GPSC

THE POWER
OF SYNERGY

CONTENT

ABOUT THIS REPORT

Global Power Synergy Public Company Limited (the "Company" or "GPSC") publishes its sustainability report annually to disclose information relating to economic, social and environmental performance and to reflect its operations focusing on sustainable development in the dimensions crucial to its business and to all stakeholders. The scope of this report, which covers the period January 1 to December 31, 2018, encompasses all companies in the Global Power Synergy Group in which GPSC holds more than 50% of the shares and for which it has operational control. There is no change in the list of companies included in the previous report. This report has been written in accordance with the Global Reporting Initiative Standards (GRI Standards) which are internationally accepted guidelines for sustainability reporting with additional indicators for companies in the electric utilities industry. Moreover, the report also provides preliminary information on the company's operations that are aligned with the United Nations Sustainable Development Goals (SDGs).

This sustainability report has been verified for accuracy of data and in accordance with the Global Reporting Initiative (GRI Standards) at the limited assurance level by KPMG Phoomchai Audit Limited. Additional details on data verification can be found in the Assurance Statement on page 123 - 124. This is the second year of verification by external organizations and reflects the way in which the company intends to be verified in the future.

GPSC is committed to improving the quality of its sustainability report and to raising the standards of information disclosure. Therefore, all suggestions are welcome and will be incorporated into the company's operational process to promote sustainable development with all stakeholders. GPSC can be reached via the following channels:

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PRESIDENT AND CEO'S STATEMENT

2018 was another challenging year for GPSC's power and utility business in this era of rapid digital technology transformation, ever-changing consumer behaviors and increased demands for clean energy driven by the key goal of minimizing environmental impacts. Nonetheless, GPSC was well prepared to embrace the changes with its potential risk and impact management strategies, both short-term and long-term. Working towards its goal of being an internationally recognized company with operational excellence and sustainability, GPSC expanded its organization to include the Product and Technology Development Department and New Business Strategic and Project Management Office (PMO) for research and development of new types of future power generation business ventures. In line with its commitment to being a power and utility generator with responsibility while boosting confidence among all stakeholders, GPSC collaborated with external organizations under Thailand's New S-Curve targeting industry for innovation, research and development. Successful and practical projects with social and environmental values include the energy storage system for solar cells and the Micro Grid power transmission system. Additionally, the company's business plan has been tailored to support the United Nations' Sustainable Development Goals (SDGs) for benefits of all stakeholder groups.

Under the sustainability framework, GPSC's overall performance has reached its aim of striking a balance across all economic, social and environmental dimensions. The company has made every effort to raise awareness of social and environmental responsibility among employees while maintaining its core mission of a power and utility generator with reliability and availability. GPSC has strived for business growth in tandem with PTT Group, with planned
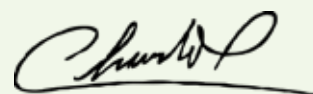
investment in Lao PDR and Myanmar. The company constantly improves its production efficiency through innovative technology.

Caring for the communities surrounding the company's operation sites provides an opportunity for the company's staff to live and learn in harmony with local residents through social activities. Among the community-engaged projects were the "Mor Fai Fah" (Electric Doctor) project, GPSC Young Social Innovator and the GPSC: One Earth One Family project. A Rayong Waste to Energy Project has been implemented by transforming community waste into fuels for power generation, which is a company-community responsibility with the effect of solving community waste and reducing environmental problems in Rayong province. In terms of employees, the company has provided a variety of skill trainings to upgrade their potential to move the business forward in a sustainable manner. Over the past year, the potential development programs have included Leadership Development training courses, and specific skills training courses. Meanwhile, the employees were kept informed about updates and trends in energy and encouraged to use and work with resources effectively, to create a safe, healthy and happy workplace, as well as good teamwork attitudes without discrimination were also encouraged.

GPSC always adheres to the good governance principles as a framework for strategic planning and operations across all economic, social and environmental dimensions for sustainability. This reflects on the company's progress and achievements. During the past year, the company received awards and recognitions from various organizations, including being ranked A+(tha) and BBB- by credit rating agencies Fitch Rating and Standard & Poor's, respectively; the Asian Excellence Awards 2018 in the "Organization Leader and Investor Relations of the Year" category; the ASEAN Corporate Governance Awards for TOP 50 ASEAN PLCs at the 2nd ASEAN Corporate Governance Awards Ceremony 2018; and an Excellent Corporate Governance Score from the Corporate Governance Report (CGR 2018) Survey for the third consecutive year by Thai Institute of Directors (Thai IOD).

Moreover, GPSC has become an alliance of Thailand's Private Sector Collective Action Coalition Against Corruption (CAC), and received the Top Innovative Organization award 2018 from the National Innovation Agency (Public Organization) (NIA), the Most Innovative Power Company from the International Finance Awards 2018, as well as the CFO Innovation Awards by CFO Innovation Magazine. These recognitions have proved the company's potential in becoming a leader in innovations. On environmental front, GPSC won the Green Industry Award Level 4, the 3Rs Award and Zero Waste to Landfill Award from the Ministry of Industry, and certification with a trophy on excellent greenhouse gas management from Thailand Greenhouse Gas Management Organization (Public Organization) (TGO).

Lastly, on behalf of the company's executives and employees, I would like to thank all the stakeholders who play significant roles in moving the company forward towards success, as well as providing priceless advice for the company's growth. As innovative power flagship of PTT Group, GPSC has strived to become a leading global innovative and sustainable power company, establishing business security while creating shared values among all stakeholder groups and maintaining social and environmental responsibilities for the maximum benefit of all parties.

Mr. Chawalit Tippawanich
President and Chief Executive Officer

SUPPLY CHAIN MANAGEMENT

SUSTAINABLE COMMUNITY

CUSTOMER RELATIONSHIP MANAGEMENT

RISK MANAGEMENT

CORPORATE GOVERNANCE

INNOVATION

HUMAN RIGHTS

OCCUPATIONAL HEALTH AND SAFETY AND WELL-BEING

BIODIVERSITY

BUSINESS ETHICS AND ANTI-CORRUPTION

ENVIRONMENTAL MANAGEMENT AND RESOURCES EFFICIENCY

CLIMATE CHANGE AND ENERGY MANAGEMENT

RELIABLE PRODUCTION AND AVAILABILITY

EMPLOYEE READINESS AND WELL-BEING

" SUSTAINABILITY "

HIGHLIGHTS PERFORMANCE

Corporate Governance

92.31% of the Board Director participated in a training provided by the Thai Institute of Director (IOD) in the important field of business

Expertise of Board Members **12 areas**

Business

Plant Availability

Rayong **99.999%**   Sriracha **99.72%**

Contribution Margin Productivity Improvement **124.80 Mbaht**

1,529.8 MW Electricity Generation Capacity (only commercial plants)

Financial Data

Operating Revenue **24,777 Mbaht**

5,457 Mbaht EBITDA

Net Profit **3,359 Mbaht**

Employees

Employee Turnover Rate **3.25%**

Proportion of Woman in the Management Level **28.85%**

Average Number of Training Hours per Employee **37.10 hours**

Environmental

Average GHG Intensity **0.33 Tons CO$_2$e/MWh**

Reducing Water Consumption based on the 3Rs **55.90%**
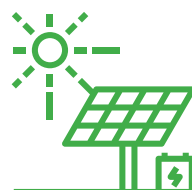
Total GHG emission reduction **227,000 Tons CO$_2$e**

Social

Customer Satisfaction **86.60%**

Zero Complaints related to Human Rights Violations

AWARDS AND RECOGNITION

Excellent and Sustainable Performance

Asian Excellence Awards 2018
- Personal Award: Asia's Best CEO
- Corporate Award : Best Investor Relations Company

By Corporate Governance Asia

TOP Innovative Organization 2018
By National Innovation Agency (Public Organization)

TOP 50 ASIAN PLCs in the 2nd ASEAN Corporate Governance Awards Ceremony 2018
By ASEAN Capital Markets Forum (ACMF)

Power Deal of the Year - Highly Commended
By The Asset

Sustainability Report Award 2018
By Thai Listed Companies Association, The Securities and Exchange Commission Thailand, Thaipat Institute

CFO Innovation Awards 2018
- CFO of the Year Excellence in Technology
- Excellence in Treasury Management Transformation

By CFO Innovation Magazine

International Finance Awards 2018
- Most Innovative Power Company

By International Magazine

Best Investor Relations Company Thailand
By International Business Magazine

Social Responsibility

Certified Companies of Thailand's Private Sector Collective Action Coalition against Corruption
By Thai institute of Directors (IOD)

Award for Standard of Corporate Social Responsibility: CSR-DIW Award 2018
By Ministry of Industry

Environmental Responsibility

Water Footprint Certification
By Water and Environment Institute for Sustainability, The Federation of Thai Industries, Ministry of Industry

Green Industry Award Level 4 : Green Culture
By Ministry of Industry

3Rs and Zero Waste to Landfill Awards
- 3Rs
- Zero Waste to Landfill

By Ministry of Industry

Certificates and trophies for greenhouse gas management at the 2018 "Joining Efforts to Combat Climate Change" event
- Thailand Voluntary Emission Reduction Program : T-VER 1 Project
- Carbon Footprint Product : CFP 1 Project
- Carbon Footprint Reduction : CFR 1 Project
- Carbon Footprint For Organization : CFO 4 Projects
- Low Emission Support Scheme : LESS 5 Projects

By Thailand Greenhouse Gas Management Organization (Public Organization)

ABOUT THE COMPANY

Shareholders Ratio

Thaioil POWER — 20.79%
Thaioil — 8.91%
ptt — 22.58%
GC — 22.73%
— 25.00%

Power Generation Ratio

Hydro Power — 18.00% — 347 MW
Solar Power — 3.00% — 57 MW
Natural Gas — 79.00% — 1,955 MW
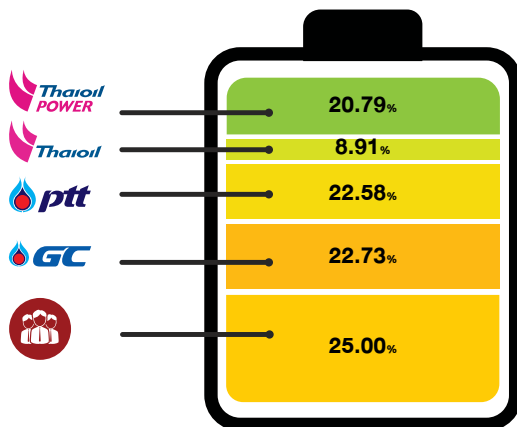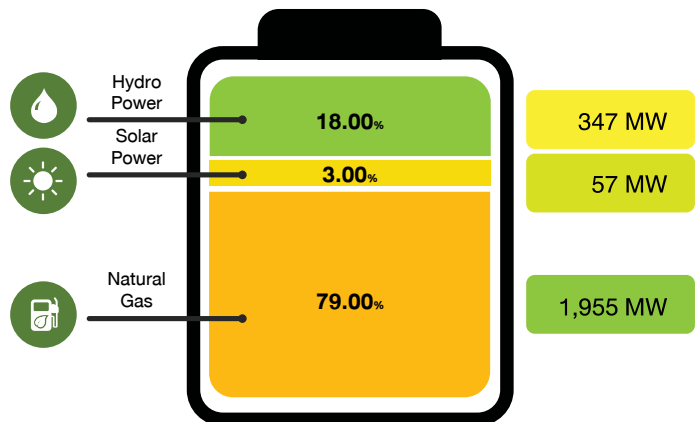
Business Operation Overview

Power

Thailand
Commercial Plants
1,509 megawatts
Under construction
78 megawatts

International
Commercial Plants
20.8 megawatts
Under construction
347 megawatts

Steam

Thailand
Commercial Plants : **1,512** tons/hour
Under construction : **73** tons/hour

Chilled Water

Thailand
Commercial Plants :
12,000 refrigeration tons

Industrial Water

Thailand
Commercial Plants :
2,080 cubic meters per hour

Company's Milestones

2013
- Established as a merged company of PTT Utility Company Limited (PTTUT) and Independent Power (IPT) on Jananary 10, 2013.

2014
- Registered and renamed as Global Power Synergy Public Company Limited (GPSC) on November 27, 2014.

2015
SET
ตลาดหลักทรัพย์แห่งประเทศไทย
- Listed in the Stock Exchange of Thailand (SET). The First Day Trade was on May 18, 2015.

Business Strategy

Vision   The global leading innovative and sustainable power company

Mission

| Create long-term shareholder's values with profitable growth | Deliver reliable energy through operational excellence to customers | Operate business with social and environmental responsibilty | Seek innovation in power and utility efficiency management through energy storage technology |

Strategy

Operational Excellence
- Maximize core business
- Manage invested companies

New Projects Development
- To grow in tandem with PTT Group's investment with a focus on business expansion in Thailand
- To develop projects in international market
- To develop business related to renewable energy

New S-Curve Business Development
- Learn and develop in solar energy project
- Develop a low-cost, high standard, environmentally friendly battery factory in Thailand that is globally competitive
- Provide a full-service of energy storage system integrator and battery
- Become energy management solution provider in the future

2016
- Listed in SET 50 and Asia Pacific ex Japan Small Cap
- Listed in ESG 100 (Excellent Environmental, Social and Governance Management)
- Achieved excellent level for CGR Scoring
- Won the Best CEO Award from Investment Analysts Association (IAA)

2017
- Selected as Thailand Sustainability Investment by SET
- Ranked BBB- rating by Standard & Poor's and A + (tha) by Fitch Ratings
- Received the Best CEO (Investor Relations), Best IR Company (Thailand) and Environmental Responsibility Award from Corporate Governance Asia
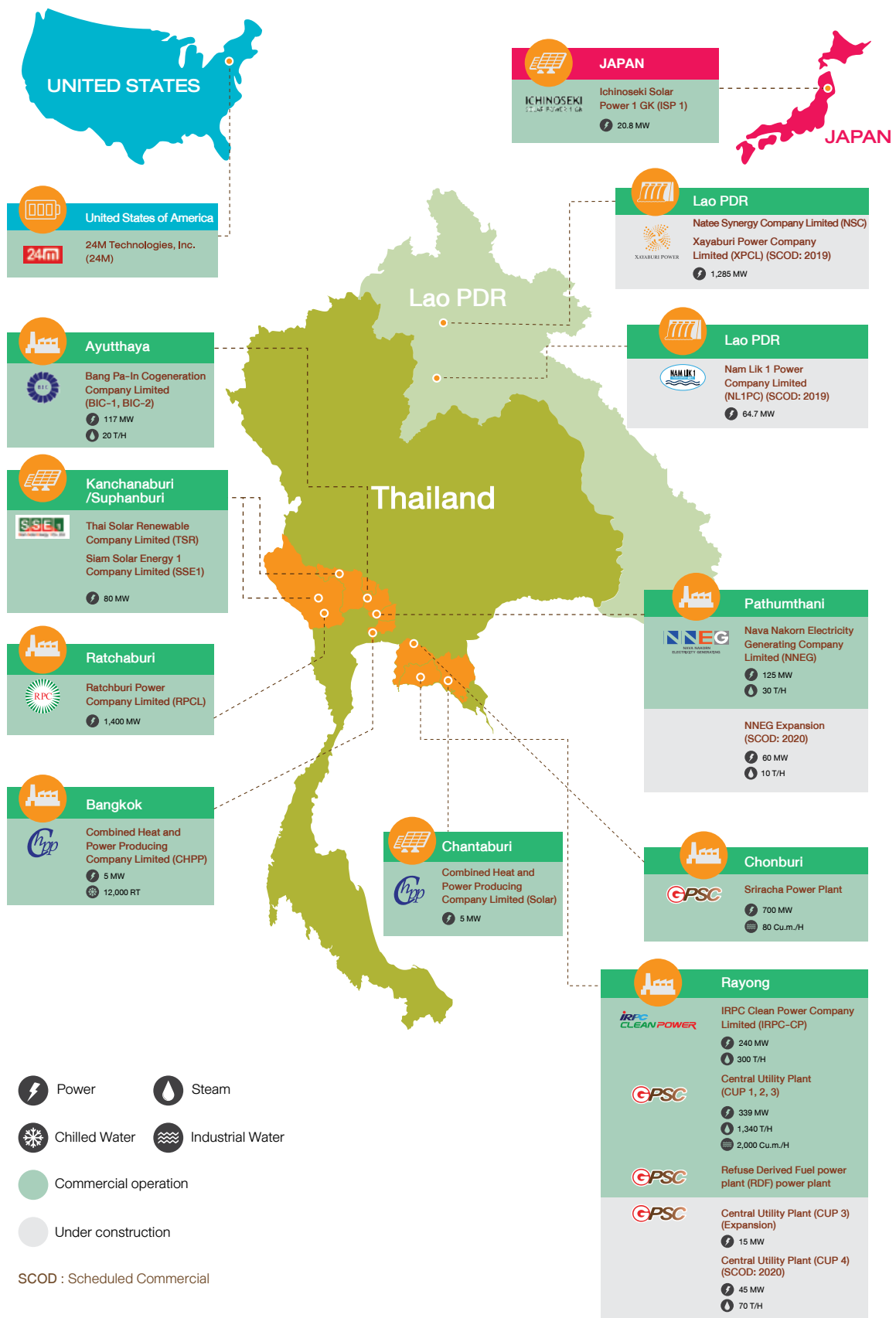
2018
- Received Top Innovation Organization Award 2018 from the National Innovation Agency (Public Organization).
- Won a Asia's Best CEO and Best Investor Relations Company Award from Corporate Governance Asia.
- Won the CFO of the Year Excellence in Technology and Excellence in Treasury Management Transformation Awards from CFO Innovation Magazine
- Establishing Global Renewable Power Co., Ltd for expansion of investment in renewable energy power plants.
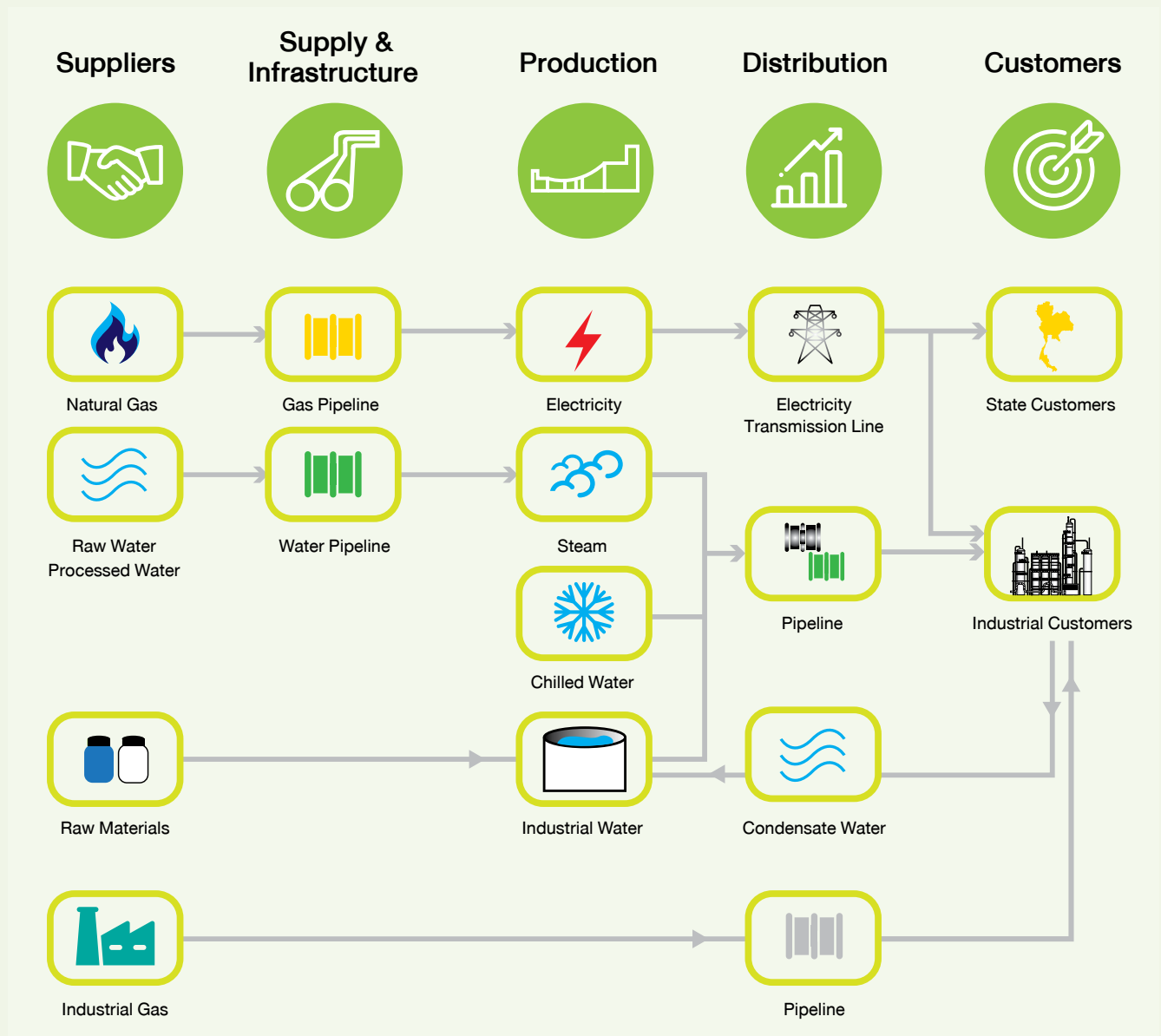
COMPANY OVERVIEW

UNITED STATES

JAPAN

Ichinoseki Solar Power 1 GK (ISP 1)
⚡ 20.8 MW

JAPAN

United States of America

24M Technologies, Inc. (24M)

Lao PDR

Natee Synergy Company Limited (NSC)
Xayaburi Power Company Limited (XPCL) (SCOD: 2019)
⚡ 1,285 MW

Ayutthaya

Bang Pa-In Cogeneration Company Limited (BIC-1, BIC-2)
⚡ 117 MW
💧 20 T/H

Lao PDR

Nam Lik 1 Power Company Limited (NL1PC) (SCOD: 2019)
⚡ 64.7 MW

Lao PDR

Kanchanaburi /Suphanburi

Thai Solar Renewable Company Limited (TSR)
Siam Solar Energy 1 Company Limited (SSE1)
⚡ 80 MW

Thailand

Ratchaburi

Ratchburi Power Company Limited (RPCL)
⚡ 1,400 MW

Pathumthani

Nava Nakorn Electricity Generating Company Limited (NNEG)
⚡ 125 MW
💧 30 T/H

NNEG Expansion (SCOD: 2020)
⚡ 60 MW
💧 10 T/H

Bangkok

Combined Heat and Power Producing Company Limited (CHPP)
⚡ 5 MW
❄ 12,000 RT

Chantaburi

Combined Heat and Power Producing Company Limited (Solar)
⚡ 5 MW

Chonburi

Sriracha Power Plant
⚡ 700 MW
🌊 80 Cu.m./H

Rayong

IRPC Clean Power Company Limited (IRPC-CP)
⚡ 240 MW
💧 300 T/H

Central Utility Plant (CUP 1, 2, 3)
⚡ 339 MW
💧 1,340 T/H
🌊 2,000 Cu.m./H

Refuse Derived Fuel power plant (RDF) power plant

Central Utility Plant (CUP 3) (Expansion)
⚡ 15 MW

Central Utility Plant (CUP 4) (SCOD: 2020)
⚡ 45 MW
💧 70 T/H

⚡ Power
💧 Steam
❄ Chilled Water
🌊 Industrial Water

🟩 Commercial operation
⬜ Under construction

SCOD : Scheduled Commercial

GPSC and its invested companies are located in Thailand and abroad, selling power and steam to several industrial customers and government agencies. The company's customers include Electricity Generating Authority of Thailand (EGAT), Provincial Electricity Authority (PEA), ELECTRICITE DU LAOS (EDL), and Tohoku Electric Power Co., Inc..

VALUE CHAIN

Suppliers	Supply & Infrastructure	Production	Distribution	Customers

Natural Gas → Gas Pipeline → Electricity → Electricity Transmission Line → State Customers

Raw Water Processed Water → Water Pipeline → Steam

Chilled Water → Pipeline → Industrial Customers

Raw Materials → Industrial Water ← Condensate Water

Industrial Gas → Pipeline

Supporting Other National Organizations

GPSC has played an important role in assisting national organizations whose operations are in alignment with the company's sustainable development approach, by providing advices, exchanging information relating to the industry to work towards sustainable growth. The organizations assisted by GPSC are as follows:

The Federation of Thai Industries (F.I.T)
Water Institute for Sustainability (WIS)
Renewable Energy Group

The Federation of Thai Industries, Chonburi
(F.I.T, Chonburi)
Thailand National Committee of TNC-CIGRE

The Institute of Industrial Energy (I.I.E)
Power Producers Group
The Federation of Thai Industries, Rayong
(F.I.T, Rayong)
The Association of Private Power
Producers (APPP)
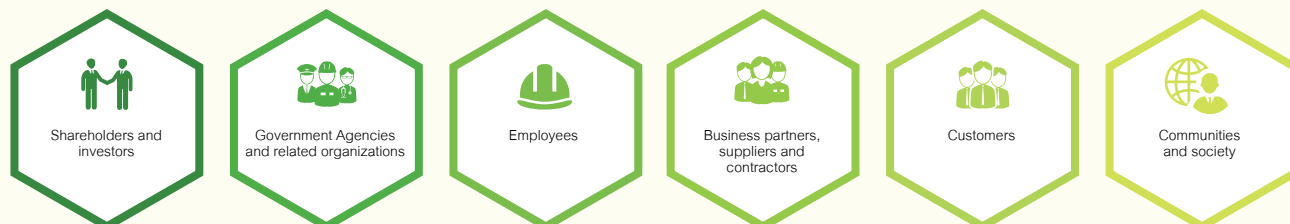The Thai Chamber of Commerce

SHAREHOLDER ENGAGEMENT
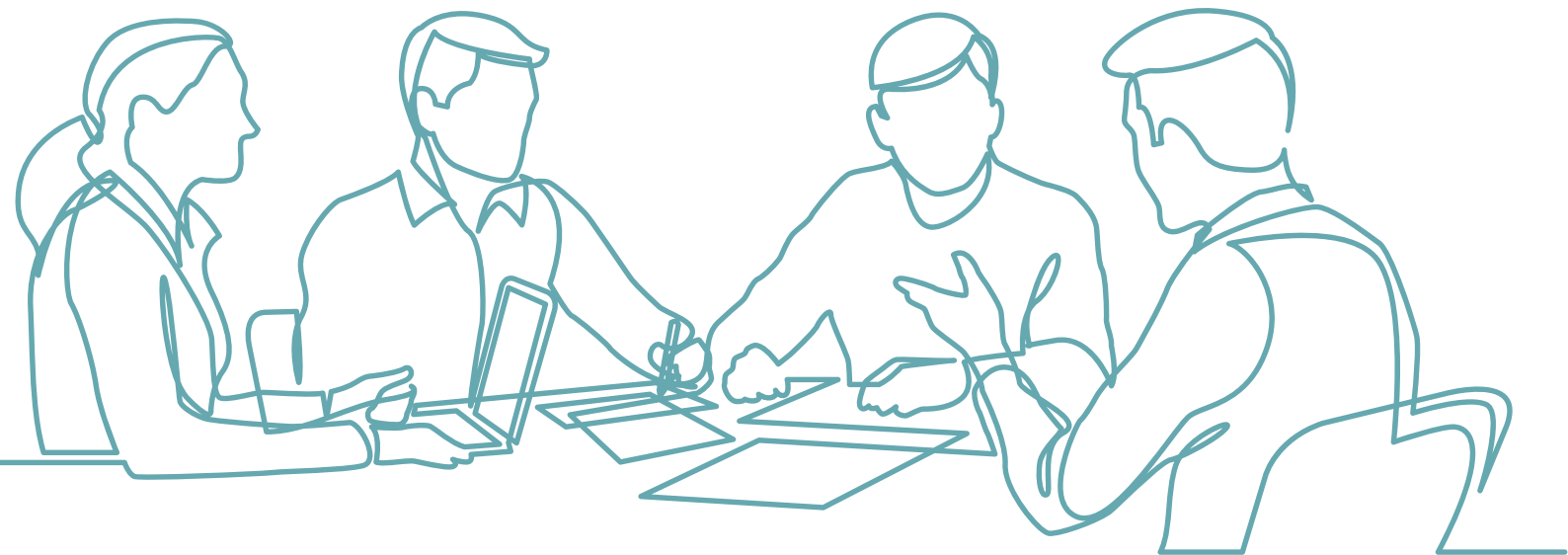
Recognizing the importance of shareholder engagement, GPSC believes that good relationship with shareholders built upon trust and shareholders' valuable feedbacks are crucial factors driving the company's sustainable growth. Shareholders management has enabled the company to effectively tailor to shareholders' needs, which helps lower the risks of company's image and business interruption while cultivating maximum benefits for all groups of shareholders. GPSC has always communicated with its shareholders to create understanding on diverse issues and to seek feedbacks for better decision making and business operation planning.

