



**Sustainable
Growth for All**
with Excellent Teamwork



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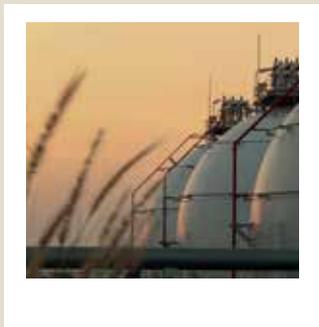
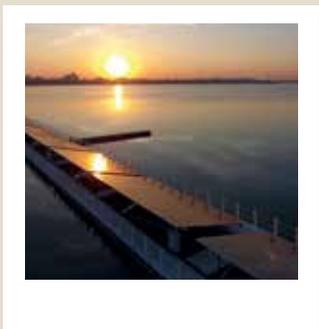
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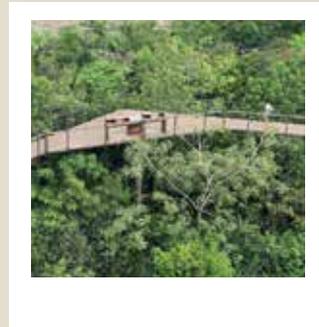
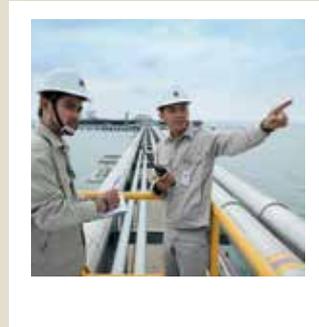


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Message from the President and CEO

Changes in economic, social, and environmental conditions as well as rapidly-moving, disruptive advancements in technology all pose significant challenges to PTT. It is therefore essential that we move quickly to build business resilience to ensure that we can continue forward on a strong foundation. We have placed a priority on achieving balanced sustainable development in three dimensions – operating whilst caring for communities and societies (People), natural resources and environmental conservation (Planet), and being the foundation for the strong and sustainable growth of the Thai economy and society (Prosperity). In addition, the Company has been promoting organizational values that integrate digital technology – through the SPIRIT+D values – as this will develop our people into ethical and highly competent individuals, who will be able to apply digital technology into their work and build upon their knowledge to foster new innovations for long-term value-added creations. We have also invited our employees to participate in the PTT TECH Savvy Agent 2019 competition to develop ideas for potential new businesses in the form of start-ups, using digital technologies as management tools. The three winning teams received the opportunity to create new businesses based on the ideas that they put forward.

At PTT, we have applied Robotic Process Automation (RPA) technology to alleviate our repetitive work processes, involving tasks such as issuing invoices, bank payments, financial report assessments, procurement, etc. The RPA

system is able to work 24 hours a day with efficiency and accuracy, and helps employees to work more conveniently, faster, and ultimately deliver enhanced customer satisfaction. Furthermore, PTT has collaborated with the Thailand Blockchain Community Initiative, a consortium of 22 Thai commercial banks, to issue electronic letters of guarantee (LGs) using blockchain technology. This will help to ensure security, reduce costs, and shorten the timeframe for issuing LGs from 7 days to 0.5 days. It is the first time that banks and users are collaborating via the same blockchain system.

We have an ongoing commitment to operating whilst caring for communities and societies. We achieve this specifically by developing and building knowledge – particularly in science, technology, and innovation. Our overall aim in this regard is to increase individual self-reliance in terms of livelihood development, as well as sustainable production and consumption. And so, in 2013, PTT supported the establishment of the Kamnoetvidya Science Academy (KVIS), for high school-level education, and Vidyasirimedhi Institute of Science and Technology, for higher education,

and that support continues today. PTT has now entered into a Memorandum of Understanding with PTT Group companies to extend its financial contribution to these two institutions for another 10 years, until 2031. To date, two cohorts of high school and university students have graduated from these institutions. We are also starting to see research outputs from these institutions; the knowledge generated can be expanded through collaborations with industries for real-life applications.

In addition, PTT works with civil society to develop and disseminate knowledge on clean energy production among communities. There are 51 project areas dedicated to clean energy throughout the country, including for biogas production systems from swine manure, solar cells, and water distribution systems using hydraulic ram pumps. These projects aim to increase the quality of life for communities and reduce energy costs. Meanwhile, PTT also encourages the project areas that demonstrate readiness to request carbon credit certifications through the Thailand Voluntary Emission Reduction Program (T-VER), as this will enable communities to sell greenhouse gas emissions credits on Thailand's voluntary carbon trading market.

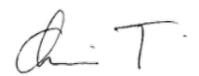
PTT fully supports efforts on forest restoration and the expansion of green spaces in order to reduce climate

change impacts. At the same time, we are focused on controlling the amount of greenhouse gas emissions from our operations, developing clean products, and developing new businesses in support of a low-carbon society. As a result, we were able to control PTT Group's greenhouse gas emissions intensity within the 2019 target, which was below 39.4 million tonnes carbon dioxide equivalent. We also continue to focus on the development of natural gas, as a clean fuel source for electricity production and industrial use, to foster energy security and drive the national economy.

Furthermore, PTT has moved forward with the development of an integrated liquefied natural gas business. This has resulted in investments in key infrastructure, including the construction of the Onshore Gas Transmission Pipeline No. 5, the expansion of the LNG Receiving Terminal to support an additional capacity of 7.5 million tonnes of LNG, bringing the total capacity to 19 million tonnes by 2022; jointly investing in the Map Ta Phut Industrial Port, Phase 3 (Section 1) development project, as well as positioning Thailand as the center for LNG trading in the ASEAN region. PTT is also developing new businesses to support the move towards a low-carbon society, particularly businesses concerning the electricity value chain, energy storage, electric vehicles, and renewable energy,

by focusing on energy management in high-potential areas. Finally, the Company is involved in developing the Eastern Economic Corridor of Innovation (EECI), or “Wang Chan Valley”, in Rayong province, transforming it into a “Smart City” and the country's center for innovation research and development.

I would like to thank all of our stakeholders who have continuously put their trust and support in PTT. In particular, I would like to thank the management and employees, who have worked to create an environment of honesty and integrity, upholding the power of doing good, within the organization. Due to these efforts, PTT has received the “NACC Integrity Award” from the National Anti-Corruption Commission, which is awarded to organizations that operate according to good governance principles, for the eighth time. I believe that by operating with ethics and responsibility in all that we do, PTT will achieve the goal of becoming an organization that is the pride of all people, while conducting business with transparency, for sustainability.



Chansin Treenuchagron
President and
Chief Executive Officer

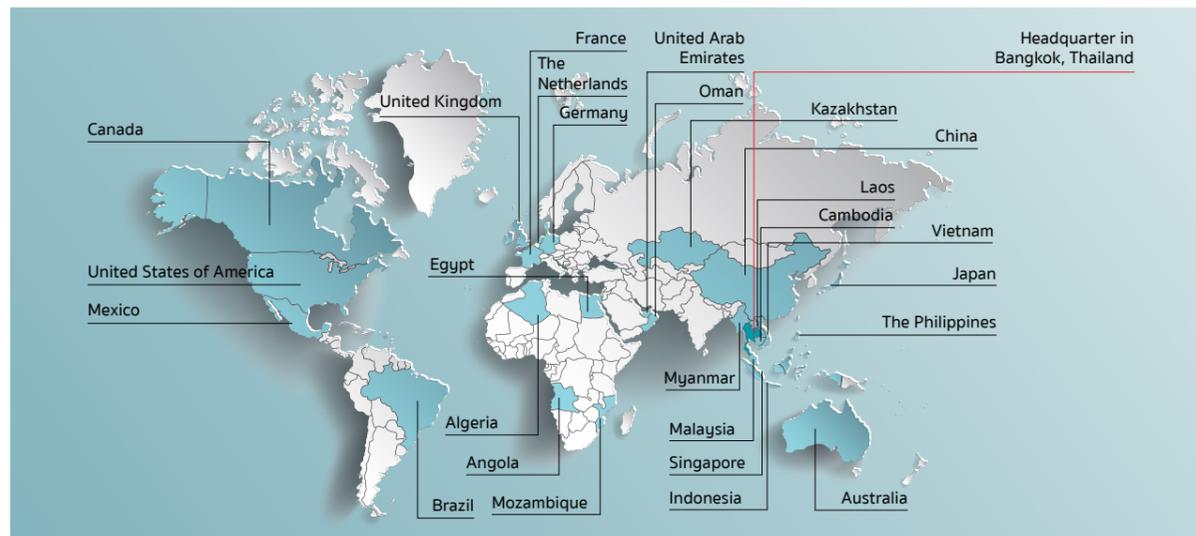


Organization Overview

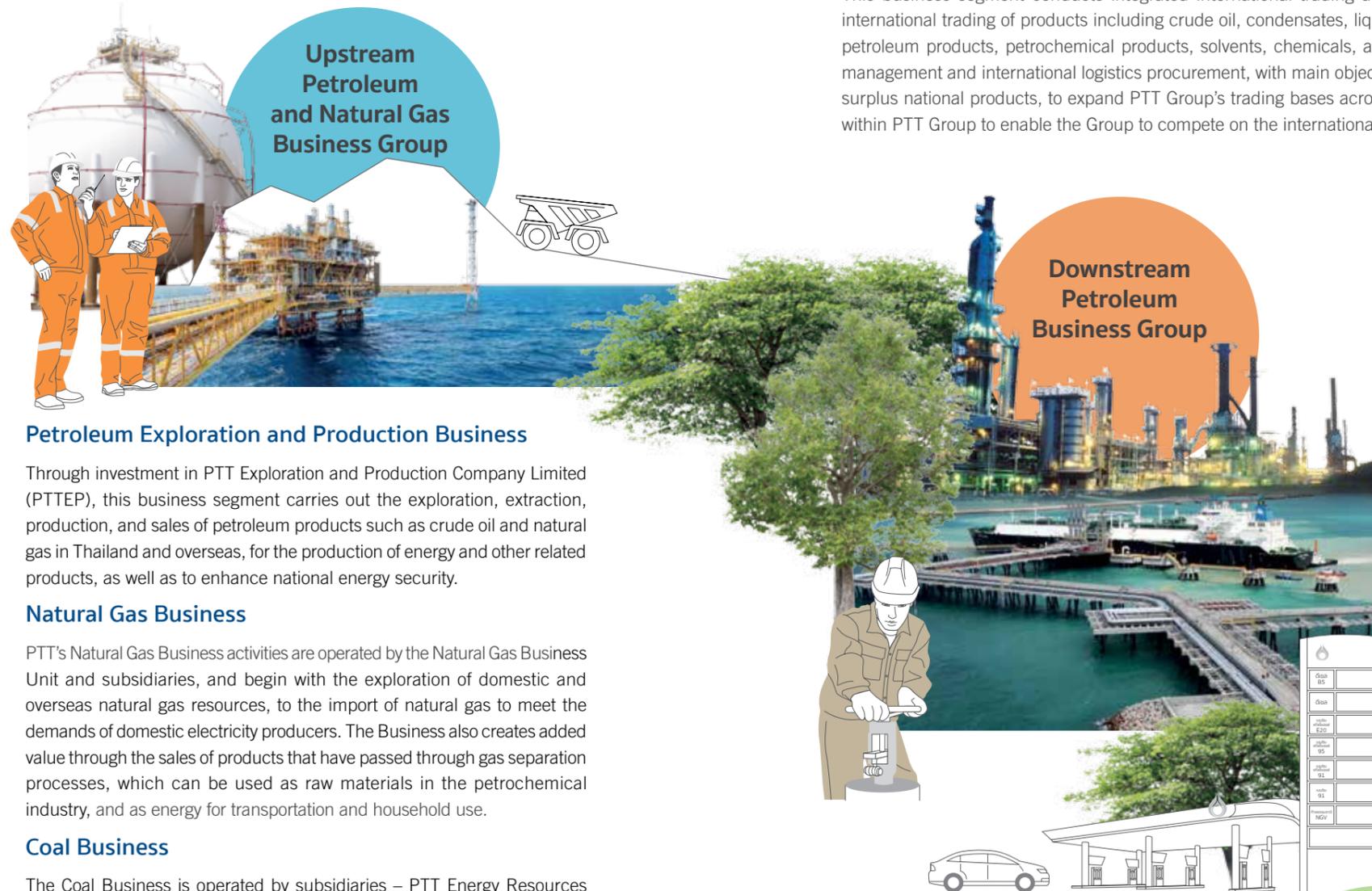
PTT Business

PTT Public Company Limited, or PTT, is a national energy company that was established to ensure national energy security for Thailand. PTT operates under the oversight of the Ministry of Finance and the Ministry of Energy, and has been listed on the Stock Exchange of Thailand since 2001. The Company's vision is to become the premier Thai multi-national energy company, which is committed and dedicated to business development through creative innovations. Meanwhile, its mission is to achieve balanced care for all stakeholders through integrated energy and petrochemical business operations, from upstream to downstream, in 26 countries globally. This is achieved through PTT-operated businesses, consisting of the Natural Gas Business and International Trading Business, and PTT Group affiliates and subsidiaries, consisting of the Petroleum Exploration and Production Business, Petrochemical and Refining Business, Oil and Retail Business, Coal Business, and Technology and Engineering Business.

PTT invests in businesses in **26** countries around the world. Employs a total of **34,193** employees within PTT Group.



PTT Group's Value Chain



Upstream Petroleum and Natural Gas Business Group

Downstream Petroleum Business Group

Petroleum Exploration and Production Business

Through investment in PTT Exploration and Production Company Limited (PTTEP), this business segment carries out the exploration, extraction, production, and sales of petroleum products such as crude oil and natural gas in Thailand and overseas, for the production of energy and other related products, as well as to enhance national energy security.

Natural Gas Business

PTT's Natural Gas Business activities are operated by the Natural Gas Business Unit and subsidiaries, and begin with the exploration of domestic and overseas natural gas resources, to the import of natural gas to meet the demands of domestic electricity producers. The Business also creates added value through the sales of products that have passed through gas separation processes, which can be used as raw materials in the petrochemical industry, and as energy for transportation and household use.

Coal Business

The Coal Business is operated by subsidiaries – PTT Energy Resources Company Limited (PTTER) and PTT Global Management Company Limited (PTTGM), and aims to identify new coal resources as energy reserves for Thailand and to build national energy security. The Business produces and distributes coal to various countries in Asia.

International Trading Business

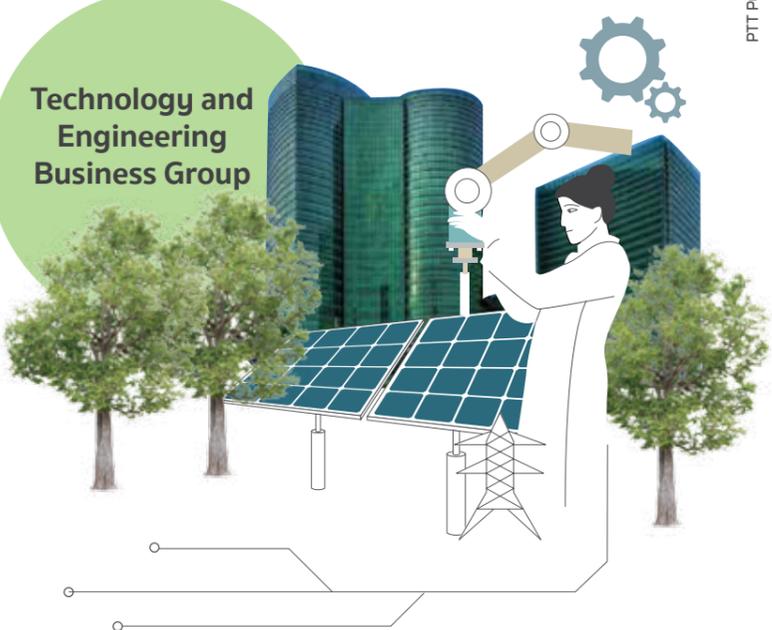
This business segment conducts integrated international trading activities covering the procurement, import, export, and international trading of products including crude oil, condensates, liquefied natural gas (LNG), liquefied petroleum gas (LPG), petroleum products, petrochemical products, solvents, chemicals, and others. In addition, it provides services on price risk management and international logistics procurement, with main objectives being to create energy security and added value for surplus national products, to expand PTT Group's trading bases across all regions of the world, and to create a trade balance within PTT Group to enable the Group to compete on the international market.

Petrochemical and Refining Business

Integrated petrochemical and refining business activities are operated by PTT Global Chemical Public Company Limited (GC), Thailoil Public Company Limited (TOP), IRPC Public Company Limited (IRPC), and PTT Tank Terminal Company Limited (PTT Tank). Activities cover crude oil refining to produce fuel oil and petrochemical products, which can be further developed into various types of chemicals, used as basic feedstock for downstream industries, and for building public utility infrastructure in support of business operations, such as harbors and product containers, for PTT Group companies and customers. This business segment also supports the development of green products and technologies to promote sustainable business practices.

Oil and Retail Business

Operated by PTT Oil and Retail Business Company Limited (OR), this business segment sells petroleum products including fuel oil, lubricants, and liquefied petroleum gas (LPG) to consumer groups, and aviation fuel, shipping fuel, and industrial fuel to industrial customers. It also sells products and services through various retail businesses, such as Café Amazon coffee shop, Jiffy convenience store, Texas Chicken restaurant, and FIT Auto car services, to domestic and international customers.



Technology and Engineering Business Group

This Business Group focuses on the research and development of new products, creating innovations to expand new business opportunities, operating capital projects, and real estate management – all in support of domestic and international business growth. Through Global Power Synergy Company Limited (GPSC), the Group produces electricity and related products, such as steam and demineralized water, for industrial customers. Meanwhile, Energy Complex Company Limited (EnCo) provides services on office space and infrastructure management, and offers integrated support to PTT Group on real estate business development. PTT Energy Solutions Company Limited (PTTES) provides technical advisory services on engineering, and PTT Digital Solutions Company Limited (PTT Digital) provides IT and communications services.

Strategic Challenges and Opportunities

Global Trends and Changes

Directions of global trends and changes are important factors that must be regularly monitored and analyzed, as these influence the revision and adjustment of PTT Group's strategy. Doing so ensures that PTT Group is able to align itself with future change, identify new business development opportunities, and respond to strategic risks that could impact the Group's business operations over the long term. An important trend continues to be the rapid advancement of science and technology, as this directly impacts on the context of business operations. Some businesses may be interrupted, while manufacturers and service providers must quickly adapt, innovate, and research new technologies in order to deliver products and services that better cater to market needs. Examples include modern medical technologies that enable citizens to live longer, and therefore bring about a global aging society. Likewise, businesses must prepare in terms of infrastructure for future needs, while consumers are now increasingly committed to the society and environment. The latter has significantly impacted energy businesses, as they must adapt to these concerns by increasing investments in clean and alternative energy, and applying innovations and technologies to support the reduction of greenhouse gas emissions and negative environmental impacts from business processes. This could include the development of electricity production businesses that use renewable energy, energy storage businesses, and electric vehicles. These considerations will create a shift away from fossil fuels and towards cleaner, renewable energy sources in the future.

As for the situation in Thailand, the government remains committed to building an innovation-driven economy, reducing reliance on international support, reducing inequality, and creating a balance between the economy and society – under the principles of the Sufficiency Economy Philosophy. In terms of energy, Thailand has set the target to reduce fossil fuel-based energy consumption, reduce its reliance on natural gas, increase the proportion of electricity generated from renewable sources, and liberalize the energy market – for all people to have inclusive and equitable access to energy. Against this challenging backdrop for energy businesses, PTT developed the “Pride and Treasure of Thailand” strategy, which prioritizes sustainability management in 3 dimensions (or the “3Ps”): Conducting business while caring for communities and society (People), Conserving natural resources and the environment (Planet), and Being a strong foundation for the sustainable and robust growth of the economy and society (Prosperity). This strategy will enable the Company to respond to change, identify new business development opportunities, and prepare to manage risks that could impact PTT Group's operations over the long term.

Emerging Risks and New Opportunities

Based on a comprehensive analysis of all available information and assessments of emerging risks and new business opportunities

that could impact PTT's business operations – including economic, social, environmental and technology risks – PTT has found that the emerging risks and opportunities for the business remain Cybersecurity and Organizational Digital Transformation. Indeed, the greater applications of new digital systems into the organization may lead to higher risks of cyber-attacks from ill-intentioned individuals, who use cyber technology to attack key work systems and in turn impact business continuity, trust, and organizational reputation. Not only have that, rapidly changing digital systems had the ability to affect business direction, employee development, and organizational adaptation to future change. Over the past year, PTT has developed preparations to respond to technological change and a shifting energy landscape – and transformed them into very tangible business opportunities. The Company has developed an energy storage system, focused on the use of electric vehicles, and successfully integrated risks and opportunities into business strategies and plans in order to stimulate concrete management on these issues.

Cybersecurity

PTT continues to manage cybersecurity risks as it has done last year. As there has been a greater reliance on technology in operations, cyber-attacks have the potential to cause significant impacts on business operations. Aside from operating in accordance with the ISO/IEC 27001 Information Security Standard, PTT has also set up a security control team to assist in providing 24-hour system safety assessments. It further established a policy governing the use of internal data, as well as provided accurate knowledge and raised awareness on potential cyber-attacks amongst employees. Should any attack occur on the Company's communications systems, PTT also has in place a Business Continuity Management System to respond, and is able to set up a 24-hour Incident Response Team to resolve the issue.

Organizational Digital Transformation

Since last year, PTT has had in place a strategy to respond to the application of technology and digital systems, which involves embedding a digital technology-driven organization into PTT's core value “SPIRIT+D”. At the same time, PTT continues to implement the Organizational Transformation strategy. The Company has organized activities to promote digital knowledge and capabilities for employees, and conducted studies and reviews of work models among different business groups and functions to ensure that manpower management and human capital resources align with business strategy development. It also focused on developing the capabilities of current employees, to enhance their efficiency in existing business operations as well as their ability to respond to new business models which rely on digital technology. All of these efforts are based upon the aim of creating tangible business results, through efficient human capital. Critically, they supplement PTT's continued efforts to improve production processes and maintain machinery and equipment using new technologies and digital systems.

Stakeholder Engagement



Challenges and Opportunities

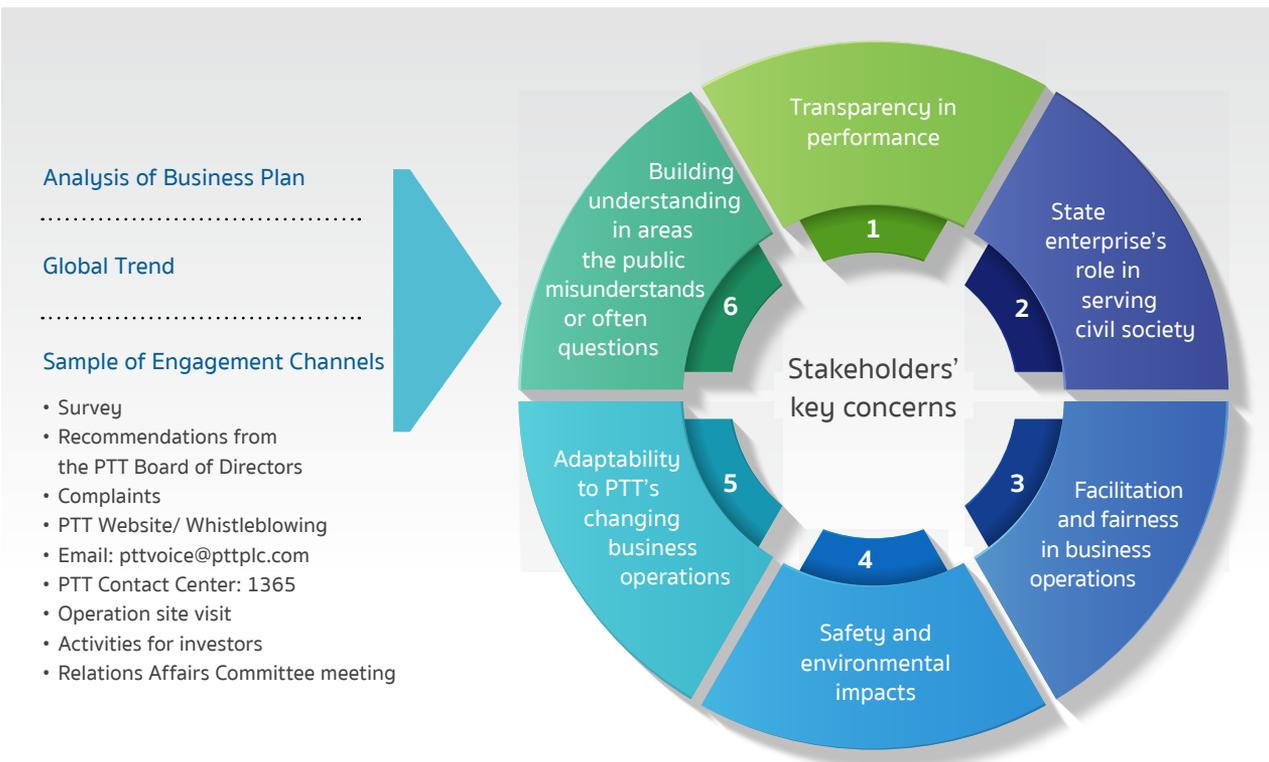
Balancing the needs for all stakeholder groups is a crucial mission in helping PTT achieves business operation goals. Effective stakeholder engagement is both an opportunity and a challenge. PTT listens to needs, expectations, concerns, and feedback of stakeholders. The output is analyzed and brought into considerations during strategic planning process for performance improvement, as well as product and service development. It contributes to creating added value or extrapolation for new innovation constructive to competitive edge. Stakeholders who are satisfied, engaged, supportive and trusting in PTT in the long run – help PTT grow sustainably.

Key Performance

In response to opportunities and challenges regarding stakeholder engagement, PTT has stipulated stakeholder management framework. It comprises 4 steps, which are 1) Business impact assessment on each stakeholder group; 2) Development of management strategy, action plan and indicators; 3) Performance according to management plan; 4) Monitoring and surveying stakeholders' engagement, result assessment and reporting to the Corporate Plan and Risk Management Committee, as well as the Enterprise Risk Committee quarterly. This allows the committees to consider and feedback the performance. Furthermore, the stakeholder engagement results are presented to relevant internal functions, ensuring their acknowledgement of stakeholders' needs and

expectations. Such process allows for effective management plan and approach. Additionally, in order to develop stakeholder engagement performance continuously and elevating the quality level, PTT makes use of AA1000 Stakeholder Engagement Standard as a comprehensive guideline for engagement approach. The Standard helps PTT in identifying crucial stakeholders, responding to noted issues effectively and efficiently.

Through various channels for stakeholders' feedback, business plan analysis, survey on stakeholders' perception to PTT, it appears that the following 6 issues are stakeholders' key concerns.



PTT manages engagement for each stakeholder group differently, depending on the opportunity's suitability and relationship level. This includes both formal and informal channels, enabling for a push towards positive changes and negative impact minimization that may happen to all stakeholders.

Stakeholder Groups	Engagement Channels	Needs/Expectations	Examples of Key Performance
Country 	<ul style="list-style-type: none"> • Consultation with public sector monthly • Site visit of PTT's operational sites monthly • Seminar and workshops to enhance understanding with public sector quarterly 	<ul style="list-style-type: none"> • State enterprise's role in caring for civil society • Support national policy • Survey for reasonably price fuel source to serve as sufficient reservoir 	<ul style="list-style-type: none"> • Expansion of business investment opportunity with a focus in energy security, page 24 • Development of Eastern Economic Corridor of Innovation (EECI), page 24 • Collaboration with public sector to support energy pricing, such as supporting LNG's discount for those with low income earner who has public welfare card; as well as discount to retail price of NGV to public transportation
Community and Society 	<ul style="list-style-type: none"> • Community development activities in 'People' and 'Planet' dimensions • Promotion of social and social enterprises projects in 3 aspects, comprising learning center development, local product support, and energy development for community • PTT Contact Center 1365, PTT Website or email pttvoice@pttplc.com 	<ul style="list-style-type: none"> • Transparency in operations • State enterprise's role in handling civil society • Safety and environmental impacts • Development of community's life quality • Campaign to raise the public's awareness in conservation of natural resources 	<ul style="list-style-type: none"> • Jointly develop Thai education with science and technology through Kamneotvidya Science Academy (KVIS) and Vidyasirimedhi Institute of Science and Technology (VISTEC), page 44 • Café Amazon for Chance project, page 47 • Community coffee bean sourcing project, page 47 • NGV Marketplace project, page 35 • Energy development for community project, page 46 • Promoting 3 forest learning centers, page 49
Shareholders 	<ul style="list-style-type: none"> • PTT website under "Investor Relations" or email ptt-ir@pttplc.com • PTT Debenture application for bond holders to review their own bond details, activity registration, points collection for special awards • Monthly activity for bond holders, such as PTT Group's site visit and seminars on economic topics • Annual general meeting • International roadshow to meet and advise non-Thai investors 	<ul style="list-style-type: none"> • Share price and good business performance • Survey for reasonably price fuel source to serve as sufficient reservoir • Engage in national and social economic development • Leadership in transparent and sustainable business 	<ul style="list-style-type: none"> • Development of business strategy with a focus on sustainable growth, page 12 • Studies and investments in new S-Curve businesses, page 25
Customers 	<ul style="list-style-type: none"> • Annual customer seminar • Sales' and executives' regular client meeting according to stipulated plan • PTT Contact Center 1365 	<ul style="list-style-type: none"> • Development of quality products and services meeting standards, continuously and with variety • State enterprise's role in handling civil society 	<ul style="list-style-type: none"> • Development of products and services for the environment and society, page 33
Suppliers 	<ul style="list-style-type: none"> • Annual customer seminar • Grievance on corruption through email grchelpdesk@pttplc.com or pttvoice@pttplc.com 	<ul style="list-style-type: none"> • Procurement process that is fast, accurate, transparent and fair 	<ul style="list-style-type: none"> • Signatory in Integrity Pact, page 28 • Development of Digital Procurement System, page 29
Employees 	<ul style="list-style-type: none"> • Acknowledgement of employees' feedback to develop response plan for employees' needs, and key competencies to accommodate new businesses throughout the year • Business relation committee on a monthly basis • CEO, Managing Director and high-level executives meet with all employee levels according to plan 	<ul style="list-style-type: none"> • Security and professional advancement • Adaptation for changes in PTT's business operations • Work-life balance 	<ul style="list-style-type: none"> • Continuous human capital and skill development, page 36 • Employees' digital competency project for employees, page 40 • Appropriately adjust welfare according to needs, page 38

Stakeholder Engagement Score



Remark:
* Assessment results in 2018 changes in calculation methods.

Stakeholder management results considers stakeholder engagement score. The target is to achieve the level of Excellence with the score of ≥80. Performance in 2019 is equal to 2018, which is 83 points. Overall, PTT has been very good in responsiveness to stakeholders. However, there are expectations to PTT, national energy company, on building the public's environmental conservation awareness, on creating jobs for communities. Expectations also include controlling product price to not increase, and in demonstrating business transparency. All of the mentioned expectations are crucial challenges to PTT, which needs to evolve its operations for effective responsiveness to each stakeholder group. As of 2020, PTT has stipulated a fair and balanced management approach for all stakeholder groups, as follows.

- 1. Country:** Proactively create understanding, equipped with information and feedback beneficial to national energy policy
- 2. Community and Society:** Increase engagement in operations in tandem with building understanding, resulting in useful activities that truly responds to needs
- 3. Customer:** Present quality products and services at appropriate prices, continuously matching the needs of customers and elevating relationship with customers
- 4. Shareholders:** Expansion of opportunities and investment in new businesses; continuous development for effective and efficient governance system
- 5. Supplier:** Create collaboration and trust in business operations based on transparency, fairness and effectiveness
- 6. Employees:** Manage employees' needs as appropriate to business operations; build employees' capacity, and provide equal growth opportunity in each career path

For more information, please visit www.pttplc.com and refer to "Sustainability" tab, "Governance" heading and "Stakeholder Engagement" sub-heading.



Materiality Assessment

For effective and balanced management, PTT conducts materiality assessment annually to consider issues that stakeholders are interested in and affected by. This includes a variety of issues that may affect corporate's value creation throughout the value chain. The process referenced GRI Sustainability Reporting Standards 2016 and International Integrated Reporting Council (IIRC)'s reporting framework.

