Shareholders of TOP No. 1/2018, held on August 27, 2018 (TOP has completed the front end engineering design ("FEED") of the CFP, whereas the environmental impact assessment ("EIA") of the CFP was already approved by the Office of Natural Resources and Environmental Policy and Planning ("ONEP")). The Board of Directors' Meeting of TOP, on August 10, 2018, resolved to approve the seeking of a potential partner who is interested in investing in the ERU Project in lieu of the sole investment by the Company in order to reduce the investment cost of the CFP, based on the reason that the ERU is a utility support unit which is relatively independent from the main production units of the CFP.

GPSC, as a leader in the power production business and the power flagship of PTT Group, had earlier expressed its interest in investing in the ERU and, accordingly, notified its intention to participate in the study and implementation of the ERU Project. Then on October 18, 2017, the Company and TOP jointly signed a Memorandum of Agreement on cooperation in a feasibility study of the investment, technology, management and environmental impact of the ERU Project. From such feasibility study, the Company has gained profound knowledge and understanding of the ERU Project. Therefore, the Board of Directors' Meeting of the Company No. 2/2019, held on January 21, 2019, resolved to approve the investment in the ERU Project. At the same time, the Board of Directors' Meeting of

⁴ Please refer to Footnote 1.

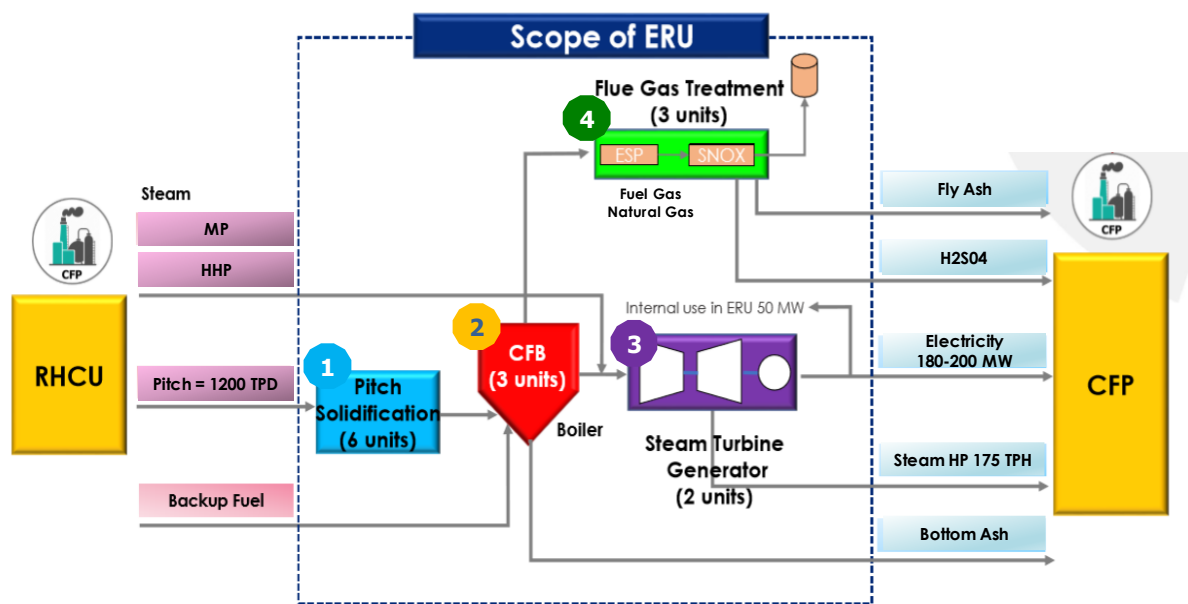
⁵ Of this amount, approximately 180 - 200 MW will be delivered back to use in the CFP and 50 MW will be for internal use.

TOP No. 1/2019, held on January 21, 2019, resolved to approve the execution of the Asset Sale and Purchase Agreement to transfer the ownership in the ERU and the execution of the Relevant Agreements with the Company or Subsidiary. Accordingly, the Company and TOP will further seek an approval from their respective 2019 Annual General Meeting of Shareholders for the entry into such transaction.



Source: TOP

Energy Recover Unit Project (ERU)



1

Pitch Preparation Unit

High temperature petroleum pitch from RHCU is fed to Double Belt Cooler in order to cool down and be ready for use as fuel for boiler in a complete burning process.

2

Fired Boiler

Condensate Water and Medium-Pressurized Steam from Thai Oil's refinery will conduct heat exchange with hot gas from burning of petroleum pitch in boiler (Circulating Fluidized Bed), and turn into steam. HHP steam is then sent to steam turbine for electricity generation. Lower-pressure steam will be sent to refinery.

3

Steam Turbine Generator and Condenser

Electricity is generated by injecting HHP steam into Steam Turbine, which is connected to rotor of electricity generating unit. 50 MW out of a total of 250 MW electricity generated will be used within the ERU Project. The balance will be used in the CFP.

4

Treating Unit

The ERU Project installs ESP (Electrostatic Precipitator) unit for collecting dust. Gas from ESP will then be sent to Flue Gas Treatment unit which will remove sulfur and nitrogen oxide with SNOx technology to control the level of sulfur and nitrogen oxide within the standard. Treated gas will be released via stack.

5

Production Supporting Units

Comprise of (a) Cooling System, producing chilled water for other systems in electricity generating unit, (b) Transmission System, including Substation connecting electricity generating unit with high voltage station of TOP's refinery, (c) Other general infrastructure, such as wastewater treatment system, road, garbage disposal, commonly used with the CFP, (d) Water System, shared water with the CFP Project from East Water Resources Development and Management PCL., and (e) Fuel Storage Connecting System.

1.2 Date of the Transaction

The Company or Subsidiary will enter into the Relevant Agreements relating to the ERU Project after obtaining the approval of the 2019 Annual General Meeting of Shareholders of the Company, which will be held on April 1, 2019, and after TOP obtain the approval from its 2019 Annual General Meeting of Shareholders, which will be held on April 10, 2019. The Company expects to sign the Asset Sale and Purchase Agreement by Q2/2019 and estimates the Closing Date to be within Q4/2023. (Please refer to more details in the "Conditions for the Transaction" provided in Part 1, Clause 1.9, of this report.)

1.3 Relevant Parties and Their Relationship

1.3.1 Relevant parties and their relationship

Name of Agreement	Counterparties	Nature of Relationship
1. Asset Sale and Purchase Agreement ("APA")	Purchaser: The Company or Subsidiary Seller: TOP	<p>1. TOP is a major shareholder of the Company, holding, directly and indirectly, a total of 24.29% of the total issued shares of the Company^{1/} as follows:</p> <p>(1) TOP is a major shareholder of the Company, holding 133,468,059 shares or 8.91% of the total issued shares of the Company.</p> <p>(2) TOP is a shareholder holding 73.99% of the total paid-up capital of Thai Oil Power Co., Ltd. ("TP"), whereas TP is the Company's shareholder holding 311,425,457 shares or 20.79%, thus representing an indirect shareholding in the Company by TOP through TP of 15.38% of the total issued shares of the Company.</p> <p>2. The Company and TOP have the common major shareholder, i.e. PTT PCL. ("PTT"), which holds 22.58%^{1/} and 48.03%^{2/} of the total issued shares of the Company and TOP, respectively.</p> <p>3. The Company's directors and executives who are connected to TOP and PTT include Mr. Atikom Terbsiri, Mr. Bandhit Thamprajamchit, Mr. Wittawat Svasti-Xuto, Mr. Supattanapong Punmeechaow, Ms. Peangpanor Boonklum and Mr. Chawalit Tippawanich.^{3/}</p>
2. Fuel and Utilities Supply Agreement ("FUSA")	Purchaser: The Company or Subsidiary Seller: TOP	
3. Power Purchase Agreement ("PPA")	Purchaser: TOP Seller: The Company or Subsidiary	
4. Operation and Maintenance Services Agreement ("OMSA")	Service Provider: TOP Service Receiver: The Company or Subsidiary	
5. Land Sub-Lease Agreement	Sub-Lessor: TOP Sub-Lessee: The Company or Subsidiary	
6. Novation Agreement	Assignor: TOP Assignee: The Company or Subsidiary	

Remark:

- 1/ Based on information from the close of shareholders register book (XD) of the Company as of August 29, 2018 provided by Thailand Securities Depository Co., Ltd. Shareholders' information to be used for the 2019 Annual General Meeting of Shareholders of the Company, to be held on April 1, 2019, will be derived from the close of shareholders register book (XM) of the Company on February 25, 2019.
- 2/ Based on information from the close of shareholders register book (XD) of TOP as of September 14, 2018 provided by Thailand Securities Depository Co., Ltd. Shareholders' information to be used for the 2019 Annual General Meeting of Shareholders of TOP, to be held on April 10, 2019, will be derived from the close of shareholders register book (XM) of TOP on March 1, 2019.
- 3/ Information on position and relationship with the Company as of January 21, 2019, as presented in Clause 1.12 of the Information Memorandum on Asset Acquisition and Connected Transactions of the Company (Attachment 4) attached to the Notice of the Annual General Meeting of Shareholders.

1.3.2 Connected persons and/or shareholders having a conflict of interest who are not eligible to vote

Names of the connected persons and/or shareholders who have conflict of interest and are not eligible to vote on the Agenda Item 6 Re: "Consideration and approval of the investment in the ERU Project" at the 2019 Annual General Meeting of Shareholders, which will be held on April 1, 2019, are provided in Clause 1.12 of the Information Memorandum on Asset Acquisition and Connected Transactions of the Company (Attachment 4) attached to the Notice of the Annual General Meeting of Shareholders.

1.4 General Characteristics of the Transaction

The Board of Directors' Special Meeting No. 2/2019, held on January 21, 2019, resolved to approve the acquisition by the Company or Subsidiary of the Energy Recovery Unit ("ERU"), which is a utility support unit of the Clean Fuel Project ("CFP") of TOP. The ERU Project is an electricity and steam

generating unit, from which electricity and steam shall be delivered back for use in the CFP's production process, whereby the ERU Project will mainly use petroleum pitch, which is a by-product of the refinery process of the CFP, as the main source of fuel. The ERU Project has an installed electricity and steam generating capacity of approximately 250 MW and 175 tons per hour, respectively.

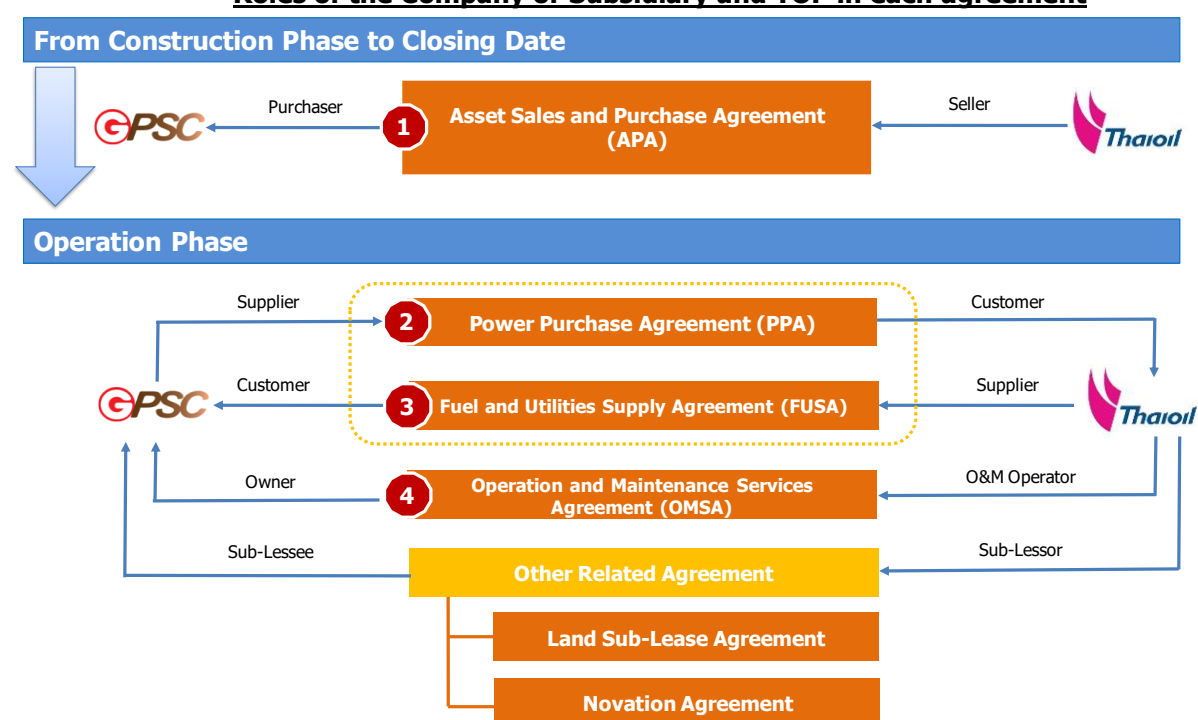
The transfer of ownership in the ERU Project to the Company or Subsidiary shall take place upon the completion of construction of the ERU Project and the issuance of a Provisional Acceptance Certificate (PAC) for the CFP, as well as the fulfillment of conditions precedent set out in the Asset Sale and Purchase Agreement (Closing Date). The completion of construction of the ERU Project and the issuance of PAC are expected in Q3/2023 and the commercial operating date ("COD") is expected in 2023.

During the operation phase, TOP shall act as:

- (1) Procurer of fuel and utilities required for the operation of the ERU to the Company or Subsidiary;
- (2) Service provider in relation to the operation (electricity generation) and maintenance of the ERU Project;
- (3) Sub-lessor for the land being the site of the ERU; and
- (4) Purchaser of electricity, steam, and by-products produced by the ERU from the Company or Subsidiary.

There are 6 relevant agreements, namely an Asset Sale and Purchase Agreement (APA) and other agreements related to the operation phase which are a Fuel and Utilities Supply Agreement (FUSA), a Power Purchase Agreement (PPA), an Operation and Maintenance Services Agreement (OMSA), a Land Sub-Lease Agreement, and a Novation Agreement. The termination of one agreement will trigger the termination of the other agreements.

Roles of the Company or Subsidiary and TOP in each agreement



Remark: During Construction Phase to the Closing Date, TOP shall be the seller of assets; while during the Operation Phase, TOP shall become the purchaser of electricity, supplier of fuel for electricity generation, operator and maintenance service provider of the power plant, and sub-lessor of the land. The Company has monitoring/follow-up mechanism during the Operation Phase, by which working team of GPSC shall monitor the operation to be in accordance with the agreed electricity generating plan.

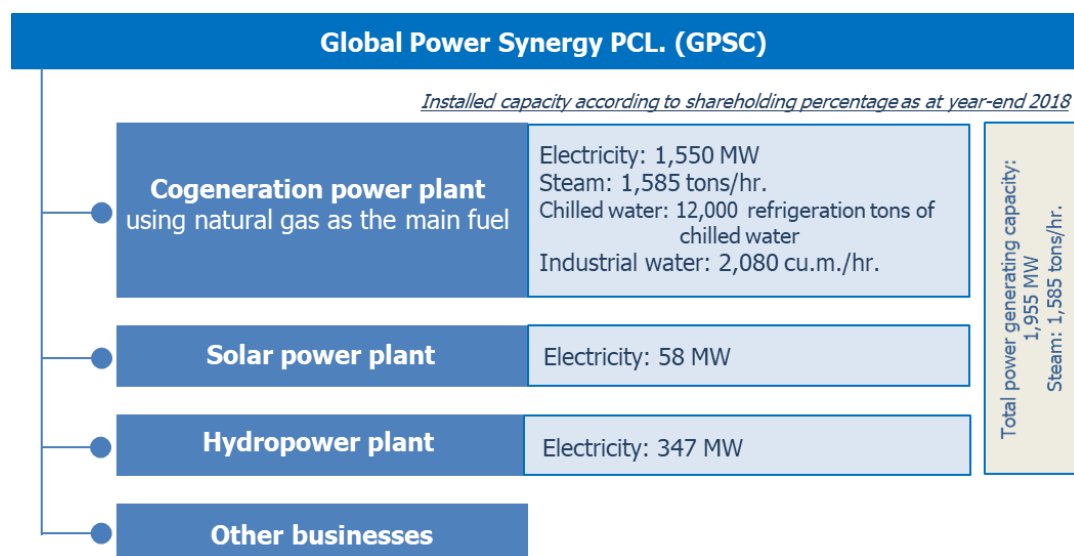
The above undertakings involve a total of 5 agreements which is considered as the Asset Acquisition and Connected Transactions (excluding the Novation Agreement which results from all of the said 5 agreements), the details of which are as follows:

1) Asset Sale and Purchase Agreement (Energy Recovery Unit or ERU) (Agreement No. 1: APA)
<p>The Company or Subsidiary will be a counterparty as purchaser, and TOP will be a seller, whereby the Company or Subsidiary will purchase the ERU Project from TOP. The ERU Project is an electricity and steam generating unit, using petroleum pitch, which is a by-product from the production process of the CFP, and steam produced from the production processes of other units of the TOP group, as the main sources of fuel for electricity and steam generation which will be delivered back to the CFP for use.</p> <p>TOP will transfer ownership of the ERU Project to the Company or Subsidiary upon the fulfillment of the conditions precedent specified in the Asset Sale and Purchase Agreement ("Closing Date"), which include the countersigning by TOP of a Provisional Acceptance Certificate (PAC) to the contractor ("EPC Contractor"), which is expected to take place in Q3/2023, and the purchaser and seller having received the necessary approvals from the relevant authorities, such as approval of the Environmental Impact Assessment (EIA), a factory license (RorNgor. 4), a license for energy industry operation, and the necessary approvals for the acquisition and disposition of the ERU Project from the Energy Regulatory Commission, etc.</p>
2) Fuel and Utilities Supply Agreement (Agreement No. 2: FUSA)
<p>The Company or Subsidiary will be a counterparty as purchaser, and TOP will be a supplier of petroleum pitch, other fuels, and other utilities used in the ERU Project. In the event that TOP is unable to deliver the fuel and utilities produced by it, TOP will use its best endeavors to procure fuel and utilities from alternative sources to be delivered to the ERU Project. The Fuel and Utilities Supply Agreement shall have a term of 25 years starting from the Closing Date, and the parties may agree to extend the agreement for 5 years but shall not exceed the term of the Land Lease Agreement between TOP and the Ministry of Finance (Land Lease Agreement between TOP and the Ministry of Finance will expire on September 10, 2052).</p>
3) Power Purchase Agreement (Agreement No. 3: PPA)
<p>The Company or Subsidiary will be a counterparty as seller, and TOP will be a purchaser of electricity, steam, and by-products which are produced by the ERU Project. The Power Purchase Agreement shall have a term of 25 years starting from the Closing Date, and the parties may agree to extend the agreement for 5 years but shall not exceed the term of the Land Lease Agreement between TOP and the Ministry of Finance (Land Lease Agreement between TOP and the Ministry of Finance will expire on September 10, 2052).</p>
4) Operation and Maintenance Services Agreement (Agreement No. 4: OMSA)
<p>The Company or Subsidiary will be a counterparty as service receiver, and TOP will be a service provider, whereby the Company or Subsidiary will hire TOP to provide services for the operation of the machinery in the ERU and all related maintenance of the ERU Project. The scope of services includes the management, operation, and maintenance of the ERU Project, including assisting the Company or Subsidiary in the submission of applications for the related and necessary permits, as assigned by the Company or Subsidiary, etc. The Operation and Maintenance Services Agreement shall have a term of 25 years starting from the Closing Date, and the parties may agree to extend the agreement for 5 years but shall not exceed the term of the Land Lease Agreement between TOP and the Ministry of Finance (Land Lease Agreement between TOP and the Ministry of Finance will expire on September 10, 2052).</p>
5) Land Sub-Lease Agreement (Agreement No. 5)
<p>The Company or Subsidiary will be a counterparty as sub-lessee, and TOP will be a sub-lessor of the land being the site of the ERU Project in the CFP, located at Thung Sukhla Sub-District, Sriracha District, Chonburi Province, having a total area of approximately 36 rai. The Land Sub-Lease Agreement shall have a term of approximately 25 years from the Closing Date, and the parties may agree to extend the agreement for 5 years but shall not exceed the term of the Land Lease Agreement between TOP and the Ministry of Finance.</p>

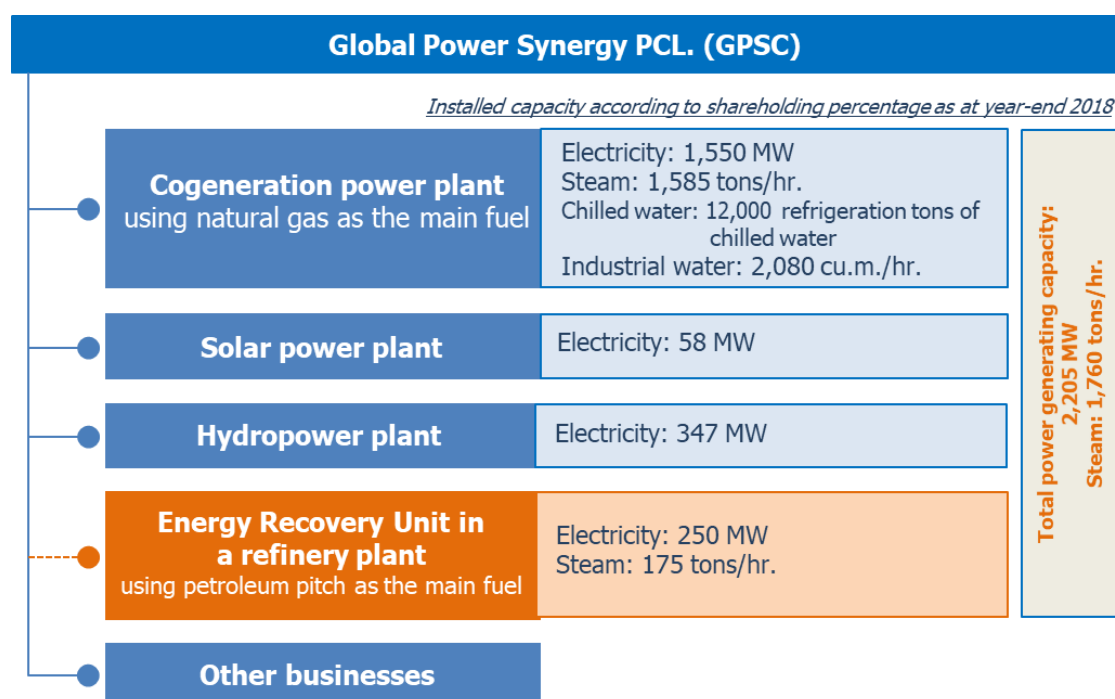
Further details of the above agreements are provided in Part 1, Clause 1.5, and Attachment 2 of this report. Please also refer to details of the Project in Part 1, Clause 1.5, of this report.

