

1. Policy and Business Operations Overview

1.1 Vision, Mission, Objective and Strategy

PTTEP Group is one of the leading E&P companies in Thailand, exploring for sustainable sources of petroleum supply for the country and other countries in which the Company operates or invests in, and generating return that would satisfy the shareholders and stakeholders. In the midst of external complexities, low oil price environment, rapidly changing environment, depleting petroleum resources, and geographical complexity, a more advanced technology with a greater capability is required, and so is the need to maintain environmental and social equilibrium. The Company's mission and vision have then been reviewed and identified.

Mission: PTTEP operates globally to provide reliable energy supply and sustainable value to all stakeholders.

Vision: Leading Asian E&P company driven by competitive performance, advanced technology, and green practices.

Goal and Objective: PTTEP Group continuously and consistently monitors domestic and global economies to conduct energy trend and situation analysis in order to develop effective strategy and execution plan. The Company's objective is to create the balance between strong performance and business sustainability aspects to the following goals:

Strong Performance: Target to have a Return on Capital Employed (ROCE) at a level higher than that the industry's average and the unit cost in the top quartile of our Asian peer companies

Business Sustainability: Target to maintain the proved reserves to production ratio (R/P Ratio) of no less than 7 years by 2025 as well as to achieve a production target of 600,000 barrels of oil equivalent per day (BOED) in the same year

Strategy: To attain the above, we have formulated our strategic directions as follows:

(1) **RESET:** To enhance competitiveness and efficiency under low oil price environment, strategizing in reducing operating cost in all of the three phases of the Company's existing assets including Organizational Capability Development

(1.1) **Producing Assets:** To focus on maintaining the production level and increasing petroleum reserves through technological advancement, while reducing costs of all major projects and work plans to ensure their economic return under the ongoing low oil price environment

(1.2) **Development Projects:** To focus on increasing proved reserves and replacing existing producing assets which are declining by ensuring that our development projects are executed as planned and able to generate revenue as well as positive economic value under the ongoing low oil price environment

(1.3) **Exploration Projects:** To focus on increasing future reserves and production to sustain the Company's growth by managing the exploration portfolio, implementing of higher technology, and enhancing capability and efficiency for higher exploration success rate

(1.4) **Organizational Capability Development:** To support corporate strategy, PTTEP Group has enhanced our organizational capabilities and developed new capability enablers in four main areas, namely, funding and financial management, human resources management, systems & process development, and acceleration of knowledge base and technology and innovation.

From RESET strategy under “SAVE to be SAFE” and “SPEND SMART” campaigns, there are more than 200 initiatives aiming to reduce cost and increasing efficiency, such as logistics and supply chain management, drilling operation, engineering and modification, and maintenance process.

(2) **REFOCUS:** To expand growth driven by portfolio rationalization which is divided between two dimensions

(2.1) **E&P Conventional:** To focus on value creation from new exploration acreage, and merger and acquisition (M&A) in Southeast Asia which is the Company’s experienced area, as well as to continue to search and invest in prolific areas and low cost producing countries.

(2.2) **E&P Transformative:** To focus on expansion of investment in Liquefied Natural Gas (LNG) projects by establishing new joint ventures with PTT to carry out businesses related to LNG value chain

(3) **RENEW:** For long-term sustainability and growth, to develop a new strategy driven from technology and business opportunities.

To expand the range of PTTEP Group’s future growth, we have also studied other business investment opportunities. Currently, there are three major aspects that we are focusing on, namely, to increase exploration success rate, to enhance production, and to promote green practices.

Procedure to Set the Company’s Vision and Mission

PTTEP Board of Directors (Board) reviews and approves the vision and mission of the Company annually, being accompanied generally by the management and, particularly in this year, taking into account the current low oil price through a systematic planning process. The process is started by updating the current business environment and the E&P industry trend, and their implications on the Company regarding opportunities and risks. The role of the Company as a national oil company to provide a reliable and sustainable energy supply for Thailand is also reviewed. In addition, the Company’s investment portfolio is reviewed and assessed on returns and risks to identify the vision, mission, and short-term and long-term strategic directions. These allow the Company to achieve sustainable growth as well as to be able to cope with business changes. The management will then develop the Company’s work plan, budget, and Key Performance Indicators (KPIs), based on the given strategic directions and policies, to be presented to the Board for approval prior to the implementation.

After the Board approves the vision, mission, and corporate strategy, the management will cascade down the approved strategic directions and corporate targets to promote a better understanding among all of the Company’s employees. In principles, this will subsequently lead to sub-work plan development and implementation which are in line with the corporate target, work plan, and core values to achieve the Company’s goals at the end.

1.2 PTTEP Sustainability Management

1.2.1 Sustainability Management Overview

PTTEP’s Sustainability Management is an integration of our business, environmental, and social risks and opportunities to make us a company of choice for stakeholders, investors, shareholders, business partners, host governments, communities, and employees. The Company continuously emphasizes effective management of the three pillars of sustainability to reflect the ongoing concerns regarding environmental and social issues as well as create value for the Company and our

stakeholders. Sustainability targets, strategies, and implementation are driven by efficient business processes, funding, Governance, Risk, Control & Compliance (GRC) management, innovation and technology, cost reduction, and human capability development to enhance production and achieve work efficiency. To achieve this, PTTEP aligns our sustainability practices with His Majesty King Bhumibol Adulyadej's (Rama IX) Sufficiency Economy Philosophy (SEP) and also adopts the United Nations Sustainable Development Goals (UN SDGs) which is a global agenda for sustainable development that is adopted and implemented across the world by both public and private sectors. Currently, we prioritize our sustainability contributions to five UN Sustainable Development Goals or SDGs which are Goals 3, 4, 7, 8, and 16, while continuing our support for the rest of the SDGs in our routine operations.

To measure and benchmark our sustainability performance with our peers, the Company's goal is to maintain the status as a listed company in the Dow Jones Sustainability Index (DJSI) World Oil and Gas Industry which is the most internationally accepted measurement for sustainability performance. In 2017, we were selected as a DJSI member in the World Oil and Gas Upstream & Integrated Industry for the fourth consecutive year. In addition, we were chosen as a member of the FTSE4Good Index Series out of 32 companies in the Oil and Gas Industry for the FTSE4Good Emerging Index category for the second consecutive year, as well as being recognized as a "2017 Top 100 Global Energy" by Thomson Reuters.

1.2.2 PTTEP Materiality Assessment and 2017 Material Issues

PTTEP's materiality assessment process engages both internal and external stakeholders by using international standards, such as the Global Reporting Initiative (GRI G4) Sustainability Reporting Guideline: Oil and Gas Sector Supplement (OGSS) framework – core level, IPIECA's Oil and Gas Industry Guidance on Voluntary Sustainability, AA1000 AccountAbility Principles Standard (2008) (AA1000APS), and SASB Materiality Map™ by Sustainability Standards Board (SASB) to identify and prioritize the Company's material sustainability issues. This includes a thorough review of current and future business risks and opportunities in the economic, social and environmental dimensions which are significant issues to our business and stakeholders in terms of sustainability. The materiality issues are then used to develop the Sustainable Development Master Plan and integrated to our short-term and long-term strategy.

In 2017, 16 material sustainability issues were identified and prioritized from the process of engaging with our stakeholders and top management through the standard materiality assessment process. The issues are grouped into 10 issues for sustainability reporting, which were also included in the Company's KPI, and can be categorized as follows:

Material Economic Issues

- GRC – Governance, Risk Management, Control & Compliance
- Human Capital Management
- Reserves and Production
- Technology and Innovation
- Supply Chain Management

Material Social Issues

- Occupational Health and Safety
- Contribution to Society

Material Environmental Issues

- Climate Change
- Environment Management
- Spills

The Company's materiality assessment process includes a structured and systematic review of the issues which reflect significant economic, environmental and social impacts to the Company as well as those which are important to our internal and external stakeholders. The assessment is conducted by identifying material issues by addressing these issues from the Company's and stakeholder's perspectives, defining reporting boundaries of the material aspects, prioritizing the issues by their level of significance using agreed criteria and stakeholder engagement, and validating the issues through review and endorsement by the SD Working Team and SD Council. Details of our materiality assessment process can be found in the website: <https://www.pttep.com/en/Sustainabledevelopment/Disclosure/Approachtoreporting.aspx>.

1.2.3 Benefits to Society and Environment

PTTEP's sustainable development targets and plans include several key environmental and social initiatives. In 2017, key environmental initiatives and continuation projects included flare gas recovery and utilization at Nong Toom-A, heat recovery steam generator and methane (CH₄) emissions reduction at the S1 Project, Flash Gas Recovery Unit (FGRU) at the Greater Bongkot South Field, maintaining partial operation of seawater cooling water pump at the Arthit Project, and the logistics fleet management project. These 2017 greenhouse gas emissions initiatives were able to reduce more than 300,000 tonnes of carbon dioxide equivalent (CO₂e) per year, while reducing approximately THB 52,700,000 in fuel and operating cost through logistics fleet management. Meanwhile, the other projects except the logistic fleet management project were able to generate a revenue of approximately THB 564,000,000 from hydrocarbon recovery.

As for the Company's business programs which enhance socio-economic values such as tourism within the local communities, the "H.T.M.S. Sattakut Diving" site where PTTEP and the Royal Thai Navy placed the decommissioned historical battleship beneath the sea near Tao Island as a diving site to be an underwater learning center and a world class diving site is a good example of what we are trying to achieve, providing us with a social license to explore and operate in the given areas. The H.T.M.S. Sattakut diving site became a popular tourist attraction and in 2017, a report showed that there were more than 166 divers per day or 60,500 divers per year, the direct benefit received by local businesses and communities is approximately THB 55 million per year in terms of revenue alone that are generated from diving tours. We believe that these efforts will help to prevent operation disruption from community protests which can potentially lead to additional impacts on the society as well as higher operating cost to the Company.

1.3 Development and Significant Changes in 2017

During 2017, PTTEP has updated the Company's organization to cope with the changing energy industry landscape, as well as improve portfolio management and operational efficiency, and implement appropriate risk management. The Company also successfully expanded our investment to support growth. The following are the highlights of these developments and changes by region.

Thailand

In September 2017, the B6/27 Project received an approval from the Minister of Energy on the termination of another partner in the project, as a result, the Company currently holds 100% participating interests.

In November 2017, the Company has updated our organization structure. Mr. Somporn Vongvuthipornchai as Chief Executive Officer (CEO), is in charge of the Company's overall performance, strategic planning and business development on E&P related and new business opportunities; and Mr. Phongsthorn Thavisin as President of Exploration and Production (PEP), is responsible for management of the Upstream Value Chain business including Exploration, Development and Production activities per the Company's strategic plans.

South East Asia

In February 2017, the Myanmar MD-7 Project received the official approval from the Government of Myanmar on the divestment of 50% participating interest to Total E&P Myanmar (TOTAL). Hence, the Company's participating interest is 50% and is an operator. The transaction would balance the risk management as well as enhance the value of the project.

In July 2017, PTGL Investment Limited (PTGLI), a 50:50 joint venture company between PTTEP and PTT, acquired a 10% stake in the MLNG Train 9 Project in Malaysia from Petronas. The MLNG Train 9 Project is an LNG Liquefaction plant with a current production capacity of 3.6 million tons per annum of LNG. Also, the Myanmar PSC G & EP2 Project submitted the relinquishment letter to the Government of Myanmar after completed the exploration activity commitment under PSC with an effective date from August 31, 2017. Moreover, the Company implemented liability management activities through buy-back and issuance of USD debenture with the identical amount, however, there is no impact to outstanding interest-bearing debt of the Company. The transaction reduced interest burden and leveraged PTTEP Treasury Center Company Limited as the financial center of the PTTEP Group.

North America

In October 2017, the Company established a new subsidiary PTTEP Mexico E&P Limited, S. de R.L. de C.V. to participate in the bidding for exploration and production rights in Mexico. Furthermore, there was a revision of development plan for the Mariana Oil Sands Project in Canada to reflect current industry circumstances, which involved delaying the project's Final Investment Decision (FID) and resulted in the recognition of impairment loss on asset of 558 MMUSD. The impairment charge was done in accordance with accounting standards without any impact the Company's cash on hand and cash flows.

1.4 Shareholding Structure of PTTEP Group

1.4.1 Business Overview

PTTEP's core business is exploration and production of petroleum in Thailand and foreign countries. As of December 31, 2017, PTTEP Group had 36¹ petroleum exploration and production projects in 10 countries. 13 projects were under the exploration phase and 23 projects were under the commercial production phase.

¹ Excluding Indonesia Semai II and Indonesia Malunda projects for which PTTEP has submitted relinquishment documents to the Governments of Indonesia and is waiting for the official approval.

| No. | Project Name | Phase | Location | Participation Interest | Operator |
|--|-----------------------------------|-------------|-------------------|------------------------|------------|
| Thailand: 14 projects | | | | | |
| 1. | Bongkot Project | Production | Gulf of Thailand | 44.4445% | PTTEP |
| 2. | S1 Project | Production | Upper Central | 100% | PTTEP |
| 3. | PTTEP 1 Project | Production | Central | 100% | PTTEP |
| 4. | B6/27 Project | Production | Gulf of Thailand | 100% ² | PTTEP |
| 5. | Arthit Project | Production | Gulf of Thailand | 80% | PTTEP |
| 6. | L22/43 Project | Production | Upper Central | 100% | PTTEP |
| 7. | L53/43 & L54/43 Project | Production | Central | 100% | PTTEP |
| 8. | E5 Project | Production | North East | 20% | ExxonMobil |
| 9. | Contract 3 Project | Production | Gulf of Thailand | 5% | Chevron |
| 10. | Contract 4 Project | Production | Gulf of Thailand | 60% | Chevron |
| 11. | G4/43 Project | Production | Gulf of Thailand | 21.375% | Chevron |
| 12. | Sinphuhorm Project | Production | North East | 55% | PTTEP |
| 13. | B8/32 & 9A Project | Production | Gulf of Thailand | 25.001% | Chevron |
| 14. | G4/48 Project | Production | Gulf of Thailand | 5% | Chevron |
| Overlapping Area: 2 projects | | | | | |
| 1. | G9/43 Project | Exploration | Thailand-Cambodia | 100% | PTTEP |
| 2. | MTJDA Project | Production | Thailand-Malaysia | 50% | CPOC |
| Overseas: 20³ projects | | | | | |
| Myanmar | | | | | |
| 1. | Myanmar M3 Project | Exploration | Gulf of Moattama | 80% | PTTEP |
| 2. | Myanmar M11 Project | Exploration | Gulf of Moattama | 100% | PTTEP |
| 3. | Zawtika Project | Production | Gulf of Moattama | 80% | PTTEP |
| 4. | Yadana Project | Production | Gulf of Moattama | 25.5% | TOTAL |
| 5. | Yetagun Project | Production | Gulf of Moattama | 19.31784% | Petronas |
| 6. | Myanmar MD-7 Project ⁴ | Exploration | Andaman Sea | 50% | PTTEP |
| 7. | Myanmar MOGE 3 Project | Exploration | Onshore | 75% | PTTEP |

² PTTEP received an approval from the Ministry of Energy to receive the transfer of the participating interests in the B6/27 Project from other joint partners on September 22, 2017. As a result, its participating interests increased from 60% to 100%.

³ Excluding the Myanmar PSC G & EP 2 Project for which PTTEP had submitted a request to terminate and return the exploration block to Government of Myanmar, after fulfilling of the requirements of the Production Sharing Contract which was effective on August 31, 2017.

⁴ PTTEP received the official approval from the Government of Myanmar for the transfer of the participating interests in the Myanmar MD-7 Project to TOTAL E&P Myanmar on February 22, 2017. As a result, its participating interests decreased from 100% to 50%.

| No. | Project Name | Phase | Location | Participation Interest | Operator |
|-------------------|---|-------------|----------|------------------------|--------------|
| Vietnam | | | | | |
| 8. | Vietnam 9-2 Project | Production | Offshore | 25% | HV JOC |
| 9. | Vietnam 16-1 Project | Production | Offshore | 28.5% | HL JOC |
| 10. | Vietnam B & 48/95 Project | Exploration | Offshore | 8.5% | Petrovietnam |
| 11. | Vietnam 52/97 Project | Exploration | Offshore | 7% | Petrovietnam |
| Indonesia | | | | | |
| 12. | Natuna Sea A Project | Production | Offshore | 11.5% | Premier Oil |
| Malaysia | | | | | |
| 13. | Sarawak SK410B Project | Exploration | Offshore | 42.5% | PTTEP |
| Algeria | | | | | |
| 14. | Algeria Hassi Bir Rekaiz Project | Exploration | Onshore | 24.5% | PTTEP |
| 15. | Algeria 433a & 416b Project | Production | Onshore | 35% | GBRS |
| Australia | | | | | |
| 16. | PTTEP Australasia Project | Production | Offshore | 90 - 100% ⁵ | PTTEP |
| Canada | | | | | |
| 17. | Mariana Oil Sands Project | Exploration | Onshore | 100% | PTTEP |
| Mozambique | | | | | |
| 18. | Mozambique Rovuma Offshore Area 1 Project | Exploration | Offshore | 8.5% | Anadarko |
| Brazil | | | | | |
| 19. | Barreirinhas AP1 Project | Exploration | Offshore | 25% | BG Brasil |
| 20. | Brazil BM-ES-23 Project | Exploration | Offshore | 20% | Petrobras |

Principal Projects in Operation

The following is a summary of project activities undertaken during 2017. Production and sales figures described hereunder are total production and sales figures for the respective projects.

(1) Highlights of Project Activity in Thailand

PTTEP has 16 projects in Thailand including projects in the overlapping claims area. Most projects are in the production phase, located both in the Gulf of Thailand and onshore. The following are highlights of key project activities in Thailand during 2017.

Bongkot Project

The Bongkot Project is located in the southern part of the Gulf of Thailand, consisting of Bongkot North and Bongkot South fields. The Company holds 44.4445% interest and is the operator. The project has been in production since 1993. All of the natural gas and condensate produced from the Bongkot Field are sold to PTT, under a Take-or-Pay basis pursuant to long-term sales agreements.

⁵ PTTEP Australasia Project holds many petroleum blocks which have varying participation interests ranging from 90 – 100%.

In the year 2017, the project continuously drilled production wells, installed wellhead platforms and constructed gas pipeline in order to maintain steady production levels. The project is the process of concession bidding preparation since the current concession of the project will be expired in 2022-2023. Sales volume from the project averaged 856 million standard cubic feet per day (MMSCFD) of natural gas (equivalent to 139,101 barrels of oil equivalent per day (BOED)) and 26,109 barrels per day (BPD) of condensates.

S1 Project

The S1 Project is the largest onshore oil field in Thailand, with an area covering parts of Kamphaeng Phet, Sukhothai and Phitsanulok provinces. PTTEP is the sole owner and operator. Product from the S1 Project consists of crude oil, natural gas, and liquefied petroleum gas (LPG). Crude oil produced at S1 is sold to PTT which is transported via truck and rail to Thai Oil Public Company Limited, Bangchak Petroleum Public Company Limited (Bangchak) refineries, PTT Global Chemical Public Company Limited, and IRPC Public Company Limited. Part of produced gas from the project undergoes to a gas plant to separate LPG, before being sold to PTT and another part is subsequently directed to EGAT as fuel for power generation and used for production of CNG for natural gas vehicles (NGV).

In the year 2017, the project has continuously drilled additional production wells with exploration drilling plan in 2018. Environment impact assessments were also undertaken in both existing and new production areas. The project's average crude oil sales volume during the year was 25,919 BPD, while sales volume of natural gas averaged 21 MMSCFD (equivalent to 4,034 BOED), and average LPG sales volume was 244 metric tons per day (equivalent to 2,020 BOED).

PTTEP 1 Project

The PTTEP 1 Project is located in Suphan Buri and Nakhon Pathom provinces. PTTEP is the sole owner and operator. Crude oil produced at PTTEP 1 is sold to PTT which is transported via truck to the Bangchak refinery.

In the year 2017, the project carried on the production wells drilling activities to maintain production plateau. The project's average crude oil sales volume was 253 BPD.

B6/27 Project

The B6/27 Project is located in the Gulf of Thailand, off the coast of Chumphon province. PTTEP is the sole owner and operator. The project continues to focus on the geological and geophysical study for future development as well as assessing the environmental impacts.

Arthit Project

The Arthit Project is located in the southern part of the Gulf of Thailand. The Company has 80% participating interest in the project and is also the operator. The project entered into long-term GSA and condensate agreement with PTT on a take-or-pay basis.

In the year 2017, the project continued to drill production wells as well as constructed and installed wellhead platforms and gas pipelines in order to maintain production levels. For G8/50 Project, which is located adjacent to the northern of Arthit Project, the Company holds 80% participating interest and is an operator. DMF approved the development area together with the associated development plans in March 2012. The project achieved its first production in 2016 through Arthit's Central Processing Platform. As a part of Arthit Project, natural gas from the project will be sold to PTT under Arthit's gas sales contract. Average natural gas sales volume in 2017 from the project was 218 MMSCFD (equivalent to 35,321 BOED) and average condensates sales volume was 9,767 BPD.

L22/43 Project

The L22/43 Project is located in the Phitsanulok and Pichit provinces. The Company is the sole owner and operator. Crude oil produced from the project is sold to PTT which is transported via truck to Bangchak refinery.