Materiality Assessment Process



1. Identification of Material Issues for the Organization and Stakeholders

Considers internal and external factors, such as economic, social and environmental issues crucial at present and in the upcoming future. This includes the country's strategic plan, regulations, laws, international agreements, corporate's key competency, business risks and opportunities, as well as stakeholders' interests, needs and expectations.



2. Prioritization

This part considers the level of impacts to PTT's value creation, encompassing finance, business and operations, corporate reputation, impacts to customers, suppliers and employees. Level of importance to stakeholders is also included in consideration. Material issues are then brought into the process of strategy development, and manage effectively thereafter.



3. Validation

Relevant high-level executives review, consider and validate material assessment results.

Materiality Assessment Results

PTT reviews material issues to have comprehensive coverage over the changing context. There is a revision of material issue's title from Safety to Safety and Occupational Health, in order to increase clarity and be more reflective of real performance. Materiality assessment reveals the first 3 material issues, which are climate change, sustainable governance, and product stewardship. Climate change remains one of the key global issues. Similarly, sustainable governance, responsible product and service development allow PTT's operation to be secure and sustainable. These are PTT's key issues for sustainability management. Details of management approach and performance in each issue can be found in relevant chapters.



1 Climate Change
Climate change management; energy management; reduction of greenhouse gas emission
page 56

2 Sustainable Governance
PTT Board's responsibilities and roles; business strategy, vision, targets, and direction; risk and opportunity management; sustainable development goals contribution
page 18

3 Product Stewardship
New product and service development for competitiveness; management of product and service impacts delivered for clients; customer relationship management
page 30

4 Human Capital Development
Development of curriculum befitting employees' needs; support for human capital development and respective efficiency; succession planning
page 36

5 Research, Development and Innovation
Technological research and development, as well as promoting innovation for production process, products and services with considerations to customers' needs, impacts to health, society and the environment
page 30

6 Security and Crisis Management
Prevention and control of incidents upon crisis; inclusive to management of business continuity to deter business disruption
page 55

7 Human Rights
Commitment to respect human rights; management of human rights risks through supply chain; management of grievance and remediation
page 41

8 Talent Attraction and Retention
Knowledge management; adherence to corporate values; assessment for performance results reflecting of real efforts; professional advancement; appropriate remuneration and welfare
page 38

9 Fair Operating Practices
Operating business with governance principle, transparency and anti-corruption stance
page 20

10 Effluents and Waste
Managing effluents and waste; reducing industrial waste volume to landfill
page 58

11 Safety and Occupational Health
Preventative management to reduce risks of incidents; management of occupational health and work environment; process safety; transport and logistic safety
page 52

12 Supply Chain Management
Procurement approach per public policy; engagement and shared value creation with suppliers and contractors
page 28

13 Capital Project Management
Analysis and management of social and environmental issues, as well as community engagement
page 26

14 Corporate Citizenship
Community engagement to elevate community's quality of life; development of Thailand's human capital; conservation of natural resources and the environment
page 42

15 Integrated Water Management
Water management to mitigate social and environmental impacts
page 59

16 Biodiversity
Managing biodiversity impacts
page 62

17 Stakeholder Dialogue
The process of exchanging opinions, acknowledging stakeholders' feedback, and responding to stakeholders' needs
page 07

18 Air Pollution
Air pollution control, such as oxides of nitrogen, sulfur dioxide and volatile organic compounds (VOCs)
page 61

PTT Strategy

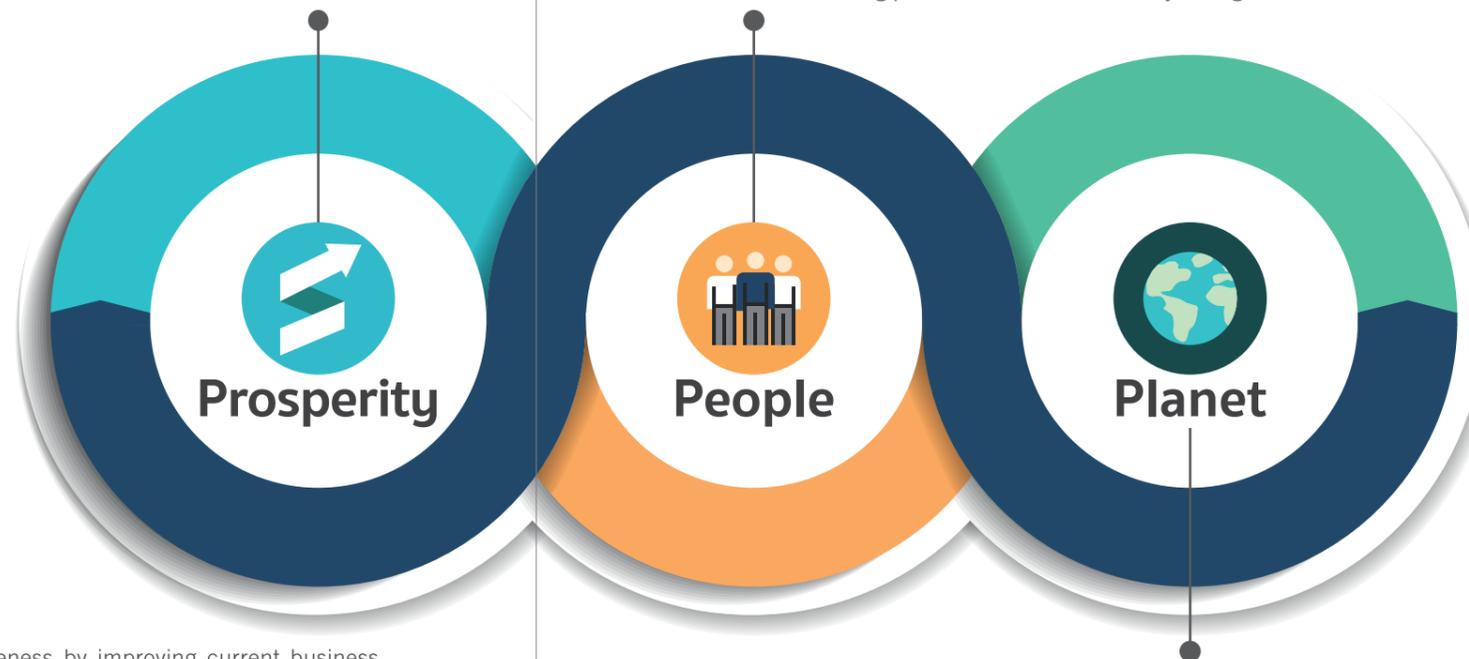
PTT Group Strategic Direction

PTT remains committed to its vision of becoming the premier Thai multi-national energy company, and its mission to manage stakeholders' expectations in a balanced manner. This is guided by the corporate core value "SPIRIT+D" and a focus on integrating digital technology into business operations, to deliver highest benefits. PTT has outlined a strategy and business direction based on the "3P" approach, which focuses on creating sustainable growth for all parties, as follows:

1 Prosperity

Create Sustainable Growth for the Thai Economy and Society

Operating with transparency and accountability, on the principles of good governance, enables PTT Group to recognize the importance of an organizational culture and mindset. These are what drive corporate governance according to the PTT Group Way of Conduct, which encourage collaborations within the Group on legal and regulatory compliance, and lead to the integration of corporate governance, risk, and compliance (GRC) concepts into organizational systems. These practices can then be implemented throughout the organization while creating sustained business growth in line with the PTT "3D" Strategy.



Do Now

Enhancing competitiveness by improving current business efficiency through Productivity Improvement Programs in order to generate revenue, reduce costs, and increase technological capabilities. This involves applying digital systems to all parts of the organization as well as establishing clear and challenging targets.



Decide Now

Expanding the business domestically and internationally across the value chain to bring about investments for future business growth and fulfill PTT Group's financial potential.



Design Now

Identifying and developing new business models, or the "New S-Curve," to achieve leaps in future growth by leveraging opportunities and challenges of global megatrends, along with developments in technology and innovation, in alignment with the government's Thailand 4.0 Policy.

2 People

Developing Human Resources, Creating Quality Livelihoods and Inclusive Business Growth with Community and Society

Preparing the Company in terms of organizational and human resources management allows PTT Group to respond to current and future business conditions. In addition, a diverse organizational model and agile human resources management will enable PTT Group to effectively address its changing business operations as well as care for societies and communities. This will be achieved through a focus on inclusive development and building quality livelihoods and a strong economy for individuals in society. For example, through engagement in Thai science and technology education development with Kamnoetvidya Science Academy School (KVIS) and Vidyasirimedhi Institute of Science and Technology (VISTEC), and the promotion of social enterprises (SE), such as by providing job opportunities and income earning potential to the deaf or elderly through the Café Amazon for Chance coffee shop.

3 Planet

Conserving Natural Resources and the Environment, and Caring for Community and Society

Under the PTT Group Clean & Green Strategy, PTT Group aims to reduce greenhouse gas emissions from its operations by 20% compared to the business-as-usual scenarios by 2030 – a target that also aligns with Thailand's national target. The Group is preparing to apply carbon pricing tools into investment decision processes by 2020, as well as preparing for the introduction of a carbon trading system or carbon tax. Not only that, it plans to apply a Circular Economy approach to the development of green innovations, which will create business opportunities for product and service development, foster collaborations within and outside of PTT Group, and finally, create positive value for the environment and society.



Furthermore, PTT is committed to operating on the foundations of good governance principles and respect for human rights, while promoting the development of community and the country. It is committed to supporting Thailand's National Strategy as well as the United Nations' Sustainable Development Goals (SDGs), specifically focusing on 7 goals: SDG 7, 8, 12, 13, 14, 15 and 16. This will be achieved by integrating these commitments into the strategies and annual enterprise plans of each relevant function and fostering the inclusive growth of all sectors, which will enable the organization, with its emphasis on transparency, to become a source of pride for all people.

Business Plans and Key Performance



Prosperity

Target

- Embed ethical practices and a way of conduct amongst employees that aligns with the GRC principles, and operate under the framework of good corporate governance; conduct internal control assessments, and efficiently manage operational risks.
- Build operational excellence
- Create synergy by expanding the business domestically and overseas.
- Generate growth, expand upon existing businesses, and identify new business development opportunities.

Contribution to the 20-Year National Strategy

- National Strategy 2: Competitiveness Enhancement
- National Strategy 6: PublicSectorRebalancing and Development



Performance

Operating on the GRC Principles

- Enhanced internal organizational strength by launching a special course, “Chansin Camp,” to promote the GRC way of operations for employees, and the “GRC Roadshow” activity, which communicates to PTT functions about the work of governance and other related functions (2nd Line of Defense).
- Reviewed and improved the second edition of the PTT Group Way of Conduct.
- Received the “NACC Integrity Awards” from the Office of the National Anti-Corruption Commission (NACC).

Creating Business Growth

Do Now Enhanced growth and competitiveness, by:

- Improving operational efficiency within PTT Group, which allowed the Group to continuously increase production output and reduce costs, totaling more than 10,802 million baht in value.
- PTT Group created synergy value through the joint project, Petrochemical and Refining Integrated Synergy Management (PRISM), totaling 1,405 million baht.
- Participating in the Dow Jones Sustainability Indices (DJSI) Corporate Sustainability Assessment, in which PTT was selected as a member for the 8th consecutive year.

Decide Now Expanded the growth of existing businesses, by:

- Completing the expansion of Onshore Gas Transmission Pipeline No. 1.
- Successfully launching and continuously operating the first LNG trading cargo.
- GPSC purchasing shares of GLOW from ENGIE to increase the proportion of its electricity production to 2,771 MW, which resulted in GPSC currently having a total of 5,026 MW in equity.

Design Now Developed new businesses, by:

- Conducting a joint research and development project between the Chulabhorn Research Institute, Government Pharmaceutical Organization, and PTT, on biosimilar products.
- Signing a MOU on the Smart Preventive Healthcare Unit Project at PTT stations with the Ministry of Public Health, the Crown Prince Hospital Foundation, and PTT.
- Investing in InnoSpace (Thailand) Co., Ltd. to drive an agile and efficient national platform; support and develop innovations, and elevate Thai startups according to the new economy approach and the government’s Thailand 4.0 Policy objectives.
- Launching the Industrial Transformation Platform (ITP) to promote the robotics industry, promote SMEs, and transform production systems into digital production systems.
- Receiving approval for the EV Charger, “Normal” model, to be registered on Thailand’s Innovation Register.
- Conducting a research and development project on a Battery Pilot Plant using semi-solid technology, which is an innovation for lithium ion batteries developed by 24M and GPSC, to enhance competitiveness in the battery business and energy storage system business, to be expanded into joint commercial production in the future.
- Launching the pilot electric motorcycle, which was jointly researched and developed by PTT and ETRAN (Thailand) Co. Ltd., and will later be expanded for commercial production.
- Investing in an additional fund on energy and related technologies, bringing the total number of investments to 7 funds and 2 companies, to identify opportunities for integrating technology into current business development, or to develop into new businesses.





People

Target

Ensure organizational readiness for current and future business operations, while creating sustainable growth for all stakeholder groups.

Contribution to the 20-Year National Strategy

- National Strategy 2: Competitiveness Enhancement
- National Strategy 3: Developing and Strengthening Human Capital
- National Strategy 4: Social Cohesion and Equity
- National Strategy 5: Eco-Friendly Development and Growth



Performance

- Upskilled and reskilled employees to prepare them for new businesses in line with PTT's strategy.
- Continuously developed and enhanced employee capabilities on digital technology and innovation through the PTT Tech Savvy Agent Project and PTT Group Innovation Awards.
- Participated in the development of the Eastern Economic Corridor of Innovation (EECi), which will serve as a national center for innovation research and development. Construction is currently progressing according to plan, and as of the end of 2019, was at 59.14% completion. However, construction on basic infrastructure and the Smart Operation Center will be completed by 2020.
- Enhanced the potential of Thai scientists and youth on science and technology, specifically through Vidyasirimedhi Institute of Science and Technology (VISTEC) and Kamnoetvidya Science Academy School (KVIS). The Nature Index, a database which highlights the institutions and countries that dominate on research, has ranked VISTEC as the number 1 institution in Thailand, and number 3 in the ASEAN region on Chemical Science. Meanwhile, the first cohort of students from KVIS was able to generate 35 research project outputs; the second cohort generated 32 research project outputs.
- Expanded partnership networks on agricultural development and community energy production, such as by signing MOUs on technology development in the agriculture sector; disseminating technological knowledge from research through the Wangchan Forest Learning Center of the PTT Reforestation and Ecosystem Institute to a community network of more than 200 individuals; and by signing a MOU on a community biogas energy production and distribution system in Pa Yup Nai sub-district, Wangchan district, Rayong province.
- The Social Enterprise Project officially opened 6 branches of the "Café Amazon for Chance" coffee shop to provide job opportunities for the deaf and elderly. The Café sources coffee beans through the Community Coffee Sourcing Project, which involves the participation of farmers from 40 households. The Project generates an average income of 30,000 baht per year per household, or a total of more than 1.2 million baht, and is able to support the purchase of 69.5 tonnes of parchment coffee from farmers from an additional 76 households.



Planet

Target

Reduce PTT Group's greenhouse gas emissions by 20% compared to the business-as-usual scenarios by 2030.

Contribution to the 20-Year National Strategy

- National Strategy 5: Eco-Friendly Development and Growth



Performance

- In 2019, PTT Group's greenhouse gas emissions intensity, including both direct and indirect emissions, was according to the target of not more than 39.4 million tonnes carbon dioxide equivalent.
- Supported national efforts to reduce greenhouse gas emissions through social development projects, such as the Company's ongoing support for the 400-rai Green Space Development Project in 6 sub-districts of Khung Bang Kachao; maintaining the 1 million rai reforestation project; Community Renewable Energy and Biogas Energy projects; and the sale of environmentally-friendly fuels to reduce greenhouse gas emissions, such as benzine, gasohol 91, 95, E20, E85, and Bio-diesel B10, B20, etc.
- Opened the Café Amazon at PTT Station Sam Yan under the "Circular Living" concept, which uses more than 70% of reprocessed recycled waste as materials for store decorations.

Value Creation Model

Input



Financial Capital

- 28,562,996,250 shares of issued and additional paid-in capital
- 2,336,155 million baht in revenue from products and services in 2018
- 351,397 million baht from EBITDA (Earnings Before Interest/ Tax/ Depreciation) in 2018



Manufactured Capital

- Production and research facilities
- Infrastructure such as natural gas pipelines and petroleum terminals
- 6 Gas Separation Plants with a total production capacity of 2,870 million cubic feet/ day
- Natural gas pipeline network spanning approximately 4,772 km



Intellectual Capital

- Knowledge-based assets
- Licensed technology, innovations and other initiatives
- Research fund of 668 million baht



Human Capital

- 3,578 PTT employees
- Skills and experiences of our people, suppliers, and partners
- Average training for executives and employees: 72.62 hours
- Average training cost for executives and employees for 53,462 baht/person
- 38.04% of Female executives and employees to total number of employees



Social and Relationship Capital

- Relationship between PTT and our stakeholders
- Brands and reputation
- Investment in social development: 1,404.50 million baht
- Stakeholder engagement



Natural Capital

- Renewable and non-renewable natural resources
- Investment in natural capital: 403 million baht

PTT Business Operations

PTT Strategy:

Prosperity

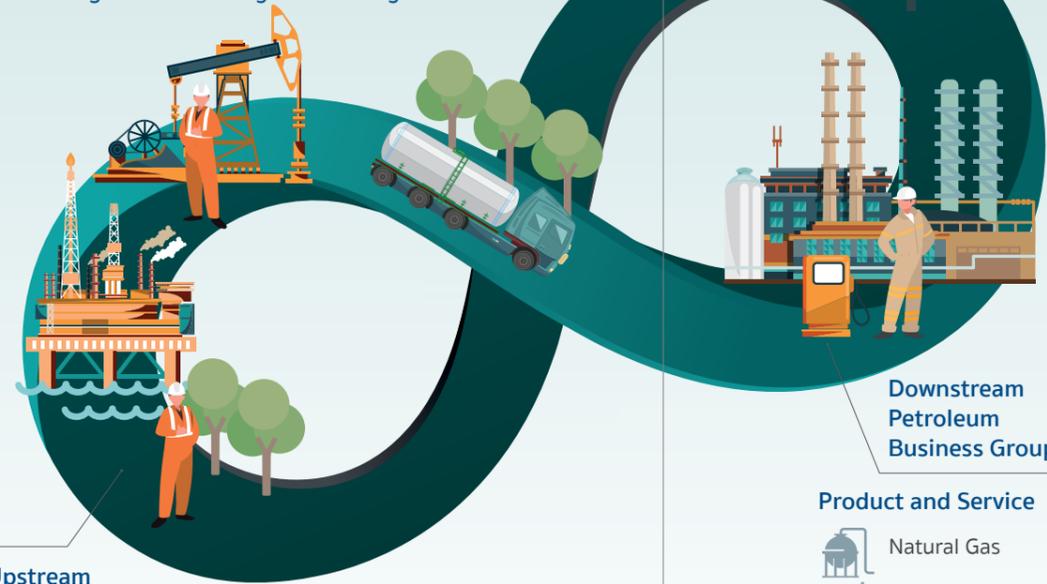
Create Sustainable Growth for the Thai Economy and Society

People

Developing Human Resources, Creating Quality Livelihoods and Inclusive Business Growth with Community and Society

Planet

Conserving Natural Resources and the Environment, and Caring for Community and Society.



Upstream Petroleum and Natural Gas Business Group

Technology and Engineering Business Group

Downstream Petroleum Business Group

Product and Service

- Natural Gas
- Petrochemical
- LPG
- Natural Gas Pipelines

Global Trends and Changes

Emerging Risks and New Opportunities

Value Creation

Stakeholders

Capital

Being a strong foundation for the sustainable and robust growth of the economy and society

• Revenue from sales of products and services: 2,219,739 million baht	Country, Shareholders, Employees	💰
• EBITDA: 288,972 million baht	Country, Shareholders, Employees	💰
• Net Debt/ EBITDA ratio: 1.14 million baht	Shareholders	💰
• Basic earnings per share: 3.20 baht per share	Shareholders	💰
• Income tax payment: 32,989 million baht	Country	💰
• 22 new products developed and 24 patents under registration	Employees, Customers, Suppliers	💡
• Direct and indirect revenue from research and development: 1,415.4 million baht	Employees, Shareholders	💰💡

Conducting Business while Caring for Communities and Society

• Human capital return on investment: 221 times	Employees	👤
• 78% employee engagement score	Employees	👤
• Employee turnover rates: Male employees 1.32, Female employees 2.03	Employees	👤
• 100% employee succession rate	Employees	👤
• 100% engagement with communities in operational areas	Communities and Society	👤👥
• Stakeholder engagement score of 83	All	👤👥
• No community conflicts	Communities and Society	👤👥

Conserving Natural Resources and the Environment

• Direct greenhouse gas emissions (Scope 1) of 29.71 million tonnes of carbon dioxide equivalent	All	🌍
• Indirect greenhouse gas emissions (Scope 2) of 1.32 million tonnes of carbon dioxide equivalent	All	🌍
• Volume of water recycled and reused: 10.37 million cubic meters	Communities and Society	🌍
• Reforestation project of 1 million rai in honor of His Majesty King Bhumibol Adulyadej to offset an average of 2.14 million tonnes of carbon dioxide per year, valued at over 280 million baht per year.	All	🌍



Governance



Corporate Governance

TARGET 16-3	TARGET 16-5	TARGET 16-6	TARGET 16-7
PROMOTE THE RULE OF LAW AND ENSURE EQUAL ACCESS TO JUSTICE	SUBSTANTIALLY REDUCE CORRUPTION AND BRIBERY	DEVELOP EFFECTIVE, ACCOUNTABLE AND TRANSPARENT INSTITUTIONS	ENSURE RESPONSIVE, INCLUSIVE AND REPRESENTATIVE DECISIONMAKING

Challenges and Opportunities

An important challenge for the PTT Board of Directors concerns the strict adherence to and compliance with various laws and regulations that are relevant to business operations. These include criteria on good governance, such as the Corporate Governance Code of the Securities and Exchange Commission (SEC), the Principles and Guidelines on Corporate Governance for State-Owned Enterprises, and the Guidelines and Enterprises Quality Assessment System issued by the State Enterprise Policy Office (SEPO), which was revised according to the State Enterprises Development and Management Act, B.E. 2562 (2019), in order to respond to the transforming environment, business context, competitiveness, and Thailand's policy. Given these considerations, PTT must apply appropriate management principles to support compliance with various laws and regulations, and ensure a balance in its role as both a state-owned enterprise and listed company. It is the Company's aspiration to become a model organization on governance, risk management, and compliance (GRC). These principles therefore serve as the foundation for the development of a management system that ensures fairness and trust for all stakeholders, and which enables the creation of an open, ethical, and transparent organization that opposes corruption in all forms. They are the driving forces behind PTT's efforts to adopt the most efficient and effective organizational management methods as well as enhance competitiveness over the short and long term. Effective and efficient corporate governance therefore requires board diversity as well as diversity in knowledge and expertise. It then becomes both an opportunity and a challenge for PTT to recruit directors with the appropriate knowledge, expertise, professional skills, and experience to guide the Company towards its vision of becoming the premier Thai multi-national energy company, and the pride of all Thai people.

Key Performance

Corporate Governance

Board Responsibility

Members of the PTT Board of Directors are appointed by the Company's shareholders, and assume the critical responsibility of determining the Company's vision, strategic direction, and key organizational policies, which must take into consideration the economic, social, and environmental risks that could impact business operations. The Board of Directors is responsible for

overseeing management's performance, which is reported to the Board during meetings at least once a quarter. Likewise, the Board can review investments through the Post-Investment Review (PIR) process, and monitor the Company's performance in other aspects through 5 area-specific committees: Audit Committee, Nomination Committee, Remuneration Committee,

Corporate Governance Committee, and Enterprise Risk Management Committee. This enables the Board to thoroughly assist in screening essential work, and guide the organization effectively and efficiently in line with the Company's strategy and established policy framework. This not only helps to enhance business competitiveness, but also ensures that governance is ethical, complies with good governance principles, and is transparent, impartial, and accountable. Likewise, it ensures a balanced approach to stakeholder governance and creates positive returns for shareholders. Given the challenges of recruiting directors with the right expertise and experience for PTT Group's businesses, which is continuously growing in scope and complexity, the Nomination Committee uses the following tools in its consideration of candidates for director positions: board skills matrix and Director's Pool of the Ministry of Finance and Thai Institute of Directors (IOD). Not only that, PTT also makes sure to review the skills of board members and verify that their qualifications match up with business strategy and direction. The Company does not impose any restrictions on candidates regarding gender, age, race, ethnicity or religion.

The PTT Board of Directors has announced the use of the Corporate Governance Policy and assigned the Corporate Governance Committee the responsibility of evaluating and screening performance on good governance, sustainability, and anti-corruption, as well as promoting a firm commitment to GRC principles in the workplace. In turn, the Governance, Risk and Compliance Management Committee (GRCMC), on which the Senior Executive Vice President, Corporate Governance and Regulatory Affairs serves as chair, acts as the focal point for PTT's anti-corruption efforts and implements policies and a management direction that focus on instilling a culture to prevent and eradicate corruption. The GRCMC further develops corporate governance and anti-corruption plans for PTT that are approved by the Corporate Governance Committee and the PTT Board of Directors, in that order, for relevant company functions. These functions will then implement the aforementioned plans and develop campaigns

to promote awareness and responsibility for good governance practices for the PTT Board of Directors, management, employees, partners, and other related parties.

PTT Group Way of Conduct

The PTT Board of Directors places importance on the corporate governance of PTT Group in order to elevate and align the Group's operational practices with international standards. The Board has updated the PTT Group Way of Conduct, which is divided into two groups of policies – policies to create alignment between PTT Group companies, and policies to enhance their competitiveness and sustainability performance – to serve as a governance framework for the policies and management of PTT Group subsidiaries. The PTT Way of Conduct is implemented by PTT's appointed representatives, directors, management, and staff, and takes on a multi-level governance approach. Management approaches for economic, social, and environmental issues are deployed directly to PTT-operated companies, where these companies must in turn deploy the Group management approaches to their own subsidiaries. To monitor performance, PTT has developed key performance indicators, reports on performance to management and the Board of Directors, and requires that its subsidiaries report back on a regular basis. This allows the Company to monitor the efficiency and effectiveness of implementation, organize performance verifications, and receive feedback to improve PTT Group management approaches going forward. Operating in compliance with the PTT Group Way of Conduct will ensure unity in the Company's approach, build synergy, as well as promote capabilities and competitive strengths at the international level in order for PTT Group to achieve transparent and sustainable growth as one.

For a detailed summary of performance by the PTT Board of Directors, please refer to PTT's 2019 Annual Report or www.pttplc.com and refer to the "Sustainability" tab, "Governance" heading and "Corporate Governance" sub-heading.



Anti-Corruption and Transparency

PTT has revised its Anti-Corruption Policy and Corruption Risk Assessment Manual with the aim of increasing efficiency and transparency in governance, risk management, and internal controls for combating corruption, as well as compliance with the No Gift Policy. The Company has developed a system, tools, and measures to govern employee conduct and foster a work environment that prioritizes ethical values and non-acceptance of corruption in all circumstances. In terms of transparency in operations, PTT reports on its financial performance through its Annual Report and submits the Annual Registration Statement (Form 56-1) to the SEC for their consideration on an annual basis. Additionally, in determining compensation for employees, top-level executives, and the Board of Directors, the Company has established and clearly communicated its evaluation criteria, and reports on the value of compensation payments in its Annual Report. In the case that a conflict of interest is found, employees must notify their direct line managers and responsible functions to resolve such conflicts, in addition to reporting on conflicts of interest annually. PTT has also developed digital tools for employees to demonstrate their transparency, as required by the Corporate Governance, Ethical Standards and Code of Business Ethics Handbook (CG Handbook), consisting of: the Advanced Reporting System for PTT Group Securities Trading, to prevent insider trading, and the Reporting System for Gifts, Assets, or Other Benefits, in compliance with the No Gift Policy. This system allows employees to report instances in which they must receive gifts but are unable to return them to senders. PTT will then consolidate these gifts for public donation.

Conflict of Interest Reporting Results

Long-term Target



No significant conflicts of interest

Short-term Target



Employees completely report conflicts of interest



In terms of receiving grievances and whistleblowing reports, there has been a revision in the requirements concerning grievance reporting and whistleblowing on corruption and non-compliance on laws, rules, and corporate regulations. Revisions were also made on guidelines for determining grievances relating to corruption or misconduct, with the aim of aligning such guidelines with the government's measures to prevent and eradicate corruption and misconduct. These revisions involve the opening of 3 channels for whistleblowing: the Company's website at www.pttplc.com, e-mail (pttvoice@pttplc.com), and mail. This allows employees, partners, customers, and stakeholders to more easily and conveniently report grievances and possible instances of corruption. Following reporting, grievances will be received by a designated center, which then follows up on issues, protects and ensures fairness to whistleblowers, the accused, and informants who provide information relating to corruption within the organization. The center will report on the results of the investigation to management and relevant committees, and inform involved parties.

This process of investigating evidence and proof of misconduct must adhere to Human Resources Guidelines. Grievances relating to corruption at the workplace and misconduct will be

examined for tangible evidence of misconduct by a committee consisting of representatives from various functions, including: the Internal Control Office, Legal Office, Human Resources Function, and representatives from the GRCMC, to ensure that the investigation process is carried out fairly and transparently.

In 2019, PTT received 21 grievance reports which were related to procurement and operations. However, following investigation according to established procedures, 16 cases were found to have no motives for corruption, and 5 are under investigation. These relate to non-compliance with PTT's rules, regulations, or orders. Furthermore, PTT found 2 cases of employee breaches of the Code of Conduct, which arose from negligence, covering up of truths, violations of PTT's regulations, rules, or orders, or intentionally slowing down work processes – resulting in damages to PTT. The Company has completed the investigations into and enacted punishment measures for these breaches in line with human resources management procedures.

For more information, please visit www.pttplc.com and refer to the "Sustainability" tab, "Governance" heading and "Fair Operating Practices" sub-heading.



Risk Management



Board Responsibility

The PTT Board of Directors has appointed the Enterprise Management Committee to promote efficient and effective risk management at PTT. In 2019, the Enterprise Risk Management Committee requested that comprehensive proactive measures be put in place to reduce the likelihood of risk events alongside reactive measures, such as risk management response plans for various types of situations. The Committee evaluates the impacts of business plans on stakeholders and integrates these considerations into plans for mitigating impacts using the most appropriate management responses. It deliberates on and provides input for large investment projects and contracts that have long-term obligations, are complex in their nature of business, and have a significant risk of impacting PTT. The Committee also assumes the responsibility of assessing and screening risks for the annual Corporate Risk Profile, which involves integrating risk profiles and enterprise risk management plans together with enterprise plans to ensure that risks are clearly stated, align with the Company's direction, targets, and business strategies, and is deployed for implementation throughout the organization. Risk management is closely monitored on a quarterly basis using leading and lagging key risk indicators, and the Committee additionally provides recommendations to management in their review of risk management plans to ensure alignment with a changing strategy and business landscape. Finally, risk management performance is reported to the PTT Board of Directors.

Risk management training courses are provided to the PTT Board of Directors and Enterprise Risk Management Committee. Risk management orientation is further provided to newly appointed members of the Enterprise Risk Management Committee. Likewise, the PTT Board of Directors participates

in site inspections and visits to PTT Group companies to receive updates on the performance and risk management of key projects, such as the LNG Receiving Terminal of PTTLNG Company Limited (PTTLNG) and Glow Energy PCL, among others.

Risk and Opportunity Management Process

PTT has updated its risk and opportunity management process. This involves analyzing internal risks from business groups, business units, and Head Office support functions to determine the organization's strengths and weaknesses, and analyzing external risks using a SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats) as well as assessments of situations that could significantly impact the organization on positive and negative terms. It has also added an analysis of global risks, and identifies key risk and opportunity factors that could impact the organization over the short and long term, covering economic, social, environmental, and technological issues, so that they may be integrated into the strategy formulation process and risk management plans. Risk owners have been assigned to oversee specific risks. Risks are further integrated into the enterprise plans for approval by the PTT Board of Directors and subsequently deployed to other departments across the organization. In addition, PTT has developed a Business Continuity Management (BCM) Plan in alignment with international standards, resulting in the Company receiving the ISO 22301:2012 Business Continuity Management certification for the third consecutive year. In 2019, the Company developed a digital system to support business impact analysis processes, which will allow it to more efficiently respond to emergency and crisis situations.