In 2018, GPSC's shareholder analysis and review was conducted to identify and classify main stakeholders to cover those in the business chain more inclusively for better stakeholder engagement management plan.

The company's six main stakeholders are

| Shareholders and investors | Government Agencies and related organizations | Employees | Business partners, suppliers and contractors | Customers | Communities and society |

The communication and engagement methods vary across types of stakeholders, as follows:

Stakeholder Group	Engagement Channels	Topics of Stakeholders' Interest
Shareholders and investors (Major and minor shareholders / debenture holders/ analysts / financial institutions)	- Annual shareholders meetings - Quarterly analyst meetings - Roadshows and Investor Relations Activities - Annual company on-site visits - Other communication channels via website, e-mail, phone calls and letter, etc. - Interviews with representatives of shareholders and investors for Market Signal Analysis - Shareholder relations activities. - Equal opportunity for all shareholders to join annual general meetings with equal vote and interrogation.	- Good performance and sustainable business growth - Transparency and corporate governance - Risk management - Joint ventures and innovation development for enhanced operation efficiency - Investment in renewable energy
Government Agencies and related organizations (government agencies, state enterprises, local administration organizations, along with private companies with authority to approve licenses or permits for the company)	- Performance reports and operation results of related government agencies. - On-going participation in government projects and activities - Participation with government agencies as a teamwork on requested issues. - PTT Group's public affairs seminars - Interviews with representatives of government agencies and related organizations	- Acting in compliance with rules, regulations, and policies of relevant regulators. - Expansion to renewable energy - Social and environmental responsibility - Living sustainably with communities in a shared economy - Safety and environment management system - Collaboration with government agencies in various projects.
Employees (Executives / Employees)	- Annual Employee Engagement Survey - Complaint channels - Town Hall Meetings for executives to interact with employees - Internal Communication - Communication via e-mail - Interviews with representatives of employees - Internal welfare committee	- Employee potential development - Employee well-being - Good remuneration and welfare - Career opportunity and progress - Performance assessment

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Stakeholder Group	Engagement Channels	Topics of Stakeholders' Interest
Business partners (contractors / suppliers)	- Annual supplier Relationship Management - Annual supplier satisfaction survey - Interviews with representatives of business partners, suppliers, and contractors	- Fair competition with equal treatment - Communication with suppliers - Efficient and transparent procurement system - Supplier audit for mutual sustainable growth
Customers (long-term and short-term customers)	- Annual customer satisfaction survey for operation improvement - Annual, quarterly, monthly customer relations activities - Monthly conferences to monitor and report on demand plan, preparation and maintenance plan, and follow-up on problem solving. - Customer complaint channels - Telemetry (Online Metering) - Interview with customer representatives	- Product delivery and production system reliability - Distribution capability - Prompt response to customer needs - Convenient customer communication channels - Technology development for environment impact mitigation - Seeking new business ventures - Price setting in compliance with Energy Regulatory Commission (ERC) and executives' approval. - Supporting technical teams for timely problem solving
Communities and society (communities surrounding new project sites/power plants)	- Annual community satisfaction survey - Regular community relations activities / visits to communities and people directly and indirectly effected - Power plant visits by local communities. - Public hearings to solicit people's opinions in Environmental Impact assessment (EIA) report and Code of Practice (CoP) - Quarterly "Kiang Bah Kiang Lai" (Side by Side) activities for public participation - Other communication channels - Interview with representatives of community and society groups	- Social and environmental impact management - Business operation with care on safety and environment - Creating local people's understanding on the company's operation. - Job creation, income generation and expense reduction for communities - Supporting or participating in community activities - Local employment - Utilizing the company's skill and knowledge for community development.

STAKEHOLDER'S VOICE

Mr. Sutthichai Kumworachai

Acting Vice President for Research
Division Power and Utility /
Petrochemical Analyst

Maybank Kim Eng Securities (Thailand) PLC

Shareholders/Investors

In addition to the company's growth, more and more investors are interested in the company's outstanding performance in Environmental, Social and Governance (ESG) over the long term. GPSC is one of the companies focusing on such issues, with good governance and social and environmental responsibility, as reflected in the increase in the company's investment in alternative energies in line with the national power development plan (PDP) and the Paris Agreement from the 2015 United Nations Climate Change Conference (COP 21).

Government Agencies and Related Organizations

The government's 20-year national strategy has applied the late King's principles for sustainable development. This is in line with the UN Sustainable Development Goals, which are regarded by the private sector as key drivers in moving the nation forward. For creating a better and environmentally friendly quality of life, GPSC has always emphasized caring for the environment and communities. Playing a key role in the Eastern Economic Corridor (EEC) Development Plan, the company needs to also focus on creating an atmosphere of local participation to build confidence. This will lead to sustainable development that benefits all parties."

Ms. Nicha Hiranburana Thuvatham

Deputy Secretary-General
to the Prime Minister
Secretariat of the Prime Minister

Government Agencies and Related Organizations

The electric power industry is helping to move the national economy forward thanks to the understanding between communities and the industrial sector. So far, GPSC has operated its businesses with social and environmental responsibility in compliance with the law. In the age of Industry 4.0, the company must give priority to the development of innovations for value-added services as well as reducing its ecological footprint. This will result in harmonious living with the communities. We would love to see the company and the communities grow together, especially in terms of alternative energy. With its potential, the company can be a leader in sustainable power energy innovations.

Mr. Dejrit Simsiri

Deputy Municipal Clerk,

Acting Map Ta Phut Deputy Municipal Clerk

Employees

All staff can contribute towards driving the company forward and sustainably. GPSC has to start by instilling awareness in employees at all levels of such issues as business ethics, good governance and human rights. With these values in the minds of all employees, the company's operation will grow sustainably.

Mr. Noranat Simarat

Office of Corporate Legal Division Manager

Customers

GPSC has been operating power generation and distribution businesses as part of the value chain for continued growth. Its good environmental management has benefited surrounding communities. With business ethics, accountability and transparency, the company has prospered in tandem with the local communities and business partners. It has created jobs and contributed to the economy. As a result, its business partners have also regularly followed and adopted GPSC's sustainability principle and practices."

Mr. Chaivichit Ano

Managing Director

PEG Intertech Co., Ltd

Mr. Theerachai Tharakul

General Manager

MIG Production Company Limited

Customers

In addition to power generation, GPSC has strived to adapt to and invested in various businesses including alternative energies and batteries. In an era where types of energy use have changed, this means more business opportunities for the company's sustainable growth.

Community and Society

GPSC already has good environment and safety management. As a power generating business using natural gas, the company does not have much impact on the communities. However, it should promote jobs in the communities for better living and a sustainable society.

Mr. Chamnong Choithongmoon

Map Cha Lood-Chak Klang Community Leader

Ms. Jirapa Mahathep

Map Cha Lood Community Leader

Community and Society

GPSC operations in the community have helped support our local economy. However, if we are to live together sustainably, GPSC must apply its skills and expertise to upgrade the community's potential, by encouraging people to participate in the company activities and by surveying community needs. The company has always focused on the community fairly and listened to people's opinions in order to move forward together.

MATERIALITY ASSESSMENT

GPSC examines issues that matter most to its business operation in terms of sustainability for internal and external organization. These issues are assessed and prioritized under the materiality assessment framework of the Global Reporting Initiative (GRI) Standards while at the same time addressing all stakeholders' expectations and global sustainability trends. The company's operation strategies, along with current and potential risk and opportunity factors, are also taken into consideration as assessment guidelines.

Identification   Prioritization   Validation   Review

Process	Practice Guidelines
STEP 1: Identification Identification of relevant issues that have impacts on sustainability of GPSC and its stakeholders throughout the value chain across economic, social and environmental dimensions. Issues taken into considering include all stakeholder expectations, global changing trends, the company's operation strategies, risk and challenge factors, GRI Standards, global business and industrial trends, interests of internal and external stakeholders, as well as relevant aspects for effective management to provide benefits for all parties.	• PTT Group's and GPSC's Sustainable Development Guidelines • International Practice Guidelines, including GRI[1], DJSI[2], SDGs[3], WBCSD[4], CDP[5] , ISO 26000[6] , and UNGC[7] • All internal and external stakeholders' voices • Annual Employee Engagement Survey • Community Satisfaction Survey • Community Satisfaction Survey • Corporate image management process • Complaint channels • Corporate risk assessment • Workshops with company's executives.
STEP 2: Prioritization Assessing the levels of importance of material aspects to determine what should be reported by taking into account the impacts on GPSC and the impacts on stakeholders. The assessment of each aspect and topic is determined by risk and opportunity assessment and factors affecting the company and stakeholders, along with stakeholders' voices. Each aspect is classified into three levels of importance; high, medium and low. This report covers and focuses only on the aspects with high and medium material levels.	• Workshops with representatives from all agencies that are directly relevant to each stakeholder group.
STEP 3: Validation Reporting the summary of materiality assessment and identified topics that are in alignment with the GRI Aspects, to be analyzed by responsible parties to ensure a more comprehensive assessment. In addition, the summary will be reviewed by GPSC's Management Committee for validation and approval of material aspects in GPSC Sustainability Report.	• Materiality assessment analyzed by external shareholders prior to being reviewed by each department. • Materiality assessment reviewed by the company's executives.

Process	Practice Guidelines
STEP 4: Review Regular reviews of the sustainability report to make sure that the identification of material aspects truly reflects stakeholders' interests and expectations, and that stakeholder engagement practices are improved via complaints and comments channels, both internal and external, for a better representation of stakeholder interests. Stakeholder engagement channels include participating in sustainability award assessment organized by the Securities and Exchange Commission, Thailand (SEC) and Thaipat Institute.	• The sustainability report reviewed by external agencies. • Complaints and Comments Channels. • Sub-group meetings of sustainability agencies to review the sustainability report.

Remarks:

[1] Global Reporting Initiative (GRI) is the organization that initiates the international report which is used as a prototype of preparing a report of sustainable development.

[2] Dow Jones Sustainability Indices (DJSI) is a family of capital indices that assesses the effectiveness of business operations according to the guideline of sustainable development of the world's leading companies which the worldwide funds use it as the investment criteria.

[3] Sustainable Development Goals (SDGs) is a set of sustainable development goals under the United Nations (UN), comprising 17 main objectives to be achieved and implemented by 2030.

[4] World Business Council for Sustainable Development (WBCSD) is the committee of business persons operating business for the world's environment. This committee comprises business persons from the groups of more than 120 international leading companies that are officially accredited in the "Earth Summit" in 1992.

[5] Carbon Disclosure Project (CDP) is the global institution highly recognized by its environmental management.

[6] ISO 26000 is an international standard for social responsibility.

[7] UN Global Compact (UNGC) is a United Nations initiative that incorporates into business policies and strategies so companies can uphold to the accepted international standards in the area of human rights, labor, environment and anti-corruption.
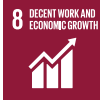
Materiality Matrix 2018

Economy
1. Corporate Governance
2. Business Ethics and Anti-Corruption
3. Risk Management
4. Customer Relationship Management
5. Supply Chain Management
6. Reliable Production and Availability
7. Innovation

Environment
8. Environmental Management and Resources Efficiency
9. Climate Change and Energy Management
10. Biodiversity

Society
11. Employee Readiness and Well-Being
12. Human Rights
13. Occupational Health and Safety and Well-Being
14. Sustainable Community

Remarks
• There is no significant difference in the levels of Importance in 2018.
• No new materiality issues in 2018.

MATERIALITY SUSTAINABILITY ISSUES IN 2018

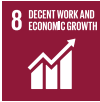| GPSC Material Issues	Scope of ESG risks and opportunities	Global Report Initiative (GRI) Correspondence	Key Stakeholder and Impact Boundary						Sustainable Development Goals: SDGs
			Investors and Shareholders	Government Agencies and Related Functions	Employees	Partners/ Suppliers and Contractors	Customers	Community and Society	
Corporate Governance	• Corporate Governance • Corporate Governance Code for Listed Companies • Selection and Nomination of the Board of Directors • Skills Training for the Board of Directors • Board of Directors' Performance Evaluation	• Management Approach (103-1, 103-2, 103-3) • Governance (102-18, 102-19, 102-20, 102-22, 102-24, 102-27, 102-28, 102-29) • Diversity and Equal Opportunity (405-1)	✓	✓	✓	✓	✓		16 PEACE, JUSTICE AND STRONG INSTITUTIONS / 17 PARTNERSHIPS FOR THE GOALS
Business Ethics and Anti-Corruption	• GPSC's Corporate Governance & Code of Conduct • Anti-Corruption Policy	• Management Approach (103-1, 103-2, 103-3) • Ethics and Integrity (102-16, 102-17, 102-25) • Economic Performance (201-4) • Anti-corruption (205-2, 205-3) • Anti-competitive behavior (206-1) • Public Policy (415-1)	✓	✓	✓	✓	✓		16 PEACE, JUSTICE AND STRONG INSTITUTIONS
Risk Management	• Creating Risk Management Culture • ESG Risks • Emerging Risks	• Management Approach (103-1, 103-2, 103-3) • Organization Profile (102-11) • Strategy (102-15) • Governance (102-30)	✓		✓		✓	✓	8 DECENT WORK AND ECONOMIC GROWTH
Customer Relationship Management	• Customer Satisfaction • Customer Relationship Management • Customer Data Privacy Protection	• Management Approach (103-1, 103-2, 103-3) • Stakeholder Engagement (102-43, 102-44)			✓		✓	✓	8 DECENT WORK AND ECONOMIC GROWTH / 17 PARTNERSHIPS FOR THE GOALS
Supply Chain Management	• Supplier Sustainable Management • Supplier Relationship Management • Spending Analysis	• Management Approach (103-1, 103-2, 103-3) • Organization Profile (102-9) • Supplier Environmental Assessment (308-1, 308-2)		✓	✓			✓	17 PARTNERSHIPS FOR THE GOALS

GPSC Material Issues	Scope of ESG risks and opportunities	Global Report Initiative (GRI) Correspondence	Key Stakeholder and Impact Boundary						Sustainable Development Goals: SDGs
			Investors and Shareholders	Government Agencies and Related Functions	Employees	Partners/ Suppliers and Contractors	Customers	Community and Society	
Supply Chain Management (Cont.)		• Freedom of Association and Collective Bargaining (407-1) • Child Labor (408-1) • Forced or Compulsory Labor (409-1) • Supplier Social Assessment (414-1, 414-2) • Health and Safety for Contractor and Subcontractor Employees (EU-17, EU-18)							17 PARTNERSHIPS FOR THE GOALS
Reliable Production and Availability	• Operational Excellence Management System (OEMS) • Total Productive Maintenance (TPM) • Productivity Improvement	• Management Approach (103-1, 103-2, 103-3) • System Efficiency (EU-1, EU-2, EU-11) • Demand Side Management (EU-10) • Availability and Reliability (EU-28, EU-29, EU-30)	✓	✓	✓	✓	✓	✓	8 DECENT WORK AND ECONOMIC GROWTH
Innovation	• Innovation Development • Innovation Trends in the Utility Industry • External Collaboration through Open Innovation	• Management Approach (103-1, 103-2, 103-3)	✓		✓	✓	✓		9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 17 PARTNERSHIPS FOR THE GOALS
Environmental Management and Resources Efficiency	• Environmental Management System in Compliance with International Standards • Air Quality • Waste Materials • Water Management • Internal Water Management • External Water Management	• Management Approach (103-1, 103-2, 103-3) • Water (303-1, 303-2, 303-3) • Emissions (305-7) • Effluents and Waste (306-1, 306-2) • Environmental Compliance (307-1)		✓	✓			✓	6 CLEAN WATER AND SANITATION 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
Climate Change and Energy Management	• Risk and Opportunity Assessment in Climate Change • Increase in Renewable Energy Production • Carbon Disclosure Project: CDP	• Management Approach (103-1, 103-2, 103-3) • Economic Performance (201-2) • Energy (302-1, 302-3, 302-4) • Emission (305-1, 305-2, 305-3, 305-4, 305-5)	✓	✓	✓			✓	7 AFFORDABLE AND CLEAN ENERGY 12 RESPONSIBLE CONSUMPTION AND PRODUCTION 13 CLIMATE ACTION
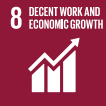
GPSC Material Issues	Scope of ESG risks and opportunities	Global Report Initiative (GRI) Correspondence	Key Stakeholder and Impact Boundary						Sustainable Development Goals: SDGs
			Investors and Shareholders	Government Agencies and Related Functions	Employees	Partners/ Suppliers and Contractors	Customers	Community and Society	
Biodiversity	• Studies on Environmental Impact Assessments • Protection Measures and Management Approaches	• Management Approach (103-1, 103-2, 103-3) • Biodiversity (304-2) • Local Communities (413-1, 413-2)		✓	✓			✓	14 LIFE BELOW WATER / 15 LIFE ON LAND
Employees Readiness and Well-Being	• Employees Readiness and Leadership Development • Succession Planning • Enhancing Employee Engagement • Knowledge Management • Performance Assessment • Organizational Diversity	• Management Approach (103-1, 103-2, 103-3) • Organizational Profile (102-8) • Market Presence (202-1) • Employment (401-1, 401-2, 401-3, EU-15) • Labor/Management Relations (402-1) • Training and Education (404-1, 404-2, 404-3) • Diversity and Equal Opportunity (405-1)			✓				3 GOOD HEALTH AND WELL-BEING / 4 QUALITY EDUCATION / 5 GENDER EQUALITY / 8 DECENT WORK AND ECONOMIC GROWTH
Human Rights	• Human Rights Management • Human Rights Policy Communication • Human Rights Risk Assessment	• Management Approach (103-1, 103-2, 103-3) • Non-Discrimination (406-1) • Rights of Indigenous Peoples (411-1) • Human Rights Assessment (412-1, 412-2)	✓	✓	✓	✓	✓	✓	5 GENDER EQUALITY / 10 REDUCED INEQUALITIES
Occupational Health and Safety and Well-Being	• Process Safety • Personal Safety • Lawful Occupational Health and Safety Practices	• Management Approach (103-1, 103-2, 103-3) • Occupational Health and Safety (403-1, 403-2, EU-25)		✓	✓	✓		✓	3 GOOD HEALTH AND WELL-BEING / 8 DECENT WORK AND ECONOMIC GROWTH
Sustainable Community	• CSR Strategy • Community Satisfaction Survey • Social Return on Investment (SROI)	• Management Approach (103-1, 103-2, 103-3) • Economic Performance (201-1) • Indirect Economic Impacts (203-1, 203-2) • Local Communities (413-1) • Socioeconomic Compliance (419-1)			✓			✓	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE / 11 SUSTAINABLE CITIES AND COMMUNITIES

EMBEDDING SUSTAINABLE DEVELOPMENT GOALS (SDGS)

GPSC continues to embrace the UN's Sustainable Development Goals (SDGs). In 2018, two goals were included: Goal 8: Decent Work and Economic Growth and Goal 16 : Peace, Justice and Strong Institutions. The two goals were added to the company's four existing goals, namely: Goal 7 : Affordable and Clean Energy, Goal 9: Industry, Innovation, and Infrastructure, Goal 12: Responsible Consumption and Production, and Goal 13 : Climate Action. This addition is to shape the company's operation towards international agendas for sustainable development for all stakeholder groups.

SUSTAINABLE DEVELOPMENT GOALS

SDGs	Action Plans • On–Going Process • Under Planning	Company's Benefits	Environmental and Social Benefits	Targets
7: 7.1, 7.2, 7.3 **7 AFFORDABLE AND CLEAN ENERGY**	• Investing in power plant and renewable energy development in rural areas and developing countries • Seeking new opportunities in power production development • Enhancing power production efficiency	• Opportunities in new businesses • Reduction on production cost • Reduction on energy use and expenses	• Supplying power in remote areas • Reduction of environmental pollution and climate change impacts. • Supporting governmental policy to increase renewable energy use.	• Investing in at least one renewable energy project per year • Increase in renewable energy power production to 300 MW by 2023 • Reduction on production cost
8: 8.1, 8.4, 8.5, 8.8, 8.9 **8 DECENT WORK AND ECONOMIC GROWTH**	• Power supply and promotion of public utility in industrial development zones in Thailand and developing countries for economic growth. • Supplying public utility projects in the Eastern Economic Corridor (EEC) and the Eastern Economic Corridor of Innovation (EECi). • Domestic business expansion and development of PTT Group investment promotion projects. • Adhering to labor laws and regulations and against all forms of illegal employment. • Providing safe and healthy work environment. • Supporting the PTT Groups' Koong Bang Krachao Project for tourism promotion.	• Opportunities in new businesses • Enhancing good corporate image. • Boosting work efficiency of employees. • Employee retention and lessening turnover rate.	• Supporting economic growth. • Supporting local employment • Increase in green zones and tourist attractions.	• Supplying 1,594 MW power to Thailand's industrial zones by 2019. • Supplying 30 MW power to EEC and EECi • Business expansion and supporting investment in PTT Group. • 53% Satisfaction Survey on safe and healthy workplace in 2019. • Increase 40% of community income in Koong Bang Krachao area and boosting 50% of hometown–loving awareness.
9: 9.2, 9.4, 9.5 **9 INDUSTRY, INNOVATION AND INFRASTRUCTURE**	• Business expansion to developing countries • Investment on innovative technology for eco-friendly production efficiency enhancement • Public utility improvement for schools, temples, and hospitals. • Organizing Youth Invention and Innovations Contests • Co-organizing "Smart City" Innovations Contests with Chiang Mai University • Co-operating with business partners for research and development of battery energy storage system	• Opportunities in new businesses • Enhancing good corporate image. • Gaining new technology and innovations. • Enhancing production efficiency	• Supporting industrial expansion and economic growth • Better public utility for communities • Supporting science and technology research and development of	• Employing at least 20 people in the business expansion zones by 2023. • Enhanced production efficiency • THB 691 million Technology investment for better production efficiency in 2019 • Promotion of public utility system in operation zones and supporting and assisting in national disaster events on a regular basis. • Building upon at least one innovative project from innovations contests. • Research and development of battery energy storage system projects and being tested with two customers by 2019.

SUSTAINABLE DEVELOPMENT GOALS (Cont.)

SDGs	Action Plans • On-Going Process • Under Planning	Company's Benefits	Environmental and Social Benefits	Targets
12: 12.2, 12.5 12 RESPONSIBLE CONSUMPTION AND PRODUCTION	• Joining hands with business partners in developing sustainability policies and risk assessment on environmental, social and governance (ESG). • Improving production process with efficient use of resources. • Implementing the company's energy conservation policy • Water and energy use reduction • Initiating "Zero waste to landfill" project • Initiating waste-sorting and waste-recycling projects in communities.	• Lessening environmental, social and governance risk in business partners management. • Reduction on resource use, cost and expenses in production and waste • Reduction on energy use and expense • Enhancing resources efficiency and management • Minimizing complaint risk.	• Supporting business partners' environmental, social and governance management. • Promoting resource conservation and sustainability • Supporting community's waste management.	• Reduction on resource consumption to conform with PTT Group's targets. • Improvement on and installation of Reverse Osmosis (R.O.) and ion-free water production system of the Central Utility Plant 4 by the 3rd quarter of 2019. • THB 60 million reduction on energy consumption in the company in 2019. • Zero waste to landfill • Increase in number and range of ages of participants joining the waste bank projects at least in one village in 2019.
13: 13.2 13 CLIMATE ACTION	• Participating in the Low Emission Support Scheme (LESS) / Thailand Voluntary Emission Reduction Program (T-VER)/ Carbon Footprint Organization (CFO) Projects • Greenhouse gas emission reduction and CO$_2$ Extraction measure	• Efficient resources use and management. • Reduction on cost and expenses	• Greenhouse gas emission reduction. • Reduction on environmental and climate change impacts.	• The five-year target on greenhouse gas emission reduction and CO$_2$ Extraction, in compliance with PTT Group's target.
16: 16.5, 16.6 16 PEACE, JUSTICE AND STRONG INSTITUTIONS	• Raising awareness on transparency though "CG Day" activities • Supporting the activities of Thailand's Private Sector Collective Action Coalition Against Corruption (CAC). • Integrating human rights and anti-corruption issues into business practices, while providing complaint channels. • Organizing workshops on human rights and risk management for employees of all departments. • Ethics and good governance principles improvement	• Transparency in business operation • Lessening risks of corruption and all forms of illegal actions. • Promotion of best practices in business ethics and good governance • Lessening human rights violation risks within the organization.	• Reduction on corruption and illegal actions while supporting good employees as good citizens of the society.	• 100% Report on transparency of conflicts of interests of the company's employees and executives. • Maintaining the 5-Star certificate of Thailand's Private Sector Collective Action Coalition Against Corruption (CAC). • Human rights violation risk assessment in all operation zones. • 80% of employees participating in ethics and good governance assessment.

ECONOMY

CORPORATE GOVERNANCE

Targets

"Excellent" Level for the Corporate Governance Report (CGR) of Thai Listed Companies

"Excellent" Level for the assessment of Board of Directors' performance

Corporate Governance is

"Relationship between company's shareholders, board of directors, management and other stakeholders which have a clear framework to achieve company's objective and methods to monitor company's performance"

Business Drivers

Corporate Governance essentially involves relations and balancing the interests of a company's shareholders, board of directors, management and other stakeholders within a structure that guides the company's objectives and approaches with transparency and fairness to all stakeholders. This is to ensure that while the company's business has become successful, long-term impacts and good governance are taken into serious account for the organization's sustainability.

The board of directors, which is elected to represent shareholders, serves as the key mechanism for driving and overseeing the organization by setting visions, missions, directions, strategies and policies. This mechanism also works to ensure that the organization operates according to the principles of business ethics and sustainability by taking into account all groups of stakeholders across economic, social and environmental dimensions. In an effort to enhance the organization's potential to adapt amid disruption, GPSC has placed great emphasis on recruiting and nominating a board of directors with diverse skills, experience and expertise, as they are key players in leading the organization to success and sustainability.