In the year 2017, the project implemented the Artificial Lift techniques in order maintain crude oil production. The project's average crude oil sales volume was 141 BPD.

L53/43 and L54/43 Project

The L53/43 and L54/43 Project are located in Suphan Buri, Kanchana Buri, Ayutthaya and Ang-Thong provinces. The Company owns 100% interest in the project and is also the operator. Crude oil produced from the project is sold to PTT which is transported via truck to the Bangchak refinery.

In the year 2017, the project carried out the exploration and development drilling activities to uphold production level. The project's average crude oil sales volume was 627 BPD.

E5 Project

The E5 Project is located in the Khon Kaen province. The Company holds 20% participating interest in the project with ExxonMobil as the operator. All of the natural gas produced by the E5 Project is sold to PTT on a take-or-pay basis pursuant to a long-term GSA. PTT then transports the gas via pipelines to EGAT power plant.

In the year 2017, average natural gas sales volume for the project amounted to 9 MMSCFD (equivalent to 1,466 BOED).

Contract 3 Project

The Contract 3 Project is located in the Gulf of Thailand, off the coast of Surat Thani province. The Company holds a 5% interest in the project with Chevron as the operator. All of the natural gas and condensate produced from Contract 3 is sold to PTT on a take-or-pay basis pursuant to long-term GSA and condensate agreement, whilst produced crude oil is under yearly sales agreement and spot cargo with other purchasers.

In the year 2017, the project continued to carry out development drilling activities in order to maintain production levels. The project sold natural gas at an average rate of 577 MMSCFD, equivalent to 97,767 BOED, crude oil at an average rate of 21,980 BPD and condensates at an average rate of 21,092 BPD.

Contract 4 Project

The Contract 4 Project, inclusive of the G7/50 Block, is located in the Gulf of Thailand, off the coast of Songkhla province. The Company holds a 60% interest (formerly 45%) in the project, with Chevron as the operator. The change of the participating interest is the result of PTTEP's acquisition of Hess Corporation's subsidiaries which was completed on April 22, 2014. All of the natural gas and condensate produced from Contract 4 is sold to PTT on a take-or-pay basis pursuant to a long-term GSA and condensate agreements.

In the year 2017, the project sold natural gas at an average rate of 347 MMSCFD (equivalent to 58,863 BOED) and condensates at an average rate of 15,769 BPD. The project continued to drill additional development wells aiming to maintain production plateau as well as accelerating the development of Ubon oil Field, a part of the Contract 4 Project, which is currently in the process of negotiation with current partners on development preparation with expected first oil production by 2022 at planned capacity of 25,000-30,000 barrel per day (BPD).

G4/43 Project

The G4/43 Project is located in the Gulf of Thailand. The Company holds a 21.375% interest in the project with Chevron as the operator. The project has mutual long-term GSA and crude oil sale agreements with the B8/32 & 9A Project.

In the year 2017, the project continued to carry out development drilling activities to sustain production level. The sales volume of crude oil and natural gas averaged 6,107 BPD and 2 MMSCFD (equivalent to 393 BOED), respectively.

Sinphuhorm Project (EU-1 and E5-North)

The project is located in the Udon Thani and Khon Kaen provinces. The Company owns a 55% interest (formerly 20%) in the project and is also the operator. The increase in participating interest is the result of PTTEP's acquisition of Hess Corporation's subsidiaries which held stakes in the Sinphuhorm Project. The acquisitions were completed on April 22, 2014. Natural gas produced from the project has long-term GSAs with PTT.

In the year 2017, sales volume of the project averaged 78 MMSCFD for natural gas (equivalent to 12,794 BOED) and 250 BPD for condensates.

B8/32 & 9A Project

The B8/32 & 9A Project is located in the Gulf of Thailand, off the coast of Chumphon province. The Company holds a 25% interest in the project with Chevron as the operator. The project currently has long-term GSAs with PTT and for the produced crude oil is sold through annual sale agreements and spot cargo with other purchasers.

In the year 2017, the project continued to carry out development drilling and waterflood operations in order to maintain the crude oil production levels. Sales volume averaged 25,434 BPD for crude oil and 94 MMSCFD for natural gas (equivalent to 16,836 BOED).

G4/48 Project

The G4/48 Project is located in the Gulf of Thailand, offshore from Surat Thani province. PTTEP holds 5% interest in the project with Chevron as the operator. The project has mutual long-term GSAs with PTT and crude oil sale agreements with the Contract 3 Project.

In the year 2017, sales volume from the G4/48 Project averaged 5 MMSCFD for natural gas (equivalent to 861 BOED) and 1,323 BPD for crude oil.

Projects located in overlapping claims areas

G9/43 Project

The G9/43 Project is located in the Gulf of Thailand, with 100% ownership and operatorship of the project. Activities at this project have been suspended pending to the resolution of the boundary dispute between the governments of Thailand and Cambodia.

MTJDA Project

PTTEP has a 50% participating interest in the MTJDA Project with Carigali PTTEPI Operating Company Sdn. Bhd. as the operator. PTTEP, PC JDA Ltd. (a subsidiary of Petronas, Malaysia's Natural Oil Company) and the Malaysia-Thailand Joint Authority (MTJA) executed a GSA for the sales of the natural gas from the MTJDA Project to PTT and Malaysia. Whilst, crude oil and condensate produced from the project were sold through auction.

In the year 2017, the project completed production drilling activities as planned in accordance with phase 3 of the development plan, and is currently in the process of construction and preparation of drilling activities in development plan phase 4 in order to maintain production volume. Current sales volume from the project averaged 263 MMSCFD (equivalent to 42,316 BOED) for natural gas and 6,991 BPD for condensates.

(2) International Projects: PTTEP has 20 projects overseas, broken down into the following regions.

(2.1) Project Activity Highlights in South East Asia: PTTEP has 13 projects in this region which are located in the Republic of the Union of Myanmar (Myanmar), Socialist Republic of Vietnam (Vietnam), Malaysia and Republic of Indonesia (Indonesia). The following section highlights the project activities.

Myanmar M3 Project

The Myanmar M3 Project is located in the Gulf of Moattama, Myanmar. PTTEP is the operator, and holds 80% participating interest in the project.

The project is currently in the process of negotiating on commercial framework with the Government of Myanmar for future development.

Myanmar M11 Project

The Myanmar M11 Project is located in the Gulf of Moattama, Myanmar. PTTEP holds 100% interest in the project and is the operator. On March 7, 2017, the Government of Myanmar has extended the exploration period to 4 years (October 23, 2014 to October 22, 2018).

In the year 2017, the project is currently assessing for the fields' resource potential with a plan to drill 1 exploration well in 2018 as well as seeking a joint partners for project risk management.

Zawtika Project

The Zawtika Project is located in the Gulf of Moattama, Myanmar. The Company owns 80% interest and is also the operator, with Myanmar Oil and Gas Enterprise (MOGE) holding the remaining 20% interest. The gas production will be sold to PTT supplying into Thai market under long-term GSA on a take-or-pay basis and MOGE for domestic use in Myanmar. To transport natural gas from Zawtika to Thailand, the Company and the joint venture partners established a gas transportation company called Andaman Transportation Limited (ATL) to construct and operate an offshore and onshore pipeline from the project to the Thai border. The project commenced its gas sales in Myanmar in March 2014 and began delivering natural gas to PTT in August 2014.

In the year 2017, the project has maintained its production as planned and completed the construction of 1 production platform in Phase 1C in 2017 while the remaining 3 production platforms have been scheduled to set up in 2018. The project also continues to carry out drilling activities in order to support the production plateau of the project. Current gas sales volume was 301 MMSCFD (approximately 47,747 BOED).

Yadana Project

The Yadana Project is a large gas project located in the Gulf of Moattama, Myanmar. The Company holds a 25.5% interest with Total E&P Myanmar (TEPM) as the operator. Natural gas produced from the project is sold to PTT on a take-or-pay basis pursuant to long-term GSA, and a certain portion is sold to MOGE for domestic use in Myanmar. To transport natural gas from Yadana to Thailand, the Company and our joint venture partners established a gas transportation company, called Moattama Gas Transportation Company (MGTC), to construct and operate an offshore and onshore pipeline from the Yadana Project area to the Thai border. Consequently, PTT completed an onshore pipeline section from the Thai border to the EGAT power generation plant in Ratchaburi province.

In the year 2017, the project completed the construction phase of Badamayar wellhead platform and started to deliver gas production from 4 development wells. During year 2017, total gas sales volume averaged 741 MMSCFD (equivalent to 90,223 BOED).

Yetagun Project

The Yetagun Project is a natural gas and condensates producing project located in the Gulf of Moattama, Myanmar. The Company holds a 19.31784% interest in the project with PC Myanmar (Hong Kong) Limited as the operator. All natural gas from the Yetagun Project is sold to PTT on a take-or-pay basis pursuant to long-term GSA. To transport natural gas from Yetagun Project to Thailand, the Company and the joint venture partners established a gas transportation company called Taninthayi Pipeline Company (TPC) to construct and operate an offshore pipeline and an onshore pipeline (parallel to the Yadana pipeline) from the project to the Thai border.

In the year 2017, the project was in the process of evaluating result from 3D seismic survey with the plan to drill exploration and development wells to maintain production plateau. The project's total sales volume averaged 215 MMSCFD (equivalent to 33,948 BOED) for natural gas and 5,458 BPD for condensates.

Myanmar MD-7 Project

The MD-7 Project is located in deep waters of the Gulf of Moattama, Myanmar. The Company has a 50% interest in the project and is the operator. During 2017 TOTAL E&P Myanmar (TEPM) has been selected to be a joint venture partner with 50% participating interests.

In the year 2017, the project was in the process of evaluating the fields' resources potentials in order to prepare exploration drilling plan.

Myanmar MOGE 3 Project

The Myanmar MOGE 3 Project is an onshore project located in Myanmar. PTTEP holds a 75% interest and is the operator of this project.

In the year 2017, the project officially received the approval to extend exploration period for additional two years (August 21, 2015 to August 20, 2020) and was in the process of evaluating the fields' resources potentials to prepare exploration drilling plan in 2018.

Vietnam 9-2 Project

The Vietnam 9-2 Project is located offshore southeast of Vietnam, and PTTEP has a 25% interest in the project with Hoan Vu Joint Operating Company as the operator. The crude oil produced from the project is sold to domestic refineries while the produced natural gas is sold to Vietnam Oil and Gas Group, a state own enterprise, for domestic consumption.

In the year 2017, the project's sales volume of crude oil averaged 4,164 BPD, while sales volume of natural gas averaged 12 MMSCFD (equivalent to 2,623 BOED).

Vietnam 16-1 Project

The Vietnam 16-1 Project is located offshore, southeast of Vietnam, with PTTEP holding a 28.5% interest, with Hoang-Long Joint Operating Company as the operator. Crude oil production of the project is sold to domestic Vietnamese refineries as well as to an international market through a bidding process. Natural gas is sold to the Vietnam Oil and Gas Group, a state-owned enterprise, for domestic consumption.

In the year 2017, the project started production from 4 developed wells as planned in order to maintain the production levels. During the year, sales volume from the project averaged 21,087 BPD of crude oil and 2 MMSCFD of natural gas (approximately 486 BOED).

Vietnam B & 48/95 Project

The Vietnam B & 48/95 Project is located offshore of Vietnam. The Company owns an 8.5% interests in the project with Petrovietnam as the operator.

In the year 2017, the project signed a letter of agreement between joint venture partners on wellhead gas prices and transportation costs and currently is in the negotiation process on commercial contracts in order to push forward the Final Investment Decision (FID) with targeted first production with the Vietnam 52/97 Project at 490 MMSCFD by the end of 2021.

Vietnam 52/97 Project

The Vietnam 52/97 Project is located offshore of Vietnam. The Company owns 7% interests in the project with Petrovietnam as the operator.

In the year 2017, the project signed a letter of agreement between joint venture partners on wellhead gas prices and transportation costs, and currently is in the negotiation process on commercial contracts in order to push forward the Final Investment Decision (FID) with targeted first production with the Vietnam B & 48/95 Project at 490 MMSCFD by the end of 2021.

Natuna Sea A Project

The Natuna Sea A Project is located in the west of the Natuna Sea in Indonesia. In 2013, PTTEP Netherlands Holding Coöperatie U.A. (PTTEP NH), a subsidiary of PTTEP, jointly signed a share purchase agreement with Pertamina Hulu Energy, a subsidiary of Pertamina, on a 50:50 basis, to acquire subsidiaries of Hess Corporation holding 23% interest in the Natuna Sea A Project. As a result, PTTEP holds 11.5% interest in the project, with Premier Oil as the operator. The crude oil and condensate produced are sold through auction, while natural gas produced is sold in Singapore for domestic consumption.

In the year 2017, the project has accelerated project development plan to maintain production plateau. The sales volume of natural gas at an average rate of 221 MMSCFD (equivalent to 38,797 BOED) and condensates at averaged at 1,491 BPD.

Sarawak SK410B Project

The Sarawak SK410B Project is located in offshore Sarawak, Malaysia. The Company has a 42.5% interest in the project and is the operator.

In the year 2017, the project completed 3D seismic survey and is currently in the process of evaluating field's resources potential with exploration drilling plan in 2018.

(2.2) **Project Activity Highlights in Africa and the Middle East:** PTTEP has three projects in this region, located in the People's Democratic Republic of Algeria (Algeria), and the Republic of Mozambique (Mozambique) with the following as key highlights:

Algeria Hassi Bir Rekaiz Project

The Algeria Hassi Bir Rekaiz Project is located onshore in eastern Algeria. The Company holds a 24.5% interest and is the operator.

In the year 2017, the project's development plans was submitted to the Algerian government since December 2017 and expected to receive the approval within the first quarter of 2018. The project is expected to start production within 2019 with the first phase capacity of around 10,000-13,000 BPD. Subsequently, further investment will be considered to ramp up to full capacity at around 50,000 BPD.

Algeria 433a & 416b Project

The Algeria 433a & 416b Project is located onshore in the eastern Algeria. The Company holds a 35% interest in the project, with Groupement Bir Seba Joint Operating Operator. Production for the year 2017 averaged 17,360 BPD.

Mozambique Rovuma Offshore Area 1 Project

The Mozambique Rovuma Offshore Area 1 Project is a large natural gas project located offshore of Mozambique. The Company owns an 8.5% interest with Anadarko as the operator.

During 2017, the project made a significant progress by achieving several key milestones including the receipt of government approval on Legal & Contractual Framework and the official approval on the marine concessions as well as resettlement which has been commenced since November 2017. The project's development plan is currently in the process of

final approval by the Government of Mozambique which is expected to achieve by early 2018. The project also expedites the finalization of LNG off-take agreements, and is negotiating project finance with financial institutions in order to support the Final Investment Decision (FID), with planned first phase of production at 12 Million tons per annum (MTPA) starting in 2023.

(2.3) Project Activity Highlights in Australasia: PTTEP has one project in this region which is located in the Commonwealth of Australia (Australia) comprising of 12 concession permits with the following as key highlights:

PTTEP Australasia Project

In 2009, the Company acquired 100% of the ordinary shares of Coogee Resources Limited, which was later renamed to PTTEP Australasia Pty Ltd. (PTTEP AA). PTTEP AA owns exploration and development fields located in the Timor Sea, in Australia and currently holds concessions to 12 permits with two key oil and gas fields, including Montara, which is in the production phase and the Cash Maple which is still under feasibility studies. The rest of the concessions are primarily in the exploration phase.

Montara Field

The Montara Field is located in the Timor Sea in Australia. The Company holds 100% interest in the project. In the year 2017, the project completed the drilling of producing well in order to accelerate production levels. The project has average sales volume for the year 2017 of 10,580 BPD in accordance with the production plan.

Cash-Maple Field

The Company holds 100% interest in the Project. The project has achieved the Pre-FEED study and is currently in the process of FEED study preparation which is scheduled to complete by 2018.

For other concessions, PTTEP has interests ranging from 90% to 100%, all of which are undergoing geological and geophysical studies to determine potential for petroleum.

(2.4) Project Activity Highlights in North America: PTTEP has three projects in this region which located in Canada and the Federative Republic of Brazil (Brazil). The following are significant activities in this region:

The Mariana Oil Sands Project

The Mariana Oil Sands Project (formerly known as the Canada Oil Sands KKD Project) is located in Alberta, Canada. PTTEP Canada Limited (PTTEP CA), a subsidiary of the Company, has 100% ownership and is the operator of the Thornbury, Hangingstone, and South Leismer fields. The project submitted the development proposal for Thornbury Phase 1 to the government of Alberta in May 2015. Currently, the project has revised its development plan and is determining appropriate approach for development.

Barreirinhas AP1 Project

The Barreirinhas AP1 Project is located in the Barreirinhas Basin, offshore to the northeast of Brazil. The Company owns 25% interest of the project, with Shell Brasil as an operator. The project comprises four exploration blocks called BAR-M-215, BAR-M-217, BAR-M-252 and BAR-M-254. The project is currently studying the petroleum potential.

The Brazil BM-ES-23 Project

The Brazil BM-ES-23 Project is located in the Espirito Santo Basin, offshore to the east of Brazil. The Company holds 20% stake in the BM-ES-23 Project, with Petrobras as an operator. The project is currently studying the petroleum potential.

Projects Divestment and Relinquishment in 2017

The Myanmar PSC G and EP2 Project is located in onshore Myanmar. The Company has 70% interest in the project, and is also the operator. The project completed drilling exploration wells in accordance with the requirements of the Production Sharing Contract and found no commercial discovery. The Company had submitted a request to terminate and return the exploration block to the Government of Republic of the Union of Myanmar on July 17, 2017 which was effective since August 31, 2017 and is in the process of receiving official approval from the government.

1.4.2 Structuring Policy of PTTEP Group

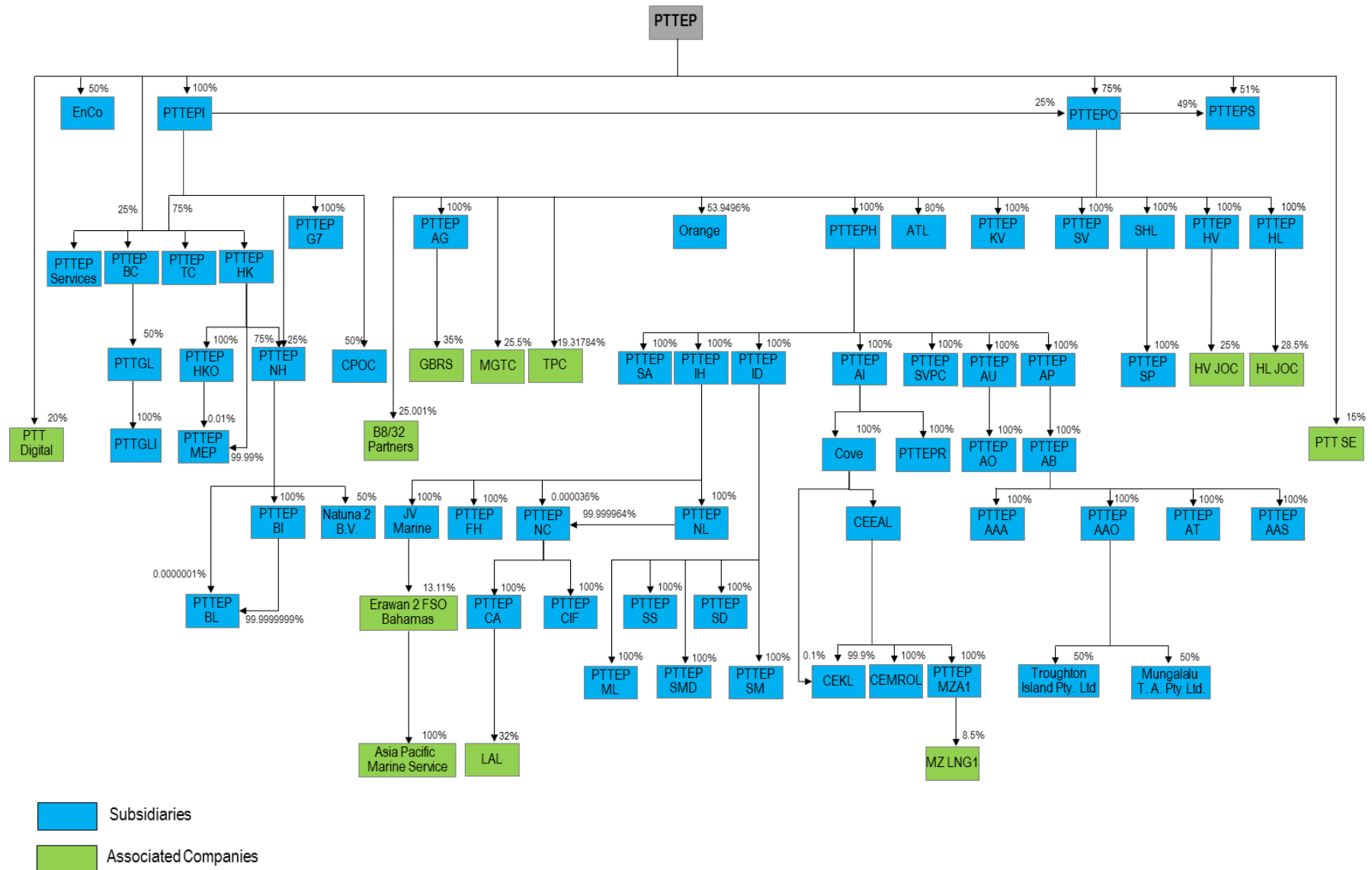
PTTEP has continuously expanded our E&P business both domestically and overseas. The establishment of subsidiaries and associated companies in various regions is necessary for the investment purpose, efficiency and competitive advantages comparable to other international oil companies as well as operational flexibility by taking into account of various factors, such as laws and regulations, financial structure, tax regimes, business and investment conditions, and risk management.