After the completion of the transaction, the production pattern and capacity according to the Company's shareholding percentage in power plants that have already commenced commercial operation and are still under construction will be as follows:

Production pattern and capacity according to the Company's shareholding percentage in power plants before entering into the transaction



Production pattern and capacity according to the Company's shareholding percentage in power plants after entering into the transaction



Remark: Excluding production capacity of GLOW (GPSC is in the process of acquisition of all GLOW shares) and 39.5 MW solar power plant, the investment in which the Company expects to complete in Q1/2019.

1.5 Details of Assets Being Acquired

The Company or Subsidiary will invest in the ERU Project and expects to sign Agreement No. 1: APA after obtaining the approval to enter into the transaction from the 2019 Annual General Meeting of Shareholders of the Company and from the 2019 Annual General Meeting of Shareholders of TOP. The conditions for the transaction are as described in Part 1, Clause 1.9 Conditions for the Transaction.

The assets to be acquired from entering into the transaction include the ERU Project (Agreement No. 1: APA) and the sub-leased land of approximately 36 rai (Agreement No. 5), the details of which are as follows:

1.5.1 General information of the ERU Project

The ERU Project is a part of the CFP of TOP. General information of the Project are as follows:

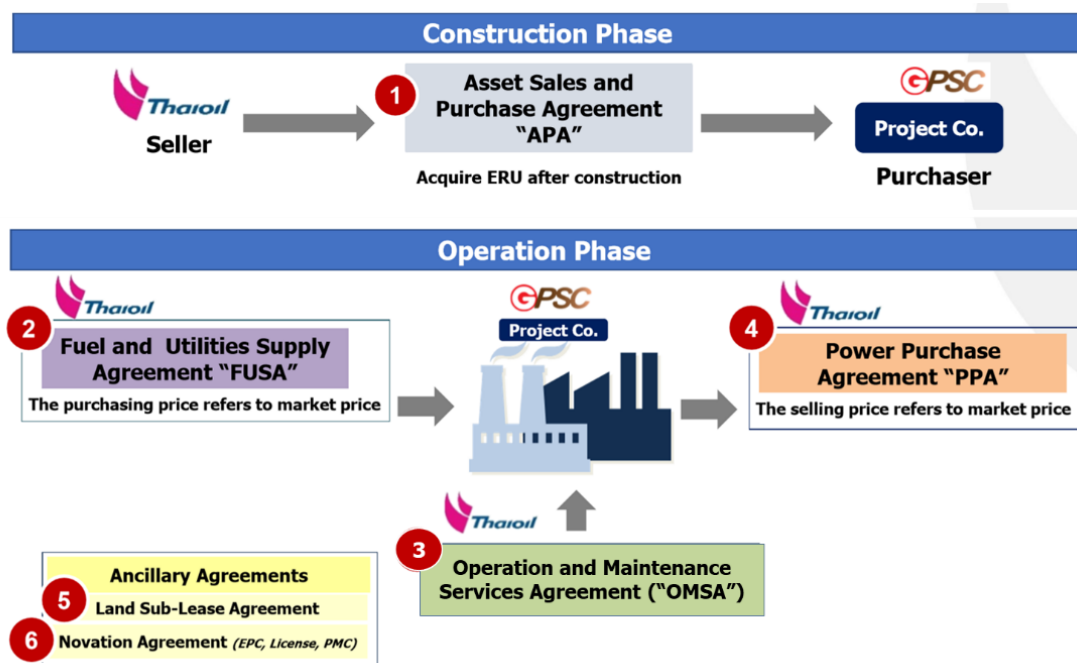
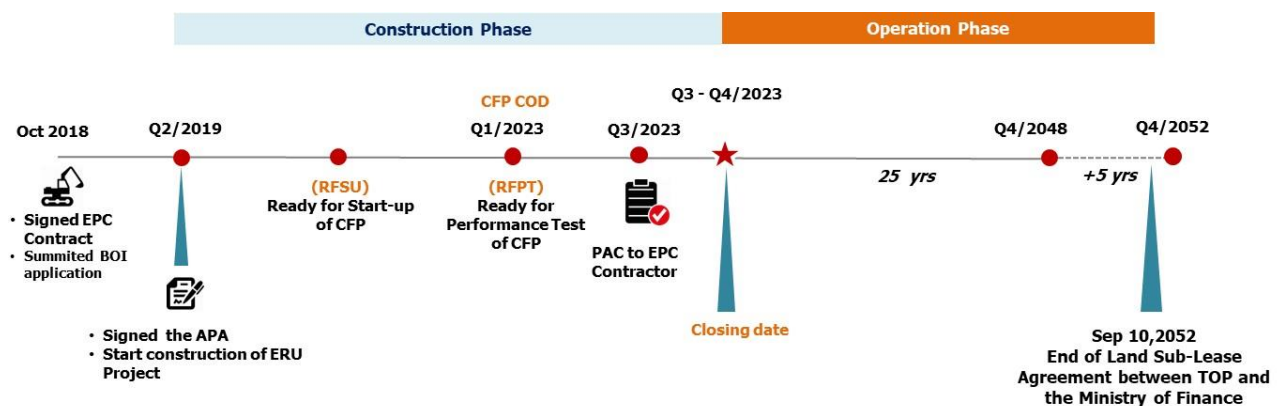
Project Characteristics	ERU Project is an electricity and steam generating unit, using petroleum pitch from the CFP as the main source of fuel for the running of the steam turbine for producing electricity and steam to be delivered back to the CFP for use.
Project Site	Located in the CFP which is in the same compound as the current refinery of TOP, being close to Laem Chabang Deep Sea Port, at Km. 124, Sukhumvit Road, Thung Sukhla Sub-District, Sriracha District, Chonburi Province.
Main Sources of Fuel	<ul style="list-style-type: none"> 1,200 tons of Petroleum pitch/day. Approximately 200 tons/hour of High High Pressure (HHP) steam and approximately 130 tons/hour of Medium Pressure (MP) steam (derived from production process of other production units of TOP Group). Approximately 6 kg./hour of natural gas and approximately 540 kg./hour of fuel gas.
Installed Production Capacity	<ul style="list-style-type: none"> Electricity: Approximately 250 MW, of which approximately 50 MW is for internal use and approximately 180 - 200 MW will be delivered back to the CFP for use. Steam: Approximately 175 tons/hour. By-products such as sulfuric acid, condensate water: To be delivered back to TOP for further management.
Investment	<p>Not exceeding USD 757.00 million or approximately Baht 24,112.49 million⁶ (capped amount) (including an 10% contingency amount), divided into</p> <ul style="list-style-type: none"> An Initial Purchase Price of USD 688.20 million or approximately Baht 21,921.03 million; and A 10% contingency amount of USD 68.80 million or approximately Baht 2,197.46 million <p>Payment shall be made in Thai Baht currency.</p>
Payment of Purchase Price	<ul style="list-style-type: none"> Under the Asset Sale and Purchase Agreement, the Company or Subsidiary shall make an Initial Payment equal to 20% of the Initial Purchase Price (USD 688.20 million or approximately Baht 21,921.03 million), which is equal to USD 137.64 million or approximately Baht 4,384.21 million, payable in Thai Baht currency in 4 installments based on the actual progress of construction of the ERU Project, with the details being as follows: <ul style="list-style-type: none"> <u>1st Installment</u> of approximately USD 13.76 million or approximately Baht 438.42 million, equal to 2% of the Initial Purchase Price, is payable in <u>2019</u>; <u>2nd Installment</u> of approximately USD 55.06 million or approximately Baht 1,753.69 million, equal to 8% of the Initial Purchase Price, is payable in <u>2020</u>; <u>3rd Installment</u> of approximately USD 27.53 million or approximately Baht 876.84 million, equal to 4% of the Initial Purchase Price, is payable in <u>2021</u>; and <u>4th Installment</u> of approximately USD 41.29 million or approximately Baht 1,315.26 million, equal to 6% of the Initial Purchase Price, is payable in <u>2022</u>. The remaining amount of the purchase price shall be paid to TOP on the Closing Date. <p>The Company or Subsidiary will enter into the Asset Sale and Purchase Agreement with TOP and will make the payment of the purchase price after the Company and TOP have obtained the approval from their shareholders' meeting.</p>
Key Conditions for the Transfer of Ownership of the ERU Project	<p>TOP will transfer ownership of the ERU Project to the Company or Subsidiary upon the fulfillment of the conditions precedent specified in the Asset Sale and Purchase Agreement. The key conditions precedent for the transfer of ownership of the ERU Project include the following:</p> <ol style="list-style-type: none"> The approval of the Ministry of Finance in relation to the sub-lease of land by the Company or Subsidiary pursuant to the Land Sub-Lease Agreement; TOP signs a Provisional Acceptance Certificate to the EPC Contractor; The Company or Subsidiary and TOP receive necessary approvals from the relevant authorities for the transfer of ownership of the ERU Project, which includes the obtaining of approval of the EIA report, a factory license (RorNgor. 4), a license for energy industry operation, an investment promotion certificate for the ERU Project, as well as all necessary approvals for the acquisition and disposition of the ERU Project from the ERC, etc.; and The execution of all Relevant Agreements.
Key Conditions for Termination of the Agreement Prior to the Transfer of Ownership of the ERU Project	<p>The key conditions for termination of the agreement prior to the transfer of ownership of the ERU Project include the following:</p> <ul style="list-style-type: none"> The Company or Subsidiary and TOP are entitled to terminate the agreement if the conditions precedent specified in the Asset Sale and Purchase Agreement are not fulfilled within August 31, 2026 (Long Stop Date); The Company or Subsidiary is entitled to terminate the Asset Sale and Purchase Agreement if the Company or Subsidiary did not consent to a waiver of any material conditions which must be satisfied by the EPC Contractor prior to TOP's signing of the Provisional Acceptance Certificate for the CFP; The Company or Subsidiary is entitled to terminate the agreement if the Company or Subsidiary did not consent to any material events;

⁶ The actual Thai Baht currency value of the transaction on the date of entry into the transaction or on each agreed payment installment date depends and may increase or decrease based on the exchange rate specified in the agreement (but not exceeding the equivalent of USD 757.00 million).

	<ul style="list-style-type: none"> The Company or Subsidiary is entitled to terminate the agreement if the ERU is materially inoperable and TOP is unable to remedy such inoperability within a period of 6 months, and TOP is unable to provide a recovery plan to the satisfaction of the Company or Subsidiary; TOP is entitled to terminate the Asset Sale and Purchase Agreement if the Company or Subsidiary defaults on the Initial Payment; and One of the counterparties is in breach of the agreement, and the defaulting party is unable to remedy such breach within the prescribed timeframe.
Return of the Initial Payment in the Event of Termination of Agreement Prior to the Closing Date	If the Asset Sale and Purchase Agreement is terminated prior to the transfer of ownership, TOP shall repay to the Company or Subsidiary the Initial Payment received by TOP, as well as reimburse the related financing costs of such amount at the rate of four percent per annum.
Construction Period	The period from the commencement date of construction until the date that the Provisional Acceptance Certificate (PAC) for the CFP is issued is approximately 58 months and it is expected to be completed in Q3/2023.

Business Model of the ERU Project

The business model is divided into the construction phase and the operation phase.



Construction Phase	<p>Business Model: TOP executes an agreement with the EPC Contractor and transfers ownership of the ERU Project to GPSC upon the completion of construction, whereby</p> <ul style="list-style-type: none"> TOP will employ the EPC Contractor and supervise the designing, construction, testing and utilization in the ERU Project under the master agreement of the CFP, and, during the construction phase, the Company or Subsidiary will dispatch their staff to observe the construction of the ERU Project.
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	<ul style="list-style-type: none"> TOP will transfer ownership of the assets to the Company or Subsidiary on the Closing Date, which will take place upon (1) the completion of construction of the ERU Project, (2) the EPC Contractor receiving the Provisional Acceptance Certificate (PAC) for the CFP, and (3) the fulfillment of the conditions precedent specified in the APA, whereby the Closing Date is expected in 2023. The Relevant Agreement is the Asset Sale and Purchase Agreement (APA), the details of which are presented in Attachment 2 of this report.
Operation Phase	<p><u>Business Model:</u> The business is conducted in the form of sale and purchase of products through the execution of the fuel sale and purchase agreement and the power purchase agreement in the general format applicable in the electricity business under the terms and conditions of sale and purchase agreement with mutually agreed liability and conditions, whereby</p> <ul style="list-style-type: none"> The Company or Subsidiary will produce electricity and steam, including other by-products, for sale to TOP for further use in the CFP; The Company or Subsidiary will purchase the main fuel, petroleum pitch, other fuels, and utilities that are necessary for running and operating the ERU Project from TOP, and will employ TOP to manage the production and maintenance of the ERU Project; Price of electricity under the agreement comprises of Capacity Payment (CP)⁷ and Energy Payment (EP)⁸. Price of petroleum pitch is based on prices of fuel oil, diesel oil, and electricity from PEA⁹; Service fee under OSMA is upon agreement; and The Relevant Agreements include <ol style="list-style-type: none"> (1) Power Purchase Agreement (PPA), (2) Fuel and Utilities Supply Agreement (FUSA), (3) Operation and Maintenance Services Agreement (OMSA), and (4) Other related agreements that will enable the ERU Project to be operated efficiently and legally, including (4.1) Land Sub-Lease Agreement and (4.2) Novation Agreement, etc. <p>Details of the Agreements No. (1) – (3) are provided in Attachment 2 of this report.</p>

Progress of the CFP and the ERU Project

• **April 2018**

TOP prepared the Environmental Impact Assessment (EIA) report of the CFP (which covers all production units of the CFP, including the ERU) and obtained the approval of such report from the Office of Natural Resources and Environmental Policy and Planning (“ONEP”) on April 23, 2018. Currently, it is in the process of conducting an EIA of the electricity and steam production project using petroleum pitch as the main fuel, by preparing an EIA report separately from the EIA report of the CFP.

• **October 2018**

TOP signed the Engineering Procurement Construction (EPC) agreement in October 2018. At present, it is in the process of detail designing and making preparations for commencement of construction in May 2019.

TOP submitted an application for investment promotion to the Board of Investment (BOI) in October 2018, and expects to obtain an approval by Q1/2019 and to receive the BOI certificate by Q2/2019.

1.5.2 Details of the sub-leased land

Purpose	TOP (the sub-lessor) agrees to allow the Company or Subsidiary (the sub-lessee) to use the sub-leased land for the construction and operation of a 250 MW power plant and other related undertakings, with the right to use the sub-leased land to construct buildings and structures, and to install equipment and machinery of the condition and type required for the aforementioned operations, at the sub-lessee's own cost and expense.
Leased Assets	The land located at Thung Sukhla Sub-District, Sriracha District, Chonburi Province under the Land Lease Agreement between TOP and the Ministry of Finance dated August 21, 2018. Total area is approximately 36 rai with a lease term of 30 years from September 11, 2022 to September 10, 2052.

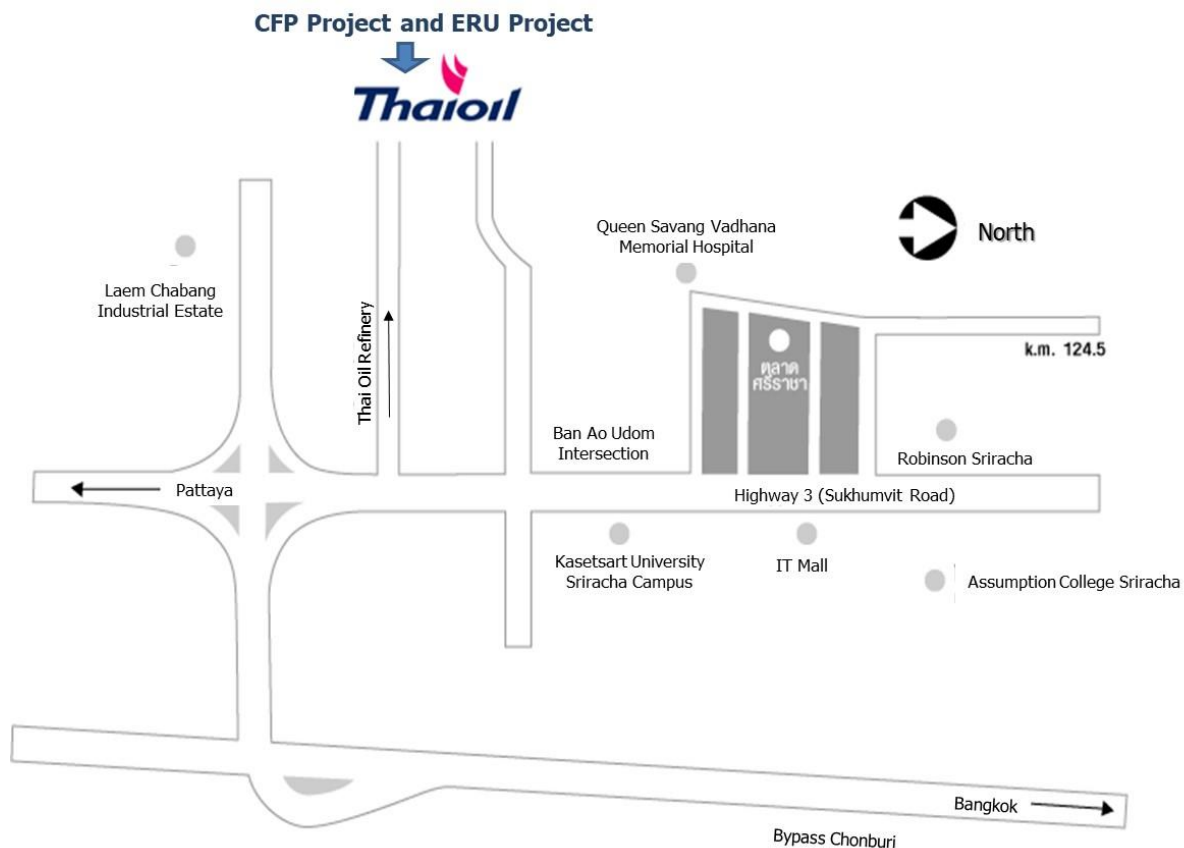
⁷ Capacity Payment (CP) is the portion of electricity tariff that reflect the availability of electricity generated from the ERU Project to be delivered to user, in which investment of the Company or Subsidiary in the ERU Project is being considered. In order to cover the whole investment of the Company or Subsidiary in the ERU Project as well as return on investment around 8% per annum, CP shall be calculated on monthly basis throughout the agreement term according to contracted capacity of the ERU Project.