For more information, please visit www.pttplc.com and refer to the "Sustainability" tab, "Governance" heading and "Risk and Crisis Management" sub-heading.



Internal Controls

Board Responsibility

The Internal Control and Risk Management Function aims to build confidence among stakeholders regarding PTT's performance – that it is efficient and effective, reliable, and complies with all relevant laws and regulations. The Function works to ensure that sufficient and appropriate controls are in place for the determined level of risk, and focuses on assessing internal controls at both the enterprise and process levels throughout the entire organization. Such controls should align with relevant international standards, namely the Internal Control Adequacy Evaluation Form of the Stock Exchange of Thailand (SET), and the Guidelines on Appropriate Internal Control Measures of the National Anti-Corruption Commission (NACC). PTT prepares assessment reports on the effectiveness and efficiency of its internal control system for submission to governing agencies on an annual basis.

The PTT Board of Directors, through the Audit Committee and PTT Management Committee, has appointed the GRCMC the authority of outlining operating guidelines according to internal control standards, as well as guidelines concerning internal control assessments and reporting. The Committee evaluates these plans and performance, and provides useful recommendations. Not only that, it calls for audit agencies to collaborate on developing plans, as this will foster integration between governing agencies (2nd Line of Defense) and audit agencies (3rd Line of Defense). This in turn will support the creation of a sufficient, robust, and appropriate internal control system, and reduce the complexity of audits at the operational level (1st Line of Defense).

Internal Control Management

The annual Internal Control Plan is consisted of internal control assessments that have been integrated with risk assessments, and covers compliance to laws, regulations, rules, operational risks, and corruption risks. The Plan ensures that there is collaboration between functions responsible for GRC at the 2nd Line of Defense. All functions will conduct internal control assessments on critical and support processes, and collaborate with the 3rd Line of Defense to provide information for selecting key processes that should be assessed. This is so that the organization achieves integration at the process level in order to quickly respond to change.

Results from the internal control assessment reveal that PTT has an adequate internal control process in place which is suited to its risk factors. There is consistency in compliance with internal control measures, and regular monitoring and evaluation of internal control effectiveness. The internal control assessment results reported to the Audit Committee in 2019 concluded that PTT's internal controls are sufficient and appropriate, efficient and effective, and ensures that PTT will be able to achieve its targets on performance, reporting, and compliance with relevant laws, rules, and regulations.

For more information, please visit www.pttplc.com and refer to "About PTT" heading and "Internal Audit" sub-heading.



Promoting a GRC Culture

PTT has improved upon its approach for applying good governance principles and the Code of Conduct in business operations, and has also integrated these approaches into risk management, internal controls, and compliance. The Company communicates on these issues through a number of channels to help employees develop their own knowledge and understanding of GRC, and thus efficiently apply these principles into their conduct. Some examples of these communications activities include:

- Training courses on corporate governance and business ethics, such as orientation training for new employees on “Good Governance Knowledge” and anti-corruption, employee training courses focused on creating positive mindsets and thought processes concerning corruption prevention and eradication; ethical awareness training courses, and training through the CG E-Learning System, which allows employees in all operational areas to access and study the principles of good governance and business ethics independently through simulations. Before and after course completion, employees will be assessed on their CG knowledge and understanding.
- GRC Camp: Promoting knowledge and understanding of GRC. Employees participating in the GRC Camp are able to adapt what they learn into their own work and become representatives on these issues among their colleagues.
- Communicating on GRC through employee meetings across all levels as well as operational-level employees. Overall communications objectives are to build knowledge, understanding, and awareness of GRC principles, combat corruption, and promote practices that align with the corporate core value “SPIRIT+D”.
- PTT Group CG Day: Campaigns and activities designed to raise awareness and communicate on PTT Group’s good governance practices to all stakeholder groups, including representatives from external agencies such as SET, SEC, IOD, Anti-Corruption Network Foundation, Office of the Ombudsman, and suppliers, customers, directors, management, and PTT Group employees. A total of 661 individuals participated in the latest CG Day activities.
- Promote learning and knowledge dissemination on risk management to executives and employees through risk management training courses, and communicate information on risk management through the Risk Management Manual and Knowledge Management Portal. PTT plans to develop training courses via e-learning formats in the future to enable executives and employees across all levels to more easily access relevant information.



Employee CG Understanding



Employee Satisfaction on CG Communication





ECONOMICS

Business Growth



Challenges and Opportunities

The demand for clean energy is currently increasing. As a result, PTT must adapt itself to respond to these changes in demand in an efficient way, by increasing investments in basic infrastructure to support the sourcing and distribution of natural gas and oil, as well as products from gas separation plants, which can be used as basic feedstock for petrochemical products. In addition, PTT continues to identify opportunities to expand its investments in logistics, as this will create added value, generate growth, increase revenue and the country's economic strength through tax and dividend payments to the government, as well as create jobs and incomes for the Thai people. Aside from building national energy security, these efforts will help to support the development of industry, extend the energy industry's value chain, and enhance confidence amongst domestic and international investors that Thailand not only has a sufficient supply of energy, but also the capabilities to compete on the global market.

Key Performance

Building Energy Security

Investments in capital projects are considered a way to enhance national energy security. Meanwhile, natural gas is a key clean energy source for Thailand's economic development, and PTT's activities, from the exploration to the extraction of natural gas – from sources as Bongkot to Erawan – have grown and expanded to include both Thailand and overseas. These efforts have been accomplished through partnerships with relevant public and private sector agencies, by developing plans to explore and procure sufficient quantities of natural gas in liquified natural gas (LNG) form, and the expansion of the LNG Receiving Terminal in Ban Nong Fab area, Rayong province, to receive the import of 7.5 million tonnes of LNG per year. Overall, the target is to have a total receiving capacity of 19 million tonnes of LNG by 2022. This project is part of the "Integrity Pact," which means that it has undergone a transparent procurement process, with external observers present at each bidding stage. In addition, PTT developed the Regional LNG Hub Project, which aims to develop Thailand's own LNG Terminal into a central market for LNG trading between buyers and sellers. The Regional LNG Hub will leverage and maximize upon the existing LNG Terminal infrastructure to elevate Thailand as the regional energy trading center for ASEAN, as "Thailand's Energy Hub," as well as reform the country's energy sector in line with governmental policy. This Project has been submitted to the Energy

Regulatory Commission Sandbox (ERC Sandbox) of the Energy Regulatory Commission (ERC). Furthermore, PTT has developed basic infrastructure to support the Eastern Economic Corridor (EEC), including by jointly investing in the Map Ta Phut Industrial Port, Phase 3 (Section 1) development project to support the transfer of natural gas and other raw materials for the petrochemical sector, as this will increase the country's capabilities on maritime logistics as well as economic security.

On 1 January 2020, the International Maritime Organization (IMO) revised its pollution limits on shipping, requiring that all types of transnational ships use clean fuels with sulfur quantities of no more than 0.5%, lower than the previous level of 3.5%. This has resulted in refining businesses having to adapt to cater to a new demand in fuel oil. PTT's International Trading Business Group has recognized the opportunities from the announcement of these new measures, and therefore revised its trading strategy on crude oil and clean petrochemical products, including by increasing the import of crude oil from the United States of America, and reducing its reliance on oil from Middle Eastern countries. These responses, apart from enabling PTT to adapt in alignment with global trends, also helps to reduce the impacts of political volatility in the Middle East on its business activities.

Generate Future Growth

PTT's 'Prosperity' strategy, to build growth and sustainability for the Thai economy and society, consists of developing new businesses that have the potential for exponential growth, or the "New S-Curve," which will respond to the rapid technological advancements in line with global megatrends. As part of this strategy, the Company evaluates investment opportunities in both internal processes and external factors, for example, in new technology and innovation research outputs developed by the PTT Innovation Institute, which have passed the PTT Idea to Commercialization Gate (I2C Gate), and research outputs from the Vidyasirimedhi Institute of Science and Technology (VISTEC) or joint collaborations with high-potential research institutions within and outside of the country. Furthermore, it is possible that the government will issue a policy concerning opportunities in mergers and acquisitions (M&A), joint ventures (JV) with high-potential venture capitalists, and investments in business ventures and startups. If a business potential is found, PTT will bring this into its decision-making process, which will subsequently be screened by the Investment Management Committee, to ensure that all new business investments will generate sustainable growth for PTT. In this regard, the Technology and Engineering Business and Downstream Petroleum Business Group are responsible for business operations, while the PTT Innovation Institute assumes the primary role in researching and developing new technologies and innovations to build a strong foundation for PTT Group's future growth. Against this backdrop, PTT is prepared to identify new opportunities for the "New S-Curve" development in the following business groups.

Electricity Value Chain (ELC) Business Group

The strategy framework related to the ELC Business Group will encompass PTT's investments in electricity production technologies, such as solar cells, Floating Solar Power Plants (FSPP), and further involve its role as energy consultants. PTT has set the target to become a leader in the electric vehicle (EV) business and energy storage business, where this will be achieved through collaborations with high-potential venture capitalists in Thailand and overseas, such as the "ETRAN KRAF" pilot electric motorcycle, which emerged from a partnership between PTT and ETRAN (Thailand) Co., Ltd. Not only that, PTT has worked with the PTT Innovation Institute to develop electric charging systems, where 3 models of EV Chargers have already been developed, consisting of the 'ECO' Model (3.5 kW), the 'Normal' Model (7 kW), which has been registered on the Thailand Innovation Register, and the 'Smart' Model (7 kW), where payments can be made through QR Codes. All EV charger models have been manufactured for commercial distribution.



Robotics and Artificial Intelligence Business Group

The robotics and artificial intelligence (AI) business is one of the ten "Target Industries" that will be the focus for driving the economy under the government's Thailand 4.0 Policy, and is one of the nation's 5 "New S-Curve" industries. Given this, PTT has set up the Robotics, AI and Intelligence Solutions Project to identify opportunities in businesses that are related to advanced technology applications in robotics and AI. The Project will involve collaborations with expert partners from both the government and public sector to ensure an integrated approach.



Smart City Business Group

The development of the EECi (Eastern Economic Corridor of Innovation) Project, as a new economic area that will serve as the country's center for research and innovation, is the first step towards the creation of a Smart City real estate business. Similarly, PTT has also identified opportunities to develop businesses relating to smart cities and logistics in other high-potential areas, such as the commercial development of areas surrounding train and sky train stations, together with PTT Group companies and other partners.



Material Science and Life Science Business Group

The objective of this Business Group is to enhance the quality of life of the Thai people, ensuring that they are healthy and have positive states of well-being. PTT has joined forces with public health agencies, including the Government Pharmaceutical Organization and the Chulabhorn Research Institute, to research and invest in the development of the country's pharmaceutical industry.

Capital Project Management

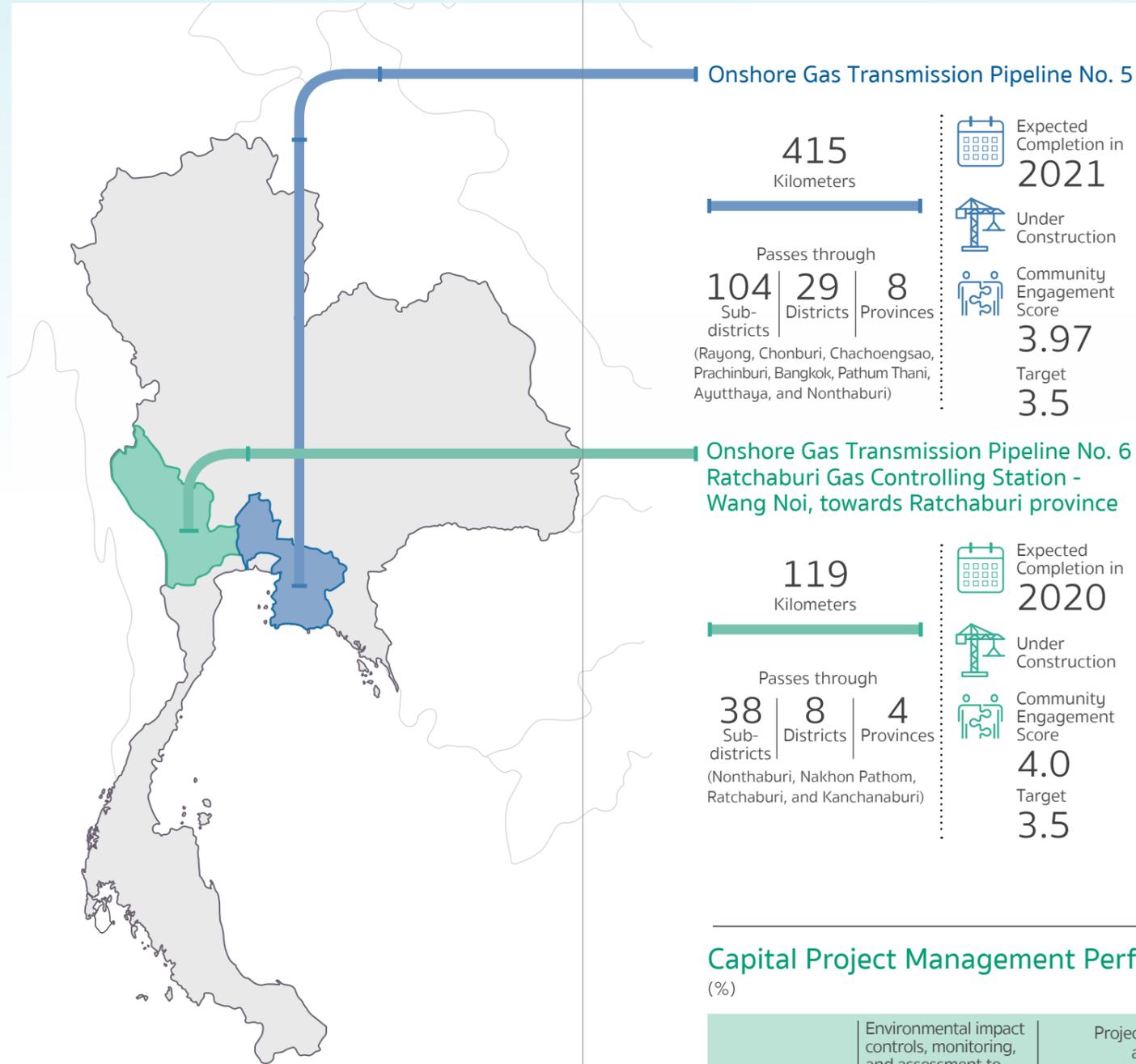


Challenges and Opportunities

To ensure inclusive energy access for all citizens and promote the growth of the industrial sector in support of a strong national economy, PTT operates a natural gas pipeline network in accordance with the Energy Planning and Policy Office (EPPO)'s natural gas distribution system and infrastructure plan. However, capital project operations encounter both approving and dissenting voices, and so one of the challenges for PTT is to foster efficient engagement with all groups of stakeholders in order to promote knowledge and understanding of operations plans before, during, and after the completion of capital projects. This will reduce any potential impacts, be it economic, social, or environmental, as well as impacts to PTT's business operations and overall national interests. In addition, stakeholder engagement also fosters the creation of a robust and sustainable collaboration network between the government, civil society, and private sectors.

Key Performance

PTT currently operates 2 capital projects: Onshore Gas Transmission Pipeline No. 5 and Onshore Gas Transmission Pipeline No. 6 Ratchaburi Gas Controlling Station – Wang Noi, towards Ratchaburi province. Details of these projects are as follows.



In the event that an individual is impacted by the Company's capital project operations, PTT has arranged various communications channels to systematically receive feedback and grievances. The Company has set up grievance centers within each project area to address and resolve any problems on the ground, and individuals are also able to report grievances through the PTT Contact Center 1365. From there, project operators will analyze and identify the causes of the issue, and implement remediation and preventative measures to prevent reoccurrence prior to reporting the outcome of the issue back to the reporting individual. Meanwhile, PTT has also established a committee to oversee and monitor the implementation of environmental impact prevention and remediation measures during the project construction phase, at the provincial and district levels. The committee, which comprised relevant government representatives and community leaders, is responsible for overseeing and monitoring the implementation of protective and remediation measures during project operations. Committee members will jointly collaborate on identifying problems according to the steps laid out in grievance management procedures, as well as monitor and evaluate the completeness of a project before completion to ensure that it achieves its targets and delivers maximum benefit to PTT and the country. Apart from the two aforementioned capital projects, which have undergone Environmental Impact Assessments prior to project initiation covering both social and health impacts, PTT has also conducted studies and environmental impact assessments and reports on other important projects, and fully implemented protective, impact remediation and monitoring measures as required by law. Interested parties can access these reports on the website of the Office of Natural Resources and Environmental Policy and Planning (ONEP), and request environmental reports at the Department of Energy Business (DOEB).

Capital Project Management Performance

(%)

	Environmental impact controls, monitoring, and assessment to ensure compliance to environmental measures	Project acknowledgement and acceptance		Stakeholder engagement	Number of community grievances and resettlements
		Acknowledgement	Acceptance		
2019 Performance	100	92.28	68.38	100	0
2019 Target	100	≥60	≥60	100	0

For more information, please visit www.pttplc.com and refer to "Sustainability" tab, "Economics" heading and "Capital Project Management" sub-heading.



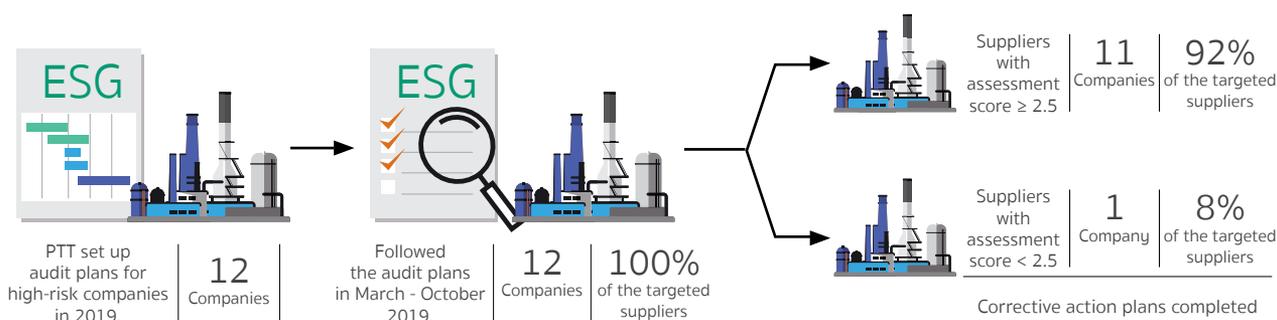
Supply Chain Management

Challenges and Opportunities

PTT manages supply chain sustainably via PTT Group Procurement and Supplier Management Policy. This ensures risk management and fosters business collaborations in all ESG aspects, environmental, social and governance. Presently, PTT Procurement is regulated under the Government Procurement and Supply Management Act B.E. 2560 (2017). Governmental procurement and supply management must provide maximum benefits to the agency, with transparency, effectiveness and traceability. Furthermore, another challenge in procurement to be considered is to support the government's Thailand 4.0 Policy. The plan is to drive industrial sector with technology, creativity, and innovation; enabling prompt responsiveness to business operations. The plan is considered in tandem with PTT Strategy, which focus in continuous process improvement through digital technology. This concludes that supply chain management must be constantly improved and developed, in order for the management to be effective and efficient amidst surrounding changes.

In 2019, PTT organized 4 human capital development trainings for suppliers. The Company has also assessed high risk suppliers, categorized according to results of economic, social and environmental risk assessment. The assessment was done in conjunction with annual expense analysis across 12 companies. PTT conduct trainings and assessments of suppliers, totals to 100% of the annual plan. Notably, there are a total of 11 companies that passed the set criteria, which is achieving higher or equal to 2.5 points (out of 4.00 full score). This is equivalent to 92%. There are only 1 company,

equivalent to 8%, which achieve less than 2.5 points. Non-compliance criteria identified comprises suppliers who have yet develop a plan for reserve products and service in case or crisis; suppliers have not conducted trainings for emergency cases or fires for employees. Suppliers may also not manage hazardous by-product materials according to stipulated standards. These are important risks. Notably, PTT has advised and provided recommendations on improvement process. Presently, the supplier has implemented corrective action plans and resolved the issues.



Remark:

Environment, Social, and Governance (ESG) Assessment criteria has a full score of 4. Suppliers must score more than or equal to 2.5 in order to pass the assessment.

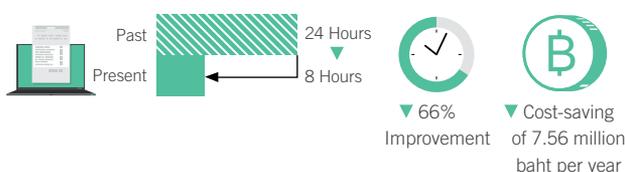
Furthermore, PTT also conducts risk management for capital project construction, as well as supply chain risk management. The work follows with PTT Group's Procurement and Supplier Management Policy strictly, and drives relevant parties to sign ratification to the Government's Integrity Pact to ensure transparent procurement. As of now, there are 3 operating projects in alignment with the Integrity Pact. They are Wangnoi Gas Controlling Station Project, Onshore Gas Transmission Pipeline No. 5 Phase 2 (Chachoengsao – Nonthaburi), the new pier and LNG Tank Station in Rayong. PTT has also stipulated clear guiding approach with suppliers, encompassing laws relevant to the project's success, social responsibility, occupational health, safety and environmental management. Notably, in equipment preparation to ensure project's completion per work plan, there is risk management and continuous monitoring with suppliers. This ensures that there will be discussions for plan or process adjustments with suppliers, in response to impacts from external factors, such as logistics personnel's strike abroad. Such arrangement ensures effective execution according to work plan.

Digital Procurement Project

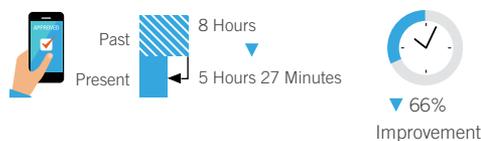
PTT deploys technology to improve procurement process and procedures, from development of internal procurement database, procurement requests, conditions, supplier selection, purchase order and contract, contract management, deliverable approval, invoice, and payment. This includes assessment of suppliers' performance and their satisfaction regarding PTT procurement process. PTT has piloted the project and started to use the system for making product and service procurement request, as well as online requirements, with internal functions within the headquarter. This is because there are many procurement work within said functions. It appears that the system for product and service procurement request sharply decreases the process duration from 3 days to merely 1. The system also saves as much as 7.65 million baht per year, approximately. Nowadays, PTT has launched the system for product and service procurement request as a mobile version. Implementation reveals it reduces the process duration for request approval by 32% from the target of 480 minutes (8 working hours) to only 327 minutes (5 hours 27 minutes). Furthermore, PTT has also launched additional supplier-related system, such as electronic bank guarantee system via block chain technology. This enhances security, decreases the costs and the process duration from 7 days to only half a day. The system provides greater convenience and increases satisfaction for suppliers in transaction with PTT.

Result of Digital Procurement Project Implementation in PTT

Purchase Requisition (PR) and Terms of Reference (TOR) Preparation



Mobile Approval



Electronic Bank Guarantee System via Blockchain Technology



PTT organized supplier conference annually to communicate business direction, per GRC principle. PTT also disseminates know-how knowledge on procurement type, method, and relevant information channels for suppliers. In the past year, PTT has communicated and organized knowledge-sharing regarding the new procurement system, which is under Digital Procurement project for PTT suppliers in Rayong Natural Gas

Separation Plant's operation sites, gas pipeline business units, vehical natural gas business unit, and other suppliers. There was a total of 4 knowledge-sharing sessions. PTT communicates policy, business directions and electronic procurement systems to suppliers, ensuring they are able to work on the electronic system. It appears that participating suppliers have increased satisfaction by 6.26% from 92.10% in 2018. Additionally, PTT has also organized a training system on ISO 20400 sustainable procurement system for employees in procurement and other related functions. It was conducted the first time, with 34 participants. The training ensures employees are able to utilize the procurement system for sustainable procuring efforts – thus facilitating PTT Group's procurement performance towards international standards.

Creating Shared Value for Supply Chain Management

PTT's Environmentally Friendly Procurement

PTT Vendor Management System was developed to facilitate procurement of environmentally friendly product and service. The system consolidates information on PTT's green spending. Suppliers selected from bidding can report information on green products in their work for PTT. The system has been active from 1st March 2019. There are a total of 42 green products and services, with the value overall totals to 327 million baht.

Project ONE Project

Due to restrictions in oil transportation, against the backdrop of rapid technological changes and increasing environmental conscious, trade flow of global oil market is shifting. World's large oil producing countries are moving towards business relying on assets to extrapolate trade and creating additional values. This is called Asset-backed Trading. PTT has therefore requested for collaboration within PTT Group through Project ONE's implementation, by managing supplies, demands and resources of companies in the Group. PTT has the expertise in procurement, trade and price risk management. This creates opportunities for optimization of commercial benefits, leading to sustainable growth and raising PTT Group's competitiveness to be on par with global trading house. The arrangement also systematically reinforces energy security.



100% of new suppliers have passed the screening for Environment, Social and Governance (ESG)

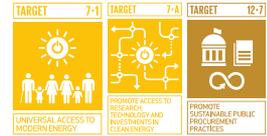


100% of suppliers whose contracts with PTT is of at least 2 million baht in value and/or whose work may impact safety and the environment, as well as suppliers interested in being on PTT vendor list, have all signed acknowledgement and followed PTT Supplier Sustainable Code of Conduct

For more information, please visit www.pttplc.com and refer to "Sustainability" tab, "Economics" heading and "Supply Chain Management" sub-heading.



Product Stewardship



Challenges and Opportunities

Changing global trends and a world that is now moving towards greater technological development, new generations that are increasingly concerned about environmental conservation, the expansion of urban societies, and finally, climate change, are all impacting people's ways of life. Indeed, these trends can be felt in various aspects, including consumer preferences for more digitized products and services, trends in clean energy use, greater interests in a Circular Economy approach. The approach refers to when resources are reused in a circular manner to create maximum efficiency – from production to consumption all the way to waste management – to the development of green products, and the move towards an aging society in which health takes precedence. All of these issues affect PTT's business operations, and so the Company has taken these opportunities and challenges as pathways to develop products and services that can advance the business and to provide more green products and services that directly respond to customers' demands.

Key Performance

Research & Development and Innovation

The PTT Innovation Institute (PTT InI) plays an important role in the research and development of innovations. Whether it is the development of new products to support business changes over the short and long term, existing product and service improvements, or services to resolve problems in production processes and provide technical advice to PTT Group businesses, all of these responsibilities support the creation of business results and tangible value for stakeholders. Such results include monetary returns from the development of products through to commercialization or real-life application, such as an increase in revenue, profit, and cost reductions, and intangible results such as national energy security, corporate reputation building, and joint collaborations on environmental preservation. Today, research at PTT InI is categorized into 2 groups. The first consists of research to support existing businesses, such as research on lubricant fuels and vehicle testing, assessments of catalysts and absorbents, applied energy techniques, and environmental research. The second includes research to support future businesses, such as electricity businesses, and health and medical businesses. In addition, over the past year, PTT revised the working structure of the PTT InI to reflect the changing natures of work, where the Company set up an Innovation and Digital Development Business Line to import different kinds of technologies. This will be achieved, for example, through investments in energy and technology funds, mergers and acquisitions of technology businesses, or by finding new ways to commercialize technology apart from using them within PTT Group businesses or by selling their rights. During this past year, outstanding research and development outputs included the development of bio-fuels of gasohol and bio-diesel types – Diesel B10 and Diesel B20 – to reduce the emission volumes of greenhouse gases and PM2.5 dust particles. Other achievements included the development of biodegradable bio-plastics for consumer products, air quality models that assess the pollutant management capacity of

a certain area, and products that support the growth of the Company's renewable energy business, such as EV chargers and back-up batteries in office buildings.

PTT's research and development is monitored, analyzed, evaluated and reported on systematically, where business results are also compared against targets and expected outcomes. Key performance indicators for R&D include the R&D Performance Index, which refers to the number of new products and patents developed during the year, and R&D Effectiveness, a financial indicator which is calculated by determining the monetary value generated from research and development compared to the expenses spent on R&D per year.

Innovation R&D Performance

	Target	Performance
 Number of new specialty products		10
 Number of new commodity products	17	11
 Number of patent applications for innovation	2	0
 Number of patent application for design	-	10
 Number of petty patent applications	8	14
 R&D Performance Index	295	236
 R&D Effectiveness	1.0	1.25
 Direct revenue (million baht)	-	57.4
 Indirect revenue (million baht)	-	1,358
 Research budget (million baht)	855	668



Residential Battery Pack

PTT InI, in collaboration with GPSC, developed the “Residential Battery Pack” to be used as a spare power supply in buildings. The Pack consists of a commercial battery cell combined with a set of controls, and its development aims to support the growth of urban societies, energy security and access, and enhance the Company’s expertise regarding battery value chains to support the growth of this business segment in the future. To date, PTT InI and GPSC have completed the development of battery packs for use in pilot plants, which have been installed and tested, and also completed the development of the final prototype as well as plans for its commercial distribution. The rights to the Residential Battery Pack are currently being prepared to be sold to GPSC, which will develop the product further for commercialization.

Electric Vehicle (EV) Wall Charger

During the past year, PTT sold the first 3.5 kW EV charger for cars through its subsidiary OR. Following that, PTT InI developed an additional EV charger for cars with a 7 kW charging capacity, to respond to a changing model of customer service within the country. The 7 kW EV charger has now been registered on Thailand’s Innovation Register. Not only that, PTT InI expanded upon these EV chargers to create a “Smart Charger” model, which comes with a QR Code payment system. The “Smart Charger” has now been tested according to the IP55 standards of TÜV SÜD (Thailand), trialed for use, manufactured and sold to customers, and is in the process of commercial expansion.



Integrated Pipeline Maintenance Monitoring System (IPMMS)

PTT InI, together with the Engineering and Natural Gas Pipeline Maintenance Function, expanded upon an innovation that is used to test the conditions of natural gas pipelines by using the Internet of Things (IoT). As PTT’s innovation, it is not yet found anywhere else in the world. The IPMMS innovation is able to reduce the cost of current interrupters from 200,000 baht per set, to a mere 20,000 baht. Compared with the costs of using the SIM system to send signals, this innovation reduced those costs from between 300 - 400 baht per month, to only 350 baht per month. Currently, PTT InI and the Function have improved the circuits by reducing their energy consumption, which allows it to be used for at least 1 year without having to install large batteries that risk being damaged. In addition, the circuit will independently monitor and calculate measurements, which will then be sent through a network to the Control Center, without requiring any humans to be involved in its operations on site. The IPMMS has now been installed in 50 spots along the natural gas pipeline network in Chonburi and Rayong provinces. In the future, plans are to install the IPMMS to cover the entire 2,000 - km natural gas pipeline network.

In 2019, this innovation received



Gold Medal from the 47th International Exhibition of Inventions in Geneva, Switzerland



The Asset ESG Award in the Innovation Initiative category



The SOE Awards in the Innovation category.

Promoting Employee Innovations

In addition to applying digital technology to enhance the organization's competitiveness and respond to a changing business landscape and operating conditions, PTT also promotes an atmosphere of innovation amongst employees. Indeed, innovation is one of PTT's "SPIRIT+D" values, and aligns with the government's Thailand 4.0 Policy, which aims to develop existing S-Curve and new S-Curve industries for the country. With this in mind, PTT developed a policy, strategy, and business direction that is geared towards crafting innovations, and encourages all employees to adopt a working culture where they are not afraid to think creatively outside the box, to propose new things, drive change, and fundamentally develop a new level of competitiveness that is necessary for PTT's business expansion into new markets. And to encourage PTT Group employees to work together on knowledge-sharing and building upon that knowledge into innovations, over the past year PTT began receiving innovation project submissions for the PTT Innovation Awards from PTT Group employees as well, whereas prior to that, the competition had been limited to PTT employees only. Subsequently, employees from 9 PTT Group companies submitted a total of 51 innovation projects to the PTT Group Innovation Awards. Furthermore, to encourage employees to propose creative ideas that are focused on technology and digitization, which have the potential to be developed into a new PTT business, the Company organized the "PTT Tech Savvy Agent" Competition for the second year. The Competition received expressions of interest and submissions from 192 PTT and PTT Group employees, composing a total of 64 teams, or 5% of all employees in the organization.