PTTEP's policy is to manage our subsidiaries strictly in line with the Company's business direction and strategy. PTTEP assigns our executives and staff to second as employees in the subsidiaries to run the projects in the similar standards and terms as PTTEP. Meanwhile, in managing our associated companies, the Company nominates representatives to serve as a shareholder and/or a member of the Board of Directors according to the terms of the investment in order to be able to effectively define the overall business strategy and policy of these entities. To manage both the subsidiaries and associated companies, the Company adheres to the Good Corporate Governance and Business Ethics of the PTTEP Group to ensure effectiveness, transparency, fairness, and achievement of our business goals.

With respect to the directors of the Company's subsidiaries and associated companies, we assign the executives who are responsible for the project under such entities as directors to ensure that they are managed in line with the Company's business direction and strategy. The Company however in some cases must also appoint a local director, if required by the laws and regulations or investment conditions of the specific countries. The subsidiaries and associated companies meanwhile are obligated to report their performance to the Company on a quarterly basis to ensure their performance and effectiveness.

1.4.3 Shareholding Structure of the PTTEP Group

As of December 31, 2017, PTTEP invested in 72 legal entities, comprising 60 subsidiaries and 12 associated companies. Shareholding structure of the PTTEP Group is illustrated as follows:



1.5 Relationship with the Major Shareholder

PTTEP's major shareholder is PTT Public Company Limited (PTT), a state-owned company which engages in fully integrated petroleum and petrochemical businesses by strategically investing directly and indirectly through its group of companies both in the upstream and downstream businesses.

Currently, PTT holds 65.29% of the Company's registered and paid-up capital, effectively making the PTT Group the only full-scale natural gas business operator in Thailand. As the major buyer of the Company's petroleum products, PTT, in turn, refines and processes the products and supplies them as energy and raw materials for the power, petrochemical, transportation sectors as well as other industries and households.

In 2017, the Company supplied crude oil, natural gas, LPG, and condensate to PTT. Conditions and price settings of all transactions undertaken between PTTEP and PTT follow normal business operations at the arm's length basis conditions for non-related persons or operations. Details of connected transactions between PTTEP and PTT are disclosed in the "Connected Transactions" section.

2. Nature of Business Operation

2.1 Revenue Structure

PTTEP and our subsidiary's revenues are mainly from sales of petroleum products of which its price is marked to the world fuel price in US Dollar. Thus, PTTEP and our subsidiaries' revenue structure of 2015 – 2017 are presented here in US Dollar in order to reflect the Company's revenue structure for the petroleum exploration and production projects in the production phase of PTTEP and our subsidiaries as at December 31, 2017 comprised 23 projects: the Bongkot, Arthit, B6/27, MTJDA, Contract 4, B8/32 & 9A, G4/43, Contract 3, G4/48, S1, L22/43, PTTEP1, L53/43 & L54/43, Sinphuhorm, E5, Zawtika, Yadana, Yetagun, Vietnam 16-1, Vietnam 9-2, Natuna Sea A, PTTEP Australasia and Algeria 433a&416b projects.

In addition, PTTEP and our subsidiaries recorded revenues proportionately from gas pipeline transportation which are Moattama Gas Transportation Company (MGTC), Taninthayi Pipeline Company LLC (TPC) and Andaman Transportation Limited (ATL).

Revenue structure of PTTEP and our subsidiaries during 2015-2017

| Product | Operated by | % of interest | 2015 | | 2016 | | 2017 | |
|-------------|----------------|---------------|--------------------------|-------|--------------------------|-------|--------------------------|-------|
| | | | Revenue (Million USD) | % | Revenue (Million USD) | % | Revenue (Million USD) | % |
| Sales | | | | | | | | |
| Crude | PTTEP | - | 141.37 | 2.51 | 115.46 | 2.66 | 137.42 | 3.03 |
| | PTTEPI | 100 | 40.18 | 0.71 | 36.30 | 0.83 | 45.38 | 1.00 |
| | PTTEPS | 100 | 367.76 | 6.54 | 290.41 | 6.68 | 346.92 | 7.65 |
| | Orange | 53.9496 | 87.69 | 1.56 | 75.49 | 1.74 | 87.08 | 1.92 |
| | B8/32 Partners | 25.0009 | 35.04 | 0.62 | 28.75 | 0.66 | 36.84 | 0.81 |
| | PTTEP HV | 100 | 22.34 | 0.40 | 17.34 | 0.40 | 20.49 | 0.45 |
| | PTTEP AP | 100 | 334.62 | 5.95 | 235.79 | 5.42 | 220.59 | 4.87 |
| | PTTEP HL | 100 | 162.18 | 2.88 | 114.77 | 2.64 | 113.58 | 2.51 |
| | Natuna 2 | 50 | 2.05 | 0.04 | 1.54 | 0.04 | 2.80 | 0.06 |
| | PTTEP AG | 100 | 2.88 | 0.05 | 34.10 | 0.78 | 53.58 | 1.18 |
| Natural Gas | PTTEP | - | 1,899.45 | 33.78 | 1,560.28 | 35.89 | 1,492.21 | 32.92 |
| | PTTEPI | 100 | 1,218.06 | 21.66 | 856.73 | 19.71 | 789.76 | 17.42 |
| | PTTEPS | 100 | 45.42 | 0.81 | 36.34 | 0.84 | 42.44 | 0.94 |
| | Orange | 53.9496 | 28.66 | 0.51 | 31.84 | 0.73 | 23.95 | 0.53 |
| | B8/32 Partners | 25.0009 | 11.02 | 0.20 | 9.90 | 0.23 | 10.09 | 0.22 |
| | PTTEP HV | 100 | 1.54 | 0.03 | 1.36 | 0.03 | 1.51 | 0.03 |
| | PTTEP OM* | 100 | - | - | - | - | - | - |
| | PTTEP HL | 100 | 2.52 | 0.04 | 1.70 | 0.04 | 0.32 | 0.01 |
| | Natuna 2 | 50 | 64.64 | 1.15 | 43.97 | 1.01 | 61.35 | 1.35 |
| | PTTEP SP | 100 | 211.27 | 3.76 | 177.99 | 4.09 | 139.11 | 3.07 |
| LPG | PTTEP | - | 9.33 | 0.17 | 9.48 | 0.22 | 9.04 | 0.20 |
| | PTTEPS | 100 | 27.99 | 0.50 | 28.44 | 0.65 | 27.14 | 0.60 |

| Product | Operated by | % of interest | 2015 | | 2016 | | 2017 | |
|--|-------------|---------------|--------------------------|--------|--------------------------|--------|--------------------------|--------|
| | | | Revenue (Million USD) | % | Revenue (Million USD) | % | Revenue (Million USD) | % |
| Condensate | PTTEP | - | 480.31 | 8.54 | 401.05 | 9.22 | 522.10 | 11.52 |
| | PTTEPI | 100 | 48.08 | 0.85 | 43.02 | 0.99 | 49.70 | 1.10 |
| | PTTEPS | 100 | 1.32 | 0.02 | 1.07 | 0.02 | 0.76 | 0.02 |
| | PTTEP OM* | 100 | - | - | - | - | - | - |
| | PTTEP SP | 100 | 40.95 | 0.73 | 36.44 | 0.84 | 47.04 | 1.04 |
| Total Sales | | | 5,286.67 | 94.01 | 4,189.56 | 96.36 | 4,281.20 | 94.44 |
| <u>Revenue from Pipeline Transportation</u> | | | | | | | | |
| Gas Pipeline Transportation | MGTC | 25.5 | 53.16 | 0.95 | 28.20 | 0.65 | 36.20 | 0.80 |
| | TPC | 19.3178 | 19.80 | 0.35 | 9.30 | 0.21 | 9.35 | 0.21 |
| | ATL | 80 | 45.53 | 0.81 | 28.99 | 0.67 | 32.26 | 0.71 |
| Total Revenue from Pipeline Transportation | | | 118.49 | 2.11 | 66.49 | 1.53 | 77.81 | 1.72 |
| <u>Other Income</u> | | | | | | | | |
| Gain On Foreign Exchange | | | - | - | 11.59 | 0.27 | 51.40 | 1.13 |
| Interest Income | | | 31.92 | 0.57 | 30.06 | 0.69 | 59.58 | 1.31 |
| Gain On Financial Derivatives | | | 132.16 | 2.35 | - | - | - | - |
| Other Income | | | 45.20 | 0.80 | 41.48 | 0.95 | 53.27 | 1.18 |
| Total Other Income | | | 209.28 | 3.72 | 83.13 | 1.91 | 164.25 | 3.62 |
| Total Revenues | | | 5,614.44 | 99.84 | 4,339.18 | 99.80 | 4,523.26 | 99.78 |
| Share of Gain of Associates and Joint ventures | | | 9.03 | 0.16 | 8.55 | 0.20 | 9.75 | 0.22 |
| Grand Total after include Share of Gain of Associates and Joint ventures | | | 5,623.47 | 100.00 | 4,347.73 | 100.00 | 4,533.01 | 100.00 |

*Revenue of PTTEP OM was represented in discontinued operations. The additional information is disclosed in Note 14 - Divestment of PTTEP Oman Company Limited and Discontinued Operations

For 2017, total revenues for PTTEP and our subsidiaries was 4,533 MMUSD (equivalent to 153,526 MMTHB), an increase of 185 MMUSD or 4% when compared with the revenues in 2016 which was 4,348 MMUSD (equivalent to 153,047 MMTHB). The increase was primarily due to an increase in sales revenue of 92 MMUSD from an increase in condensate and crude sales revenue. The increase was primarily due to an increase in the average selling price of operating projects operated by PTTEP and PTTEP Siam Limited (PTTEPS).

2.2 Products and Services

2.2.1 Petroleum

Petroleum is defined as a naturally occurring hydrocarbon mixture, including crude oil, natural gas, condensate, related products, and other hydrocarbon products which are free in nature.

Crude oil is the portion of petroleum which is liquid in nature and obtained from oil wells and gas separation process, yet to be refined or purified.

Natural gas is hydrocarbon in gas or vapor phase at atmospheric temperature and pressure, commonly having methane as its major constituent.

Condensate is a low-density liquid hydrocarbon. It is condensed from hydrocarbon gas. Condensation occurs when gas is produced at the surface where temperature and pressure are lower than those in the reservoir.

Liquefied Petroleum Gas (LPG) is obtained from crude oil refinery or natural gas separation process, primarily consisting of butane and propane.

Crude oil, condensate, and LPG are measured in barrel, while natural gas is measured in cubic foot at the standard conditions (One atmosphere or atm at 60 degree Fahrenheit). All petroleum products can be converted to barrel of oil equivalent (BOE) based on their heat contents. One cubic foot of natural gas has a heating value of approximately 1,000 British thermal units (BTU), whereas one barrel of crude oil has a heating value of approximately 6,000,000 BTU.

2.2.2 Gas Transportation Pipeline

PTTEP Offshore Investment Company Limited (PTTEPO), a wholly-owned subsidiary of PTTEP, has major investments in other companies, such as 80% holding in Andaman Transportation Limited (ATL), 25.5% in Moattama Gas Transportation Company (MGTC), and 19.31784% in Taninthayi Pipeline Company (TPC). The objective of the company is to invest in gas pipeline transportation connecting at the border between the Republic of the Union of Myanmar and Thailand.

2.2.3 Jetty and Warehouse

Petroleum Development Support Base was established to provide jetty and warehouse services to support offshore exploration and production activities both in Thailand and abroad. The support base mainly accommodates the Company's own offshore operating projects in Thailand, such as Bongkot Project, Arthit Project, B6/27 Project, as well as those of other offshore oil and gas operating companies, such as PTT, Chevron Thailand Exploration and Production Limited, Carigali-PTTEPI Operating Company Sdn Bhd (CPOC), MP G11 (Thailand) Limited, KrisEnergy G10 (Thailand) Ltd., and Mubadala Petroleum (Thailand) Limited. The support base can also support affiliated offshore operating projects, such as Myanmar M3 Project, Myanmar M11 Project, and Zawtika Project which are located in the Republic of the Union of Myanmar. Currently, our support base operates from two branches in, namely, Songkhla province and Ranong province.

1. *Petroleum Development Support Base (Songkhla Branch)* solely provides marine jetty berthing and warehousing services and is owned and operated by PTTEP International Limited (PTTEPI), a subsidiary of PTTEP. The jetty is equipped with 380 meters of wharf which is capable of berthing six supply vessels with a size of more than 500 gross tonnes simultaneously. The jetty is also equipped with storage facilities and operated with a high standard of material-handling equipment. The support base also operates under the international management system for Safety, Security, Health and Environment, while strictly following the International Ship and Port Facilities Security Code (ISPS Code) which is awarded by the Marine Safety and Environment Bureau of the Royal Thai Marine Department. The jetty is therefore recognized as one of the country's leading shore base facilities for petroleum exploration and production activities. The 58-rai warehousing service facility is divided into four sections, namely, storage warehouse, open yard, free zone storage warehouse, and free zone yard for the best storage and maintenance purpose of materials and equipment as well as for the privilege of taxes and custom duties.

2. *Petroleum Development Support Base (Ranong Branch)* provides marine jetty berthing and warehousing services and is owned and operated by PTTEPI; though the jetty service which is operated through Ranong multi-purpose port is owned by the Port Authority of Thailand, operating from a 150-meter wharf which is capable of berthing two supply vessels with a size of more than 500 gross tonnes simultaneously. The support base is also fully equipped with storage facilities and standard material-handling equipment. The 25-rai warehousing service facility is divided into four sections, namely, storage warehouse, open yard, free zone storage warehouse, and free zone yard for the best storage and maintenance purpose of materials and equipment as well as for the privilege of taxes and custom duties.

To ensure that the services of both support base branches meet the international standards and top safety level, performance audit is continuously conducted to emphasize on the Safety, Security, Health and Environment. Both are also operated and equipped with high security systems, such as parameter and high mast lights, barb wire fence, CCTV system, and 24-hour security guards.

PTTEP regularly exercises awareness and gets involved with the local community in the operating areas. The Company holds several certificates which are accredited by the International Environment Control Program (ISO 14001 certification), and the Occupational Health Control Program (OHSAS 18001 certification). The Company has also prepared the Emergency Response Plan under the ISO 22301 standard to handle unexpected and emergency cases as well as to rehearse and exercise our response plan to ensure that our support base is capable to response with the latest technologies and methods for continuity of the operation.

2.2.4 PTT Digital Solutions Company Limited (PTT Digital)

PTT ICT Solutions Company Limited (PTT ICT), an affiliate of which 20% is owned by PTTEP, signed an agreement with PTTEP to provide the Company with all information technology and communication services according to the resolution of PTTEP's Board of Directors Meeting No. 10/2549/254 on September 29, 2006. The agreement includes infrastructure design and implementation services, consultancy services, procurement services, and outsourcing services to support the Company's needs in information technology and communication, based on the PTT Group's ICT Policy Strategy to drive and increase synergy within the group.

PTT ICT has re-registered its name with the Department of Business Development of the Ministry of Commerce to PTT Digital Solutions Company Limited on June 22, 2017. The current service contract is valid for 5 years starting from January 1, 2016.

2.2.5 Energy Complex Company Limited (Energy Complex)

PTT and PTTEP have jointly established, constructed, and managed the Energy Complex Investment Project. The complex is considered to be the energy business center of the country, also comprising the Ministry of Energy, subsidiaries and associated companies of the PTT Group, and some private energy companies.

2.2.6 PTTEP Services Limited (PTTEP Services)

PTTEP Services was established in accordance with the resolution of PTTEP Board Meeting No. 12/2546/216. With its primary business objective of supplying the manpower needed to support PTTEP Group's operational activities, the company additionally ensures that PTTEP is sufficiently staffed overall for both its domestic and international expansion.

To fulfill the objective, the company has recruited and hired various types of staff, such as specialists, operators, engineers, technicians, both Thai and foreign, to serve PTTEP since July 1, 2004. The company has continuously developed and improved its compensation, welfare and benefits policies, and practices to ensure competitiveness and fairness.

To enhance staff's capability to effectively support PTTEP operations, PTTEP Services has provided several training and development programs, focusing on the compulsory Safety, Security, Health and Environment (SSHE) training as well as functional training based on PTTEP's business requirements. In addition, the company has provided training to enhance basic skills required by the staff to perform their duties effectively. This includes soft skills and computer skills training.

2.2.7 PTT Global LNG Company Limited (PTT GL)

PTTEP and PTT have jointly established PTT GL on June 23, 2017 pursuant to the resolution of PTTEP's Board of Directors No. 1/2560/419 on January 26, 2017 and No. 7/2560/425 on May 25, 2017 to carry out business related to Liquefied Natural Gas (LNG) value chain with equal shareholding at 50%. PTTEP is seeking investment opportunities in LNG as natural gas has seen the highest consumption growth, being the cleanest form of energy among fossil fuels, with an abundance of reserves globally.

As of December 31, 2017, PTT GL had one investment project, a 10% share in PETRONAS LNG 9 Sdn Bhd (a subsidiary of PETRONAS). The company operates an LNG liquefaction plant in Malaysia with 3.6 million tons per annum (31.2 million barrels of oil equivalent) capacity.

2.3 Permission to Operate, Concession or Business Promotion

PTTEP operates petroleum exploration and production business in the Kingdom of Thailand and abroad. The Company's investments in foreign countries must comply with all applicable laws and regulations of those invested countries, such as Production Sharing Contract, Concession, or Services Agreement. Within the Kingdom of Thailand, the Company must comply with the Petroleum Act B.E. 2514 and its amendments which set out the rights to explore, exploit and produce petroleum under concession regime, production sharing contract regime and services agreement regime. Key points in the petroleum business are as follows:

2.3.1 Demarcation of Petroleum Exploration and Production Areas

The Department of Mineral Fuels, the Ministry of Energy, as the government authority under petroleum law, is responsible for demarcating each petroleum exploration and production areas (Block) and inviting oil companies to submit their applications requesting for awarding concession, production sharing contract or services agreement. In considering any awards, the Petroleum Committee has duty to render consultation to the Minister. The Minister with the approval of the Cabinet has the authority to sign the concession, production sharing contract or services agreement to award the right to explore, exploit and produce petroleum. Qualification of each applicant will be considered by the State to award the right to explore, exploit and produce petroleum which includes without limitation to adequacy of the investment funds to be brought in and used in the exploration activities, transfer of knowledge and technology, employment of Thai nationals, and the utmost benefits of the State.

2.3.2 Characteristic of Joint Venturer

A petroleum concession, a production sharing contract or a services contract may be awarded to a single concessionaire/contractor or multiple concessionaires/contractors. Since the risk of the petroleum exploration and production business is relatively high in its nature, it is common for concessionaires or contractors to form a joint venture in order to diversify such business risk. In a joint venture, a company will be designated as the “operator” to conduct the exploration and production operations on behalf of its partner(s) and commonly under the supervision of a management committee or an operating committee which is composed of representatives of all parties. Other non-operator companies will participate in making of operational decisions including technical, work program and budget. The operator will cash call all parties to finance the project. Generally, whether an oil company will become a project operator depends largely on its investment conditions, readiness, and business strategy in that particular project.

2.3.3 Nature of Operations and Investment Decisions

Before an oil company decides to invest in a petroleum exploration in the Kingdom of Thailand or abroad, it has to consider the chance of having a successful exploration as well as other investment risk factors. A thorough study on the information available is conducted to determine whether the area has high petroleum potential and whether the project is commercially feasible. The success ratio of exploration wells in neighboring areas as well as other risk factors in the invested countries must also be taken into account. Assuming that the project is commercially feasible, the company will apply for a right to explore, exploit and produce petroleum or, if such right is already awarded, “farm-in” to the existing petroleum concession.

After the oil company is awarded a right to explore, exploit and produce petroleum, an exploration program will be conducted, normally taking 2-3 years. If the petroleum reserves are found, the oil company will compare the amount of investment funds required for the development phase and the expected sales value of the petroleum based on the commercialized petroleum reserves. If the study indicates that the reserves are worth investing in as generally, this means that the petroleum field is considered to have commercial viability; a further investment onto development phase is therefore justified. The operator shall then apply for an approval of petroleum production and simultaneously may start its production activity. The operator is still able to explore the rest of the existing areas if it is within the time frame of the exploration period as mentioned in the concession, the production sharing contract or the services contract. At this stage, the operator must have a

certain degree of confidence about the investment. However, as the investment expenditure required for such development phase is very high; the operator must normally be able to identify buyers of the petroleum in advance, whereas a long-term sales agreement for the petroleum to be produced shall be signed. Currently, PTT Public Company Limited (“PTT”) is the biggest petroleum buyer in Thailand. The principal elements of the sales agreement for petroleum generally include determination method of the sales price and quantity of the petroleum to be delivered. Sales of natural gas from domestic areas is made at the wellhead, while sales of natural gas from foreign areas is made at the Thai borders. PTT is currently responsible for installation of most of the gas pipelines for the production amount as specified in the gas sales agreement. Sales of crude oil is made at the buyer’s refinery, while sales of condensate is made at the Floating Storage Unit (FSU) near the wellhead.