⁸ Energy Payment (EP) is the payment for each Kilowatt of electricity generated and delivered to for the energy delivered to user. The calculation of the Energy Payment shall referred to net cost of electricity and by-product generation (after deducting revenue from sale of by-product of the ERU Project) such as fuel cost, operating expenses, and maintenance cost. Energy Payment is, therefore, the electricity tariff that take net operating cost of the Company or Subsidiary into consideration.

⁹ Sale and purchase price of petroleum pitch is calculated from blending of gas oil to the pitch in order to make comparable quality of pitch to that of fuel oil. Then, price of fuel oil shall be deducted by price of gas oil according to the blending ratio and converted to derive base price of petroleum pitch as at the beginning of 2023. Price of petroleum pitch in subsequent years shall base on growth of market price of electricity.

Lease Term	The sub-lease has a term of approximately 25 years from the Closing Date, and the parties may agree to extend the term of agreement shall not exceed the term of the Land Lease Agreement between TOP and the Ministry of Finance.
Rental and Payment of Rental	The rental for the sub-lease is approximately USD 13.08 million or approximately Baht 416.54 million ¹⁰ , payable in advance by the sub-lessee to the sub-lessor on a yearly basis.
Ownership of Buildings	Any buildings constructed by the sub-lessee on the sub-leased land, or any modifications or additions in the sub-leased land, reparations or new constructions which are not equipment or machinery shall fall under the ownership of the Ministry of Finance.

Project Site



1.6 Total Value of Assets Being Acquired and Criteria Used for Calculation of Consideration Value

1.6.1 Total value of consideration

Asset Acquisition Transaction

The total value of consideration of the ERU Project for the Asset Acquisition Transaction is estimated from value of assets or value of investment in the ERU Project (under Agreement No. 1: APA), comprising of investment in assets such as equipment and machinery and related expenses of the ERU Project of not exceeding USD 757.00 million or approximately Baht 24,112.49 million, and value of the Land Sub-Lease Agreement of USD 13.08 million or approximately Baht 416.54 million (under Agreement No. 5), totaling USD 770.08 million or approximately Baht 24,529.03 million.

Details of consideration for the Asset Acquisition Transaction are as follows:

Agreement	Total Value
<u>Construction Phase</u>	
Asset Sale and Purchase Agreement (Agreement	Not exceeding USD 757.00 million (approximately Baht 24,112.49 million)

¹⁰ In making the payment, the parties may specify price and method of payment as being denominated in Thai Baht or United States Dollars currency. If the payment is agreed to be made in United States Dollars, the actual Thai Baht currency value of the transaction depends and may increase or decrease based on the exchange rate agreed by the parties.

Agreement	Total Value
<u>Construction Phase</u>	
No. 1: APA)	
<u>Operation Phase</u>	
Land Sub-Lease Agreement (Agreement No. 5)	Approximately USD 13.08 million (approximately Baht 416.54 million)
Total value of consideration	Approximately USD 770.08 million (approximately Baht 24,529.03 million)

Connected Transaction

The total value of consideration of the ERU Project for the Connected Transaction is estimated from the combined value of Agreements No. 1 – No. 5 of approximately USD 12,264.93 million or approximately Baht 390,671.04 million.

Details of consideration for the Connected Transaction are as follows:

Agreement	Total Value
<u>Construction Phase</u>	
Asset Sale and Purchase Agreement (Agreement No. 1: APA)	Not exceeding USD 757.00 million (approximately Baht 24,112.49 million)
<u>Operation Phase</u>	
Fuel and Utilities Supply Agreement (Agreement No. 2: FUSA)	Approximately USD 3,716.17 million (approximately Baht 118,370.05 million)
Power Purchase Agreement (Agreement No. 3: PPA)	Approximately USD 6,813.15 million (approximately Baht 217,017.22 million)
Operation and Maintenance Services Agreement (Agreement No. 4: OMSA)	Approximately USD 965.53 million (approximately Baht 30,754.74 million)
Land Sub-Lease Agreement (Agreement No. 5)	Approximately USD 13.08 million (approximately Baht 416.54 million)
Novation Agreement	-
Total value of consideration	Approximately USD 12,264.93 million (approximately Baht 390,671.04 million)

1.6.2 Criteria used for determination of consideration

Asset Acquisition Transaction

Total value of the assets to be acquired is approximately USD 770.08 million or approximately Baht 24,529.03 million, comprising investment in assets such as equipment and machinery and related expenses of the ERU Project of not exceeding USD 757.00 million or approximately Baht 24,112.49 million, and value of the Land Sub-Lease Agreement of USD 13.08 million or approximately Baht 416.54 million. The determination of the consideration for the ERU Project is based on the assessment of the investment value, taking into consideration the enquiry into and evaluation of the construction value, price of equipment and machinery, as well as other related costs and expenses. Details of the determination of consideration and payment methods are as follows:

Agreements	Total Value	Basis Used to Determine Total Value of the Transaction	Payment Method
<u>Construction Phase</u>			
Asset Sale and Purchase Agreement (Agreement No. 1: APA)	Not exceeding USD 757.00 million (approximately Baht 24,112.49 million)	Based on investment cost of the CFP calculated from the assessment of bids based on the preliminary engineering design, covering detailed engineering design, procurement and construction/installation of machinery and equipment, other estimated expenses which are relevant to and necessary for the ERU Project, as well as the estimated interest expenses during construction.	By cash (payment in installments of approximately 20% of the purchase price during construction period, and payment of the remaining amount upon transfer of the ownership of the ERU Project, which is expected to occur during Q3-Q4/2023).
<u>Operation Phase</u>			
Land Sub-Lease Agreement (Agreement No. 5)	Approximately USD 13.08 million (approximately Baht 416.54 million)	The total value is derived from 25-year projection, based on the rental fee specified by the Ministry of Finance. Total construction and operation period of the ERU Project is about 30 years (5 years + 25 years).	By cash (payment in annual installments throughout the term of the Agreement).

Connected Transaction

Total value of the Connected Transaction is approximately USD 12,264.93 million or approximately Baht 390,671.04 million. The basis used to determine total value of the transaction is as follows:

Agreements	Total Value	Basis Used to Determine Total Value of the Transaction	Payment Method
Construction Phase			
Asset Sale and Purchase Agreement (Agreement No. 1: APA)	Not exceeding USD 757.00 million (approximately Baht 24,112.49 million)	Based on investment cost of the CFP calculated from the assessment of bids based on the preliminary engineering design, covering detailed engineering design, procurement and construction/installation of machinery and equipment, other estimated expenses which are relevant to and necessary for the ERU Project, as well as the estimated interest expenses during construction.	By cash (payment in installments of approximately 20% of the purchase price during construction period, and payment of the remaining amount upon transfer of the ownership of the ERU Project, which is expected to occur during the Q3-Q4/2023).
Operation Phase			
Fuel and Utilities Supply Agreement (Agreement No. 2: FUSA)	Approximately USD 3,716.17 million (approximately Baht 118,370.05 million)	Total value is derived from 25 - year projection, whereby <ul style="list-style-type: none"> - Petroleum pitch: Based on price of fuel oils, diesel oils, and purchase price of electricity of the Provincial Electricity Authority¹¹. - Price of other products: Based on market price. 	By cash (payment according to actual purchase throughout the term of the Agreement)
Power Purchase Agreement (Agreement No. 3: PPA)	Approximately USD 6,813.15 million (approximately Baht 217,017.22 million)	Total value is derived from 25-year projection, whereby <ul style="list-style-type: none"> - Electricity price: Based on Capacity Payment structure under the agreement, comprising of Capacity Payment¹² and Energy Payment¹³. - Price of other products: Based on market price. 	By cash (accepting payment according to actual purchase throughout the term of the Agreement)
Operation and Maintenance Services Agreement (Agreement No. 4: OMSA)	Approximately USD 965.53 million (approximately Baht 30,754.74 million)	Total value is derived from 25-year projection, based on operating and maintenance expenses of the comparable power and steam generation unit, and compared to sophistication of equipment and production process.	By cash (payment in monthly installments throughout the term of the Agreement)
Land Sub-Lease Agreement (Agreement No. 5)	Approximately USD 13.08 million (approximately Baht 416.54 million)	Total value is derived from 25-year projection, based on the rental fee specified by the Ministry of Finance. Total construction and operation period of the ERU Project is about 30 years (5 years + 25 years).	By cash (payment in annual installments throughout the term of the Agreement).
Novation Agreement	-	There is no determination of price since this is an assignment of rights and obligations as the owner of the ERU, which is carried out as a part of the Asset Sale and Purchase Agreement of the ERU.	-

1.7 Calculation of the Transaction Size

Asset Acquisition Transaction

Criteria for Transaction Size Calculation	Calculation Formula	Transaction Size
1. Net tangible assets (NTA)	Not applicable since it is an investment in the ERU Project, not an acquisition of securities	N/A
2. Net profit	Not applicable since it is an investment in the ERU Project, not an acquisition of securities	N/A
3. Total value of consideration	Baht 24,529.03 ¹¹ million / Baht 64,278.27 ¹² million	38.16%
4. Value of securities issued by the Company as consideration for the acquired assets	Not applicable since there is no issuance of new securities as consideration for the acquired assets	N/A
Highest transaction size		38.16%
Highest transaction size when combined with value of transactions during the past 6 months on the total value of consideration criteria		42.94%

¹¹ Please refer to Footnote 9.

¹² Please refer to Footnote 7.

¹³ Please refer to Footnote 8.

Source: 1/ Details as presented in Part 1, Clause 1.6, Sub-Clause 1.6.1 "Asset Acquisition Transaction," of this report.
 2/ Total assets of the Company based on the reviewed consolidated financial statements as of September 30, 2018.

Connected Transaction

Criteria for Transaction Size Calculation	Calculation Formula	Transaction Size
Total value of consideration payable to connected persons	Baht 390,671.04 million / 39,031.95 ^{1/}	1,000.90%

Source: 1/ Net tangible assets of the Company = Total assets of Baht 64,278.27 million – Intangible assets of Baht 505.14 million – Total liabilities of Baht 22,502.23 million – Non-controlling interests of subsidiaries of Baht 2,238.95 million, based on the reviewed consolidated financial statements of the Company ended September 30, 2018 (the intangible assets of Baht 505.14 million include goodwill of Baht 14.65 million and intangible assets of Baht 490.48 million).

1.8 Sources of Funds for the Transaction

For the investment in the ERU Project, the Company will use its internal cash flow and/or will seek for funding from other sources as necessary and appropriate, such as obtaining financing from financial institutions.

1.9 Conditions for Entry into the Transaction

The investment in the ERU Project shall be subject to approval of the 2019 Annual General Meeting of Shareholders of the Company and the 2019 Annual General Meeting of Shareholders of TOP, and shall be contingent upon the following conditions:

- (1) Under the Asset Sale and Purchase Agreement (APA), TOP will transfer ownership of the ERU Project to the Company or Subsidiary upon the fulfillment of the conditions precedent specified in the Asset Sale and Purchase Agreement, which include the signing by TOP of a Provisional Acceptance Certificate (PAC) for the CFP to the EPC Contractor which is estimated to take place in Q3/2023, and the purchaser and seller receive all necessary approvals from the relevant authorities in relation to the transfer of ownership of the ERU Project such as approval of the EIA, a factor license (RorNgor. 4), a license for energy industry operation, the BOI promotion certificate for the ERU Project, and necessary approvals for the acquisition and disposition of the ERU Project from the ERC, etc. (Please refer to more details in Attachment 2 of this report.)
- (2) The Relevant Agreements during the operation phase, including the Fuel and Utilities Supply Agreement, the Power Purchase Agreement, the Operation and Maintenance Services Agreement, the Land Sub-Lease Agreement and the Novation Agreement, must be executed prior to the Closing Date.

2. Profile of Global Power Synergy Public Company Limited (GPSC)

Please refer to details in Clause 5 of the Information Memorandum on Asset Acquisition and Connected Transactions of the Company under Schedule 2 (Attachment 4) and the 2018 Annual Report of the Company (Attachment 1), which are enclosed with the notice of the shareholders' meeting.

3. Profile of Thai Oil Public Company Limited (TOP)

Please refer to details in Attachment 1 of this report.

4. Summary of Significant Agreements Related to the Energy Recovery Unit

Please refer to details in Attachment 2 of this report.

Part 2: Opinion of the Independent Financial Advisor on Reasonableness of the Asset Acquisition and Connected Transactions

In determining the reasonableness of the transaction, CapAd has taken into account the following key factors:

1. Objective and Necessity of the Transaction

As the PTT Group's power flagship with a key role in developing, investing in and operating power business at home and abroad, the Company has devised the business policy, target, and strategic plan that emphasize inorganic growth both within and outside the PTT Group. A focus is also placed on ensuring energy security to cater for growth of the PTT Group and other industries and seeking investment opportunities in power projects in the country and overseas. In new project developments, the Company has a strategic plan to grow together with the PTT Group's investment, expand customer base to cover the entire PTT Group, including its electricity business so as to serve the group's power demand, and create an opportunity to further develop the electricity business that uses non-conventional fuels to ensure energy security in the future.

The investment in the ERU Project, which is a part of the CFP of TOP, is considered a promising project that is likely to generate favorable returns for the Company. It is accordingly consistent with the Company's business policy, target and strategic plan. Therefore, the Board of Directors' Special Meeting No. 2/2019, held on January 21, 2019, resolved to propose the Asset Acquisition and Connected Transactions to the shareholders' meeting for consideration and approval.

2. Comparison of Advantages and Disadvantages of the Transaction

2.1 Advantages and Benefits of the Transaction

(1) The Project is consistent with the Company's business policy to become the PTT Group's power flagship and will create added value to the Company.

The investment in the ERU Project aligns with the Company's business policy and strategic plan, as described in Part 2, Clause 1 above, and will create added value to the Company, whereby its electricity generating capacity will be expanded to respond to growth and power demand of the PTT Group. Having an installed capacity of 250 MW, the ERU Project will supply electricity of around 180 – 200 MW and steam of about 175 tons/hour throughout the project life of 25 years (+5 years given a renewal of agreement) to the CFP, which is a project aimed to enhance production efficiency of the existing oil refinery of TOP, a PTT Group member, and located in the same compound as TOP's refinery at Thung Sukhla Sub-District, Sriracha District, Chonburi Province. This will ensure regular returns from such investment for the Company throughout the project life and, hence, add value to the Company in the long term.

(2) The Project will create an opportunity to further develop the electricity generating and other fuel businesses and enhance the Company's competitiveness in the electricity generating business.

As at the end of 2018, GPSC Group has been generating electricity from the combined cycle power plant which uses natural gas as the main fuel and diesel oil as the reserve fuel, the cogeneration power plant which uses natural gas as the main fuel, the solar power plant, and the hydropower plant.

The ERU Project will generate electricity from petroleum pitch, which is a by-product from crude oil refining process that must be processed before being reused as fuel. This is a reuse of residues from the refining process and reduction of the burden of waste disposal which is deemed as economic losses.

As such, the investment in the ERU Project will provide an opportunity for the Company to improve and expand its electricity business expertise into a more diverse type of fuel, as well as provide an opportunity to diversify and develop into the electricity generating and other fuel businesses. The power production in the ERU Project that a by-product left from the oil refining process as the source of fuel instead of the conventional fuel from natural gas, hydropower, and other alternative energy will help distinguish the Company's power generation capability from other producers, thus, enhance its competitiveness in the industry and relatively add value to the Company in the long run.

(3) The Project helps to expand the Company's electricity generating capacity.

As at the end of 2018, the Company's power production capacity according to its shareholding percentage in power plants that have already commenced commercial operation and are under construction is as tabulated below:

Product	Location	Production Capacity According to Shareholding Percentage		
		Commercially Operated	Under Construction	Total
Electricity	Domestic	1,509 MW	78 MW	1,587 MW
	Overseas	21 MW	347 MW	368 MW
	Total	1,530 MW	425 MW	1,955 MW
Steam	Domestic	1,512 tons/hour	73 tons/hour	1,585 tons/hour

Source: GPSC

Remark: Excluding production capacity of GLOW (GPSC is in the process of acquisition of all GLOW shares) (as at the end of Q3/2018, GLOW had an installed capacity of 3,207 MW of electricity and 1,206 tons/hour of steam), and a 39.5 MW solar power plant, the investment in which the Company expects to complete in Q1/2019.

After the investment in the ERU Project, the Company's installed production capacity for electricity and steam will increase by approximately 250 MW and 175 tons/hour respectively, and the Commercial Operating Date ("COD") is expected in Q3-Q4/2023.

(4) It will improve the Company's ability in power project development in an oil refinery plant from the initial stage to the commercial production stage and create an opportunity to develop personnel's capability and potential.

After completion of the front end engineering design (FEED) by TOP, the Company took part in conducting a feasibility study of the investment, technology, management and environmental impact of the ERU Project and thereby gain profound knowledge and understanding of the Project.

During the construction phase and operation phase, the Company or Subsidiary will assign a team of staff to be responsible for the ERU Project and to work and coordinate closely with TOP. The team will subsequently acquire a true understanding of the construction, installation and performance testing such that they will be able to follow the engineering design and issue the PAC to the EPC Contractor. Moreover, during the post-COD phase, the team will have an opportunity to enhance their knowledge and experience in construction, technology, fuel management, production planning, production process, technical know-how and maintenance of a power plant that use petroleum pitch as main fuel in order to create an opportunity to diversify into the electricity generating and other fuel businesses.

Therefore, the Company will be able to develop and provide an opportunity for its staff to operate a large-scale project, which will be beneficial to the management of other power projects in the future.

(5) It is, as of the Closing Date, an investment in a completed power project that already obtained all permits, thus minimizing financial risk, technical risk and project management risk.