Roadmap to Success

Approaches to good Corporate Governance are as follows:

Strategies

• Good Corporate Government Policy

Action Plans

- Charter of the Board of Directors, and Charters of the four Sub-committees: Audit Committee, the Corporate Governance Committee, Risk Management Committee, and the Nomination and Remuneration Committee
- 2017 Corporate Governance Code for listed companies
- Defining clear scopes, policies and operation guidelines for sustainable management by the Corporate Governance Committee
- Analyzing the mix of skills and expertise of the Board of Directors and developing the board's potential
- Assessing the Corporate Governance Report (CGR) for Listed Companies, by the Thai Institute of Directors

Filing and Reporting Performance

- Filing and Reports in information systems on the board of directors' meetings and the significant information of the board of directors
- Report systems on information of the company, shareholders and the board of directors, in compliance with the regulations of the Securities and Exchange Commission (SEC), and the Stock Exchange of Thailand (SET)

(For more details, please visit http://www.gpscgroup.com/en/about/directors and 2018 Annual Report)

Performance

Corporate Governance

The present board of directors is made up of the directors themselves and four Sub-Committees, namely:
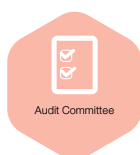
Audit Committee | the Nomination and Remuneration Committee | Risk Management Committee | The Corporate Governance Committee

Audit Committee, the Nomination and Remuneration Committee, Risk Management Committee, the Corporate Governance Committee

GPSC defines a clear scope, roles, and responsibilities of the board of directors and the charters of the four Sub-Committees, focusing on sustainable value creation across economic, social and environmental dimensions for all groups of stakeholders. At the same time, the company has committed to operating businesses with integrity, transparency and accountability, with the Corporate Governance Committee setting the company's good corporate governance policy and approaches. The Corporate Governance Committee also constantly reviews the corporate governance policy and approaches by comparing them to international approaches. Performances of the board of directors and the management team are also under its supervision so as to comply with the good corporate governance code.

2017 Corporate Governance Code for Listed Companies

GPSC has been advised by the Corporate Governance Committee to apply the Securities and Exchange Commission's 2017 Corporate Governance Code (CG Code). From the mutual assessment of the board of directors and management team, the company's operation has been in line with all eight codes contained in the 2017 CG Code for Listed Companies. GPSC will also have its operations reviewed on a yearly basis to ensure that all are carried out in a proper manner, paving the way for the company's future sustainability.

The Corporate Governance Principles

Establish Clear Leadership Role and
Responsibilities of the Board

1

Ensure Engagement
and Communication
with Shareholders

8

Define Objectives that
Promote Sustainable
Value Creation

2

Corporate Governance Code

Ensure Disclosure and
Financial Integrity

7

Strengthen Board
Effectiveness

3

Strengthen Effective
Risk Management and
Internal Control

6

Ensure Effective CEO and
People Management

4

5

Nurture Innovation
and Responsible Business

Selection and Nomination of the Board of Directors

The Nomination and Remuneration Committee is appointed to nominate and select the right persons to join the board of directors by taking into consideration the lists suggested by major and minor shareholders, as well as the directors' pools from trustworthy organizations. The candidates' qualifications are then considered in accordance with the company's criteria and presented in the board of directors' meeting and the general shareholders' meetings for further approval.

The criteria for the nomination of the board of directors give priority to transparency and diverse qualifications of directors, in terms of independence, skills, experience, specialized expertise, gender and age. The Board Skills Matrix is designed to identify individuals with valuable skills to make sure that the directors' qualifications suit the company's key objectives and targets, answer the stakeholders' need, and comply with the laws and international CG codes. Details of the Board Skills Matrix are as follows:

Composition of the Board of Directors

Gender

Male **10**   Female **3**

Total   13 persons

Status

Independent Directors **5**   **Non**-Executive Directors **7**   Executive Directors **1**

Total   13 persons

Board Skills Matrix

7 Persons
Innovation Management

13 Persons
Policy Development

6 Persons
International Business

12 Persons
Business Judgement

10 Persons
Power Industry Expertise

13 Persons
Strategic Planning

9 Persons
HR and Organization
Development

5 Persons
Finance and Accounting

10 Persons
Risk Management and
Internal Control

5 Persons
Internal Audit

10 Persons
Coporate Governance and CSR

2 Persons
Law

Skills Training for the Board of Directors

Apart from recruiting the board of directors with different fields of expertise, GPSC also places emphasis on continuous skill improvement of the board of directors. In 2018, the GPSC board of directors attended a variety of training courses of Thai Institute of Directors (IOD) to improve their knowledge and skills which are essential for GPSC. Moreover, they also participated in several electricity training courses to increase their understanding about the direction of GPSC business such as the Executive Program in Energy Literacy organized by Thailand Energy Academy and Business Revolution and Innovation Network (BRAIN) organized by The Federation of Thai Industries.

Board of Directors' Performance Evaluation

For optimal efficiency of the board of directors' performance, GPSC has conducted annual performance evaluation of the board of directors, the sub-committees, and individual committee members. The Corporate Governance Committee proposes the evaluation methods, criteria and the evaluation forms at the board of directors' meeting for approval. The annual evaluation covers performance of board of directors as a whole, performance of the four sub-committees, performance of individual committee members, both through self-evaluation and cross-evaluation. The secretary will then collate the evaluation results and suggestions from the meeting for maximum benefit of the development for operational approach. The following is the result of board of directors' performance evaluation in 2018.

Result of Board of Directors' Performance Evaluation	Average Score (%) 2018
Type1 : Performance of board of directors as a whole	88.76 (Excellent)
Type2 : Performance of individual committee members	
1. Self-evaluation	96.01 (Excellent)
2. Cross-evaluation	96.19 (Excellent)
Type3 : Performance of the four sub-committees	
1. Evaluated by the board of directors	100.00 (Excellent)
2. Evaluated by the committee (Self-evaluation)	98.24 (Excellent)
3. Evaluated by the Nomination and Remuneration Committee	99.44 (Excellent)
4. Evaluated by the Corporate Governance Committee	92.22 (Excellent)
5. Evaluated by the Risk Management Committee	86.57 (Excellent)

Key Performance Indicators

	Performance			Target	
	2016	2017	2018	2018	2019
Corporate Governacne Report Evaluation Level / **Performance of board of directors**	**91** Excellent	**95** Excellent	**96** Excellent	**96** Excellent	**96** Excellent

Excellent CG Score in Corporate Governance Report (CGR) of Thai Listed Companies 2018

Surveyed in the Corporate Governance Report (CGR) of Thai Listed Companies 2018 by the Thai Institute of Directors (IOD), GPSC has received excellence level (five stars) for three consecutive years. In 2018, the company earned 96%, the higher score ever.

2018–2019 Sustainability Operation Plan

The Corporate Governance Committee has approved the 2018-2019 sustainability operation plan in order to enhance the company's operational efficiency across economic, social and environmental dimensions to be on par with those of other leading national companies and those of international standards. This is also to prepare for selection by the globally renowned Dow Jones Sustainability Index (DJSI) in order to boost investors' and stakeholders' confidence, and to create opportunities for competitive advantages. The company has taken into account the long-term environmental impacts, while respecting the rights of, and being responsible for, shareholders and stakeholders.

Ms. Nicha Hiranburana Thuvatham
Independent Director/Member of the
Corporate Governance Committee

GPSC has always had clear objectives on good corporate governance, and gives priority to diversity and gender equality. This is reflected in promoting women's roles on the board of directors and the increased number of female executives. The overall image of the company's board of directors comprises a good mix of qualified directors with diverse expertise and experience for more balanced corporate governance and better benefits for stakeholders. The policies, visions and good governance principles are shared among the employees through the corporate culture to encourage the company's employees at all levels to be socially responsible, paving the way for sustainable business operations, which is in line with the national development strategy and the sustainable development goals.
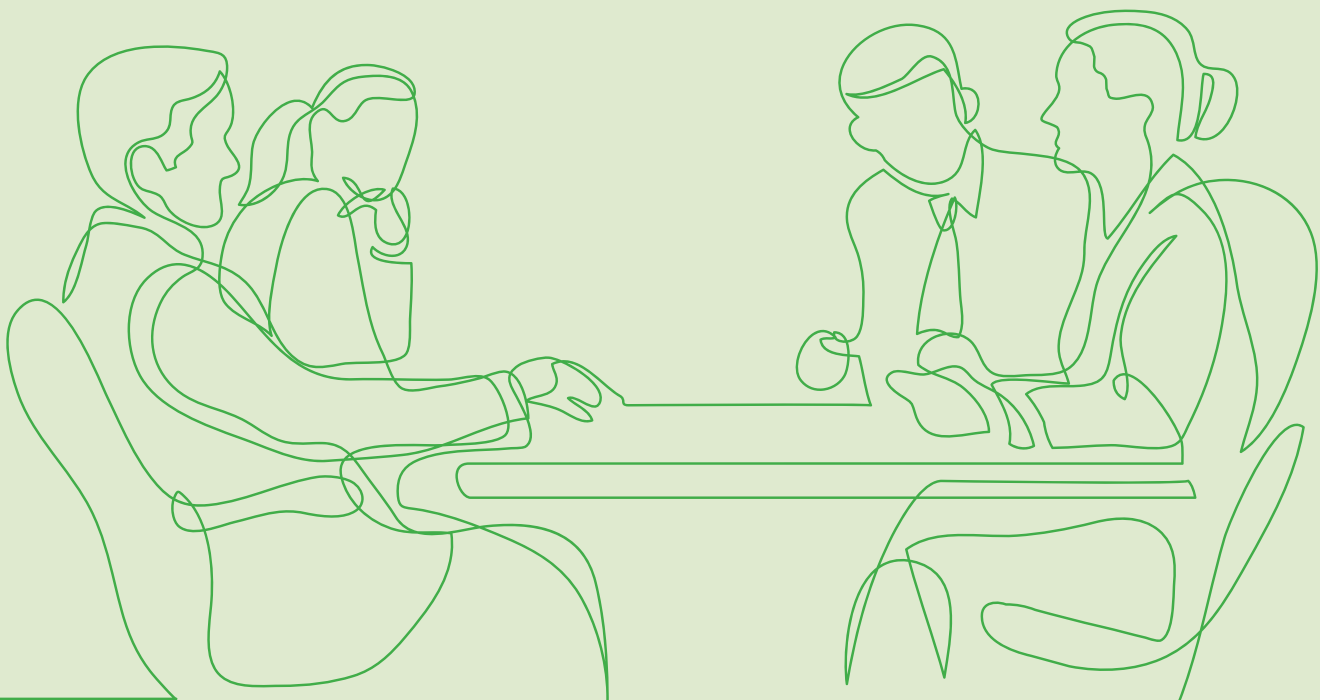
BUSINESS ETHICS AND ANTI–CORRUPTION

Targets

Hold a training in business ethic and integrity every quarter

Zero complaints on business ethics
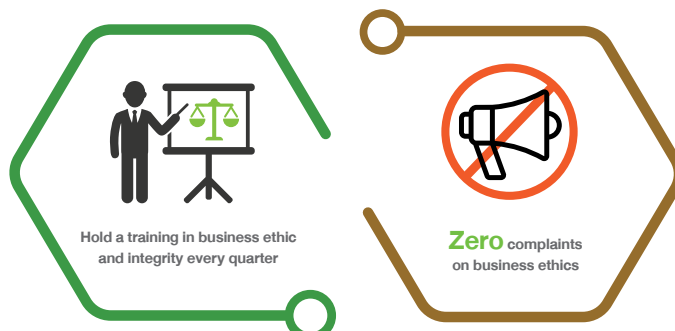
Business Drivers

Business ethics and integrity are important issues and ones of which stakeholders take note as they help to reduce possible risks and damages. In today's borderless social media world, all groups of stakeholders can quickly get news and information on the economy, society and the environment, including about unethical actions that go against good corporate governance principles. To enhance competitiveness and to increase investors' confidence, the company has set its policies on Corporate Governance (CG) & Code of Conduct using the official manual as a guideline.

Roadmap to Success

Approaches to Business Ethics and Anti–Corruption are as follows:

Strategies

- Corporate Governance (CG) & Code of Conduct Policy and Manual
- Anti-Corruption Policy
- Compliance Policy & Charter
- Whistleblowing and Complaints Handling Policy
- Law and Regulation Policy
- Asset Management, Confidentiality and Information Disclosure Policies

Action Plans

- Roles and responsibilities for legal affairs
- Practices on anti-corruption, anti-gift/benefit accepting and giving through information technology and communications
- Reports on stakeholder engagement of directors, executives and related persons. The report criteria include those in the first report, quarterly reports on changes of stakeholders' information and annual reports on shareholders' information
- Raising awareness of business ethics and anti-corruption among all stakeholders, including directors, employees, executives, representatives of affiliate companies, business partners and other groups.

Filing and Reporting Performance

- Filing and Reports on security holdings of the company's directors, and senior executives
- Filing and Reports on shareholder engagement of the company's board members, executives, and persons involved
- Filing and Reports on lists of gifts or other benefits in compliance with the practices on anti-corruption, anti-gift/benefit accepting and giving through information technology and communications.
- Filing and Reports on disclosure of the company's conflicts of interest.

(For more details, please visit http://www.gpscgroup.com/en/cg/policy)

Performance

GPSC's Corporate Governance & Code of Conduct

All the company's employees must uphold and comply with the GPSC's Corporate Governance & Code of Conduct under the supervision of the good governance committee to ensure sustainability of the company's good governance in comparison to international practices. The company has instilled ethics in its working culture, with integrity as one of the core corporate values, through various activities and various channels. After signing an acknowledgement of GPSC's Corporate Governance & Code of Conduct Manual, all the company's board members, executives and employees, have strictly upheld these as guidelines. In 2018, a brief version of GPSC's Corporate Governance & Code of Conduct Manual was published covering 15 aspects of the practices for running the business with fairness, accountability and transparency based on international corporate governance. A report on disclosure of the company's conflicts of interest was also published, where the company's employees are required to report conflicts of interest at least once a year and whenever any changes, as specified in the Code of Conduct, on shareholder engagement and conflicts of interest, arise.

Anti-Corruption Policy

GPSC has committed to operating the business with integrity, transparency, fairness and responsibility for society and all stakeholders, based on the corporate governance & code of conduct and anti-corruption in all forms, both direct or indirect. Since 2015, the company has been a signatory to Thailand's Private Sector Collective Action Coalition Against Corruption (CAC), ensuring all the company's employees strictly comply with the Anti-Corruption Policy and guidelines on accepting-giving gifts, entertainment, or any forms of benefits (No Gift Policy). The practices on anti-corruption in 2018 include the following:

Whistleblowing and Complaints Handling System

To enhance effectiveness in business operation and to ensure the company, its subsidiaries, affiliated companies, employees and other people act in line with the company's laws, regulations, corporate governance & code of conduct policy, and to prevent potential risks and damages to all stakeholders, as well as to handle complainants fairly, the company has announced the Whistleblowing and Complaints Handling Policy, procedures and check and

monitoring system. In 2018, after receiving a complaint in relation to the breaching of the company's code of conduct, the company conducted an investigation and took disciplinary action against the persons involved. The company also publicly disclosed the number and cases of code of conduct breaches in its annual report and the information checklist (56-1 Form). However, there have been no complaints of anti-competitive behavior, anti-trust and monopoly practices via the company's complaints channel.

Raising Awareness on Business Ethics and Anti-Corruption

In a bid to bring the attention of all employees to business ethics and anti-corruption so that they can put them into practice, various events were held in 2018, as follows:

- The "PTT Group CG Day 2018" was held on the concept "Born to be REAL". Over the past 40 years, the PTT Group has been "REAL" in its commitment to moving the organization forward based on corporate governance (CG 4.0) with advanced technologies, creativity and innovations based on integrity (INTEGRITY 4.0), for the benefit of all stakeholders on the basis of transparency and honesty.

- The "GPSC CG Day 2018" was held for the first time with the aim of promoting the corporate governance and anti-corruption policy and practice, as well as values in ethics and integrity. The event was organized to make sure all employees have a better understanding of anti-corruption measures.

- A survey on the understanding of the company's business ethics was carried out for all employees as a means to remind them of the policy and put it into practice correctly.

- A new employee orientation was held to welcome newcomers and to inform them about the company's corporate governance & code of conduct, and anti-corruption policies.

- Information on anti-corruption measures was shared at the "Supplier Relationship Management 2018"

- The company joined a seminar entitled "Thai People…Waken & Fight Corruption", held to mark Anti-Corruption day.

- The company participated in International Anti-Corruption day organized on the concept "Zero Tolerance: Thai People Do Not Tolerate Corruption" .

Ms. Patchaneeya Mahaisavariya

Corporate Governance and Compliance Division Manager

GPSC has put a strong focus on business ethics with concrete policies and guidelines, integrating them as part of its business operation strategies. Training and activities are regularly held to raise awareness and build up understanding about the policy and practices among all the stakeholders for the company to achieve its goals and to grow securely and sustainably.

Key Performance Indicators

	Performance			Target	
	2016	2017	2018	2018	2019
Training and/or campaigns on GPSC's Code of Conduct	At least 1 time per year	At least 1 time per year	At least 1 time per year	At least 1 time per quarter	At least 1 time per quarter
Percentage of Employees signing an acknowledgement on GPSC's Code of Conduct (%)	100	100	100	100	100
Average score of result of the survey on understanding of the company's business ethics (%)	–	97	93	>90	>90

GPSC Receives the Certificate of Membership from Thailand's Private Sector Collective Action Coalition Against Corruption (CAC).

The board of committees of Thailand's Private Sector Collective Action Coalition Against Corruption certified the membership of GPSC. The company's anti-corruption policy and guidelines have been evaluated based on the CAC's criteria. GPSC announces its performance of anti-corruption on a yearly basis in its annual reports and the annual information checklist (56-1 Form).

GPSC Ranks Among TOP 50 ASEAN PLCs in the 2nd ASEAN Corporate Governance Awards Ceremony 2018

The company received the ASEAN Corporate Governance Awards (Top 50 ASEAN PLCs) for its continuous commitment to corporate governance, transparency and information disclosure to all stakeholders. It is also praised for its great vision, the roles of its policy approval committee, and practices.

RISK MANAGEMENT

Targets

100%
Functional Risk Management, Monitoring and Review

100%
Basic Risk Management Training for New Employees and Main Contractors

Business Drivers

With the rapid changes in global economic, social and environment landscapes, business risks as well are continually evolving. These risks are undeniable and in accordance with GPSC's mission in developing business growth benefiting the stakeholders while building sustainable communities, the company implements Enterprise Risk Management as one of the tools to manage the rising risk The company's risk management approach is aligned with the international protocols, ranging from making policy, setting risk management strategies, planning corporate's structure and framework. This approach has been applied throughout the organization covering both functional and corporate levels along with the company's investment policy. This application is meant to aid in preparing the entire organization for any upcoming opportunities or threats.

Roadmap to Success

Approaches to Risk Management are as follows:

Strategies

- Making risk management policy
- Setting and aligning risk management strategies at all level in the organization by clearly stating all risk factors and levels of toleration
- Establish structure and framework for risk management that incorporate both functional and corporate levels into consideration

Action Plans

- Managing risks effectively at all levels by establishing assessment, controlling, monitoring and management processes for the entire organization
- Preparing contingency plan in time of crisis which focus on continuation of business operation for every functional department
- Analyzing and assessing impacts on organization sustainability from all measured risk factors both currently existed and emerging
- Promoting the risk management culture across the organization

Filing and Reporting Performance

- Record and report system in the company database of the assessment results from every functional departments in the organization
- Test and measurement system that justify employees' understanding about risk management

(For more details, please visit http://www.gpscgroup.com/en/sustainability/economic/risk-and-crisis-management)

Performance

Creating Risk Management Culture

GPSC is determined to create a corporate risk culture and embed risk management as one of its key performance indicators for all executives and employees. In order to achieve this goal, the company has organized regular risk management training for employees and all concerned parties.

In 2018, the company conducted the risk management training programs and tests online in order to raise awareness and effectively measure the risk level at the functional level. Risk Agents were assigned at each of the functional level responsible for a more precise and a more comprehensive assessment. These agents assist in aligning, cooperating and managing risks encompassing the entire organization. All the encountered risks are listed on the Risk Register and then reviewed by top executives of each department. With the great efforts from all employees the company's risk management can be accomplished and sustained over the long run.

Environmental, Social and Governance Risks (ESG Risks)

GPSC takes proactive view and action against any unforeseeable losses or risks established from both corporate and functional risks' analyses and assessment. The company's risk measurement incorporates the impacts in term of finance, operation process, reputations, regulations, customers and employees which reflected in the stakeholders' expectations. Based on closely measured risk factors and prediction of possible impacts, the company engages in risk prevention and protection. Additionally, the company has conducted environmental, social and governance (ESG) risk analyses, such as power plant construction risks, and activities that may have impacts on the environment and good governance of business partners.

In 2018, GPSC established risk management standard relating to Anti-Corruption based on entire organization's risk assessment. Hence, the company received a notable recognition as well as a certificate from the Corrective Actions Against Corruption (CAC) program on this achievement.

(For more details, please refer to 2018 Annual Report)

Emerging Risks

Today's fast evolving business disruption has drastically changed the business climates in all dimensions, including impacts on value chain as well as the company's operational activities. In order to manage both current and potential risks and their possible impacts to the company's operations, GPSC focuses on high potential risk management and crisis preparation measures. Among the key issues are disruptive technology risk, and climate change risk.

Disruptive Technology Risks

Risk Impacts on the Company:	Management Approaches:
Technology transformation over the past decades has widely and immensely impacted the economy. Social media and constantly evolving business technologies and innovations have transformed our daily lives. Agility in effectively responding to these technological changes is one of GPSC's fundamental pillars to achieve sustainable competitiveness. For the company to move ahead and stay ahead, it needs world-changing innovative businesses, new ideas and applications and strategies to prepare for technological disruption.	• Setting up a team with special expertise to monitor, analyze, and assess significant impacts of the risks on the company's operations in order to report to the company's managing executives and come up with risk management plans in a timely manner. • Adapting operational strategies, including cost management and technology and innovative applications for the company to stay ahead. • Engaging in advanced technology and innovations development and applications that are compatible with existing technology for better operational efficiency. • Creating business opportunities by investing in new technologies. • Upgrading the company's potential.

Climate Change Risks

Risk Impacts on the Company:	Management Approaches:
Storms, floods and drought are among the impacts of climate change and come with ever-increasing severity and frequency. Climate change is another issue that has direct impacts on the company's business operations. For instance, changes in rain quantity and solar intensity also means changes in quantity of power generated, and therefore the company's revenue. Furthermore, among potential risks is the government's enforcement of the greenhouse gas emission reduction policy. GPSC has, therefore, strived to be prepared in dealing with climate change risks and opportunities.	• Providing climate change risks and opportunities training workshops to identify risks and opportunities, and to assess impacts and financial ratio, and climate change risks and opportunities. • Looking for opportunities to invest in renewable energy to minimize greenhouse gas emissions. • Participating in the Thailand Voluntary Emission Reduction Program (T-VER) • Implementing energy conservation programs for optimum energy use efficiency.

Key Performance Indicators

	Performance			Target	
	2016	**2017**	**2018**	**2018**	**2019**
Functional Risk Management (Monitoring and Review of Functional Risks for All Groups at Risk) (%) / Basic Risk Management Training (for all new employees and main contractors) (%)	**100**	**100**	**100**	**100**	**100**
	100 of all risk agents	100 of all risk agents	100 of Employee 73 of Contractors	100 of Employee and main contractors	100 of Employee and main contractors

2018 Risk Management Training

To conform to the Operational Risk Management: ORM task force's plan, a basic risk management training workshop was provided for GPSC's new staff including long-term contract staff from GC Maintenance and Engineering Company Limited (GCME) and Business Service Alliance Company Limited (BSA) in Rayong and Sriracha Provinces. Held on May 24, 2018 at the Multipurpose Room, CUP-2, the workshop aimed to provide understanding and management approaches to potential risks in order to achieve the company's goals.

Surajit Bourtherng
Vice President, Engineering and Maintenance

" Risk is the most important issue in all departments. By acknowledging risks, all the departments can prioritize their tasks systematically. For plant operations staff, risk assessment is a crucial factor in terms of work planning and decision making to minimize losses, both monetary and of equipment. "

CUSTOMER RELATIONSHIP MANAGEMENT

Targets

Over **85**% Customer Satisfaction

4 long-term trade contracts and/or agreements with private industrial companies per year
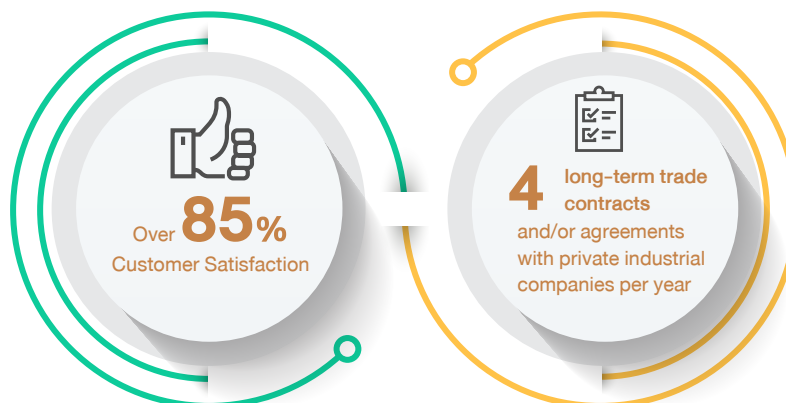
Business Drivers

Customer relationship management is a fundamental ingredient for business success. It is also a contributing factor to the company's performance and leads to mutual sustainable growth. GPSC has always strived to upgrade product quality, delivery and services, as well as its operation process standards. This is achievable by successfully networking with involved partners to bring about increased profits and reductions in expenses. Precise and on-time delivery plans can lead to a better equipment maintenance management plan and optimization of production control that meet customer expectations. In addition, it is necessary that the company is introduced to new customers by existing customers who have trust in and a good relationship with the company, and to obtain information that may be useful for the development of existing businesses and future ventures.

Roadmap to Success

Approaches to Customer Relationship Management are as follows:

Strategies

- Customer retention, customer relationship creation, customer expectation management and customer satisfaction management.
- Use of property management, internal information and safeguarding of confidential information policy, data protection, use of internal data and confidentiality of customers' information and trade secrets.

Action Plans

- Corporate Procedure, including reviews of agreements, issuing of invoices and customer satisfaction assessment, to ensure smooth product/services delivery that meets customer expectations based on the concerted operation of all departments involved.
- Two-way communication/ complaint channels including a Hotline, mobile phones, and customer relations e-mails.
- Annual customer relations activity plans to foster cooperation and two-way communication engagement to obtain access to the latest updates in the company's news.
- Annual customer satisfaction survey and regular activities to strengthen good customer relations and engagement. Results of the surveys and activities can lead to guidelines or suggestions for better services.
- Codes of conduct on protection of customer data privacy, contracts, agreements, and other related documents.

Filing and Reporting Performance

- The filing and reporting information system includes customer expectation reports and follow-ups, agreements, delivery plans, invoices, complaints, customer satisfaction assessment results and key customer data.
- Online communications with customers for convenient access via Telemetry, where the company can also retrieve customer purchasing data for ease and accuracy of analyses and production management and planning for optimum benefits. Telemetry is scheduled for a test run by 2019.