2.3.4 Description of Laws Relating to the Business

Operation of petroleum business in Thailand is governed by two major enactments, namely, the Petroleum Act B.E. 2514, and the Petroleum Income Tax Act B.E. 2514 and its amendments. The concessionaire and contractor must be a limited company or a juristic person which has the same status as a limited company, established under the laws of Thailand or foreign laws. Several major features of these laws are as follows:

(1) Concession

(1.1) The concessionaire(s) and the co-venturer(s) shall pay the royalty which is normally in cash. The Minister may authorize such royalty payment in kind of petroleum with the prior notice of not less than 6 months. The royalty can be used as credit against income tax (Thailand I) or deducted as expenses (Thailand III).

(1.2) Petroleum income tax is prescribed at a rate not lower than 50% and not higher than 60% of the net profit from the petroleum operation.

(1.3) Interest paid cannot be deducted as expenses for income tax purposes.

(1.4) Each concessionaire could be awarded concessions with no limitation in terms of number of blocks.

Thailand I for the petroleum concessions awarded by the Ministry of Industry¹ from B.E. 2514 to B.E. 2532 and those onshore petroleum concessions issued before B.E. 2525

Thailand II² for the onshore petroleum concessions awarded by the Ministry of Industry from B.E. 2525 to B.E. 2532

Thailand III for the petroleum concessions awarded by the Ministry of Industry from B.E. 2533

¹ Currently, the Ministry of Energy

² Under Section 36 of the Petroleum Act (No. 4) B.E. 2532, all petroleum concessionaires under Thailand II have applied to be subject to the criteria under Thailand III.

Details of the Terms: Thailand I, II, and III

| Term | Thailand I | Thailand II | Thailand III |
|----------------------|--|--|--|
| Royalty Rates | 12.5% of income from sales or disposal of petroleum which may be treated as tax credit | 12.5% of income from sales or disposal of petroleum which may be treated as tax credit | progressive rate at sliding scale of 5-15%, deemed to be expenses which could be deducted in tax calculation |
| Petroleum Income Tax | 50% of net profit from petroleum business operation | 50% of net profit from petroleum business operation | 50% of net profit from petroleum business operation |
| Special Benefits | - | annual benefits and annual production bonus | special remunerator benefit which may be taken as deduction |
| Exploration Period | 8 years with 4 year extension | 8 years with 4 year extension | 6 years with 3 year extension |
| Production Period | not exceeding 30 years from exploration's expiration date, with extension not exceeding 10 years | not exceeding 30 years from exploration's expiration date, with extension not exceeding 10 years | not exceeding 20 years from exploration's expiration date, with extension not exceeding 10 years |
| Concession Areas | not exceeding 10,000 sq. km. per exploration block, up to 5 exploration blocks | not exceeding 10,000 sq. km. per exploration block, up to 5 exploration blocks | not exceeding 4,000 sq. km. per exploration block, up to 5 exploration blocks ³ |

(2) Production Sharing Contract

(2.1) All petroleum operation expenditure shall be responsible by the contractor whereas the contractor shall be recovered such expenditure by deducting from the production. The expenditure that can be deducted shall be the actual expenditure according to the work program and budget approved by the Director General of the Department of Mineral Fuels, the Ministry of Energy, but shall not exceed 50% of the overall production.

(2.2) The contractor shall pay the royalty to the State at the rate of 10% of the overall production.

(2.3) The remaining production after deducting the royalty and the recoverable expenditure shall be shared to the contractor, but not exceeding 50%.

(2.4) Petroleum income tax is prescribed at a rate not lower than 20% of the net profit from petroleum operation.

(3) Services Contract

(3.1) Services contract can be either the hiring for exploration and production contract, the hiring for exploration contract or the hiring for production contract.

(3.2) The contractor shall be paid by the State according to the terms and conditions of each services contract.

(3.3) All petroleum operation expenditure shall be responsible by the contractor.

(3.4) Payment shall be made to the contractor after deducting the royalty.

³ Under Section 28 of the Petroleum Act (No. 6) B.E. 2550, effective on October 18, 2007, there is currently no limitation in terms of number of blocks.

2.4 Market and Competition

PTTEP has invested in both domestic and overseas projects, including the Republic of Indonesia, the Republic of the Union of Myanmar, the Socialist Republic of Vietnam, Malaysia, the Commonwealth of Australia, Canada, the People's Democratic Republic of Algeria, the Republic of Mozambique and the Federative Republic of Brazil. The target markets are both domestic and overseas where we have invested in. The Company's petroleum products include natural gas, crude oil, condensate, and LPG.

In 2017, total sales by the Company and our subsidiaries averaged 299,206 barrels of oil equivalent per day (BOED). The total sales ratio of natural gas to liquid was 70%:30% by volume and 60%:40% by revenue, as shown below.

| Product | Volume | Value (million USD) |
|-------------|----------------------------------|---------------------|
| Natural Gas | 473,697 MMSCF or 76.29 MMBOE | 2,560.74 |
| Condensate | 11.83 MMBBL | 619.60 |
| Crude Oil | 20.35 MMBBL | 1,064.69 |
| LPG | 88,981 metric tons or 0.74 MMBOE | 36.18 |

2.4.1 Marketing Characteristics

PTTEP sells our outputs from domestic and regional projects primarily to the Thai market through PTT Plc. (PTT), the major buyer and processor of all the products. PTT then turns the processed products to the country's power sector, petrochemical industry sector, transportation sector, industry sector, and household sector.

Marketing of petroleum products varies with their characteristics and field location which in turn differentiate the market and sales price structures.

(1) Natural Gas

Due to capital-intensive investment in developing oil and gas exploration business, gas sales agreements (GSAs) must be agreed or signed between the buyer and seller before any major investment is made. GSAs are typically a long-term contract, ranging from 15 to 30 years. Prices, volumes, and points of sale are stipulated for each of the contracts. Currently, the designated transfer points for all domestically sold gas are at the Central Processing Platform (CPP), from which the buyer will invest in the transmission system to the CPP. The delivery point of the gas sold from the Republic of the Union of Myanmar to Thailand is however at the Myanmar-Thai border. In this case, the seller is responsible for investment in the transmission pipelines from the CPP to the border.

Gas prices are usually linked to fuel prices and several key economic indices as well as to reflect the investment costs and be competitive comparing with fuel oil for the GSA period.

Sales volumes are based on the assessed reserves on the negotiation date. GSAs stipulate obligations between buyer and seller for a committed volume. If the buyer does not take the volume of gas as committed to in the GSA, it must pay for the committed volume whether the gas is taken or not (Take-or-Pay). As a consequence, the buyer is entitled to take delivery of free of charge in subsequent years (Make-up Gas).

On the other hand, should the seller fail to deliver as nominated by the buyer, the buyer is entitled to an agreed discount price of the undelivered volumes as stipulated in the agreement (Shortfall).

(2) Condensate and Crude Oil

Condensate and crude oil prices are determined by their properties and benchmarked with crude oil prices of those predominantly sold in the region. Contracts are either short-term or long-term, and some are sold in spot the markets.

(3) LPG

LPG produced from S1 Project is sold to PTT under a long-term contract with the price in line with the government's policy and announcements by the Joint Committee on Energy Policy Administration.

Sales of petroleum products from PTTEP's international fields vary from country to country as follows:

- Zawtika, Yadana and Yetagun projects in the Republic of the Union of Myanmar: Approximately 80% of the produced natural gas from Zawtika and Yadana projects is primarily sold to Thailand through PTT, while the remaining 20% is sold to the Republic of the Union of Myanmar for its domestic power generation. Nearly all of the condensate from Yetagun Project in 2017 is sold in the regional spot markets due to the revamping of domestic refinery. All the gas output from Yetagun Project is currently sold to PTT for the consumption in Thailand.

- Vietnam 9-2 and Vietnam 16-1 projects in the Socialist Republic of Vietnam: All of the oil output produced from Vietnam 9-2 Project is sold to Binh Son Refining and Petrochemical Company Limited (BSR), a refinery in the Socialist Republic of Vietnam, for the consumption in the Socialist Republic of Vietnam. The produced crude from Vietnam 16-1 Project is sold in the regional spot markets through auction, while the produced gas from both projects is sold to Vietnam Oil and Gas Group, a state enterprise, for the consumption in the Socialist Republic of Vietnam.

- Algeria 433a & 416b Project in the People's Democratic Republic of Algeria: The Bir Seba Field has been commenced the production with its first commercial sales of crude oil since December 2015. The crude oil is sold and marketed by PTT as the marketing agent in the spot markets.

- Montara Project in the Commonwealth of Australia: All of the crude oil produced from the Montara Field is sold to PTT as a long-term sales agreement

For MTJDA Project in Malaysia-Thailand Joint Development Area, the produced natural gas is sold to PTT for the consumption in Thailand. Starting from April 2015, the gas has been sold to Malaysia according to the Gas Balancing Agreement between PTT and Petroliaam Nasional Berhad (PETRONAS). The condensate output meanwhile has been marketed and sold by a co-marketing agent of PTT and PETRONAS Trading Corporation Sdn Bhd (PETCO) through auction in the spot markets.

2.4.2 Competition

Thailand's E&P industry is an oligopolistic due to the business' relatively high investment and advanced technology required. The growing demand especially for natural gas and the GSAs which are predominantly long-term contract coupled with take-or-pay clauses however have continued to attract new investments to the market.

Regarding the approximate domestic production in 2017, PTTEP's petroleum production accounts for 31% of the total domestic production in 2017, making the Company the leader among the domestic producers.

| Producers | % Domestic Production Volume |
|-----------|------------------------------|
| PTTEP | 31 |
| Chevron | 29 |
| Total | 9 |
| MOECO | 8 |
| Petronas | 5 |
| Shell | 4 |
| Others | 14 |

Source: Department of Mineral Fuels, Ministry of Energy

Currently, the shale gas revolution is driving a dramatic restructuring of the global natural gas markets. It creates new opportunities and incentives to move lower-cost natural gas to higher-value global markets via LNG exports. The global LNG demand growth is therefore expected to be stronger, resulting in an increase of its market share in the future.

2.5 Production

2.5.1 Exploration and Production Stages and Technology

Petroleum exploration and production can generally be divided into four major stages as follows:

(1) Exploration stage: This is the first step to identify the areas with reservoir potential. The main activities conducted in this stage include:

- Primary geological and geophysical surveys
- Seismic acquisition, processing and interpretation
- Exploration well drilling and testing

(2) Appraisal/Delineation stage: This stage mainly involves with additional study to increase the certainty of estimating size and properties of the reservoirs. The main activities conducted in this stage include:

- Detailed study of petroleum geology and additional seismic survey
- Reservoir formation evaluation and conceptual development design
- Appraisal/Delineation well drilling and testing

(3) Development stage: This is the last stage prior to the production. The main activities conducted in this stage include:

- Field development plan design and optimization
- Production facilities design, construction, and installation
- Development well drilling

(4) Production stage: This is the stage where petroleum and associated products are flowed through the pressure controlled equipment (wellhead) and processing facilities including measuring equipment to obtain the production rates of all of the productions. The main activities conducted during this stage include:

- Monitoring of production rate, proportion between produced gas, crude oil or condensate, and water, as well as pressure decline rate
- Forecasting of the future reservoir performance
- Well work-over and facilities maintenance

PTTEP has been well equipped in terms of manpower, technology and equipment to operate the business efficiently according to the Company's target.

2.5.2 Petroleum Reserves

Petroleum reserves can be divided into two categories, namely, Proved Reserves and Unproved Reserves according to the level of certainty.

(1) Proved Reserves are those quantities of petroleum which, by analysis of geological and engineering data, can be estimated with reasonable certainty to be commercially recoverable, from a given date forward, from known reservoirs and under current economic conditions, operating methods, and government regulations.

Practically, Proved Reserves mean the petroleum in reservoirs which can be commercially produced based on supporting data gathered during the well testing process. In some cases, reserves may be classified as Proved Reserves essentially when the results from well logging and/or analyzing of the core samples can prove that the reservoirs and petroleum in the reservoirs are similar or comparable to those of the neighboring areas which have already been commercially produced or with the potential to be produced according to their well testing results. In addition, Proved Reserves must be able to be produced by using the existing production equipment or with the production equipment that have a firmed plan to install in the future.

(2) Unproved Reserves are defined based on geoscience and/or engineering data similar to that used in the estimation of Proved Reserves but with technical or other uncertainties which preclude such reserves from being categorized as Proved. Unproved Reserves can be further categorized into Probable Reserves and Possible Reserves as follows:

- Probable Reserves are those additional quantities of petroleum obtained from an analysis of geoscience and/or engineering data similar to that used in the estimation of Proved Reserves but with less production possibility.
- Possible Reserves are those additional quantities of petroleum obtained from an analysis of geoscience and/or engineering data similar to that used in the estimation of Probable Reserves but with less production possibility than both Proved Reserves and Probable Reserves.

The Company's Proved Reserves are reviewed annually by our earth scientists and reservoir engineers to ensure the industry's rigorous professional standards. The Proved Reserves are reported on a gross basis which includes the Company's net working interest and related host country's interest. As of December 31, 2017, the total amount of Proved Reserves of PTTEP Group's projects was 156 million stock-tank barrels (MMSTB) of crude oil and condensate*, and 3,049 billion standard cubic feet (BSCF) of natural gas or 475 million barrels of oil equivalent (MMBOE). The total amount of Proved Reserves in terms of oil equivalent in consolidation was therefore 631 MMBOE. Details of the Company's Proved Reserves are shown in the following table.

* LPG included

PTT Exploration and Production Public Company Limited

Crude Oil and Condensate and Natural Gas Proved Reserves ⁽¹⁾

As of December 31, 2017

| | Crude Oil and Condensate ⁽²⁾ | | | Natural Gas | | | Barrel of Oil Equivalent | | |
|--|---|---------|-------|-------------|---------|-------|--------------------------|---------|-------|
| | (MMSTB) | | | (BSCF) | | | (MMBOE) | | |
| | Domestic | Foreign | Total | Domestic | Foreign | Total | Domestic | Foreign | Total |
| Proved Reserves as of Dec 31, 2016 | 108 | 62 | 170 | 2,018 | 1,353 | 3,371 | 438 | 257 | 695 |
| 1) Revision of previous estimates | 11 | (0) | 11 | 77 | (50) | 27 | 24 | (7) | 17 |
| 2) Improved recovery | 2 | 1 | 3 | 9 | 0 | 9 | 4 | 1 | 5 |
| 3) Extensions and discoveries | 4 | 3 | 7 | 109 | 111 | 220 | 22 | 19 | 41 |
| 4) Purchases/Sales of petroleum in place | - | - | - | - | - | - | - | - | - |
| 5) Production | (26) | (9) | (35) | (389) | (189) | (578) | (90) | (37) | (127) |
| Proved Reserves as of Dec 31, 2017 | 99 | 57 | 156 | 1,824 | 1,225 | 3,049 | 398 | 233 | 631 |

(1) The Proved Reserves are reported on a gross basis which includes the Company's net working interest and the related host country's interest.

(2) LPG included

2.5.3 PTTEP Petroleum Production

In 2017, the total production of PTTEP Group was 127 MMBOE, consisting of 35 MMSTB of crude oil and condensate* and 578 BSCF or 92 MMBOE of natural gas. This was equivalent to a production rate of approximately 347,508 barrels of oil equivalent per day (BOED) which was approximately 20,795 BOED or 5.6% decrease from the previous year. The decrease was mainly due to the low nomination from buyers of MTJDA, Bongkot North (GBN), Sinphuhorm and Contract 4 projects, and the suspension of production of S1 Project in areas under the oversight of the Agricultural Land Reform Office (ALRO). However, the production of S1 Project in these areas has already returned to normal operation since June 26, 2017.

2.5.4 Environmental Impact Mitigation and Management

PTTEP has strictly conducted business with environmental impacts mitigation and minimization. In 2017, an effective and standardized environmental management system of PTTEP has been updated and implemented to ensure that the following potential environmental impacts are mitigated and controlled:

- Water and soil contamination from discharges of drilled cuttings as per the Environmental Impact Assessment (EIA) Report
- Air pollution from hydrocarbon releases and atmospheric emissions from gas flaring, venting, fugitive and fuel combustion from the production process
- Accidental spills of hydrocarbons (oil and condensate) and chemical substances during drilling and production activities

In 2017, PTTEP conducted the environmental impact assessment study prior to commencing new exploration and production projects, which is legally required to ensure that the environmental mitigation and monitoring programs have been put in place to minimize environmental impacts arising from operations for both domestic and international projects.

Currently, mitigation and monitoring of the above environmental programs are controlled and regulated by local government agencies. In Thailand, there are two main agencies, namely, the Department of Mineral Fuels (DMF) of the Ministry of Energy which plays a major role in regulating the activities of exploration and production companies, and the Office of Natural Resources and Environmental Policy and Planning (ONEP) of the Ministry of Natural Resources and Environment which issues directives and approvals of environmental impact assessments study report prior to the commencement of exploration, drilling, and production projects.

In an effort to reduce environmental impacts and endorse environmental sustainability, the Company has introduced and implemented, with continuous improvement and monitoring, the following initiatives:

- (1) Implementation of a sustainable development philosophy and framework for the Company's business and daily operations to achieve our current corporate vision and mission, resulting in sustainable values for all stakeholders

* LPG included

The Company's sustainable development framework focuses on three dimensions of business, namely, social, environmental, and economic. In line with our SD G.R.O.W.T.H Policy and Framework, the PTTEP Sustainable Development (SD) Guideline as well as the PTTEP SD Roadmap are developed and implemented to secure the Company's path towards sustainability.

(2) Implementation of the ISO 14001:2015 Environmental Management System (EMS) Standard for PTTEP's operational projects. The Company, as a result, has become the first petroleum exploration and production company in Thailand and in the Southeast Asian region to achieve the ISO14001 Certification from AJA Registrars Limited under accreditation of the United Kingdom Accreditation Service (UKAS).

(3) EIA mitigation measures and monitoring program are also conducted for each project during each phase to ensure that the environmental programs stated in the environmental impact assessment study report are implemented and up to the standards for domestic and international projects.

(4) Establishment of the short-term and medium-term target for greenhouse gas emissions reduction to be at 20% by 2020 and 25% by 2030 from base year 2012. Details of the Company's greenhouse gas emission are disclosed in the 2017 Sustainability Report.

(5) Implementation of the ISO14064-1:2006 Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and GHG Protocol, as well as the United Nations Framework Convention on Climate Change (UNFCCC) Guidelines

The GHG Reporting system is implemented to quantify, account, report, and monitor the Company's GHG emissions accurately. In addition, Climate Change Risk Assessment has also been conducted, and updated annually in the Enterprise Risk Management System on corporate level.

(6) Development of Green Practices Roadmap to achieve environmental sustainability with a long-term implementation plan towards 2020 to ensure that the Company's business operations are environmental-friendly and that those environmental impacts from operations are mitigated.

The Roadmap includes plans for reduction of ecological footprint, namely, (1) carbon footprint, for example, to reduce greenhouse gas emissions from our operations and other initiatives through Clean Development Mechanism (CDM), and (2) water footprint, while increasing biodiversity through environmental and CSR initiatives. The Roadmap also includes eco-efficiency projects, energy consumption schemes and reduction plan development, resource efficiency initiatives, such as recovery of flare gas for electricity generation and water scarcity study, mitigation of environmental impacts, waste management, green supply chain initiatives to become more eco-friendly, and green practices for decommissioning at project's end of life. Details on the Company's Green Practices Roadmap as well as projects and initiatives are disclosed in the 2017 Sustainability Report.

(7) Since 2008, the Company has re-injected produced water to subsurface reservoirs to ensure no overboard discharging which could affect the environment at the Bongkot Project, Arthit Project, S1 Project, PTTEP 1 Project, and L53/43 & L54/43 Project.

(8) Controlling and monitoring of synthetic drilling fluid concentration in cuttings to ensure that drilling fluid on cutting discharge is complied with the standards as stated in the Environmental Impact Assessment Report.

(9) Monitoring of discharged wastewater quality from production process, seawater quality, sediment quality, benthos, and fish habituating around the operation platform to ensure limited exposure to environmental hazards. In addition, Environmental Compliance Monitoring Reports of the above must be submitted to local regulators, namely, the Department of Mineral Fuels of the Ministry of Energy, and the Office of Natural Resources and Environmental Policy and Planning (ONEP) of the Ministry of Natural Resources and Environment annually.

(10) Implementation of the Spill Response

Spill response and management plans, equipment, trainings and exercises are provided to ensure environmentally sound operations for Tier 1. The Company is also registered as a member in the Oil Industrial Environmental Safety Group Association (IESG) for Tier 2. As for Tier 3, the Company is registered as a member of the Oil Spill Response Limited (OSRL) and cooperates with the PTT Group in response to and mitigation of environmental impacts. In 2017, the Company's representatives participated in the National Oil Spill Response Plan Improvement, Sensitive Map Verification and Oil Spill Response Thailand Seminar.