Pursuant to the conditions specified in the Asset Sale and Purchase Agreement (APA), the Closing Date will take place upon the completion of construction, the issuance of the Provisional Acceptance Certificate (PAC), and the fulfillment of all conditions precedent set out in the APA. The purchase price of the assets shall not exceed USD 757.00 million or approximately Baht 24,112.49 million, which already includes a 10% contingency amount. Therefore, the Company or Subsidiary shall be able to mitigate financial risk, technical risk and project management risk as follows:

- The Company or Subsidiary will bear no cost overrun risk, given the asset acquisition cost of not exceeding USD 757.00 million or approximately Baht 24,112.49 million.
- The investment in the ERU Project will occur upon the issuance of the PAC which is subsequent to the completion of machinery performance test for a period of approximately 6 months from the date of the Ready for Performance Test (RFPT) of the CFP, thus, ensuring that the ERU Project will be able to operate the whole production process according to the design and to supply electricity and steam to the CFP.
- TOP must duly receive the various necessary approvals prior to the Closing Date, which include (a) the approval of the EIA report of the ERU Project from ONEP, (b) the BOI promotion certificate for the ERU Project, (c) a license for energy industry operation and the approval from ERC which is necessary for the acquisition and disposition of the ERU Project (the ERU Project is a transaction conducted in the same group of business and TOP is the sole purchaser of electricity and steam from GPSC, thus, posing no impacts on the competition or the electricity market), and (d) a factory license (RorNgor. 4), etc. Thus, the said investment by the Company will be made at an appropriate timing.

(6) This is an investment in a sound and potential project

The ERU Project is considered a sound and potential project which will generate satisfactory income and return throughout the project life and create an opportunity for the Company in the future based on the following reasons:

(6.1) The Project will commercially generate income immediately as of the Closing Date and is supported by the long-term Power Purchase Agreement throughout the project life.

The ERU Project will commence operation as from the Closing Date, which is expected in Q3-Q4/2023. The Company or Subsidiary will be able to commercially generate income and realize return from the Project instantly. Being secure by the long-term Power Purchase Agreement for the ERU Project throughout the project life starting from the Closing Date, the Company or Subsidiary will earn recurring income and bring in cash flow from the stable revenue and performance throughout the 25-year project life, thereby boosting its revenue and business potential in the long term. Production capacity of the ERU Project will be aligned with the production capacity of the CFP since the main source of fuel for electricity generation is petroleum pitch, which is a residue from crude oil refining process in the CFP's refinery unit.

Based on the opinion of the auditors of the Company and TOP, this item will be recorded as a financial lease (Please refer to more details in Part 2, Clause 5.1, of this report).

(6.2) The Project will deliver a reasonable internal rate of return.

The Project's net present value (NPV) is estimated at USD 23.75 million – USD 25.76 million (approximately Baht 756.51 million – Baht 820.43 million), with an internal rate of return (IRR) of approximately 8.00% per annum, which is higher than average WACC of 7.25% per annum, and a payback period of approximately 10.09 years from the commercial operation date (COD) (approximately January 1, 2024 according to the financial projection), which is considered appropriate by the IFA when compared with the investment value. (Please refer to more details in Part 3 of this report.)

(6.3) The Project is undertaken through cooperation between the PTT Group members, which is beneficial to the Company.

The ERU Project is carried out through cooperation with TOP and serves as a supporting unit to use petroleum pitch, which is a residue from the oil refining process, in generating electricity and steam to be delivered back to the CFP's distillation unit. In this respect, TOP is responsible for (a) construction work to ensure the engineering design will support operation of the CFP, (b) procurement of fuel and necessary utilities, and (c) management of the production and maintenance of the ERU Project, thus mitigating the Company's production risk.

Moreover, the team of staff of the Company or Subsidiary has participated in the investment feasibility analysis, the follow-up and inspection of operation process, and the continuous performance monitoring throughout the project life.

Under a Memorandum of Agreement between TOP and PTT, PTT will purchase liquefied petroleum gas and various types of oil from the CFP in a minimum quantity of 49.99% of TOP's production output at a competitive price. This demonstrates the stability of the CFP's production to a certain extent, which will affect the volume of petroleum pitch to be used for electricity production and the power demand of the CFP.

Therefore, such cooperation will be favorable to both parties. The Company or Subsidiary will receive a reasonable internal rate of return and gain experience and track record in a power plant business that has different production process from its existing power plants. At the same time, TOP will be able to secure an adequate source of power supply to meet its refinery plant's future demand by optimizing the use of a by-product from the crude oil refining process and, hence, be able to reduce the burden of waste disposal/reduce losses due to such waste disposal.

(6.4) The Project is eligible for the BOI promotion.

One of the conditions to be fulfilled as at the Closing Date is that the ERU Project must receive a BOI promotion certificate. The ERU Project is eligible to apply for promotional privileges from the Board of Investment (BOI) in accordance with the Investment Promotion Act, Section 7: Service and Public Utilities, Category 7.1 Public Utilities and Basic Services: Production of Electricity and Steam from Waste (Category 7.1.1.1), which are entitled to exemption from corporate income tax for 8 years (unlimited amount) for revenues from sales, except for revenues from sales of steam, and exemption from import duty on machinery.

TOP filed an application for the BOI promotion certificate in October 2018. It meets the criteria set forth in the BOI Announcement No. 10/2561 Re: Special Measures to Stimulate Investment during Thailand Investment Year, which grants the rights and benefits such as a 50% reduction of corporate income tax for 3 years from the end of the tax holiday.

(7) The Project provides social and environmental benefits through appropriate management of by-products for environmental conservation.

The ERU Project uses a residue from the oil refining process (petroleum pitch) as the main fuel for generation of electricity and steam for supply to the Clean Fuel Project (CFP) of TOP by employing a proper technology for such by-product management. As such, the ERU Project will contribute to society as a whole in terms of worthwhile resource management and environmental conservation.

2.2 Disadvantages of the Transaction

(1) The Company shall have increasing debt, interest expenses, and debt to equity ratio.

The sale and purchase price under the APA is not exceeding USD 757.00 million or approximately Baht 24,112.49 million. To partially cover such amount, the Company will seek for funding from financial institutions in the form of project finance or other types of financing after Q3/2023 in a proportion of about 75% or approximately Baht 18,084.37 million. As such, the investment in the Project will result in an increase in its debt burden and finance costs, thus, relatively pushing up its debt to equity ratio. However, the Company will opt for a suitable form of fund raising during such period, while taking into account financial ratios relevant to its debt service ability (as described in Part 2, Clause 4.1, of this report) to ensure that its credit rating will not be affected.

According to its consolidated financial statements as at December 31, 2018, the Company had total liabilities of Baht 22,089.94 million, shareholders' equity of Baht 42,349.08 million, net interest-bearing debt to equity ratio of 0.41 times, debt to equity ratio of 0.52 times, and net debt to equity ratio of 0.27 times.

Therefore, after entering into the transaction with the ownership transfer and payment of the purchase price to be made during Q3-Q4/2023, from the calculation based on the abovementioned financial statements regardless of future performance and other investments (excluding the Company's investment in all ordinary shares of GLOW and the solar power plant in Q1/2019), the Company's net interest-bearing debt to equity ratio will edge up to approximately 0.54 times, debt to equity ratio to approximately 0.60 times, and net debt to equity ratio to 0.51 times. The actual level of such ratios will depend on financial information prevailing at the time of entering into the transaction.

Nonetheless, such increasing net debt to equity ratio will not exceed the financial covenants set out by financial institutions and the covenants of the Company's debentures which is specified at not over 2.5 times and will also not exceed the Company's financial ratio policy of not over 1 time.

For the investment in all ordinary shares of GLOW at a maximum value of approximately Baht 138,814.19 million, the Company will raise funds from debenture issuance and capital increase in a proportion of approximately 48% and 52% respectively. As a result, its debt to equity ratio from the investment in all ordinary shares of GLOW (based only on the sources of funds to be used regardless of the ratio after consolidated GLOW business into the Company's financial statements) will be at approximately 0.93 times, thus, reflecting no impact on the debt incurrence of other projects.

(2) Risk involved with adequacy of funds in the event that the Company fails to obtain loans as planned.

The Company plans to apply for financial supports from financial institutions when the Project nearly complete in 2023. Given that the Company or Subsidiary fails to obtain project finance and/or other types of credit facilities in the estimated required amount of approximately Baht 18,084.37 million, which is 75% of the total asset purchase price under the APA, the Company or Subsidiary will then have to seek for other sources of fund, probably through a registered capital increase which could cause a dilution effect on the Company's shareholders during that time.

However, the Company is confident that it will fully obtain the desired amount of loans. After all, the Company has a policy to maintain its net debt to equity ratio at not over 1 time and debt service coverage ratio (DSCR) of the ERU Project at above 1.2 times, which are the financial ratios that could positively support the loan application from financial institutions.

(3) Risk associated with heavy reliance on Thai Oil PCL. (TOP).

The ERU Project was initiated from a study conducted by TOP, before turning into a cooperative effort between the Company and TOP. The ERU Project has TOP as its sole customer according to the PPA, demonstrating heavy income reliance on one single customer. Should TOP need to cease its oil refining operation for whatsoever reason, whether for a short or long period, this will directly impact the ERU Project. Nonetheless, pursuant to the PPA, the contracted capacity is set at 180 - 200 MW (which can be adjusted, as deemed fit, within the first 2 years from the effective date of the PPA) and the capacity payment is clearly determined to cover the entire investment and the internal rate of return, thereby helping to mitigate the income risk.

Besides, during the operation phase throughout the project life of 25 years, the Company or Subsidiary will enter into agreements relevant to the whole production process with TOP, consisting of (a) procurement of the main fuel for electricity generation, which is petroleum pitch, including the reserve fuel and utilities, solely from TOP under the FUSA, (b) employment of TOP as provider of operation and maintenance services under the OMSA, and (c) sub-lease of land which is the location of the ERU Project from TOP.

Serving as both the procurer of the main fuel (petroleum pitch) and utilities and the service provider in relation to electricity generation and maintenance, TOP will be able to align the fuel supply plan with the power production and maintenance plan in accordance with the terms and conditions set forth in the agreements to ensure availability of fuel and achieve the desired amount of electricity.

However, the ERU Project has been developed to dispose petroleum pitch of the CFP by using it as fuel for electricity generation which will be delivered to other refinery units in the CFP, which is the core business of TOP, and the ERU Project. This results in an increasing refinery capacity of TOP from 275,000 barrels per day to 400,000 barrels per day. Thus, it can be assured that TOP will be able to comply with the conditions specified in the agreements to prevent any adverse effect on the overall performance of the CFP.

The company has a measure to control/follow-up operations during the Operation Phase, where there shall be a GPSC's working team to follow-up operations to be in accordance with planned electricity generation which is mutually agreed on a monthly basis. Such plan contemplates electricity generating plan, primary fuel consumption, transmission of electricity to the CFP, repair and maintenance plan, and calculation of revenue, cost, and expenses according to the agreed concept stated in the Relevant Agreements.

In the event that TOP is unable to comply with terms of the agreement, for example, TOP cannot deliver fuel according to the required quantity as specified in the FUSA, there is a control mechanism of the OMSA in which TOP shall manage the operation as planned. If the project is unable to generate minimum electricity, the Company still entitle to receive Capacity Payment of such discrepancy. In addition, in case of termination of OMSA, the Company shall receive the remaining amount of total investment at a rate specified in the PPA (every agreement in the Operation Phase is inter-related and use the concept of charging all costs and expenses into Capacity Payment).

(4) Risk associated with changes in the relevant government sector's policies or rules and regulation.

Since electricity business is governed by various authorities such as the ERC and the Electricity Generating Authority of Thailand (EGAT), it is exposed to risk from new policy issuance or changes in existing policies such as a change in the rate of remittance of income to the Power Development Fund under the ERC's notification, which could eventually affect the Project's performance.

3. Comparison of Benefits and Impacts between the Transaction with the Connected Person and the Transaction with a Third Party

The investment in the ERU Project is deemed as a specific project investment which is not conducted in general. This is because the ERU Project uses petroleum pitch derived from an oil refinery as the main source of fuel and, hence, its engineering design will support/link with equipment in the refinery plant. As a part of the CFP of TOP, the ERU Project will generate electricity by using petroleum pitch, a by-product from the oil refining process of the CFP, as fuel and deliver back the generated electricity to crude oil refining unit and other production units in the CFP only. The detail design must therefore link with the fuel (petroleum pitch) supply process from RHCU to the ERU, which are located in the same area, and also link with the electricity and steam transmission to other production units of the CFP.

Furthermore, the investment in such a large-scale power project with an installed production capacity of 250 MW of electricity and 175 tons/hour of steam cannot be easily formed, particularly in the country, since it requires a vast area of land in a suitable location and must gain acceptance from nearby communities. The Company has not received any proposal from other investors who have invested in other projects of the similar scale to the ERU Project, including power projects using natural gas and other alternative energy as fuel and power projects in an oil refinery plant using petroleum pitch as the main fuel.

As such, the Company cannot consider the investment in this transaction in the same manner as a general project investment and cannot compare this transaction with the transaction with a third party.

4. Other Analysis

4.1 Adequacy of Funds for the Transaction

For the investment in the ERU Project, the Company will use its internal cash flow and/or will seek for other sources of funds as deemed necessary and appropriate, such as obtaining financing from financial institutions.

The requirement and sources of funds are estimated as follows:

	2019	2020	2021	2022	2023 as at the Closing Date	Total
Estimated fund requirement according to installment payment in the APA (payable in Baht currency)						
Amount (USD million)	13.76	55.06	27.53	41.29	619.36 (remaining balance of purchase price)	Not exceeding 757.00
Amount (Baht million equivalent)	438.42	1,753.69	876.84	1,315.26	19,728.28 (remaining balance of purchase price)	Not exceeding 24,110.49
Sources of funds	Internal cash flow and/or other sources of funds				Project finance and/or other types of loans and internal cash flow of the Company	
Funding ratio	Internal cash flow : Project Finance and/or other types of loans Approximately 25% : 75% (Baht 6,028.12 million : Baht 18,084.37 million)					

Remark: The land sub-lease fee will be paid on an annual basis throughout the agreement term with funds from internal cash flow of the ERU Project.

The Company will make available its internal cash flow and apply for project financing and/or other types of loans from financial institutions who will consider approving such credit facilities based primarily on the Company's creditworthiness. (The Company will increase its capital or lend to the subsidiary to be newly established during the pre-Closing Date period.)

The IFA has considered the Company's cash and cash equivalent, net cash flow from operating activities, and EBITDA as shown on its consolidated and separate financial statements. It is expected that the Company will have sufficient internal cash flow to cover the investment costs to be incurred prior to the Closing Date, as detailed below:

(Unit: Baht Million)	2014	2015	2016	2017	2018
Consolidated financial statements					
Cash and cash equivalent	3,420.95	2,864.88	5,421.67	3,964.78	4,911.41
Net cash flow from operating activities	4,603.40	2,631.79	4,130.09	3,152.97	5,848.11
EBITDA	2,726.00	2,772.00	3,809.00	4,187.00	5,457.00
Separate financial statements					
Cash and cash equivalent	3,336.15	2,755.74	4,754.69	3,917.04	4,851.40
Net cash flow from operating activities	4,594.46	2,711.27	3,666.58	2,704.81	3,715.35
EBITDA	2,904.82	3,423.64	4,086.65	4,385.50	4,154.28

Currently, the Company is in the process of investing in several projects which also require a huge amount of funds. These projects, which have already been approved by the Company's Board of Directors and are still in the process of seeking for an approval from the concerned authorities and fulfilling all conditions precedent to the share transfer and payment, include:

(1) An acquisition of ordinary shares in GLOW is equivalent to 69.11% of the total issued shares of GLOW at an approximate value of Baht 95,933.54 million (combining with the maximum amount to be used for making a tender for all ordinary shares of GLOW of approximately 42,880.65 million, total value of investment shall not exceed Baht 138,814.19 million). The Company is presently in the process

of acquisition of all ordinary shares of GLOW, of which funds shall be from debenture issuance and capital increase¹⁴; and

(2) An investment in ordinary shares of 3 entities operating solar power plant and related businesses at a combined value of approximately Baht 3,070.00 million. Share transfer is expected to be completed in Q1/2019¹⁵.

Therefore, in seeking for additional financing for the investment in the ERU Project which will occur in about the next 4 years, the Company must opt for an appropriate type of funds while taking into account of the financial ratios relevant to its debt service ability such as net debt to equity ratio¹⁶, net debt to EBITDA ratio, and funds from operation (FFO) adjusted net leverage ratio so as to ensure that its credit rating will not be affected.

4.2 Appropriateness of Conditions in the Draft Relevant Agreements

In view of the appropriateness of conditions set forth in the draft of 5 Relevant Agreements which are the Asset Sale and Purchase Agreement (APA), the Fuel and Utilities Supply Agreement (FUSA), the Power Purchase Agreement (PPA), the Operation and Maintenance Services Agreement (OMSA), and the Land Sub-Lease Agreement, including the Novation Agreement¹⁷, the IFA is of the opinion that such conditions are appropriate and beneficial to the Company since it will obtain a return on investment and benefit from the investment in the ERU Project. Besides, the Company will gain benefit from the PPA, considering that the ERU Project's electricity demand will be stable and hinge upon the capacity of TOP's oil refinery plant which is supported by the agreement with PTT. TOP will act as both the procurer of fuel and the provider of operation and maintenance services, thus enabling the production plan to be in line with the Company's requirement. Remuneration between the parties is deemed reasonable.

As set out in the draft APA that the Closing Date and the transfer of ownership in the ERU Project to the Company or Subsidiary shall be contingent upon completion of the construction under the conditions precedent, the Company will accordingly acquire a power plant which is ready for electricity and steam generation and already obtained all permits and promotional privileges. At the same time, the conditions set forth in other agreements could guarantee that the Company or Subsidiary will be protected against any damage, if any. As such, the investment in the Project should not lower benefits of the Company or Subsidiary and it is considered a worthy investment.

Regarding the term of the draft agreement and the renewal condition, the IFA views that the agreement term of 25 years with right to extend for another 5 years (but not exceeding the term of the land lease agreement between TOP and the Ministry of Finance which will expire on September 10, 2052) will be beneficial to the Company in the long term, enabling it to generate recurring income and long-term return.

5. Other Notable Issues

5.1 Accounting Treatment in the Form of Financial Lease

In legal, tax and BOI aspects (based on the draft Relevant Agreements), the Company or Subsidiary will become the owner of the ERU Project after the Closing Date and will generate and supply electricity and steam to TOP throughout the term of the PPA.

However, according to the Accounting Standard No. 17 (TAS 17), Re: Leases, and the Thai Financial Reporting Interpretation Committee No. 4 (TFRIC 4), Re: Determining whether an Arrangement Contains a Lease, the ERU Project is an asset specifically use in TOP's CFP Project and has TOP as a sole client. Due to the location of the Project, it is unable to sell products to other clients and has to produce in accordance with TOP's orders. Therefore, it is recognized on the financial statements as a financial lease.

The auditors of the Company and TOP have opined that this will fall into the category of financial lease, whereby the Company or Subsidiary, as the lessor, will record the "financial lease

¹⁴ Approved by the Extraordinary General Meeting of Shareholders No. 1/2018 held on August 24, 2018, and subsequently lower purchase price of GLOW shares as GLOW announced interim dividend payment.

¹⁵ Approved by the Board of Directors' Meeting of the Company No. 10/2018 on November 28, 2018.

¹⁶ Net debt is calculated from interest-bearing debt less cash and cash equivalent, restricted deposits at banks, and current investments.

¹⁷ TOP will assign its rights and obligations under the EPC, the Project Management Consultancy Agreement, and the License Agreement prevailing as at the Closing Date to the Company or Subsidiary.

receivable" as asset and gradually recognize interest income, whereas TOP, as the lessee, will record the "ERU Project" as assets and gradually recognize depreciation and interest expenses.

However, the accounting for financial lease is merely an accounting practice and will by no means affect either the payment under all agreements between the Company or Subsidiary and TOP or the cash flow, tax profits and taxes of the Company or Subsidiary.

5.2 Discrepancy between Thai Baht Currency Value of Asset Purchase Price Payable on the Transaction or Payment Date and Value of Assets in Thai Baht Applied in This Report

The Company or Subsidiary agrees to acquire the ERU Project from TOP in US Dollar currency at the amount not exceeding USD 757.00 million pursuant to the APA, but will pay for such price in Thai Baht currency. As such, the actual Thai Baht currency value of the transaction on the Closing Date or on each agreed payment installment date of the agreement depends and may increase or decrease based on the exchange rate specified in the agreement, not the exchange rate applied in this report.