Following continued efforts to foster a creative and innovative environment, the PTT Innovation Awards have now received a total of 2,759 innovation project submissions from the very start of the awards in 2012 to present day. For 2019, 366 innovation projects were submitted.

SPIRIT+D Value Commitment Score on "Innovation"

(%)



Examples of Winners from the PTT Group Innovation Awards 2019

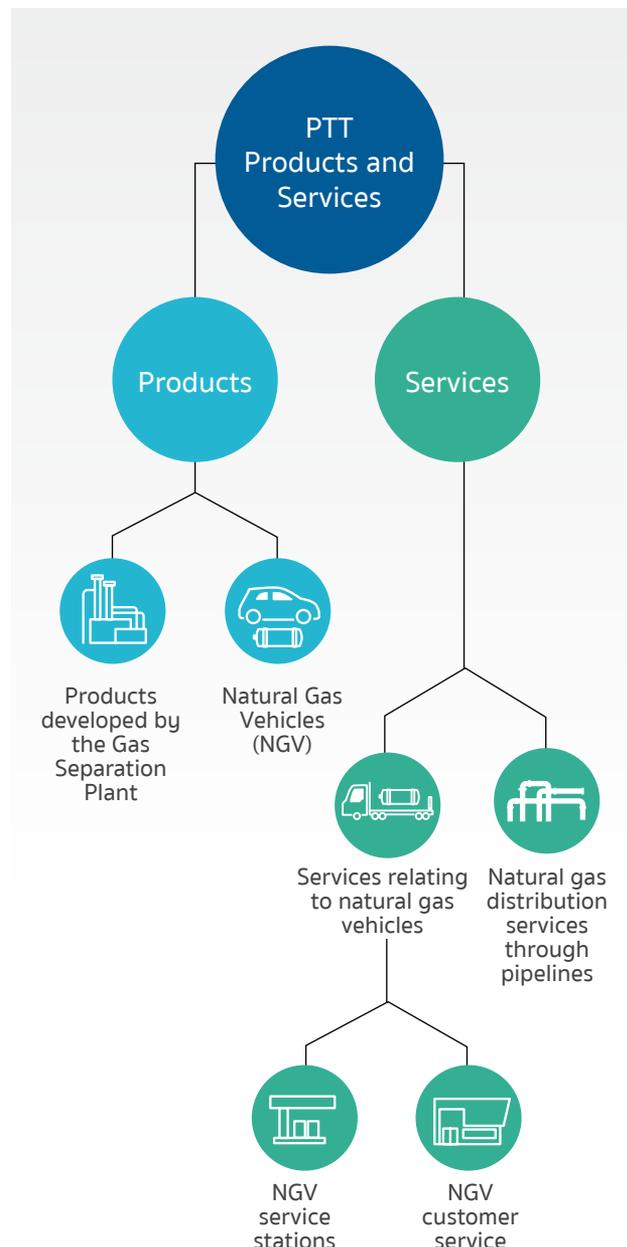


Coal Blending Optimization Platform

An automatic platform used in identifying the optimized solution for homogenous coal blending, designed to make coal quality appropriate for processes and customer demands. Sakari Resources Limited (SAR), a PTT Group company, has been able to benefit from this platform by using it to expand into new markets and create additional value, for example in Indonesia, Malaysia, Philippines, India, and USA. As a result, profit increased by at least 200 million baht per year, and the cost of lost revenue from lost business opportunities decreased by around 1,200 million baht per year, without SAR having to make any additional investments.



For more information, please visit www.pttplc.com and refer to "Business/ Products and Services" tab.



Green Products and Services

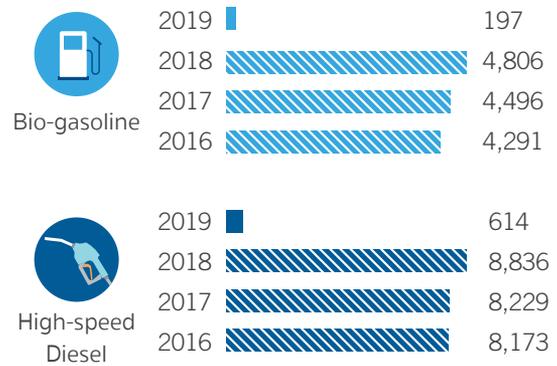
PTT Group is committed to developing products that are environmentally friendly by creating innovations that reduce environmental impacts across PTT's value chain. This commitment covers products and services under the PTT Group label, suppliers' goods produced using PTT Group products, as well as packaging that is designed to contain products or is related to the provision of services. PTT has developed and improved upon its approach for certifying PTT Group's environmentally-friendly products (which can refer to either products or services) under the GREEN FOR LIFE label. The label aligns with the ISO 14021:2016 standard on self-declared environmental claims, also known as "Type II" environmental labeling, and covers an additional 15 environmental issues including Carbon Neutral certifications and Third-Party certifications according to ISO14024. As a result, in 2019, there were a total of 8 GREEN FOR LIFE products that received certifications in the Third-Party Certification category. These products are able to reduce between 0.08-1.10 kilograms of carbon dioxide per unit of production. Furthermore, to ensure readiness to adapt to the digital age and increase efficiency and clarity in communicating the environmental benefits of these products, the Company set up the PTT GREEN FOR LIFE website (<https://greenforlife.pttgrp.com>) as another channel to communicate with stakeholders. The website also serves as a channel for submitting requests for GREEN FOR LIFE certification labels, where it links to the Green Products and Services Database of the Federation of Thai Industries. PTT also added an additional communication via channel via QR code as part of the GREEN FOR LIFE label. It helps to efficiently disseminate environmental information to stakeholders, serving as another available alternative. As a result of PTT Group's ongoing commitment to develop environmentally-friendly products, in 2019, 155 of PTT Group's products received environmental certifications, namely the Carbon Footprint of Products (CFP) and the Carbon Footprint Reduction (CFR) labels. Overall, the number of PTT Group's products and services that were certified under the GREEN FOR LIFE label increased by 13 products and 120 service stations, bringing the total to 87 products and 273 service stations.

PTT Group Products and Services Certified under the GREEN FOR LIFE Label



Biofuel Production in Thailand

(million liters)



Remarks:

As of 2019, the biofuel volume reported is from PTT only.

In 2018, the data covers both PTT and PTTOR.

In 2016-2017, the data on biofuel production volume was adjusted.



Green NGV Service Station

PTT is determined to develop environmentally-friendly products and services across its entire value chain. The Natural Gas Vehicles Function therefore initiated the project, Electricity Reduction at PTT NGV Stations, which involves improving the natural gas dispensing system by using two trailer trucks. The first piloted project was able to reduce around 10.19% of greenhouse gas emissions and 6.17% in energy consumption. The latter reduction was calculated by the amount of electricity against the amount of natural gas sold, and is equal to greenhouse gas reductions of around 20 tonnes carbon dioxide. The station has now received the GREEN FOR LIFE certification at the 3-star level.

“The Electricity Reduction at PTT NGV Station Project, which uses 2 trailers at the PTT NGV Service Station, Lak Muang-Thavorn Panit branch, and has been submitted for the GREEN FOR LIFE certification, is one of a number of energy reduction projects implemented by the NGV function. These projects align with PTT Group’s Clean & Green strategy, and so NGV is committed to reducing energy and greenhouse gas emissions, and plans to expand this project to cover another 5 NGV stations in the future.”



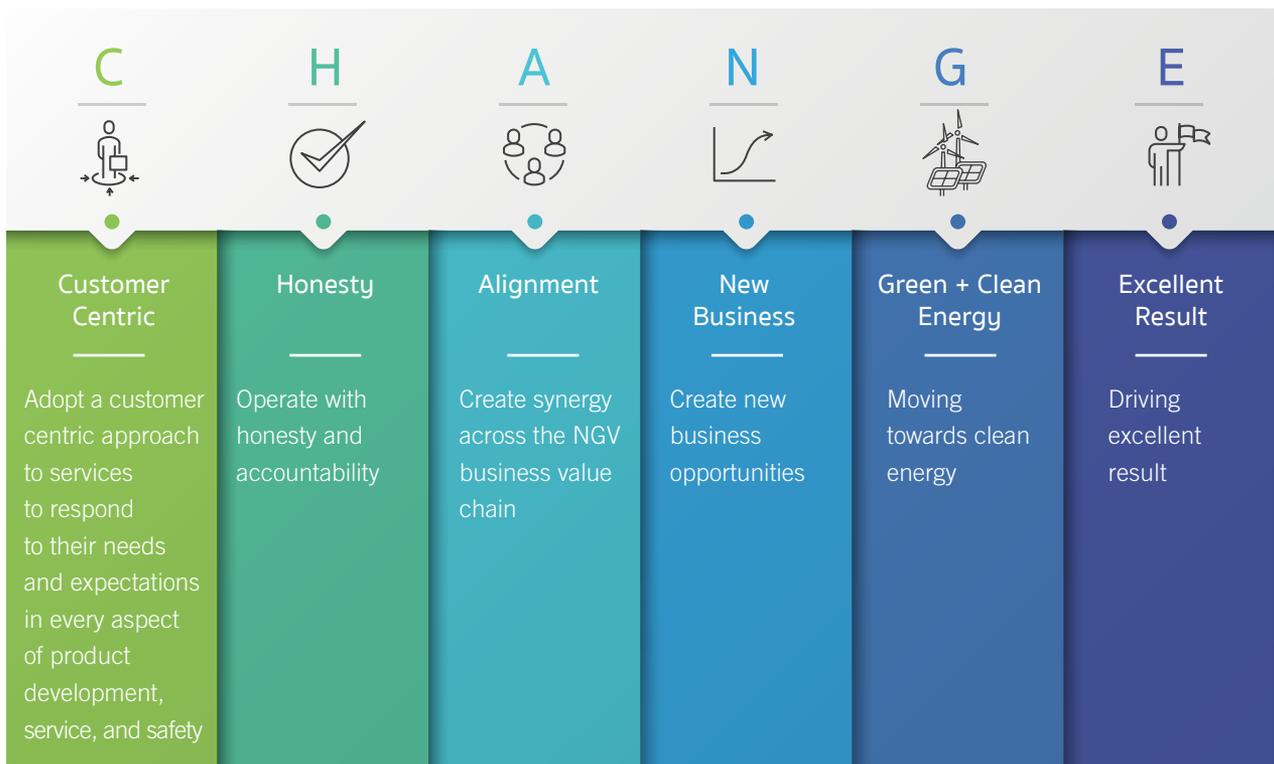
Mr. Adisak Kaewprasert

NGV Service Stations
Maintenance Division
Manager



PTT NGV Plus

The PTT NGV Plus, an NGV product, has been developed as a clean and green energy product that increases the acceleration of cars and allows them to run for longer distances, in order to save on fuel costs. There are currently 4 service stations that sell the PTT NGV Plus product – Phannee Power Service Station, Pathum Thani province; Suksomkiat Transport Group (2004) Service Station, Saraburi province; PTT Service Station Nam Phong, Khon Kaen province; and PTT Service Station Khao Khan Song, Chonburi province. PTT plans to expand the sales area for this product in the future. Equally important are services, particularly the service capabilities of station staff, cleanliness, and the orderly management of NGV stations. The NGV function is therefore ensuring these service and customer standards by using the “CHANGE” strategy:





NGV Digital Market Place 4.0

PTT signed a Memorandum of Understanding with the Ministry of Agriculture and Cooperatives on the NGV Marketplace Project, which will take place under the framework of the Ministry's Digital Marketplace 4.0 Project (Agriculture 4.0 Strategy, or Phra Phirun Strategy). The Project will involve leveraging PTT's NGV service station network as a central marketplace for safe agricultural products sold by farmers. A pilot marketplace has been set up at the PTT NGV Service Station in Chonburi province. Related to this, PTT plans to develop digital systems to support the sales of safe farming produce from the project to other consumers on a wider scale. This approach applies the "Marketing-driven Production" concept, which will allow farmers to plan their production schedules, reduce restrictions and monopolization, and thus further elevate the qualities of life for Thai farmers.

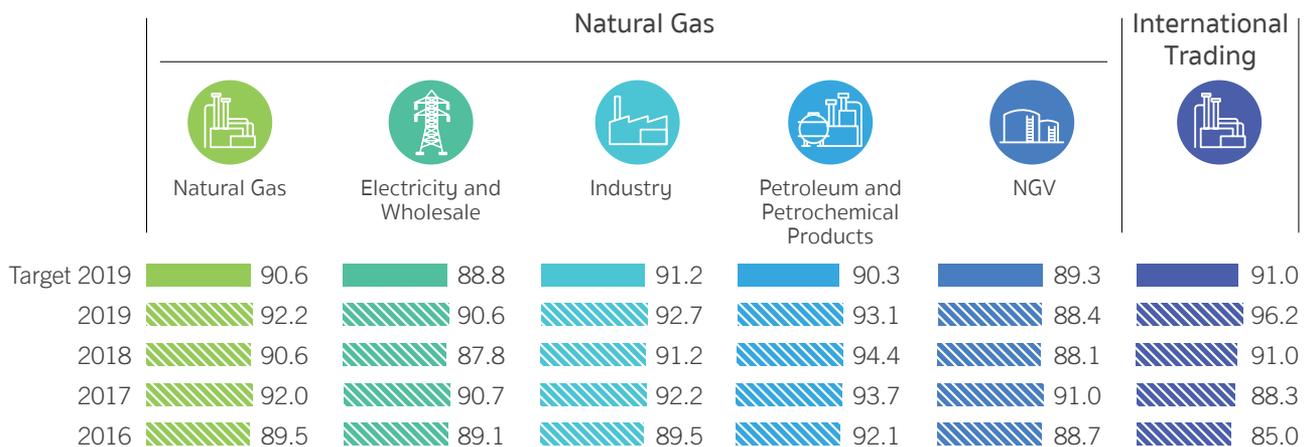


Customer Relationship Management

PTT operates a systematic approach to customer relations management. This starts from receiving customer feedback from a number of communications channels, including: the annual Customer Satisfaction Survey, customer visits, seminars with customers, an efficient customer database that uses modern technology, relationship-building through activities, and tools and mechanisms to communicate with and receive customer feedback – namely the Company's website, social media, and PTT Contact Center 1365. The information received will then be used for analysis to further develop products and services, and respond to the needs of customers and businesses at all times. Likewise, PTT encourages customers to search for key information on products and services. These measures are part of efforts to transform PTT into a 'Customer-Centric' organization in the age of the digital economy.

Customer Satisfaction Survey

(%)



Remarks:

The customer satisfaction level for natural gas customers does not include the NGV customers group, as it is a state-controlled market.

Electricity customers include EGAT, IPPs, and SPPs.

Wholesale customers include DCAP, NGD, and customers that have used natural gas for more than a year.

For more information, please visit www.pttplc.com and refer to "Sustainability" tab, "Economics" heading and "Product Stewardship" sub-heading.





Human Resource Management



Challenges and Opportunities

PTT prioritizes elevation of personnel’s knowledge and capacity, creating learning community, reinforcing leadership development, and developing employees at all level to be ethical, talented, professional and a life-long learner. This ensures employees are ready to support PTT in caring for society, community, environment, in tandem with driving for corporate sustainability. This fits an era win which digital technology has a more active role daily and in operations. It is considered one of the challenges for PTT. To promote and support digital technology usage for employees, preparing them for upcoming changes, PTT has analyzed stakeholders’ needs, internal and external factors. The output is used to develop strategy and human capital management, supporting the efforts to drive vision, mission and business strategy.

Key Performance

In 2019, human capital management considers internal factors, comprises PTT’s vision, mission, values and business directions. The Group also considers external factors, comprising rapid technological changes, energy revolution, reduced resources in the country, and social license to operate. PTT has therefore stipulated 3 human capital management strategies, which are personal readiness preparation in various aspects for strategy execution, process improvement, and implementation of technology.

Human Capital Development and Learning Support

Learning management for executive- and employee-level is deployed through PTT Leadership and Learning Institute (PLLI). The Group is divided into 3 main curriculum groups, as follows.



1. Leadership Development Program is a curriculum focusing on building readiness and strengthening executives' capacity, technical knowledge, people and work management. The format involves exchange of opinions and experienced, facilitated by world class instructor. There is also sharing session from high-level executives' work experience, both internal and external. Participants for this workshop are selected managers whose competence meets the corporate-stipulated requirements.



2. Compulsory Program focuses in developing capacity of all employees according to their level, position, or career paths. This is divided to the main curriculum sub-group and career path curriculum sub-group.

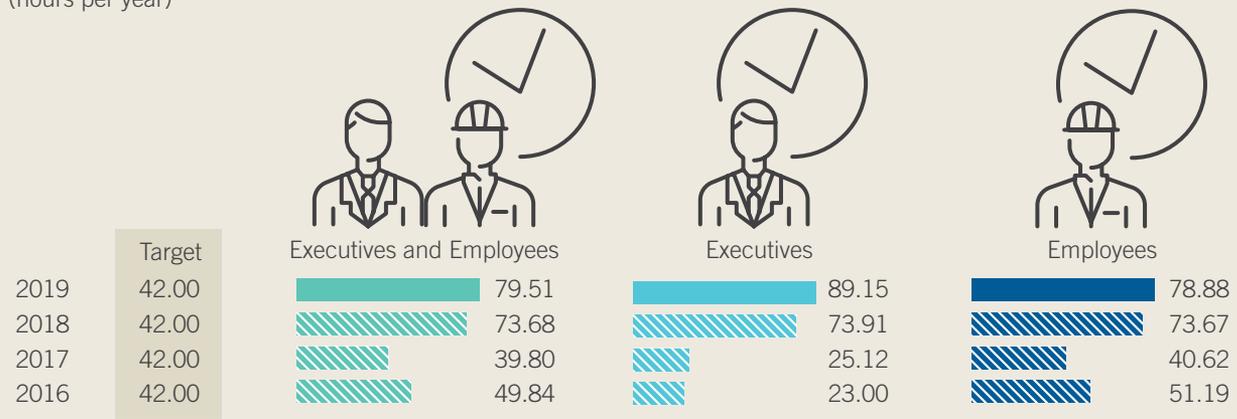


3. Elective Program is a curriculum to develop employees' capacity according to their individual needs. It relies on mutual collaborations between supervisors and employees in selecting development program befitting of employees' needs, such as English, Presentation skill, to name a few.

PTT has reviewed content under Technology curriculum to align with key competency, which is Technology Savvy for employees and Digital Acumen for executives. There are 2 training curriculums, which are 'Digital Enterprise for Executives' and 'Power up the Technology Savvy within You' for function-level employees and lower. These curriculums enable executives and employees to recognize benefits in a concept of digitalized organization. They provide knowledge, understanding of technology's roles and impacts on their respective functions. Trained personnel would be able to truly develop a transition plan for process change, transitioning towards digitalization. The focus is on introducing new technology, as well as organizing Digital 101 FIN the Series: Future is now in the Form of Micro Learning. This reinforced fundamental understanding in novel technology, such as Big Data & Analytics, Cybersecurity, Chatbot & AI, Blockchain and Cloud. Furthermore, there are also analyses conducted on need and learning behaviors of executives and employees. The activity format and training tools have been updated to fit present context, with an emphasis on experimenting and real application. The training allows knowledge exchange across all levels, as well as utilization of digital tools for employees to learn remotely, anywhere anytime. Channels such as E-learning and Online Learning are present. To measure the success of investment in human capital development, executives and employees assessed behaviors pre- and post-training. There are also assessments on knowledge application on in operations and overall capacity analysis, which are compared against business results.

Average Training Hours

(hours per year)



Average Training Cost for Executives and Employees



Human Capital Return on Investment

(Times)



Building Employees' Engagement

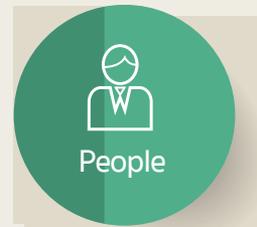
PTT reviews and develops key factors affecting personnel engagement and satisfaction score on an annual basis. This is done through field data collection, in-depth interviews with executives, small group meeting with employees, along with employee engagement and satisfaction surveys themselves. The objective is to gain understanding of employees' needs and expectation, which varies in each group. The output will be analyzed to improve engagement and satisfaction building approach, leading to notable business results.

The survey reveals that employees' engagement to PTT in 2019 is at 78%, increased by 7% compared to 2018. This is also higher than the target value of 73%. The score makes it the third consecutive year that engagement score continues to increase. In comparison, engagement score of Oil and Natural Gas Sector's employees in Asia-Pacific is only at 68%. The score increased is a result from factorial analysis that distinctly categorized engaged and unengaged employees. Similarly, in 2019, there has been efforts to communicate with employees through increased number of channel, in addition to continuous development of improvement plans. Factors employees presently prioritized have also been noted, such as performance management, talent management and development, as well as digital technology adoption for operational support.

PTT has improved its performance to thoroughly response to employees' expectation. This comprises, reducing the number of KPIs to make performance assessment more efficient and standardized, improved approach for talented employees' readiness in transitioning to managerial executive level. There are also efforts in development of clocking in-out record system through application immediately once on PTT Grounds; increased flexibility of working hours, and prototyping work-from-home approach to save traveling time, reduce energy consumption and contribution to air pollution. Similarly, PTT has worked to maintain good relationships with retirees, as well as providing services or organizing countless activities under "Forever Friend" Project for them. The project allows retired employees to have entitlements for first aid at PTT infirmary with no expense incurred. It also includes organizing activities for retiree clubs monthly, such as watercolor painting, activities for knowledge sharing on urban farming in natural classrooms. There are also volunteer activities for those visually impaired, and learning tool production for classrooms for the blinds.

Knowledge Management

PTT defines corporate of learning with 5 components, which are: 1) mutual learning; 2) fast learning; 3) continuous learning; 4) learning in facilitative environment; and 5) learning with executives serving as Role Model. PTT's knowledge management, relevant to both internal and external, comprises 3 primary mechanisms, as follows.



People

Develop personnel to have regular self-development and learning habit.



Process

Develop knowledge management system to systematically build the process of knowledge exchanging, storage, application and inference. PTT Group's knowledge theme was review to match with business strategy and operations, both for Do Now, Decide Now and Design Now, such as New-S Curve. This also includes encouragement for digitization to accommodate crucial changes in the future and responsiveness to needs of all stakeholder groups.



Technology

Promotes information technology in data storage and search to enhance accessibility effectiveness and speed. PTT Group's knowledge storage system or PTT Group KM SPACE was updated to be more responsive to users.

Knowledge Management Level

(%)



Corporate Values

In order for employees to operate according to corporate value of SPIRIT+D, aligned to PTT Group's strategic directions, PTT focuses on creating innovation, operating business transparently, and implementation of digital technology. PTT has therefore developed the following formats to reinforce corporate value, with PTT's own leaders as SPIRIT+D Role Model for employees. This comprises:



- Development of work guideline according to SPIRIT value, through executive and all-level employee engagement. It serves as a guideline for employees to adapt and deploy in multitude of circumstances.
- Develop SPIRIT Gamification system to expand communication channel and stimulate employees, particularly Generation Y (Gen Y), to express behaviors consistent to corporate value. There is data collection on employees' behavior according to said value.
- Promote innovation and digitalization in the format of Innovation Award and Tech Savvy. This allows employees to present concepts addressing business function's strategic needs, to help facilitate said unit towards commercial innovation for effectively.
- Promote Integrity & Ethics values in consistent to driving GRC performance continuously, such as training/ seminars, Chansin Camp, and Envisioning our Future curriculum, to name a few.

Additionally, PTT has also instilled corporate value in PTT Group's employees, ensuring consistent behaviors through PTT Group Way of Conduct. This ensures PTT Group's business strategy, decisions, and management approach are aligned. The alignment shall result in PTT Group's strengthened sustainable growth and distinction as a good and responsible company.

SPIRIT Commitment Score (%)



PTT set the target for SPIRIT Commitment Score at 74% (Top Quartile Fortune 100) by 2020.



Chansin Camp

Through PTT Leadership and Learning Institute, PTT has designed and developed Chansin Camp for managers or equivalent. This is according to managing director and chief executive officer's policy. The objective is to build knowledge, understanding, and instill corporate governance values, anti-corruption, ethics and leadership. This was laid out in corporate value, emphasizing on R I T (Responsibility for society, Integrity & Ethics, Trust & Respect). Beyond being talented, if the talent has good morals and ethics, they will also be able to sustainably promote social responsibility and community. The Camp has received kind collaboration from the President and Chief Executive Officer, high-level executives, and external speakers, who have come to share their expertise. There are 6 classes of graduates between April – July 2019, with over 571 participants. The curriculum receives satisfaction score, on average, of 3.47 points out of 4.

"I have learnt a lot from the Management. Intensive content helps me understand corporate directions' alignment to R I T values better"



Suebpong Kongkhun

Maintenance Planning & Management Division Manager, Gas Separation Plant, Rayong

"I have learnt a great deal of many things the Company is working on, as well as reasons behind them. I am now aware of past mistakes and incidents to be avoided. This helps us make thorough future plans,"



Khemchira Magrode

Manager, Human Resource Strategy & Policy Department

PTT Tech Savvy Agent 2019

PTT TECH Savvy Agent 2018 was the first of its kind to be organized, and it was a success. The objective is to develop employees' digital competency, aligning with corporate value of Digitalization (SPIRIT+D). There are 3 winners, serving as PTT TECH Savvy Agent, participating in activities and public relations both internally and externally. They led by examples in digital promotion with other employees, and become a good starting point for human capital development on digital competence. Digitalization commitment score is also expected to increase. Management has thus decided to organize PTT TECH Savvy Agent 2019 for the second consecutive year, focusing on concept or project that can create new businesses or value-added. This is particularly the case for state enterprise or startups. Digital technology should be used as a management tool. There were Coaching and Pitching Session; seminars and dialogues with PTT's high-level executives, digital experts and nationally acclaimed start-ups. The contest was recorded in the format of reality-show, and



disseminated internally through PTT Workplace channel, Employee Experience Corner, YouTube, and PTT People Plus channel. This bolsters awareness of both employees and external individuals. Post-contest, 3 winning teams, comprising 9 employees, receive the opportunity to extrapolate on a concept or build businesses anew. There is a booster project, Technology and Engineering Head, serving as the handler department ensuring for sustainably alignment to corporate strategy and business operations.

For more information, please visit www.pttplc.com and refer to "Sustainability" tab, "Social" heading and "Sustainable Human Resource Management" sub-heading.



Human Rights



Challenges and Opportunities

There has been significant changes regarding human rights laws, regulations and business guidelines in the past few years. This reflects increasing expectation from the public sector and civil society for business to respect human rights in their operations. In 2019, the Thai Government announced the very first National Action Plan on Business and Human rights (NAP). This effectively established Thailand as the first country in Asia as a leader with advanced tangible work in business and human rights. Human rights issues in Thailand is exposed to labor rights, awareness raising in accordance with the UN Guiding Principles on Business and Human Rights (UNGP) among state-owned enterprises, impacts and discussions with communities in areas with large investment development projects in the special economic zone, government procurement, and access to remedies. PTT therefore is determined to operate responsibly, respect human rights and take a stand to protect stakeholders' rights in every activity.

Key Performance

The foundation of PTT's sustainable business operations lies in respecting human rights in accordance to the United Nations Guiding Principles on Business and Human Rights (UNGPs). In 2019, the President and Chief Executive Officer has announced PTT Human Rights Statement. The statement demonstrates PTT's strong commitment in operating businesses with full respect to human rights. It highlights right protection for all stakeholder groups, as well as disseminating human rights management to suppliers and other relevant parties. PTT has also signed to demonstrate support to the World Business Council for Sustainable Development (WBCSD)'s CEO Guide to Human Rights. The gesture indicates PTT Group's commitment to drive human rights performance in alignment across the entire PTT Group. PTT also encourages PTT International Trading London Ltd (PTTT LDN), located in London, the United Kingdom, to announce a new compliance statement regarding the Modern Slavery Act 2015 of the United Kingdom.

Furthermore, PTT has also reviewed the PTT Group Human Rights Management System, deployed since 2017. The Management System's addition includes guidelines for corporate governance, compliance, and assessment of human rights impacts towards stakeholders. The recent supplement has been approved and deployed by the Corporate Governance Committee. The scope of PTT Group's human rights due diligence has also been adjusted to fit PTT Group Way of Conduct. There are 15 subsidiaries operating in compliance with PTT Group Human Rights Management System, altogether accumulates to 30 areas across 14 countries. Key human rights risks identified in PTT Group's business operations consisted of occupational health and safety, migrant workers, security, suppliers' labor practice, community's quality of life, and indigenous people's lives. However, PTT Group's human rights risk level, per 2019 risk assessment, remains in the range

of low to moderate. Such result is due to development of human rights management plan and utilization of control measures suitable for each area. There is quarterly monitoring on the operations to ensure risks remain within risk appetite. The monitoring also ascertains that control measures execute with maximum efficiency.

Furthermore, there are seminars organized on global trends and PTT Group's readiness to directions of human rights management at an international scale for PTT Board, Executives and relevant employees. There are also trainings on sustainability management, encompassing fundamental human rights training for employees related to human rights performance. There was a total of 47 participants, with total training time at 11 hours.

Due to continuous and tangible efforts of PTT Group Human Rights Management System, as well as annual performance disclosure according to the United Nations Global Compact's 10 Principles, there were no human rights grievances filed in 2019. Additionally, PTT Group's performance in human rights management's effectiveness, as rated by Corporate Human Rights Benchmark, continues to improve on a yearly basis.



No human rights grievances were filed.

For more information, please visit www.pttplc.com and refer to "Sustainability" tab, "Social" heading and "Human Rights Management" sub-heading.