(11) Provision of appropriate technologies for waste management system (disposal, storage, treatment, and transport) for hazardous and non-hazardous wastes from production process for environmental impact abatement.

The Company complies with local legislations and requirements concerning waste management to ensure that waste generated was properly controlled and disposed in compliance with legislations or standards. In addition, the Company complies with the Basel Convention for the transportation and disposal of mercury contaminated wastes with the control of the Department of Mineral Fuels and the Department of Industrial Works.

(12) Provision of appropriate support and coordination with other exploration and production companies, government agencies, the Petroleum Institute of Thailand, and other related agencies/associations to encourage knowledge sharing and experience aimed to avoid environmental impacts and problems as well as to allow for further continuous improvement of environmental issues in the oil and gas sector.

2.5.5 Performance over the Past Three Years

PTTEP strives to manage operational and process safety as a fundamental and critical element in our SSHE philosophy and practice. To achieve this, SSHE risks are identified, eliminated, and minimized to be As Low As Reasonably Practicable (ALARP). The Company continuously monitors, benchmarks, and improves safety performance by using various safety performance indicators such as Lost Time Injury Frequency (LTIF) and Total Recordable Injury Rate (TRIR). In 2017, both LTIF and TRIR were better than the IOGP average and have been expected to be even lower in the future.

To be in line with the Company's sustainable growth objectives, proactive reinforcement of the SSHE Management System is carried out throughout the business life cycle in both domestic and international units. This includes periodically updating documents (standards, procedures, guidelines, etc.), conducting SSHE awareness training for all staff, encouraging use of identical standard practices to minimize the number and severity of incidents, conducting SSHE audits, and becoming a target-zero company.

During 2015 - 2017, PTTEP has strictly complied with both Thai and International legislation, and other regulations and requirements concerning the area of Safety, Security, Health and Environment (SSHE), the following performances and recognitions are:

(1) PTTEP was honored with Thailand Sustainability Investment Award 2017 from Stock Exchange of Thailand. The award was presented to PTTEP as one of the listed companies recognized for outstanding performance in the areas of Environment, Social, and Governance along with good business performance.

(2) PTTEP improved and developed our Environmental Management System Standard to comply with the revised edition of international standards ISO 14001 (ISO 14001:2015), and certified by AJA Registrars Limited under accreditation of the United Kingdom Accreditation Service (UKAS). By adopting the ISO 14001 "One Common System" for all certified sites, the Company has improved the efficiency of our environmental management system by continuously upgrading the environmental practices in maintaining, developing, and reducing environmental impacts in the following areas:

- Headquarters
- Greater Bongkot North and Bongkot South fields of the Bongkot Project
- Arthit Project
- S1 Project
- PTTEP 1 Project and L53/43 & L54/43 Project
- Sinphuhorm Project
- PTTEP Petroleum Development Support Base (Songkhla and Ranong) – with the scope of "provision of logistic services to offshore oil and gas operations"
- PTTEP Core Research Center – with the scope of "building management and maintenance service, core research center and logistic support for storage of core, slab samples, and archive"
- Montara Field, Darwin base, and Perth office of PTTEP Australasia (Ashmore Cartier) Pty Ltd in Australia

In 2017, PTTEP implemented the ISO 14001:2015 in Zawtika Project and expected to achieve the certification by 2018.

(3) PTTEP has continued to maintain the OHSAS 18001:2007 Occupational Health and Safety Standard, being certified by AJA Registrars Limited and accredited from ANSI-ASQ National Accreditation Board (ANAB) for our safety management system which enables us to control occupational health and safety risks as well as to improve the performance. The projects which have received the certification and accreditation are, namely, S1, PTTEP 1, L53/43 & L54/43, Sinphuhorm, PTTEP Petroleum Development Support Base (Ranong), Arthit, and Bongkot (for both North & South fields). The Company also plans to expand coverage of the OHSAS to international assets meanwhile.

(4) PTTEP conducted Environmental Impact Assessment Studies prior to commencement of all exploration and production development projects as required by local regulations. In addition, EIA Compliance Audit Reports including Environmental Monitoring Reports were also conducted and submitted periodically to local authorities and regulators as required.

(5) PTTEP was certified by the Thailand Greenhouse Gas Management Organization (Public Organization) (TGO) from the implementation of Carbon Neutral Event in SD Day 2017. The amount of 4.42 tonnes CO₂ equivalent was offset. PTTEP reported the greenhouse gas emission performance on a monthly and annually basis to evaluate the Company's performance against target. Details are disclosed in the 2017 Sustainability Report.

(6) PTTEP submitted Safety, Security, Health and Environment performance reports to the Department of Mineral Fuels on a monthly and annual basis, while SSHE implementation at operating sites is audited by the local regulator.

(7) PTTEP has achieved a member status from the Dow Jones Sustainability Index (DJSI) World in Oil and Gas Upstream & Integrated Industry for the fourth consecutive year (2014 – 2017).

(8) Since 2014, PTTEP has been rated for four consecutive years by the Carbon Disclosure Project, a well-known organization which compiles and evaluates information regarding environmental governance, and shortlisted in the Carbon Disclosure Leadership Level as one of the best companies in the Southeast Asia plus Hong Kong for disclosure of information on greenhouse gas emissions as well as for prevention of climate change. The Company has been also rated in Water Management Sustainability with A-list, and we are only one company in the region who received both leader-level awards.

(9) SSHE performance report as included in the Company's Sustainability Report has been assured by an independent external third party since 2012 and rated to receive the highest level of Global Report Initiative (GRI) for six consecutive years.

Regarding the spill which is one of the key performance indicators of environment management, during 2015 and 2017, the spills accounted for 17.14, 0.74 and 4.65 tonnes, respectively. Details of spill incident and mitigation actions are disclosed in the 2017 Sustainability Report.

SSHE competency development for the Company's employees meanwhile is crucial to reduce human errors in daily operations especially in high risk activities. We continuously provides SSHE training to employees more than that is required by legislation to improve work efficiency, effectiveness and safety. Since 2015, the Company has conducted additional in-house training for personal and process safety, environmental impact prevention, contractor safety management, and SSHE culture for all operating assets.

2.5.6 Disputes or Lawsuits Regarding the Environment and Solutions

Details are disclosed in the "Legal Dispute" section.

2.5.7 Safety, Security, Health and Environment Management

PTTEP develops, implements, and continuously improves our Safety, Security, Health and Environment (SSHE) Culture according to a long-term roadmap to achieve our ultimate goal to prevent any accident that may result in injury, occupational illness, and major accident event. In 2017, PTTEP's SSHE strategy was mainly focused on improving SSHE Management System in both operational and process safety, strengthening SSHE Culture to reach the generative level or level 5, improving SSHE competency for employees and contractors, and creating environmental sustainability.

In 2017, PTTEP conducted the third SSHE Culture Survey, using the International Association of Oil and Gas Producers (IOGP) methodology as a reference. The survey results showed that PTTEP has achieved a SSHE culture maturity level 4 or Proactive Level, which reflects our continuous improvement in SSHE performance from level 3 or Calculative Level in the first survey in 2011. It also reflects that all PTTEP employees take SSHE as the first priority in everyday operations.

In addition, PTTEP's 2017 Safety Key Performance Indicators of Lost Time Injury Frequency Rate (LTIF) and Total Recordable Injury (TRIR) turned out to be the best in the Company's history and in the Top Quartile of IOGP's performance for the group of companies with more and less than 50 million work hours, respectively. This is a direct result of our ongoing incident prevention campaigns in operations focusing on equipment moving/lifting activities, land transportation and chemical and hydrocarbon spills which are major contributors to PTTEP's statistics.

PTTEP operates according to the SSHE standards and legislation in all areas and follows up incidents via the Incident Management System (IMS). In 2017, the Company registered a patent of the IMS with the Department of Intellectual Property and is the first organization in Thailand that received a runner-up award in the Communication Category of the 2017 Global Duty of Care Awards from the International SOS Foundation. Those achievements are great credits to PTTEP that we put priority on and continuously improve SSHE implementation so as to achieve our ultimate goal of being a "Target Zero" organization where employees and contractors can come to work and return home safely every day.

3. Risk Factors

Due to technical and operational complications of the petroleum exploration and production business, together with high investment cost in new investment opportunities, exploration activities, development activities, as well as production activities, PTTEP therefore places a great importance on risk management by setting Risk Governance Framework to define roles and responsibilities for each level of authority, ranging from Board of Directors, management, and business units/functions to ensure that all the risks are taken care of, monitored, and reported with a systematic and efficient risk management.

In 2017, crude oil price improved from the previous year; however, a number of uncertainties led to the persistence of oil price volatility. As such, PTTEP has continued our strategies in maintaining unit cost and increasing operational efficiency, while striving for long-term sustainable growth. PTTEP is also shaping the organization to enhance our competitiveness in E&P business which is the core business, while searching for opportunities in related businesses to invest in the near future. Key risk factors associated with our core business can be summarized as follows.

3.1 Strategic & Portfolio

3.1.1 New Investment Risks

PTTEP continues to focus on E&P opportunities in the Southeast Asia, particularly Thailand, Malaysia, and Myanmar, which is the area that the Company is familiar with. We also continue to search for business opportunities in prolific petroleum areas with acceptable geopolitical risk and low cost of development and production. Certain risks and uncertainties must also be considered. These are such as political stability, energy policy changes, and clarity in regard to decommissioning decree and profit splits of the fiscal regimes.

The Company has mitigated those risks which may have potentially impacted our operations and investment growth in various ways, including conducting of due diligence, securing of proficient consultants, promoting of the understanding among stakeholders, proactively conducting public relations, monitoring and providing opinions for appropriate decommissioning in terms of the technical aspects, regulatory requirements, economic feasibility as well as study of the environmental and social impacts. In addition, we also regularly assess and analyze influence of the climate change in relation to the business, as well as identify our “Low Carbon Footprint Reduction” roadmap, targets and action plans to manage the risks and their impacts, such as carbon tax in the countries where we operate, and physical damage to our asset structures from the rise in global temperatures.

Investment in new countries or unfamiliar territories contains a number of inherent risks. The Company therefore has instituted risk mitigation guidelines for the assessment of each investment. The guidelines provide considerations in various aspects, ranging from petroleum potential, size and project characteristics, acquisition procedures, additional reserves volume, operator's capability and performance, attractiveness of the fiscal regime, geographical conditions, related laws and regulations, political stability, international relations, economic and financial stability. The risks are then taken into account from which prevention measures and options are formulated and integrated into the return-on-investment analysis or the joint venture agreement.

Investment in new projects, including farm-in and farm-out joint ventures, mergers and acquisitions, as well as withdrawal or divestment from a given project must be intensively screened by the Investment Committee and Management Committee whose responsibility is to assess and ensure that the project adheres to the Company's investment direction and policy and that it is economically and technologically, whether conventional or unconventional resources are involved, feasible before proposing it to the Risk Management Committee prior to the final approval of the Board of Directors.

3.1.2 Organization Capability Risks

Organizational capability is a key factor towards the achievement of a Company's targets. Human resources are therefore inevitably of a great importance. Potential risks that may occur under this circumstance are, such as risk of a lack of expertise and knowledge, and risk of business process inefficiency. In this regard, PTTEP has taken the following actions to enhance our business process and organizational capability.

(1) Knowledge management, including new technologies and capability of the Company's research and development program, is developed, so that it falls in line with our growth strategy. Our Capability and Technology Development Roadmap has been developed along with a continuous research on technology to support the business growth.

(2) Systems, procedures, and organization structure are developed according to PTTEP's growth strategy and business plan. These are such as work process improvement towards matrix organization to maximize work efficiency, development of the Delegation of Authority and Signatures (DAS), as well as enhancement of the IT Global Platform, system stability and confidentiality control. Meanwhile, development of our financial and accounting management capability is aimed to take the Company to a world-class finance level. The development includes enhancement of efficiency of our managerial accounting data analysis for M&A decision making, establishment of the Shared Service Center and the Financial Academy training.

(3) To prepare for future overseas investment and to be in Thailand's Top Quartile by 2020, the Company has Human Resources Development plans for recruiting of the required and qualified staff members in operating and targeted countries, developing of their capabilities and leadership, as well as enhancing of their employee engagement. In addition, human resource improvement and our values and culture embedded also ensure that development and growth of the Company are in line with PTT Group's goals.

3.2 Financial & Market

3.2.1 Financial Risks

PTTEP systematically sets cash management policy with emphasis on sources of funds, debt financing, and liquidity management, while properly and timely managing financial risk that might affect the Company's financial status. The financial policy as defined by the Board of Directors is to ensure the robustness of the financial status in support of the Company's investment planning and execution in both short term and long term.

Financial risks mainly consist of counterparty risk, and cash and liquidity risks. To manage counterparty risk, it is PTTEP Group policy that we conduct business only with reputable and creditworthy counterparties. The financial stability and credibility of each counterparty must be analyzed and reviewed regularly. Currently, the majority of PTTEP Group's products are sold to PTT which is our parent company.

For cash and liquidity risk which may arise from our inability to maintain adequate working capital necessary for the operations, PTTEP Group has a policy to eliminate and minimize such risk by preparing an appropriate and discreet cash flow management and maintaining both committed and uncommitted credit facilities with banks and financial institutions well in advance.

3.2.2 Commercial Risks

PTTEP has entered long-term gas sales agreements (GSAs) with PTT, which is the Company's major domestic buyer. The terms of the GSAs generally last 25-30 years. To mitigate market risks which can result in refusals from buyers to purchase contracted volumes of natural gas, GSAs stipulate buyer and seller obligations for committed annual minimum volumes. Buyers must pay for the committed volume of gas, whether or not the full amount is taken (Take-or-Pay).

To effectively cope with the dynamics of Thailand energy market, the Company closely monitors petroleum demand in coordination with PTT and related government agencies to collectively outline an optimized supply plan. The Company reviews and adjusts our production as well as project development plans regularly to ensure that the development master plan is able to optimize reserves and resources of existing assets to match the country's energy demand. We also have a project in Mozambique which possesses large natural gas reserves which can be developed as a Liquefied Natural Gas (LNG) project. This project is a good example of the projects which fit in well with PTT's plan to import LNG as well as to contribute effectively to the enhancement of the energy security of Thailand.

3.2.3 Price Risks

PTTEP Group's product prices vary, depending on those of the world's crude oil prices, which are subject to multiple factors beyond our control, for example, market demand and supply, political and economic stability of various countries, OPEC's production policy, capability and production plan of major oil producer countries (e.g. the United States of America, Russia), oil reserves in each country, and seasonal changes of the global climate.

Fluctuations in the world's oil prices immediately affect the prices of PTTEP Group's crude oil and condensate, while natural gas prices tend to follow the oil prices. Most of PTTEP Group's contractual natural gas prices are adjusted every 6 or 12 months, depending on the gas price formula of each project; as a result, natural gas price will move correspondingly, to a certain degree, to the prices of crude oil and condensate.

As of December 31, 2017, PTTEP Group has implemented an oil price hedging program for a volume of 7.7 million barrels for the year 2018 according to the objectives of the risk management framework.

3.2.4 Exchange Rate Risks

PTTEP Group uses the U.S. Dollar (USD) as the functional currency according to the International Financial Reporting Standards (IFRS) since the USD is used for trading petroleum products, such as crude oil and natural gas which are the Company's major products. PTTEP Group's cash flows, however, still bear an exchange rate risk from the Thai Baht (THB) movement against the USD as most of the Company's revenue is in THB which is linked to the USD. For example, revenue from USD-linked crude oil sold to a Thai company must be paid in THB equivalent to USD only, while the Company's main cash outflows, such as investments and operating expenditures, are mostly in USD. The currency mismatch and discrepancies

between payables and receivables' settlement periods as well as the USD/THB volatility therefore inevitably impose foreign exchange risks to our cash flows. Under this circumstance, the PTTEP Group has minimized the foreign exchange risk by using available financial derivative instruments in the market, such as forward and option contracts to hedge the exposure relating to the foreign exchange rate as determined in the sales agreements by, for example, matching the Company's USD revenue with USD investments and operating expenditures.

With USD as the functional currency, coupled with the foreign exchange rate volatility, PTTEP Group is also exposed to the foreign exchange translation risk arising from the translation of non-USD assets and liabilities at the end of every accounting period. To minimize such translation risk, we have consistently put in a great effort to maintain a proper balance between our non-USD assets and liabilities, mainly in THB, as well as enter cross currency swaps on our non-USD denominated obligations to reduce the impact from the exchange rate volatility by converting both interest and principal payments to USD.

3.2.5 Interest Rate Risks

PTTEP Group is exposed to interest rate risk as the risk affects future cash flows and fair value of the financial instruments employed. PTTEP Group eliminates and minimizes the risk by maintaining an appropriate debt portfolio optimization (ratio of fixed rate liabilities and floating rate liabilities) and using financial derivatives, such as interest rate swaps. Interest rate risk management is conducted dynamically, appropriately, and correspondingly to the nature of the business, the market conditions, and the cost and the Company's acceptable risk limits.

3.3 Political and Legal/Regulatory

3.3.1 Political Risk in Investment Countries

According to PTTEP's foreign investment policy to secure resources to meet the expanding domestic energy market and ensure long-term sustainable growth, the Company has prudently maintained our growth strategy of expanding business in countries which have been experiencing geopolitical risks. Under the circumstance, the Company appoints a geopolitical risk team to monitor all these factors and periodically analyze as well as report on the development, including political stability, macro-economics, legal and regulatory, and security, across a range of investment countries. In so far, we have found that the high risk areas remain in Africa and the Middle East, mainly as a result of political and economic instability. Comprehensive assessments of these risks are immediately conducted and responded by the Company, especially when they are of significance. We, in such cases, have a process of evaluating the risks in various scenarios which assists our management and relevant departments to efficiently mitigate the risks related to the countries in which we invest.

Analysis is also conducted to formulate geopolitical risk's rating scores which will be used as part of the assessment process before making investments in new projects. In addition, PTTEP liaises closely with the Ministry of Foreign Affairs and Thai embassies in our invested countries to ensure that the Company's business operations are well-supported by these groups and that the projects are aligned with the respective national energy policies.

3.3.2 Compliance Risk

Generally, these risks can result from a variety of factors, such as complexity of specific laws, continual changes of laws and regulations, incorrect interpretation of laws, or even nuances of the language in which the laws are written. The risks can potentially lead to incorrect compliance, ultimately causing a violation of or non-compliance with applicable laws which may lead to pecuniary punishments, such as fines and operational difficulties, potential revocation, suspension of licenses, and possible damage to PTTEP's reputation. To minimize these risks, the Company has established the Compliance Department to be responsible for assuring that all of the business units strictly comply with their relevant laws, thereby building confidence among the Company's Board, management, and employees that we are fully compliant with laws relating to our business operations.

In 2015, there was a significant amendment to the Organic Act on Counter Corruption (No. 3) B.E. 2558 which extended the punishment to legal entity which relates to government official bribery. PTTEP immediately recognized the importance and impact of the latest amendment to the Act and, since, has prioritized the anti-corruption risk as an important risk which needs to be closely monitored as well as improved the internal control measures, so that they can effectively prevent all possible forms of corruption. The monitoring program continued in 2017. Details are disclosed in the "Corporate Governance" section, "Anti-Corruption" part.

3.4 Operational

3.4.1 Exploration Risks

Exploration activities are essential for the E&P business as it is to ensure that additional new petroleum reserves are found to replace those which have been turned to production to generate the revenues, as well as to add new reserves to support future production targets and growth.

The objective of an exploration is to search for petroleum resources which are sizable enough for commercial development. The risk in exploration activities is related to geological risks and the uncertainty of finding a petroleum field of commercial size (Resources Volume Uncertainty).

The risks in exploration activities are largely associated with the chance of success of the exploration and appraisal drilling, and resource and size estimation. The risks, whether being high or low, however depends on several other factors, such as exploration period and planned expenditures, thoroughness of geological studies, seismic acquisition and interpretation, exploration economic evaluation, the government and parties involved, and the terms of contracts, as well.

PTTEP establishes a best practice process, starting from potential petroleum basin evaluation and selection, in-depth subsurface studies of targeted blocks, and above-ground investment risks. The Geosciences and Exploration Group of PTTEP is tasked with formulating the exploration strategy and strategic plan based on the exploration portfolio management, while allocating exploration budgets to high potential blocks for further exploration activities. This process is reviewed and revised annually to ensure that the portfolio reflects and remains in line with changing of the environment, outcome of the overall exploration activities, and agreement with the corporative targets.

In addition, the Company also nominates a special and expert advisory team to review and ensure the quality and completeness of the investigation and that it is in compliance with the Company's standard and guideline of studies and evaluation prior to decision makings.

3.4.2 Project Development Risks

Following the oil price fluctuation, PTTEP has continued to adjust the Company's development plans as well as cost-cutting plans. Development projects which will contribute to increase of the reserves and production in the near future are such as those in the Mozambique Rovuma Offshore Area 1 Project, Algeria Hassi Bir Rekaiz Project, Mariana Oil Sands Project, and the Cash-Maple Field in PTTEP Australasia Project. Meanwhile, for new projects in which there are potential for project development delays and cost overruns, the Company has implemented the following risk mitigation measures to ensure that they all remain within the schedule.