(For more details, please visit http://www.gpscgroup.com/en/sustainability/economic/customer-relationship-management)

Performance

Customer Satisfaction

Results of the company's annual customer satisfaction surveys are presented in the company's management committee's meetings as guidelines on development of products, management, and delivery services. Customer feedback and lessons learned from the surveys are transmitted to the relevant departments for further service improvement. Customer relations activities are also held monthly, quarterly and annually, enabling the company to continually keep up with customers' businesses, strengthen relations and maintain their satisfaction. The latest customer satisfaction survey revealed six issues. These and the relevant mitigation measures are as follows:

- Confidence in reliable production and delivery, and system stability.
    - The 2-feeder transmission system and its control system between Central Utility 1 (CUP 1) and Central Utility 3 (CUP 3) have been installed and inspected completely.
- Steam quality should be as prescribed in the agreements.
- The company has improved the steam quality control system to meet customer expectations. Impacts of Central Utility 4 (CUP 4) construction progress on system stability.
    - The company has informed customers about the construction progress to ensure them that it will be completed pursuant to the agreement and to meet increased customer demands.
- Readiness of planning and inspection on customer sites prior to maintenance.
    - Making plans with customers to prepare staff and necessary spare parts prior to maintenance.
- Maintenance follow-ups and increase of customer communication channels
    - Follow-up meetings with customers to acknowledge problems and improvement issues as well as to add more contact channels directly to customers.
- Expectation on quick follow-up response
    - Reports on progress of procurement and information preparation, use of Customer Requirement System, and preparation of staff who is responsible for the tasks.

In 2018, GPSC's customer satisfaction survey was conducted on 57 respondents from 21 companies. The customer satisfaction score was 86.60%, higher than the target of 85%. The company successfully improved the six issues and mitigation measures from the customer satisfaction survey of the past year.

Customer Relationship Management

GPSC's annual customer relationship management plan is to deepen customer relations through diverse activities, meetings on delivery and maintenance service planning, and other monthly services, all of which are two-way communication channels. In the delivery service planning meeting in December, 2018, the company's Sustainability Roadmap was introduced to customers to raise awareness of the importance and impacts of mutual sustainability management. Moreover, seminars for customers' executives were organized for better understanding of renewable energy power plant operation and management with field trips to a wind power plant called Kaminokuni in Kaminokuni, Hokkaido and Ichinoseki Solar Power 1 GK, a subsidiary of Global Power Synergy Public Company Limited, in Ichinoseki, Iwata.

Customer Data Privacy Protection

GPSC acknowledges customer data privacy and assumes the responsibility to protect it. Customer Data Privacy Protection is one of the conditions in trade agreements, along with the asset management plant, confidential information protection and use of company data which contains code of conduct on customer data privacy protection, contracts and trade agreement information, as well as related documents. There are no complaints about customer data privacy protection received over the past year.

Key Performance Indicators

	Performance			Target	
	2016	2017	2018	2018	2019
Customer Satisfaction (%)	87.40	86.80	86.60	> 85.00	> 85.00
Number of long-term trade contract (s) and/or agreement(s) with private industrial companies	–	1	9	4	4

Customer Retention and Expansion

Over the past two years, the company has continuously improved and maintained production and delivery systems to reach agreements and cater to customer needs. These were coupled with the application of customer suggestions from monthly meetings, complaint channels and customer satisfaction survey to ensure better services to meet customer expectations. This has resulted in retaining customers which are four private industrial companies to renewtheir trade contracts. Moreover, the customers based in Map Ta Phut Industrial Estate have also been expanded. Four of them have made heads of agreements for utility trading and three more for long-term trade contracts.

Total contract value approx.
THB one hundred billion
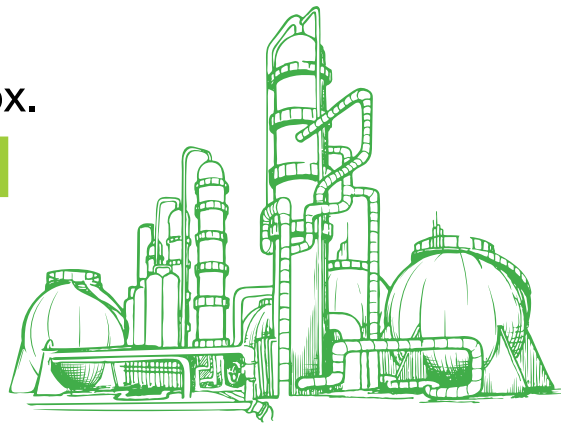
> The company has constantly improved its product quality and reliability. Customer communication channels have also been upgraded to support operations. Co-planning with customers is a great way to achieve mutual benefits.

Mr. Theerachai Tharakul
General Manager
MIG Production Company Limited

> Customer relationship management deepens connections with customers and boosts understanding of customers' business characteristics, which benefit product development, business expansion, distribution and services plan to meet current and future expectations of customers. This can optimize the company performance for the utmost mutual benefits in a sustainable manner.

Mr. Parinya Nonrapug
Commercial and Supply Chain
Division Manager

SUPPLY CHAIN MANAGEMENT

Targets

8 suppliers
receiving Environmental, Social, and Governance (ESG) audits

100%
employees training on Environmental, Social, and Governance (ESG) in relation to supplier sustainable management

100%
of Tier 1 Suppliers signed GPSC's Supplier Sustainable Code of Conduct

Business Drivers

Supply chain sustainability, from upstream to downstream, is a key ingredient for sustainable business success in fostering supplier relationships, enhancing competitiveness, adapting to changes, and minimizing potential business risks. It can be viewed as an opportunity for mutual monitoring and assessment. GPSC, therefore, is committed to work i with every supplier in accordance with the Supplier Sustainable Code of Conduct, which covers issues such as business ethics, human rights, safety and environmental management. This approach enables efficient supplier chain management and encourages share of knowledge and technology, hence resulted in procurement process improvement.

Roadmap to Success

Approaches to Supply Chain Management are as follows:

Strategies

- Sustainable procurement and supplier management policy

Action Plans

- Supplier Sustainable Code of Conduct
- Operational regulations include procurement regulations, supplier selection regulations, procurement management plan regulations, bidding management regulations, supplier contract management regulations, supplier search strategy regulations, supplier performance assessment regulations, and procurement assessment regulations.
- Supplier sustainability assessment based on Environmental, Social, and Governance (ESG) audits
- GPSC Supplier Relationship Management 2018
- Supply Chain Risk Management and Supplier Development Plan

Filing and Reporting Performance

- Filing and reports in information systems on vendor list and spending analysis.
- Vendor management system, which includes Vender Approve System, Material Receive (MR), Vender Management System (VMS), and Group Strategic Sourcing (GSS)

(For more details, please visit http://www.gpscgroup.com/en/sustainability/economic/supply-chain-managemnet)

Performance
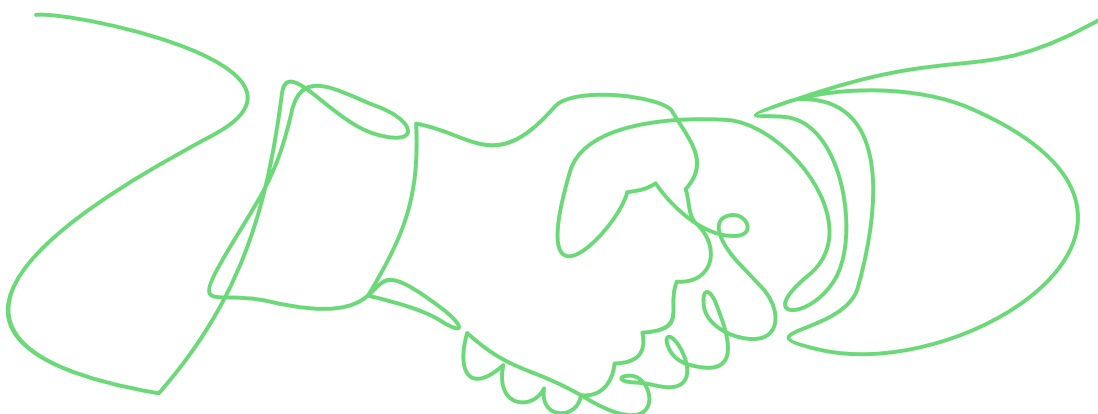
Supplier Sustainable Management

The company's strategic supplier audit on Environmental, Social, and Governance (ESG) has been practiced with an attempt for suppliers to be aware of the company's approach toward sustainability and be encouraged to act toward the same goal. Most suppliers have so far understood and have been able to perform accurate assessments. They have well cooperated with the audit plans. In 2018, nine Tier 1 Suppliers underwent the Environmental, Social, and Governance (ESG) audits and demonstrated good performance without any risk on business ethics, social responsibility, labour rights, safety and environment. This year a Tier 2 Suppliers was audited and the audit result is good. The company plans to continuously audit the remaining of the Tier 2 Suppliers.

Supplier Relationship Management

GPSC has incorporated Supplier Relationship Management as part of its operational process in order to achieve sustainability. The company emphasizes in informing our suppliers of the company's intention toward sustainability which has been embedded in our operational approaches and policies by utilizing the slogan, "Collaboration for Growth". The slogan involves improvement in the following topics, 1. GPSC Business Profile, 2. Procurement Policy, 3. Anti-corruption Measures, 4.Bill Placement Process Improvement and 5. Supply Chain Management for Eco Factories. The company, joining forces with PTT Group, has committed to sustainable procurement and supplier management. It has strived to procure and support locally-sourced, eco-friendly products and services. In 2019, the company plans to develop a green procurement plan.

Spending Analysis

GPSC has kept track of its spending based on various areas, including suppliers, types of materials, expenses, and zones. The data are being utilized in many analyses with goals in procurement plan and risk assessment in procurement process improvement to become more effective and systematic

Key Performance Indicators

	Performance		Target	
	2017	2018	2018	2019
Supplier audit on Environmental, Social, and Governance (ESG) by third party	4 Tier1 Suppliers	1 Tier2 Suppliers *	10 Tier2 Suppliers	8 Tier1 Suppliers
Staff training on Environmental, Social, and Governance (ESG) issues in relating to supplier sustainable management (%)	100 of Procurement Staff	100 of Procurement staff who use the Procurement Management Manual	100 of Procurement staff who use the Procurement Management Manual	100 of Procurement staff who use the Procurement Management Manual
Signing the Supplier Sustainable Code of Conduct Acknowledgement Form	100 Tier1 Suppliers	114 Tier1 Suppliers	100% of significant Tier 1 Suppliers	100% of significant Tier 1 Suppliers

Note: *The company is currently reviewing the efficiency of the process of Environmental, Social, and Governance (ESG) audits on suppliers to suit the company's corporate governance.

Procurement Process Improvement

In 2018, Procurement Process Improvement Program was implemented to upgrade the role of procurement department. This department plays an important role in finetuning the whole procurement process in order to cut cost on urgent procurement and to lower possible corruption risks between the company and its suppliers. Data can also be accessed online for quick procurement approvals, data accuracy, and quick management. The program has helped lessen extra workforce needed due to urgent procurement by 60%. As a result, the company has acquired better quality, more recognized suppliers.

> With national power demand on the rise, energy business growth means economic growth, higher employment rate and better quality of life. These days when clean and green energy has become a central issue for change towards social and environmental sustainability, suppliers need to level up their services to meet business demands.

Mr. Wirote Wannasiwaporn
Managing Director
MARC (Thailand) Co., Ltd.

> In the past, the company implemented supply chain management strategies in compliance with the company's and PTT Group's sustainability management and supplier management policies. Recently, the Management of Contractor & Supplier Strategy Roadmap & Develop Implementation Plan was revised, which encompassed both short-term and long-term supply chain management.

Mr. Preecha Kamtanmool
Procurement Division Manager

RELIABLE PRODUCTION AND AVAILABILITY

Mr. Smornchai Khoonrak
Executive Vice President, Operations

> Zero Unplanned Shutdown, Reliable Production and Plant Availability are the three ultimate goals of Operational Excellence; employees are key to achieving these goals. GPSC therefore places top priority on human resource development, empowering employees with both functional and competency skills. Meanwhile, the company's vision, direction, operation strategies and risk management plan are clearly defined and understood. Key performance assessments have also been carried out appropriately.

Targets

100%
Plant Availability

Zero Unplanned Shutdown
0 Event
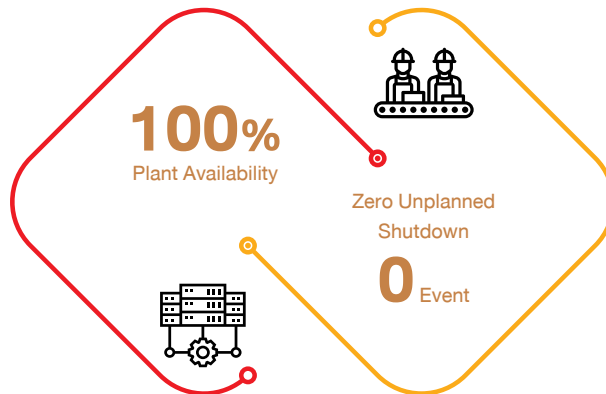
Business Drivers

GPSC always aims for Operational Excellence. The company focuses on efficient and effective utilization of limited resources through a systematic risk management approach and the use of innovations for business competitiveness. This is to strengthen reliability and availability of power and steam production and the distribution system. To provide the maximum benefits to all stakeholder groups, the company upholds its core purpose of being a leader in reliability and availability in sustainable power and steam production while building national energy security for the country.

Roadmap to Success

Vision — Very High Reliability
Driver — KPI
Management System — TPM PM Pillar — OEMS–RAI — ISO
Process/Workflow — Work Process (CMMS–SAP)
Foundation — Risk Management — SSHE

Lesson Learnt, Best Practice, KM
Sharing
External Knowledge
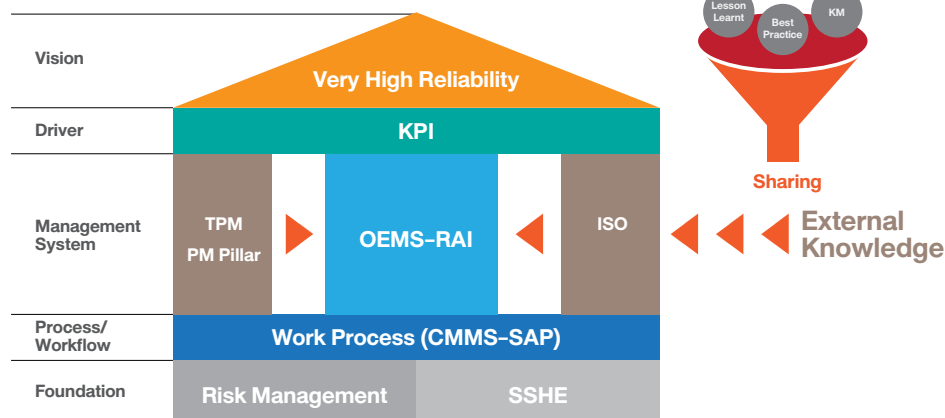
Approaches to Reliable Production and Availability are as follows:

Strategies

- Maximize Core Business
- Operational Excellence Management for Affiliated Companies along with Business Growth

Action Plans

- Operational Excellence Management Systems (OEMS)
- Total Productive Maintenance (TPM)
- Internal Management System for audit in normal times and during crises.
- Operator Training Simulator (OTS) for employee skill improvement on operational control
- Advance process control with Real-Time Optimization (RTO)

Filing and Reporting Performance

- Plant Incident System
- Plant Information (PI)
- PTT Group Operational Excellence Portal
- Information system including Operational Excellence Management information.

(For more details, please visit http://www.gpscgroup.com/en/sustainability/economic/operational-excellence)

Performance

Representatives of the "Reliability & Asset Integrity" (RAI) element receive the Top Score Award.

Operational Excellence Management System (OEMS)

"Reliability & Asset Integrity" (RAI) is a key element of the Operational Excellence Management System (OEMS) to improve production efficiency and business competitiveness. GPSC's employees are informed of the Operational Excellence Management System (OEMS), leading to adjustments in the working approach based on PTT Group's accepted working practices. This is to set in place Operational Excellence, reliability and sustainability and to ensure that the company's assets are systematically maintained in accordance with best practices for the highest operational and cost management efficiency. The company adheres to operational excellence in maintaining power availability and production reliability and delivering the best products to meet client expectations and on time. With the effectiveness of its production machineries regularly upgraded, OEMS development has been assessed, together with PTT Group, to share information and suggestions for further improvement. From the latest assessment in 2018, the company's Reliability & Asset Integrity (RAI) score rose by 39%, making this element the winner of OEMS Top Score Award in GPSC. The next assessment will be conducted in 2020 for even more improvement in OEMS.

Total Productive Maintenance (TPM)

Total Productive Maintenance (TPM) is a system of maintaining and improving the integrity of production and quality systems through the machinery, equipment, and processes with collaboration of all staff, from executives to employees. GPSC has applied TPM to its operations, passed the standard evaluation of the Japan Institute of Plant Maintenance Assessors (Japan), one of the most reliable industrial institutes in that country, and also received the 2017 TPM Excellence Award in the power industry sector. GPSC is the first Thai power generating company to be awarded the prize that recognizes organizations that can increase efficiency in production, quality management, production reliability, safety standard for operational employees and contractors, as well as achieve production cost reduction and carbon emission reduction. This has upgraded business competitiveness, thereby gaining a high level of recognition among all stakeholders. The award has driven the company to keep up the good work and to target the award for Excellence in Consistent TPM Commitment.

A group of GPSC's representatives receive the 2017 TPM Excellence Award "Category A"

Productivity Improvement

Productivity Improvement is a process carried out on a yearly basis by operational staff in diverse departments including production, engineering, maintenance and construction management with the aim of optimizing production efficiency and minimizing losses in Central Utility Plant 1, 2 and 3 (CUP 1 – 3), as well as the Sriracha (SRC) Power Plant. In 2018, the company's 15 projects contributed to an increase in the contribution margin of THB 124.8 million, achieving the THB 100 million target.

Key Performance Indicators

		Performance			Target	
		2016	2017	2018	2018	2019
Plant Availability* (%)		CUP 1–3 99.999	CUP 1–3 100	CUP 1–3 99.999	CUP 1–3 99.995	CUP 1–3 100
		SRC 100	SRC 100	SRC 99.72	SRC 99.03	SRC 99.295
Zero Unplanned Shutdown ** (events)		1	0	2	0	0

Notes: * In 2018, the assessment method for plant availability was different from those in 2016 and 2017.

** Unplanned shutdown, events affecting the clients.

Operator Training Simulator (OTS)

An Operator Training Simulator (OTS) is an advanced computer-based training tool that provides operators with the skills to respond to risks and impacts on production and distribution. This year, actual past events were analyzed and dynamic simulation models were added, in particular models of unexpected and unplanned challenges relating to accidents, force majeure and natural disaster resulting in production, transmission and distribution shutdown. This provides trainees with the opportunity to learn how to react in a proper and timely manner when a similar situation or problem occurs in the actual plant. This year, a total of 64 employees from the Central Utility Plant 1 to 3, joined the program, representing a 100% increase in participants.

> By joining an Operator Training Simulator (OTS) program, I have gained an overview of the power and steam generation system from a simulation model that was developed last year. I also have a better understanding of minimizing losses along with proper approaches to problem solving and prevention.

Mr. Wasin Nirantranon
Engineer, Performance and Efficiency Section
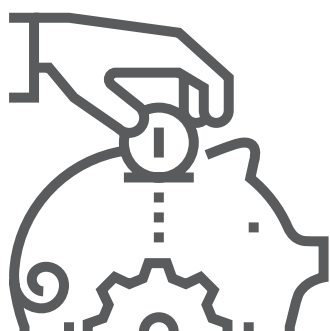
The company's OTS program can help reduce

THB **5.2** million in annual expenses.

Awards

2018 Zero Unplanned Shutdown Award

Thanks to its performance in 2017, the company won the Zero Unplanned Shutdown Award, "Complex" level, for its four operation sites; Central Utility Plant 1, 2, 3 (CUP 1-3) (and Sriracha (SRC) Power Plant after 12 years. It also marked the first time the company won the Zero Unplanned Shutdown Award in the "Cluster" level, with constant Zero Unplanned Shutdown of all complexes, including Power and Steam (of CUP 1 and CUP 3). The 2018 PTT Group Operational Excellence Award ceremony was held on March 13, 2018.

Utilization HRSG Stack Temp Loss Reduction CUP 1

For optimum use of energy resources, GPSC compiled information for a comparison of production efficiency in all the Heat Recovery Steam Generation (HRSG) units of Central Utility Plant 1 (CUP 1). It was found that the HRSG 5 and HRSG 6 can reuse stack temperature loss in steam generation most effectively, compared to other HRSG units with the same steam generation capacity. The steam generation plan was therefore revised and the total steam generation is pooled at HRSG 5 and HRSC 6 for energy loss reduction and optimum utilization of energy resources. As a result of the implementation, the company's expenses reduced by THB 25.66 million as of December 2018.

Optimized Duration for Main Machine Shutdown

GPSC's boiler inspection, using the Remaining Life Assessment and Safe Guarding & Instrument Function Online Test, equivalent to international standard, enables the duration between required inspections to increase from every one year to three years. This supports continuous energy and steam generation and reduces use of human resources while operation efficiency rises. This inspection has been conducted in all plants in 2018. As a result, the company's operation cost reduced by THB 30.91 million and the company's profit rose by THB 34.18 million.

Expense Reduction
THB **25.66** million

Operation Cost Reduction
THB **30.91** million

Increase in Profit
THB **34.18** million

INNOVATION

Mr. Suttipoom Poomhiran
Product and Technology Development Division Manager

> Innovations are of great importance to our organization as technological disruption occurs at a faster pace than ever and globalization means easier and better access to end users in the market. Therefore, it is significant for an organization to strive for continuous improvement to gain competitive advantages and move ahead in the so-called Blue Ocean. We value continuous development of innovations within the company, as reflected in our previous operations with the budgets allocated for research and development. And, the Open Innovation strategy will enabled our products to be commercially viable.

Targets

High quality and reasonable prices battery in order to support system integrator while gaining a competitive advantage in the electricity market by 2022
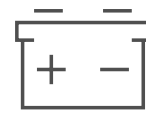
3 contracts and/or agreements to install battery energy storage system

Business Drivers

Driven by environmentally friendly technologies and innovations, GPSC focuses on both products and processes innovations, an indispensable ingredient for utility companies to stay relevant and successful now and in the future. Taking into account the values our innovations benefiting all stakeholders, the company has developed two strategies: In-House Research and Development (R&D) and Investment in Research & Development (R&D) companies.

In-House Research & Development (R&D)
Innovation development undertaken within the company with research institutes or research units under PTT Group
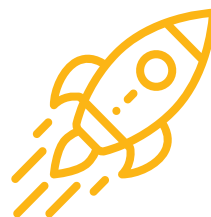
Investment in Research & Development (R&D) company
Investment in R&D/start-up companies to obtain R&D patents for commercial purposes

In 2018, a new organizational structure was introduced to support Energy Disruptive Innovation Department to boost innovation development efficiency of each division.

Energy Disruptive Innovation

Battery Manufacturing	Business and Market Development	Product and Technology Development	New Business Strategic and Project Management Officer (PMO)
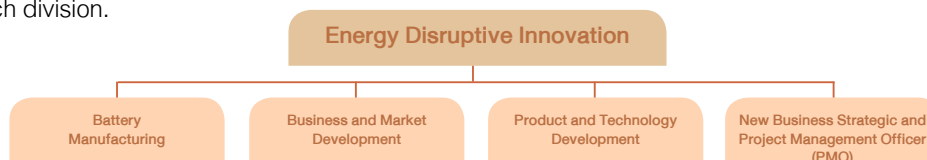
The new organizational structure also supports the United Nations' Sustainable Development Goal 9, which aims at promoting inclusive and sustainable industrialization, innovation, and infrastructure.

Roadmap to Success

Approaches to Innovation are as follows:

Strategies

- Technology Research and Development (R&D) policy
- Management and support strategies for research and innovations
- Business cooperation for research and innovations

Action Plans

- Analyse changes in the industry and challenges of technology and innovations
- Set profit targets for research and innovation investments with continuous monitoring of the investment budgets
- Select projects based on the results of investment value analysis

Filing and Reporting Performance

- Data storage system in the company's computer system stores reports including industrial change analysis and impacts of new innovations reports, return on research and innovation investment reports, investment budget tracking reports, as well as investment value analysis reports.

(For more details, please visit http://www.gpscgroup.com/en/sustainability/economic/innovation)

Performance

Innovation development

GPSC stresses on innovation development, integrating it as one of the company's business growth strategies on future energy with Energy Storage System (ESS) as key element. Since early 2018, Energy Disruptive Innovation department has initiated the lithium-ion battery plant pilot project, and new market development segments for ESS products, while installing ESS for many residential and industrial projects for PTT Group. The company competed in bidding for large ESS installation projects of the Electricity Generating Authority of Thailand (EGAT), by joining hands with other divisions in PTT Group and our business partners in Thailand and overseas in enhancing the value of ESS. Moreover, the company has strived to increase system quality of other alternative renewable energy to reflect our commitment in promoting innovations and sustainability.

Innovation trends in the utility industry

One major innovation for the utility industry is distributed generation. GPSC adheres to the 3D principles: Decentralize, Decarbonize and Digitalize. These 3Ds are in line with the changing trends of the energy business, which transform the energy value chain.
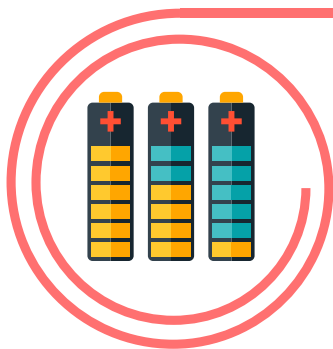
Decentralize

Decentralization refers to the decentralization of electricity from large power stations to small-scale ones by harnessing renewable energy such as solar power from solar rooftops integrates into microgrid and smart grid systems. To enable decentralization, two things need to be developed: software and batteries. GPSC recognizes the importance of batteries in enabling exceptional energy storage to expand the possibilities for our customers. Therefore, the company has collaborated with 24M Technologies, Inc. in establishing a lithium ion battery factory for business expansion.
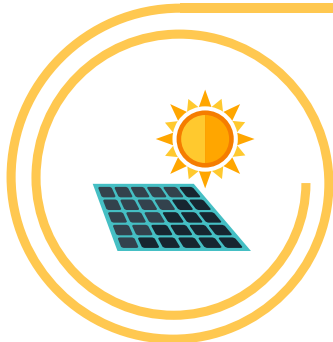
Decarbonize

GPSC is committed to reducing pollution and using green products to reduce the impacts on the environment. The use of renewable energy is, therefore, pivotal in the company's operation. We are determined to develop batteries as renewable energy, embracing the future trend that gears towards renewable energy storage. Decarbonization is also in line with the ecological goals of Thailand's national integrated energy plan in terms of increasing power production from renewable energy and using advanced technologies to minimize impacts on the environment and communities.

Digitalize

GPSC uses digital technologies to increase work efficiency. Digital technologies enable us to cut unnecessary processes, reduce costs, transform businesses to technological societies and gain advantages in business competitiveness in this rapidly evolving world.

With the commitment to the 3D principles, GPSC has initiated the lithium-ion battery factory project in cooperation with 24M Technologies, Inc. A team of the company's engineers paid a visit to the 24M Technologies' labs in the United States to learn the technical know-hows regarding semi-solid battery production, prior to taking charge of overseeing all the battery cell production process in 2018. The tasks range from designing related machines, and dealing with vendors for necessary resources in battery cells production for this pilot project.