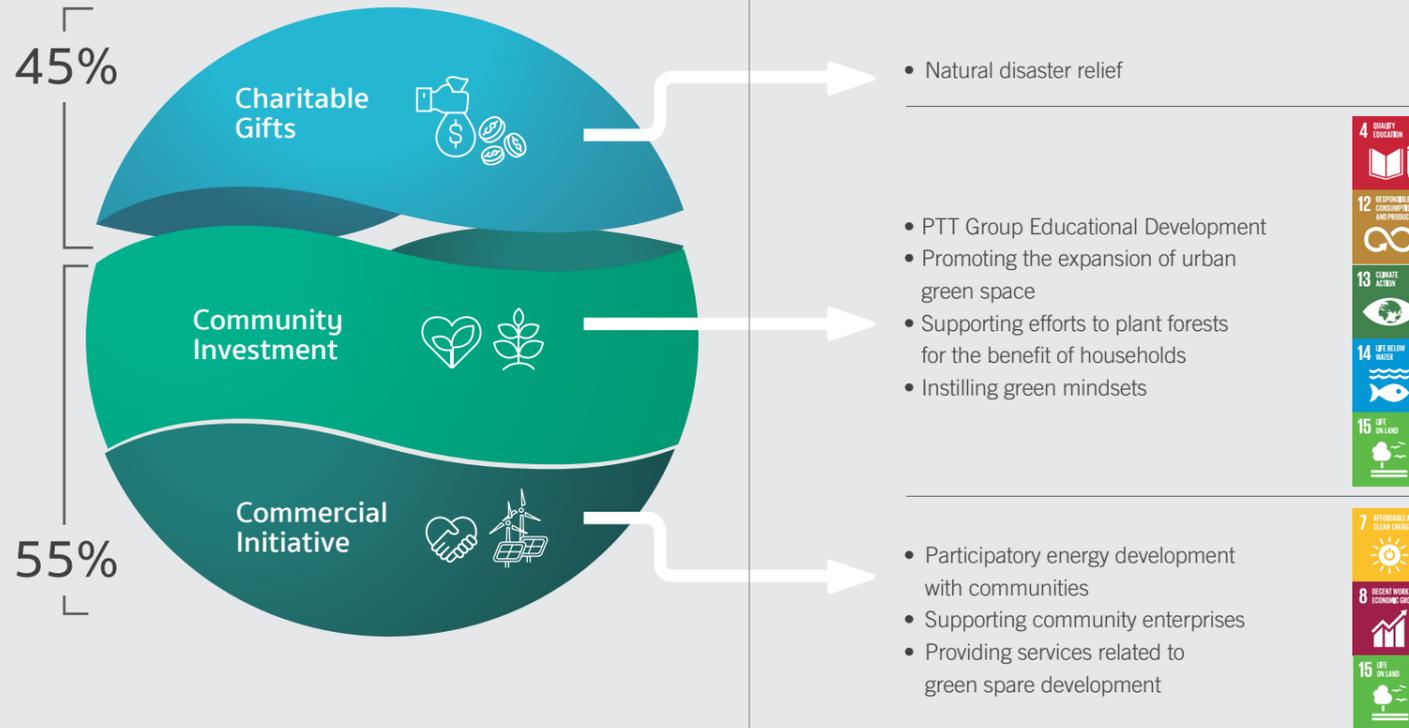


Corporate Citizenship

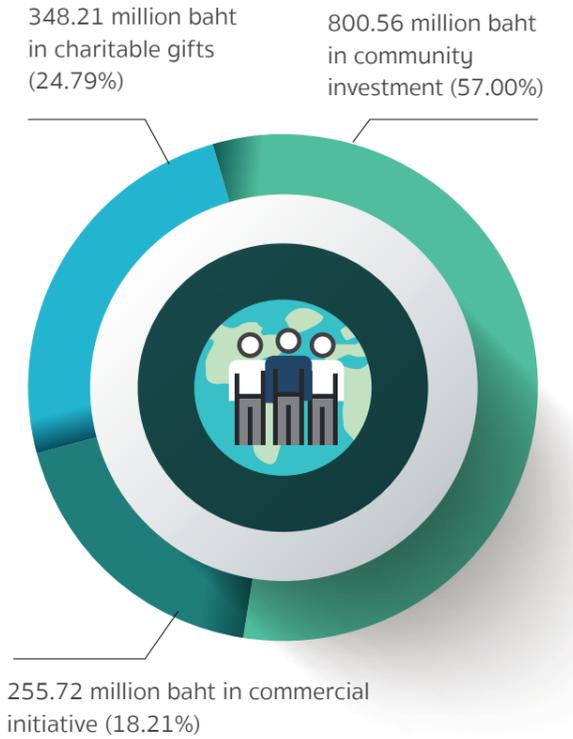
Challenges and Opportunities

A major challenge confronting PTT Group is providing a fair and balanced response to the needs of each stakeholder group – especially stakeholders from communities and society, and the country, with its expectations regarding the Group's performance in sustainably creating shared value. Thus, PTT Group has determined a management approach that considers internal and external factors, stakeholder needs as reflected in stakeholder surveys, as well as available PTT Group expertise, while maintaining awareness of the different priority levels of each social development project. This management approach ensures that PTT Group is able to appropriately respond to stakeholder needs, effectively build engagement with target groups, and leverage the capabilities to create the most impacts. In turn, PTT Group can then remain an organization that Thai people are proud of, and continue contributing to sustainable development in the country.

PTT Group's approach in implementing social development projects, broken down by social investment type



In 2019, the net social investment budget was **1,404.50** million baht.



The budget can also be broken down into 24.79% in charitable gifts, and 75.21% in community investment and commercial initiative. PTT Group has plans to maintain an appropriate allocation of social investments, and to deliver social impacts while maximizing social return on investment. Thus, the Group will continue improving upon work processes to ensure alignment with global and organizational contexts.

Community Engagement

PTT continues to engage communities to gather their opinions, and give them the opportunity to design different projects. To ensure that PTT's activities are truly and effectively benefiting communities and supporting community development, the Company has designated community representatives, determined engagement objectives, conducted consultation meetings, and monitored results. In the past year, PTT has consulted with communities in 15 operational areas, equivalent to 100% of all operational areas, and communities in 4 development projects, equivalent to 100% of all development projects.

Key Performance

PTT Group's corporate citizenship projects are categorized into 2 dimensions: "People" projects that develop human capital, communities, and society, and "Planet" projects that promote environmental and natural resource conservation and restoration. All projects aim to build social prosperity, and are implemented in 3 forms of social enterprise projects, corporate social responsibility (CSR) projects, or donations. PTT Group expertise, alongside innovation and new technologies, are applied in project implementation. PTT Group has set up the target to dedicate 3% of its net operating profits to social development projects, and has established a target to achieve sustainable allocation of social investments within 5 years (2019-2024). The target specifies that the share of donations out of all social investments should be 30% or below, while the share of funds used in CSR projects and social enterprises out of all social investments should be at least 70%. For 2019, the target has been set at 45% of social investments in charitable gifts, and 55% of social investments in community investment and commercial initiative. Furthermore, PTT Group has supported the participation of employees in social development projects. In the past year, 1,570 employees – or 44% of all 3,587 employees – participated in volunteer activities.

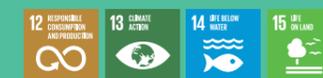
PEOPLE

Indicators



PLANET

Indicators



Human Capital, Community, and Social Development Projects (People)

PTT Group Educational Development

PTT Group has extended its educational development efforts by designing the STEM+E (Science, Technology, Engineering, Mathematics, and Ethics) education model, which now also streamlines the Group's efforts in this area. The objective of the model is to develop 21st century skills and readiness in today's youth. To realize this objective, PTT Group develops innovations in its areas of expertise - science, business, energy, and integrity - and applies such innovations to all 96 schools in its network.

Furthermore, through the Pracharath School Project, PTT Group supports the development of the quality of education in parallel with government policy. In 2019, PTT Group organized projects with 82 of its partner schools. Projects covered education in the kindergarten, primary, and secondary levels, and focused on developing teachers' knowledge and skills through courses on academic content, leadership skills, and ethics. These courses are organized based on the readiness of each school, with PTT Group analyzing school-related information and grouping the schools to ensure that the training is relevant and applicable for each school.

PTT Group has continued to provide funding support to Kamneotvidya Science Academy (KVIS) and Vidyasirimedhi Institute of Science and Technology (VISTEC). Between 2013 - 2017, the Group provided 5,745.9 million baht in financial contributions for the construction and initial operations of these institutions. For 2018-2021, a budget of 2,500 million baht has been allocated towards operations. On 11 November 2019, PTT Group, consisting of PTTEP, GC, TOP, IRPC, GPSC, and OR, entered a MOU to solidify their commitment to education promotion by providing financial support to KVIS and VISTEC over a ten-year period, from 2022 - 2031. This amounted to an additional contribution of 7,768 million baht (3,800 million baht from PTT only). These efforts demonstrate PTT Group's recognition that advancements in science, technology, and innovation are critical foundations for driving national growth and enhancing the country's competitiveness on an equal level with international peers. It also falls in line with PTT Group's aspirations to support KVIS and VISTEC as developers of leading research and creators of internationally-renowned experts in science and technology.



Graduated
2 | 141
Cohorts | Students

Currently studying
213
Students

The second cohort, with 70 students, received scholarship awards to pursue science, engineering, and technology studies abroad.

32
Scholarships



Doctoral degree

Graduated
2 Students
from the first cohorts

Currently studying
39
Students

Master's degree

Graduated
2 | 19
Cohorts | Students

Currently studying
10
Students

Outstanding Research Studies

The Institute has produced recognized research studies regarding developing innovation in energy storage from materials with high porosity and specific surface area, as well as the Cash Return from Zero Waste and Segregation of Trash Project, or C-ROS. C-ROS is an integrated biotechnology platform that resulted from the application of concepts in synthetic biology, anaerobic digestion, and process engineering. The result is a technology that delivers fast conversion of food waste into biofuels, value-added biochemicals, and high-quality fertilizers. The Project was initiated in 2019 with funding support from both the public and private sectors, including the Thailand Science Research and Innovation (TSRI), Kasikorn Bank Public Company Limited, Bangkok Industrial Gas Company Limited, and PTT Group.

Innovative development of electrical energy storage devices from materials with high porous surface area.



Sports Skill Development

PTT implements the “Inspire Dreams, Power Thai Sports” Project through collaborations with 13 sports associations and clubs throughout the country. The aim of the Project is to provide the youth and disadvantaged in various regions of the country with opportunities to train and develop their athletic skills, including at over 40 sports competitions held throughout the year. These measures all serve as important foundations for developing the abilities of Thai athletes, enhancing their skills for international competitions, and eventually to transform them into international professionals. This is achieved through the 3T Strategy, which consists of key achievements, as follows:

T1 Training

In collaboration with the Thailand Swimming Association, organize the PTT Swimming for Life Initiative to teach students basic survival skills in water, to prevent drowning amongst youth. There were over 3,360 youths participating. In collaboration with the Football Association of Thailand under Patronage of His Majesty the King, PTT brought in international football coaches from Spain (EKKONO) to organize the football clinic, “AFC Grassroots by PTT,” to provide football training to more than 900 youth.

T2 Tournament

Organize competitions such as PTT Tennis Championship for the 15th year, to support more than 950 youth competitors from around the country, and the PTT Thailand Five 2019 futsal competition between the national teams of Thailand, Oman, Guatemala, and Vietnam, where the Thai national team successfully won the championship.

T3 Thai Cheer

PTT organized the “Thai Cheer to SEAGAMES 2019” Project, which brought a cheer team of 40 people to support Thai athletes at the 30th SEAGAMES in Manila, Philippines. The cheer team cheered on 6 matches – in basketball, boxing, football, volleyball, and gymnastics – to boost morale and provide inspiration to Thai athletes, as representatives of Thailand, as they compete on the international stage. It was a proud achievement for all, as the teams that were cheered on by the cheerleaders all won their respective matches.

Furthermore, PTT promotes better qualities of life for disadvantaged youths and disabled persons, and aims to create more equality in society to help them achieve their dreams. This is accomplished through support for various projects led by key associations and clubs, such as the BBG Club, Special Olympics Thailand, the Paralympic Committee of Thailand, and Thailand Wheelchair Basketball Association.



Natural Disaster Relief

PTT Group monitors natural disasters throughout the year to maintain readiness to provide prompt disaster responses to those in need. Over the past year, the Group has supported victims of the Tropical Storm Pabuk, floods in Northeastern Thailand and Ubon Ratchathani province, droughts, and cold weather, through providing survival kits, blankets, fuel oil, services of the Group’s emergency rescue and response team (PTT Group Seals), and cash donations through government agencies and other organizations. In total, the Group supported 32,000 households.



Participatory Energy Development with Communities

PTT promotes renewable energy consumption in communities in 3 different ways by collaborating with civil society actors and relevant agencies. Details on progress are reported below:

Community Biogas System from Pig Farming Project: The Project was expanded to one more location in Payupnai District, Rayong Province, while the first Project location in Kamkaen District, Khon Kaen province also had its carbon credits certified through the Thailand Voluntary Emission Reduction Program (T-VER).



4 Project locations



794 Beneficiary households



Reduce greenhouse gas emissions by 10,518 tonnes CO₂ equivalent per year

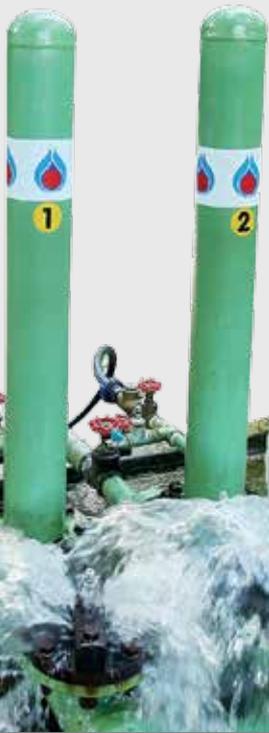


Gaining increased incomes from selling organic fertilizers - a by-product of biogas production and carbon credits and reduce 7.17 million baht per year in energy costs



Water Distribution using Hydraulic Ram Pump Project:

The Project has been expanded to 8 other locations.



30 Locations in total



Equivalent to a reduction of 2,532,033 baht in water costs per year



The pump capacity is 678 cubic meters per day, or 247,356 cubic meters per year.



Solar Cell System: PTT promotes the use of solar cells through three different approaches – through sharing knowledge and investing in communities, sharing knowledge and investing jointly with communities, and sharing knowledge without investing (i.e. the community is the investor). In 2019, PTT further supported the attainment of carbon credits through the T-VER Program in one new location in Mae Ta district in Chiang Mai province.



The Project currently covers 17 locations



500 Beneficiary households



Produced 349,792 units of electricity per year



Total cost reduction of 1,399,168 baht per year



Greenhouse gas emissions reductions of 199 tonnes of CO₂ per year

Here, PTT has collaborated with GPSC in installing a 17 kW solar power system and organizing training sessions on renewable energy, solar power systems, as well as solar power system maintenance, at Doi Hang Prison in Chiang Rai province, a Royal Initiative Project of Her Royal Highness Princess Bajrakitiyabha Narendira Debyavati. The Project aimed to promote efficient energy and resource consumption, and build readiness and vocational skills for inmates.

Promoting Social Enterprises

PTT Group supports social enterprises through Sarn Palung Social Enterprise Company Ltd. (SPSE). Performance highlights are as follows:

Community Coffee Sourcing Project: Apart from the direct purchasing of coffee beans, this Project aims to promote shade-grown Arabica coffee, wastewater management, and the development of knowledge assets associated with the coffee bean growing process and reprocessing. Farmers in Chiang Rai province from Ban Pang Khon and Ban Pha Lang communities in Mueang district, and household farmers in Ban Huai Mak, Ban Huai Yuak Pa So, Ban Sam Sung, and Ban Ato in Mae Salong Nai district have now participated in the Project.



160 Households in total



The Project further added 6,500 shade trees.



In 2019, PTT Group purchased 134 tonnes of parchment coffee



SROI is 13.8%



Increased incomes by 15,000-30,000 baht per household per month, or a total of 1,699,275 baht per year

Café Amazon for Chance: Hired additional individuals with hearing disabilities as permanent employees and baristas at two additional stores, bringing the total to five stores. Most recently, a new Café Amazon for Chance store opened at the PTT Head Office in December 2019, where the Company recruited those with hearing disabilities as baristas, offering pre-training and on-the-job training, as well as provided opportunities for those with learning disabilities and the elderly.



Created 18 job opportunities for those with disabilities (16 with hearing disabilities, and 2 with learning disabilities)



Increasing income by around 7,000 baht per person per month, or 1,512,000 baht per year



SROI is 10%.

Not only that, the Project area was expanded to promote Robusta coffee planting among farmers in Ban Pong Luek and Ban Bang Kloei in Kaeng Krachan district, Phetchaburi province, and to a research and development partnership with the Forestry Industry Organization on coffee growth and production in economic forest areas, using a business and community management model under the framework of social enterprises.



PTT Group Lounge: This Project aims to reduce the elderly caregiving burdens of those in the labor market and on government benefits by promoting elderly employment. The Project was launched at the Happy and Healthy Bike Lane at Suvarnabhumi Airport.



Generated an income of 13,000 baht per person per month, or a total of 780,000 baht per year



Employed 5 elderly individuals



SROI is 15%.

PTT Day Care Project: A day care center for the children of PTT Group employees, which is also a way to create jobs for stakeholders from the Housewives Association of the State Railway of Thailand. The day care has been opened since 2 September 2019.



Currently cares for 26 children from below the age of one year old to four years old and expecting a maximum of 40 children in 2020



11 caregivers in which 3 have been selected from the Housewives Association



Generate additional income of around 11,000 baht per person per month, or 253,000 baht per year



SROI is 27%.

Promoting Environmental and Natural Resource Conservation and Restoration (Planet)

PTT is expanding upon the knowledge that it has gained from over 25 years of experience in reforestation by creating awareness of natural resources and environmental conservation, and linking them to the unique benefits of forests and green spaces in a sustainable way, through an integrated approach. Performance highlights can be summarized as follows:

Natural Resource Conservation



Promoting the expansion of urban green spaces and instilling a “Green Mindset”

In 2019, the Company organized the event, “40 Years: PTT Plant Together,” by supporting five universities – Thammasat University, Rangsit University, Bangkok University, King Mongkut’s Institute of Technology Ladkrabang, and Rajamangala University of Technology Krungthep – in a competition to win prize money from designing a green space according to the needs of each university. PTT provided an initial financial contribution of 100,000 baht to each institution for their designs, shared knowledge from the PTT Ecosystem and Reforestation Institute, and worked with landscape architects on recommending tree species, area needs, appropriate means of caretaking and the benefits of various tree species to participants throughout the duration of the competition. It can also be considered a starting point for increasing urban green spaces by using an inclusive approach, and for instilling a green mindset to promote better qualities of life and environment in cities.



Increase urban green spaces by 2,694 square meters



Since 1994, PTT has planted and cared for 1,167,213 rai of forest area.



In 2019, PTT planted 2,470 rai of forest area.



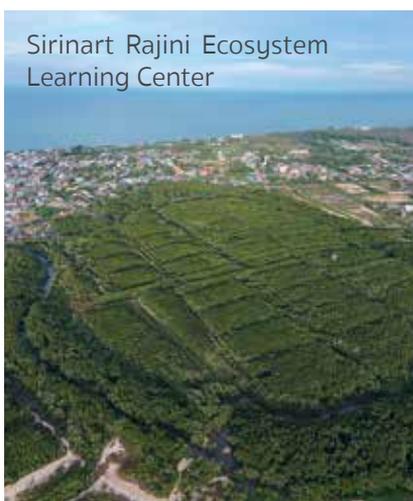
Absorb over 2.14 million tonnes CO₂ per year in greenhouse gases.



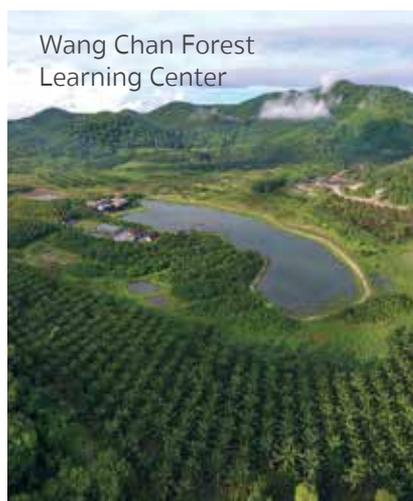
Generate a value of over 280 million baht in forest services for communities.

Reforestation for Ecosystem Conservation and Promoting Community Forests:

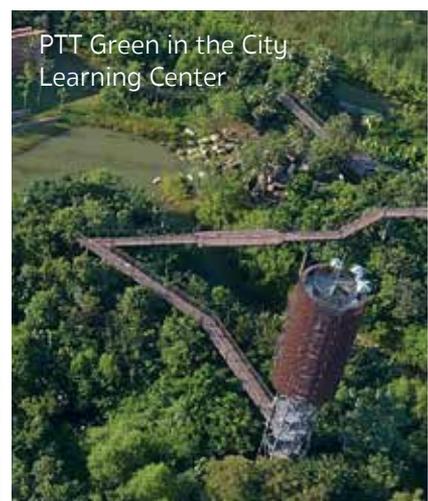
Following PTT’s continued collaborations with community networks on forest and natural resources promotion and preservation, including with the Green Globe Institute, Civil Forest Protection Volunteers Network, and Vetiver Network, the Company decided to expand upon these collaborations by increasing green spaces in the form of community household forests within community-owned spaces. Growing a community forest refers to the creation of a forest – in an area with a title deed – for household uses. It involves growing a mixture of plants that benefit both air conditions and food security, such as perennial plants, fruit trees, flowering plants, herbs, and spices, etc., in accordance with the approach of the Royal Project, “Plant Forests, Create Incomes,” of Her Royal Highness Princess Maha Chakri Sirindhorn, and the 20-Year National Strategy on Eco-Friendly Development and Growth. Today, the community forest area in Pang Sawan sub-district, Chum Ta Bong district, Nakhon Sawan province, has grown by 219 rai. In addition, since 1994, PTT has planted and cared for 1,167,213 rai of forest area. In 2019, the Company planted 2,470 rai of forest area, which is able to absorb over 2.14 million tonnes carbon dioxide per year in greenhouse gases, and generates a value of over 280 million baht in forest services for communities. Furthermore, PTT entered into a MOU with the National Science and Technology Development Agency (NSTDA) on testing the Smart Farming Prototype system in the Wang Chan Forest Learning Center area, which involved installing a sensor system, and systems for humidity, light, temperature, air circulation, and control. The System will serve as a prototype for how innovations can be integrated with existing knowledge on reforestation, so that it can be leveraged later on by farmers in target areas, or by other interested parties.



Sirinart Rajini Ecosystem Learning Center



Wang Chan Forest Learning Center



PTT Green in the City Learning Center

Learning Promotion through Three Learning Centers

These include the Sirinart Rajini Ecosystem Learning Center, the Wang Chan Forest Learning Center, and PTT Green in the City Learning Center. On average, these centers have more than 17,000 visitors per month combined. They serve as centers for knowledge dissemination and learning on diverse ecosystems for the Company and interested parties, and help to inspire and instill a sense of awareness about the environment.



More than 17,000 visitors per month in 2019

Promoting Forest Benefits and Learning through the Nature Trail and Cycling Path in Forest Plot FPT 49

PTT, in collaboration with the Department of National Parks, Wildlife and Plant Conservation, and the Armed Forces Development Command, developed a 800-meter nature study trail and 7-km cycling path at the entrance-exit of the hill towards “Nara Tree Song Pluk Forest,” in forest plot FPT 49. These trails are located in a no hunting zone in Phu Luang Hill, Lam Nang Kaeo sub-district, Pak Thong Chai district, Nakhon Ratchasima province. Opening hours are between 8:30 - 16:30 everyday. They were created in honor of the coronation of H.M. King Maha Vajiralongkorn, as well as to provide urban and rural dwellers with the benefits of the forest through cycling activities and the nature trail, as they can serve as learning sources for forest and ecosystem restoration, and relaxation spots.



Nara Tree Song Pluk Forest

Social Collaboration Mechanism in Khung Bang Kachao

In 2018, PTT jointly established the “Our Khung Bang Kachao” Project in collaboration with 34 organizations from the public sector, private sector, civil society, academic institutions, and communities – with the Chaipattana Foundation overseeing governance. The aim of the Project is to develop green areas, foster growth, and strengthen communities living in Khung Bang Kachao through sustainable, environmentally-friendly ways. This “Green Growth” approach will be achieved through three main dimensions – environment, economic, and cultural – to improve the overall livelihoods and environment of Khung Bang Kachao communities, and to serve as a model for green community development in a Thai city. The progress of the Project is regularly monitored by the Khung Bang Kachao Development Committee for Sustainable Development. As for PTT, the Company is responsible for the Green Area Taskforce, and Administration and Communication Taskforce. In 2019, progress was achieved in the conservation and improvement of 400 rai of green spaces, namely in terms of a joint community consultation process, procurement of saplings, and improvement of water management systems. This is in pursuit of the goal to preserve and develop 6,000 rai of green spaces in the six sub-districts of Khung Bang Kachao, in line with the objectives of the Five-Year Plan (2019-2023).



Conserved and developed 400 rai of green spaces in 2019



Target to conserve and develop 6,000 rai of green spaces in 5 years



Interview from a Participant in the “40 Years: PTT Plant Together” Competition

The winning team from the Rajamangala University of Technology Krungthep submitted their urban green space design using the concept, “From Grey to Green.” It involved adapting the area of an existing building, which is used as storage space and is not too visually appealing, into an area that inspires people in the form of a “Co-working Space.” Users of this space will be able to get in touch with nature and work in a functional area, while considering ways of caring for the trees around them. This is an example of a small but innovative green space that can serve as an inspiration for future urban green space development, regardless of limitations.

“The 40 Years: PTT Plant Together event greatly developed our capabilities, because when we first got involved in the activity, we still lacked knowledge on design. But once we received advice from the landscape architects and advisors from the PTT Reforestation and Ecosystem Institute, as well as all the judges, we felt much more confident that our work will turn out well. This event gave us the opportunity to collaborate with experts from so many different departments, and so I would like to say thank you, and would like this competition to be organized every year.”



For more information, please visit www.pttplc.com and refer to “Sustainable Growth for All” tab or “Sustainability” tab, “Social” heading and “Corporate Citizenship” sub-heading



Safety and Occupational Health



Challenges and Opportunities

Effective safety and occupational health are crucial to employees, suppliers, contractors and other related stakeholders. PTT focuses on managing and controlling safety and occupational health for continuous and systematic operations. This prevents severe incidents from occurring in any processes. The Company deploys engineering principles according to the laws, international standards, and other regulations to facilitate indication, assessment and control efforts of any danger. Such danger may derive from process, storage, design, usage, maintenance, monitoring, testing, transportation or mobilization of hazardous chemicals. This includes product transportation. PTT aims to build stakeholders' trust in the safety and occupational health management system, which grow in tandem sustainably and steadily with PTT.

Key Performance

PTT seeks to ensure safety and occupational health performance is accordance to the laws and international standards' guiding principle. The Company also aims to grant employees and all operators safety and good well-being. PTT therefore develops safety and occupational work plan on an annual basis, in order to consistently mitigate any incidents that may happen. There are targets regarding safety and occupational health as follows, zero Loss Time Accident (LTA) for employees and contractors; less than 0.08 per 200,000 working hours of Total Recordable Injury Rate (TRIR) for employees and contractors' and no more than 0.12 Total Recordable Occupational Illness Rate (TROIR) per 200,000 working hours. The targets were benchmarked against leading peers from both the same and similar sector. Safety and occupational health performance in 2019 comprises zero TROIR for employees, zero LTA for employees and 0.025 for contractors, 0.061 TRIR for employees and 0.038 for contractors. Employees' TRIR did not improve due to decreased working hours. The hour change was due to oil business retails being split out as OR.

Safety

Work safety is plausible if employees and relevant parties are mindful and strictly follow measures stipulated by PTT, to an extent it is reinforced as corporate safety culture. Furthermore, PTT has also announced Security, Safety, Occupational Health and Environment Regulation. This encompasses rights and roles of employees when it comes to safety and occupational health. It includes the right to stop-work and to turn down work deemed unsafe. In 2019, there is also an ongoing event to identify areas of risks within the Head Office. Subsequently, solutions are proposed. The walking areas at the Head Office have also been improved.

Process Safety

PTT Group Process Safety Management Task Force, a PTT-Group level network, has worked to develop PTT Group Process Safety Strategy. The task force analyzes internal and external factors, monitor changing engineering standards, laws, and news of severe incidents across the world on a regular basis. Their role is to develop improvement plan addressing PTT Group process safety issues, including organizing technical trainings and knowledge exchange, both within PTT Group and across a number of leading companies around the world. The task force collaborates with expert working team on PTT Group Operational Excellence, to join forces in producing PTT Group standards on work and prevention against serious accident.

To achieve the target for 'zero process safety incidents', PTT Group applies the Bow Tie Analysis as a tool to analyze and management process safety risks. This facilitates the Group's aspired elevation of process safety management level. By 2021, PTT Group aims to build a safe working culture and put in concerted efforts to develop the Process Safety Management Strengthening Toolkits. The toolkit is to be used for executives, employees and operators to minimize risk of severe accidents on a daily basis. Furthermore, PTT Group's KPIs on process safety achievements refers to the number of Tier 1 process incidents, which needs to be zero. The Group has recently set the target of Tier 2 process incidents to be no more than 6 times (excluding the counts occurring in 2018). In 2019, the trend increased from 2018. There has been a total of 4 Tier 1 process safety incidents and 7 Tier 2 process safety incidents. Notably, PTT Group Process Safety Management Task Force has developed 2020 work plan on process safety incident investigation and preventative measures to avoid recurrence. The task force aims to expand application of the Bow Tie Analysis to additional operation areas of PTT Group. It supports thorough utilization of the Process Safety Management Strengthening Toolkits to effective prevent and reduce number of process safety incident in PTT Group effectively.

PTT Group Process Safety Indicators

(Number of incidents)

Tier 1 Process Safety Incident

	2019	2018	2017	2016
Performance	6	3	6	7
Target	0	0	0	0

Tier 2 Process Safety Incident

	2019	2018	2017	2016
Performance	6	6	5	8
Target	N/A	N/A	N/A	6

Remarks:

- Report of PTT Group's Tier 1 and Tier 2 process safety incidents referenced specifications of American Petroleum Institute (API) Recommended Practice 754
- There were no Tier 1 and Tier 2 process safety incidents occurring in PTT.



Transportation Safety

PTT's policy stipulates that transportation contractors apply the PTT Group Road Safety Management Guideline diligently. The targeted rate of serious road accidents is set at no more than 0.04 per 1,000,000 kilometers distance by 2019, and zero injuries or fatalities. Past continuous good performance results in steady decreasing trend in road safety incidents. PTT has therefore established new targeted rate for 2020, one which is more challenging. The new target is 0.027 per 1,000,000 kilometers distance. The long-term target is to achieve zero incident by 2022.

PTT continuously organizes PTT Group Logistics Zero Accident and Eco-Driving program to elevate control measures against incident risks. The programs aim to build road safety sustainably. PTT has also awarded the PTT Group Logistics Zero Accident and Eco-Driving Award 2019 to outstanding transport contractors. There are 2 projects, comprising Zero Accident and Fuel Saving Program for transport contractors. The projects encourage contractors to adhere with PTT Group's product transportation safety criteria. They also help reduce fuel consumption by 2.62 million liters per year, or equals to 74 million baht per year; as well as reducing greenhouse gas emission by 7,095 tonnes carbon dioxide equivalent per year. Furthermore, PTT, as Pracharath Working Committee for Road Safety, continuously supports in awareness raising on road safety for governmental sector, private sector and civil society. This is part of the efforts to elevate road safety management level.

PTT Group's Road Safety Incident

(Number of incidents per 1,000,000 kilometers distance)

Performance



Target



Remarks:

PTT Group determines severity of road safety incidents from multiple factors, such as Lost Time Injury, product spillage volume, number of fatalities, impacts to communities and corporate image, to name a few.



PTT Provided 21,000 Helmets for Road Safety

Road safety incident analysis helps PTT identifies that 80% of fatalities on the road are motorcycle users ranging from age 15-20 years old; considered as youths. PTT recognizes the issues' gravity, and accordingly supports Department of Land Transport's project, 'New Gen, Get Helmet' by providing 21,000 helmets. Said helmets are made from renewable materials, Green ABS, by PTT Group, which already passed Thai Industrial Product Standard (TISI). PTT prioritizes road safety, and would like to be part of the efforts to instill youths with awareness of good driving, and safe driving in compliance to laws. This is to facilitate reduction of severe road safety incident on the road, and to help improve quality of lives among Thais.

Occupational Health

PTT uses Health Performance Indicator (HPI) per International Petroleum Industry Environmental Conservation Association (IPIECA)'s Standard. The Group also uses information from companies in The International Association of Oil & Gas Producers (IOGP) to benchmark the performance against, via the use of self-assessment form on occupational health management. Furthermore, in 2019, PTT has reviewed HPI Checklist and organized for an internal assessment to determine PTT's internal function's score on health performance. The feedback and information collected will be used to develop and further improve corporate occupational health management approach. PTT's health performance in 2019 was at 3.09, which will be used for comparison in the upcoming years.



Health Campaign

In 2019, following an employee survey on Stretching event, it appears that most employees have muscle fatigue. PTT has therefore organized stretching event for employees working at headquarter on Tuesdays and Thursdays, between April to October. The program provided employees the opportunity to stretch and decreased fatigue. There was also a campaign for employees and other workers to exercise every Wednesday end of month (PTT Sport Day). There was also a Health Promotion Activity for employees to exercise by themselves. Employees were to record the duration and exercise types. The data generated will be used to analyze for exercise results and determine employees' general health; relying on data such as Body Mass Index (BMI). There is a total of 319 project participants, comprises headquarter employees, long-term contractors, to name a few. Results in 2019 illustrates that participants' BMI improved by 35.



For more information, please visit www.pttplc.com and refer to "Sustainability" tab, "Social" heading and "Security, Safety and Occupational Health" sub-heading.