(1) Project management: To safeguard against project delays and cost overruns, the Company focuses on related policy formulation, project management organization, project planning and engineering system designs, contract management, procurement, and construction monitoring.

(2) Personnel and process: To meet the targets set for safety, quality, budget, and timeline for project completion, the Company focuses on development of our project team's skills which help us to better prepare for and protect ourselves from the increased competition in the employment market for those with extensive skills and experience in the field. Information and experience sharing from previous projects is also encouraged as part of all our project team skills development, while the Company's Project Realization Process (PREP) continues to actively seek out new approaches to fine-tune the operations so that targets are in line and realized.

(3) Commercial contracts: To ensure maximum efficiency to minimize the risks associated with non-contractual compliance and disputes while working with our contractors, the Company focuses on contract drafting, terms and conditions identification and contract administration. These risks can, however, be controlled by negotiations based on comprehensive competency, knowledge, and concerted effort from various departments, such as construction, engineering, procurement, finance, accounting, and legal. Prudent contract management also lessens the risks and possible damages which can potentially result from delays which, in turn, can affect a given project and the Company's performance at large.

3.4.3 Production Risks

In every production process, PTTEP has to face various potential risks, starting from bottom of the well at the production process until the point of sale. These risks include, for example, risk of well potential, production design flaws, damaged equipment, aging facilities, operation errors, and poor product quality, all of which can directly impact the corporate goals, and production and sales targets.

Mitigation of the production risks focuses on the areas of process planning and platform design, production control systems, and preventive maintenance. The Asset Reliability & Integrity Management System (ARIMS) which is a part of the Operational Excellence Project has been continuously improved to ensure the highest standards of production integrity and safety. ARIMS has been designed specifically to minimize production losses due to worn-out equipment and also to improve

equipment efficiency through preventive maintenance and inspection, with the goal of attaining zero unplanned shutdown. Work procedures, operation manuals, and extensive training programs have meanwhile been developed and employed to instill greater understanding and efficiency among the Company's operation personnel.

The Company has also set up the Operational Risk Committee (ORC) to analyze and assess the production risks in respect to technical issues, contracts, and operational support for projects to increase the overall efficiency and effectiveness.

3.4.4 Safety, Security, Health and Environmental Risks

PTTEP has continued to analyze the Safety, Security, Health and Environment (SSHE) risks to reduce the likelihood and impact of unexpected events. The analysis comprises identification of internal and external factors. This helps to prevent major accidents as well as to reduce the risks that would impact the Company's employees and assets.

PTTEP has managed SSHE Risks through the Company's SSHE Management System to set the SSHE policies, standards, guidelines and procedures for the employees and contractors to understand the implementation process and objectives. This is in addition to allowing the SSHE awareness to be embedded in the corporate culture by providing training in regard to safety and risk management to improve the knowledge and performance as well as to keep the risks as low as reasonably practicable (ALARP).

PTTEP has monitored the SSHE Risk Management through the Company's Risk Management Committee in many levels and with a variety of key risk indicators and trackers, for example, Total Recordable Injury Rate, audit findings, close-out status, natural disaster, security status, and health infection in high risk countries to ensure that all situations are being monitored to determine the suitable mitigation plans for improvements, corrections, and preventions towards an even higher social and business sustainability.

3.4.5 Digital Security Threats Risks

In 2017, cybercrime became increasingly prominent across multiple business sectors through various channels, such as software vulnerability attack, ransomware, and malware which can potentially lead to business disruption. PTTEP recognizes the importance of digital security threats and has addressed the risk of digital security threats in the Company's Corporate Risk Profile to closely monitor the development as well as to implement necessary measures.

The measures include upgrading of antivirus programs for early detection, raising IT security awareness and understanding among the Company's staff through IT security e-learning program, establishing of the Security Operation Center (SOC) to be responsible for IT network surveillance, and exercising of the Cyber Security Response Drill and Recovery Plan on a regular basis to ensure prompt response to disruptive situations.

3.5 Emerging Risk

3.5.1 Climate Change

Climate plays an important role in PTTEP's operation. A Cyclone or a flood, for example, can cause a serious damage to the Company's production platforms or make new exploration areas or production sites inaccessible. Meanwhile, global warming can cost the Company's in the form of carbon tax depending on the countries in which we operate.

PTTEP has developed, implemented, and incorporated greenhouse gas reduction initiative projects, energy efficiency improvement and other carbon offsetting schemes into our operations as the Company is targeting to reduce greenhouse gas emissions by at least 20% by 2020. The Company has also engaged with Thailand Greenhouse Gas Management Organization (TGO) to develop a set of protocols and methodologies to reduce greenhouse gases under the Thailand – Voluntary Emission Reduction (T-VER) project.

3.5.2 Risk Arising from Disruptive Technology that Adversely Impacts Oil and Gas Industry

Technological advancement and renewable energy are playing an increasingly more crucial role in the energy industry, while appearing in all forms, such as more reliable and efficient energy storages, battery-powered cars (Electric Vehicle), as well as other renewables and EV businesses whose production costs have been driven down exponentially over the years. Oil demand has consequently been affected to the degree which some believe that days of the oil era can start to be numbered.

In this regard, PTTEP has formulated several mitigation plans to manage such risk, for example, establishing of the New Generation Exploration Team (NExT) to study diversified businesses. NExT however later became a transformative business unit titled “New Business” to go hand in hand with the corporate strategy (RENEW strategy). In addition, to minimize the Company’s financial reliance on Oil, we also focus on gas project acquisitions with committed market in short-term, gas potential exploration projects in long-term, and investment opportunities in the midstream, such as liquefaction, trading, and shipping through a joint cooperation with PTT in LNG Value Chain.

4. PTTEP and Our Subsidiaries' Assets

4.1 Property, Plant and Equipment

4.1.1 Oil and Gas Properties ¹

PTTEP and our subsidiaries' properties are mainly jointly controlled oil and gas properties in each project. These properties comprise land, buildings, construction, machine and equipment, transportation pipeline, capitalized exploratory and production drilling costs, decommissioning costs, which are estimated by PTTEP Group's engineers and management's judgment, and acquisition costs of concession right, which shall incur when PTTEP and our subsidiaries acquire the concession right.

As at December 31, 2017, PTTEP and our subsidiaries' oil and gas properties are represented as share of the joint ventures' individual assets for each project as follows:

| <u>PTTEP's joint ventures</u> | <u>Company's interest (%)</u> |
|------------------------------------|-------------------------------|
| Contract 3 (B10, B11, B12 and B13) | 5 |
| E5 | 20 |
| Sinphuhorm (E5 North) | 20 |
| Algeria Hassi Bir Rekaiz | 24.5 |
| S1 | 25 |
| Bongkot | 44.4445 |
| Contract 4 (B12/27) | 45 |
| Arthit | 80 |
| <u>PTTEPI's joint ventures</u> | <u>Company's interest (%)</u> |
| G4/48 | 5 |
| Yetagun | 19.31784 |
| G4/43 | 21.375 |
| Yadana | 25.5 |
| Bongkot (G12/48) | 44.4445 |
| Contract 4 (G7/50) | 45 |
| MTJDA | 50 |
| Arthit (G8/50) | 80 |
| PTTEP1 | 100 |
| G9/43 | 100 |
| L22/43 | 100 |
| Myanmar M3 | 80 |
| Myanmar M11 | 100 |

¹ See more details in Attachment 5 – Supplemental Information on Petroleum Exploration and Production Activities (Unaudited)

| | |
|-----------------------------------|-------------------------------|
| Zawtika | 80 |
| L53/43 & L54/43 | 100 |
| <u>PTTEPO's joint venture</u> | <u>Company's interest (%)</u> |
| B8/32 & 9A ² | 25.001 |
| <u>PTTEP SV's joint venture</u> | <u>Company's interest (%)</u> |
| Vietnam 52/97 | 7 |
| <u>PTTEP KV's joint venture</u> | <u>Company's interest (%)</u> |
| Vietnam B & 48/95 | 8.5 |
| <u>PTTEP HL's joint venture</u> | <u>Company's interest (%)</u> |
| Vietnam 16-1 | 28.5 |
| <u>PTTEP HV's joint venture</u> | <u>Company's interest (%)</u> |
| Vietnam 9-2 | 25 |
| <u>PTTEP AG's joint venture</u> | <u>Company's interest (%)</u> |
| Algeria 433a & 416b | 35 |
| <u>PTTEPS's joint venture</u> | <u>Company's interest (%)</u> |
| Sinphuhorm (EU-1) | 20 |
| B6/27 ³ | 100 |
| S1 | 75 |
| <u>PTTEP SM's joint venture</u> | <u>Company's interest (%)</u> |
| Indonesia Semai II ⁴ | 28.33 |
| <u>PTTEP SA's joint venture</u> | <u>Company's interest (%)</u> |
| Myanmar PSC G & EP 2 ⁵ | - |
| Myanmar MD-7 ⁶ | 50 |
| Myanmar MOGE 3 | 75 |
| <u>PTTEP ML's joint venture</u> | <u>Company's interest (%)</u> |
| Indonesia Malunda ⁷ | 100 |

² PTTEP Offshore Investment Company Limited (PTTEPO) has shareholding in Orange Energy Limited and B8/32 Partners Limited, which hold the project's concession.

³ On September 22, 2017, PTTEP Siam Limited (PTTEPS) received an approval from the Minister of Energy to receive the transfer of the participating interests in the B6/27 project from the other joint operation partners. As a result, its participating interests increased from 60% to 100%.

⁴ On November 7, 2014, PTTEP Semai II Limited (PTTEP SM) and joint operation partners had submitted a request to terminate and return the exploration block of Indonesia Semai II to the Government of Republic of Indonesia, after the fulfilment of the requirements of the Production Sharing Contract. The termination will be effective after receiving the official approval from the Government of Republic of Indonesia.

⁵ On July 17, 2017, PTTEP South Asia Limited (PTTEP SA) had submitted a request to terminate and return the exploration block of Myanmar PSC G & EP 2 Project to the Government of Republic of the Union of Myanmar, after the fulfilment of the requirements of the Production Sharing Contract which was effective since August 31, 2017.

⁶ On February 22, 2017, PTTEP South Asia Limited (PTTEP SA) received the official approval from the Government of the Republic of the Union of Myanmar for the transfer of the participating interests in the Myanmar MD-7 Project to the other joint operation partner. As a result, its participating interests decreased from 100% to 50%. PTTEP SA still is the operator of this project.

⁷ On May 8, 2015, PTTEP Malunda Limited (PTTEP ML) had submitted a request to terminate and return the exploration block of Indonesia Malunda Project after the fulfilment of the requirements of the Production Sharing Contract. The termination will be effective after receiving the official approval from the Government of Republic of Indonesia.

| | |
|---|-------------------------------|
| <u>PTTEP CA's joint venture</u> | <u>Company's interest (%)</u> |
| Mariana Oil Sands | 100 |
| <u>PTTEP AP's joint venture</u> | <u>Company's interest (%)</u> |
| PTTEP Australasia | |
| • AC/L7, AC/L8, AC/RL7, AC/RL12 and AC/P54 | 100 |
| • AC/L1, AC/L2 and AC/L3 | 100 |
| • AC/RL10 | 90 |
| • AC/RL4 (Tenacious) | 100 |
| • AC/RL6 (Audacious), AC/RL6 (exclusive of Audacious) | 100 |
| • AC/RL4(exclusive of Tenacious), AC/RL5 | 100 |
| <u>Cove Energy Group</u> | <u>Company's interest (%)</u> |
| Mozambique Rovuma Offshore Area 1 | 8.5 |
| <u>Natuna 2's joint venture</u> | <u>Company's interest (%)</u> |
| Natuna Sea A | 11.5 |
| <u>PTTEP BL's joint venture</u> | <u>Company's interest (%)</u> |
| Barreirinhas AP 1 | 25 |
| Brazil BM-ES-23 | 20 |
| <u>PTTEP SP's joint venture</u> | <u>Company's interest (%)</u> |
| Contract 4 (B12/27) | 15 |
| Sinphuhorm (E5 North and EU-1) | 35 |
| <u>PTTEP G7's joint venture</u> | <u>Company's interest (%)</u> |
| Contract 4 (G7/50) | 15 |
| <u>PTTEP HKO's joint venture</u> | <u>Company's interest (%)</u> |
| Sarawak SK410B | 42.5 |

As at December 31, 2017, details of properties' net book value are as follows:

Unit: Million USD

| Details of properties | Historical cost | Accumulated depreciation | Allowance for impairment of assets | Net book value |
|-----------------------------------|------------------|--------------------------|------------------------------------|------------------|
| Oil and Gas Properties | 26,226.23 | (17,688.42) | (1,225.49) | 7,312.32 |
| Exploration and Evaluation Assets | 5,098.22 | - | (1,791.24) | 3,306.98 |
| Goodwill | 1,134.08 | - | (119.70) | 1,014.38 |
| Pipeline and Others | 1,192.10 | (380.81) | (5.25) | 806.04 |
| Total | 33,650.63 | (18,069.23) | (3,141.68) | 12,439.72 |

4.2 Investments

PTTEP has details of subsidiaries, associates, joint operations and joint ventures presented as follows:

| Company name | Registered country | Type of business | Percentage of interest (including indirect holding) | |
|--|---------------------------|--|--|------|
| | | | 2017 | 2016 |
| <u>Subsidiaries</u> | | | | |
| PTTEP International Limited (PTTEPI) | Thailand | Petroleum | 100 | 100 |
| PTTEP Offshore Investment Company Limited (PTTEPO) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Services Limited (PTTEP Services) | Thailand | Human resource support | 100 | 100 |
| PTTEP Siam Limited (PTTEPS) | Thailand | Petroleum | 100 | 100 |
| PTTEP MEA Limited (PTTEP MEA) ¹ | Cayman Islands | Petroleum | - | 100 |
| PTTEP HK Holding Limited (PTTEP HK) | Hong Kong | Petroleum | 100 | 100 |
| PTTEP Treasury Center Company Limited (PTTEP TC) | Thailand | Treasury center for the Group's business | 100 | 100 |
| PTTEP Business Center Company Limited (PTTEP BC) | Thailand | Petroleum | 100 | 100 |
| PTTEP Southwest Vietnam Company Limited (PTTEP SV) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Kim Long Vietnam Company Limited (PTTEP KV) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Hoang-Long Company Limited (PTTEP HL) ² | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Hoan-Vu Company Limited (PTTEP HV) ³ | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Algeria Company Limited (PTTEP AG) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Holding Company Limited (PTTEPH) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Indonesia Company Limited (PTTEP ID) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Africa Investment Limited (PTTEP AI) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Rommana Company Limited (PTTEPR) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Australia Pty Ltd (PTTEP AU) | Commonwealth of Australia | Petroleum | 100 | 100 |
| PTTEP Australia Offshore Pty Ltd (PTTEP AO) | Commonwealth of Australia | Petroleum | 100 | 100 |
| PTTEP South Asia Limited (PTTEP SA) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Semai II Limited (PTTEP SM) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Australia Perth Pty Ltd (PTTEP AP) | Commonwealth of Australia | Petroleum | 100 | 100 |

¹ On December 29, 2017, PTTEP MEA Limited (PTTEP MEA) received the approval of dissolution of the company from the registrar, as disclosed in Note 18.6 – Significant Transactions during the Year.

² PTTEP HL has a 28.5% shareholding in Hoang-Long Joint Operating Company.

³ PTTEP HV has a 25% shareholding in Hoan-Vu Joint Operating Company.

| Company name | Registered country | Type of business | Percentage of interest (including indirect holding) | |
|--|---------------------------|---|--|------|
| | | | 2017 | 2016 |
| <u>Subsidiaries</u> (continued) | | | | |
| PTTEP Australia Browse Basin Pty Ltd (PTTEP AB) | Commonwealth of Australia | Petroleum | 100 | 100 |
| PTTEP Australia International Finance Pty Ltd (PTTEP AIF) ⁴ | Commonwealth of Australia | Investment funding for the Group's business | - | 100 |
| PTTEP Australasia Pty Ltd (PTTEP AA) ⁴ | Commonwealth of Australia | Petroleum | - | 100 |
| PTTEP Australia Timor Sea Pty Ltd (PTTEP AT) | Commonwealth of Australia | Petroleum | 100 | 100 |
| PTTEP Australasia (Finance) Pty Ltd (PTTEP AAF) ⁴ | Commonwealth of Australia | Petroleum | - | 100 |
| PTTEP Australasia (Petroleum) Pty Ltd (PTTEP AAP) ⁴ | Commonwealth of Australia | Petroleum | - | 100 |
| Tullian Pty Ltd (PTTEP AAT) ⁴ | Commonwealth of Australia | Petroleum | - | 100 |
| PTTEP Australasia (Operations) Pty Ltd (PTTEP AAO) | Commonwealth of Australia | Petroleum | 100 | 100 |
| PTTEP Australasia (Ashmore Cartier) Pty Ltd (PTTEP AAA) | Commonwealth of Australia | Petroleum | 100 | 100 |
| PTTEP Australasia (Staff) Pty Ltd (PTTEP AAS) | Commonwealth of Australia | Petroleum | 100 | 100 |
| PTTEP International Holding Company Limited (PTTEP IH) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Southwest Vietnam Pipeline Company Limited (PTTEP SVPC) | Cayman Islands | Gas pipeline transportation | 100 | 100 |
| PTTEP FLNG Holding Company Limited (PTTEP FH) ⁵ | Hong Kong | Petroleum | 100 | 100 |
| PTTEP Netherland Holding Limited (PTTEP NL) | Cayman Islands | Petroleum | 100 | 100 |
| JV Marine Limited (JV Marine) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP South Mandar Limited (PTTEP SMD) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP South Sageri Limited (PTTEP SS) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Sadang Limited (PTTEP SD) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP Malunda Limted (PTTEP ML) | Cayman Islands | Petroleum | 100 | 100 |

⁴ On March 19, 2017, the entities in the Group of PTTEP Australia Perth Pty Ltd (PTTEP AP) received the approval of dissolution of the company from the registrar, as disclosed in Note 18.6 – Significant Transactions during the Year.

⁵ On August 24, 2017, the Company approved for the registration for the dissolution of PTTEP FLNG Holding Company Limited (PTTEP FH), as disclosed in Note 18.6 – Significant Transactions during the Year.

| Company name | Registered country | Type of business | Percentage of interest (including indirect holding) | |
|---|--|---|--|------|
| | | | 2017 | 2016 |
| <u>Subsidiaries</u> (continued) | | | | |
| PTTEP Netherlands Coöperatie U.A. (PTTEP NC) | Netherlands | Petroleum | 100 | 100 |
| PTTEP Canada Limited (PTTEP CA) | Canada | Petroleum | 100 | 100 |
| PTTEP Canada International Finance Limited (PTTEP CIF) | Canada | Investment funding for the Group’s business | 100 | 100 |
| Cove Energy Limited (Cove) | United Kingdom of Great Britain and Northern Ireland | Petroleum | 100 | 100 |
| Cove Energy Mozambique Rovuma Onshore Limited (CEMROL) ⁶ | Republic of Cyprus | Petroleum | 100 | 100 |
| Cove Energy East Africa Limited (CEEAL) | Republic of Cyprus | Petroleum | 100 | 100 |
| PTTEP Mozambique Area 1 Limited (PTTEP MZA1) | Republic of Cyprus | Petroleum | 100 | 100 |
| Cove Energy Kenya Limited (CEKL) ⁷ | Republic of Kenya | Petroleum | 100 | 100 |
| PTTEP Netherlands Holding Coöperatie U.A. (PTTEP NH) | Netherlands | Petroleum | 100 | 100 |
| PTTEP Brazil Investment B.V. (PTTEP BI) | Netherlands | Petroleum | 100 | 100 |
| PTTEP Brazil Investments in Oil and Gas Exploration and Production Limitada (PTTEP BL) | Federative Republic of Brazil | Petroleum | 100 | 100 |
| Sinphuhorm Holdings Limited (SHL) | Cayman Islands | Petroleum | 100 | 100 |
| PTTEP SP Limited (PTTEP SP) | United Kingdom of Great Britain and Northern Ireland | Petroleum | 100 | 100 |
| PTTEP G7 Limited (PTTEP G7) | Thailand | Petroleum | 100 | 100 |
| PTTEP HK Offshore Limited (PTTEP HKO) | Hong Kong | Petroleum | 100 | 100 |
| PTTEP Mexico E&P Limited, S. de R.L. de C.V. (PTTEP MEP) ⁸ | Mexico | Petroleum | 100 | - |
| <u>Associates</u> | | | | |
| Energy Complex Company Limited (EnCo) | Thailand | Property rental services | 50 | 50 |
| PTT Digital Solutions Company Limited (PTT Digital) ⁹ | Thailand | Information technology and communication Services | 20 | 20 |

⁶ On May 22, 2017, the Company approved for the registration for the dissolution of Cove Energy Mozambique Rovuma Onshore Limited (CEMROL), as disclosed in Note 18.6 – Significant Transactions during the Year.

⁷ On May 22, 2017, the Company approved for the registration for the dissolution of Cove Energy Kenya Limited (CEKL), as disclosed in Note 18.6 – Significant Transactions during the Year.