Key Performance Indicators

	Performance		Target	
	2017	2018	2018	2019
Establishment of Energy Disruptive Innovation department and prototype products development	Working on Establishment of Energy Disruptive Innovation department	Working on Establishment of supporting sections under Energy Disruptive Innovation department to enhance the department's capacity for innovations development	Establishment of supporting sections under Energy Disruptive Innovation department to enhance the department's capacity for innovations development	Development of prototype products for commercial scale
Contracts and/or agreements to install battery energy storage system	–	–	–	3

External collaboration through Open Innovation

GPSC values and sees opportunities in Open Innovation, which opens doors to and exchange of knowledge, ideas, and experiences with external organizations. This allows the company to increase the value of existing products, create brand new products to boost company's competitiveness and develop better energy innovations that fulfil our visions and missions.

This year, GPSC applied different types of energy storage systems to serve different needs and make the most of the electricity system by reducing costs and ensuring power system stability for customers. The company collaborated with the following three organisations:

1) Chiang Mai University's Nakornping Energy Research and Development Institute
   - A battery energy storage system is installed for solar panels to store and save excess electricity for consumption during peak times when the institute has a high demand for electricity. The excess power is also channeled to the power supply system for laboratories that need high-quality electricity. The power generated from its solar rooftop panels on weekend, and holidays is used in the institute during weekdays and to protect its laboratory devices from damage during power brownouts and blackouts.

2) PTT Innovation Institute under PTT Public Company Limited
   - The collaboration aims to test capacity and operation of the battery energy storage system and the batteries used as backup power sources for the institute's laboratory equipment.

3) GC Logistics Solutions Company Limited (GCL)
   - Electricity generated from solar panels during off-peak periods with low demands for electricity is stored for use during peak times to maximize value of electricity generated by the solar rooftop system. This installed ESS system can generate electricity worth approximately THB 240,000 per year.

Virtual Account for Payment Solution

In 2018, joining hands with Standard Chartered Bank, GPSC developed the financial innovation system called Virtual Account for Payment Solution to enhance the efficiency and flexibility of financial management as well as bank accounts management in the computer system. With just only one physical bank account, the company can manage multiple virtual bank accounts by using virtual account numbers instead of bank accounts to manage payments at each office. This solution results in higher efficiency in data processing and financial analyses, while reducing costs, and enabling real-time analyses. Also, it supports the company plans to grow businesses both in Thailand and overseas, which requires an efficient, modern financial management system. Applying appropriate technologies, GPSC developed this payment solution for maximum benefits of the organization, customers, and business partners.

This is Thailand's first collaboration between an organization from the private sector and a financial institution in creating a virtual account solution with financial management innovation. The company is confident that this financial innovation will lay a solid foundation for the company's future growth.

Mrs. Wanida Boonpiraks
Executive Vice President,
Finance and Accounting

"Seeking new financial innovations for operational excellence is one of our goals. It is also in line with the government's Thailand 4.0 Policy towards innovation-driven economy. Virtual Account for Payment Solution uses financial management technologies to reduce the number of bank accounts, allowing better management, and performance. It is truly a cost-effective financial management solution.

Cost reduction by approximately THB 200,000 per year

Awards and Recognitions

CFO of the Year "Excellence in Technology" Award & "Excellence in Treasury Management Transformation" Award granted by CFO Innovation Magazine

These awards were granted in recognition of outstanding technologies and innovations with added values. They are the pride of the company and a driving force to continue seeking for innovations to increase work efficiency with the vision to be an internationally-recognized power generating organization driven by innovations and sustainability.

2018 Most Innovative Power Company" Award granted by International Finance Magazine (IFM)

Most Innovative Power Company Award was granted in recognition of a company in the energy sector with outstanding performance and continuous development of innovations at the 2018 International Financial Awarding ceremony.This award reflects the company's commitment to innovations to enhance production and create new business opportunities, which contributes to sustainable growth.

Top Innovative Organization Award 2018

GPSC's innovation capabilities were assessed along with those of other top 37 companies listed in the Stock Exchange of Thailand (SET). The assessment examined eight elements of innovation capabilities, namely: innovative strategies, customer-centeredness, innovation team, innovation process, knowledge management, corporate culture, supporting resources, and innovative outputs. GPSC is committed to continuous improvement of its innovation capabilities.

ENVIRONMENT

ENVIRONMENTAL MANAGEMENT AND RESOURCES EFFICIENCY

Targets

Maintaining
ISO 14001: 2015 environmental management certification

Zero
waste to landfill

Zero fine on breaching strict environmental laws

Business Drivers

Valuing natural resources and environment as the ultimate source of all living organisms and ecosystems, GPSC as a power generator who uses water as a main resource for production, is committed to operating a sustainable and eco-efficient business, minimizing uses of resources and impacts on the environment, society and health. In addition, it always strives to strike a balance between economic growth and ecological conservation, with management policies to reduce its eco footprint and to use natural resources in a more sustainable manner.

Roadmap to Success

Approaches to Environmental Management and Resources Efficiency are as follows:

Strategies	Action Plans
• Quality, Security, Safety, Occupational Health and Environment Management Policy • Climate Change Policy • Waste management based on the 3Rs (Reduce, Reuse, Recycle) principle	• Environmental prevention and impact mitigation measures based on Environmental Impact Assessment (EIA) • Verified by international accreditation bodies (ISO 14001:2015) • Eco-efficiency best practice certified by the Eco Factory Program • Operational Excellence Management System (OEMS) in environmental management • Internal and external water and waste material management projects based on the 3Rs (Reduce, Reuse, Recycle) principle

Filing and Reporting Performance

- Filing and Reports in information systems
- Filing, monitoring and management system for environmental management information that is reliable and inspected by external organizations.
- Environmental Management Accounting (EMA)
- Water management monitoring and forecasting system in Map Ta Phut (Rayong Province and Eastern Region) by PTT Group Water Management (PTTWT)

(For more details, please visit http://www.gpscgroup.com/en/sustainability/environmental/environmental-responsibility)

Performance

Environmental Management System in Compliance with International Standards

GPSC is determined to take responsibility for environmental conservation and efficient resources management in order to lessen impacts on communities, while at the same striving for productivity improvement in its business operation. The company's environmental and resources management has been in line with the company's Quality, Security, Safety, Health and Environment (QSHE) Policy, TIS 18001, the international ISO 9001, ISO 14001, ISO 45001, and IMS sustainability standards, and under the Operational Excellence Management System (OEMS). Committed to operating business in line with the environmental regulations and laws, the company has supported environmental conservation projects on an annual basis.

Air Quality

Nitrogen Oxide (NO_x) is an irritant gas pollution released by natural gas power plants. Without proper control, NO_x gases can cause adverse respiratory health effects and pollution, including acid rain. GPSC, therefore, has placed emphasis on effective controlling and monitoring of air pollution at source, using the following approaches:

Continuously improving operation and production efficiency to lessen air pollution emission. Ultra Low NO_x Burners are used to lower burner peak flame temperature and NO_x emissions from gas turbines. Selective Catalytic Reduction (SCR) technology is also used, which converts nitrogen oxides (NO_x) with the aid of a catalyst into diatomic nitrogen (N_2), and water (H_2O). A gaseous reductant, typically anhydrous ammonia, aqueous ammonia or urea, is added to a stream of flue or exhaust gas and is adsorbed onto a catalyst.

Continuous Emission Monitoring Systems (CEMS) installed at flues to measure fuel flow of NO_x and CO_2 and send information to the information center of the industrial estate office.

Air quality monitoring inside and outside operation plants in compliance with the law.

Regular maintenance for machinery effectiveness.

Waste Materials

GPSC has strived to minimize waste from production processes while optimizing the 3Rs principle (reduce, reuse, and recycle) for waste and unused materials and emphasizing sustainable uses of resources. In 2018 the company announced its waste management policy based on the 3Rs principle, requiring all executives and employees to support and act in compliance with the 3Rs principle.

Constantly improving operation processes, including production-supporting activities to minimize waste, following the action plans on waste and unused materials management.

Promoting creative reuses and value-added creation from waste materials.

Lawfully disposing of and managing waste materials, from waste storage, internal reuse, to external disposal.

Raising awareness on waste management among all levels of employees to practice the 3Rs principle for constant waste management improvement.

GPSC has successfully managed to reuse waste materials, resulting in achieving the target of zero waste to landfill. This success involves contractors, who sort waste from any activity in maintenance, production and administration works prior to disposal. This management has reduced the company's waste disposal expenses by THB 211,246.20 and made a return profit of THB 260,671.88 from selling waste.

Sorted Materials include:

Used lubricants   Stainless steel   Paper scraps   Uncontaminated steel
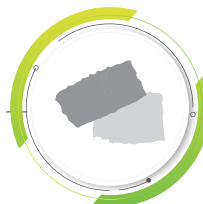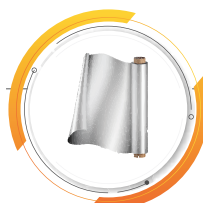
Old power cords   Aluminum   Plastic

Water Management

Water is essential to power generation. GPSC's guidelines on proactive water management aim for maximum efficient water use by utilizing minimum water resources and increasing water recycling. In addition, as a member of the PTT Group water management team, the company has collaborated with the Group on a more effective plan on monitoring and assessing the water situation in semi-arid Rayong and the eastern region in a way that does not have any impact on the communities and environment. For drought events, the company has an action plan to continuously monitor the water situation, ensure water use efficiency of all plants, customer water consumption, and conducts drought planning to reduce risks. The company's internal and external water management systems are as follows:

Internal Water Management

In-Process Water Management

GPSC's water management plan aims to reduce water usage, and to collect water usage data for even more efficient water management based on the 3Rs principle. To minimize water usage during the production process, the company has implemented effective technologies and strived to recycle used water, as follows:

Reducing water usage in the power generation process

Increasing cycle time of cooling towers to reduce makeup water.

Reducing water usage in office buildings

Reuse of cooling blowdown water as boiler feed

Using treated waste water for watering of plants within the company.
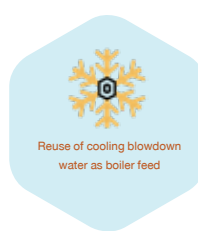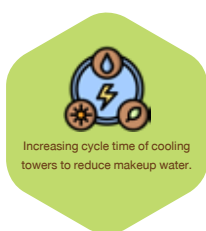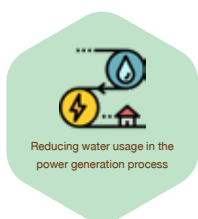
Other implementations include reuse of condensate water in steam production process. Water used in the company's production process comes from the following sources: Central Utility Plant 1 and 3 (CUP 1 and 3) use clarified water from WHA Utilities and Power Public Company (WHA UP) and condensate water from customers' companies. Meanwhile, Central Utility Plant 2 (CUP 2) gets raw water from RIL 1996 Co., Ltd. (RIL) and condensate water from customers' companies; Sriracha Power Plant uses raw water from East Water.

In 2018, GPSC's water usage was 8,196,195.40 m³. The company's reused, reduced, recycled water usage was 4,582,002.35 m³ or 55.90 % of total water use.

Internal Waste-Water Management in Production Process

GPSC has regularly monitored water quality prior to disposal in the industrial estate's central waste water treatment system and to Khlong Huay Yai, ensuring that the released water is safe for the communities and in line with the standard specified by law. So far, it is found that the wastewater quality of all the company's projects has been higher than the legal requirements.

Water Footprint

The company's Water Footprint Assessment is to assess direct and indirect water use during the whole cycle of products by calculating water use along the life cycle of a product, to be in line with the ISO 14046 standard. In 2018, GPSC participated in the ground water footprint assessment, with the Central Utility Plant 2 (CUP 2) as the pilot project to examine water consumption in each process and to identify water consumption peak points, which enables further planning on water use reduction.

External Water Management

As a member of the Eastern region's water management team, GPSC has regularly collaborated with external organizations, including the Royal Irrigation Department, East Water, and representatives from communities as well as companies in the industrial estates for water management during crises. GPSC has used the working team's water situation reports and analyses for the company's water management plan.

Key Performance Indicators

	Performance			Target	
	2016	2017	2018	2018	2019
Hazardous waste to landfill (%)	0	0	0	0	0
ISO 14001 Environmental Management Standard	Maintaining ISO 14001: 2008 environmental management certification	Maintaining ISO 14001: 2008 environmental management certification	Maintaining ISO 14001: 2008 environmental management certification	Maintaining ISO 14001: 2008 environmental management certification	Maintaining ISO 14001: 2008 environmental management certification
Fine for breaching strict environmental laws (Thai Million Baht)	0.88	0	0	0	0

Green Industry Project

The Green Industry Project was initiated by the Industry Ministry in an effort to encourage the Thai industrial sector to be environmentally and socially friendly. Industrial operators are urged to upgrade all manufacturing processes and environmental management with social responsibility and eco supply chains for sustainability. Green Industry can be divided into five levels:

Level 1
Green Commitment

Level 2
Green Action

Level 3
Green System

Level 4
Green Culture

Level 5
Green Network

A strong commitment to reducing environmental impacts with effective communication within the organization.

Taking actions towards lowering eco footprint as per commitment.

Systematic environmental management with constant assessment and reviews for improvement. This includes recognized environment management awards and certifications.

All staff of the organization taking concerted actions towards eco-friendly operation across all dimensions, which has become green company culture.

Expanding green culture and green supply chains to business partners and alliances so that they are also certified with green industry standards.

Mrs. Natchatheeya Buasuang
Quality, Security, Safety, Health
and Environment Management
Division Manager

"
Sustainable environmental management across supply chains is key to a viable future for businesses in this fiercely competitive era and amid a rapidly changing environment. Customers, stakeholders, investors, employees and communities are placing priority on sustainable management across economic, social and environmental dimensions, which will have greater impacts on supply chain management.

Valuing the idea of and opportunities for creating added values for business, GPSC has embedded sustainability in the business operation across supply chains, especially risk management, which ranges from business partners selection process, procurement, business partners' operation monitoring via Eco Factory and Green Industry projects, for greater efficiency in business operation. This has been done in tandem with encouraging our business partners to adopt sustainable business approach for mutual sustainable growth.
"

GPSC received a Green Industry Award Level 4
for promoting green industrial operators
from Department of Industrial Works,
Ministry of Industry

In 2018 GPSC has been certified for Level 4, Green Industry Project for the Sriracha Power Plant, and Central Utility Plants 1-3, thanks to its clear environment policies, green culture, and social responsibility that are in line with ISO 26000 guideline. This means the company has reached another green milestone for balanced and sustainable development. Better still, the company has continued to keep up the good work, aiming for Level 5, and is constantly promoting green activities among stakeholders across the supply chains, communities and consumers.

CLIMATE CHANGE AND ENERGY MANAGEMENT

Targets

Increase in renewable energy production to **700** MW by 2022

Direct and indirect Greenhouse Gas Emissions Intensity lower than **0.45** $TonCO_2e/MWh$
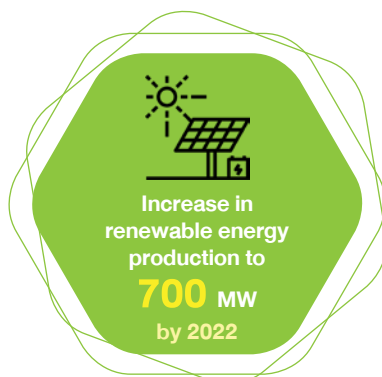
Business Drivers

The company is committed to supporting the development of clean energy to meet the needs of society in the future. This corresponds with the trends in low-carbon power generation to reduce environmental and ecological damage. New ways of thinking and new strategies are required for energy security and sustainable development targeting reasonable-priced, procurable and environmentally friendly energy. This is also in line with the Sustainable Development Goals (SDGs), Thailand's ratification of the Paris Agreement or the United Nations Framework Convention on Climate Change (UNFCCC), and Thailand's Nationally Determined Contribution Roadmap on Mitigation 2021-2030 which has a target of reducing Thailand's greenhouse gas at 20% within 2030.

Roadmap to Success

Approaches to Climate Change and Energy Management are as follows:

Strategies

- Strategies on climate change management: supporting all forms of and all activities related to greenhouse gas reduction.
- Climate change policy and energy conservation policy

Action Plans

- Climate change risk assessment
- Joining forces with Thailand Greenhouse Gas Management Organization (Public Organization) in the development of greenhouse gas reduction projects.

Filing and Reporting Performance

- Organization's account of greenhouse gas emissions in compliance with the ISO 14064-1:2006, the Greenhouse Gas Protocol, American Petroleum Institute (API 2009), Intergovernmental Panel on Climate Change (IPCC) 2006 and Thailand Greenhouse Gas Management Organization (Public Organization)
- Organization's level for filing and reporting environment and safety management of the PTT Group
- The information system includes climate change data to be used in improvement of future production process and development projects.

(For more details, please visit http://www.gpscgroup.com/en/sustainability/environmental/climate-change-management)

Performance

Risk and Opportunity Assessment in Climate Change

Thailand is ranked ninth on a list of countries most affected by extreme weather events on the Global Climate Risk Index.[1] In order to adapt to the impacts of climate change, the company has assessed the risks relating to climate change at across various dimensions, including physical changes, laws, product development and corporate image, with a focus on improvement in energy use efficiency and constant follow-up on environmental administration to achieve the company's aims.

[1] *The Germanwatch Global Climate Risk Index 2018*

Risks	Management Approaches
Chronic Risks: constantly higher temperature, etc.	• Environmental Impact Assessment (EIA) • Cooperating with water management committee within PTT Group and public and private partners. • Participating in the Thailand Voluntary Emission Reduction Program (T-VER)
Acute Risks: from severe climate events such as earthquake, flood, etc.	• Resource reservation for emergency power generation • Emergency drill • Business Continuity Management (BCM)
Regulatory Risks: Policies relating to climate change.	• Constant follow-up on regulatory risks • Attending the seminar on "Greenhouse Gas Emission Reduction Monitoring and Assessment Trends in Power Generation Industry", joined by power generators, public agencies and concerned parties to exchange ideas regarding possible solutions on greenhouse gas emission reduction management.
Technology Risks: Technology risks from greater use of carbon energy	• Joint investment with partners on innovation research and development • Updates on environment technologies to be applied in the company's operations.
Market Risks: from changes of product designs, products and new ways of services.	• Investment expansion for energy production from alternative energies.
Reputation Risks: from changes of perception and social/customer participation	• Monitoring and follow-up of climate change impacts on environment and communities as consequences of manufacturing process. • Supporting such policies as energy conservation and alternative energy. • Natural resources and environment conservation supporting projects.

The risk assessment has resulted in the following opportunities for business operations:

Resource Efficiency:
Decreased operating capital and improved manufacturing efficiency.

Products and Services:
Green procurement, and manufacturing factory development for low-cost, quality and environmentally friendly batteries.

Resilience:
Ability to restructure the organization for efficiency in risk and opportunity management.

Energy Source
Renewable energy business development and use of alternative energies such as solar power, wind energy and biomass.

Market:
Searching for new markets or investment in alternative energies for greenhouse gas emission reduction and developing flagship energy storage projects.

Increase in Renewable Energy Production

Presently, 79% of the company's energy production plants are fueled by natural gas while the rest are fueled by solar and hydro power, which are clean energy options. Thailand's Alternative Energy Development Plan (AEDP 2015) (2015-2036) aims to increase renewable energy consumption by 30% of total energy consumption by 2022. This is to support the national renewable energy development and greenhouse gas emission reduction plans. The company's objective is to increase renewable energy production from 400 MW to 700 MW by 2022. The company has also signed a contract for the purchase of power from nine domestic solar energy production plants with a total production capacity of 39.5 MW, with plans to increase investment in the future.

Carbon Disclosure Project: CDP

For three years, GPSC has taken part in the Carbon Disclosure Project (CDP), an international organization which supports companies to disclose the environmental impacts, aiming to make environmental reporting and risk management a business norm, and drive disclosure and action towards a sustainable economy. In 2018, carbon emission data analysis was integrated into the company's process to render more precise and reliable information. And in 2018, the company was recognized among the CDP's C-list companies.

Key Performance Indicators

	Performance			Target	
	2016	2017	2018	2018	2019
Direct and indirect Greenhouse Gas Emissions Intensity (TonCO$_2$eq/MWh)	0.33	0.30	0.33	Lower than 0.45	

Reduction of Greenhouse Gas (GHG) Emission in Manufacturing Process

GPSC's direct and indirect greenhouse gas emission control methods are based on life cycle assessment (LCA) and carbon footprint of products (CFP). Additionally, since joining the Thailand Voluntary Emission Reduction Program (T-VER) in 2017, the company has succeeded in reducing greenhouse gas emissions of 40,000 TonCO$_2$e per year from the Central Utility Plant 2. In 2018, the company expanded its operations with the registration and certification of GHG emission reductions at its Cogeneration Power Plant 3, achieving high efficiency in electricity and steam generation thanks to the combined-cycle turbine with heat recovery steam generator (HRSG), resulting in a greenhouse gas emission reduction of 187,000 TonCO$_2$e per year. The total GHG emission reduction is 227,000 TonCO$_2$e per year.

Moreover, the company has reduced energy consumption and expenses at the three cogeneration power plants, including the Sriracha plant, as follows:

Reduction of energy consumption of 147,000 MMBTU/year or
36,800,000 Bt/year
Central Utility Plant 1

Reduction of energy consumption of 7,300 MMBTU/year or
1,820,000 Bt/year
Central Utility Plant 2

Reduction of energy consumption of 20,600 MMBTU/year or
5,780,000 Bt/year
Central Utility Plant 3

Reduction of energy consumption of 1,320,000 kWh/year or
8,527,000 Bt/year
Sriracha Power Plant

Budget
THB 5,247 million
for the operation of the voluntary greenhouse gas emission reduction project (2014-2021).

Business Benefits
Reduction in energy consumption of the Central Utility Plant 3 and Sriracha Plant, amounting to THB **53** million/year

Environmental Benefits
The total GHG emission reduction is **227,000** $TonCO_2e$ per year.

Thanks to its continual internal improvement and participation in climate change projects, the company received a total of 12 awards for greenhouse gas management from the following projects at the 2018 "Joining Efforts to Combat Climate Change" event.

- Thailand Voluntary Emission Reduction Program: T-VER): 1 Project,

- Carbon Footprint of Products: (CFP) : 1 Project,
- Carbon Footprint Reduction Project (CFR): 1 Project,
- Carbon Footprint for Organization: CFO): 4 Projects,
- Low Emission Support Scheme: LESS): 5 Projects

Placing a priority on greenhouse gas emission reduction, GPSC has participated as a pilot project in GHG reduction assessment through Thailand Greenhouse Gas Management Organization (TGO)'s methodology and tools. I really appreciate the company's commitment to greenhouse gas emission reduction, working towards the country's and international goal. The company is a good model of low-carbon organizations in energy industry, moving Thailand towards a low carbon society.

Mrs. Prasertsuk Patoonsittichai
Executive Director
Greenhouse Gas Management Organization
(Public Organization) (TGO)

BIODIVERSITY

Targets

New projects or projects with expanding production capacity and which have been **approved following** biodiversity–inclusive Environmental Impact Assessment (EIA).

Business Drivers

Maintaining natural resources and operating business with responsibility for the environment and communities are part of GPSC's core values, and also indicated in the company's Quality, Security, Safety, Health and Environment Policy. Realizing that the company's operation might result in both positive and negative impacts and damage to the environment and biodiversity, which is home to a variety of the world's flora and fauna, the company has placed emphasis on environmental impact protection and control and biodiversity management based on the International Union for Conservation of Nature and Natural Resources (IUCN) regulations. This covers non-trespassing into conserved areas and world heritage-protected zones in order to lower the risks and impacts of the company's operation for long-term business sustainability.

Roadmap to Success

Approaches to Biodiversity are as follows:

Strategies	Action Plans
• The company's Quality, Security, Safety, Health and Environment Policy	• Studies on the environmental impact assessments of national and international projects • Biodiversity studies on international projects by formulating action plans and an environmental management and monitoring plan • Measures on prevention and environmental impact mitigation and measures for monitoring environmental impact assessment, as well as PTT Group Biodiversity and Ecosystem Services Management Procedure.

Filing and Reporting Performance

• Information filing and reporting systems
• Reporting in compliance with environmental impact assessment (EIA) regulations.

(For more details, please visit http://www.gpscgroup.com.en/sustainability/social/environment/biodiversity)

Performance

Studies on Environmental Impact Assessments

The company requires that all the company's new projects or expansion of capacity projects be subject to an environmental impact assessment. Impacts on habitats and biodiversity are one of the key issues that must be thoroughly assessed, covering the number, species and living conditions of flora and fauna in the surrounding areas. For biodiversity studies, all the company's projects are required to conduct inspections of types of plant and animal species within the project sites and surrounding areas in compliance with related laws, including Thailand's Wildlife Conservation and Protection Act, B.E. 2535, the Decree on Prohibited Timber, B.E. 2530, and regulations of International Union for Conservation of Nature (IUCN). Most of GPSC's projects are located in industrial zones and thus may have minor impacts on the ecosystem. However, with its commitment to maintaining biodiversity, the company has set up a biodiversity management, control and monitoring system in compliance with practices that form part of environmental impact assessments to mitigate and prevent environmental impacts, and avoid damage to flora and fauna and to their habitats. Biodiversity-inclusive environmental impact assessments (EIA) are also imposed

on the company's future projects, whether implemented domestically or internationally. It is found that in 2018, the company's operation did not have any impact on biodiversity in its operational zones.

Protection Measures and Management Approaches

GPSC publishes environmental impact assessment (EIA) reports prior to implementing projects in compliance with the law. The environmental impact assessment is a study to identify and evaluate both the positive and negative potential impacts on the environment and communities. The aim is to ensure that the potential impacts of the projects have been examined across diverse aspects, from the planning process to decision making. The company has also issued environmental impact mitigation and prevention measures that are added to the EIA reports for greater efficiency. The content in the EIA reports covers water quality management, air quality management, community participation, waste management, noise management, and more.

Power Plants	Environmental and Social Impact Assessment	Environmental Impact Mitigation and Prevention Measures
Central Utility Plant 1	✓	• On air quality
Central Utility Plant 2	✓	• On water use
Central Utility Plant 3	✓	• On waste water quality, water drainage and flood prevention
Sriracha Power Plant	✓	• On noise
		• On transportation
		• On waste management
		• On occupational safety and health
		• On health
		• On society, economy, and people participation

* No projects are located in conservation areas or world heritage zones.