Therefore, if the actual exchange rate is higher or lower than the exchange rate applied herein (Baht 31.8527/USD), the actual Thai Baht currency value payable for the asset purchase price will either increase or decrease from the figures expressed in Thai Baht currency in this report.

However, the capacity payment will be adjusted according to the actual Thai Baht currency value of the investment, thus posing no impact on the IRR of the ERU Project.

6. Summary of the Independent Financial Advisor's Opinion on Reasonableness of the Asset Acquisition and Connected Transactions

The investment in the ERU Project, which is a part of the CFP of TOP, is considered a promising project that is likely to generate favorable returns for the Company. It is accordingly consistent with the Company's business policy, target, and strategic plan that emphasize inorganic growth both within and outside the PTT Group. A focus is also placed on ensuring energy security to cater for growth of the PTT Group and other industries and seeking investment opportunities in power projects in the country and overseas. In new project developments, the Company has a strategic plan to grow together with the PTT Group's investment, expand customer base that covers the entire PTT Group, including its electricity business so as to serve the group's power demand, and create an opportunity to further develop the electricity generating business that uses non-conventional fuels to ensure energy security in the future.

The Company will gain the following benefits from the entry into the Asset Acquisition and Connected Transactions:

- (1) The Project is consistent with the Company's business policy to become the PTT Group's power flagship and will create added value to the Company.
- (2) The Project will create an opportunity to further develop the electricity generating and other fuel businesses and enhance the Company's competitiveness in the electricity generating business.
- (3) The Project helps to expand the Company's electricity generating capacity.
- (4) It will improve the Company's ability in power project development in an oil refinery plant from the initial stage to the commercial production stage and create an opportunity to develop personnel's capability and potential.
- (5) It is, as of the Closing Date, an investment in a completed power project that already obtained all permits, thus minimizing financial risk, technical risk and project management risk.
- (6) This is an investment in a sound and potential project because:
 - (6.1) The Project will commercially generate income immediately as of the Closing Date and is supported by the long-term Power Purchase Agreement throughout the project life;
 - (6.2) The Project will deliver a reasonable internal rate of return;
 - (6.3) The Project is undertaken through cooperation between the PTT Group members, which is beneficial to the Company; and
 - (6.4) The Project is eligible for the BOI promotion.
- (7) The Project provides social and environmental benefits through appropriate management of by-products for environmental conservation.

However, the transaction has the following disadvantages and risks:

- (1) The Company shall have increasing debt, interest expenses and debt to equity ratio;
- (2) Risk involved with adequacy of funds in the event that the Company fails to obtain loans as planned;
- (3) Risk associated with heavy reliance on Thai Oil PCL. (TOP);

(4) Risk associated with changes in the relevant government sector's policies or rules and regulations.

After considering objective and necessity of the transaction together with the advantages, disadvantages, benefits and risk factors, the IFA is of the opinion that the Company will be able to expand its production capacity and grow its income and profit, which is consistent with its strategic plan, while those risks are at an acceptable and manageable level. The transaction will be beneficial to society, the environment and the country as a whole. Therefore, **the Asset Acquisition and Connected Transactions is considered reasonable.**

Part 3: Opinion of the Independent Financial Advisor on the Appropriateness of the Acquisition Price and Conditions of the Asset Acquisition and Connected Transactions

The Board of Directors' Special Meeting of the Company No. 2/2019, held on January 21, 2019, resolved to approve the investment of the Company or a Subsidiary in the Energy Recovery Unit Project ("ERU Project"), which is a part of the Clean Fuel Project ("CFP") of TOP. The ERU Project is an electricity and steam generating unit, from which electricity and steam shall be delivered back for use in the CFP's production process, whereby the ERU Project will mainly use petroleum pitch, which is a by-product of the refinery process of the CFP, as the main source of fuel. The ERU Project has an installed electricity and steam generating capacity of approximately 250 MW and 175 tons per hour, respectively.

CapAd has considered the appropriateness of the investment value of the ERU Project by constructing the financial forecast of the ERU Project by taking into account future cash flows of the ERU Project (Free Cash Flow: FCF) and calculated;

- (1) Internal rate of return ("IRR") of the ERU Project,
- (2) Net present value ("NPV") of the ERU Project by using the weighted average cost of capital ("WACC") of the ERU Project as a discount rate, and
- (3) Payback period of the ERU Project.

The IFA evaluated the appropriateness of the investment in the ERU Project by using information obtained from the Company and other publicly-disclosed information, such as Form 56-1, audited and reviewed financial statements, Information Memorandum on Asset Acquisition and Connected Transactions of the Company with respect to the Acquisition of the Energy Recovery Unit, Memo of on ERU Cost Estimation prepared by Pöyry Energy Ltd. ("Pöyry")¹⁸, Memo on Technical Viability prepared by Pöyry¹⁹, Report of Heat and Material Balance – ERU prepared by Amec Foster Wheeler²⁰,

¹⁸ According to Memo on ERU cost estimates prepared by Pöyry Energy Ltd., Ref No. 127000517, dated October 11, 2018.

Pöyry Energy Ltd. is an international consulting and engineering firm that serves clients across the energy and industrial sectors especially those in power generation industry, transmission & distribution, forest industry, chemicals & bio-refining industry, mining & metals industry, transportation and water industry. The company is listed on the Helsinki Stock Exchange (Trading Code: POY1V) and is headquartered in Vantaa, Finland with 130 offices in 40 countries. It employs approximately 5,500 experts providing service in more than 100 countries. Its turnover in 2018 was at EUR 579.5 million.

Pöyry delivered approximately 10,000 projects each year. Its credential in huge engineering consulting projects includes:

- The world's longest traffic tunnel, the Gotthard Base Tunnel in Switzerland
- The world's largest combined power and desalination plant, Ras al-Khair in Saudi Arabia
- The first hydropower dam on the lower Mekong river, the Xayaburi Dam in Laos
- The largest and most energy efficient waste-to-energy plant in Finland, Vantaa Energy, Finland
- One of the world's most advanced sewage systems, Emscher, Germany
- The world's largest single-line pulp mill, Eldorado, Brazil
- One of the world's largest offshore wind farms, Lillgrund Wind Farm, Sweden

(Source: <https://en.wikipedia.org/wiki/Pöyry> and <https://www.poyry.com>)

¹⁹ According to Memo on Technical Viability prepared by Pöyry Energy Ltd., Ref. No. 127000555, dated October 8, 2018.

²⁰ According to the Report of "Heat and Material Balance – ERU" prepared by Amec Foster Wheeler, No. R1116010-18000-PF-HMB-0001, Revision Z1 (for design), dated April 21, 2017.

Amec Foster Wheeler was a company providing engineering, procurement, and construction management (EPC) contracting service and power equipment supply. Its Global Engineering and Construction (E&C) Group provides design, engineering and construction service of leading-edge processing facilities and related infrastructure for the upstream oil and gas, LNG and gas-to-liquids, refining, chemicals & petrochemicals, pharmaceuticals, biotechnology & healthcare, environmental and power industries.

Foster Wheeler was established in 1927 in USA and listed in the NYSE in 1929. In 2008, it moved its listing to Switzerland. Foster Wheeler was acquired by AMEC PCL. in the second half of 2014 and changed its name to form Amec Foster Wheeler. In 2017, it was acquired by and merged into John Wood Group with 60,000 employees and 235 offices in 60 counties. Its turnover was at USD 5,382 million in the first half of 2018.

Foster Wheeler's credentials include;

- Front End Engineering and Design (FEED), Managing Project Management Contractor (MPMC), and Project Management Consultant (PMC) of Paradip Refinery Project, India.
- EPC Management of Pluto LNG Plant, Australia.
- Maintenance, engineering, construction, and project management of the efficiency production improvement for Shell ONEgas, North Sea.
- Project management, engineering, procurement, inspection, construction management, health, safety and environment, action tracking, human factors engineering, quality assurance / quality control, environmental support, and flow assurance for BP's Gulf of Mexico and Louisiana deep water oil and gas production.
- World-scale environmental impact assessment for Mackenzie Valley Pipeline, Arctic Coast to Northwestern Alberta, Canada.
- Project management and consultancy for Kuwait Oil's efficiency improving project.
- Project managing PetroChina Guangxi Refinery project, China.

(Source: https://en.wikipedia.org/wiki/Foster_Wheeler, <https://www.amecfw.com>, <https://www.woodplc.com>)

industry information and financial information from various websites, and information from the SEC's website (www.sec.or.th), and the SET's website (www.set.or.th). The IFA has rendered its opinion based mainly on the assumption that all information and documents accurate and complete, and reflects current operating environment and most up-to-date information at the time of issuance of this report. Any change of such information may have material impact on business operation of the Company regarding the entry into this transaction and the IFA's opinion on this transaction as well as the shareholders' decision.

To support the consideration of the appropriateness of the transaction, the IFA conducted financial forecast for the ERU Project based on the financial forecast prepared by the Company and adjusted certain assumptions so as to reflect overall market conditions and current economic situation as well as to be in accordance with conservative basis. With this regard, the IFA has prepared the financial forecast for a period of 30 years from 2019 - 2048, to be in consistent with the construction period (5 years) and the term of the Power Purchase Agreement (25 years). The IFA assumed the ERU Project will start the commencement in early 2024, which was slightly delay from the schedule of the project around 3 months based on conservative basis.

The Energy Recovery Unit (ERU) is a utility support unit of the Clean Fuel Project (CFP) of TOP. It is an electricity and steam generating unit, using petroleum pitch, which is a by-product from the production process of the CFP, and steam produced from the production processes of other units of the TOP group, as the main sources of fuel for electricity generation from which electricity shall be delivered back to the CFP for internal use. Material agreements relating to the entry into this transaction are as follows:

- (1) Draft Asset Sales and Purchase Agreement (APA): A subsidiary to be incorporated by the Company (the "Subsidiary") will purchase the ERU Project from TOP at the value not exceeding USD 757 million (Capped Amount), consisted of Initial Purchase Price of USD 688.20 million and 10% Contingency of approximately USD 68.80 million. The Subsidiary will pay 20% of the Initial Purchase Price during construction period (4 years), and the remaining purchase price will be paid to TOP on the Closing Date.
- (2) Draft Power Purchase Agreement (PPA): The Subsidiary will enter into the Power Purchase Agreement with TOP with contracted generating capacity of 180 MW. The Power Purchase Agreement shall have a term of 25 years starting from the Closing Date, and the parties may agree to extend the agreement for another 5 years.
- (3) Draft Fuel and Utilities Supply Agreement (FUSA): TOP will be a counterparty as supplier of petroleum pitch, other fuels, and other utilities used in the ERU Project. The Fuel and Utilities Supply Agreement shall have a term of 25 years starting from the Closing Date, and the parties may agree to extend the agreement for another 5 years.
- (4) Draft Operation and Maintenance Services Agreement (OMSA): The Subsidiary will employ TOP to provide services for the operation and maintenance of the machinery of the ERU Project. The Operation and Maintenance Services Agreement shall have a term of 25 years starting from the Closing Date, and the parties may agree to extend the agreement for another 5 years.
- (5) Draft Land Sub-lease Agreement: The Subsidiary will enter into the Land Sub-lease Agreement with TOP which shall have a term of approximately 25 years.

Key assumptions for the financial forecast of the ERU Project, an electricity and steam generating unit with contracted capacity of 180 MW of electricity which will be delivered back to CFP Project, are as follows:

▪ **Production capacity**

The ERU Project has an installed electricity and steam generating capacity of approximately 250 MW and 175 tons/hour, respectively. The contracted capacity according to the PPA is 180 MW – 200 MW, which is net electricity capacity of the electricity for internal use in the ERU Project. However, in this financial forecast, the IFA assumed contracted capacity of 180 MW only. The ERU Project is expected to shut down for maintenance every 3 years where the shutdown schedule shall be in consistent with those of the CFP.

▪ **Revenue from sales of electricity**

During the Term of the Draft PPA, the Subsidiary shall have revenue from sales of electricity to TOP as follows:

Revenue from Sales of Electricity = Capacity Payment + Energy Payment

1. Capacity Payment (CP) is the portion of electricity tariff that reflect the availability of electricity generated from the ERU Project to be delivered to user, in which investment of the Company or Subsidiary in the ERU Project is being considered. In order to cover the whole investment of the Company or Subsidiary in the ERU Project as well as return on investment around 8% per annum, CP shall be calculated on monthly basis throughout the agreement term according to contracted capacity of the ERU Project. Moreover, CP is set to align with cash flow of the project. The calculation of CP can be summarized as follows:

$$\text{Capacity Payment} = \text{Base Capacity Payment} + \text{Adjustment Charge}$$

Where

- Base Capacity Payment Base: Monthly electricity tariff which refer to investment cost of the ERU Project (including project's return on investment) in order to be in line with cash flow of the project.
- Adjustment Charge: Adjustment of electricity tariff as a result of additional investment cost incurred during the operation phase.

Front-loaded Capacity Payment can be summarized as follows:

- Base Capacity Payment of USD 69.24 million per annum throughout the projected period (Year 1 – 25)
- Additional capacity payment for Year 1 – 8 of USD 6.83 million per annum
- Additional capacity payment for Year 9 – 15 of USD 2.80 million per annum

2. Energy Payment (EP) is the payment for each kilowatt of electricity generated and delivered to for the energy delivered to user. The calculation of the Energy Payment shall referred to net cost of electricity and by-product generation (after deducting revenue from sale of by-product of the ERU Project) such as fuel cost, operating expenses, and maintenance cost. Energy Payment is, therefore, the electricity tariff that take net operating cost of the Company or Subsidiary into consideration (excluding administrative expenses borne by the Subsidiary such as salary of managements, allocation of GPSC's expenses, audit fee, and etc.).

▪ Revenue from sales of other products

In addition to revenue from sales of electricity, the ERU Project generates revenue from sales of steam, condensate water, and sulfuric acid, which are by-products from the electricity generation. The selling price is as set out in the PPA and/or the reference market price of each product or the price of similar product that TOP purchases from other suppliers in nearby areas.

Summary of revenue from sales of electricity and other products of the ERU Project are as follows:

Revenue from sales	Unit	2024F ^{1/}	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Revenue from sales of electricity	USD mn.	171.95	174.27	165.27	177.83	181.58	169.20	185.53	188.04	177.50
Revenue from sales of steam and by-products	USD mn.	62.00	63.09	54.13	65.13	66.20	55.72	70.23	71.84	61.66
Total revenue from sales	USD mn.	233.95	237.35	219.40	242.96	247.77	224.92	255.76	259.88	239.16

Revenue from sales	Unit	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
Revenue from sales of electricity	USD mn.	214.09 ^{3/}	193.90	186.04	203.36	205.70	197.37	207.49	210.43
Revenue from sales of steam and by-products	USD mn.	73.87	75.44	62.87	78.28	79.42	68.40	82.19	83.83
Total revenue from sales	USD mn.	287.95	269.33	248.91	281.65	285.12	265.77	289.68	294.27

Revenue from sales	Unit	2041F	2042F	2043F	2044F	2045F	2046F	2047F	2048F
Revenue from sales of electricity ^{2/}	USD mn.	196.78	215.94	244.22 ^{3/}	207.62	225.09	228.27	213.51	235.24
Revenue from sales of steam and by-products	USD mn.	69.67	86.51	88.00	76.03	91.06	92.63	77.18	96.10
Total revenue from sales	USD mn.	266.45	302.45	332.23	283.65	316.15	320.90	290.69	331.34

Remark: 1/ The IFA assumed the ERU Project will commence its operation on January 1, 2024, which is slightly delay from the schedule of the project based on conservative basis.

2/ Revenue from sale of electricity = Capacity Payment + Energy Payment

3/ Revenue from sale of electricity in 2033 and 2043 increase from previous year as there shall be a change of Catalyst of the ERU Project every 10 year. Cost of the change of Catalyst paid by the Company or Subsidiary shall be recalculated in the Energy Payment and electricity tariff according to the PPA. As a result, revenue from sale of electricity in 2033 and 2043, when there are changes in Catalyst, increase from prior year.

- **Cost of sales**

Cost of sales comprised of fuel cost, material handling, utilities and others. Under the Fuel and Utilities Supply Agreement, TOP shall procure all fuel, material and utilities for the electricity generation of the ERU Project. TOP shall ensure that such fuel and utilities meet the specifications set on in the FUSA. The selling price is as specified in the FUSA and may be adjusted from time to time as mutually agreed in the future. Such incurred cost of sales shall be included in the calculation of the Energy Payment paid by TOP to the Company or Subsidiary.

In this financial projection, the quantity of fuel, material and utilities used in electricity generation are based on the Report of Heat and Material Balance – ERU prepared by Amec Foster Wheeler and adjusted by TOP in order to suit the specific features of the ERU and the CFP.

Fuel cost

Sale and purchase price of petroleum pitch is calculated from blending of gas oil to the pitch in order to make comparable quality of pitch to that of fuel oil. Then, price of fuel oil shall be deducted by price of gas oil according to the blending ratio and converted to derive base price of petroleum pitch as at the beginning of 2023. Price of petroleum pitch in subsequent years shall base on growth of market price of electricity. Petroleum pitch price will be adjusted using growth rate of approximately 1.36% per annum, based on the estimated growth rate of PEA's electricity tariff.

Price of the natural gas and fuel gas are based on market price and the change of the price is based on the internal forecast to be shared in PTT Group.

Utilities expenses

Majority of utilities is steam produced from the production processes of other units of TOP Group. In this financial forecast, steam price is based on selling price of steam that TOP sell to other parties in nearby areas. Growth rate of steam price is based on growth of natural gas price and consumer price index. The Company has checked the steam prices used in this financial forecast and found that such prices were closed to steam price sold by other projects of the Company.

In addition, prices of other materials and chemicals shall refer to market price of each product or the price that TOP sell to other parties in nearby areas. Growth rate of material and chemical prices is at approximately 2.00% per annum based on the estimated inflation rate and equivalent to the average CPI growth during the past 20 years (1994 – 2018).

Material handling

Material handling comprises of sand, bottom ash and fly ash. The prices of these materials are based on asked price from suppliers or refer to price of such materials used in other power plants of TOP. The Company has checked the material prices and found that such prices were closed to market price and/or the material prices used in other power plants of the Company.

- **Operation and maintenance expenses (excluding depreciation and amortization expenses)**

Under the Operation and Maintenance Service Agreement (OMSA), TOP will provide operation and maintenance service for the ERU Project. The scope of services includes management, operation, and maintenance of the ERU Project and all related facilities under quality standard, including the attainment of operational reliability, availability and performance of the ERU, pitch and by-products management and procurement of utilities necessary for the operation of the ERU in order to comply with terms and conditions of the PPA.

Operating and maintenance expenses to be paid to TOP shall be in accordance with the rate specified in the OMSA. However, in preparing the financial projection, the IFA has considered the estimated operating and maintenance expenses from projected operating and maintenance expense of the ERU Project which consist of cost of chemical, cost of catalyst, maintenance expenses, employee expenses, sub-lease fee, selling and administrative expenses, insurance expense, back-up power fee, and other fees. Such incurred operation and maintenance expenses shall be included in the calculation of the Energy Payment that TOP has to pay to the Company or Subsidiary.

Main assumptions are as follows:

- Maintenance expenses are assumed at 1.25% of the project cost or approximately USD 9.93 million in the first year and increased by 2.00% per annum. This is based on maintenance expenses of other typical power plants of TOP which is at approximately 1.00% of project cost. Considering the complexity of the ERU Project comparing to other power plants, TOP has estimated maintenance expenses of the ERU Project at 1.25% of the project cost. In addition, the technical consultant of the Company, namely Pöyry, has viewed that the maintenance expenses at 1.25% of the project cost is appropriate.