⁸ On October 24, 2017, the Group established PTTEP MEXICO E&P LIMITED, S. DE R.L. DE C.V. (PTTEP MEP), as disclosed in Note 18.6 – Significant Transactions during the Year.

⁹ Changed the name from PTT ICT Solutions Company Limited (PTT ICT) to PTT Digital Solutions Company Limited (PTT Digital), as disclosed in Note 18.6 – Significant Transactions during the Year.

| Company name | Registered country | Type of business | Percentage of interest (including indirect holding) | |
|--|---|---------------------------------------|--|---------|
| | | | 2017 | 2016 |
| <u>Associates</u> (continued) | | | | |
| PTTEP AP Group’s Associates ¹⁰ | Commonwealth of Australia | Air base services | 50 | 50 |
| PTT Global LNG Company Limited (PTT GL) ¹¹ | Thailand | Petroleum | 50 | - |
| <u>Joint Ventures</u> | | | | |
| PTT FLNG Limited (PTT FLNG) ¹² | Hong Kong | Produce and sale of petroleum product | - | 50 |
| Erawan 2 FSO Bahamas Limited (Erawan 2) ¹³ | Bahamas | FSO rental services | 13.11 | 13.11 |
| <u>Joint Operations</u> | | | | |
| Carigali – PTTEPI Operating Company Sdn Bhd. (CPOC) | Malaysia | Petroleum | 50 | 50 |
| Moattama Gas Transportation Company (MGTC) | Bermuda | Gas pipeline transportation | 25.5 | 25.5 |
| Taninthayi Pipeline Company LLC (TPC) | Cayman Islands | Gas pipeline transportation | 19.3178 | 19.3178 |
| Orange Energy Limited (Orange) | Thailand | Petroleum | 53.9496 | 53.9496 |
| B8/32 Partners Limited (B8/32 Partners) | Thailand | Petroleum | 25.0009 | 25.0009 |
| Leismer Aerodrome Limited (LAL) | Canada | Airports and flying field services | 32 | 32 |
| Groupement Bir Seba (GBRS) | People's Democratic Republic of Algeria | Petroleum | 35 | 35 |
| Andaman Transportation Limited (ATL) | Cayman Islands | Gas pipeline transportation | 80 | 80 |
| Natuna 2 B.V. (Natuna 2) | Netherlands | Petroleum | 50 | 50 |
| Mozambique LNG1 Company Pte. Ltd (MZ LNG1) ¹⁴ | Singapore | Petroleum | 8.50 | - |

4.3 Net Book Value

As at December 31, 2017, PTTEP's net book value amounted to 11,517 MMUSD (equivalent to 376,375 MMTHB) or USD 2.90 per share (equivalent to THB 94.81 per share).

¹⁰ PTTEP AP's group associates are Mungalalu Truscott Airbase Pty Ltd and Troughton Island Pty Ltd.

¹¹ On June 23, 2017, PTTEP Business Center Company Limited (PTTEP BC), a subsidiary of the Group, had jointly invested with PTT Public Company Limited (PTT) to establish PTT Global LNG Company Limited (PTT GL), as disclosed in Note 18.6 – Significant Transactions during the Year.

¹² On June 16, 2017, PTT FLNG Limited (PTT FLNG) had received the approval of dissolution of the company from the Government of Hong Kong, as disclosed in Note 18.6 – Significant Transactions during the Year.

¹³ Erawan 2 has a 100% shareholding in Asia Pacific Marine Services (EF) B.V.

¹⁴ On March 21, 2017, PTTEP Mozambique Area 1 Limited (PTTEP MZA1), a subsidiary of the Group, has invested with its participating interests of 8.5% in Mozambique LNG1 Company Pte. Ltd. (MZ LNG1), as disclosed in Note 18.6 – Significant Transactions during the Year.

5. Legal Dispute

As of December 31, 2017, the outstanding legal disputes which PTTEP or one of the Company's subsidiaries is a party involved as well as those which can significantly affect our operation or the subsidiary's, excluding disputes from the normal operation and circumstance, are as follows:

5.1 PTTEP and PTTEP Australasia (Ashmore Cartier) Pty Ltd ("PTTEP AAA") were sued by the Ministry of Environment and Forestry of Indonesia at the Central Jakarta District Court of Indonesia for the environmental damages and environmental recovery costs.

On May 3, 2017, the Ministry of Environment and Forestry of Indonesia filed a lawsuit against PTTEP and PTTEP AAA at the Central Jakarta District Court of Indonesia, claiming for the damages of mangrove forests, seagrass meadows, and coral reefs, and environmental recovery costs at the total amount of IDR 27,482,674,332,000 (approximately USD 2.1 billion) from 2009 Montara incident in Australia. As of December 31, 2017, the case was still under the court proceeding.

5.2 PTTEP Australasia (Ashmore Cartier) Pty Ltd ("PTTEP AAA") was sued by a group of Indonesian seaweed farmers at the Federal Court of Australia for damages.

On August 1, 2016, a group of Indonesian seaweed farmers filed a lawsuit against PTTEP AAA at the Federal Court of Australia, claiming for the damages caused by 2009 Montara incident in Australia. The lawsuit was filed after the lapsing of the period of prescription for claims. However, the Federal Court of Australia has granted an extension of the limitation period due to certain legal exceptions on November 15, 2017. As of December 31, 2017, the case was still under the court proceeding. This lawsuit did not state the amount of claim.

PTTEP and PTTEP AAA continue to maintain the position, based on independent scientific researches overseen by the Australian Government, that no oil from Montara reached the shores of Australia or Indonesia, that no lasting impact on the highly sensitive and biodiverse ecosystems in Australian waters in the areas closest to Indonesian waters, and that there is no long-term damage to the environment in the Timor Sea.

6. General and Other Significant Information**6.1 Information of PTTEP**

| | |
|----------------------|---|
| Company Name | PTT Exploration and Production Public Company Limited or PTTEP |
| Headquarters Address | 555/1 Energy Complex Building A, 6 th and 19 th – 36 th floor, Vibhavadi Rangsit Road, Chatuchak, Bangkok 10900, Thailand |
| Type of Business | Exploration and production of petroleum and investments in related businesses |
| Registration Number | 0107535000206 |
| Telephone | +66-2537-4000 |
| Facsimile | +66-2537-4444 |
| Website | www.pttep.com |
| E-mail | Independent Directors: independentdirector@pttep.com Investor Relations: ir@pttep.com Corporate Secretary: corporatesecretary@pttep.com |
| Registered Capital | 3,969,985,400 ordinary shares with THB 1 per share (THB 3,969,985,400) |
| Paid-Up Capital | 3,969,985,400 ordinary shares with THB 1 per share (THB 3,969,985,400) as of December 31, 2017 |

6.2 Subsidiaries' Information¹

As of December 31, 2017, there were 60 subsidiaries which can be categorized as follows:

- Subsidiaries which had the same contact address, telephone and facsimile as those of PTTEP. Details of directors designated by the PTTEP Group of each subsidiary are disclosed in Attachment 2.

| No. | Company Name | Abbreviation | Number of Shares Sold | | Shareholders | |
|---|---|--------------|-----------------------|----------------|------------------------------------|-------------------------|
| Petroleum Exploration and Production Business | | | | | | |
| 1. | PTTEP International Limited | PTTEPI | 2,000,000,000 | Ordinary Share | PTTEP | 100% |
| 2. | PTTEP Siam Limited | PTTEPS | 1,000,000 | Ordinary Share | PTTEP PTTEPO | 51% 49% |
| 3. | Orange Energy Limited | Orange | 1,000,000 | Ordinary Share | PTTEPO MOECO B.V. KrisEnergy | 53.95% 36.05% 10% |
| 4. | PTTEP G7 Limited | PTTEP G7 | 6,413,741 | Ordinary Share | PTTEPI | 100% |
| 5. | JV Marine Limited | JV Marine | 50,000 | Ordinary Share | PTTEP IH | 100% |
| 6. | PTTEP Algeria Company Limited | PTTEP AG | 50,000 | Ordinary Share | PTTEPO | 100% |
| 7. | PTTEP Africa Investment Limited | PTTEP AI | 50,000 | Ordinary Share | PTTEPH | 100% |
| 8. | PTTEP Holding Company Limited | PTTEPH | 50,000 | Ordinary Share | PTTEPO | 100% |
| 9. | PTTEP Hoang-Long Company Limited | PTTEP HL | 50,000 | Ordinary Share | PTTEPO | 100% |
| 10. | PTTEP Hoan-Vu Company Limited | PTTEP HV | 50,000 | Ordinary Share | PTTEPO | 100% |
| 11. | PTTEP Indonesia Company Limited | PTTEP ID | 50,000 | Ordinary Share | PTTEPH | 100% |
| 12. | PTTEP International Holding Company Limited | PTTEP IH | 50,000 | Ordinary Share | PTTEPH | 100% |
| 13. | PTTEP Kim Long Vietnam Company Limited | PTTEP KV | 50,000 | Ordinary Share | PTTEPO | 100% |
| 14. | PTTEP Malunda Limited | PTTEP ML | 50,000 | Ordinary Share | PTTEP ID | 100% |
| 15. | PTTEP South Asia Limited | PTTEP SA | 50,000 | Ordinary Share | PTTEPH | 100% |
| 16. | PTTEP Netherland Holding Limited | PTTEP NL | 50,000 | Ordinary Share | PTTEP IH | 100% |

¹ Notification of the Securities and Exchange Commission Kor Chor. 17/2551 Determination of Definitions in Notifications relating to Issuance and Offer for Sale of Securities

| No. | Company Name | Abbreviation | Number of Shares Sold | | Shareholders | |
|-----|---|--------------|-----------------------|----------------|----------------------|-----------------------|
| 17. | PTTEP Offshore Investment Company Limited | PTTEPO | 6,667 | Ordinary Share | PTTEP PTTEPI | 75% 25% |
| 18. | PTTEP Rommana Company Limited | PTTEPR | 50,000 | Ordinary Share | PTTEP AI | 100% |
| 19. | PTTEP Sadang Limited | PTTEP SD | 50,000 | Ordinary Share | PTTEP ID | 100% |
| 20. | PTTEP Semai II Limited | PTTEP SM | 50,000 | Ordinary Share | PTTEP ID | 100% |
| 21. | PTTEP South Mandar Limited | PTTEP SMD | 50,000 | Ordinary Share | PTTEP ID | 100% |
| 22. | PTTEP South Sageri Limited | PTTEP SS | 50,000 | Ordinary Share | PTTEP ID | 100% |
| 23. | PTTEP Southwest Vietnam Company Limited | PTTEP SV | 50,000 | Ordinary Share | PTTEPO | 100% |
| 24. | Sinphuhorm Holdings Limited | SHL | 100 | Ordinary Share | PTTEPO | 100% |
| 25. | PTTEP Australia Pty Ltd | PTTEP AU | 50,000 | Ordinary Share | PTTEPH | 100% |
| 26. | PTTEP Australia Offshore Pty Ltd | PTTEP AO | 50,000 | Ordinary Share | PTTEP AU | 100% |
| 27. | PTTEP Australia Perth Pty Ltd | PTTEP AP | 50,000 | Ordinary Share | PTTEPH | 100% |
| 28. | PTTEP Australia Browse Basin Pty Ltd | PTTEP AB | 50,000 | Ordinary Share | PTTEP AP | 100% |
| 29. | PTTEP Australasia (Staff) Pty Ltd | PTTEP AAS | 10 | Ordinary Share | PTTEP AB | 100% |
| 30. | PTTEP Australasia (Ashmore Cartier) Pty Ltd | PTTEP AAA | 1,700,000 | Ordinary Share | PTTEP AB | 100% |
| 31. | PTTEP Australasia (Operations) Pty Ltd | PTTEP AAO | 106,686,517 | Ordinary Share | PTTEP AB | 100% |
| 32. | PTTEP Australia Timor Sea Pty Ltd | PTTEP AT | 50 | Ordinary Share | PTTEP AB | 100% |
| 33. | PTTEP Netherlands Coöperatie U.A. | PTTEP NC | - | - | PTTEP IH PTTEP NL | 0.00005% 99.99995% |
| 34. | PTTEP Netherlands Holding Coöperatie U.A. | PTTEP NH | - | - | PTTEP HK PTTEPI | 75% 25% |
| 35. | PTTEP Brazil Investment B.V. | PTTEP BI | 50,000 | Ordinary Share | PTTEP NH | 100% |
| 36. | PTTEP Canada Limited | PTTEP CA | 2,932,513,490 | Ordinary Share | PTTEP NC | 100% |
| 37. | PTTEP FLNG Holding Company Limited | PTTEP FH | 10,000 | Ordinary Share | PTTEP IH | 100% |
| 38. | PTTEP HK Holding Limited | PTTEP HK | 10,000 | Ordinary Share | PTTEP PTTEPI | 25% 75% |
| 39. | Cove Energy Limited | COVE | 508,912,947 | Ordinary Share | PTTEP AI | 100% |

| No. | Company Name | Abbreviation | Number of Shares Sold | | Shareholders | |
|-------------------------|---|----------------|-----------------------|----------------|-----------------------|---------------------------|
| 40. | Cove Energy East Africa Limited | CEEAL | 1,000 | Ordinary Share | COVE | 100% |
| 41. | Cove Energy Mozambique Rovuma Onshore Limited | CEMROL | 1,000 | Ordinary Share | CEEAL | 100% |
| 42. | PTTEP Mozambique Area 1 Limited | PTTEP MZA1 | 1,000 | Ordinary Share | CEEAL | 100% |
| 43. | Cove Energy Kenya Limited | CEKL | 1,000 | Ordinary Share | CEEAL COVE | 99.9% 0.1% |
| 44. | PTTEP Brasil Investimentos Em Exploração e Produção de Petróleo e Gás Ltda. | PTTEP BL | 790,293,700 | Ordinary Share | PTTEP BI PTTEP NH | 99.9999999% 0.0000001% |
| 45. | PTTEP SP Limited | PTTEP SP | 2 | Ordinary Share | SHL | 100% |
| | | | 95,279,585 | Ordinary Share | | |
| 46. | PTTEP HK Offshore Limited ² | PTTEP HKO | 10,000 | Ordinary Share | PTTEP HK | 100% |
| 47. | PTTEP Mexico E&P Limited, S. de R.L. de C.V. | PTTEP MEP | 3,000 | Ordinary Share | PTTEP HK PTTEP HKO | 99% 1% |
| Service Business | | | | | | |
| 48. | PTTEP Services Limited (Personnel Services Support) | PTTEP Services | 100,000 | Ordinary Share | PTTEP PTTEPI | 25% 75% |
| 49. | Andaman Transportation Limited (Investments in gas pipeline projects in Myanmar) | ATL | 62,500 | Ordinary Share | PTTEPO MOGE | 80% 20% |
| 50. | PTTEP Southwest Vietnam Pipeline Company Limited (Investments in gas pipeline projects in Vietnam) | PTTEP SVPC | 50,000 | Ordinary Share | PTTEPH | 100% |
| 51. | PTTEP Canada International Finance Limited (Raise Fund for PTTEP Business) | PTTEP CIF | 50,000 | Ordinary Share | PTTEP NC | 100% |
| 52. | PTTEP Treasury Center Company Limited (Treasury Center for PTTEP and subsidiaries) | PTTEP TC | 10,000,000 | Ordinary Share | PTTEP PTTEPI | 25% 75% |
| 53. | PTTEP Business Center Company Limited (Business Center for PTTEP and subsidiaries) | PTTEP BC | 521,572,300 | Ordinary Share | PTTEP PTTEPI | 25% 75% |

² Formerly known as PTTEP HK Investment Limited

- Subsidiaries which had different contact address, telephone and facsimile from PTTEP³.

| No. | Company Name | Type of Business | Abbreviation | Number of Shares Sold | | Shareholders |
|-----|---|---|--------------|-----------------------|----------------|--|
| 54. | Carigali-PTTEPI Operating Company SDN BHD | Petroleum Exploration and Production | CPOC | 350,000 | Ordinary Share | <ul style="list-style-type: none"> PTTEPI 50% PC JDA 50% |
| | Head Office: Level 8, Tower 2, PETRONAS Twin Towers Kuala Lumpur City Centre, 50088 Kuala Lumpur, Malaysia | | | | | |
| | Telephone: +603-2782-2555 | | | | | |
| | Facsimile: +603-2713-9877 | | | | | |
| 55. | PTT Global LNG Company Limited | Petroleum Exploration and Production | PTT GL | 10,421,446,000 | Ordinary Share | <ul style="list-style-type: none"> PTT 50% PTTEP BC 50% |
| | Head Office: 555/1 Energy Complex Building A, 6 th Floor, Vibhavadi Rangsit Road, Chatuchak, Chatuchak, Bangkok 10900, Thailand | | | | | |
| | Telephone: +66-2140-4599 | | | | | |
| | Facsimile: +66-2140-4559 | | | | | |
| 56. | PTT Global LNG Investment | Petroleum Exploration and Production | PTT GLI | 309,800,000 | Ordinary Share | <ul style="list-style-type: none"> PTT GL 100% |
| | Head Office: 1401 Hutchison House, 10 Harcourt Road, Hong Kong | | | | | |
| | Telephone: +852-2846-2345 | | | | | |
| | Facsimile: +852-2845-0476 | | | | | |
| 57. | Energy Complex Company Limited | Property Leasing | EnCo | 180,000,000 | Ordinary Share | <ul style="list-style-type: none"> PTTEP 50% PTT 50% |
| | Head Office: 555/1 Energy Complex Building A, Vibhavadi Rangsit Road, Chatuchak, Chatuchak, Bangkok 10900, Thailand | | | | | |
| | Telephone: +66-2140-1000 | | | | | |
| | Facsimile: +66-2140-1122 | | | | | |

³ Details of directors designated by the PTTEP Group of each subsidiary are disclosed in Attachment 2.

| No. | Company Name | Type of Business | Abbreviation | Number of Shares Sold | | Shareholders |
|-----|--|---|--------------|-----------------------|----------------|--|
| 58. | Mungalalu Truscott Airbase Pty Ltd | Operation of Air Base | - | 600 | Ordinary Share | <ul style="list-style-type: none"> ● PTTEP AAO 50% ● Mr. Arthur Hamilton 41.667% ● Mr. Alex Wood 8.333% |
| | Head Office: Unit 8, 9 Swan Crescent, Winnellie, Northern Territory, 0820, Australia | | | | | |
| | Telephone: +61-8-8981-6981 | | | | | |
| | Facsimile: +61-8-8918-8017 | | | | | |
| 59. | Troughton Island Pty Ltd | Operation of Air Base (Secondary) | - | 100 | Ordinary Share | <ul style="list-style-type: none"> ● PTTEP AAO 50% ● Mr. Arthur Hamilton 44% ● Mr. Alex Wood 6% |
| | Head Office: Unit 8, 9 Swan Crescent, Winnellie, Northern Territory, 0820, Australia | | | | | |
| | Telephone: +61-8-8981-6981 | | | | | |
| | Facsimile: +61-8-8918-8017 | | | | | |
| 60. | Natuna 2 B.V. | Petroleum Exploration and Production | Natuna | 90,000 | Ordinary Share | <ul style="list-style-type: none"> ● PTTEP NH 50% ● PHE OG 50% |
| | Head Office: Atrium Building, 8 th Floor, Strawinskylaan 3127, 1077 ZX, Amsterdam, The Netherlands | | | | | |
| | Telephone: - | | | | | |
| | Facsimile: - | | | | | |

Remark: Name of other shareholders in subsidiaries

| Abbreviation | Name |
|--------------|---|
| PTT | PTT Public Company Limited |
| PTT GL | PTT Global LNG Company Limited |
| PC JDA | PC JDA Ltd. |
| PHE OG | Pertamina Hulu Energi Oil and Gas Company |
| KrisEnergy | KrisEnergy (Gulf of Thailand) Ltd. |
| MOGE | Myanmar Oil and Gas Enterprise |
| MOECO B.V. | MOECO International B.V. |

6.3 Associated Company's Information⁴

As of December 31, 2017, PTTEP had 12 associated companies. Details of the directors designated by the PTTEP Group of each associated company are disclosed in Attachment 2.

| No. | Company Name | Type of Business | Abbreviation | Number of Shares Sold | | Shareholders |
|-----|---|---|--------------|-----------------------|----------------|---|
| 1. | PTT Digital Solutions Company Limited | Information Technology and Communication Services | PTT Digital | 15,000,000 | Ordinary Share | <ul style="list-style-type: none"> ● PTTEP 20% ● PTT 20% ● PTTGC 40% ● ThaiOil 20% |
| | Head Office: 555/1 Energy Complex Building A, 4 th -5 th Floor, Vibhavadi Rangsit Road, Chatuchak, Chatuchak, Bangkok 10900, Thailand | | | | | |
| | Telephone: +66-2537-3456 | | | | | |
| | Facsimile: +66-2537-2935 | | | | | |
| 2. | Moattama Gas Transportation Company | Gas Pipeline in Myanmar | MGTC | 1,000,000 | Ordinary Share | <ul style="list-style-type: none"> ● PTTEPO 25.5% ● Unocal Myanmar 28.2625% ● Total E&P Myanmar 31.2375% ● MOGE 15% |
| | Head Office: No. 5 Sacred Tooth Relic Lake Avenue, Punn Pin Gone Quarter No. 5, Mayangon Township, Yangon, Myanmar | | | | | |
| | Telephone: +95-1-650-977, 660-466 | | | | | |
| | Facsimile: +95-1-650-478, 650-479 | | | | | |
| 3. | Taninthayi Pipeline Company LLC | Gas Pipeline in Myanmar | TPC | 100,000 | Ordinary Share | <ul style="list-style-type: none"> ● PTTEPO 19.31784% ● PCM III 30.00140% ● PCML 10.90878% ● MOGE 20.45414% ● Nippon 19.31784% |
| | Head Office: 16 Shwe Taung Kyar Bahan, Yangon, Myanmar | | | | | |
| | Telephone: +95-1-526-411-4 | | | | | |
| | Facsimile: +95-1-525-698 | | | | | |

⁴ Notification of the Securities and Exchange Commission Kor Chor. 17/2551 Determination of Definitions in Notifications relating to Issuance and Offer for Sale of Securities

| No. | Company Name | Type of Business | Abbreviation | Number of Shares Sold | | Shareholders |
|-----|---|---|-----------------|-----------------------|----------------|---|
| 4. | B8/32 Partners Limited | Petroleum Exploration and Production | B 8/32 Partners | 110,000 | Ordinary Share | <ul style="list-style-type: none"> ● PTTEPO 25% ● MOECO BV 16.71% ● KrisEnergy 4.63% ● Chevron Global 46.34% ● Chevron 7.32% |
| | Head Office: 19 Siam Commercial Bank Park Plaza, East 3 rd Building, 5 th Floor, Ratchadaphisek Road, Chatuchak, Bangkok 10900, Thailand | | | | | |
| | Telephone: +66-2545-5555 | | | | | |
| | Facsimile: - | | | | | |
| 5. | Hoang Long Joint Operating Company | Petroleum Exploration and Production | HL JOC | - ⁵ | - | <ul style="list-style-type: none"> ● PTTEP HL 28.5% ● PVEP 41% ● SOCO 28.50% ● OPECO 2.0% |
| | Head Office: Suite 2001, Me Linh Point Tower, 2 Ngo Duc Ke Street, District 1, Ho Chi Mihn City, S.R. Vietnam | | | | | |
| | Telephone: +84-8-3829-9359 | | | | | |
| | Facsimile: +84-8-3822-6106 | | | | | |
| 6. | Hoan-Vu Joint Operating Company | Petroleum Exploration and Production | HV JOC | - ⁶ | - | <ul style="list-style-type: none"> ● PTTEP HV 25% ● SOCO 25% ● PVEP 50% |
| | Head Office: Suite 2006, Me Linh Point Tower, 2 Ngo Duc Ke Street, District 1, Ho Chi Mihn City, S.R. Vietnam | | | | | |
| | Telephone: +84-8-3823-9525 | | | | | |
| | Facsimile: +84-8-3823-9526 | | | | | |

⁵ No share was issued. Percentage of shareholding is subject to participation interest of the concession.