Security

Challenges and Opportunities

As the environmental landscapes rapidly changes nowadays, PTT faces multitude of challenges. These may be unpredictable or predictable events. This affects PTT's business capacity, damages to lives or assets, disruption of critical processes, and may even have wide-range impacts to the country, society, community and stakeholders. It is a challenge to PTT to manage security and business continuity, in order to ensure continuous and effective business operations and responsiveness to stakeholders

Key Performance

PTT reviews its 2019 Security Management Guideline to ensure alignment with present and future contexts. Furthermore, PTT also prioritizes development for integrated approach. Accordingly, the performance is divided into 3 aspects, which are: human capital development, operation development, as well as security technology and innovation deployment. The 3 aspects are continuously developed and improved, focusing on assessment threats from security threats and relevant situations. They are used to stipulate relevant measures befitting of the situations. Each process must be in alignment with Universal Declaration of Human Rights (UHR) and relevant human rights guidelines. The adherence ensures effective readiness against any threats to PTT. Similarly, PTT has also reviewed PTT Group's Emergency and Crisis Management to ascertain that PTT and PTT Group are able to contain emergencies and crises in the most effective way. Such containment enables utmost minimization of impacts. In tandem, PTT has also been certified for ISO22301: 2012 Standards, and have also designed management approach consistent to the 2015 National Crisis Prevention and Mitigation Plan. This enables emergency and crisis management efforts with other agencies, whether governmental, state enterprise, or private sector, to be smooth and effective.

In 2019, PTT developed an incident action plan and response plan in case of security threats in operational sites. PTT security personnel are trained with relevant personnel from public agency, including both polices and soldiers. This arrangement ensures preparedness against threats that may arise from unrests and protests. There are also training provided to security personnel on human rights principles regarding violence. The training was organized at HRH Princess Sirindhorn's Botanical Garden. Notably, security, emergency and crisis management is not limited to only within PTT Group. PTT has also created a collaborative network with public sector, state enterprises, and public sector, to allow exchange, mutual learning and guideline development. This ensures that PTT is able to maintain continuous security, and preserve the mission to sustainably provide energy security to Thailand.



Monitoring Pabuk Tropical Storm

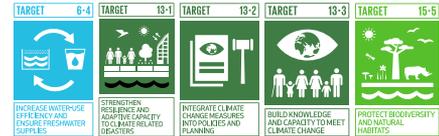
On 1st January 2019, Thai Meteorological Department announced that Pabuk Tropical Storm may affect the southern part of Thailand, and was likely to move towards PTTEP's offshore drilling rig. PTT therefore founded a monitoring center to closely follow on Pabuk Tropical Storm, in order to ascertain said operations would be safe and able to deliver natural gas to relevant departments without disruptions. PTT's President and Chief Executive Officer was the head of Tropical Storm monitoring center and supervised the efforts. There were also executives of PTT Group's subsidiaries, such as PTTEP, GC, IRPC, TOP, and GPSC, participating, integrating both information and resources in a joint effort. Once the storm has passed, it was confirmed that all employees were safe – with minimal damages to the equipment which can be immediately fixed. Customers also receive their natural gas delivery without any disruption.

For more information, please visit www.pttplc.com and refer to "Sustainability" tab, "Social" heading and "Security, Safety and Occupational Health" sub-heading.





Environmental Management



Challenges and Opportunities

PTT Group fully recognizes that our operations are directly linked to the use of natural resources. Because of this, we are determined to care for the environment across all of our operations, including by designing production processes that do not cause environmental impacts, continuously innovating green products, and minimizing environmental impacts throughout our value chain. Overall, climate change continues to be one of the top environmental issues impacting the business and our stakeholders. PTT Group is therefore committed to the ongoing mission of climate change management by becoming a leader in the integration of carbon pricing mechanisms into our capital expenditure decision-making processes, as well as applying the Circular Economy approach to the management of all material issues, in order to maximize the value and efficiency of our limited natural resources.

Key Performance

Climate Change and Energy Management

PTT closely monitors and evaluates the impacts of risks and opportunities emerging from climate change – covering short-, medium-, and long-term climate risks and opportunities. In this regard, PTT is committed to enhancing the management of climate opportunities and risks in order to respond appropriately to climate conditions in Thailand and at the international level. The Company has developed the PTT Group Clean & Green Strategy and established a greenhouse gas emissions reduction target as one of the corporate key performance indicators for top-level executives of PTT and PTT Group (including PTTEP, GC, IRPC, TOP, and GPSC), where this target falls in line

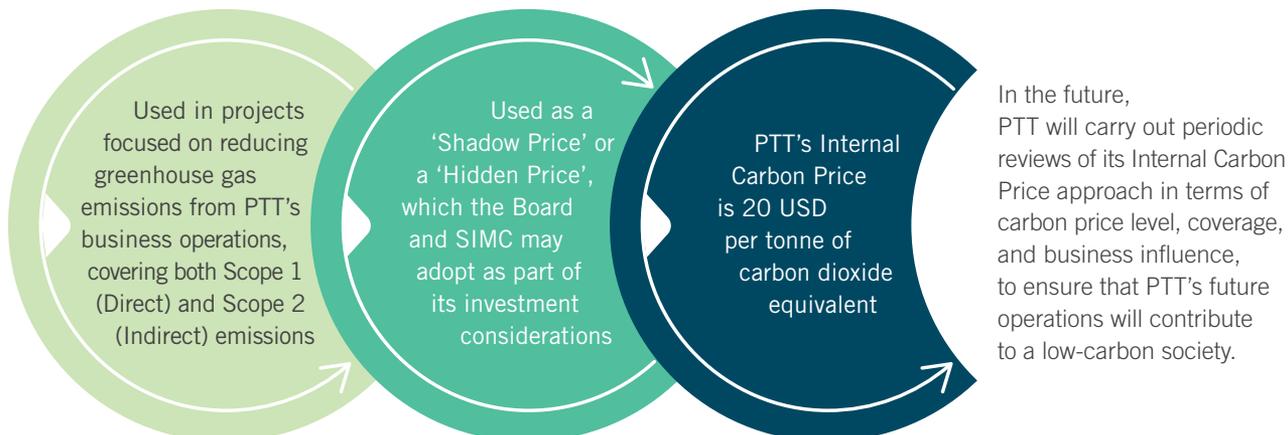
with Thailand's Nationally Determined Contribution (NDC). In 2019, PTT Group also set the target to limit the quantity of its greenhouse gas emissions to no more than 39.4 million tonnes carbon dioxide equivalent. The Group's top-level Management Committee has determined that progress against this target should be monitored quarterly as part of the Committee's meeting agenda.

The PTT Group Clean & Green Alignment Working Team is responsible for overseeing the Group's efforts on climate change, and is composed of appointed representatives from each PTT Group company. Together, these representatives will develop and enact short-, medium-, and long-term plans on climate change. The approaches, targets, and achievements of the PTT Group Clean & Green Strategy are summarized as follows.

Management Approach	Controlling greenhouse gas emissions from business operations	Increasing the quantity of clean and low-carbon products	Operating new businesses that are clean and low-carbon
Target	<ul style="list-style-type: none"> Reduce PTT Group's greenhouse gas emissions by 20% compared to business-as-usual scenarios, by 2030. Control greenhouse gas emissions intensity at the business unit level and Flagship company level. 	<ul style="list-style-type: none"> Increase the proportion of PTT Group's revenue from low-carbon products by 2023. Evaluate and integrate carbon pricing into investment decisions by 2020. 	
Past Key Performance	<ul style="list-style-type: none"> Applied the "Circular Economy in Process" approach – i.e. in business operations – by using the 3Rs principle, Reduce, Reuse, Recycle, and renewable energy and materials. Implemented energy efficiency initiatives, such as the Waste Heat Recovery Project. Reduced waste, or reused waste for other purposes. Consumed energy from renewable sources, such as by installing solar panels in office areas and PTT stations. 	<ul style="list-style-type: none"> Increased investments in renewable energy businesses and businesses in the Electricity Value Chain. Conducted studies and developed electric vehicles. Increased the quantity of products that are certified under the GREEN FOR LIFE label. Developed and manufactured products that help to reduce greenhouse gas emissions during their use, such as Gasohol 91, Gasohol 95, Gasohol E20, Gasohol E85, Diesel B10, Diesel B20, and Diesel Ultra Force. These products help users to reduce greenhouse gas emissions during their usage period by approximately 2.1 million tonnes carbon dioxide equivalent per year. 	<ul style="list-style-type: none"> Developed and implemented an approach for using an internal carbon price in investment decisions, which are considered and approved by top-level executives. Operated businesses with the goal of creating a low-carbon society, according to the "Circular Economy in Product and Value Chain" approach by setting up the largest integrated plastic recycling plant in the country, in line with international standards.

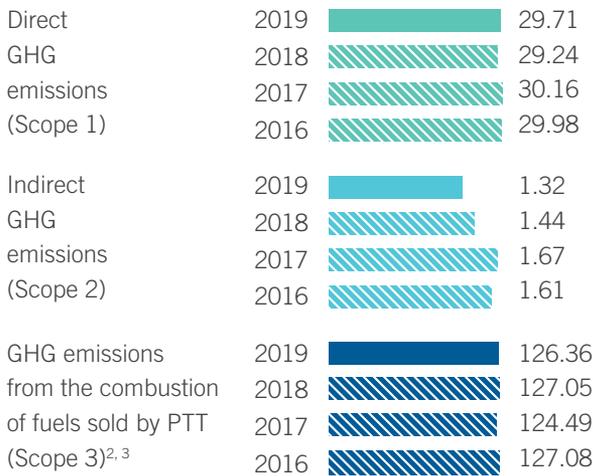
Internal Carbon Price (ICP): Using the ICP in PTT's Capital Expenditure Decision Process

In 2019, PTT developed an approach to use carbon pricing mechanisms in its capital expenditure decision process. The approach was developed by applying the "How-to Guide to Corporate Internal Carbon Pricing: Four Dimensions to Best Practice Approaches" by Ecofys, Generation Foundation, and CDP. PTT's Internal Carbon Price approach has undergone consideration and approval by the PTT Group Clean & Green Alignment Committee, the Strategic Investment Management Committee (SIMC), and PTT Group Management Committee. Given this, PTT's use of the ICP in its capital expenditure decision process can be summarized as follows:



PTT Group Direct and Indirect Greenhouse Gas Emissions¹

(million tonnes of CO₂ equivalent)



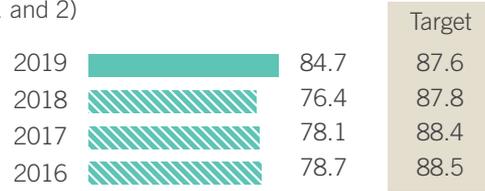
Remarks:

- 1 The scope of data covers companies in Thailand in which PTT holds direct shares of more than 20%, or indirect shares of 100%.
- 2 Scope 3 GHG emissions cover the combustion of PTT's fuel products (gasoline, diesel, jet fuel, fuel oil, liquefied petroleum gas, and kerosene). PTT manages the volume of its Scope 3 GHG emissions by setting a target to reduce direct and indirect GHG emissions (Scopes 1, 2, and 3) per unit of PTT products sold, as defined by the State Enterprise Performance Appraisal (SEPA).
- 3 The scope of data for Scope 3 GHG emissions covers PTT and OR.

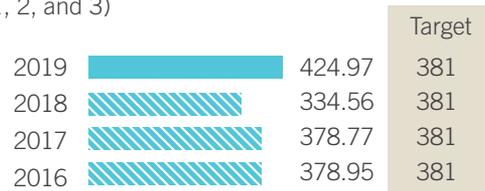
Greenhouse Gas Emission Intensity

(kilogram CO₂ per barrel of oil equivalent)

Direct and indirect GHG emissions from PTT Group activities (Scopes 1 and 2)



Direct and indirect GHG emissions from PTT Group activities and the combustion of fuel products sold by PTT (Scopes 1, 2, and 3)



Remarks:

The scope of data covers companies in Thailand in which PTT holds direct shares of more than 20%, and holds the majority of shares.

Energy Intensity Reduction from Energy Management Projects

(gigajoule per tonne of product)



Remarks:

The scope of data covers PTT's Rayong Gas Separation Plant, PTTEP, GC, TOP, and IRPC.



Water Management

Water management is an essential issue for PTT. The Company therefore ensures that water is used and managed with the proper recognition of its value, in order to generate the highest benefits from its use. In practice, this involves implementing dedicated water resource conservation measures, promoting environmentally-friendly designs, reducing water consumption from production processes, raising awareness about water use efficiency, and using water efficiently as well as creating opportunities to recycle water for other beneficial purposes – in line with Circular Economy approaches. Changes in the amount of water currently available for use are caused not only by fluctuations in annual weather patterns, but also the ongoing issue of climate change.

In 2019, PTT regularly assessed and monitored water conditions, including by monitoring its water budget and rainfall conditions, in order to inform its water management preparations, manage risks, and reduce the impacts of its water use on the ecosystem, agriculture, fishing, society and community, the environment, and business development and operations. Overall, this is to ensure communities that PTT and PTT's Group operations do not impact upon community rights to water use. In terms of the water management approach, PTT Group coordinates with internal and external agencies to manage water use efficiency in line with established targets, and also implements water risk management activities within and outside of the organization. Details of these activities are as follows.

Water Management Activities

External Management: Manage external risks, which emerge from the location of facilities and other external factors, such as risks concerning the quantity and quality of the water budget, policy and regulatory risks, and social risks.

Internal Management: Manage internal risks such as the volume of water availability and quality of wastewater from treatment systems.



Assess risks and water-related impacts on PTT Group's operations, including physical risks (volume and quality of water), legal risks, and reputational risks, by using tools and international assessment standards such as Aqueduct, WBCSD Global Water Tool, CERES Aqua Gauge, and the Water Footprint Assessment. In addition, PTT Group analyzes and develops risk management plans to reduce water-related impacts on each company by outlining impact scenarios that could emerge from raw water reduction measures over a period of 4 months. These are divided into 3 scenarios – impacts from a water reduction of 10%, 30%, and 50% – which could significantly impact production and even lead to temporary production shutdowns.



Monitor conditions and assess water risks, at the watershed level, that could impact community water access. This is accomplished by working with the Water War Room, Eastern Region, which is consisted of relevant government agencies, Eastern Water Resources Development and Management Public Company Limited (East Water), and other relevant representatives from the private sector.



Integrate cooperation and support to stimulate development and create stability and sustainability in overall water management in the Eastern region. PTT has set the target for water storage capacity in its operational areas in Rayong province to be at least 240 million cubic meters, which covers the reservoirs Dok Krai, Nong Pla Lai, and Khlong Yai. In addition, PTT monitors and promotes water resources development projects in the EEC area to ensure that it has the capacity to fulfil the increase in water demand of 1,000 million cubic meters per year by 2036.



Operate according to the 2Rs Principle (Reserve and Re-visualize) by monitoring the progress of water resources development projects implemented by relevant agencies.



Develop strategic plans on water management that align with PTT Group's climate management and risk management strategies.



Set targets, evaluate, and monitor the efficiency of the organization's water use to reduce water use intensity in 2030 by 12.6% for the production sector, and by 10% for office buildings, compared to base year 2013.

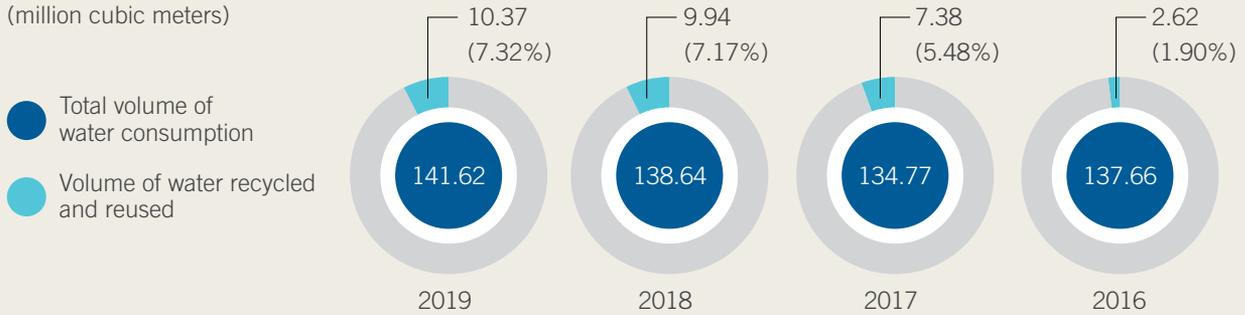


Enhance water management according to the Circular Economy approach by committing to the 3Rs principle – Reduce, Reuse, and Recycle – as well as desalinating seawater to reduce reliance on public water resources.



Water Resources Management

(million cubic meters)

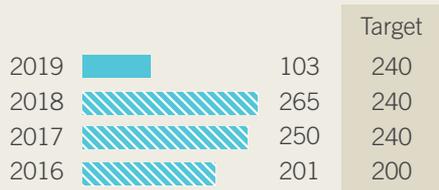


Remark:

The scope of covers companies in Thailand in which PTT holds direct shares of more than 20%, and holds the majority of shares.

Water Storage Capacity in PTT's Operational Areas, Rayong Province

(million cubic meters)



Remark:

The scope of data covers 3 main reservoirs in Rayong province: Dok Krai, Nong Pla Lai, and Khlong Yai.

Waste Management

PTT is committed to reducing the volume of industrial waste sent to landfill by reusing waste for other benefits, or extending the service life of materials according to Circular Economy principles, in the pursuit of its target to reduce hazardous waste to landfill to zero by 2020. In 2019, the Rayong Gas Separation Plant conducted studies into the reuse of expired activated carbon from its production process, in other processes, through regeneration. In this case, heat is used to stimulate and treat the hydrocarbons that remain on surfaces and porous areas to increase the surface area and porosity of the activated carbon, which can subsequently be reused. This has resulted in a reduction of activated carbon waste disposal of more than 296,420 kilograms.

Furthermore, PTT has also considered the issue of managing the country's non-hazardous waste. As a result, the Company has been promoting an awareness and consciousness of waste separation amongst employees – to address the issue of waste creation at its origin. In this regard, PTT has organized workshops and regularly communicated information on waste separation and reuse, and also collected non-hazardous waste from office buildings to be reused. For example, collecting plastic bags for reprocessing and reuse as appropriate, and collecting plastic straws to create pillows for bed-ridden patients, etc. Not only that, PTT also implemented the project, "Recycle Waste, Reduce Global Warming" through the SSHE Token System, which uses Blockchain technology to record the volume of waste and greenhouse gas emissions reduced. This Project has been certified under the Low Emission Support Scheme (LESS) of the Thailand Greenhouse Gas Management Organization (Public Organization). Likewise, it is a way for PTT to prepare to support Thailand in its Plastic Waste Management Roadmap, 2018 - 2030, which aims to use 100% recycled plastic by 2027.

Percentage of Routine Hazardous Waste to Landfill to Total Routine Hazardous Waste

(%)



Remark:

Data scope covers PTT, PTTEP, IRPC, GC, TOP, GPSC and OR.

Air Quality Management

PTT Group has set a goal to control the increasing rate of air emission including the volatile organic compounds (VOCs), oxides of nitrogen dioxide (NOx) and sulfur dioxide (SO₂) to zero by 2020. The plan covers the additional installation of 1 Selective Catalytic Reduction (SCR) control system. In addition, the Rayong Gas Separation Plant, Unit 5 is setting up a hydrogen sulfide removal unit from the regenerative thermal gas separation oxidizer (RTO) process to control the air quality emitted to have the least impact on the environment and nearby communities through continuously monitoring and measuring of emissions. The data is then used for analyzing and planning for the effective air quality management.



VOCs Intensity

(tonne of VOCs per million barrels of oil equivalent)

2019		72.34
2018		68.23
2017		74.79
2016		49.35

Oxides of Nitrogen (NOx)

(tonne of NOx per million barrels of oil equivalent)

2019		36.66
2018		37.92
2017		37.40
2016		39.72

Sulfur Dioxide (SO₂)

(tonne of SO₂ per million barrels of oil equivalent)

2019		16.93
2018		16.83
2017		13.70
2016		10.45

Remarks:

- For 2016, the scope of data covers PTT, PTTEP, GC, TOP, IRPC, IRPC's Upstream Project for Hygiene and Value-Added Product (UHV), and GPSC.
- Data scope covers PTT, PTTEP, IRPC, GC, TOP, GPSC and OR.

Oil and Chemical Spills

Aside from regularly controlling operations across our entire supply chain to reduce environmental impacts, PTT also ensures its preparedness in responding to and managing emergency situations, including all cases of oil and chemical spills, by enacting various measures. These include: reporting any and all spills that occur as they happen, rehearsing emergency response plans annually and at all PTT operational areas, and ensuring preparedness in terms of personnel and up-to-date equipment, such as oil spill containment booms, dispersant spraying arms, and satellite valve control systems in natural gas transmission systems (or Supervisory Control and Data Acquisition (SCADA)). Furthermore, PTT is involved as a member in a number of oil spill management organizations, including Oil Spill Response & East Asia Response Limited (OSRL) and IESG (Oil Industry Environmental Safety Group), in order to coordinate collaboration efforts and prepare for potential oil spills in the sea and on land. Members are also able to share knowledge and best practices on oil and chemical spill responses.

In 2019, PTT Group developed the "PTT Group Oil Spill Remediation Guideline" in collaboration with professors from the Department of Environmental Technology and Management, Faculty of Environment, Kasetsart University, and experts from the Office of Industrial Water and Environmental Technology, Department of Industrial Works, Ministry of Industry. The purpose of the Guideline is to outline an approach that aligns with international standards on assessing the results of remediation following an oil spill in the environment, including on seawater, soil, and groundwater. This will ensure that there is a systematic approach to remediation and environmental quality monitoring, and that environmental impacts are minimized as much as possible. Going forward, PTT Group plans to expand the scope of its environmental remediation studies to include spills of both its hydrocarbon and non-hydrocarbon products into the environment, and develop a Guideline for Environmental Resources Remediation Caused by Contamination.

In November 2019, at the Bangchak petroleum pier, a customer's vessel lost balance, leading to spillage of heavy fuel oil. The emergency response of PTT, including OR and together with the relevant authorities was swift and effective and as a result the spillage was contained and the leaked heavy fuel oil was fully recovered before reaching a public water source. The recovered mixture was treated and disposed of properly. The vessel was also recovered safely. Additional tests on the water in the affected area confirmed the effectiveness of the containment of the spillage and the absence of any impact on the community and environment.

Biodiversity

PTT Group analyzes and assesses biodiversity risks on an annual basis to protect against losses and reduce any negative impacts that might occur from business activities in its operational areas. Examples include additional construction projects or polluting activities that could impact ecosystems, habitats, as well as the living conditions of living beings around operational areas. For these reasons, PTT Group's biodiversity risk assessment covers relevant geographical locations, characteristics, and types of project activities. Any project that has a high biodiversity risk must develop a Biodiversity Action Plan (BAP) to mitigate potential impacts on fauna, wildlife, and the overall environment. Risk assessments have been conducted on 5 areas which is under the operation of PTT and does not cover the area under the operation of OR. The assessment showed 1 area with high risk which is the Khanom Gas Separation Plant. In addition, the BAP has been prepared to support the reduction of potential risks including a Biodiversity Survey Project to develop a baseline database of the living organisms surrounding PTT's operational areas, a Public Engagement Session on Biodiversity Assessments to allow community representatives and local agencies to participate and provide input, and Biodiversity Knowledge Training Sessions for employees, etc. In 2019, PTT Group developed a "No Net Loss" Biodiversity Assessment and is in the process of implementing these assessment guidelines in pilot areas within PTT Group, with the ultimate goal of achieving the "No Net Loss" objective. In addition, PTT Group also revised the PTT Group Biodiversity Statement, in which it added the issues of avoiding exploration and operations in areas that have been designated as World Heritage Sites and IUCN conservation areas. The revised Statement will be announced in 2020.



Environmental Management Accounting

PTT regularly collects and records environmental expenses, revenues, and investments. In 2019, PTT collected data on environmental expenses incurred within the organization starting from the source, by requesting that those carrying out reimbursements record their environmental expenses on the "e-Expense" system, to ensure greater completeness of data. PTT has now expanded this system to 6 other PTT Group Flagship companies: PTTEP, GC, TOP, IRPC, GPSC and OR. In addition, PTT developed an Environmental Return on Investment (EROI) assessment tool to determine the effectiveness of environmental investments in clear monetary terms, in order to create trust amongst stakeholders and accurately reflect the true value of its environmental expenses and investments, as outlined in the United Nations' "Environmental Management Accounting Procedures and Principles." In 2020, PTT expects to expand this system to cover additional PTT Group companies.

Environmental Investments

(million baht)



Remarks:

- Environmental investments are investments for the purpose of acquiring environmental assets of PTT only.
- Although the assets of PTT and OR have been separated since July 2018, environmental assets have increased in value compared to 2017. In 2018, PTT has improved data gathering from the investment in "Nitrogen Oxide Reduction System by Selective Catalytic Reduction (SCR) Installation" project at the Waste Heat Recovery Unit (WHRU), Rayong Gas Separation Plant Unit 5.



For more information, please visit www.pttplc.com and refer to "Sustainability" tab, "Environment" heading.



PTT Performance Summary



Economic

GRI	Required Data	Unit	PTT			
			2016	2017	2018	2019
GRI 201-1	Direct economic value generated					
	Sales revenues	Million baht	1,718,846	1,995,722	2,336,155	2,219,739
	Economic value distributed					
	Operating costs	Million baht	1,464,614	1,688,461	2,023,039 ⁵	1,967,529
	Employee wages and benefits ¹	Million baht	9,651	10,683	9,953 ²	9,865
	Dividend payments for the performance of the year	Million baht	45,699	57,108	57,123	57,125 ³
	Income taxes payment	Million baht	26,593	28,307	53,647	32,989
	Social investment	Million baht	919	1,186	1,559	1,404
	Economic value retained	Million baht	171,370 ⁵	209,977 ⁵	190,834 ⁵	150,826 ⁵
GRI 201-4	Tax privileges from the Board of Investment, Thailand ⁴	Million baht	4,030	6,180	1,525	0

Remarks:

- ¹ Employee wages and benefits for employees managed under PTT include: PTT's employees, PTT's secondment and employees in subsidiaries under PTT financial management. The scope does not include the Chief Executive Officer and top executives. Employee wages and benefits include salaries, bonuses, contributions to provident funds, etc., (if applicable).
- ² Employee wages and benefits decreased from 2017 due to the transfer of oil business to OR. A certain amount of employees were transferred to OR accordingly, resulting in lower expenses of PTT during July-December 2018
- ³ Dividend payment from the 2nd half of 2019 performance is subjected to approval from the 2020 Annual General Meeting (AGM)
- ⁴ Amount of PTT's Tax privileges only
- ⁵ Restated



Social



People

GRI	Required Data	Unit	2016		2017		2018		2019		
			Male	Female	Male	Female	Male	Female	Male	Female	
GRI 102-8	Permanent employees	Manpower	3,044	1,562	3,073	1,614	2,303	1,412	2,200	1,378	
	Outsourced workers ¹	Service Point	2,089		2,139		1,019		1,051		
	Employees by area										
	• Bangkok	Manpower	1,554	1,347	1,586	1,398	1,128	1,216	1,042	1,181	
	• Others ²	Manpower	1,447	201	1,451	199	1,148	181	1,131	186	
	• Overseas	Manpower	43 ³	14 ³	36 ⁴	17 ⁴	27 ⁵	15 ⁶	27	11	
GRI 405-1	Employees by level and age group										
	Executive (Level 14-19)	%	3.08	1.41	3.29	1.81	3.23	2.34	3.41	2.43	
	• Over 50 years old	%	2.30	1.30	2.52	1.47	2.34	1.67	2.38	1.82	
	• 30-50 years old	%	0.78	0.11	0.77	0.34	0.89	0.67	1.03	0.61	
	• Below 30 years old	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Middle management (Level 11-13)	%	7.49	5.95	8.02	6.02	7.81	6.81	8.58	7.24	
	• Over 50 years old	%	3.65	2.50	3.39	2.52	2.77	2.69	2.74	2.77	
	• 30-50 years old	%	3.84	3.45	4.63	3.50	5.03	4.12	5.84	4.47	
	• Below 30 years old	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Senior (Level 9-10)	%	18.54	10.03	18.09	10.37	18.22	12.57	18.45	13.47	
	• Over 50 years old	%	4.93	2.69	4.42	2.20	3.74	2.02	3.63	2.10	
	• 30-50 years old	%	13.55	7.27	13.65	8.11	14.32	10.39	14.67	11.26	
	• Below 30 years old	%	0.07	0.07	0.02	0.06	0.16	0.16	0.14	0.11	
	Employee (Level 8 and below)	%	36.97	16.52	36.16	16.24	32.73	16.29	31.05	15.37	
	• Over 50 years old	%	2.19	0.74	1.79	0.47	1.24	0.32	1.17	0.28	
	• 30-50 years old	%	21.06	9.42	20.91	8.85	18.65	8.75	18.59	8.66	
• Below 30 years old	%	13.72	6.36	13.46	6.91	12.84	7.21	11.29	6.43		
GRI 401-1	Total new employees	Manpower	150		280		224		76		
	New employees	Manpower	90	60	149	131	120	104	33	43	
	New hire rate	%	1.95	1.30	3.18	2.79	3.23	2.80	0.92	1.20	
	New employees by area										
	• Bangkok	Manpower	64	54	109	118	92	91	15	29	
		%	1.39	1.17	2.33	2.52	2.48	2.45	0.42	0.81	
	• Others ²	Manpower	26	6	40	13	28	13	18	14	
		%	0.56	0.13	0.85	0.28	0.75	0.35	0.50	0.39	
	New employees by age										
	• Over 50 years old	Manpower	0	0	0	1	2	0	1	0	
		%	0.00	0.00	0.00	0.02	0.05	0.00	0.03	0.00	
	• 0-50 years old	Manpower	6	8	11	21	12	22	7	8	
	%	0.13	0.17	0.23	0.45	0.32	0.59	0.20	0.22		
• Below 30 years old	Manpower	84	52	138	109	106	82	25	35		
	%	1.82	1.13	2.94	2.33	2.85	2.21	0.70	0.98		

GRI	Required Data	Unit	2016		2017		2018		2019		
			Male	Female	Male	Female	Male	Female	Male	Female	
	Total employee turnover	Manpower	87		83		71		57		
	Total employee turnover rate	%	0.02		0.02		0.02		0.02		
	Employee turnover	Manpower	43	44	44	39	44	27	29	28	
	Employee turnover rate by gender	%	0.93	0.96	0.94	0.83	1.18	0.73	0.81	0.78	
	Employee turnover by area ⁷										
	• Bangkok	Manpower	29	39	30	35	36	25	24	25	
		%	1	0.85	0.64	0.75	0.97	0.67	0.67	0.70	
	• Others ²	Manpower	14	4	14	4	8	2	5	2	
		%	0.30	0.09	0.30	0.09	0.22	0.05	0.14	0.06	
	Employee turnover by age ⁷										
	• Over 50 years old	Manpower	5	5	7	9	7	5	5	3	
		%	0.11	0.11	0.15	0.19	0.19	0.13	0.14	0.08	
	• 30-50 years old	Manpower	21	22	18	17	26	15	14	21	
		%	0.46	0.48	0.38	0.36	0.70	0.40	0.39	0.59	
	• Below 30 years old	Manpower	17	17	19	13	11	7	10	4	
		%	0.37	0.37	0.41	0.28	0.30	0.19	0.28	0.11	
	GRI 401-3	Number of employees entitled to parental leave	Manpower	3,044	1,562	3,073	1,614	2,303	1,412	2,200	1,378
Number of employees taking parental leave		Manpower	68	43	79	44	66	49	68	40	
Number of employees returning to work after parental leave		Manpower	68	43	79	44	65	48	68	35	
Number of employees returning to work after parental leave who are still employed for the next 12 months		Manpower	67	42	70	38	0	0	0	0	
Retention rate		%	98.53	97.67	88.61	86.36	0.00	0.00	0.00	0.00	
GRI 404-1	Average hours of training per employee ⁸	Hour per employee	38.82	71.35	37.85	43.51	76.69	68.78	71.25	74.81	

Remarks:

- ¹ Outsourced workers refers to contractors who deliver tasks specified in the annual TOR and do not include short-term outsourced workers during the year e.g. sub-contractors, consultants, housekeepers, etc.
- ² Others refers to other provinces outside Bangkok where PTT's offices are situated.
- ³ Including employees working abroad in Cambodia, Laos, Myanmar, Malaysia, the Philippines, Singapore, Indonesia and England.
- ⁴ Including employees working abroad in Cambodia, Laos, Myanmar, Malaysia, the Philippines, Singapore, Indonesia, England and the United States of America.
- ⁵ Including employees working abroad in Cambodia, Myanmar, Malaysia, the Philippines, Singapore, Indonesia and England.
- ⁶ Including employees working abroad in Cambodia, Laos, the Philippines, Singapore, England, China and the United States of America.
- ⁷ Employee turnover excludes retired employees.
- ⁸ Hours of training and further study are included in the average hours of training per year per employee.