- Employee expenses are estimated at 1.00% of the project cost and shall increase by 5.00% per annum based on those of other power plants of TOP.
- Chemical and catalyst costs are estimated by TOP. Prices of chemical and catalyst are based on asked prices from suppliers, and assumed to increase by 1% – 2% per annum.
- Selling and administrative expenses (SG&A) are expenses for utilization of part of the CFP's assets. The SG&A is assumed at USD 0.25 million per annum, which is based on TOP's estimation. Such expenses are assumed to increase by 2.00% per annum based on the estimated inflation rate and equivalent to the average CPI growth during the past 20 years (1994 – 2018).
- The Subsidiary shall enter into the Land Sub-lease Agreement with TOP, where the Land Sub-Lease Agreement shall have a term of approximately 25 years. The Sub-lease fee is estimated based on existing land rental rate plus a margin of 25.00%²¹, and will increase by 10.00% every 3 years.
- Insurance expenses are estimated at 0.34% of the project cost and increased by 2.00% per annum based on TOP's estimation. However, this insurance expense is slightly higher than those of other power plants of the Company as the ERU Project is a power plant project inside an oil refinery plant, where higher standard and higher risk level is assumed. Consequently, the insurance expenses of the ERU Project will be higher than those of other types of power plants.
- Back-up power fee is an expenses paid to the Electricity Generating Authority of Thailand (EGAT) for back-up power. It is estimated at Baht 113.85 million per annum (approximately USD 3.57 million²²) throughout 25-year period, based on the notification of EGAT Re: "the back-up power fee starting from November 2015".
- Other fees comprise of annual fee for electricity generation license (1 satang/unit), annual fee for electricity distribution license (0.7 satang/unit), and land and signboard tax including other fees are assumed at USD 0.97 million per annum throughout projection period.

Summary of cost of sales and operation and maintenance expenses for the ERU Project is as follows:

(Unit: USD million)

Cost of sale and O&M	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Total cost of sale and O&M	155.66	159.05	141.27	164.64	169.47	146.78	177.38	181.49	161.44

Cost of sale and O&M	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
Total cost of sale and O&M	210.23 ^{1/}	191.49	166.72	199.48	202.93	183.58	210.99	215.60

Cost of sale and O&M	2041F	2042F	2043F	2044F	2045F	2046F	2047F	2048F
Total cost of sale and O&M	187.76	223.76	253.54 ^{1/}	204.98	237.46	242.20	212.00	252.67

Remark: 1/ Cost of sale and P&M in 2033 and 2043 increase from previous year as there shall be a change of Catalyst of the ERU Project every 10 year. Cost of the change of Catalyst paid by the Company or Subsidiary shall be recalculated in the Energy Payment and electricity tariff according to the PPA. As a result, revenue from sale of electricity in 2033 and 2043, when there are changes in Catalyst, increase from prior year.

▪ **Administrative expenses**

The Company has estimated administrative expenses of the Subsidiary such as employee expenses of the Subsidiary, audit fee, share services of the Company and miscellaneous expenses at Baht 6.00 million per annum or approximately USD 0.19 million, and increase by 2.00% per annum based on the estimated inflation rate and equivalent to the average CPI growth during the past 20 years (1994 – 2018).

▪ **Project cost**

Estimated project cost of the ERU Project inside the CFP Project is USD 757 million. Summary of the project cost is as follows:

	USD million
1. EPC Cost	552
2. Construction cost and machinery and equipment for the associated facilities	51
3. Operating costs and contingency	154
Total purchase price of the ERU project	757

²¹ The Order of the Treasury Department No. 720/2559 Re: Rules for determining rental rate, compensation and fees in relation to exploitation of royal property stated that if the lessee has sub-lease of the property and the property is used for the same purpose, the rental rate must be increased by 25.00%.

²² Based on the exchange rate of THB 31.8527/USD which is the weighted average selling rate announced by the Bank of Thailand on January 18, 2019. (Source: The Bank of Thailand)

The Company appointed a technical advisor, namely, Pöyry Energy Ltd. (Pöyry) to evaluate the EPC cost of the ERU Project inside the CFP Project. Pöyry has estimated the EPC cost of the ERU Project at approximately USD 518.75 million, which is approximately 6.45% lower than the EPC cost of the ERU Project proposed by TOP. The proposed EPC cost by TOP is not much difference from the estimation by Pöyry due to slight difference in attributes and details of the design.

Besides, Pöyry has compared the project cost of the ERU Project with typical power plant producing similar power output to the ERU Project that is coal-fired power plant. The project cost of coal-fired power plant is approximately USD 338 million (2 coal-fired power plants x 110 MW), which is lower than the EPC cost of the ERU Project. The project cost of the ERU Project is higher than those of typical power plants because of (1) higher standard of boiler units is required for oil refinery plant, and (2) no pitch solidification unit is used in coal-fired power plant.

- **Financial cost**

Sources of fund for the investment in the ERU Project will be from loans from financial institutions and equity investment. In this financial forecast, it is assumed that the ERU Project will be financed by long-term loans from financial institutions at approximately USD 590 million and the remaining portion shall be from the Company.

Term of the long-term loans from financial institutions is assumed at 15 years to be in line with cash flows of the ERU Project. Interest rate is assumed at 5.00% per annum, higher than average interest rate on long-term loans of the Company, which is approximately 3.00% - 4.00% per annum as the borrowing for the ERU Project will take place in the next 5 years and the term of this loan is relatively long. The long-term loans will be drawdown in 2023 when the construction and test running of the ERU Project is completed and the ERU Project is ready to be transferred to the Subsidiary.

- **Corporate income tax**

The ERU Project is in the process of applying for investment promotion from the Board of Investment of Thailand (BOI) for the production of electricity and steam from waste (Category 7.1.1.1). The Group A1 activity-based incentive is expected to be granted, which are 8-year exemption from corporate income tax (unlimited amount) and additional 50% corporate income tax reduction for 3 years after the end of the corporate income tax exemption period. Products receiving tax privilege is 250 MW power and by-products, excluding steam

Therefore, in this financial forecast, the effective tax rate of the ERU Project is in the range of 4.75% – 12.51% in 2024 – 2034 (11 years after earning revenue from sale of electricity) and 20% in 2035 – 2048.

- **Capital expenditure**

Most of regular repair and maintenance and major overhaul expenses is included under the OMSA, and the schedule for repair and maintenance is also set out in the OMSA. Therefore, capital expenditure after the commercial operation of the ERU Project is limited. However, if additional capital expenditure is required in the future, capacity payment will be recalculated to reflect such additional expenditure. Thus, in this financial forecast, the IFA assumes no additional capital expenditure.

- **Asset and liabilities turnovers**

It is assumed that there is no asset and liabilities turnover for the ERU Project based on the assumption that the receiving of revenues and paying of expenses will take place on the same day, according to the corresponding payment condition specified in the PPA, FUSA, and the OMSA.

- **Exchange rate**

In this financial forecast, the IFA assumed the exchange rate of Baht 31.8527/USD based on weighted average selling rate announced by the Bank of Thailand on January 18, 2019. (Source: The Bank of Thailand)

- **Terminal value growth**

The IFA assumes that terminal value shall equal to zero based on conservative basis. This is due to the fact that, after the end of the PPA, TOP will buy back the ERU Project at the agreed price in the future, of which cannot be estimated at the present.

- **Discount rate**

The IFA has applied the Weighted Average Cost of Capital ("WACC"), which derived from the weighted average of Cost of Debt (Kd) and Cost of Equity (Ke) of the Project as follows:

WACC	=	$Ke * E/(D+E) + Kd * (1-T) * D/(D+E)$
Ke	=	Cost of equity or shareholders' required rate of return (Re)
Kd	=	Cost of debt or interest rate on loan of the ERU Project
T	=	Corporate income tax rate
E	=	Total shareholders' equity
D	=	Interest-bearing debt

Cost of equity (Ke) or the required rate of return for shareholders (Re) is derived from the Capital Asset Pricing Model (CAPM) as follows:

Ke (or Re)	=	$Rf + \beta (Rm - Rf)$
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Whereby

Risk Free Rate (Rf)	=	3.34% per annum based on 30-year government bond yield (information as of January 31, 2019), which is the government bond with term that is in line with the projection period of the ERU Project.
Beta (β)	=	0.43 – 1.72 times based on median unlevered beta of 19 comparable SET- or MAI-listed companies in Energy and Utilities sector operating power plant business ²³ (1-year historical data until January 31, 2019), and then adjusted with the estimated debt to equity ratio of the ERU Project in the future.
Market Risk (Rm)	=	11.85% per annum, which is the 26-year average rate of annual return from investment in the Stock Exchange of Thailand from 1993 – 2018 as it is the most suitable period to reflect average return from the SET.
Kd	=	5.00% per annum based on estimated interest rate on long-term loan of the ERU Project in the future.
D/E Ratio	=	Estimated D/E ratio at 0 – 3 times throughout the projection period.
T	=	Estimated effective tax rate is in the range of 4.75% – 20.00% per annum.

From aforementioned assumptions, WACC is equal to 6.97% – 8.25% per annum.

Summary of operating cash flows of the ERU Project (the Subsidiary) in 2024 – 2048 are as follows:

(Unit: USD million)

	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Total revenue	233.95	237.35	219.40	242.96	247.77	224.92	255.76	259.88	239.16
EBITDA	78.10	78.11	77.94	78.12	78.10	77.93	78.17	78.18	77.50
EBIT	46.60	46.69	46.52	46.70	46.60	46.51	46.75	46.76	46.00
Net profit	16.30	18.26	20.04	22.01	23.78	25.67	27.63	29.50	28.27

	2033F	2034F	2035F	2036F	2037F	2038F	2039F	2040F
Total revenue	287.95	269.33	248.91	281.65	285.12	265.77	289.68	294.27
EBITDA	77.50	77.61	81.95	81.93	81.95	81.94	78.44	78.41
EBIT	46.08	46.19	50.54	50.42	50.53	50.52	47.02	46.91
Net profit	30.07	31.81	34.14	35.62	37.27	38.84	37.62	37.53

	2041F	2042F	2043F	2044F	2045F	2046F	2047F	2048F
Total revenue	266.45	302.45	332.23	283.65	316.15	320.90	290.69	331.34
EBITDA	78.43	78.42	78.42	78.39	78.41	78.40	78.40	78.37
EBIT	47.01	47.00	47.00	46.89	46.99	46.98	46.98	46.86
Net profit	37.61	37.60	37.60	37.51	37.59	37.59	37.58	37.49

²³ Consisted of BCPG PCL., CK Power PCL., Banpu Power PCL., Energy Absolute PCL., Electricity Generating PCL., Glow Energy PCL., Global Power Synergy PCL., Ratchaburi Electricity Generating Holding PCL., Sahacogen (Chonburi) PCL., Solartron PCL., SPCG PCL., Superblock PCL., TPC Power Holding PCL., Thai Solar Energy PCL., B. Grimm Power PCL., Gulf Energy Development PCL., M.D.X. PCL., Sermsang Power Corporation PCL., and TPI Polene Power PCL.

The IFA applies median unlevered beta of those 19 comparable companies as it can better reflect return and risk from investment in power plants (power plant industry) than using only the unlevered beta of the Company.

Remark: In the case that the auditor of the Company considers this asset acquisition transaction as financial lease, financial statements of the Subsidiary may be different from above statement. However, the difference in accounting treatment will not affect the cash flow of the ERU Project. (Please refer to more details in Part 2, Clause 5.1, of this report.)

Summary of the Free Cash Flow (FCF) of the ERU Project are as follows:

(Unit: USD million)

	2019F	2020F	2021F	2022F	2023F	2024F	2025F	2026F	2027F	2028F
EBIT	-	-	-	-	-	46.60	46.69	46.52	46.70	46.60
Corporate income tax	-	-	-	-	-	(2.21)	(2.22)	(2.05)	(2.24)	(2.23)
Depreciation and amortization expenses	-	-	-	-	-	31.51	31.42	31.42	31.42	31.51
Capital expenditures	(13.76)	(55.04)	(27.52)	(41.28)	(619.41)	-	-	-	-	-
Net Project Cash Flow	(13.76)	(55.04)	(27.52)	(41.28)	(619.41)	75.89	75.89	75.88	75.88	75.87
PV of FCF	(12.86)	(48.08)	(22.46)	(31.49)	(436.53)	49.57	45.95	42.61	39.54	36.71

Remark: Maximum investment of the Subsidiary in the ERU Project will not exceed USD 757.02 million.

	2029F	2030F	2031F	2032F	2033F	2034F	2035F	2036F	2037F	2038F
EBIT	46.51	46.75	46.76	46.00	46.08	46.19	50.54	50.42	50.53	50.52
Corporate income tax	(2.06)	(2.30)	(2.32)	(5.66)	(5.67)	(5.78)	(10.11)	(10.08)	(10.11)	(10.10)
Depreciation and amortization expenses	31.42	31.42	31.42	31.51	31.42	31.42	31.42	31.51	31.42	31.42
Capital expenditures	-	-	-	-	-	-	-	-	-	-
Net Project Cash Flow	75.87	75.87	75.86	71.84	71.84	71.83	71.85	71.84	71.84	71.84
PV of FCF	34.10	31.70	29.48	26.03	24.29	22.67	21.19	19.81	18.51	17.30

	2039F	2040F	2041F	2042F	2043F	2044F	2045F	2046F	2047F	2048F
EBIT	47.02	46.91	47.01	47.00	47.00	46.89	46.99	46.98	46.98	46.86
Corporate income tax	(9.40)	(9.38)	(9.40)	(9.40)	(9.40)	(9.38)	(9.40)	(9.40)	(9.40)	(9.37)
Depreciation and amortization expenses	31.42	31.51	31.42	31.42	31.42	31.51	31.42	31.42	31.42	31.51
Capital expenditures	-	-	-	-	-	-	-	-	-	-
Net Project Cash Flow	69.03	69.03	69.03	69.02	69.02	69.01	69.01	69.00	69.00	69.00
PV of FCF	15.54	14.52	13.57	12.68	11.85	11.07	10.35	9.67	9.04	8.45

Summary of the feasibility of the ERU Project

The ERU Project		Value
Net Present Value of the ERU Project as of January 1, 2019 (NPV)	(USD million)	24.75
Internal Rate of Return (IRR)	(% per annum)	8.00%
Payback Period from January 1, 2019 ^{1/}	(Year)	15.09
Payback Period from January 1, 2024 ^{2/}	(Year)	10.09

Remark: 1/ Starting from present time (round up to a full year). The ERU Project has preparation and construction period of approximately 5 years from present.

2/ Starting from the date when the project is expected to commercially generate revenue from sale of electricity. The IFA assumed that the project shall generate revenue from sale of electricity since January 1, 2024.

In addition, the IFA has conducted a sensitivity analysis by adjusting the discount rate or WACC increased (decreased) by 0.25% per annum of the calculated discount rate mentioned above. The IFA is of the opinion that such 0.25% per annum adjustment should cover volatility of assumptions at a certain level.

	Unit	Discounted Rate (% per annum)		
		6.99% - 8.27%	6.97% - 8.25%	6.95% - 8.23%
Net Present Value of the ERU Project (NPV)	USD million	23.75	24.75	25.76
	Baht million	756.51 ^{3/}	788.41 ^{3/}	820.43 ^{3/}
Internal Rate of Return (IRR)	% per annum	8.00	8.00	8.00
Payback Period from January 1, 2019 ^{1/}	Years	15.09	15.09	15.09
Payback Period from January 1, 2024 ^{2/}	Years	10.09	10.09	10.09

Remark: 1/ Starting from present time (round up to a full year). The ERU Project has preparation and construction period of approximately 5 years from present.

2/ Starting from the date when the project is expected to commercially generate revenue from sale of electricity. The IFA assumed that the project shall generate revenue from sale of electricity since January 1, 2024.

3/ Based on exchange rate of THB 31.8527/USD which is the weighted average selling rate announced by the Bank of Thailand on January 18, 2019 (Source: The Bank of Thailand).

From above table, the net present value of free cash flow (NPV) of the ERU Project is USD 23.75 – 25.76 million (approximately Baht 756.51 – 820.43 million). The Internal Rate of Return (IRR)

of the ERU Project is 8.00% per annum, and the payback period is 10.09 years from the commercial operation date of the ERU Project (approximately January 1, 2024 according to the financial projection).

Summary of the IFA opinion on the appropriateness of the investment of the ERU Project

From above information, the IFA views that the ERU Project could generate a reasonable return to the Company as the net present value of the ERU Project is USD 23.75 – 25.76 million (approximately Baht 756.51 – 820.43 million), the Internal Rate of Return (IRR) of the ERU Project is 8.00% per annum which is higher than average WACC of 7.25% per annum, and the payback period is 10.09 years from the commercial operation date of the ERU Project (approximately January 1, 2024 according to the financial projection). Therefore, **the IFA is of the opinion that the acquisition of assets to transfer ownership in the ERU Project is feasible and appropriate.**

Part 4: Summary of the Independent Financial Advisor's Opinion on the Asset Acquisition and Connected Transactions

Please see the opinion of the Independent Financial Advisor in "**Executive Summary**" section on page 5 of this report.

However, shareholders should carefully study all documents and information attached to the notice to this shareholders' meeting, for the sake of their own decision making. Decision whether to approve the Asset Acquisition and Connected Transaction rests primarily and is the sole discretion of the shareholders.

CapAd, as the Independent Financial Advisor, hereby certifies that it has provided the above opinion cautiously in accordance with professional standard for the benefit of the shareholders.

Sincerely Yours,
The Independent Financial Advisor
Capital Advantage Co., Ltd.

-Patchara Netsuwan-

(Mr. Patchara Netsuwan)
Managing Director

-Patchara Netsuwan-

(Mr. Patchara Netsuwan)
Supervisor

Attachment 1

Business Overview and Operating Results of Thai Oil Public Company Limited

1. General Information

Company Name	:	Thai Oil Public Company Limited ("TOP")
Main business	:	Operate modern and efficient petroleum refinery to produce and sell fuel oil, petrochemical products, lube base oil, ethanol; invest in power generation business as well as marine transportation of petroleum and petrochemical, transportation of petroleum via pipeline system; and provide power business advisory service
Head Office	:	555/1 Energy Complex, Building A 11 th floor Vibhavadi Rangsit Road, Chatuchak Sub-district, Chatuchak District, Bangkok 10900
Refinery plant location	:	42/1 Moo 1 Sukhumvit Road Km. 124, Thung Sukla Sub-district, Sriracha District, Chonburi 20230
Registered capital	:	Baht 20,400,278,730 divided into 2,040,027,873 common shares at par value of Baht 10 per share
Paid-up capital	:	Baht 20,400,278,730 divided into 2,040,027,873 common shares at par value of Baht 10 per share

2. Nature of Business

Thai Oil PCL. (TOP) is the largest petroleum refinery and supplier of petroleum products in Thailand founded in 1961. It is one of the most efficient petroleum refineries in Asia Pacific. Its main business includes petroleum distillation with current production capacity of 275,000 barrels/day. In addition, TOP operates as an integrated group of businesses in oil refinery, petrochemicals and lube base oil. TOP leads the Thai refinery through a well-planned and integrated production process, yielding optimum efficiency and production of high quality products rated in top quartile of refineries in Asia Pacific at lower production cost, enhancing its competitive advantage. TOP also involves in various related business such as power generation business, solvent business, marine and pipeline petroleum transportation business, renewable energy business, production of LABS: an intermediate in the production of surfactants, and Treasury Center which enhance the fund management capability of Thai Oil Group.