⁶ No share was issued. Percentage of shareholding is subject to participation interest of the concession.

| No. | Company Name | Type of Business | Abbreviation | Number of Shares Sold | | Shareholders |
|-----|---|--------------------------------------|------------------------------|-----------------------|----------------|--|
| 7. | Groupement Bir Seba | Petroleum Exploration and Production | GBRS | - ⁷ | - | <ul style="list-style-type: none"> ● PTTEP AG 35% ● PVEP 40% ● Sonatrach 25% |
| | Head Office: Zone d'activité Route Nationale N°3 BP 256 EURO JAPAN Hassi Messaoud, Ouargla, Algeria | | | | | |
| | Telephone: +213-29-79-71-66 | | | | | |
| | Facsimile: +213-29-79-09-15 | | | | | |
| 8. | Erawan 2 FSO Bahamas Ltd. | Lease of FSO (vessel) | Erawan 2 FSO Bahamas | 100 | Ordinary Share | <ul style="list-style-type: none"> ● JV Marine 13.11% ● Chevron Global 65.91% ● MOECO 20.98% |
| | Head Office: Ocean Centre, Montagu Foreshore, East Bay Street, Nassau, New Providence, Bahamas P.O. Box SS-19084 | | | | | |
| | Telephone: - | | | | | |
| | Facsimile: - | | | | | |
| 9. | Leismer Aerodrome Limited | Operation of Air Base | LAL | 200 | - | <ul style="list-style-type: none"> ● PTTEP CA 32% ● AOC Leismer Corner Partnership 48% ● FCCL 20% |
| | Head Office: 1200, 215 – 9 th Avenue SW Calgary, AB T2P 1K3, Canada | | | | | |
| | Telephone: +1-403-237-8227 | | | | | |
| | Facsimile: +1-403-264-4640 | | | | | |
| 10. | Asia Pacific Marine Services (EF) B.V. | Lease of FSO (vessel) | Asia Pacific Marine Services | 18,000 | Ordinary Share | <ul style="list-style-type: none"> ● Erawan 2 FSO 100% |
| | Head Office: Naritaweg 165, Telestone 8, 1043 BW Amsterdam, The Netherlands | | | | | |
| | Telephone: - | | | | | |
| | Facsimile: - | | | | | |

⁷ No share was issued. Percentage of shareholding is subject to participation interest of the concession.

| No. | Company Name | Type of Business | Abbreviation | Number of Shares Sold | | Shareholders |
|-----|---|--|--------------|-----------------------|----------------|--|
| 11. | Mozambique LNG 1 Company Pte. Ltd. | Petroleum Exploration and Production | MZ LNG 1 | 250,000 | Ordinary Share | <ul style="list-style-type: none"> ● PTTEP MZA1 8.5% ● ANADARKO 26.5% ● MITSUI 20% ● BPRL 10% ● BREML 10% ● ONGC Videsh 10% ● ENH 15% |
| | Head Office: 50 Raffles Place #60-00 Singapore Land Tower, Singapore 048623 | | | | | |
| | Telephone: - | | | | | |
| | Facsimile: - | | | | | |
| 12. | Sarn Palung Social Enterprise Company Limited | Execution of social enterprises of PTT group companies | PTT SE | 1,000,000 | Ordinary Share | <ul style="list-style-type: none"> ● PTTEP 15% ● PTT 20% ● PTTGC 15% ● ThaiOil 15% ● IRPC 15% ● GPSC 10% ● PTTOR 10% |
| | Head Office: 555/1 Energy Complex Building A, 10 th Floor, Vibhavadi Rangsit Road, Chatuchak, Chatuchak, Bangkok 10900, Thailand | | | | | |
| | Telephone: +66-2537-2971 | | | | | |
| | Facsimile: - | | | | | |

Remark: Name of other shareholders in associated companies

| Abbreviation | Name |
|----------------|--|
| PTT | PTT Public Company Limited |
| PTTGC | PTT Global Chemical Public Company Limited |
| ThaiOil | Thai Oil Public Company Limited |
| Chevron | Chevron Block B8/32 (Thailand) Ltd. |
| ANADARKO | Anadarko Mozambique Area 1 Limited |
| BPRL | BPRL Venture Mozambique B.V. |
| BREML | BEAS Rovuma Energy Mozambique Limited |
| Chevron Global | Chevron Global Energy Inc. |

| Abbreviation | Name |
|--------------------------------|---|
| Erawan 2 FSO | Erawan 2 FSO Bahamas Ltd. |
| ENH | Empresa Nacional De Hidrocarbonetos |
| FCCL | FCCL Partnership |
| KrisEnergy | KrisEnergy (Gulf of Thailand) Ltd. |
| MITSUI | Mitsui E&P Mozambique Area 1 Limited |
| MOGE | Myanmar Oil and Gas Enterprise |
| MOECO BV | MOECO International B.V. |
| MOECO | Mitsui Oil Exploration Co., Ltd. |
| Nippon | Nippon Oil Exploration (Myanmar) Ltd. |
| ONGC Videsh | ONGC Videsh Limited |
| OPECO | OPECO Vietnam Ltd. |
| PCML | Petronas Carigali Myanmar (Hong Kong) Ltd. |
| PCM III | Petronas Carigali Myanmar III Inc. |
| PTTOR | PTT Oil and Retail Business Company Limited |
| PVEP | PetroVietnam Exploration & Production Corporation |
| SOCO | SOCO Vietnam Ltd. |
| Sonatrach | Société Nationale pour la Recherche, la Production, le Transport, la Transformation et la Commercialisation des Hydrocarbures |
| AOC Leismer Corner Partnership | Athabasca Oil Corporation |
| Total E&P Myanmar | Total E&P Myanmar SAS |
| Unocal Myanmar | Unocal Myanmar Offshore Co., Ltd. |

6.4 References

1) Share Registrar

| | | |
|------|--------------------|--|
| 1.1) | Name | Thailand Securities Depository Company Limited |
| | Address | 93, Rachadaphisek Road, Dindaeng, Bangkok 10400, Thailand |
| | Telephone | +66-2009-9000 |
| | SET Contact Center | +66-2009-9999 |
| | Facsimile | +66-2009-9991 |
| | E-mail | SETContactCenter@set.or.th |
| | Website | http://www.set.or.th/tsd |

2) Registrar and Paying Agent

- 2.1) Registrar and paying agent for THB 2,500 million debentures issued in March 2003, THB 5,000 million debentures issued in May 2009, and THB 5,000 million subordinated capital debentures issued in June 2012

| | |
|-----------|---|
| Name | TMB Bank Public Company Limited |
| Address | Floor 5A, 3000 Phahon Yothin Road, Chatuchak, Bangkok 10900, Thailand |
| Telephone | +66-2299-1824, +66-2299-1825 |
| Facsimile | +66-2242-3270 |

- 2.2) Registrar and paying agent for THB 11,400 million debentures issued in June 2014, and THB 8,200 million debentures issued in June 2014

| | |
|-----------|---|
| Name | Siam Commercial Bank Public Company Limited |
| Address | 17 th Floor, North Wing, G Tower Grand Rama 9, 9 Rama 9 Road, Huai Khwang, Huai Khwang, Bangkok 10310, Thailand |
| Telephone | +66-2128-2316 |
| Facsimile | +66-2128-4621, +66-2128-4622 |

3) Debenture Holders' Representative

- 3.1) Debenture holders' representative for THB 5,000 million debentures issued in May 2009, and THB 5,000 million subordinated perpetual capital debentures issued in June 2012

| | |
|-----------|---|
| Name | Siam Commercial Bank Public Company Limited |
| Address | 17 th Floor, North Wing, G Tower Grand Rama 9, 9 Rama 9 Road, Huai Khwang, Huai Khwang, Bangkok 10310, Thailand |
| Telephone | +66-2128-2316 |
| Facsimile | +66-2128-4621, +66-2128-4622 |

4) Trustee

- 4.1) Trustee for USD 700 million debentures issued in April 2011, outstanding USD 323 million debentures issued in September 2013, outstanding USD 145 million subordinated perpetual capital debentures issued in June 2014, and outstanding USD 855 million subordinated perpetual capital debentures issued in July 2017

Name BNY Mellon Corporate Trust
Address #03-01 Millenia Tower, 1 Temasek Avenue, Singapore 039192
Telephone +65-6632-0120, +65-6432-0351, +65-6432-0354
Facsimile +65-6883-0338

- 4.2) Trustee for outstanding USD 490 million debentures issued in June 2012

Name Citicorp International Limited
Address 39th Floor, Champion Tower, Three Garden Road, Central, Hong Kong
Telephone +852-2868-7964
Facsimile +852-2323-0279

5) Registrar and Paying Agent

- 5.1) Registrar and paying agent for bills of exchange with a total revolving credit of up to THB 50,000 million

Name TMB Bank Public Company Limited
Address Floor 5A, 3000 Phahon Yothin Road, Chom Phon,
Chatuchak, Bangkok 10900, Thailand
Telephone +66-2299-1824, +66-2299-1825
Facsimile +66-2242-3270

6) Facility Agent

- 6.1) Facility agent for USD 500 million loan agreement dated in November 2010

Name The Bank of Tokyo-Mitsubishi UFJ, Ltd.
Address 10th Floor, AIA Central, 1 Connaught Road, Central, Hong Kong
Telephone +852-2823-6698, +852-2823-6691, +852-2823-6962, +852-2823-6693
Facsimile +852-2823-6686

7) Process Agent for Bank Loan

- 7.1) Process agent for USD 500 million loan agreement dated in November 2010

Name Law Debenture Corporate Services Limited
Address 5th Floor, 100 Wood Street, London EC2V 7EX
Telephone +44-20-7606-5451
Facsimile +44-20-7606-0643

8) Process Agent for Common Shares

8.1) Name CT Corporation System
Address 13th Floor, 111 Eighth Avenue, New York County (Manhattan),
New York, New York, 10011
Telephone +1-212-894-8800, +1-212-894-8940
Facsimile -

9) Interest Rate Swap Counterparties

9.1) Name Kasikornbank Public Company Limited
Division Capital Markets Business Division
Address 400/22 Phahon Yothin Avenue, Samsen-Nai, Phayathai,
Bangkok 10400, Thailand
Telephone +66-2470-3006
Facsimile +66-2271-4486

10) Cross Currency Swap Counterparties

10.1) Name Kasikornbank Public Company Limited
Division Capital Markets Business Division
Address 400/22 Phahon Yothin Avenue, Samsen-Nai, Phayathai,
Bangkok 10400, Thailand
Telephone +66-2470-3006
Facsimile +66-2271-4486

10.2) Name Deutsche Bank AG, Bangkok Branch
Division Corporate Treasury Sales
Address 63 Athenee Tower, 27th-29th Floor, Wireless Road, Lumpini,
Pathumwan, Bangkok 10330, Thailand
Telephone +66-2646-5139
Facsimile +66-2651-5892

10.3) Name Siam Commercial Bank Public Company Limited
Division Financial Market Division
Address 12th Floor, Zone B, 9 Ratchadaphisek Road,
Chatuchak, Bangkok 10900, Thailand
Telephone +66-2544-5741-9
Facsimile +66-2937-7968

11) FX Contracts Counterparties

- | | | |
|-------|------------------|---|
| 11.1) | Name | Kasikornbank Public Company Limited |
| | Division | Capital Markets Business Division |
| | Address | 400/22 Phahon Yothin Avenue, Samsen-Nai, Phayathai, Bangkok 10400, Thailand |
| | Telephone | +66-2470-3006 |
| | Facsimile | +66-2271-4486 |
| | | |
| 11.2) | Name | Krung Thai Bank Public Company Limited |
| | Division | Corporate Sales, Global Markets Group |
| | Address | Building 1 (Nana Nua), 8 th Floor, 35 Sukhumvit Road, Klongtoey Nua, Wattana, Bangkok 10110, Thailand |
| | Telephone | +66-2208-4644 |
| | Facsimile | +66-2256-8398 |
| | | |
| 11.3) | Name | Siam Commercial Bank Public Company Limited |
| | Division | Financial Market Division |
| | Address | 12 th Floor, Zone B, 9 Ratchadaphisek Road, Chatuchak, Bangkok 10900, Thailand |
| | Telephone | +66-2544-5741-9 |
| | Facsimile | +66-2937-7969 |
| | | |
| 11.4) | Name | The Hongkong and Shanghai Banking Corporation Limited |
| | Division | Corporate Marketing and Sales |
| | Address | 968 HSBC Building, Rama IV Road, Silom, Bangrak, Bangkok 10500, Thailand |
| | Telephone | +66-2614-4848 |
| | Facsimile | +66-2632-4831 |
| | | |
| 11.5) | Name | Bank of America, National Association |
| | Division | Fixed Income Currencies and Commodities (FICC) Sales |
| | Address | 87/2 All Seasons Place, CRC Tower, 20 th Floor, Wireless Road, Bangkok 10330, Thailand |
| | Telephone | +66-2305-2988, +66-2305-2986 |
| | Facsimile | +66-2685-3224 |

- | | | |
|--------|------------------|--|
| 11.6) | Name | Citibank, N.A. |
| | Division | Corporate Sales & Structuring Thailand |
| | Address | Interchange 21 Building, 399 Sukhumvit Road, Klongtoey Nua, Wattana, Bangkok 10110, Thailand |
| | Telephone | +66-2788-2785 |
| | Facsimile | +66-2788-4825-8 |
| | | |
| 11.7) | Name | CIMB Thai Bank Public Company Limited |
| | Division | Global Sales, Treasury Sales Division |
| | Address | 44 Langsuan Road, Lumpini, Pathumwan, Bangkok 10330, Thailand |
| | Telephone | +66-2670-4623, +66-2670-4658 |
| | Facsimile | +66-2657-3282-3 |
| | | |
| 11.8) | Name | Bank of Ayudhya Public Company Limited |
| | Division | Sales & Trading Division Global Markets Group |
| | Address | 1222 Rama III Road, Bang Phongphang, Yannawa, Bangkok 10120, Thailand |
| | Telephone | +66-2021-6207, +66-2021-6385 |
| | Facsimile | +66-2266-3048 |
| | | |
| 11.9) | Name | Bangkok Bank Public Company Limited |
| | Division | Treasury Division |
| | Address | 333 Silom Road, Silom, Bangrak, Bangkok 10500, Thailand |
| | Telephone | +66-2021-1111 |
| | Facsimile | +66-2636-4633 |
| | | |
| 11.10) | Name | Oversea-Chinese Banking Corporation Limited |
| | Division | Global Markets |
| | Address | 1 Q.House Lumpini Building, 15 th Floor, Unit 2, South Sathon Road, Tungmahamek, Sathon, Bangkok 10120, Thailand |
| | Telephone | +66-2287-9852 |
| | Facsimile | +66-2287-9898 |

- | | | |
|--------|------------------|---|
| 11.11) | Name | TMB Bank Public Company Limited |
| | Division | Capital Markets |
| | Address | 3000 Phahon Yothin Road, Chatuchak, Bangkok 10900, Thailand |
| | Telephone | +66-2676-8008 |
| | Facsimile | +66-2292-4690-2 |
| 11.12) | Name | United Overseas Bank (Thai) Public Company Limited |
| | Division | Global Markets |
| | Address | 191 South Sathon Road, Bangkok 10120, Thailand |
| | Telephone | +66-2028-9898 |
| | Facsimile | +66-2285-1365 |
| 11.13) | Name | BNP Paribas Bangkok Branch |
| | Division | Global Markets Corporate Sales |
| | Address | 990 Abdulrahim Place, 29 th Floor, Rama IV Road, Silom, Bangrak, Bangkok 10500, Thailand |
| | Telephone | +66-2659-8990-3 |
| | Facsimile | +66-2636-1929 |
| 11.14) | Name | ANZ Bank (Thai) Public Company Limited |
| | Division | Markets |
| | Address | 63 Athenee Tower, 8 th Floor, Unit 801-807, Wireless Road, Lumpini, Pathumwan, Bangkok 10330, Thailand |
| | Telephone | +66-2263-9722 |
| | Facsimile | +66-2168-8780 |
| 11.15) | Name | Sumitomo Mitsui Banking Corporation |
| | Division | Treasury Department |
| | Address | 1 Q.House Lumpini Building, 8 th -10 th Floor, South Sathon Road, Tungmahamek, Sathon, Bangkok 10120, Thailand |
| | Telephone | +66-2353-8188 |
| | Facsimile | +66-2353-8815-16 |

12) Auditor

- | | | |
|-------|------------------|---|
| 12.1) | Name | Office of the Auditor General of Thailand |
| | Address | Soi Areesampan, Rama VI Road, Phayathai, Bangkok 10400, Thailand |
| | Telephone | +66-2271-8112 |
| | Facsimile | +66-2618-5790 |

13) Legal Advisors

- 13.1) **Name** Herbert Smith Freehills (Thailand) Limited
Address 1403 Abdulrahim Place, 990 Rama IV Road,
Silom, Bangrak, Bangkok 10500, Thailand
Telephone +66-2657-3888
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- 13.2) **Name** Herbert Smith Freehills LLP
Address (1) Exchange House, Primrose Street,
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Facsimile +44-20-7374-0888

Address (2) 50 Raffles Place, Singapore Land Tower # 24-01,
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- 13.3) **Name** Pracha Tooppoltup Law Office
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Telephone +66-2530-3173
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- 13.4) **Name** Siam Premier International Law Office Limited
Address 26th Floor, The Offices of Central World,
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- 13.5) **Name** Skrine
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- 13.6) **Name** Weerawong, Chinnavat & Partners Ltd.
Address 540 Mercury Tower 22nd Floor, Ploenchit Road,
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- 13.7) **Name** EY Corporate Services Limited
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- 13.8) **Name** EH & Partners
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London, United Kingdom NW8 9XY
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- 13.9) **Name** Vietnam International Law Firm
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- 13.11) **Name** South Asia Law Co., Ltd.
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13.12) Name Chandler MHM Limited
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13.14) Name Siam Justice Law Office
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13.15) Name Chuwattana Law Office
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Facsimile -

14) Advisor to the Board of Directors

14.1) Name Mr. Tongchat Hongladarom
Address 8/48 Prasanmit Condominium, Sukhumvit 23,
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Telephone +66-2258-4363
Facsimile +66-2258-4363

15) Advisor to the Risk Management Committee

15.1) Name Mr. Nuttachat Charuchinda
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Facsimile -

6.5 Other Significant Information

- None -