Safety

Reporting Scope	Year	PTT Operated Business															2019 Coverage (%)	
		PTT Building					Terminal											
		Head Office	Prakanong Office	PTT Innovation Institute	Rayong Office	Oil Business Academy (OBA)	Gas Separation Plant (GSP)	Gas Transmission (GTM)	Gas Terminal	Oil Terminal	Aviation	Retail	Lubrication	Transportation	NGV	Café Amazon Roasting Plant		
Near miss incident	Employee and contractor	2019	•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	100
	Employee and contractor	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Employee and contractor	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Employee and contractor	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Occupational illness frequency rate (OIFR)	Employee	2019	•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	100
	Contractor		•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	
	Employee	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Employee	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Employee	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Fatalities	Employee	2019	•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	100
	Contractor		•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	
	Employee	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Employee	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Employee	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Absentee rate (AR)	Employee	2019	•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	100
	Contractor		•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	
	Employee	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Employee	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Employee	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Lost workday case (LWC)	Employee	2019	•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	100
	Contractor		•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	
	Employee	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Employee	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Employee	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	

Reporting Scope	Year	PTT Operated Business														2019 Coverage (%)			
		PTT Building						Terminal											
		Head Office	Prakanong Office	PTT Innovation Institute	Rayong Office	Oil Business Academy (OBA)	Gas Separation Plant (GSP)	Gas Transmission (GTM)	Gas Terminal	Oil Terminal	Aviation	Retail	Lubrication	Transportation	NGV		Café Amazon Roasting Plant		
Lost day rate (LDR)	Employee	2019	•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	100	
	Contractor		•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR		
	Employee	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Employee	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Employee	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Contractor	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•			
Total recordable injuries case (TRIC)	Employee	2019	•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR		100
	Contractor		•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR		
	Employee	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Employee	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Employee	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Contractor	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•			
Total recordable injuries rate (TRIR)	Employee	2019	•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR	100	
	Contractor		•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR		
	Employee	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Employee	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Employee	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Contractor	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•			
Lost time injury frequency rate (LTIFR)	Employee	2019	•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR		100
	Contractor		•	NR	•	NR	NR	•	•	NR	NR	NR	NR	NR	NR	•	NR		
	Employee	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Employee	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Contractor		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
	Employee	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Contractor	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•			

Remarks:

NR: Not relevant

- Working hours at service stations include those working at PTT-owned and operated stations only. Reporting includes total workforce only.
- Working hours at NGV Service Stations cover NGV Mother Station and PTT-owned and operated service stations only.

GRI	Required Data ⁵	Unit	PTT			
			2016	2017	2018	2019
GRI 403-2 ¹	Lost workday case (LWC) ²					
	• Employee	Person	3	2	1	0
	• Contractor	Person	5	2	7	2
	Lost day rate (LDR)					
	• Employee	Lost day per 200,000 hours worked	0.84	1.01	0.07	0
	• Contractor	Lost day per 200,000 hours worked	0.68	0.11	0.61	0.11
	Total recordable injuries case (TRIC) ³					
	• Employee	Person	8	4	2	2
	• Contractor	Person	9	8	16	3
	Total recordable injuries rate (TRIR) ³					
	• Employee	Person per 200,000 hours worked	0.18	0.09	0.04	0.06
	• Contractor	Person per 200,000 hours worked	0.05	0.04	0.09	0.04
	Lost time injury frequency rate (LTIFR) ³					
	• Employee	Person per 200,000 hours worked	0.07	0.04	0.02	0
	• Contractor	Person per 200,000 hours worked	0.03	0.01	0.04	0.03
	Occupational illness frequency rate (OIFR) ³					
	• Employee	Person per 200,000 hours worked	0	0	0	0
	• Contractor	Person per 200,000 hours worked	NA	NA	NA	0
	Absentee Rate (AR)					
• Employee	%	1.74	1.64	1.58	1.44	
• Contractor	%	NA	NA	NA	NA	
Fatalities						
• Employee	Person	0	0	0	0	
• Contractor	Person	0	0	1 ⁴	0	
Near Misses						
• Employee and contractor	Case	164	104	113	75	
Zero accident	Number of accidents from using corporate vehicles	Case	14	13	6	6
		Target	6	6	10	5
	Number of land transport accidents	Case per 1,000,000 km	0.07	0.05	0.01	0.02
		Target	0.05	0.05	0.05	0.04

Remarks:

NA: Not available

¹ The reporting boundary covers domestic operations only, not broken down at the regional level. OH&S data is also not broken down by gender because PTT equally regards the importance of safety for all, employees, in accordance with PTT's Code of Business Ethics. The data excludes contractors working on construction projects that have not yet been handed over to PTT, such as the Natural Gas Transmission Pipeline Project.

² Monitored by calendar day, and is recorded after the day on which the incident occurred. 2020 target is equal to zero.

³ Do not include first aid cases.

⁴ In 2018, there were accidents resulting in one fatality. PTT has investigated and taken actions to prevent recurrence. The incident was raised as a lesson-learned for relevant parties.

⁵ Workers were recategorized according to GRI 2016 for the year 2016 – 2018.

* All employees refer to employees and contractors under PTT's governance, according to the original G4 Guideline.

** Contractors refers to independent contractors only - in accordance to the original G4 Guideline.



Environment

Reporting Scope	Year	PTT Operated Business														2019 Coverage (%)			
		PTT Building				Terminal													
		Head Office	Prakanong Office	PTT Innovation Institute	Rayong Office	Gas Separation Plant (GSP)	Gas Transmission (GTM)	Gas Terminal	Oil Terminal	Aviation	Retail	Lubrication	Transportation	NGV	Cafe Amazon Floating Plant				
Direct GHG emissions (Scope 1)	2019	•	•	•	NA	•	•	•	•	•	•	•	•	•	•	•	•	•	100
	2018	•	•	•	NA	•	•	•	•	•	•	•	•	•	•	•	•	•	
	2017	•	•	•	NA	•	•	•	•	•	•	•	•	•	•	•	•	•	
	2016	•	•	•	NA	•	•	•	•	•	•	•	•	•	•	•	•	•	
Indirect GHG emissions (Scope 2)	2019	•	•	•	NA	•	•	•	•	•	•	•	•	•	•	•	•	•	100
	2018	•	•	•	NA	•	•	•	•	•	•	•	•	•	•	•	•	•	
	2017	•	•	•	NA	•	•	•	•	•	•	•	•	•	•	•	•	•	
	2016	•	•	•	NA	•	•	•	•	•	•	•	•	•	•	•	•	•	
Direct energy consumption	2019	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	100
	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Electricity purchased	2019	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	100
	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Water withdrawal	2019	•	NR	•	NR	•	•	•	•	NR	NR	NR	NR	•	NR	•	NR	•	100
	2018	•	•	•	•	•	•	•	•	•	•	•	NR	•	•	•	•	•	
	2017	•	•	•	•	•	•	•	•	•	•	•	NR	•	•	•	•	•	
	2016	•	•	•	•	•	•	•	•	•	•	•	NR	•	•	•	•	•	
Effluents	2019	•	NR	•	NR	•	•	•	•	NR	NR	NR	NR	•	NR	•	NR	•	100
	2018	•	•	•	NR	•	•	•	•	•	•	•	NR	•	NR	•	NR	•	
	2017	•	•	•	NR	•	•	•	•	•	•	•	NR	•	NR	•	NR	•	
	2016	•	•	•	NR	•	•	•	•	•	•	•	NR	•	NR	•	NR	•	
Produced water	2019	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	100
	2018	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
	2017	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
	2016	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Waste disposal	2019	•	NR	•	NR	•	•	•	•	NR	NR	NR	NR	•	NR	•	NR	•	100
	2018	•	•	•	•	•	•	•	•	•	•	•	NR	•	•	•	•	•	
	2017	•	•	•	•	•	•	•	•	•	•	•	NR	•	•	•	•	•	
	2016	•	•	•	•	•	•	•	•	•	•	•	NR	•	•	•	•	•	
Oil and chemical spills	2019	•	NR	•	NR	•	•	•	•	NR	NR	NR	•	•	NR	•	NR	•	100
	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Nitrogen oxides (NOx)	2019	NR	NR	NR	NR	•	•	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	100
	2018	NR	NR	NR	NR	•	•	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
	2017	NR	NR	NR	NR	•	•	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
	2016	NR	NR	NR	NR	•	•	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Sulphur dioxide (SO ₂)	2019	NR	NR	NR	NR	•	•	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	100
	2018	NR	NR	NR	NR	•	•	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
	2017	NR	NR	NR	NR	•	•	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
	2016	NR	NR	NR	NR	•	•	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Volatile Organic Compounds (VOCs)	2019	NR	NR	NR	NR	•	•	•	•	NR	NR	NR	NR	NR	NR	NR	NR	•	100
	2018	NR	NR	NR	•	•	•	•	•	•	•	NR	NR	NR	NR	NR	•	•	
	2017	NR	NR	NR	•	NR	•	•	NA	NA	NA	NR	NA	NR	NA	NR	NA	•	
	2016	NR	NR	NR	•	NR	•	•	NA	NA	NA	NR	NA	NR	NA	NR	NA	•	
Volume of methane (CH ₄) emitted	2019	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	NR	•	100
	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	NR	•	
	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	NR	•	
	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	NR	•	
Direct methane (CH ₄) emissions	2019	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	NR	•	100
	2018	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	NR	•	
	2017	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	NR	•	
	2016	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	NR	•	

Remarks:

NA: Not available
NR: Not relevant



Water

GRI	Required Data	Unit	PTT			
			2016	2017	2018	2019
GRI 303-1	Total water withdrawal	Million m ³	3.59	3.64	3.67	2.35
	• Surface water	Million m ³	0.31	0.25	0.16	0.06
		%	8.75	6.87	4.38	2.56
	• Seawater: other purposes	Million m ³	0.02	0.02	0.02	0.02
		%	0.56	0.55	0.57	0.91
	• Water supply	Million m ³	3.03	3.17	3.27	2.15
		%	84.56	87.09	89.00	91.73
	• Groundwater	Million m ³	0.17	0.14	0.15	0.04
		%	4.72	3.85	4.05	1.56
	• Rainwater	Million m ³	0.05	0.06	0.07	0.08
		%	1.41	1.65	2.00	3.24
		Total salt/brackish water (seawater + once through cooling)	Million m ³	0.02	0.02	0.02
	Water from all other sources (surface water + groundwater)	Million m ³	0.48	0.38	0.31	0.10
GRI 303-3	Recycled & reused water	Percentage of water withdrawal	5.87	3.57	6.41	9.09
		Million m ³	0.21	0.13	0.24	0.21
	Water intensity	m ³ /mboe	0.009	0.009	0.009	0.006

Remarks:

- Strategic Objective 2020: Reduce water consumption in high risk areas and limit the increase of water consumption in areas with high consumption.
- In 2018, the amount of surface water use has decreased because WECoZi was out of PTT's Scope
- In 2018, the amount of water supply use has increased as the scope of reporting has expanded to cover PTT's 7 new owned and operated service stations.
- In 2018, the amount of recycle & reused water has increased due to recycled water used for planting .
- In 2019, the data excludes that of PTT Oil and Retail Business Public Company (Limited) - resulting in reduced overall water consumption.



Effluents

GRI	Required Data	Unit	PTT			
			2016	2017	2018	2019
GRI 306-1	Total water discharge	Million m ³	1.47	1.41	1.41	0.44
	Chemical oxygen demand (COD)	Tonne	117.76	132.60	123.14	19.62
	Biochemical oxygen demand (BOD)	Tonne	7.59	6.21	5.51	2.73

Remarks:

- Water discharge remained in line with the legal requirements.
- In 2019, the data excludes that of OR - resulting in reduced overall water discharge.



Waste

GRI	Required Data	Unit	PTT			
			2016	2017	2018	2019
GRI 306-2	Waste from routine operations	Tonne	16,847.63	20,014.48	19,534.06	5,817.80
	Total hazardous waste disposal	Tonne	4,773.07	3,421.64	4,290.97	3,971.01
	• Secure landfill	Tonne	122.16	58.20	34.43	6.26
	• Reuse	Tonne	0.00	0.00	7.09	0.24
	• Recycle	Tonne	279.42	438.51	926.01	413.90
	• Recover	Tonne	3,676.94	2,469.10	2,946.80	3,029.51
	• Others (incineration, compositing, deep well injection)	Tonne	694.55	455.84	376.65	521.10
	Total non-hazardous waste disposal	Tonne	12,074.56	16,592.83	15,243.09	1,846.79
	• Landfill	Tonne	247.76	1,328.92	358.93	27.39
	• Reuse	Tonne	0.03	59.00	143.85	1.44
	• Recycle	Tonne	2,696.53	2,834.09	964.48	99.48
	• Recover	Tonne	215.58	247.68	433.59	554.00
	• Domestic waste	Tonne	8,870.36	12,121.30	13,078.74	908.57
	Waste from non-routine operations (e.g. construction waste, spill clean-up waste, crisis management waste)	Tonne	7,675.01	244.86	489.45	1,844.52
	Total hazardous waste disposal	Tonne	3,485.42	29.48	0.45	5.26
	• Secure landfill	Tonne	44.95	14.45	0.00	0.00
	• Recycle	Tonne	0.00	0.00	0.03	0.00
	• Recover	Tonne	3,369.90	0.00	0.00	2.54
	• Othersr	Tonne	70.57	15.03	0.42	2.72
	Total non-hazardous waste disposal	Tonne	4,189.59	215.38	489.00	1,839.26
	• Landfill	Tonne	0.00	0.00	0.00	0.00
	• Reuse	Tonne	3,721.90	183.00	489.00	1,838.00
	• Recycle	Tonne	67.69	32.38	0.00	0.00
• Domestic waste	Tonne	0.00	0.00	0.00	0.00	
On-site waste storage	Tonne	118.25	102.93	225.36	91.82	
• On-site hazardous waste storage	Tonne	96.73	80.83	52.78	83.16	
• On-site non-hazardous waste storage	Tonne	21.52	22.10	172.58	8.66	

Remarks:

- Waste to landfill from routine operations is separated at the beginning of the disposal process, allowing for more appropriate waste disposal methods, in alignment with the Strategic Objective 2020 "Zero Hazardous Waste to Landfill."
- The amount of waste from non-routine operations includes waste generated from the construction of capital projects, oil and chemical spillage, and risk & crisis management.
- There is no established threshold for hazardous waste, as all operations must report their total volume of hazardous waste sent for disposal.
- Domestic waste is disposed by the municipality by either landfill and/or incineration. However, we have limited access to information from the municipality.
- 2019 performance data does not include OR's domestic waste and therefore resulting in decreased domestic waste volume.
- The disposal methods excluded from the total amount of waste disposal are composting, incineration, and land reclamation.



Spills

GRI	Required Data	Unit	PTT			
			2016	2017	2018	2019
GRI 306-3	Oil and chemical spills					
	From PTT operational boundary					
	• Number of hydrocarbon spills	Number of spills	1	0	0	0
	• Volume of hydrocarbon spills	m ³	3.00	0.00	0.00	0.00
	• Number of non-hydrocarbon spills	Number of spills	0	0	0	0
	• Volume of non-hydrocarbon spills	m ³	0.00	0.00	0.00	0.00
	From 3 rd party (transportation): truck transportation					
	• Number of hydrocarbon spills	Number of spills	2	3	0	0
	• Volume of hydrocarbon spills	m ³	16.09	18.66	0.00	0.00
	• Number of non-hydrocarbon spills	Number of spills	0	0	0	0
	• Volume of non-hydrocarbon spills	m ³	0.00	0.00	0.00	0.00
	From 3 rd party (transportation): ship and barge transportation					
	• Number of hydrocarbon spills	Number of spills	0	0	0	0
	• Volume of hydrocarbon spills	m ³	0.00	0.00	0.00	0.00
	• Number of non-hydrocarbon spills	Number of spills	0	0	0	0
	• Volume of non-hydrocarbon spills	m ³	0.00	0.00	0.00	0.00
	Significant spill (Volume ≥ 100 barrel)					
	From PTT operational boundary					
	• Number of hydrocarbon spills	Number of spills	1	0	0	0
	• Volume of hydrocarbon spills	m ³	17.87	0.00	0.00	0.00
	• Number of non-hydrocarbon spills	Number of spills	0	0	0	0
	• Volume of non-hydrocarbon spills	m ³	0.00	0.00	0.00	0.00
	From 3 rd party (transportation): truck transportation					
	• Number of hydrocarbon spills	Number of spills	0	0	2	0
	• Volume of hydrocarbon spills	m ³	0.00	0.00	59.00	0.00
	• Number of non-hydrocarbon spills	Number of spills	0	0	0	0
	• Volume of non-hydrocarbon spills	m ³	0.00	0.00	0.00	0.00
	From 3 rd party (transportation): ship and barge transportation					
	• Number of hydrocarbon spills	Number of spills	0	0	0	0
	• Volume of hydrocarbon spills	m ³	0.00	0.00	0.00	0.00
	• Number of non-hydrocarbon spills	Number of spills	0	0	0	0
	• Volume of non-hydrocarbon spills	m ³	0.00	0.00	0.00	0.00

Remarks:

- Volume of hydrocarbon and non-hydrocarbon spills include spills which occur in operational areas, as well as those from truck and shipping transportation, that result in a volume of more than 1 barrel of oil spilled to the environment. In spill cases, PTT executes spill response procedures to control spills within the shortest time possible in order to minimize environmental impacts, for instance, with the use of booms and skimmers.



Emissions

GRI	Required Data	Unit	PTT			
			2016	2017	2018	2019
GRI 305-7	Volatile Organic Compounds (VOCs)	Tonne	9,937.58	10,384.24	9,670.56	1,373.85
	VOCs Intensity	Tonne per million barrel oil equivalent (mboe)	24.76	25.47	23.66	3.70
	Nitrogen oxides (NOx)	Tonne	1,090.25	1,097.85	1,033.61	888.47
	NOx intensity	Tonne per million barrel oil equivalent (mboe)	2.72	2.69	2.53	2.39
	Sulphur dioxide (SO ₂)	Tonne	97.58	106.58	60.00	48.79
	SO ₂ intensity	Tonne per million barrel oil equivalent (mboe)	0.24	0.26	0.15	0.13

Remarks:

- Strategic Objective 2020: Zero emission rate of SO₂, NOx, and VOCs.
- SO₂ and NOx emissions from all facilities remain below the legal threshold for air quality.
- VOCs emission has increased as the scope of reporting has expanded to cover PTT's 7 new owned and operated service stations.
- In 2019, data excludes that of OR, resulting in decreased VOCs emissions.



Energy

GRI	Required Data	Unit	PTT			
			2016	2017	2018	2019
GRI 302-1	Total direct energy consumption	GJ	44,600,252	45,351,329	44,415,197	45,464,198
	Total indirect energy consumption	GJ	2,516,002	2,330,158	2,340,957	1,968,011
	• Electricity purchased	GJ	2,516,002	2,330,158	2,340,957	1,968,011
	Total energy sold	GJ	NA	0	0	0
	• Electricity sold	GJ	NA	0	0	0

GRI	Required Data	Unit	PTT Group			
			2016	2017	2018	2019
GRI 302-1	Total energy consumption	GJ	265,716,839	330,098,149	314,737,645	309,966,042
	Total direct energy consumption					
	• PTT operational control	GJ	238,851,349	314,370,090	300,101,305	294,432,610
	Total indirect energy consumption	GJ	26,865,490	15,728,059	14,636,340	15,532,720
GRI 302-3	Direct energy intensity					
	• Oil and gas production	GJ/mboe	196,716	188,682	205,577	198,080
	• Refinery throughput	GJ/Tonne refinery throughput	2.14	2.42	1.57	1.51
	• Petrochemical throughput	GJ/Tonne petrochemical throughput	9.14	8.29	5.62	5.60

Remarks:

NA: Not available

- The organizational boundary of PTT Group based on the equity share approach includes all domestic subsidiaries in which PTT directly owns more than 20% of shares or indirectly owns 100% of shares.
- PTT's indirect energy consumption solely comes from electricity purchase.
- Intensity of energy consumption in oil and gas industry, refinery, and petrochemicals has its organizational boundary in consistent with PTT's greenhouse gas accounting. In 2019, total energy consumption, in combination with alternative energy consumed onsite, Number 10 Gas Pipeline Operation Center and Innovation Institute.



GHG Emissions

GRI	Required Data	Unit	PTT			
			2016	2017	2018	2019
	Total GHG emissions	Tonne CO ₂ equivalent	10,652,132	11,280,532	11,211,694	11,813,668
GRI 305-1	Direct (Scope 1) GHG emissions	Tonne CO ₂ equivalent	10,334,822	11,050,978	10,985,990	11,637,769
GRI 305-2	GHG Scope 2	Tonne CO ₂ equivalent	317,309	229,554	225,704	175,899
GRI 305-3	GHG Scope 3	Tonne CO ₂ equivalent	127,078,140	124,488,019	127,046,865	81,862,930

GRI	ข้อมูลที่จำเป็น	Unit	PTT Group			
			2016	2017	2018	2019
GRI 305-1	GHG Scope 1					
	• PTT operational control	Tonne CO ₂ equivalent	29,979,970	30,163,397	29,880,469	29,938,655
	• PTT equity share	Tonne CO ₂ equivalent	19,693,954	20,047,851	20,186,466	20,590,912
GRI 305-2	GHG Scope 2					
	• PTT operational control	Tonne CO ₂ equivalent	1,606,220	1,669,446	1,437,035	1,530,104
	• PTT equity share	Tonne CO ₂ equivalent	950,828	921,565	818,830	850,142
GRI 305-3	GHG Scope 3	Tonne CO ₂ equivalent	127,078,140	124,488,019	127,046,865	126,355,782
GRI 305-4	GHG Intensity					
	• Oil and gas production	Tonne CO ₂ equivalent/Million barrel oil equivalent	38,045	38,257	38,672	36,398
	• Refinery	Tonne CO ₂ equivalent/Tonne refinery throughput	0.1416	0.1540	0.1275	0.1324
	• Petrochemical	Tonne CO ₂ equivalent/Tonne petrochemical product	0.5432	0.5782	0.3857	0.3995

Remarks:

- The organizational boundary of PTT Group based on the equity share approach includes all domestic subsidiaries in which PTT directly owns more than 20% of shares or indirectly owns 100% of shares.
- Scope 3 emissions include the combustion of fuel sold by PTT only.
- In 2017, PTTAC, PTTMCC, PTTPL, PTTPM and HMC, since PTT sold equityshares of PTTAC, PTTMCC, PTTPL, PTTPM and HMC to PTTGC.
- In 2019, other indirect GHG emission includes emissions from the combustion of fuel sold by PTT and OR only.



Methane Emissions

GRI	Required Data	Unit	PTT			
			2016	2017	2018	2019
	Volume of methane emitted (leakage, venting, and flaring)	m ³	30,606,285	24,873,057	25,663,465	25,298,193
	Direct CH ₄ emissions (extracted from GHG)	Tonne	20,679	16,807	17,339	17,092
G4-OG6	Volume of flared hydrocarbon	Million m ³	197,367	155,751	192,662	198,481
	Volume of vented hydrocarbon	Million m ³	21,474	30,317	23,911	21,143

GRI	Required Data	Unit	PTT Group			
			2016	2017	2018	2019
	Volume of methane emitted (leakage, venting, and flaring)	m ³	71,332,568	64,181,617	63,556,610	67,111,071
	Direct CH ₄ emissions (extracted from GHG)	Tonne	48,335	43,448	43,023	46,751
G4-OG6	Volume of flared hydrocarbon	Million m ³	1,210,395	1,224,651	1,282,503	1,167,933
	Volume of vented hydrocarbon	Million m ³	21,474	30,636	24,003	21,219

Remarks:

- The volume of methane emitted includes leakage (fugitive), gas vented from processes (CO₂ separation and ethylene production), methane emitted from vented emissions, and flaring.
- Direct CH₄ emissions include those from aforementioned sources, as well as direct CH₄ emitted from combustion sources.



Environmental Management

Required Data	Unit	PTT			
		2016	2017	2018	2019
Environmental Policy/ Management System					
Capital investments	Million Baht	132	123	163	55
Operating expenses	Million Baht	356	322	331	348
Total expenses (Capital Investment + Operating Expense)	Million Baht	488	445	494	403
Savings, cost avoidance, income, tax incentives, etc.	Million Baht	142	285	43	288
Operations covered (by revenue, production volume, or employees, etc.)	%	100	100	100	100
Environmental Violations					
Number of violations of legal obligations/ regulations	Case	0	0	0	0
Amount of fines/ penalties related to the above	Baht	0	0	0	0
Environmental liability accrued at year end	Baht	0	0	0	0

Remarks:

- Environmental investment refers to investment made to gain environmental assets, specifically for PTT.
- Since 2016, PTT improved the methodologies for completeness and to be in accordance with the Environmental Management Accounting Procedures and Principles developed by the United Nations. Return on environmental investment calculation was improved by including the projects registered under PTT's Productivity Improvement Circle Programs.
- Eventhough PTT's and Oil Retail Business' assets have been separated since July 1st, 2018; environmentally-related assets has increased compares to 2017. In 2018, PTT worked to raise investment for implementation of Selective Catalyst Reduction (SCR) type NOx emission reduction system at Waste Heat Recovery Unit (WHRU) of Gas Separation Plan No. 5, and was able to raised more.
- In 2019, PTT has developed e-Expense system, enabling more comprehensive collection of corporate environmental expenditure. PTT is also investing in 'Regenerative Thermal Oxidizer (RTO) type remover of hydrogen sulfide contamination acidic gaseous by-product' and 'SO₂ Scrubber' of Natural gas Separation Plan No.5, Rayong.'

Awards and Recognition

PTT has received a total of **26 / 51** Institutions Awards



International Awards
17 Awards



MEMBER OF **Dow Jones Sustainability Indices**



In collaboration with

PTT maintains its position as a member in the Dow Jones Sustainability Indices (DJSI) for 8th consecutive year

From RobecoSAM and S&P Dow Jones Indices

Gold Medal from the 47th International Exhibition of Inventions Geneva

at Geneva, Switzerland
Awarded for Integrated Pipeline Maintenance and Monitoring System (IPMMS)

From the Swiss Federal Government, the State, the City of Geneva and of the World Intellectual Property Organization (WIPO)

The Asset ESG Award in Innovation Initiative

Awarded for Integrated Pipeline Maintenance and Monitoring System (IPMMS)

From the Asset Magazine

Good Corporate Governance Award

1. Asia's Icon in Corporate Governance
2. Asian Corporate Director Recognition Awards

From Corporate Governance Asia Magazine



4 Outstanding Awards

1. Most Organised Investor Relations
2. Best Senior Management IR Support
3. Most Consistent Dividend Policy
4. Best Strategic Corporate Social Responsibility

From Alpha Southeast Asia Magazine



4 Awards from the 9th Asian Excellence Awards

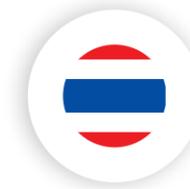
Individual Category:

1. Asia's Best CEO for Mr. Chansin Treenuchagron
2. Asia's Best CFO for Ms. Pannalin Mahawongtikul

Corporate Category:

1. Best Investor Relations Company
2. Best Environmental Responsibility

From Corporate Governance Asia Magazine



National Awards

34 Awards

The 8th NACC Integrity Awards

From the Office of National Anti-Corruption Commission (NACC)

Royal Award from HRH Princess Maha Chakri Sirindhorn for "Company with 5 Excellent Management Performance"

which comprises, leadership, sustainable development, marketing, financial management, and human capital management.

From Thailand Management Association (TMA) and Sasin School of Management, Chulalongkorn University



Board of the Year Award 2018

for Listed Company with Market Value of over 100,000 million baht for 7th consecutive time

From Thai Institute of Directors

SOE AWARD 2019 for Outstanding State Enterprise

1. Outstanding State Enterprise's Board
2. Outstanding Corporate Management
3. Outstanding Disclosure and Transparency Award
4. Outstanding Environmental and Social Performance Award
5. Outstanding Creativity Award
6. Outstanding Innovation Award
7. Outstanding Collaboration for Development Award, in Corporate Management Improvement
8. Honorary Award for Development to Digital State Enterprise

From State Enterprise Policy Office (SEPO)



"SET Awards 2019"

1. Best Sustainability Awards for Listed Companies
2. Best Investor Relations Awards for Listed Companies

From the Stock Exchange of Thailand, in collaboration with Money and Banking Thailand Publication



THE BEST OF DRIVE AWARD 2019 DRIVE AWARD EXCELLENCE in Resource Management

From Chulalongkorn University's MBA Alumni Association, in collaboration with Master of Business Administration, Faculty of Commerce and Accountancy, Chulalongkorn University.

Thailand Contractor Award 2019 for PTT Group's Wangchan Valley Land Development

From Thai Construction Association under Royal Patronage

Commemorative Award from Zero Accident Campaign

From the Ministry of Labor, in collaboration with Thailand Institute of Occupational Safety and Health (TOSH) and Safety and Health at Work Promotion Association (Thailand)

Employer for Happy Retirement Award and Commemorative Certificate

From the Securities and Exchange Commission (SEC), in collaboration with 16 corporate partners and investment management companies.

Company with Excellent Low-Carbon and Sustainability Performance

1. Award of Excellence under Low Carbon and Sustainable Business Index (LCSI)
2. Award from Low Emission Support Scheme (LESS) from Touch Green Project
3. Award for Carbon Offsetting from PTT and PTT Group's Annual QSHE Policy, Targets and Performance Meeting in 2018

From Thailand Greenhouse Gas Management Organization (TGO)

About this Report



PTT Public Company Limited has published its annual sustainability report for the 12th consecutive year to communicate the Company's economic, social, and environmental performance to stakeholders. The report covers the period from 1st January to 31st December 2019.

Reporting Scope

The information disclosed in this report covers the performance of PTT-operated businesses, consisting of the Natural Gas Business, International Trading Business, Technology and Engineering Business, as well as that of PTT Group Flagship Companies, PTT Exploration and Production Public Company Limited (PTTEP), PTT Global Chemical Public Company Limited (GC), Thaioil Public Company Limited (TOP), IRPC Public Company Limited (IRPC), Global Power Synergy Public Company Limited (GPSC), and PTT Oil and Retail Business Public Company Limited (OR), or as specified in each chapter. PTT has adopted the following international guidelines to determine the key issues to be presented:

GRI

This report has been prepared in accordance with the Global Reporting Initiative (GRI) Sustainability Reporting Standards 2016: 'Core' option and the Oil and Gas Sector Disclosures (OGSD)

IIRC

The Integrated Reporting <IR> Framework of the International Integrated Reporting Council (IIRC)

UNGC

Communication on Progress on the 10 Principles of the United Nations Global Compact (UNGC), Advanced Level

TCFD

Climate change performance reporting according to the Recommendation of the Task Force on Climate-related Financial Disclosures (TCFD)

SDGs

Progress report on the United Nations Sustainable Development Goals (SDGs)

Report Assurance

The economic, social, and environmental performance disclosed in this sustainability report has been approved by top executives from relevant functions of the Company. Key performance data has been verified by an independent assurer for the 9th consecutive year to ensure its completeness, accuracy, and credibility.

Readers may click or scan the QR Codes shown in this sustainability report to access additional information on each topic, as well as visit www.pttplc.com for more information on PTT's performance.