Key Performance Indicators

New projects or projects with expanding production capacity that have undergone biodiversity–inclusive Environmental Impact Assessment (EIA). (Percentage)

Performance   Target

2016	2017	2018	2018	2019
100	100	100	100	100
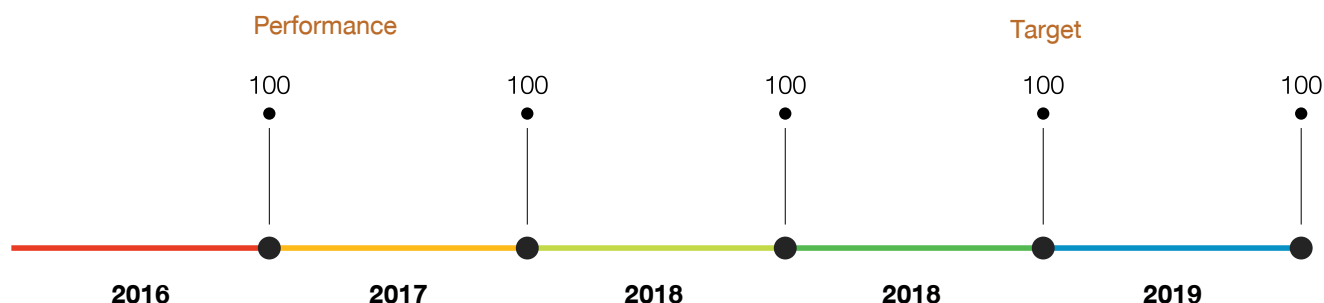
Environmental Revival Project – A Collaboration with Communities and Stakeholders

Sang Fai Kayai Pah Project (check dam construction and reforestation)

Although GPSC's businesses in Thailand are situated in industrial estates, thus imposing a relatively minor impact on habitats and biodiversity, the company realizes that the businesses may, to some extent, affect the biodiversity in the areas, directly or indirectly. An environment revival project, "Sang Fai Kayai Pah" (check dam construction and reforestation), is thus being implemented to increase green zones, as part of the "GPSC: One Earth One Family" activity, in collaboration with Baan Neon Kraprok Bon Community Network, Tesaban Tambon Baan Chang, Rayong Province. Designed to revive waterways and the forest ecosystem, this project is the fruit of cooperation between the company, the company's volunteer staff, communities and the Royal Thai Navy in constructing 20 dams to reduce flooding of residential areas. The dams are made from natural materials, which can be continuously cared for and maintained by people in the communities. The dams can also help add moisture to the soil and revive various types of native plants. For the reforestation component of the project, trees planted include bamboos and yang na (Dipterocarpus alatus), to be used as economic plants for consumption and distribution, thereby generating sustainable incomes for the local communities. The project will be developed into a nature learning center in the near future.

GPSC has supported the project in several ways, from implementation, problem-solving, to revival of environmental quality. The company has also encouraged people and stakeholder participation in biodiversity preservation in order to instill awareness of local resources conservation, thereby enhancing efficiency in biodiversity management. This innovative community development approach is truly effective in solving environmental problems and at the same time caring for the environment.

The company's volunteer staff joined up to building dams as part of the "Sang Fai Kayai Pah" Project

The "Sang Fai Kayai Pah" Project has been implemented in the forest zones of Baan Neon Kraprok Bon Community Network, Baan Chang District, Rayong Province as a water resource development and reforestation project for the community. It can also help reduce flooding during the rainy season. The company has found that this approach is crucial for environmental sustainability. This area is one of the company's target zones. Our cooperation will be expanded to other surrounding communities in the future.

Mr. Smornchai Khoonrak
Executive Vice President, Operations

This cooperation has benefited the communities over the longer-term. It has helped solve water shortages especially in the agricultural sector during the dry season and reduced flooding during the rainy season. Reforestation to increase green zones helps revive the ecosystem and also strengthens community economy.

Mr. Suchin Poonhiran
Mayor, Baan Chang District

In the past during the wet season, heavy rains caused soil erosion in the Baan Neon Kraprok Bon forest. This caused trees to fall and frequent flooding. This project has helped reduce these problems and offered more opportunities for creating jobs in the community.

Mr. Phanom Nonphimai
Advisory Committee of Community Forestry Networks, Baan Chang District, Rayong Province

SOCIETY

EMPLOYEE READINESS AND WELL–BEING

Targets

Over 60%
Employee
Engagement

100%
Succession Planning
in **Key Positions**

**Employee
Turnover Rate
lower** than industry's
average

Business Drivers

GPSC treasures every employees as a valuable assets in driving forward a successful business. Human resource management, employee growth, well-being, and incentives are among the company's top priorities to keep talented employees engaged in the long run. The company believes that effective human resource management can enhance business competitiveness and growth, thereby pushing the company at the forefront among internationally recognized energy companies with innovations and sustainability as core values.

Amid global unprecedented shifts in economy, society and environment, the challenge of human resource management is to boost employee's potential and readiness to accomplish tasks and to enhance employee engagement in the way that aligns with the company's strategies. In 2018, the company not only reshuffled its organization and operation structure, but also updated the performance and remuneration management system, leadership development program, as well as appropriate internal succession process in support for future growth.

Roadmap to Success

Approaches to Employee Readiness and Well-Being management are as follows:

Strategies	Action Plans	Filing and Reporting Performance
• Human Resource Management and Corporate Development Strategies • Readiness of Employees • Strengthening Leadership Capability • Corporate Culture and Increasing Employee Engagement • Delivering HR Operation Excellence	• Human Resource Management, encompassing recruitment, employee readiness, maintaining talented employees, and remuneration and welfare. • Human resource management code of conduct to ensure all employees are clearly informed of the company's policies, regulations, compensation and benefits.	• Human Resource Information System (HRIS) for HR development analyses and welfare planning • GPSC Knowledge Management Portal via the company's intranet

(For more details, please visit http://www.gpscgroup.com.en/sustainability/social/our-employee)

Performance Management

Recruitment

Personal Self Service

HR Analytics

HRIS

Workforce Management

Talent Management

Payroll

Learning & Development
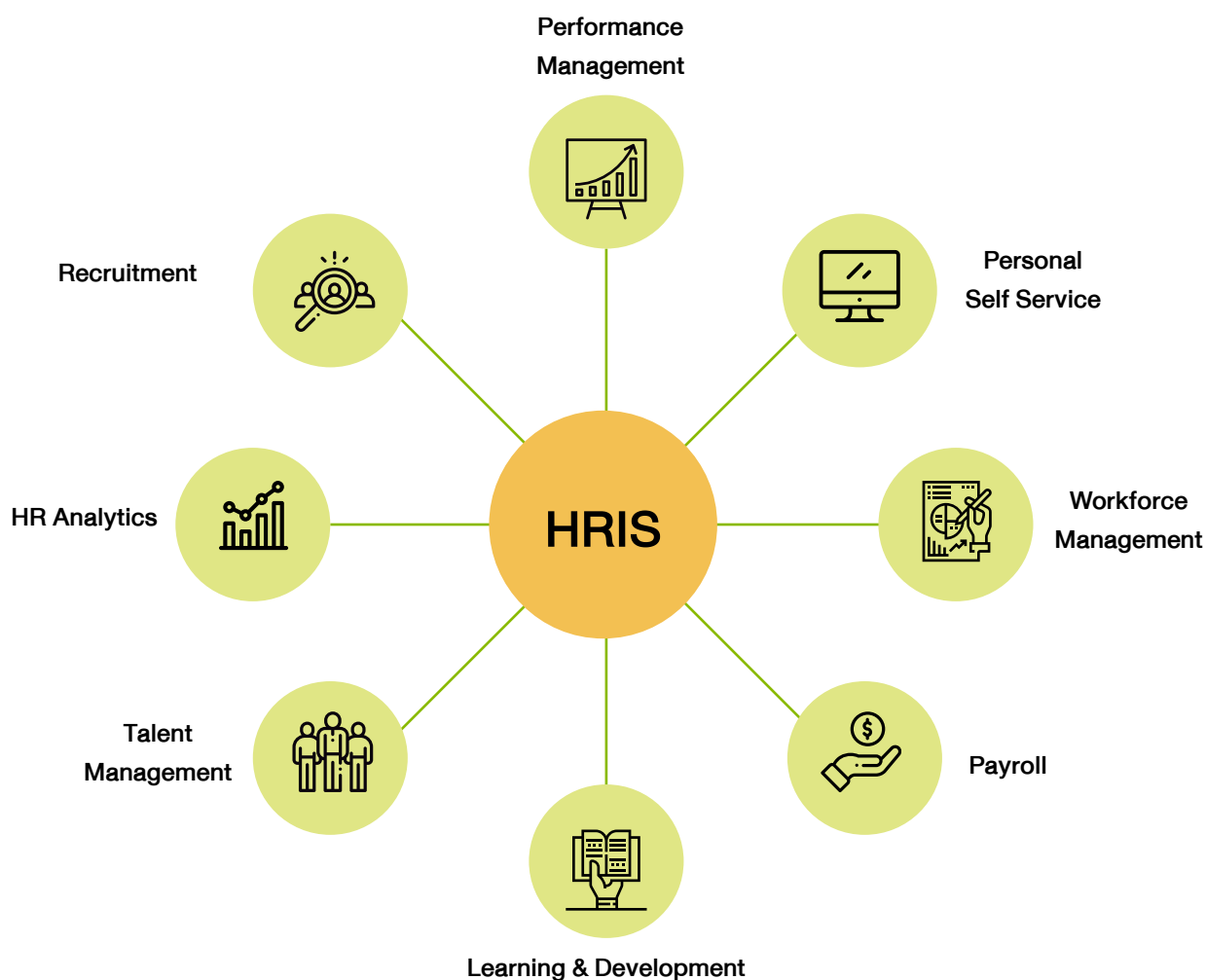
Performance

The objective of human resource management in 2018 was to support the approaches to enhance the company's future growth. The objective was achieved by implementing programs on personnel development and operation system enhancement, as well as embedding corporate culture, all of which covers the following four areas:

1. Readiness of Talented Employees

• Improving recruitment process, mechanism and tools in correspondence with the company's demands, corporate growth plans, demands of talented employees for new businesses, employee branding development in order to attract top talented people to the company.

• Enhancing employee potentials to suit certain positions in support of both domestic and international business growth plans, as well as new ventures including the Power and Battery Energy Storage System.

2. Strengthening Leadership Capability

• Developing the Career Management Model, and training courses to match required competency, which covers core competency, functional competency, and Leadership Competency, in order to upgrade each employee competence.

• Revising recruitment strategies for adept executives, planning for individual capability enhancement, and designing succession plans for readiness of ensuring the next set of adept executives in replacement of the retirees and in preparation for future business expansion.

3. Embedding Corporate Culture and Increasing employee engagement

• Promoting employee engagement by instilling the value of team spirit as corporate culture through human resource mechanism and activities, in order to bring forward appropriate working behaviors whist also build up understanding between executives and employees for better employee satisfaction and engagement.

4. HR Operation Excellence

• Revising HR operation process to be in line with the company's business operation, focusing on the following three main aspects: Performance Management System, Strategic Workforce Planning and Organization Restructuring.

• Updating HR operation processes to conform with international business operation directions for better efficiency by creating platforms to optimize future operations.

Key Performance in Alignment with Human Resource and Corporate Development Strategies

Leadership Development Program

Proficient employees are indispensable in the light of optimizing business competitiveness, particularly amid current constant disruption in the energy industry. Among GPSC's top priorities are leadership development program, and career management for equal development opportunity, where a career path is clearly laid out and personal potential development is encouraged to match present and future positions. The leadership development program focuses on three types of competency: Core Competency for certain careers, Functional Competency, and Leadership Competency, which are included in the training programs, namely Core Competency Course, Functional Competency Course and Leadership Development Course.

Core Competency Development   **Functional Competency**   **Leadership Competency**

In 2018, GPSC introduced a Career Management Committee (CMC), comprising experienced executives who specialize in their own fields to give guidelines on the members' overall career paths to further promote the business competitiveness and sustainable growth.

Succession Planning

GPSC identifies key positions for which a succession plan is necessary, in place of the retirees and in preparation for new positions derived from business expansion. Succession planning is designed to enhance readiness of talented employees, ensuring talented next generation employees is at the right level, and perform systematically, driving business growth sustainably. Details of the company's succession planning are as follows:

1 Identifying key positions for which a succession plan is necessary.

2 Categorizing potential executives.

3 Evaluating the executives' leadership capabilities and personal attribute.

4 Designing leadership development programs for selected individuals.

5 Monitoring the performance of potential leaders after joining leadership development program.

In 2018, sixteen key positions were identified and leadership development programs were designed for talented employees.

Enhancing Employee Engagement

GPSC has conducted employee engagement survey on an annual basis by a third party to ensure neutrality. From 305 employees surveyed (98% of those who have rights to be surveyed, and have joined the company for more than 6 months), employee engagement in 2018 was at 57%, higher than the year before. The result will be used to improve the operation plan 2019 to meet the requirements and to enhance employee engagement, through the following steps:

1 Evaluation of Survey Result

2 Small group meeting with employees

3 Submitting the result for executives' consideration

4 Designing operation plan to enhance employee engagement

Knowledge Management

Knowledge management allows the company to develop knowledge and operational skills effectively, to apply them in support of the company's visions and targets in lowering risks, and to achieve excellence and competitiveness. GPSC promotes knowledge shared among organizations and creates culture of self-learning through Knowledge Management Portal, pursuant to the company's knowledge management plan.

Performance Assessment

In 2018, GPSC revised its Performance Management System (PMS) to be more concise and systematic for employee performance assessment with an aim to drive forward the performance in order to achieve the company's goals and to reinforce continuous development. Behavior based appraisal was revised to be in consonance with the Core Competency and the corporate value of team spirit. The performance assessment comprises two methods: behavior appraisal and performance appraisal using individual key performance indicators in correspondence with the company's strategies and goals. The performance results are used as backup data not only for career development planning that suits the employees in both short and long terms, but also for remuneration, adjustment, and promotion.

Key Performance Indicators

	Performance			Target	
	2016	2017	2018	2018	2019
Employee Engagement (%)	50	52	57	55	60
Employee Turnover Rate (%)	3.87	2.40	3.25	Lower than industry's average	

Remark: Survey result of 2018 employees turnover rate in utility industry are at 6.20%

Leadership Development Programs

Leadership development is another key factor to boost confidence and trust in the company's executives in order to move the company forward. In 2018, GPSC organized leadership development programs provided by Thailand's top HR consulting firms as follows:

Trusted Leaders Training for division manager levels and higher, to promote readiness of leaders for evolving changes of today and tomorrow. Leadership skills can build trust and connections between performance and the company's goals. The training was attended by 40 participants.

The concepts and theories learned from the Trusted Leaders Training Program can be really put into practice. Trust building, for example, can be applied in the working team, urging them to be more open and listen to one another more deeply. It can also enhance team engagement, and allow me to share the company's visions, missions and strategies with clarity for employee's true understanding. We need to build strong team works and urge them to work together with their utmost capability by setting clear expectations and responsibilities. If any problem arises, we can help clear the path. All in all, it is good for the company as a whole when all divisions can build team cooperation with commitment to utilizing their full potential to achieve the company's goals.

Mr. Chartchai Sae-Lim
Engineering and Maintenance
Division Manager

Trusted Leaders – Effective Supervisor Training for senior executives and department managers, to inform about creating trust between managers and subordinates, speaking and motivation skills to lead toward success. The training was attended by 23 participants.

Ms. Jintana Sitthikaew
Senior Auditor Officer

"After attending the program, I am equipped with knowledge for self–development, and an ability to raise confidence with my boss and colleagues, which enhances work effectiveness. Additionally, I have had better understanding on the causes of different behaviors of employees from different generations, learned about techniques to get ready for changes, and to get to the points when providing feedbacks, and been accepted by colleagues."

Thanks to the Leadership Development Programs, the participants are now able to apply knowledge to their work field for more effective managerial works.

63
Participants

88%
Satisfaction on training content

84%
Knowledge application

Organizational Diversity

GPSC values diversity and individual differences across all dimensions, regardless of gender, race, nationality, religion, political stance, socio-economic status, age, domicile and disability. It believes that diversity within the organization helps the company to address diverse needs of its stakeholders and fosters creativity in adapting to the wavering pattern of future businesses. This reflective of the company's recruitment process, HR development for equal career growth. In 2018, the percentage of female executives and female employees are 28.85 and 32.39 respectively. (More details can be found on Sustainability Performance Data)

HUMAN RIGHTS

> Human rights is a fundamental concern issue for companies with good governance. It is a duty of GPSC to run its business with zero human rights violation, to ensure equality and mutual respect. This means friendship prevails. With the company's clearly defined human rights policy, our joint venture companies can also take the right actions on their human rights management process.
>
> On construction projects, GPSC focused on safety first by strictly following the construction safety laws, and placing emphasis on the safety of contractors and workers at all levels. The company has designed a contractor safety plan, a contractor safety manual, an emergency plan and mitigation measures with provisions for proper placing as well as career development for those affected.

Mr.Sirimet Leepagorn
Exective Vice President, Asset Management

Targets

Zero complaints related to **human rights violations**

100% **Human rights risks and impact** assessment of all business departments and operation sites

Business Drivers

With a strong commitment to human rights across the value chain, GPSC has implemented a Human Rights Policy that adheres to the UN Guiding Principles on Business and Human Rights (UNGP). The objective is to minimize, prevent and avoid risks of human rights violation in the company and across the value chain by following the Human Rights Due Diligence Processes, which addresses adverse human rights impacts, a mitigation action plan, remediation for those impacted by human rights violations, as well as monitoring and reporting, based on strict observance of human rights protection.

Roadmap to Success

Approches to Human Rights are as follows:

Strategies	Action Plans
• Human Rights Policy	• Human Rights Due Diligence: HRDD • Human Rights Risk and Impact Assessment Methodology • Human Rights Management System

Filing and Reporting Performance

• Filing and reporting system includes communications, monitoring, and reviews of information and complaints relating to human rights issues

(For more details, please visit http://www.gpscgroup.com/en/sustainability/social/human-rights)

Performance

Human Rights Management

GPSC has set the following human rights policy and management framework to ensure that business is conducted in accordance with ethics and human rights principles as prescribed by international standards while striking a balance in fulfilling the company's duty to its stakeholders. Workshops on Human Rights Risk and Impact Assessment were held by the company's Corporate Sustainability Management department to conform to the Human Rights Due Diligence (HRDD).

03
Integration of Assessment Results
and Management

02
Human Rights Risk
and Impact Assessment

04
Monitoring and
Performance Reporting

01
Announcement of
Human Rights Policy

05
Remediation
for those impacted
by human rights violations
through complaint

GPSC's 5 Steps towards Human Rights Due Diligence

1) **The company announced its human rights policy** through its information system.

2) **Human rights risk and impact assessments** have been conducted at the national level on operational industrial plants and at the personal level.

3) **Integration of Assessment Results and Management:** The assessment results are taken into account for future human rights risk management planning based on PTT Group's sustainability management framework, the security, safety, occupational health and environment management system, and Community Development & Community Relations Manual, in order to minimize and prevent impacts.

4) **Monitoring and reporting performance:** The company has set monitoring periods and assessed performance based on plan types to make sure that the management process has been implemented effectively and the operational performance and management results have been disclosed openly among all stakeholders.

5) **Remediation for those impacted by human rights violations:** There was no human rights violation which cause negative impacts to the company were identified in the past year.

Human Rights Policy Communication

GPSC has used the PTT Group Human Rights Management System as the guideline for human rights management, implemented the UN guiding principle Human Rights Due Diligence, and informed all executives and employees of the human rights policy via e-mail and through human rights training.

Human Rights Risk Assessment

In 2018, GPSC conducted human rights risk assessments at the organizational level in collaboration with involved departments, including human resources, community and state affairs, supply chain, security, safety, occupational health and environment, customer relations, also with external parties involved or impacted, such as business partners, clients, communities and the surrounding environment, as well as affiliated companies. It is necessary for the company to be informed by both internal and external organizations of human rights impacts that might occur to any and all stakeholders, and to identify and prioritize human rights risks, so that it can more effectively design management plans for high human rights risks and impacts. This has driven the company to move forward with ethics and respect for human rights.

From the human rights risk assessment, no complaints related to human rights risk were identified. Notwithstanding, human rights risks at the high and medium levels remain on

the company's watch list. While mitigation and monitoring measures are in place. For complaints concerning human rights issues, the company has provided various channels for all groups of stakeholders. Internal complaint channels for employees include the welfare committee and company's suggestion box. Meanwhile, complaint channels for non-employees are available via the company's website, as well as by telephone, fax and letter. In 2018, no complaints related to human rights violation arose.

Key Performance Indicators

	Performance			Target	
	2016	2017	2018	2018	2019
Complaints related to human rights violation	0	0	0	0	0
Human rights risks and impact assessment on all business departments and operation sites (%)	-	-	100	100	100
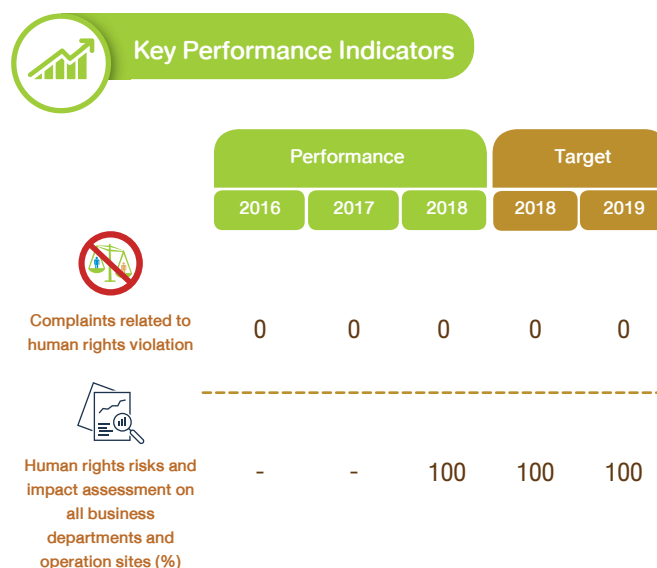
Note: In 2016 and 2017, Human rights risk and impact assessments were not conducted.

In a training session to raise awareness of human rights in the business sector based on international principles, the company's employees had a chance to collaborate in assessing human rights risks that might occur, and the results will be further used in human rights risk prevention and mitigation planning for greater efficiency of human rights risk management.

OCCUPATIONAL HEALTH AND SAFETY AND WELL–BEING

Mr. Chawalit Tippawanich
President and Chief Executive Officer

> GPSC has placed emphasis on high standards of quality, security, safety, occupational health and environment. Our greatest concern is the safety of all employees and contractors. We believe that all staff must be happy at work and have a work–life balance. All of you are the company's most treasured resources and assets. I am confident that we can achieve the goal of 10,000,000 consecutive accident–free work hours, where all employees and all involved parties work in a healthy and safe environment. I will do my best to work together with you towards this goal.

Opening speech at "QSHE 2018" and the 2nd Town Hall
CEO-Employees Meeting" on November 6, 2018 and December 18, 2018

Targets

Zero
Lost Time Injury Frequency
(LTIF)

Zero
Total Recordable Injury Rate
(TRIR)
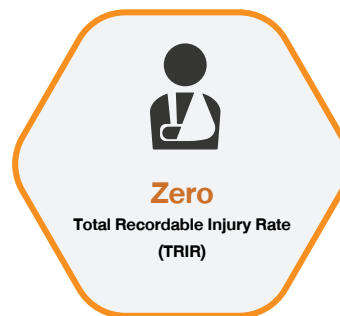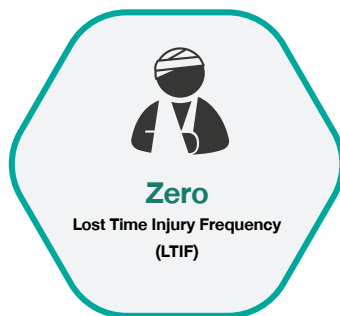
Business Drivers

GPSC is committed to operational excellence, with a strong focus on implementing the Quality, Security, Safety, Health and Environment Policy. To minimize loss of lives, injury, illness, and impacts on nearby communities and the environment, risk control and management has been put in place across all the company's working processes. Production efficiency, machinery reliability, and proper management in compliance with laws on security, safety, occupational health and environment, are among the company's central commitments. The company has always taken responsibility for the safety and health of employees, society, and the environment by implementing preventive measures to reduce risks associated with machinery and operation, and working towards a zero accident work environment.

Safety Vision

Underlining the company's responsibility for the safety and health of employees, society, and the environment, GPSC is fully committed to its safety vision:

"Drive to zero incidents that harm people"

Missions on Security, Safety and Occupational Health

1. Quality and reliability that meet the customer's needs.
2. Standardize and drive QSHE, Process Safety Management and uphold the 'we SAFE' QSHE culture to embed safety awareness into the GPSC DNA.
3. Hazards are all identified and controlled to the As Low As Reasonably Practicable (ALARP) point.
4. Enhance the QSHE 3Es: Engineering, Education and Encouragement to employees and contractors.

Roadmap to Success

Approches to Occupational Health and Safety and Well-Being are as follows:

Strategies	Action Plans
• Quality, Security, Safety, Health and Environmental Policy	• International Standard for the Occupational Health and Safety Management Systems (TIS/OHSAS 18001 and ISO 45001: 2018) • The Operational Excellence Management System on Security, Safety, Health and Environment Elements (OEMS; SSHE Element) includes Process Safety, Personal Safety, Security Management, Office Safety Management, Emergency Management and Contractor Safety Management. • The Occupational Health Management System includes Health Risk Assessment, Industrial Hygiene and Annual Checkup Program.

Filing and Reporting Performance

- The information system for recording and reporting includes Incident Report Program.
- Health Record and Analysis; GPSC E-health book.

(For more details, please visit http://www.gpscgroup.com/en/sustainability/social/occupational-health-and-safety)

Performance

Process Safety

Recognizing that effective safety management in the working process helps reduce serious incidents, GPSC has used its safety management framework as the operational guideline across the value chain. With its safety vision, mission, values and corporate culture, the company has established best practices and modern technologies in the operation process, from engineering designs, production operation and equipment maintenance to hazardous material management.

GPSC's process for safety management is implemented under its Operational Excellence Management System (OEMS), and International Organization for Standardization (ISO) to strictly conform to PTT Group's operation direction and laws. The company has thus obtained the TIS/OHSAS 18001 (Occupational Health and Safety Management System 18001) from MASCI since 2014. Thanks to its continual improvement from taking into consideration the risks, potential for and legal requirements relating to occupational health and safety, GPSC has also obtained the international standard for the Occupational Health and Safety Management Systems (ISO 45001: 2018), and Integrated Management System (IMS) Standard.

Personal Safety

GPSC targets zero Lost Time Injury Frequency (LTIF) and zero Total Recordable Injury Rate (TRIR) in both short and long terms, and has set its occupational health and safety management as a Key Performance Indicator (KPI).

With rigorous and continual improvement, GPSC has achieved its target of being an accident-free, injury-free organization for six consecutive years since 2013, as of December 31, 2018. It has accumulated 7,839,305 consecutive accident-free work hours, with a total of 10,000,000 consecutive work hours as the next target.

Good business performance is the fruit of hard work by the company's knowledgeable and competent employees. It is essential for the company to take good care of employees' lives, safety, personal and company assets. At GPSC, all employees are required to attend orientation training on the fundamental principles of safety, which include personal safety in terms of readiness before starting work and wearing personal protective equipment (PPE).

Lawful Occupational Health and Safety Practices

GPSC pays great attention to lawful occupational health and safety practices and the constant improvement of occupational health and safety skills of its employees and contractors to ensure their actions abide by the law. All new employees must attend occupational health and safety training and participate in annual training, in compliance with the company's Quality, Security, Safety, Health and Environmental Policy, as well as the legal requirements and laws on occupational health, safety, and environment. These practices have been carried out in tandem with creating confidence among communities surrounding the company's operation sites.

Additionally, GPSC has set up the Safety, Occupational Health and Working Environment Policy, comprising executives, operational employees and safety guards at its headquarters and utility plants. The committee meeting is held at least once a month to report performance and share suggestions for improvement to comply with the laws on workplace safety. The company also always promotes workplace safety activities as well as conducts regular performance follow up for future planning.