As of September 30, 2018, TOP's investments in the subsidiaries classified by business type are as follows:

Company name	Place of registration	Business	Shareholding (%)
Lube Base Oil Business			
Thai Lube Base PCL.	Thailand	Lube base oil manufacturing and distribution	99.99
Petrochemical Business			
Thai Paraxylene Co., Ltd.	Thailand	Upstream petrochemical manufacturing and distribution	99.99
Labix Co., Ltd.	Thailand	Linear Alkyl Benzene manufacturing and distribution (LAB), an intermediate in the production of surfactants such as detergents)	75.00 ^{1/}
Thaioil Solvent Co., Ltd.	Thailand	Invest in solvent and chemical business	99.99
TOP Solvent Co., Ltd.	Thailand	Solvent and chemical distribution	99.99 ^{2/}
Sak Chaisidhi Co., Ltd.	Thailand	Hydrocarbon solvent manufacturing and distribution	80.52 ^{3/}
TOP Solvent (Vietnam) LLC.	Vietnam	Solvent and chemical product distribution in Vietnam	100.00 ^{3/}
Power Generation Business			
Thaioil Power Co., Ltd.	Thailand	Small Power Producer (SPP)	73.99
Global Power Synergy PCL.	Thailand	Operate power generation business, including invest and develop future projects in power business	29.70 ^{4/}
TOP SPP Co., Ltd.	Thailand	Small Power Producer (SPP)	99.99
Transportation Business			
Thaioil Marine Co., Ltd.	Thailand	Provide marine transportation	99.99

Company name	Place of registration	Business	Shareholding (%)
		services for petroleum and petrochemical products	
Thaioil Marine International Private Limited	Singapore	Invest in marine transportation of crude oil and petroleum products	100.00 ^{5/}
TOP-NYK MarineOne Private Limited	Singapore	Provide marine transportation service for crude oil and petroleum products	50.00 ^{6/}
TOP Maritime Services Co., Ltd.	Thailand	Provide marine transportation services for crew and supplies in the Gulf of Thailand	55.00 ^{5/}
T.I.M. Ship Management Co., Ltd.	Thailand	Provide ship management and international-standard fleet development service as well as crew development consultation (technical operation and marine transportation quality)	33.33 ^{5/}
TOP-NTL Private Limited	Singapore	Trustee Management	50.00 ^{5/}
TOP Nautical Star Co., Ltd.	Thailand	Provide large vessels for storage and transportation of crude oil, feedstock, and petroleum products	35.00 ^{5/} and 30.00 ^{7/}
Thai Petroleum Pipeline Co., Ltd.	Thailand	Provide pipeline transportation of petroleum products	9.19
Other business			
Thaioil Energy Service Co., Ltd.	Thailand	Provide recruiting management service to Thai Oil Group	99.99
Thaioil Ethanol Co., Ltd.	Thailand	Invest in ethanol business and alternative energy	99.99
Sapthip Co., Ltd.	Thailand	Ethanol manufacturing and distribution	50.00 ^{8/}
Ubol Bio Ethanol PCL.	Thailand	Cassava-based and molass-based ethanol manufacturing and distribution	21.28 ^{8/}
PTT Digital Solution Co., Ltd.	Thailand	Provide Information Technology and communication services	20.00
PTT Energy Solutions Co., Ltd.	Thailand	Provide engineering technique consultation and other services	20.00
San Palung Social Enterprise Co., Ltd.	Thailand	Support execution of social enterprise of PTT Group	15.00
Thaioil Treasury Center Co., Ltd.	Thailand	International Head Quarter business (IHQ) Treasury Center (TC) for Thai Oil Group	99.99

Source: TOP's Form 56-1 for the year 2017 and notes to financial statement 2018

Remark:

- 1/ Shares held via Thai Paraxylene PCL.
- 2/ Shares held via Thaioil Solvent PCL.
- 3/ Shares held via TOP Solvent Co., Ltd.
- 4/ Direct shareholding and 20.80% shareholding via Thaioil Power Co., Ltd.
- 5/ Shares held via Thaioil Marine PCL.
- 6/ Shares held via Thaioil Marine International Private Limited
- 7/ Shares held via TOP-NTL Private Limited
- 8/ Shares held via Thaioil Ethanol Co., Ltd.

3. Board of Director

List of 14 of TOP's Board of directors as of February 22, 2019 is as follows:

Name	Position
1. Mr. Thosaporn Sirisumphant	Chairman of the Board
2. Mr. Atikom Terbsiri	Chief Executive Office and President / Director
3. Mr. Auttapol Rerkpiboon	Director
4. Mr. Yongyut Jantararotai	Director
5. Ms. Phannalin Mahawongtikul	Director
6. Ms. Duangporn Thiengwatanatham	Director
7. Mr. Praphon Wongtharua	Director
8. Ms. Chularat Suteethorn	Independent director / Chairman of Audit Committee
9. Mr. Chen Namchaisiri	Independent director / Audit Committee
10. Mr. Pasu Decharin	Independent director / Audit Committee
11. ACM. Suttipong Inseepong	Independent director
12. Pol. Gen. Aek Angsananon	Independent director
13. Mr. Kani Si	Independent director
14. Gen. Kukiatt Srinaka	Independent director

Source: www.set.or.th and corpus.bol.co.th

Remark: The authorized directors are Mr. Atikom Terbsiri sign and affix company's seal or Ms. Duangporn Thiengwatanatham, Ms. Phannalin Mahawongtikul, Mr. Auttapol Rerkpiboon, any 2 of 3 directors jointly signed and affix the company's seal.

4. Shareholder Structure

As of September 14, 2018, TOP had registered and paid-up capital of Baht 20,400,278,730 divided into 2,040,027,873 common shares at par value of Baht 10 per share. The details are as follows:

Shareholder name	Number of share (shares)	Shareholding (%)
1. PTT PCL. ^{1/}	979,765,183	48.03
2. Thai NVDR Co., Ltd.	318,839,029	15.63
3. State Street Europe Limited	68,187,462	3.34
4. South East Asia UK (Type C) Nominees Limited	45,982,939	2.25
5. Social Security Office	32,251,200	1.58
6. The Bank of New York (Nominees) Limited	25,035,505	1.23
7. BNY Mellon Nominees Limited	17,561,283	0.86
8. GIC Private Limited	14,697,800	0.72
9. Chase Nominees Limited	12,696,153	0.62
10. SE Asia (Type B) Nominees LLC	11,666,090	0.57
Total top 10 major shareholders	1,526,682,644	74.83
Other shareholders	513,345,229	25.17
Total	2,040,027,873	100.00

Source: www.set.or.th

Remark:

1/ **PTT PCL. (PTT)**

Main business: Integrated petroleum and petrochemical complex

Board of directors: PTT has 15 directors: Mr. Krairit Euchukanonchai, Mr. Chansin Treenuchagron, Mr. Chumpol Rimsakorn, Mr. Nuttachat Charuchinda, Mr. Kulit Sombatsiri, Mr. Kittipong Kittayarak, Mr. Vichai Assarasakorn, Gen. Chatchalerm Chalermsook, Mr. Thon Thamrongnawasawat, Mrs. Nuntawan Sakuntanaga, Mr. Supot Teachavorasinskun, Mr. Surapon Nitikraipot, Mr. Somsak Chotrattanasiri, Mr. Don Wasantapruek, and Mr. Danucha Pichayanan.

PTT PCL. has registered and paid-up capital of Baht 28,562,996,250 divided into 28,562,996,250 common shares at par value of Baht 1 per share. Major shareholders as of October 12, 2018 are as follows:

PTT's shareholder name	Number of share (shares)	Shareholding (%)
1. Ministry of Finance	14,598,855,750	51.11
2. Thai NVDR Co., Ltd.	2,196,575,586	7.69
3. Vayupak Fund 1 by MFC Asset Management PCL.	1,736,895,500	6.08
4. Vayupak Fund 2 by Krung Thai Asset Management PCL.	1,736,895,500	6.08
5. State Street Europe Limited	572,054,528	2.00
6. South East Asia UK (Type C) Nominees Limited	547,412,451	1.92
7. Social Security Office	391,204,100	1.37
8. The Bank of New York (Nominees) Limited	263,758,093	0.92
9. GIC Private Limited	235,759,200	0.83
10. N.C.B. Trust Limited-Norges Bank 1	182,479,900	0.64
Total top 10 major shareholders	22,461,890,608	78.64
Other shareholders	6,101,105,642	21.36
Total	28,562,996,250	100.00

Source: www.set.or.th

5. Financial Highlight

Summary of financial information for the year 2016 - 2018 as of December 31, 2016, 2017, and 2018 are as follows:

Consolidated financial statement (Unit: Baht thousand)	Dec. 31, 2016	Dec. 31, 2017	Dec. 31, 2018
Balance Sheet			
Current assets	115,730,642	126,211,389	164,743,458
Non-current assets	102,000,570	101,896,904	103,869,495
Total assets	217,731,212	228,108,293	268,612,953
Current liabilities	34,145,828	33,348,043	38,020,051
Non-current liabilities	71,988,080	67,612,004	104,120,524
Total liabilities	106,133,908	100,960,047	142,140,575
Issued and paid-up share capital	20,400,279	20,400,279	20,400,279
Share premium	2,659,302	2,659,302	2,759,857
Retained earnings (losses)	83,906,463	99,259,995	98,684,778
Other component of shareholders' equity	(109,469)	(96,099)	(132,892)
Minority interest	4,740,729	4,924,769	4,760,356
Total shareholders' equity	111,597,304	127,148,246	126,472,378
Total liabilities and shareholder's equity	217,731,212	228,108,293	268,612,953
Comprehensive Income Statement			
Revenue from sale and rendering of service	274,738,949	337,387,694	389,343,526
Cost of sale and rendering services	(247,261,172)	(305,385,582)	(373,127,968)
Gross profit	27,477,777	32,002,112	16,215,558
Dividend income	247,337	157,890	157,372
Net derivative loss on hedging	(243,242)	(133,219)	(820,524)
Gain from foreign exchange	446,107	3,181,552	626,683
Other income	1,118,812	1,190,071	1,718,921
Selling and administrative expense	(2,633,353)	(3,461,245)	(2,781,724)
Share of profit of joint ventures and associates	929,669	1,196,663	1,192,892
Profit (loss) before finance costs and income tax expense	27,343,107	34,133,824	16,309,178
Finance costs	(3,460,705)	(3,285,063)	(3,510,848)
Finance costs from repurchase of debentures	-	-	(431,100)
Profit before income tax expense	23,882,402	30,848,761	12,367,231
Income tax expense	(2,295,464)	(5,529,487)	(1,982,789)
Net profit (loss)	21,586,938	25,319,273	10,384,442
Equity attributable to owners of the Company	21,221,910	24,856,198	10,149,038
Non-controlling interests	365,028	463,075	235,404
Net profit for the year	21,586,938	25,319,273	10,384,442

Remark: Consolidated financial statements of TOP for the year 2016 - 2018 ended December 31, 2016, 2017, and 2018 were audited by KPMG Phoomchai Audit Ltd., which is a certified auditor approved by the SEC.

Management's discussion & Analysis of financial position and operating results of TOP

Operating performance **2016**

Thai Oil Group reported sales revenue of Baht 274,739 million which was lower than 2015 by Baht 18,830 million as average product selling prices declined significantly. However, Thai Oil Group earned gross margin including stock gain (loss) of USD 9.1/barrel, increased by USD 1.9/barrel due to the superior contribution from Thai Paraxylene Co., Ltd. (TPX) and LABIX Co., Ltd. performance since its commercial operations in February 2016. Moreover, Thai Oil Group continuously implemented profitability improvement strategy which consists of 3 main types of activities which are supply and marketing management, hydrocarbon management, and cost saving via the Orchestra project. Besides, the consecutive increase in crude oil price since the beginning of 2016 resulted in Thai Oil Group recording stock gain of Baht 6,138 million, compared with stock loss of Baht 6,945 million in 2015. Thai Oil Group also had a reversal of inventory write-down to Net Residual Value of Baht 1,041 million which was lowered by Baht 297 million and had hedging loss of Baht 243 million, compared with hedging gain of Baht 1,489 million in 2015. Nevertheless, Thai Oil Group posted EBITDA of Baht 32,675 million, increased by Baht 7,183 million. This included the performance of LABIX Co., Ltd. and TOP SPP Co., Ltd. which commercially operated since Q1/2016 and Q2/2016, respectively. In addition, Thai Oil Group had foreign exchange gain of Baht 446 million. Deducting with depreciation, finance costs and income tax expense, Thai Oil Group recorded net profit of Baht 21,222 million or Baht 10.40 per share, higher than that of 2015 by Baht 9,041 million.

2017

Thai Oil Group had revenue from sales of Baht 337,388 million, increased by Baht 62,649 million due to the increase in average product selling prices tracking crude oil price and higher integrated intake. Thai Oil Group posted gross profit margin excluding stock gain (loss) of USD 9.1/barrel, improved by USD 1.6/barrel as a result of stronger petroleum product spreads, especially gas oil and fuel oil, and lower crude premium. Besides, aromatics market was supported by recovery of benzene market which was resulted from tight supply after shutdowns of major benzene producers in the U.S. since late 2016. However, paraxylene market was pressured by new supply from India. For LAB market, its spread over feedstock remained weak due to sluggish Indian demand. Lube base oil market improved as a result of supply shrinkage from scheduled maintenances of lube base oil plants in the region. Bitumen market also improved since regional supply decrease after many refineries in Thailand and Singapore had maintenance shutdowns in the first half of 2017. In addition, some producers increased fuel oil production instead of bitumen because of higher margin following a rise in fuel oil price. As crude oil price increased by USD 9.5/barrel from the end of 2016, stock gain was recorded at Baht 3,343 million. When combining net derivative loss on hedging of Baht 133 million, Thai Oil Group reported EBITDA of Baht 36,925 million, increased by Baht 4,250 million. According to a 3.15 Baht/USD appreciation in Thai Baht from the end of 2016, Thai Oil Group had net foreign exchange gain of Baht 3,182 million, increased by Baht 2,736 million. Thail Marine (TM) recorded a loss on assets impairment of Baht 547 million due to a change in marine transportation business and a sluggish in exploration and production industry which caused TM to earn lower chartering rate and some vessels were unutilized. However, the commercial operations of LABIX and TOP SPP since 2016 continuously provided contributions to Thai Oil Group throughout the year 2017. Meanwhile, Ethanol business improved as a result of a significant increase in gross margin following higher selling price and lower feedstock cost. Thai Oil Group recorded income tax expense of Baht 5,529 million, increased by Baht 3,234 million, due to a rise in profit before tax and a fully-utilization of loss carry forward and BOI tax privileges from emission reduction and energy efficiency projects. Thus, Thai Oil Group earned net profit of Baht 24,856 million or Baht 12.18 per share in 2017, higher than that of 2016 by Baht 3,634 million.

2018

For the year 2018, comparing with the year 2017, Thai Oil Group had revenue from sales of Baht 389,344 million, increased by Baht 51,956 million due to the rise in average product selling prices tracking crude oil price. However, it recorded lower gross margin excluding stock gain (loss) by USD 2.2/barrel to USD 6.9/barrel because gross refining margin dropped due to considerably increase in crude premium and softened gasoline spread over Dubai, despite stronger gas oil and jet/kero spreads from previous year. In addition, base oil and bitumen spreads over fuel oil also weakened owing to increasing base oil supply and softening bitumen demand. Besides, in 2018, Thai Oil Group recorded stock loss and the write-down to Net Residual Value on petroleum inventory of Baht 2,628 million, compared with stock gain and the reversal of write-down to Net Residual Value on petroleum inventory of Baht 3,416 million in 2017. Thus, Thai Oil Group posted EBITDA of Baht 20,239 million, decreased by Baht 16,686 million. Offsetting with finance costs which included non-recurring expenses from amortized deferred discount on debentures and related expenses relevant to liabilities management, depreciation, and income tax expense, Thai Oil Group earned net profit of Baht 10,149 million or Baht 4.97 per share, plunged by Baht 14,707 million from prior year.

Financial position**Total Assets**

As of December 31, 2016, Thai Oil Group had total assets of Baht 217,731 million, increased by Baht 25,565 million or 13.3% from December 31, 2015 due to an increase in cash and cash equivalents and current investment of Baht 7,646 million which is a result of cash flows from operations during the year 2016 and dividends received. Other current assets grew by Baht 17,595 million primarily due to an increase in inventories by Baht 14,306 million from higher inventory average crude oil price in December 2016 than December 2015. Moreover, trade accounts receivable went up by Baht 5,359 million because of higher average petroleum product prices in December 2016 as well as an increase in trade accounts receivable of LABIX and TOP SPP due to their commercial operations in 2016. Other receivables decreased by Baht 1,475 million. Non-current assets rose by

Baht 324 million mainly due to an increase in intangible assets of Baht 1,200 million from deferred license fee of an indirect subsidiary. Meanwhile, property, plant, and equipment decreased by Baht 947 million mainly from assets depreciation.

As of December 31, 2017, Thai Oil Group had total assets of Baht 228,108 million, increased by Baht 10,377 million or 4.8% from December 31, 2016. The main contributions are an increase in cash and cash equivalents and current investment of Baht 7,166 million which is a result of to the increase in cash flows from operations for the year 2017. Nevertheless, TOP and subsidiaries paid dividends in April and September 2017 and repaid debentures in March 2017. Other current assets increased by Baht 3,314 million primarily due to a rise in trade accounts receivable by Baht 2,792 million following higher average product prices in December 2017 than December 2016. Receivable from Oil Fuel Fund also grew by Baht 865 million due to higher LPG subsidized rate than prior year. However, inventories decreased by Baht 348 million since inventory level as of the end of December 2017 was lower than the end of December 2016. Non-current assets decreased by Baht 103 million as property, plant, and equipment decrease by Baht 3,699 million mainly from assets depreciation while investments in available-for-sale securities grew by Baht 2,859 million as a result of an increase in investments in private funds.

As of December 31, 2018, Thai Oil Group had total assets of Baht 268,613 million, grew by Baht 40,505 million or 17.8% from 31 December 2017. The main contribution of such increase is an increase in cash, cash equivalents and current investment of Baht 39,321 million which is a result of cash flows from operations for the year 2018, and proceeds from debenture issuance. However, there were investments in several projects and dividends paid in April and September 2018. Other current assets decreased by Baht 789 million primarily due to decreases in inventories by Baht 4,102 million following a drop in average crude oil price in December 2018 when compared with that in December 2017. However, trade accounts receivable rose by Baht 2,031 million due to higher average product sales volume in December 2018 than December 2017. Non-current assets increased by Baht 1,972 million because property, plant, and equipment increased by Baht 1,317 million mainly from investment in several project according to business plan. Moreover, other non-current assets increased by Baht 2,850 million due mainly to advance rental payment of Baht 2,962 million according to joint venture agreement on leasing state properties signed on August 21, 2018. Investments in available-for-sale securities reduced by Baht 2,743 million mainly from reclassification of private funds, which have maturity date in 2018, to current investments.

Total Liabilities

As of December 31, 2016, Thai Oil Group had total liabilities of Baht 106,134 million, increased by Baht 10,977 million or 11.5% from December 31, 2015. The main contribution is an increase in current liabilities of Baht 10,190 million which is a result of an increase in trade accounts payable by Baht 7,835 million as a consequence of a rise in average crude oil price in December 2016 when compared with that of December 2015. Moreover, other payables went up by Baht 607 million and long-term borrowings and debentures (including current portions) increased by Baht 341 million.

As of December 31, 2017, Thai Oil Group had total liabilities of Baht 100,960 million, decreased by Baht 5,174 million or 4.9% from December 31, 2016. Major contribution is an increase in current liabilities of Baht 4,748 million primarily due to an increase in excise duty payable of Baht 3,335 million since Excise Department has changed regulations for excise duty submission. Additionally, income tax payable went up by Baht 2,324 million owing to full utilization of loss carry forward and BOI tax privileges from emission reduction and energy efficiency projects. Trade accounts payable dropped by Baht 924 million as a result of lower average crude oil purchase in December 2017 than that in December 2016. Long-term borrowings and debentures (including current portions) decreased by Baht 9,935 million mainly because TOP repaid its due Baht-denominated debentures of Baht 2,000 million and due Baht-denominated with cross currency swap contract debentures of Baht 2,932 million in Q1/2017. Moreover, TOP's USD-denominated debentures decreased by Baht 3,105 million owing to the 3.15 Baht/USD appreciation in Thai Baht from the end of 2016 and receipt of loan repayment from related party.