GRI, UN SDGs, IR, UNGC and TCFD Content Index

GLOBAL REPORTING INITIATIVE (GRI)

GRI Standard	Description	Sustainability Report (Page / URL) and Remarks (Omission / Comment)	Relations to SDG Targets
Organizational Profile			
GRI 102-1	Name of the organization	4	
GRI 102-2	Activities, brands, products, and services	4-5	
GRI 102-3	Location of headquarters	4	
GRI 102-4	Location of operations	4	
GRI 102-5	Ownership and legal form	4	
GRI 102-6	Markets served	4	
GRI 102-7	Scale of the organization	4, 63-64	
GRI 102-8	Information on employees and other workers	64	8.5
GRI 102-9	Supply chain	4-5, 28-29	
GRI 102-10	Significant changes to the organization and its supply chain	No significant changes in the organization and its supply chain in 2019	
GRI 102-11	Precautionary principle or approach	21-22, 55, 61-62	
GRI 102-12	External initiatives	7, 14-15, 41, 44-51, https://www.pttplc.com/en/Sustainability/Sustainabilitygovernance/Network.aspx	
GRI 102-13	Membership of associations	14-15, 46, 49-50, 76-77	
Strategy			
GRI 102-14	Statement from senior decision-maker	2-3	
GRI 102-15	Key impacts, risks, and opportunities	2-3, 6	
Ethics and Integrity			
GRI 102-16	Values, principles, standards, and norms of behavior	19-20, 24-25, 36-39, 42-43	16.3
GRI 102-17	Mechanisms for advice and concerns about ethics	19-22	16.3
Governance			
GRI 102-18	Governance structure	18-19, https://www.pttplc.com/en/About/Our-Organization/Organization.aspx	
GRI 102-19	Delegating authority	18-19, 21-22, https://www.pttplc.com/en/Sustainability/Sustainabilitygovernance/Corporategovernance.aspx	
GRI 102-20	Executive-level responsibility for economic, environmental, and social topics	18-19, 21-22, https://www.pttplc.com/en/Sustainability/Sustainabilitygovernance/Pttgroupsustainabilitymanagementsystem.aspx	
GRI 102-21	Consulting stakeholders on economic, environmental and social topics	7-11	16.7
GRI 102-22	Composition of the highest governance body and its committees	18-19, https://www.pttplc.com/en/About/Our-Organization/Organization.aspx	5.5, 16.7
GRI 102-23	Chair of the highest governance body	https://www.pttplc.com/en/About/Our-Organization/Board-Of-Director.aspx	16.6
GRI 102-24	Nominating and selecting the highest governance body	https://www.pttplc.com/en/About/Our-Organization/Board-Of-Director.aspx	5.5, 16.7
GRI 102-25	Conflicts of interest	18-20	16.6
GRI 102-26	Role of the highest governance body in setting purpose, values, and strategy	18-19, 21, 5.0 Responsibilities of the Board (page 31), https://www.pttplc.com/uploads/About/การกำกับดูแลกิจการที่ดีของ%20ปตท/06_PTT_CGbookEN_rev4.2.pdf	
GRI 102-27	Collective knowledge of highest governance body	18-19	
GRI 102-28	Evaluating the highest governance body's performance	22, 5.8 Evaluation of the Performance of the Board (page 45), https://www.pttplc.com/uploads/About/การกำกับดูแลกิจการที่ดีของ%20ปตท/06_PTT_CGbookEN_rev4.2.pdf	

GRI Standard	Description	Sustainability Report (Page / URL) and Remarks (Omission / Comment)	Relations to SDG Targets
GRI 102-29	Identifying and managing economic, environmental and social impacts	6-7, 10-11, 18-19	16.7
GRI 102-30	Effectiveness of risk management process	21-22	
GRI 102-31	Review of economic, environmental, and social topics	10-11	
GRI 102-32	Highest governance body's roles in sustainability reporting	10-11, 78	
GRI 102-38	Annual total compensation ratio	https://www.pttplc.com/en/Sustainability/Sustainabilitygovernance/Corporategovernance.aspx	
Stakeholder Engagement			
GRI 102-40	List of stakeholder groups	8-9	
GRI 102-41	Collective bargaining agreements	41	8.8
GRI 102-42	Identifying and selecting stakeholders	7-9	
GRI 102-43	Approach to stakeholder engagement	7-9	
GRI 102-44	Key topics and concerns raised	8-11, https://www.pttplc.com/en/Sustainability/Sustainabilitygovernance/Stakeholderengagement.aspx	
Reporting Practice			
GRI 102-45	Entities included in the consolidated financial statements	78	
GRI 102-46	Defining report content and topic boundaries	78, 10-11	
GRI 102-47	List of material topics	10-11, https://www.pttplc.com/en/Sustainability/Sustainabilitygovernance/Sustainabilitystrategy.aspx	
GRI 102-48	Restatements of information	63-64	
GRI 102-49	Changes in reporting	10-11	
GRI 102-50	Reporting period	78	
GRI 102-51	Date of most recent report	78, PTT Corporate Sustainability Report 2018	
GRI 102-52	Reporting cycle	78	
GRI 102-53	Contact point for questions regarding the report	78	
GRI 102-54	Claims of reporting in accordance with the GRI Standards	78	
GRI 102-55	GRI content index	79	
GRI 102-56	External assurance	87-88	
GRI 201: Economic Performance			
GRI 103-1	Explanation of the material topic and its boundary	4-5, 10-11	
GRI 103-2	The management approach and its components	4-5	
GRI 201-1*	Direct economic value generated and distributed	42-47, 63	8.1, 8.2, 9.1, 9.4, 9.5
GRI 201-2	Financial implications and other risks and opportunities due to climate change	12-17, 48-49, 56-58	13.1
GRI 201-4	Financial assistance received from government	63	
GRI 203: Indirect Economic Impact			
GRI 103-1	Explanation of the material topic and its boundary	16-17, 30-33	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 203-1	Infrastructure investments and services supported	33-35, 42-51	5.4, 9.1, 9.4, 11.2
GRI 203-2	Significant indirect economic impacts	63	1.2, 3.8, 8.2, 8.3, 8.5
GRI 205: Anti-Corruption			
GRI 103-1	Explanation of the material topic and its boundary	18-20	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 205-2	Communication and training about anti-corruption policies and procedures	20-23	16.5
GRI 205-3	Confirmed incidents of corruption and actions taken	20	16.5

GRI Standard	Description	Sustainability Report (Page / URL) and Remarks (Omission / Comment)	Relations to SDG Targets
GRI 302: Energy			
GRI 103-1	Explanation of the material topic and its boundary	56-57	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 302-1*	Energy consumption within the organization	73	7.2, 7.3, 8.4, 12.2, 13.1
GRI 302-3*	Energy intensity	58	7.3, 8.4, 12.2, 13.1
GRI 302-4	Reduction of energy consumption	58	7.3, 8.4, 12.2, 13.1
GRI 303: Water (2016)			
GRI 103-1	Explanation of the material topic and its boundary	56, 59-60, https://www.pttplc.com/en/Sustainability/Environment/Water.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 303-1*	Water withdrawal by source	70	
GRI 303-3	Water recycled and reused	59-60, 70	12.2
GRI 304: Biodiversity			
GRI 103-1	Explanation of the material topic and its boundary	62, https://www.pttplc.com/en/Sustainability/Environment/Biodiversity.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 304-2	Significant impacts of activities, products, and services on biodiversity	62	6.6, 14.2, 15.1, 15.5
GRI 305: Emissions			
GRI 103-1	Explanation of the material topic and its boundary	56-58, 61, https://www.pttplc.com/en/Sustainability/Environment/Air.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 305-1*	Direct (Scope 1) GHG emissions	58	3.9, 12.4, 13.1, 14.3, 15.2
GRI 305-2*	Energy indirect (Scope 2) GHG emissions	58	3.9, 12.4, 13.1, 14.3, 15.2
GRI 305-3*	Other indirect (Scope 3) GHG emissions	58	3.9, 12.4, 13.1, 14.3, 15.2
GRI 305-4*	GHG emissions intensity	58	13.1, 14.3, 15.2
GRI 305-7*	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	61	3.9, 12.4, 14.3, 15.2
GRI 306: Effluents and Waste			
GRI 103-1	Explanation of the material topic and its boundary	58-60, https://www.pttplc.com/en/Sustainability/Environment/Waste.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 306-1*	Water discharged by quality and destination	60, 70	3.9, 6.3, 12.4, 14.1
GRI 306-2*	Waste by type and disposal method	60, 71	3.9, 6.3, 12.4, 12.5
GRI 306-3*	Significant spills	72	3.9, 6.3, 6.6, 12.4, 14.1, 15.1
GRI 307: Environmental Compliance			
GRI 103-1	Explanation of the material topic and its boundary	56-57	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 307-1	Non-compliance with environmental laws and regulations	75	16.3
GRI 308: Supplier Environmental Assessment			
GRI 103-1	Explanation of the material topic and its boundary	28-29, https://www.pttplc.com/en/Sustainability/Economics/Supplychainmanagement.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		

GRI Standard	Description	Sustainability Report (Page / URL) and Remarks (Omission / Comment)	Relations to SDG Targets
GRI 308-1	New suppliers that were screened using environmental criteria	28-29	
GRI 308-2	Negative environmental impacts in the supply chain and actions taken	28-29	
GRI 401: Employment			
GRI 103-1	Explanation of the material topic and its boundary	36-39, https://www.pttplc.com/en/Sustainability/Social/Sustainablehumanresourcemanagement.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 401-1	New employee hires and employee turnover	64-65	5.1, 8.5, 8.6
GRI 401-3	Parental leave	65	5.1, 5.4, 8.5
GRI 403: Occupational Health and Safety (2016)			
GRI 103-1	Explanation of the material topic and its boundary	52-54	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 403-2*	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	68	3.3, 3.9, 8.8
GRI 404: Training and Education			
GRI 103-1	Explanation of the material topic and its boundary	36-39, https://www.pttplc.com/en/Sustainability/Social/Sustainablehumanresourcemanagement.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 404-1*	Average hours of training per year per employee	37, 65	4.3, 4.4, 4.5, 5.1, 8.2, 8.5
GRI 404-2	Programs for upgrading employee skills and transition assistance programs	37-39	8.2, 8.5
GRI 404-3	Percentage of employees receiving regular performance and career development reviews	36-39	5.1, 8.5
GRI 405: Diversity and Equal Opportunity			
GRI 103-1	Explanation of the material topic and its boundary	https://www.pttplc.com/en/Sustainability/Social/Sustainablehumanresourcemanagement.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 405-1	Diversity of governance bodies and employees	64	5.1, 5.5, 8.5
GRI 406: Non-Discrimination			
GRI 103-1	Explanation of the material topic and its boundary	41, https://www.pttplc.com/en/Sustainability/Social/Sustainablehumanresourcemanagement.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 406-1	Incidents of discrimination and corrective actions taken	41, https://www.pttplc.com/en/Sustainability/Social/Sustainablehumanresourcemanagement.aspx	5.1, 8.8
GRI 408: Child Labor			
GRI 103-1	Explanation of the material topic and its boundary	41, https://www.pttplc.com/en/Sustainability/Social/Sustainablehumanresourcemanagement.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 408-1	Operations and suppliers at significant risk for incidents of child labor	41, https://www.pttplc.com/en/Sustainability/Social/Sustainablehumanresourcemanagement.aspx	8.7, 16.2
GRI 410: Security Practices			
GRI 103-1	Explanation of the material topic and its boundary	55, https://www.pttplc.com/en/Sustainability/Social/Securitysafetyandoccupationalhealth.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 410-1	Security personnel trained in human rights policies or procedures	55	16.1

GRI Standard	Description	Sustainability Report (Page / URL) and Remarks (Omission / Comment)	Relations to SDG Targets
GRI 411: Right of Indigenous Peoples			
GRI 103-1	Explanation of the material topic and its boundary	https://www.pttplc.com/en/Sustainability/Social/Humanright.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 411-1	Incidents of violations involving rights of indigenous peoples	No incidents of violations involving rights of indigenous peoples in 2019	2.3
GRI 412: Human Rights Assessment			
GRI 103-1	Explanation of the material topic and its boundary	41, https://www.pttplc.com/en/Sustainability/Social/Humanright.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 412-1	Operations that have been subject to human rights reviews or impact assessments	41, https://www.pttplc.com/en/Sustainability/Social/Humanright.aspx	
GRI 412-2	Employee training on human rights policies or procedures	41, https://www.pttplc.com/en/Sustainability/Social/Humanright.aspx	
GRI 413: Local Communities			
GRI 103-1	Explanation of the material topic and its boundary	26-27, 42-43	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 413-1	Operations with local community engagement, impact assessments, and development programs	42-50	
GRI 413-2	Operations with significant actual and potential negative impacts on local communities	26-27, 42-50	1.4, 2.3
GRI 414: Supplier Social Assessment			
GRI 103-1	Explanation of the material topic and its boundary	28-29	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 414-1	New suppliers that were screened using social criteria	28-29, https://www.pttplc.com/en/Sustainability/Economics/Supplychainmanagement.aspx	5.2, 8.8, 16.1
GRI 414-2	Negative social impacts in the supply chain and actions taken	28-29, https://www.pttplc.com/en/Sustainability/Economics/Supplychainmanagement.aspx	5.2, 8.8, 16.1
GRI 415: Public Policy			
GRI 103-1	Explanation of the material topic and its boundary	https://www.pttplc.com/en/Sustainability/Sustainabilitygovernance/Network.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 415-1	Political contributions	https://www.pttplc.com/en/Sustainability/Sustainabilitygovernance/Network.aspx	16.5
GRI 416: Customer Health and Safety			
GRI 103-1	Explanation of the material topic and its boundary	30-31, https://www.pttplc.com/en/Sustainability/Economics/Innovationandproductresponsibility.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	30-31, https://www.pttplc.com/en/Sustainability/Economics/Innovationandproductresponsibility.aspx	16.3
GRI 417: Marketing and Labeling			
GRI 103-1	Explanation of the material topic and its boundary	30-31, 41, https://www.pttplc.com/en/Sustainability/Economics/Innovationandproductresponsibility.aspx	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 417-2	Incidents of non-compliance concerning product and service information and labeling	https://www.pttplc.com/en/Sustainability/Economics/Innovationandproductresponsibility.aspx	16.3
GRI 419: Socio-economic Compliance			
GRI 103-1	Explanation of the material topic and its boundary	26-27	
GRI 103-2	The management approach and its components		
GRI 103-3	Evaluation of the management approach		
GRI 419-1	Non-compliance with laws and regulations in the social and economic area	26-27	

Green text means indicators with added commentary in GRI Oil and Gas Sector Disclosure (OGSD).

* These indicators have been externally verified by an independent third party organization, whose assurance statement is available on page 87-88.

GRI Oil and Gas Sector Disclosure	Description	Sustainability Report (Page / URL) and Remarks (Omission / Comment)	Relations to SDG Targets
G4-OG4*	Number and percentage of significant operating sites in which biodiversity risk has been assessed and monitored	62	6.6, 14.2, 15.1, 15.5
G4-OG6*	Volume of flared and vented hydrocarbon	73-74	3.9, 7.3, 12.2, 12.4, 12.5, 13.1, 14.3
G4-OG10	Number and description of significant disputes with local communities and indigenous peoples	26-27	1.4, 2.3
G4-OG12	Operations where involuntary resettlement took place	26-27	1.4, 2.3
G4-OG13*	Process safety events, by business activity	52-53	3.9, 8.8
G4-OG14	Volume of biofuels produced and purchased	33	7.2, 15.2, 15.5

Green text means indicators with added commentary in GRI Oil and Gas Sector Disclosure (OGSD).

* These indicators have been externally verified by an independent third party organization, whose assurance statement is available on page 87-88.

INTEGRATED REPORTING <IR>

Capital	Description	Page
Financial	The pool of funds that is available to an organization for use in the product of goods or the provision of services; and obtained through financing, such as debt, equity or grants, or generated through operations or investments.	16-17
Manufactured	Manufactured physical objects that are available to an organization for use in the production of goods or the provision of services (e.g. buildings, equipment, and infrastructure).	16-17, 26-27
Intellectual	Organizational, knowledge-based intangibles including intellectual property (e.g. patents, copyrights, software, rights and licenses) and organizational capital (e.g. tacit knowledge, systems, procedures and protocols).	16-17, 30-35
Human	People's competencies, capabilities and experience, and their motivations to innovate.	16-17, 36-37, 52-55
Social and Relationship	The institutions and relationships within and between communities, groups of stakeholders and other networks, and the ability to share information to enhance individual and collective well-being (e.g. shared norms, common values and behaviors; key stakeholder relationships; intangibles associated with the brand and reputation; social license to operate).	7-9, 16-17, 18-23, 26-27, 28-29, 30-33, 42-51
Natural	All renewable and non-renewable environmental resources and processes that provide goods or services that support the past, current or future prosperity of an organization (e.g. air, water, land, minerals and forests, biodiversity and eco-system health).	16-17, 26-27, 56-62

Content Elements	Description	Page
Organizational overview and external environment	The organization's culture, ethics and values; ownership and operating structure; principal activities and markets; competitive landscape and market positioning, position within the value chain etc. External environment are aspects of the legal, commercial, social, environmental and political context that affect the organization's ability to create value in the short, medium or long term.	4-5, 6-7, 36-39
Governance	Explanations of how the governance structure support the organization's ability to create value in the short, medium, and long term (the organization's leadership structure; specific processes used to make strategic decisions and monitor the culture of the organization; the organization's culture, ethics, and values and their affects on capitals etc.)	18-22
Business model	The system of transforming inputs, through its business activities, into outputs and outcomes that aims to fulfil the organization's strategic purposes and create value over the short, medium and long term.	4-5, 12-13, 16-17
Risks and opportunities	The key risks an opportunities that are specific to the organization, including those that relate to the organization's effects on, and the continued availability, quality and affordability of, relevant capitals in the short, medium and long term.	6, 10-11, 18-22

Content Elements	Description	Page
Strategy and resource allocation	Explanation of the organization's strategic direction and its implementation (short, medium and long term strategic objectives; resource allocation plans to implement the strategy; targets and achievements; the organization's competitive advantage and enablers to create values for stakeholders etc.)	12-17, 24-25, 30-33
Performance	Explanations of the organization's performances in achieving strategic objectives, and the outcomes in terms of effects on the capitals.	7-9, 16-17, 20-23, 27-31, 36-39, 42-44, 52-53, 56-62
Outlook	Explanations of identified challenges and uncertainties the organization is likely to encounter in pursuing its strategy and potential implications for its business model and future performances.	6, 24-25
Basis of preparation and presentation	The organization's process of determining material issues, reporting boundary, and framework and method used to quantify or evaluate material matters.	10-11

UNITED NATIONS GLOBAL COMPACT (UNGC)

Communication on Progress - Advanced Level

Criterion	Description	Page
1	The COP describes mainstreaming into corporate functions and business units	18-23
2	The COP describes value chain implementation	4-5, 16-17, 28-29
3	The COP describes robust commitments, strategies or policies in the area of human rights	41
4	The COP describes effective management systems to integrate the human rights principles	41
5	The COP describes effective monitoring and evaluation mechanisms of human rights integration	41
6	The COP describes robust commitments, strategies or policies in the area of labor	41
7	The COP describes effective management systems to integrate the labor principles	41
8	The COP describes effective monitoring and evaluation mechanisms of labor principles integration	41
9	The COP describes robust commitments, strategies or policies in the area of environmental stewardship	30-33, 56-62
10	The COP describes effective management systems to integrate the environmental principles	30-33, 56-62
11	The COP describes effective monitoring and evaluation mechanisms for environmental stewardship	30-33, 56-62
12	The COP describes robust commitments, strategies or policies in the area of anti-corruption	18-20
13	The COP describes effective management systems to integrate the anti-corruption principle	18-20
14	The COP describes effective monitoring and evaluation mechanisms for the integration of anti-corruption	18-20
15	The COP describes core business contributions to UN goals and issues	16-17
16	The COP describes strategic social investments and philanthropy	42-50
17	The COP describes advocacy and public policy engagement	16-17
18	The COP describes partnerships and collective action	16-17, 20-23, 30-31, 56-57, 59
19	The COP describes CEO commitment and leadership	2-3
20	The COP describes Board adoption and oversight	18-20
21	The COP describes stakeholder engagement	7-9, 26-27

THE TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

TCFD recommendation	Pages / Remarks
Governance: Disclose the organization's governance around climate related risks and opportunities.	
a) Describe the board's oversight of climate-related risks and opportunities.	18-21, 56-58, https://www.pttplc.com/en/Sustainability/Environment/Climatechangemanagement.aspx
b) Describe management's role in assessing and managing climate-related risks and opportunities.	18-21, 56-58, https://www.pttplc.com/en/Sustainability/Environment/Climatechangemanagement.aspx
Strategy: Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.	
a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	https://www.pttplc.com/en/Sustainability/Environment/Climatechangemanagement.aspx
b) Describe the impact of climate related risks and opportunities on the organization's businesses, strategy, and financial planning.	https://www.pttplc.com/en/Sustainability/Environment/Climatechangemanagement.aspx
c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	Information is currently unavailable.
Risk Management: Disclose how the organization identifies, assesses, and manages climate-related risks.	
a) Describe the organization's processes for identifying and assessing climate-related risks.	https://www.pttplc.com/en/Sustainability/Environment/Climatechangemanagement.aspx
b) Describe the organization's processes for managing climate-related risks.	https://www.pttplc.com/en/Sustainability/Environment/Climatechangemanagement.aspx
c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	https://www.pttplc.com/en/Sustainability/Environment/Climatechangemanagement.aspx
Metrics and Targets: Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.	
a) Disclose the metrics used by the organization to assess climate related risks and opportunities in line with its strategy and risk management process.	Information is currently unavailable.
b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	57-58
c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	57, 59



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Independent limited assurance report

To the Directors of PTT Public Company Limited (“PTT”)

Conclusion

Based on the procedures performed, as described below, nothing has come to our attention that causes us to believe that the selected subject matters (“Subject Matters”) identified below and included in the Sustainability Report 2019 (the “Report”) for the year ended 31 December 2019 and disclosures regarding their adherence to the three AccountAbility Principles of Inclusiveness, Materiality and Responsiveness under AA1000APS (2008), and reliability of Subject Matters, are not, in all material respects, prepared in compliance with the reporting criteria (the “Criteria”).

Our Responsibilities

We have been engaged by PTT and are responsible for providing a limited assurance conclusion in respect of the Subject Matters for the year ended 31 December 2019 to be included in the Report as identified below.

Our assurance engagement is conducted in accordance with the International Standard on Assurance Engagements ISAE 3000 *Assurance Engagements other than Audits or Reviews of Historical Financial Information* and ISAE 3410 *Assurance on Greenhouse Gas Statements*. We have also conducted our engagement in accordance with the Accountability Assurance Standard of Sustainability AA1000AS (2008) at moderate level that corresponds to a limited assurance as per ISAE 3000 with a Type 2 engagement, which covers not only the nature and extent of the organisation’s adherence to the AA1000APS (2008), but also evaluates the reliability of Subject Matters as indicated below. These standards require the assurance team to possess the specific knowledge, skills and professional competencies needed to provide assurance on sustainability information, and that we plan and perform the engagement to obtain limited assurance on whether the Subject Matters are prepared, in all material respects, in compliance with the Criteria. We have complied with the requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants to ensure their independence. The firm applies International Standard on Quality Control 1 and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

We have not been engaged to provide an assurance conclusion on any other information disclosed within the Report.

Subject Matters

Subject Matters comprised of the following data expressed numerically or in descriptive text for the year ended 31 December 2019:

- GRI 302-1 Energy consumption within organization
- GRI 302-3 Energy intensity
- GRI 303-1 Water withdrawal by source
- GRI 305-1 Direct (Scope 1) GHG emissions
- GRI 305-2 Energy indirect (Scope 2) GHG emissions
- GRI 305-3 Other indirect (Scope 3) GHG emissions
- GRI 305-4 GHG emissions intensity
- GRI 305-7 Nitrogen Oxide (NOx), Sulfur Oxide (SOx), and other significant air emissions (Volatile Organic Compounds: VOCs)
- GRI 306-1 Water discharge by quality and destination
- GRI 306-2 Waste by type and disposal method
- GRI 306-3 Significant spills
- GRI 403-2 Type of injury and rates of injury, occupational diseases, lost days, and absenteeism, and total number of work-related fatalities
- GRI 404-1 Average hours of training per year per employee
- GRI 201-1 Economic value distributed – Community Investment

- OGSD – OG4 Number and percentage of significant operating sites in which biodiversity risk has been assessed and monitored
- OGSD – OG6 Volume of flared and vented hydrocarbon
- OGSD – OG13 Process safety events, by business activity

Criteria

The Subject Matters were assessed according to the following criteria:

- The Sustainability Reporting Standards of the Global Reporting Initiative (“GRI Standards”);
- The Oil and Gas Sector Disclosures (“OGSD”); and
- AA1000 AccountAbility Principles Standard (2008) (“AA1000APS”).

Directors’ and management’s responsibilities

The directors and management of PTT are responsible for the preparation and presentation of the Subject Matters, specifically ensuring that in all material respects the Subject Matters are prepared and presented in accordance with the Criteria. This responsibility also includes the internal controls relevant to the preparation of the Report that is free from material misstatement whether due to fraud or error.

Procedure performed

In forming our limited assurance conclusion over the Subject Matters, our procedures consisted of making enquiries and applying analytical and other evidence gathering procedures including:

- Interviews with senior management and relevant staff at corporate and operating sites;
- Inquiries about the design and implementation of the systems and methods used to collect and process the information reported, including the aggregation of source data into the Subject Matters;
- Inquiries about managements practices and procedures related to identifying stakeholders and their expectations, determining material sustainability matters and implementing sustainability policies and guidelines;
- Visits 3 sites; Region 10 Gas Transmission Pipeline Operation, Innovation Institute, and Khanom Gas Separation Plant, selected on the basis of risk analysis including the consideration of both quantitative and qualitative criteria;
- Agreeing the Subject Matters to relevant underlying sources on a sample basis to determine

whether all the relevant information has been included in the Subject Matters and prepared in accordance with the Criteria.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement and consequently the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed. Accordingly, we do not express a reasonable assurance opinion.

Inherent limitations

Due to the inherent limitations of any internal control structure it is possible that errors or irregularities in the information presented in the Report may occur and not be detected. Our engagement is not designed to detect all weaknesses in the internal controls over the preparation and presentation of the Report, as the engagement has not been performed continuously throughout the period and the procedures performed were undertaken on a test basis.

Restriction of use of our report

Our report should not be regarded as suitable to be used or relied on by any party wishing to acquire rights against us other than PTT, for any purpose or in any other context. Any party other than PTT who obtains access to our report or a copy thereof and chooses to rely on our report (or any part thereof) will do so at its own risk. To the fullest extent permitted by law, we accept or assume no responsibility and deny any liability to any party other than PTT for our work, for this independent limited assurance report, or for the conclusions we have reached.

KPMG Phoomchai Audit Ltd.

Bangkok

10 March 2020

Reader Feedback Survey

PTT Corporate Sustainability Report 2019

Feedback received from this survey will be used to improve content and disclosure of future sustainability reports.

Please indicate an X in the selection box and provide your feedback in the space provided.

1 Please indicate the stakeholder group applicable to you

- Shareholder/ Investor Employee Supplier
- Customer Media
- School Student/ University Student/ Academic Institution/ Researcher
- Governmental Agency/ Public Sector
- Community in the vicinity of operation sites
- Others, please specify.....

2 Through which channel did you receive PTT Corporate Sustainability Report 2019?

- Annual General Meeting for Shareholders
- Conference/ Seminar/ Exhibition
- PTT Employee
- PTT Corporate website
- Others, please specify

3 What is your purpose in reading PTT Corporate Sustainability Report 2019?

- To understand PTT better For studies/ researches To prepare my own corporate sustainability report
- To support investment decisions Others, please specify.....

4 PTT Corporate Sustainability Report 2019's completeness and credibility

	Very high	High	Medium	Low	Very low
• Your understanding of PTT Sustainability issues upon finishing the report	<input type="radio"/>				
• Alignment between PTT Strategy and sustainability performance	<input type="radio"/>				
• Suitability and credibility of content	<input type="radio"/>				
• Content relevance to your interests	<input type="radio"/>				
• Overall satisfaction to the report	<input type="radio"/>				

5 Please indicate the 3 sustainability issues most important to you, ranking from 1-Highly important, 2-Moderately important, 3-Slightly important

- Governance
- Human Rights
- Stakeholder Engagement
- Good Corporate Citizenship
- Fair Operating Practices
- Occupational Health and Safety
- Capital Project Management
- Security and Crisis Management
- Supply Chain Management
- Climate Change
- Research & Development and Innovation
- Integrated Water Management
- Product Stewardship
- Air Pollution
- Human Capital Development
- Wastewater and Waste
- Talent Attraction and Retention
- Biodiversity
- Business Growth
- Others, please specify

6 In your opinion, has the report covered all of PTT's material sustainability issues?

- Yes No

If no, please indicate which issues you would like to be included.

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7 Please provide additional comments for continuous improvement of sustainability report

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8 Additional comments on sustainability management at PTT

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Thank you very much for your kind cooperation.

Readers may scan this QR code to complete the survey online





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สำนักงานส่งเสริมการค้า
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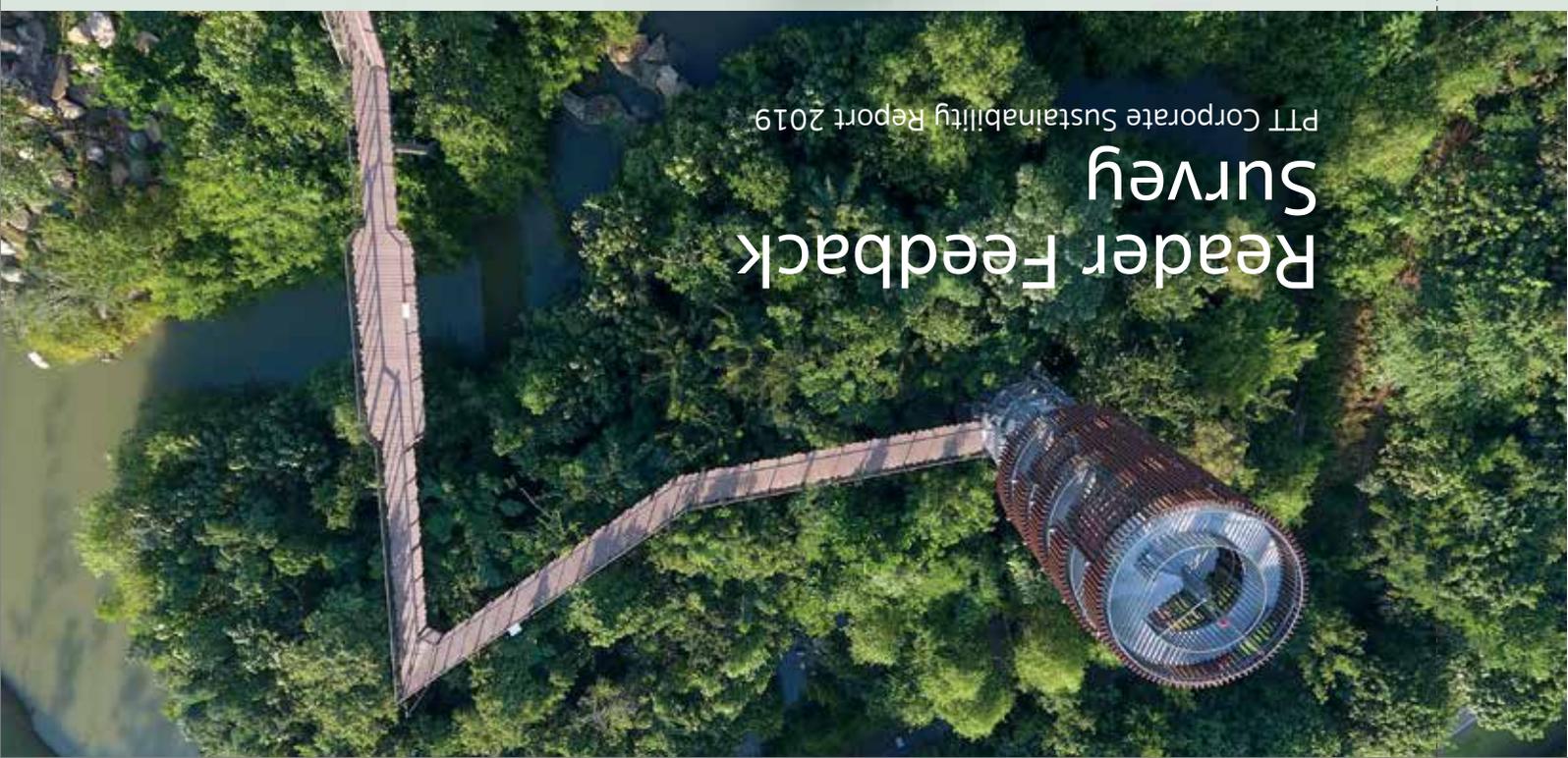
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Reader Feedback Survey

PTT Corporate Sustainability Report 2019



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