Achieving the target of consecutive accident–free work hours

5,000,000
hours in 2016

7,000,000
hours in 2018

Targeting
10,000,000
consecutive accident-free work hours

Statistics = **7,839,305** consecutive accident–free work hours (as of December 31, 2018)
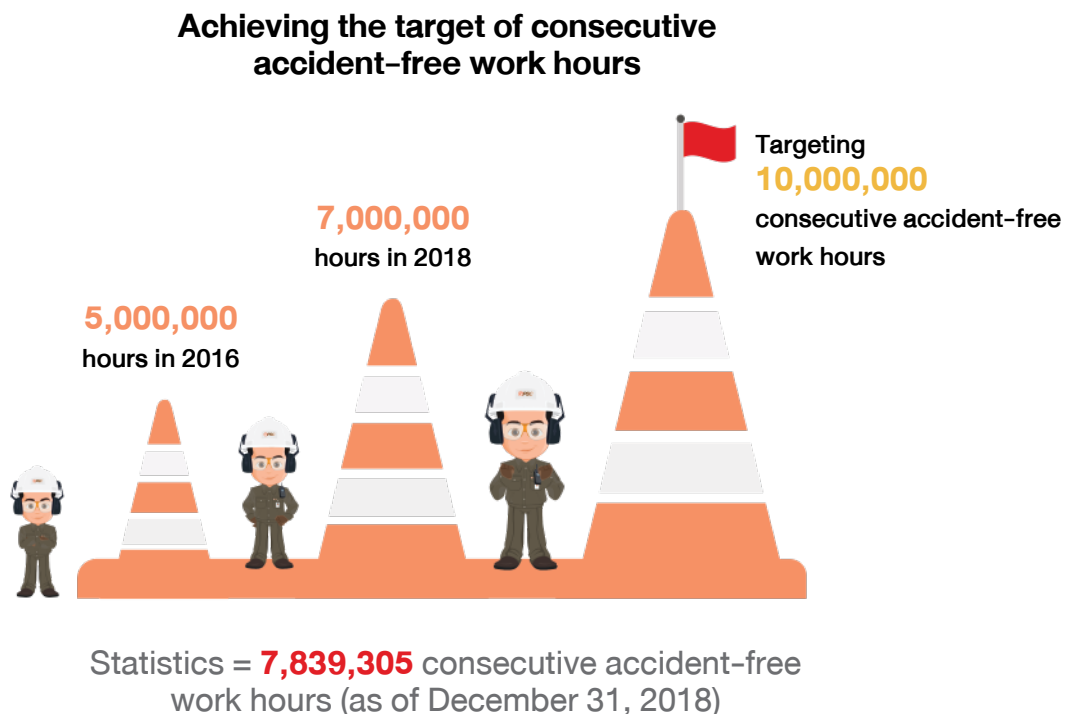
Key Performance Indicators

	Performance			Target	
	2016	2017	2018	2018	2019
Lost Time Injury Frequency (LTIF)	0	0	0	0	0
Total Recordable Injury Rate (TRIR) of Employees and Contractors	0	0	0	0	0

GPSC Web-accident Program

"GPSC's Zero Accident", thevision is designed to foster confidence in business operations among all stakeholders. The company's safety performance information system has been upgraded for greater accuracy and convenience for analyses, searches and preventive measure planning. Its Incident Report Program, launched in 2017 in collaboration with the company's Information Technology division, is an intranet single point communication program accessible by all employees. The program is for information sharing on incidents for investigation and future preventive planning though the online database.

Accident Reporting is for incidents resulting in injury, death and loss of assets.

Near-Miss Incident Reporting is for incidents without injury, death, or loss of assets.

Sub-Standard Practice Reporting is for substandard or unsafe actions with potential accidents.

Enhancing Employee Well-Being

Acknowledging that a pleasant working environment and good health can boost efficiency, GPSC provides annual physical checkups for all employees. Extra checkups are added where necessary to address risk factors in operation sites. The physical checkup results are available via the GPSC E-health Book, which is convenient for not only personal searches but also healthcare providers to analyze and follow up for health program planning. In 2018, the company's health and well-being activities include the following:

- E-Health Journals to provide healthcare tips and to raise awareness of illness and diseases. Among the topics are the dangers of high blood pressure and trans fats, winter diseases, Non-Communicable Diseases (NCDs), signs of stress, "Lose Belly Fat, Lose Diseases" and Rotavirus, an infection that causes watery diarrhea.
- Special Lectures on Non-Communicable Diseases (NCDs) and Office Syndrome by physicians.
- The "5S Decluttering Activity and Big Cleaning Day" urges all employeesto organize and take care of their own work space and environment on a regular basis. The company has set the 5S decluttering assessment as a key performance indicator for all units and 100% of employees passed the assessment criteria.
- The "Daily Walking – Jogging" activity to convince all employees to take regular exercise to reduce risks of illness.
- "GPSC Lose Belly Fat, Lose Diseases" Program to promote self-care and healthy diets among all employees.

A Lecture on "Office Syndrome" for employees

Mr. Thanawuth Chaibenjakul

Division Manager, Quality, Safety, Security, Health and Environment Policy

> GPSC has committed to upgrading the management of safety, security, occupational health and environment to conform with the evolving international standards. Having always taken care for all the employees, the company has been certified for the international standard for the Occupational Health and Safety Management Systems (ISO 45001: 2018), issued in place of BS OHSAS 18001: 2007, since March 12, 2018.

SUSTAINABLE COMMUNITY

Targets

Social Return
on Investment (SROI)
6 Projects

Over **75**%
Community Satisfaction

Over **1** %
Ratio of Budget for
Social Responsibility Projects
and Net Profit

Business Drivers

GPSC is pursuing its mission of conducting business with social and environmental responsibility. In the firm belief that a sustainable business grows hand in hand with communities and society, the company has been conducting business with community engagement to enhance quality of life and peoples' potential through a sharing economy for sustainability. Its community and social development frameworks have been brought into alignment with those of international standard. The company also wishes to be one of the electric and utility companies listed on the Dow Jones Sustainability Indices (DJSI) as a company working towards sustainable development. Embedding the United Nations Sustainable Development Goals (SDGs) into its business operations, GPSC applies its knowledge and expertise to solve social problems and address social needs, as well as in support of the SDGs, in particular Goal 9: Industry, Innovation and Infrastructure and Goal 12: Responsible Production and Consumption.

Additionally, the company conducts business within a corporate social responsibility strategic framework, which encompasses initiatives in education, quality of life improvement, public engagement and the environment. The Objectives are to build up stakeholders' confidence and strengthen a sharing economy for sustainability.

Roadmap to Success

Approches to Sustainable Community are as follows:

Strategies	Action Plans	Filing and Reporting Performance
• Social and Environmental Responsibility Policy • Corporate social responsibility strategic framework that aligns with business strategies and directions	• Community relations handbook • Surveying community engagement in areas of business operations • Fostering employees' volunteer spirit • Analysis of Social Return on Investment (SROI) • Community complaint and communication channels	• Filing and Reports in information systems

(For more details, please visit http://www.gpscgroup.com/en/sustainability/social/community-responsibility)

Performance

CSR Strategies

In line with the company's sustainability management and social and environmental responsibility policies, GPSC has provided funding for and supported various forms of social development programs through strategies designed to be in line with the company's direction. Increasingly, emphasis is placed on businesses that focus on creating shared value (CSV) and social enterprises (SE), as well as on the engagement of internal and external stakeholders, in particular those living in the communities surrounding the company's areas of operation. The company's social development strategies include the following three aspects: 1. Supporting activities associated with the company's mission and related to its business operation; 2. Applying the company's expertise and skills to transfer knowledge to communities; and 3. Addressing community and social needs and expectations. This is conducted under the corporate social engagement strategic framework encompassing four areas: education, public participation, quality of life development and the environment.

Education Project
Leader-Building for Sustainable Education (CONNEXT ED)

- **Objectives** - to develop a network of new-generation leaders who will play key roles in fostering sustainable education in Thailand. This project encourages them through the process of knowledge sharing and strategic planning in academic development with school administrations.
- **Targets who benefit** : Wat Phala School, Wat Tap Ma Community School, Wat Khao School, and Wat Baan Payoon School in Rayong province.
- **Benefits to Community and Society** : Transforming teaching/learning behaviors and instilling facilitating skills in teachers for sustainable development of learning in schools. The company is proud to be part of the national educator enhancement.

Quality of Life Development Project
"Light for a Better Life" Project

- **Objectives** - To take responsibility for community electrical system, as part of PTT Group's energy innovation leaders, by utilizing staff expertise to care for the community, society and the country. To provide electrical vocational skill training to people in the communities to take responsibility for their own communities.
- **Targets who benefit :** Local schools, temples and hospitals, including Ban Wang Takian School in Chachoengsao, Ban Chak Yai Chin School in Chonburi, and Wat Prachoommitr School in Rayong.

- **Benefits to Community and Society :** Job and income generation for people in the communities.

Public Participation Project
Kiang Bah Kiang Lai (Side by Side) Project

- **Objectives** - To build public understanding of and confidence in the company's operations; to organize public hearings on any aspect affected by doubt; and to strengthen good relations between the communities and the company through providing information on the company's overall operations, production procedure, eco conservation, as well as home electrical system care and safety.
- **Targets who benefit :** Communities surrounding the company's operation site including Krached Bon Community, Krached Lang Community (Map Chump Pattana Sub-district Municipality), Si Khao Community (Muang Ban Chang Municipality), Loh Kwean Community (Ban Chang Municipality) and Map Ta Phut Market Community (Muang Map Ta Phut Municipality).
- **Benefits to Community and Society :** Building up public participation, urging people to express their opinions in relation to the company's operations.

Environment Project
Rayong Waste to Energy Project

- **Objectives –** To solve waste problems in collaboration with Rayong Provincial Administration Organization, as part of the state's support for waste disposal. The "Waste to Energy" is an effective, environmentally friendly waste management project, launched in April 2018.
- **Benefits to Community and Society :** The communities have managed waste systematically, thereby reducing waste and impacts on people's health and hygiene in a sustainable manner. This has fostered power stability in the surrounding communities. Meanwhile, the proceeds earned by nearby communities where the project is being implemented and these go to the Power Development Fund for further local development.
- **Future Plan :** The company has been working with Rayong Provincial Administration Organization on improving the project so that it can handle the remaining old waste and an additional 500 tons of waste each day as well as the waste in landfill. By adopting the sustainable management approach, value has been added to community waste and the project is expected to become a community, and national, learning center for waste sorting management and transforming waste to energy.

"

The project has effectively solved the problem of community waste in Rayong province. We have learned that waste is useful if we know how to sort it and turn it into fuel and energy. It is the company's intention to launch Rayong Waste to Energy Project as a learning center for communities and the country as a whole. Students can also learn about waste sorting and turning it into energy. This is a good project that is beneficial to communities and the environment.

"

Mr. Jaruwat Singsomdee
Vice President, Corporate Sustainability Management
President of Rayong Waste to Energy Project

GPSC has also co-invested with PTT Group in establishing Sarn Palung Social Enterprise Company Ltd. (PTTSE) in an effort to resolve social and environmental issues in Thailand and to promote employment of local communities in an efficient and sustainable manner. In 2018, the Zero Waste Village was set up to foster awareness on how to sort waste properly, creating value for waste materials while reducing environmental problems for the community.The Zero Waste Village is a project for quality of life development and environmental conservation, which can be further upgraded into a social enterprise to generate sustainable income for the community in the long term. Activities in the Zero Waste Village include a garbage bank, products from recycled waste and household organic waste management. In 2018, two communities in Rayong Province participating in the project as model communities were Baan Pai Community, Nong Tapan Sub-district, and Modern City Village, Tap Ma Sub-district, Muang District. They are expected to be in full operation in 2019.

GPSC Young Social Innovator Project

With an emphasis on sustainability across social, economic and environmental dimensions in line with the UN Sustainable Development Goals, coupled with the company's targets on energy development, and natural resources and environmental conservation, GPSC initiated GPSC Young Social Innovator 2018. High school students and vocational college students or equivalent are encouraged to propose their ideas and innovations that can practically solve social, economic and environmental problems. The innovative ideas will be put into practice in the areas with actual problems or will be transformed into products to be distributed in the market in social enterprise format. This people participation is one of the drivers for national sustainable development. Out of 20 teams of students in the eastern region participating in the project, the three outstanding teams presenting practical innovative solutions to our society are 1) Smart Biogas by students from Prince Chulabhorn Science High School, Chonburi Province, 2) The food waste separating machine by students from Kamnoet Vidya Science Academy, Rayong Province, and 3) Banana Trunk Packaging D.I.Y. by students from Wangchan Wittaya School, Rayong Province. The three teams are competing for the championship in February 2019, and the champion's project will receive a prize and in all probability be upgraded to a social enterprise startup.

Mr. Chawalit Tippawanich
President and Chief Executive Officer

The GPSC Young Social Innovator 2018 was held for the first time this year on the concept of sustainable energy, natural resources and environment, where students have a chance to present innovative and eco-friendly ideas to solve social problems. I take pride in our creative young generation who are innovative and active in contributing to economic, social and environmental development and their ideas are really practical and useful for the communities.

> By participating in this project, I have learned about the practice of initiating, planning and designing products to answer targets' needs more precisely and practically.

Mr. Supakorn Koknoi
Prince Chulabhorn Science High School, Chonburi Province

> Many thanks to this project for giving youth an opportunity to develop startup ideas. I feel that my project is a valuable one. I am inspired to continue working on the project.

Miss Aksrapak Kiatkajonrit
Kamnoet Vidya Science Academy, Rayong Province

Community Engagement Satisfaction Survey

In 2018, the company inaugurated an independent community satisfaction survey on social responsibility projects and on relations with people in the communities surrounding the company's operation site in Rayong Province. This was conducted by Thammasat University Research and Consultancy Institute. The survey revealed that the overall result of the level of community satisfaction on the company's social responsibility projects and public relations is 60. 4%. This result will be used by the company to review, develop and improve its strategies and operational plans on investment and social responsibility.

Key Performance Indicators

		Performance			Target	
		2016	2017	2018	2018	2019
	Community Satisfaction (%)	90.20	82.40	60.40*	75	75
	Social Return on Investment (SROI)	–	1	5	3	6
	Ratio of Budget for Social Responsibility Projects and Net Profit (%)	0.30	0.79	0.94	More than 0.75	More than 1

*Note: The company has expanded the scope of the survey to cover more stakeholders. This the first year the survey is conducted by a third party for information neutrality.

In 2018, GPSC has invested more than THB 29.7 million in community and social development projects, or 0.94% of the company's net profit.

The THB 29.7 million, in support of community and social development projects, is divided into:

- THB 20.7 million donation for public good.
- THB 9 million investment for communities and the society.

To improve the company's delivery of service to community, analyses of Social Return on Investment (SROI) were conducted on five projects in 2018, as follows:

Project	Operation Budget (THB)	Business Benefit	Social Benefit	SROI
Mor Fai Fah (Electric Doctor)	903,942	Develop specific skills and expertise for staff	Improve quality of life of people in the community	0.85
Mor Fai Fah (Electric Doctor), Job-Creating Project	126,826	Develop skills of masters of ceremonies for staff	Enhance working skills, create jobs in the community, and provide fundamental care for households.	0.81
Improving Yield of Oyster Mushroom Project of Map Chalood Community	72,928	Enhance good relationship between the community and the company	Promote and create jobs in the community	0.76
"Fabric Ceremony Decoration" Community Potential Enhancement Project	47,006	Enhance good relationship between the community and the company	Promote and create jobs in the community	0.40
Cost Reduction in Recycled Waste Transportation Project	74,433	Enhance good relationship between the community and the company	Promote and create jobs in the community	6.54
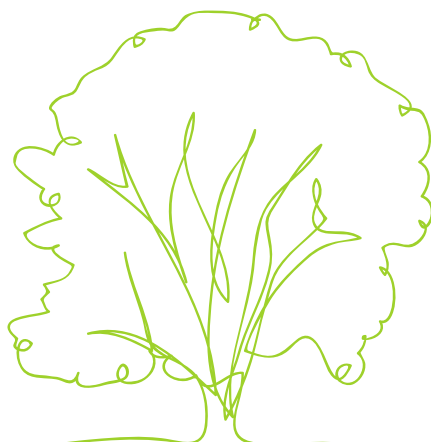
SUSTAINABILITY PERFORMANCE DATA

💰 Economic

GRI Standards	Required Data	Unit	Data Collection Period			
			2015	2016	2017	2018
Economic						
201-1	**Economic Performance**					
	Sales revenues	Million Baht	22,444	20,675	19,917	24,777
	Operating cost	Million Baht	20,847	18,265	17,226	21,138
	Employee wages and benefits[1]	Million Baht	448	407	518	637
	Dividend payments for the performance	Million Baht	1,120	1,573	1,723	1,873
	Payments to government	Million Baht	552	697	518	297
Corporate Governance						
205-2	**Anti-Corruption**					
	Governance body members that the organization's anti-corruption policies and procedures have been communicated to	Persons	10	10	12	13
		%	100	100	100	100
	Governance body members that have received training on anti-corruption	Persons	N/A	N/A	N/A	N/A
		%	N/A	N/A	N/A	N/A
	Employees that anti-corruption policies and procedures have been communicated to	Persons	N/A	N/A	292	318
		%	N/A	N/A	100	100
	Employees that have received training on anti-corruption	Persons	N/A	N/A	139	176
		%	N/A	N/A	47.60	55.35
205-3	Confirmed incidents of corruption and actions taken	Cases	0	1	0	1
206-1	Total number of legal actions for anti-competitive behavior, anti-trust, and monopoly practices and their outcomes	Cases	0	0	0	0
419-1	Total monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws and regulations	Million Baht	0	0	0	0
103-2	**Grievance**					
	Number of grievances about environmental impacts[2] through formal grievance process	Cases	0	0	0	0
	Number of grievances about human rights[3] through formal grievance process	Cases	0	0	0	0
	Number of grievances about labor practices[4] through formal grievance process	Cases	0	0	0	0
	Number of grievances about impacts on society[5] through formal grievance process	Cases	0	0	0	0

GRI Standards	Required Data	Unit	Data Collection Period			
			2015	2016	2017	2018
Production						
G4–EU1	**Production***					
	Total installed capacity	MW	1,052	1,052	1,052	1,052
	Natural gas	% of total contribute	100	100	100	100
	Oil[6]	% of total contribute	0	0	0	0
G4–EU2	Net energy generated*	MWh	10,422,182	10,741,051	8,369,410	7,441,150
	Natural gas	% of total generation	99.99	99.99	99.99	99.98
	Oil	% of total generation	0.01	0.01	0.01	0.02
	Renewable	% of total generation	N/A	N/A	N/A	N/A
G4–EU10	Capacity under construction including purchased power and reserve margins	MW	N/A	N/A	392	425
G4–EU11	Average annual efficiency for total energy sold[7]	%	N/A	N/A	69.90	67.56
	Average annual efficiency for electricity[8]	%	N/A	N/A	28.00	28.39
G4–EU28	System Average Interruption Frequency Index (SAIFI)	N/A	0.63	0	0	0.14
G4–EU29	System Average Interruption Duration Index (SAIDI)	N/A	0.7	0	0	7.68
G4–EU30	Average plants availability factor by energy source and by regulatory regime	%	99.98	100	100	99.82

Remarks:

N/A: not applicable

* Adjusted data from previous year

[1] The scope of employee wages and benefits exclude PTT's secondment employees. Employee wages and benefits include salaries, bonuses, contributions to provident funds, etc. (data from consolidate financial statement).

[2] Environmental impacts include company's impact on living and non–living natural systems such as land, air, water, and ecosystems

[3] Human right complaints include discrimination, gender inequality, freedom of association, collective bargaining, forced or compulsory labor, and indigenous rights

[4] Labor practice complaints include unfair treatment to employee, discrimination or harassment in workplace

[5] Impacts on society include water availability, social security, infrastructure development, and poverty

[6] The power plant in Sriracha is capable of generating energy from both natural gas and oil depending on customer's request

[7] Average annual efficiency for total energy (electricity and steam) includes Central Utility Plant 1, Central Utility Plant 2, and Central Utility Plant 3

[8] Average annual efficiency for total electricity only includes Central Utility Plant 1, Central Utility Plant 2, and Central Utility Plant 3

Environment

GRI Standards	Required Data	Unit	Data Collection Period			
			2015	**2016**	**2017**	**2018**
Environment						
	Energy Consumption*					
302-1	Total energy consumption[1,2]	GJ	56,102,212	61,420,486	11,858,961	14,048,258
	Total direct energy consumption	GJ	56,033,631	83,919,914	39,208,180	37,429,167
	Total indirect energy consumption	GJ	68,581	19,534	37,087	657,063
	Electricity purchased	GJ	N/A	1,751,403	38,508	10,496
	Steam purchased	MWh	124,740	134,661	0	171,779[3]
	Total energy sold[4]	MWh	6,932,363	6,255,267	7,176,730	6,677,214
	Electricity	MWh	4,868,024	3,877,575	3,557,097	3,236,656
	Steam	MWh	2,090,246	2,377,692	3,619,633	3,440,558
302-3	Total energy intensity	GJ/MWh	5.60	10.00	5.00	5.12
	Water Withdrawal by Source*					
303-1	Total water withdrawal	Million m^3	11.14	7.36	9.61	9.45
	Surface water	Million m^3	6.44	4.63	4.08	3.62
	Municipal water and private water utilities	Million m^3	4.70	2.73	5.53	5.83
303-3	Total water reused and recycled[5]	Million m^3	N/A	4.59	3.00	4.43
		% of total water withdrawal	N/A	41%	31%	45%
306-1	**Water Discharge**					
	Total water discharge to surface water	m^3	1,459,287	1,620,696	1,431,765	353,548
	Greenhouse Gas Emission (GHGs)*					
305-1	Direct total GHGs (scope1)	Tonnes CO_2e	3,076,991	2,794,747	2,524,048	2,417,043
	CO_2	Tonnes CO_2e	N/A	N/A	2,510,749	2,775,683
	CH_4	Tonnes CO_2e	N/A	N/A	16,483.85	28,928
	N_2O	Tonnes CO_2e	N/A	N/A	6.90	47.65
	HFCs	Tonnes CO_2e	N/A	N/A	153.44	0
	SF_6	Tonnes CO_2e	N/A	N/A	307.80	68.40
305-2	Indirect total GHGs (scope2)	Tonnes CO_2e	1,889.00	8,881.07	3,653.65	43,488[6]
305-3	Other indirect GHGs emission (scope3)*	Tonnes CO_2e	N/A	385,130	357,481	344,220
305-4	Total GHG emission intensity	Tonnes CO_2e/MWh	N/A	N/A	0.30	0.33
305-5	Reduction of GHG emission	Tonnes CO_2e	40,199	268	798	43,486[7]

GRI Standards	Required Data	Unit	Data Collection Period			
			2015	2016	2017	2018
305-7	**Emissions[8]**					
	Nitrogen Oxides (NO_x)	Tonnes NO_2	985	754	518.75	814.45
	SF_6	Kg	5	0	13.5	0
306-2	**Waste Disposal**					
	Total hazardous waste as defined by National Legistration	Tonnes	107.35	68.00	90.29	232.82
	Recycle	Tonnes	44.11	31.23	14.96	4.29
	Recovery	Tonnes	23.88	27.94	75.03	228.53
	Incineration	Tonnes	39.31	8.73	0	0
	On-site storage	Tonnes	0.05	0.10	0	0
	Total non-hazardous waste as defined by National Legistration	Tonnes	665.39	583.63	721.61	784.21
	Recycle	Tonnes	162.39	57.59	42.98	27.20
	Recovery	Tonnes	34.25	23.00	24.31	25.57
	Composting	Tonnes	189.12	468.65	457.11	511.29
	Incineration	Tonnes	34.36	34.39	24.66	0
	Other management methods (central wastewater treatment plant and land reclamation)	Tonnes	245.27	0	172.55	220.15
307-1	**Compliance**					
	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations	Million Baht	0	0.88	0	0

Remarks:

N/A: not applicable

* Adjusted data from previous year

[1] Due to small proportion of energy consumption from renewable sources, data includes only from non-renewable sources

[2] GRI formula for total energy consumption has been applied

[3] The scope of stream purchased had changed in 2018

[4] Total energy sold refers to electricity and steam

[5] Total water reused and recycled include condensate return water

[6] Indirect total GHGs (scope2) had increased due to maintenance activity in 2018

[7] GHG reduction increased significantly due to the participation of Thailand Voluntary Emission Reduction Program (T-VER)

[8] No SO_x emission detected in GPSC operations (CUP-1, CUP-2, CUP-3, and SRC) by UV - Fluorescence Method (EIA)

Social

Social

GRI Standards	Required Data	Unit	Data Collection Period			
			2015	2016	2017	2018
Social Responsibility						
102–42 102–43	**Product Responsibility**					
	Customer satisfaction survey	% of total clients	86.85	87.40	86.80	86.60
	Data coverage	% of total clients	100	100	100	100
	Customer satisfaction target	% of total clients	85.00	85.00	85.00	85.00
Corporate Social Responsibility						
201–1	**Philanthropic Activities**					
	Total contribution	Baht	36,450,515	230,959,445	278,168,930	29,768,393
	Charitable donations	Baht	5,325,420	2,337,911	6,401,752	20,732,993
		% of total contribute	14.61	1.01	2.31	69.70
	– Cash contribution	Baht	5,184,075	2,195,411	6,401,752	20,732,993
	– Products or services donations	Baht	141,345	142,500	0	0
	Community investments	Baht	31,125,095	3,621,534	11,875,244	9,035,400
		% of total contribute	85.39	1.57	4.27	30.30
	Commercial initiatives	Baht	0	225,000,000	259,891,934	0[1]
		% of total contribute	0	97.42	93.42	0
413–1	**Local Community**					
	Percentage of operations with implemented local community engagement, impact assessments, and development programs	%	N/A	N/A	0	0
G4–EU22	Number of people physically and economically displaced by large projects	Persons	N/A	N/A	0	0
	Plant expansion	Persons	0	0	0	0
	New plant	Persons	0	0	0	0
	New transmission lines	Persons	0	0	0	0
	Number of people compensated including those that may be affected positively	Persons	0	0	0	0
–	Community satisfaction survey	%	84.00	90.20	82.40	60.40
	Community satisfaction target	%	80.00	80.00	80.00	75.00

GRI Standards	Required Data	Unit	2015		2016		2017		2018	
			Male	Female	Male	Female	Male	Female	Male	Female
Labour Practice										
102–8	**Workers by Area**									
	Rayong	Persons	136		137		151		160	
		Persons	112	24	112	25	124	27	133	27
	Chonburi–Sriracha	Persons	41		41		31		25	
		Persons	36	5	37	4	27	4	22	3
	Bangkok	Persons	63		80		110		133	
		Persons	29	34	31	49	47	63	60	73
	Other Provinces	Persons	0		0		0		0	
		Persons	0	0	0	0	0	0	0	0
	Workers by Employment Type and Contract									
	Permanent contract[2]	Persons	240		258		292		318	
		Persons	177	63	180	78	198	94	215	103
	Temporary contract[3]	Persons	0		0		0		0	
		Persons	0	0	0	0	0	0	0	0
	Full time[4]	Persons	240		258		292		318	
		Persons	177	63	180	78	198	94	215	103
	Part time[5]	Persons	0		0		0		0	
		Persons	0	0	0	0	0	0	0	0
405–1	**Workers by Age**									
	<30 years	Persons	48		46		51		46	
		Persons	32	16	29	17	31	20	27	19
		% by gender against worker category	66.67	33.33	63.04	36.96	60.78	39.22	58.70	41.30
	30 – 50 years	Persons	184		204		230		256	
		Persons	137	47	143	61	156	74	173	83
		% by gender against worker category	74.46	25.54	70.10	29.90	67.83	32.17	67.58	32.42
	>50 years	Persons	8		8		11		16	
		Persons	8	0	8	0	11	0	15	1
		% by gender against worker category	100.00	0.00	100.00	0.00	100.00	0.00	93.75	6.25