As of December 31, 2018, Thai Oil Group had total liabilities of Baht 142,141 million, increased by Baht 41,181 million or 40.8% from 31 December 2017. Major contribution of such increase is an increase in current liabilities of Baht 1,715 million which primarily due to an increase in trade accounts payable of Baht 2,881 million since trade accounts payable which due in January 2019 increase. Moreover, other payables rose by Baht 396 million due mainly to an increase in Oil Fund

payables as a result of higher excise duty rates and product sales volume in December 2018 when compared with those in December 2017. Nevertheless, income tax payable dropped by Baht 3,014 million following a decrease in net profit. Long-term borrowings and debentures (including current portions) went up by Baht 39,169 million mainly because Thai Oil Treasury Center Co., Ltd. issued USD-denominated debentures to foreign institutional investors for the total amount of USD 1,000 million, which fully guaranteed by TOP. These debentures comprised of USD 400 million with the tenor of 10 years and USD 600 million with the tenor of 30 years. TOP SPP Co., Ltd. also had borrowed Baht-denominated loan of Baht 8,500 million in Q1/2018 to use for inter-company loan refinancing from TOP, of which the repayment schedule began in Q2/2018. TOP Solvent (Vietnam) LLC. (shares indirectly held via TOP Solvent Co., Ltd.) incurred VND-denominated borrowings equivalent to Baht 319 million in 2018 for the North Vietnam Distribution project.

Total Shareholders' Equity

As of December 31, 2016, Thai Oil Group had total shareholders' equity of Baht 111,597 million, increased by Baht 14,588 million or 15.0% from December 31, 2015, due to total comprehensive income for the year 2016 of Baht 21,582 million, deducted by dividends paid of Thai Oil Group of Baht 6,994 million.

As of December 31, 2017, Thai Oil Group had total shareholders' equity of Baht 127,148 million, increased by Baht 15,551 million or 13.9% from December 31, 2016, due to total comprehensive income for the year 2017 of Baht 25,006 million, deducted by dividends paid of Thai Oil Group of Baht 9,455 million.

As of December 31, 2018, Thai Oil Group had total shareholders' equity of Baht 126,472 million, decreased by Baht 676 million or 0.5% from December 31, 2017, due to total comprehensive income for the year 2018 of Baht 10,330 million, deducted by dividends paid of Thai Oil Group of Baht 11,006 million.

6. Industry Outlook

Crude oil and refinery market outlook

In 2019, crude oil price is likely to remain high due to strong oil demand growth which is expected to grow approximately 1.4 million barrels per day from previous year, in line with global economy expansion which is forecasted to grow by 3.7% from previous year. Declining crude oil supply from Iran and Venezuela also contribute to the surge in crude oil price. However, crude oil price may be affected by rising U.S. crude oil production, which is expected to grow approximately 1.1 million barrels per day in 2018 to the level of 11.8 million barrel per day after oil price has risen above breakeven level of shale oil producers, as well as increasing OPEC crude oil production to compensate the supply loss from Iran and Venezuela. In addition, USD appreciation, according to market expectation on more-than 3 times of FED rate hike in 2019, may adversely affect crude oil price.

In 2019, finished oil products is expected to grow due to considerably rising diesel demand in marine transportation sector especially in Q4/19, which is driven by the regulations of International Maritime Organization (IMO) to control sulfur emission from bunkers by reducing sulfur content in marine fuel oil to 0.5% starting January 2020. Moreover, supply of gasoline and jet fuel is expected to decline as refineries will adjust their production to maximize proportion of diesel production to meet the rising product demand. However, fuel oil product spread over crude oil price is forecasted to decline due to the switch to use diesel instead of fuel oil in order to comply with the IMO's regulation. Furthermore, rising Chinese finished oil products export from two new Chinese refineries in the second half of 2019 will affect finished oil products market. (*Source: IEA Oil Monthly Report and EIA Short-term Energy Outlook, October 2018*).

Aromatics market outlook

In 2019, aromatics market is forecasted to be pressured by rising supplies from many aromatics plants in Saudi Arabia and in Vietnam, which expected to have more stable production in 2019 after having technical difficulties since start up in 2018. Aromatics plants in China and in Indonesia are also expected to resume their production in Q4/18. Moreover, new aromatics plants in China (with Paraxylene production capacity of 2.25 million tons per year) is forecasted to commence operations in the second half of 2019. Accordingly, paraxylene market in 2019 will be affected by

oversupply situation due to paraxylene supply growth of approximately 3.4 million tons per year compared to paraxylene demand growth of approximately 1.8 million tons per year. Meanwhile, benzene market may have been less pressured as benzene demand growth is relatively in line with supply growth, namely the supply growth is expected to be approximately 1.3 million tons per year while demand growth is approximately 1.4 million tons per year. (*Source: IHS Spring'18 and Wood Mackenzie Chemicals, August 2018*)

Lube base oil market outlook

In 2019, lube base oil market is expected to be tighten when compared with 2018 due to rising supply from new lube base oil group 2 and 3 plants with total capacity of approximately 2.2 million tons per year, leading to high price competition among lube base group 2 plants which may affect lube base oil group 1 price. However, lube base oil demand is likely to grow in accordance with recovering global economy growth. (*Source: ICIS Base Oil Weekly Report, October 2018 and Argus Base Oil Weekly Report, October 2018*)

Bitumen market outlook

In 2019, bitumen market is expected to be tighten due to higher supply especially in late 2019 as some producers will switch to produce bitumen instead of fuel oil due to lower fuel oil demand from the impact of the IMO's new regulation. However, bitumen demand is likely to grow in accordance with economic development plan of each country in the region, which continues to focus on the development of infrastructure. (*Source: Argus Bitumen Weekly Report, October 2018*)

Attachment 2

Summary of Agreements relating to Energy Recovery Unit (ERU) Project

1. Draft Asset Sales and Purchase Agreement (APA)

Counterparties	Buyer : The Company or Subsidiary Seller : Thai Oil PCL. (TOP)
Date of Agreement	Expected agreement signing date in Q2/2019
Consideration	Total consideration including 10% contingency shall not exceed USD 757 million or approximately Baht 24,112.49 million (Capped Amount)
Payment	<p>The Initial Payment at 20% of the Initial Purchase Price (USD 688.20 million), equal to USD 137.64 million, equivalent to Baht 4,384.21 million shall be made in 4 installments according to construction progress of the ERU Project as follows:</p> <ul style="list-style-type: none"> - 1st installment: 2% of the Initial Purchase Price (approximately USD 13.76 million or Baht 438.42 million) shall be paid in 2019; - 2nd installment: 8% of the Initial Purchase Price (approximately USD 55.06 million or Baht 1,753.69 million) shall be paid in 2020; - 3rd installment: 4% of the Initial Purchase Price (approximately USD 27.53 million or Baht 876.84 million) shall be paid in 2021; and - 4th installment: 6% of the Initial Purchase Price (approximately USD 41.29 million or Baht 1,315.26 million) shall be paid in 2022. <p>The Company or Subsidiary shall pay the remaining purchase price to TOP on the Closing Date in Thai Baht based on exchange rate on the Agreement Date or the agreed payment date. The consideration can increase or decrease based on the specified exchange rate in the agreement.</p>
Condition Precedents	<p>The following conditions must be satisfied before the Company or Subsidiary and TOP enter into the Asset Sales and Purchase Agreement.</p> <ol style="list-style-type: none"> 1. The Company or Subsidiary and TOP must obtain an approval from their shareholders' meetings. 2. All Related Agreement are signed. 3. TOP signs the Provisional Acceptance Certificate (PAC) to the EPC Contractor. 4. The Company or Subsidiary and TOP receives necessary licenses from related party concerning the transfer of ownership of the ERU Project and obtains EIA approval, License for Energy Industry Operation, Factory Construction Permit (RorNgor 4), the Certificate from Board of Investment for the ERU Project and other licenses approved by the Energy Regulatory Commission. 5. There is no event materially affect the assets and cause inoperable of ERU units from the date TOP signs the PAC until the Closing Date.
Material Events in relation to the ERU Project	The amendment to or waiver of rights under the EPC Contract which results in material impact to the Performance Guarantee or Defect Liability under the EPC Contract in relation to the ERU Project.
Termination conditions	<ul style="list-style-type: none"> • The Company or Subsidiary and TOP may terminate this agreement if TOP is unable to sign Provisional Acceptance Certificate (PAC) before August 31, 2023 (Long Stop Date). • The Company or Subsidiary does not give consent or waiver in relation to material conditions which EPC Contractor has to complete before TOP signs the PAC of the ERU Project. • The Company or Subsidiary does not give consent in relation to Material Events • When ERU is materially inoperable and is not remedied within 6 months and TOP is unable to propose a remedy plan accepted by the buyer. • When either parties breach the agreement and the defaulting party is unable to remedy within the specified period.
The reimbursement in case agreement is terminated prior to the Closing Date	<ul style="list-style-type: none"> • In case the agreement is terminated prior to the transfer of asset's ownership, TOP is required to reimburse the Initial Payment that has been paid to the Company or its subsidiary as well as related financial cost at the rate of 4% per annum.
Construction Period	<ul style="list-style-type: none"> • The project construction starts from Commencement Date until the issuance date of PAC under the CFP Project. It is expected to complete in Q3/2023.
Cost Overrun	<p>If there is cost overrun, the Company or Subsidiary shall summon its board of directors' meeting and/or shareholders' meeting to consider and approve any of the following options:</p> <ol style="list-style-type: none"> 1. The purchase of all assets according to the asset list as of the Agreement Date at the cost not exceed USD 757.00 million (or approximately Baht 24,112.49 million). Additional asset on the Closing Date (if any) shall be purchased at actual cost. 2. The purchase of assets with aggregate value not exceed USD 757.00 million (or approximately Baht 24,112.49 million). TOP shall invest in the remaining assets and allow the Company or Subsidiary to utilize such assets via Operation Maintenance and Service Agreement (OMSA). 3. Termination of the agreement.

2. Draft Fuel and Utilities Supply Agreement (FUSA)

Counterparties	Buyer : The Company or Subsidiary Seller : Thai Oil PCL. ("TOP")
Term of Agreement	25 years from the Closing Date and the parties may agree to extend the agreement for further 5 years but shall not exceed the lease period under the Land Lease Agreement between TOP and the Ministry of Finance (Land Lease Agreement will expire on September 10, 2052).
Key Conditions	<ul style="list-style-type: none"> TOP shall deliver petroleum pitch and other utilities to the Company or Subsidiary. If TOP cannot make the quantities available for delivery, TOP will procure from an alternative source of fuel. If demand for fuel and utilities exceeds the agreed quantity, TOP will use its endeavors to procure and supply an alternative source of fuel and utilities for the ERU Unit as agreed by both parties. If the Company or Subsidiary cannot accept the delivery of petroleum pitch at the quantity specified in the agreement, the Company or Subsidiary shall be liable to pay liquidated damages to TOP at the rate stipulated in this agreement, provided that the liquidated damages shall not exceed the Maximum Liquidated Damages as stipulated in the agreement.
Contract price	<ul style="list-style-type: none"> Petroleum pitch price is quoted based on fuel oil price, diesel price and electricity price from Provincial Electricity Authority (PEA)^{1/}. Other utilities price is quoted based on market price. Other fuel price is quoted based on market price.
Termination conditions	<p><u>Termination by the Company or Subsidiary</u></p> <ul style="list-style-type: none"> TOP fails to deliver the quantities of fuel and utilities for 60 consecutive days. <p><u>Termination by TOP</u></p> <ul style="list-style-type: none"> The Company or Subsidiary fails to pay the amount due within 30 days from the receipt of TOP's notice. The Company or Subsidiary intentionally and unreasonably fails to accept delivery of petroleum pitch, provided that such failure cannot be cured within 24 hours from the receipt of TOP's written notice. <p><u>Termination by either parties</u></p> <ul style="list-style-type: none"> If either party becomes bankrupt or insolvent, goes under rehabilitation, or has Court's order for asset confiscation. The expiry of Operation Maintenance and Services Agreement (OMSA), Power Purchase Agreement (PPA) and Land Sub-Lease Agreement. If force majeure continues for a period of more than 180 consecutive days or 270 days in aggregate in any 2 years period. If either party undergoes a change of control.

Remark: 1/ Please refer to Footnote 9.

3. Draft Power Purchase Agreement (PPA)

Counterparties	Purchaser : Thai Oil PCL. ("TOP") Seller : Company or Subsidiary
Products	Electricity, Steam, Condensate Water and Sulfuric Acid
Term of Agreement	25 years from the Closing Date and the parties may agree to extend the agreement for further 5 years but shall not exceed the lease period under the Land Lease Agreement between TOP and Ministry of Finance (Land Lease Agreement will expire on September 10, 2052).
Commencement Date	The obligation under this agreement shall only commence on the Closing Date, when the Company or Subsidiary commence products delivery to TOP.
Production capacity	Approximately 180-200 MW adjustable within the first 2 years from the effective date of PPA.
Contract price	<ul style="list-style-type: none"> Electricity price is based on the formula specified in the PPA by referring to electricity price structure under the PPA, consisting of Capacity Payment^{1/} and Energy Payment^{2/}. Steam price is based on the formula specified in the PPA. Condensate Water price is based on market price. Sulfuric price is based on market price.
Termination	<p><u>Termination by the Company or Subsidiary</u></p> <ul style="list-style-type: none"> TOP fails to pay the amount due and such payment default is not cured within 30 days from the receipt of the Company's or Subsidiary's notice. TOP ceases to control or own the CFP Project (except that TOP transfers ownership of the CFP Project to company in PTT Group). If the Company's or Subsidiary's legal ownership of assets of the ERU Project is contested for whatever reason which can reasonably be expected to materially and adversely affect the Company's or Subsidiary's ownership of the ERU Project. <p><u>Termination by TOP</u></p> <ul style="list-style-type: none"> If the Company or Subsidiary sells the ERU Project to the third party without any written consent from TOP. If the maximum liquidated damages paid by the Company or Subsidiary is reached twice in 2 consecutive years. <p><u>Termination by either party</u></p> <ul style="list-style-type: none"> If the other party becomes bankrupt, goes under rehabilitation, or has Court's order for

	asset confiscation. <ul style="list-style-type: none"> • The expiry of Operation Services and Maintenance Agreement, Fuel Utilities and Supply Agreement or Land Sub-Lease Agreement. • If either party undergoes a change of control. • If force majeure continues for a period of more than 180 consecutive days or 270 days in aggregate in any 2 years period.
Agreed Amount upon Termination	<ul style="list-style-type: none"> • If it is neither party's fault, TOP shall pay the remaining amount of total investment to the Company or Subsidiary^{3/}. • If it is TOP's fault, TOP shall pay 110% of the remaining amount of total investment to the Company or Subsidiary. • If it is the Company's or Subsidiary's fault, TOP shall pay 90% of the remaining amount of total investment to the Company or Subsidiary.
Purchase of the ERU Project	Upon the expiry of the agreement, the Company or Subsidiary shall purchase the ERU Project and all relevant facilities and assets from TOP at the amount agreed by both parties.
Additional Capital Expenditure	The additional capital expenditure shall be adjusted in Capacity Payment according to the formula in the agreement.

Remark: 1/ Please refer to Footnote 7.

2/ Please refer to Footnote 8.

3/ Net present value of the Company or Subsidiary from the termination date to expiry date of agreement.

4. **Draft Operation and Maintenance Services Agreement (OMSA)**

Counterparties	Employer : The Company or Subsidiary Service Provider : Thai Oil PCL. ("TOP")
Scope of Service	<ul style="list-style-type: none"> • TOP shall manage, operate and maintain the ERU Project and related unit to comply with conditions on quality, efficiency and readiness for distribution. • Manage petroleum pitch and other by-products from the production. • Procure required utilities for the ERU project according to PPA. • Provide support to the Company or Subsidiary to obtain necessary licenses. • To make a claim to EPC Contractor, technology owner, and other service providers as authorized by the Company or Subsidiary. • Environmental and waste management.
Term of Agreement	25 years from the Closing Date and the parties may agree to extend the agreement for further 5 years but shall not exceed the lease period under the Land Lease Agreement between TOP and Ministry of Finance (Land Lease Agreement will expire on September 10, 2052).
Service fee and payment	Monthly payment as agreed by both parties based on operation and maintenance expense of the comparable electricity and steam generating unit, and compared to the sophistication of equipment and production process.
Insurance	TOP shall procure the necessary insurances of the ERU project under the Operation Maintenance and Service Agreement.
Termination	<u>Termination by the Company or Subsidiary</u> <ul style="list-style-type: none"> • If there is a material breach of agreement which cannot be cured within 30 days after the receipt of notice by another party. • If the operation and/or maintenance causes any significant environmental issue or damage and such event cannot be cured within 3 months from the date of its occurrence. • If there is a change or replacement of major equipment such as boilers, steam turbines, fuel gas treatment (SNOX), and the entire solidification system relating to the ERU, provided that such replacement occurs within 5 years after the Closing Date due to the error in the design or technological process of the ERU which is not caused by actions of the Company or Subsidiary. • If the additional capital expenditure exceeds USD 50 million due to the error in the design or technological process of the ERU which is not caused by actions of the Company or Subsidiary. • If the ERU Project becomes wholly inoperable due to the error in the design or technological process of the ERU within 3 years after the Closing Date which is not caused by actions of the Company or Subsidiary. • The ERU availability is less than 75% of the operating days for such operating year due to an unplanned incident resulting from the error in the design or technological process of the ERU, equipment or material, and such event cannot be cured within 3 months. <u>Termination by TOP</u> <ul style="list-style-type: none"> • If the Company or Subsidiary unreasonably and intentionally interfere petroleum pitch management and such interference is not ceased within 24 hours from the receipt of TOP's notice. • If the Company or Subsidiary fails the amount due to pay TOP within 30 days from the receipt of TOP's notice. <u>Termination by either party</u> <ul style="list-style-type: none"> • If the other party becomes bankrupt, goes under rehabilitation, or has Court's order for asset confiscation. • If force majeure continue for a period of more than 180 consecutive days or 280 days in aggregate in any 2 years period.

	<ul style="list-style-type: none"> • The expiry of related agreement including FUSA, PPA and Land Sub-Lease Agreement. • If the other party materially breach of the agreement.
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5. **Draft Land Sub-lease Agreement**

Counterparties	Sub-Lessee : The Company or Subsidiary Sub-Lessor : Thai Oil PCL. ("TOP")
Leased asset	Land which is located in Thung Sukla Sub-district, Sriracha District, Chonburi Province under the Lease agreement between TOP and the Ministry of Finance dated August 21, 2018 with total land area of approximately 36 rai.
Lease Objective	To build, operate, and maintain 250 MW Power Plant for electricity generation and related business with the right to use sub-leased land for building construction, machinery installation for the business operation at the Company's or Subsidiary's expense.
Leased Period	Approximately 25 years from the Closing Date and the parties may agree to extend term of the agreement but shall not exceed the leased period under the Land Lease Agreement between TOP and the Ministry of Finance.
Rental fee and payment	Existing rental fee between TOP and Ministry of Finance plus additional rental fee. The rental fee shall be made in advance on a yearly basis. The first year rental payment shall be made on the agreement date as per detail stated in the order of Treasury Department regarding the rental charge criteria, compensation and fee.
Ownership of Building	The ownership of building that was built and renovated or refurbished on sub-leased land by the sub-lessee will belong to the Ministry of Finance.
Termination	<ul style="list-style-type: none"> • If the Company or its subsidiary becomes bankrupt or has Court's order for asset confiscation. • If the Company or Subsidiary materially breach the agreement and the Company or Subsidiary cannot cured such event (not the case of payment default) within 30 days from the date that the Company or Subsidiary received TOP's written notice. • The expiry of related agreement including FUSA, PPA and OMSA.

6. **Draft Novation Agreement**

Counterparties	Assignee : The Company or its subsidiary Assignor: Thai Oil PCL. ("TOP")
Duty of Assignor	TOP shall transfer its rights and obligation under EPC Contract, Project Management Consultancy, and License Agreement on the Closing Date to The Company or Subsidiary