GRI Standards	Required Data	Unit	2015		2016		2017		2018	
			Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
	Worker by Level*									
	Total workforce	Persons	240		258		292		318	
		Persons	177	63	180	78	198	94	215	103
	Executive	Persons	2		1		1		1	
		Persons	2	0	1	0	1	0	1	0
		% by gender against worker category	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00
	Middle Management	Persons	24		26		38		51	
		Persons	19	5	19	7	29	9	36	15
		% by gender against worker category	79.17	20.83	73.08	26.92	76.32	23.68	70.59	29.41
405-1	Senior	Persons	25		43		60		62	
		Persons	24	1	38	5	44	16	42	20
		% by gender against worker category	96.00	4.00	88.37	11.63	73.33	26.67	67.74	32.26
	Non-management	Persons	189		188		194		204	
		Persons	132	57	122	66	125	69	136	68
		% by gender against worker category	69.84	30.16	64.89	35.11	64.43	35.57	66.67	33.33
	Worker by Function									
	Operation	Persons	N/A	N/A	N/A	N/A	142	16	149	17
		% by gender against worker category	N/A	N/A	N/A	N/A	89.87	10.13	89.76	10.24
	Corporate / Support	Persons	N/A	N/A	N/A	N/A	56	78	66	86
		% by gender against worker category	N/A	N/A	N/A	N/A	41.79	58.21	43.42	56.58

GRI Standards	Required Data	Unit	2015		2016		2017		2018	
			Male	Female	Male	Female	Male	Female	Male	Female
401-1	**Total Number and Rate of New Employees Hires and Employee Turnover**									
	New employees	Persons	32		22		33		29	
		Persons	17	15	6	16	17	16	20	9
	New hire rate	% of total employees	7.08	6.25	2.33	6.20	5.82	5.48	6.29	2.83
	New Employee Hire by Area									
	Rayong	Persons	5	0	3	1	10	3	10	1
		% of total employees	2.08	0.00	1.16	0.39	3.42	1.03	3.14	0.31
	Chonburi-Sriracha	Persons	1	0	1	0	0	0	0	0
		% of total employees	0.42	0.00	0.39	0.00	0.00	0.00	0.00	0.00
	Bangkok	Persons	11	15	2	15	7	13	10	8
		% of total employees	4.58	6.25	0.78	5.81	2.40	4.45	3.14	2.52
	Other Provinces	Persons	0	0	0	0	0	0	0	0
		% of total employees	0	0	0	0	0	0	0	0
	New Employee Hire by Age									
	<30 years	Persons	13	10	2	7	9	7	9	5
		% of total employees	5.42	4.17	0.78	2.71	3.08	2.40	2.83	1.57
	30 - 50 years	Persons	4	5	4	9	8	0	11	4
		% of total employees	1.67	2.08	1.55	3.49	2.74	0.00	3.46	1.26
	>50 years	Persons	0	0	0	0	0	0	0	0
		% of total employees	0	0	0	0	0	0	0	0
	Turnover									
	Total employee turnover rate	Persons	4	3	7	3	4	3	6	5
		% of total employees	1.67	1.25	2.71	1.16	1.37	1.03	1.89	1.57
	Voluntary employee turnover rate	Persons	4	3	7	3	4	3	6	5
		% of total employees	1.67	1.25	2.71	1.16	1.37	1.03	1.89	1.57
	Turnover rate by Age Group									
	< 30 years	Persons	2	2	1	1	0	1	2	1
		% of total employees	0.83	0.83	0.39	0.39	0.00	0.34	0.63	0.31
	30 - 50 years	Persons	2	1	6	2	4	2	3	4
		% of total employees	0.83	0.42	2.33	0.78	1.37	0.68	0.94	1.26

GRI Standards	Required Data	Unit	2015		2016		2017		2018	
			Male	Female	Male	Female	Male	Female	Male	Female
	> 50 years	Persons	0	0	0	0	0	0	1	0
		% of total employees	0	0	0	0	0	0	0.31	0
	Turnover by Area									
	Rayong	Persons	2	0	1	0	3	0	2	0
		% of total employees	0.83	0	0.39	0	1.03	0	0.63	0
	Chonburi–Sriracha	Persons	0	0	0	0	0	0	1	1
		% of total employees	0	0	0	0	0	0	0.31	0.31
	Bangkok	Persons	2	3	6	3	1	3	3	4
		% of total employees	0.83	1.25	2.33	1.16	0.34	1.03	0.94	1.26
	Other Provinces	Persons	0	0	0	0	0	0	0	0
		% of total employees	0	0	0	0	0	0	0	0
401–3	**Parental leave**									
	Employee taken parental leave	Persons	N/A	N/A	0	4	0	6	0	5
	Employee entitled to parental leave	Persons	N/A	N/A	184	4	286	6	6	5
	Employee returned to work after parental leave	Persons	N/A	N/A	0	4	0	6	0	0
	Employee returned to work after parental leave who were still employed twelve month after their return to work	Persons	N/A	N/A	0	4	0	6	0	0
404–1	**Average hours of training[6]**									
	Executive	Hours	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Middle Management	Hours	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Senior	Hours	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Non-management	Hours	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
404–3	**Employee Receiving Regular Performance and Career Development Reviews**									
	Executive	Persons	2		5		6		1	
		Persons	2	0	5	0	6	0	1	0
		%	100	0	100	0	100	0	100	0
	Middle Management	Persons	24		27		27		50	
		Persons	19	5	20	7	20	7	36	14
		%	79.17	20.83	74.07	25.93	74.07	25.93	72	28
	Senior	Persons	25		49		53		61	
		Persons	24	1	42	7	42	11	41	20
		%	96.00	4.00	85.71	14.29	79.25	20.75	67.21	32.79

GRI Standards	Required Data	Unit	2015		2016		2017		2018	
			Male	Female	Male	Female	Male	Female	Male	Female
	Non-management	Persons	189		179		157		196	
		Persons	132	57	115	64	108	49	129	67
		%	69.84	30.16	64.25	35.75	68.79	31.21	65.82	34.18
G4-EU15	**Eligible Employees to Retire in the Next 5 and 10 Years**									
	Total	Persons	8	0	10	0	15	0	17	1
	Eligible Employees to Retire in the Next 5 and 10 Years By area									
	Rayong	Persons	5	0	6	0	7	0	8	0
	Chonburi-Sriracha	Persons	0	0	0	0	0	0	1	0
	Bangkok	Persons	3	0	4	0	8	0	8	1
	Other Provinces	Persons	0	0	0	0	0	0	0	0
	Eligible Employees to Retire in the Next 5 and 10 Years By category									
	Executive	Persons	1	0	5	0	1	0	1	0
	Middle Management	Persons	7	0	4	0	13	0	13	0
	Senior	Persons	0	0	0	0	1	0	1	0
	Non-management	Persons	0	0	0	0	0	0	2	1
-	**Employee Engagement**									
	Employee engagement	%	72		50		52		57	
	Employee engagement by Gender	%	N/A	N/A	N/A	N/A	55	45	59	53
	Data coverage	%	83.7		91		95		98	
	Employee engagement target	%	N/A		N/A		55		60	

GRI Standards	Required Data	Unit	Data Collection Period			
			2015	2016	2017	2018
Health and Safety						
403-1	**Representatives in Health and Safety Committees[7]**					
	Total Workers representation in formal joint management worker health and safety committees	Person	N/A	21	20	22
		% of Total Employee	N/A	8.14	6.85	6.29
	Executive[8]	Person	N/A	6	7	0
		% of Total Health and Safety Committees	N/A	28.57	35.00	0
	Middle Management[9]	Person	N/A	5	3	6
		% of Total Health and Safety Committees	N/A	23.81	15.00	27.27

GRI Standards	Required Data	Unit	Data Collection Period			
			2015	2016	2017	2018
403-1	Senior[10]	Person	N/A	1	1	2
		% of Total Health and Safety Committees	N/A	4.76	5.00	9.09
	Non-management[11]	Person	N/A	9	9	14
		% of Total Health and Safety Committees	N/A	42.86	45.00	63.64
403-2	**Rate of Injury, Occupational Disease, Lost Day and Work Related Fatalities**					
	Fatalities					
	Total workforce	Cases	0	0	0	0
	Supervised workers	Cases	0	0	0	0
	Employees	Cases	0	0	0	0
	Contractors	Cases	0	0	0	0
	Total Recordable Injuries Case					
	Total workforce	Cases	0	0	0	0
	Supervised workers	Cases	0	0	0	0
	Employees	Cases	N/A	N/A	N/A	0
	Injuries Rate (IR)					
	Total workforce	Cases/1 million Manhours	0	0	0	0
	Supervised workers	Cases/1 million Manhours	0	0	0	0
	Employees	Cases/1 million Manhours	N/A	N/A	N/A	0
	Lost-Time Injury Frequency Rate (LTIFR)					
	Total workforce	Cases/1 million Manhours	0	0	0	0
	Supervised workers	Cases/1 million Manhours	0	0	0	0
	Employees	Cases/1 million Manhours	0	0	0	0
	Data coverage	% of total employee	100	100	100	100
	Contractors	Cases/1 million Manhours	0	0	0	0
	Data coverage	% of total employee	100	100	100	100
	Lost Workday Case (LWC)					
	Total workforce	Cases	0	0	0	0
	Supervised workers	Cases	0	0	0	0
	Employees	Cases	N/A	N/A	N/A	0

GRI Standards	Required Data	Unit	Data Collection Period			
			2015	2016	2017	2018
	Lost Day Rate (LDR)					
	Total workforce	Day/1 million Manhours	0	0	0	0
	Supervised workers	Day/1 million Manhours	0	0	0	0
	Employees	Cases	N/A	N/A	N/A	0
	Occupational Disease Rate (ODR)[12]					
	Total workforce	Cases/1 million Manhours	N/A	N/A	N/A	0
	Supervised workers	Cases/1 million Manhours	N/A	N/A	N/A	0
	Employees	Cases/1 million Manhours	N/A	N/A	N/A	0
	Data coverage	% of total employee	N/A	N/A	N/A	100
403–2	Contractors	Cases/1 million Manhours	N/A	N/A	N/A	0
	Data coverage	% of total employee	N/A	N/A	N/A	100
	Absentee Rate (AR)[12]					
	Total workforce	%	N/A	N/A	N/A	N/A
	Supervised workers	%	N/A	N/A	N/A	N/A
	Employees	%	N/A	N/A	N/A	1.31
	Data coverage	% of total employee	N/A	N/A	N/A	100
	Contractors	%	N/A	N/A	N/A	N/A
	Data coverage	% of total employee	N/A	N/A	N/A	N/A
G4–EU17	**Days Worked by Contractor and Subcontractor Employees on Electric Utility Systems (Generation, Distribution, Transmission)**					
	Construction activities	Day	365	365	365	365
	Operation activities	Day	365	365	365	365
	Maintenance activities	Day	365	365	365	365
G4–EU18	**Health and Safety for Contractor and Subcontractor Employees**					
	Contractor and subcontractor employees that have undergone relevant health and safety training	%	100	100	100	100

GRI Standards	Required Data	Unit	Data Collection Period			
			2015	2016	2017	2018
G4–EU25	**Customer Health and Safety**					
	Number of injuries to the public involving company assets, including legal judgement, settlement and pending legal cases of diseases	Cases	0	0	0	0
	Number of fatalities to the public involving company assets, including legal judgement, settlement and pending legal cases of diseases	Cases	0	0	0	0
	Contractor and subcontractor working on electric utility systems, employees that have undergone relevant health and safety training in comparison to total contractor and subcontractor	%	0	0	0	0

Remarks:

N/A: not applicable

* Adjusted data from previous year

[1] The scope of commercial initiatives had changed in 2018

[2] Permanent employee is an employee with permanent contract: A permanent employment contract is a contract with an employee for full-time or part-time work, for an indeterminate period

[3] Temporary employee is an employee under contract of limited duration, and is terminated by a specific event, including the end of a project or work phase or return of replaced employees

[4] Full-time employee is an employee whose working hours per week, month, or year are defined according to national legislation and practice regarding working time (such as national legislation which defines that 'full-time' means a minimum of nine months per year and a minimum of 30 hours per week)

[5] Part-time employee is an employee whose working hours per week, month, or year are less than 'full-time'

[6] Data will be collected on 2019

[7] 2018 Data has been based on GPSC new employee classification

[8] Executive means job level that is equal or higher than 16

[9] Middle management means job level 11-15

[10] Senior means job level 9-10

[11] Non-management means job level that is equal or lower than 8

[12] Data had collected and reported this year

Country	Subsidiaries & Associated companies	Share holding	Operational control	Corporate Governance	Business Ethics Anti-Corruption	Supply Chain Management	Risk Management	Customer Relationship Management	Reliable Production and Availability	Innovation	Environment Management and Energy Efficiency
				Economic							**Environment**
Hongkong	GPSC International Holdings Limited	100%	Yes	✕	✕	✕	✕	✕	✕	✕	✕
USA	24M Technologies, Inc.	29.5%	No	●	◐	○	○	○	○	○	○
Japan	Ichinoseki Solar Power 1 GK Company	99%	Yse	●	◐	●	●	●	●	●	●
Laos	Nam Lik 1 Power Company Limited	40%	No	●	◐	○	○	○	○	○	○
Laos	Xayaburi Power Co., Ltd.	25%	No	●	◐	○	○	○	○	○	○
Thailand	Natee Synergy Company Limited	100%	Yes	✕	✕	✕	✕	✕	✕	✕	✕
Thailand	Global Renewable Company Limited	100%	Yes	●	●	●	●	●	●	●	●
Thailand	Business Services Alliance Company Limited	25%	No	●	◐	○	○	○	○	○	○
Thailand	Bangpa-In Cogeneration Company Limited	25%	No	●	◐	○	○	○	○	○	○
Thailand	IRPC Clean Power Company Limited	51%	Yes	●	◐	●	●	●	●	●	●
Thailand	Nava Nakorn Elecricity Generating Company Limited	30%	No	●	◐	○	○	○	○	○	○
Thailand	Siam Solar Energy 1 Company Limited	100%	Yes	●	◐	●	●	●	●	●	●
Thailand	Thai Solar Renewable Company Limited	40%	No	●	◐	○	○	○	○	○	○
Thailand	Ratchaburi Power Company Limited	15%	No	●	◐	○	○	○	○	○	○
Thailand	Combined Heat and Power Producing Company Limited	100%	Yes	●	◐	●	●	●	●	●	●
Thailand	Global Power Synergy Public Company Limited	100%	Yes	●	●	●	●	●	●	●	●

Material issues	Thailand											Laos		Japan	USA	Hongkong
Subsidiaries & Associated companies	Global Power Synergy Public Company Limited	Combined Heat and Power Producing Company Limited	Ratchaburi Power Company Limited	Thai Solar Renewable Company Limited	Siam Solar Energy 1 Company Limited	Nava Nakorn Elecricity Generating Company Limited	IRPC Clean Power Company Limited	Bangpa-In Cogeneration Company Limited	Business Services Alliance Company Limited	Global Renewable Company Limited	Natee Synergy Company Limited	Xayaburi Power Co., Ltd.	Nam Lik 1 Power Company Limited	Ichinoseki Solar Power 1 GK Company	24M Technologies, Inc.	GPSC International Holdings Limited
Share holding	100%	100%	15%	40%	100%	30%	51%	25%	25%	100%	100%	25%	40%	99%	29.5%	100%
Operational control	Yes	Yes	No	No	Yes	No	Yes	No	No	Yes	Yes	No	No	Yse	No	Yes
Climate Change and Energy Management	Full	Full	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Not cover	X	Partial	Partial	Partial	N/A	X
Biodiversity	Full	X	N/A	N/A	Not cover	N/A	Not cover	N/A	N/A	Not cover	X	Not cover	N/A	Not cover	N/A	X
Social																
Occupational Health, Safety, and Well-Being	Full	Not cover	N/A	N/A	Not cover	N/A	Not cover	N/A	N/A	Not cover	X	Not cover	N/A	Not cover	N/A	X
Human Rights	Full	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial	Partial
Our Employees	Full	Not cover	N/A	N/A	Not cover	N/A	Not cover	N/A	N/A	Not cover	X	Not cover	N/A	Not cover	N/A	X
Sustainable Community	Full	Not cover	N/A	N/A	Not cover	N/A	Not cover	N/A	N/A	Not cover	X	Not cover	N/A	Not cover	N/A	X

Remark:

● = Cover Full Scope
◐ = Cover Partially of the Scope
● = Not cover the Scope
○ = Not applicable (due to less than 50% of shares and no operational control)
X = Not relevance

GRI Content Index

Global Reporting Initiative: Core Options

Disclosure	Global Reporting Initiative	Page	Detail/Omission	External Assurance
GRI 102: General Disclosures				
1. Organizational Profile				
102–1	Name of the Organization	Cover		
102–2	Activities, brands, products, and services	10		
102–3	Location of Headquarters	Back cover		
102–4	Location of operations	12		
102–5	Ownership and legal form	10		
102–6	Markets served	12		
102–7	Scale of the organization	12, 99, 100, 104		
102–8	Information on employees and other workers	104		
102–9	Supply Chain	13		
102–10	Significant changes to the organization and its supply chain	2, this page	No significant changes during the reporting period	
102–11	Precautionary Principles or approach	40–43		
102–12	External initiatives	14		
102–13	Membership of associations	13		
2. Strategy				
102–14	Statement form senior decision–maker	4–5		
102–15	Key impacts, risks, and opportunities	42, 69		
3. Ethics and Integrity				
102–16	Values, principles, standards, and norms of behavior	36–39		
102–17	Mechanisms for advice and concerns about ethics	37–38		✓
4. Governance				
102–18	Governance Structure	31	Annual report 2018	
102–19	Delegating authority	31		
102–20	Executive-level responsibility for economic, environmental, and social topics	21, 35		
102–21	Consulting stakeholders on economic, environmental, and social topics	20–21		
102–22	Composition of the highest governance body and its committees	32, This page	Annual Report 2018	
102–24	Nominating and selecting the highest governance body	32		
102–25	Conflicts of interest	40		

Disclosure	Global Reporting Initiative	Page	Detail/Omission	External Assurance
102-27	Collective knowledge of highest governance body	33		
102-28	Evaluating the highest governance body's performance	34		
102-29	Identifying and managing economic, environmental, and social impacts	20-21, 35		
102-30	Effectiveness of risk management processes	41		
102-32	Highest governance body's role in sustainability reporting	21		
102-35	Remuneration policies	This page	Annual Report 2018 and CG handbook	
102-38	Annual total compensation ratio	This page	Annual report 2018	
5. Stakeholder Engagement				
102-40	List of stakeholder groups	14-16		
102-41	Collective bargaining agreements	This page	GPSC did not have the trade union during the reporting period.	
102-42	Identifying and selecting stakeholders	14		
102-43	Approach to stakeholder engagement	15-16		
102-44	Key topics and concerns raised	15-16		
6. Reporting Practice				
102-45	Entities included in the consolidated financial statements	This page	Annual Report 2018: The boundary of the consolidated financial statements is included in GPSC and its subsidiaries.	
102-46	Defining report content and topic boundaries	2, 25-27		
102-47	List of material topics	25-27		
102-48	Restatements of information	This page	Sustainability Performance Data for energy consumption, water withdrawal by source and GHG emission are changed due to changes in calculation methodologies and scope of data.	
102-49	Changes in reporting	21		
102-50	Reporting period	2		
102-51	Date of most recent report	This page	GPSC Sustainability Report 2017	
102-52	Reporting cycle	2		
102-53	Contact point for questions regarding the report	2		

Disclosure	Global Reporting Initiative	Page	Detail/Omission	External Assurance
102–54	Claims of reporting in accordance with the GRI Standards	2		
102–55	GRI content Index	114–120		
102–56	External Assurance	123–124		
GRI 103: Management Approach				
103–1	Explanation of the Material Topic and its Boundary	30, 36, 40, 44, 48, 51, 56, 62, 68, 73, 78, 85, 88, 93		
103–2	The Management Approach and its Boundary	30–31, 36–37, 40, 44–45, 48–49, 51–52, 57, 62–63, 68, 74, 79, 86, 89, 93		
103–3	Evaluation of the Management Approach	31–35, 37–39, 41–43, 45–47, 49–50, 52–55, 57–60, 63–67, 69–72, 74–76, 80–84, 86–87, 89–92, 94–98		
GRI 201: Economic Performance				
201–1	Direct Economic value generated and distributed	98–99		
201–2	Financial Implications and other risks and opportunities due to climate change	42, 69		
201–4	Financial assistance received from government	This page	In 2018, GPSC did not receive any financial assistance from any government	
GRI 202: Market Presence				
202–1	Ratios of standard entry level wage by gender compared to local minimum wage	This page	Entry level wage of GPSC is higher than local minimum wage at significant locations of operation with an equal opportunity to employees regardless of gender.	
GRI 203: Indirect Economic Impacts				
203–1	Infrastructure investments and services supported	94		
203–2	Significant indirect economic impacts	94–98		
GRI 205: Anti–Corruption				
205–2	Communication and training about anti–corruption policies and procedures	38, 99		

Disclosure	Global Reporting Initiative	Page	Detail/Omission	External Assurance
205–3	Confirmed incidents of corruption and actions taken	38, 99		
GRI 206: Anti–Competitive Behavior				
206–1	Legal actions for anti–competitive behavior, anti–trust, and monopoly practices	38		
GRI 300: Environment				
GRI 302: Energy				
302–1	Energy Consumption within the organization	101		✓
302–3	Energy Intensity	101		
302–4	Reduction of Energy Consumption	73		
GRI 303: Water				
303–1	Water withdrawal by source	65, 101		✓
303–2	Water sources significantly affected by with-drawal of water	65, This page	There was no water resource significantly affected by the company water withdrawal in 2018.	
303–3	Water recycled and reused	65, 101		
GRI 304: Biodiversity				
304–2	Significant impacts of activities, products, and services on biodiversity	74–75		
GRI 305: Emissions				
305–1	Direct (Scope 1) GHG emissions	101		✓
305–2	Energy Indirect (Scope 2) GHG emissions	101		✓
305–3	Other indirect (Scope 3) GHG emissions	101		
305–4	GHG Emissions Intensity	71, 101		✓
305–5	Reduction of GHG Emissions	71, 101		
305–7	Nitrogen oxides (NO_X), sulfur oxides (SO_X), and other significant air emissions	102		✓
GRI 306: Effluents and Waste				
306–1	Water Discharge by Quality and Destination	65		
306–2	Waste by type and disposal methods	64, 102		✓
GRI 307: Environmental Compliance				
307–1	Non–compliance with environmental laws and regulations	66, 102		
GRI 308: Supplier Environmental Assessment				
308–1	New Suppliers that were screened using environmental criteria	50		
308–2	Negative environmental impacts in the supply chain and actions taken	49		

Disclosure	Global Reporting Initiative	Page	Detail/Omission	External Assurance
GRI 400: Social				
GRI 401: Employment				
401–1	New Employee hires and employee turnover	83, 106		
401–2	Benefits provided to full–time employees that are not provided to temporary or part–time employees	On website	www.gpscgroup.com/th /sustainability/social/our–employees	
401–3	Parental Leave	107		
GRI 402: Labor/Management Relations				
402–1	Minimum notice periods regarding operational changes	This page	Comply with local laws and regulations	
GRI 403: Occupational Health and Safety				
403–1	Workers representation in formal joint management–worker health and safety committees	108–109		
403–2	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	90–91, 109–110	Not applicable for GPSC to breakdown such data into region and gender due to region and gender equity in Thailand on occupational health and safety.	✓
GRI 404: Training and Education				
404–1	Average hours of training per year per employee	107		
404–2	Programs for upgrading employee skills and transition assistance programs	79–84		
404–3	Percentage of employees receiving regular performance and career development reviews	107–108		
GRI 405: Diversity and Equal Opportunity				
405–1	Diversity of governance bodies and employees	32, 84, 104–107		
GRI 406: Non–Discrimination				
406–1	Incidents of Discrimination and corrective actions taken	85–87		
GRI 407: Freedom of Association and Collective Bargaining				
407–1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	49	No case of employee dismissal or obstruction against the assembling of employees for negotiation purpose in 2018	
GRI 408: Child Labor				
408–1	Operations and suppliers at significant risk for incidents of child labor	49		

Disclosure	Global Reporting Initiative	Page	Detail/Omission	External Assurance
GRI 409: Forced or Compulsory Labor				
409–1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	49		
GRI 411: Rights of Indigenous Peoples				
411–1	Incidents of violations involving rights of indigenous peoples	87		
GRI 412: Human Rights Assessment				
412–1	Operations that have been subject to human rights reviews or impact assessments	85, 87		
412–2	Employee training on human rights policies or procedures	87		
GRI 413: Local Communities				
413–1	Operations with local community engagement, impact assessments, and development programs	75		
413–2	Operations with Significant actual and potential negative impacts on local communities	75		
GRI 414: Supplier Social Assessment				
414–1	New Suppliers that were screened using social criteria	50		
414–2	Negative social impacts in the supply chain and actions taken	49		
GRI 415: Public Policy				
415–1	Political contributions	This page	GPSC did not support any in-kind both direct and non-direct political contribution during the reporting period.	
GRI 419: Socioeconomic Compliance				
419–1	Non-compliance with laws and regulations in the social and economic area	This page	No significant fine and non-monetary sanction for non-compliance with environmental, social and economic law and regulations in 2018.	
G4 Sector Disclosure: Electric Utilities				
EU1	Installed capacity, broken down by primary energy source and by regulatory regime	10, 12, 100		
EU2	Net energy output broken down by primary energy sources and by regulatory regime	100		

Disclosure	Global Reporting Initiative	Page	Detail/Omission	External Assurance
EU10	Planned capacity against projected electricity demand over the long term, broken down by energy source and regulatory regime	100		
EU11	Average generation efficiency of thermal plants by energy source and regulatory regime	100		✓
EU15	Percentage of employees eligible to retire in the next 5 and 10 years broken down by job category and by region	108		
EU17	Days worked by contractor and subcontractor employees involved in construction, operation & maintenance activities	110		
EU18	Percentage of contractor and subcontractor employees that have undergone relevant health and safety training	110		
EU22	Number of people physically and economically displaced and compensation, broken down by type of project	103		
EU25	Number of injuries and fatalities to the public involving company assets, including legal judgements, settlements and pending legal cases of diseases	111		
EU28	Power outage frequency	100		
EU29	Average power outage duration	100		
EU30	Average plant availability factor by energy source and by regulatory regime	51, 54, 100		✓

THE PRINCIPLES OF UNITED NATIONS GLOBAL COMPACT (UNGC) PROGRESS STATUS

UNGC Principle	Progress	Information is available at
Human Rights		
1. Businesses should support and respect the protection of internationally proclaimed human rights.	• Supporting human rights principles on employees and management • Announcement of human rights policy • Human Rights Due Diligence	p. 85 - 87
2. Make sure that they are not complicit in human rights abuses.	• Establishing Human Rights Management System that includes Due Diligence Process on Human Rights • Setting a variety of communication channels for human rights grievances	p. 85 - 87
Labour		
3. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.	• Open communication for employee's opinions • Did not interfere employees on participating labor association or meeting • Established welfare committee that consists of representative employees from various divisions	p. 78 - 84 and http://www.gpscgroup.com/th/sustainability/social/our-employees
4. The elimination of all forms of forced and compulsory labor.	• Human resource management that covers human rights aspects • Communication of policy and standards related to forced and compulsory labor to suppliers and contractors for using as a guidance	p. 48 - 50 and 78 - 84
5. The effective abolition of child labor	• Human resource management that covers human rights aspects on child labor issues • Communication of policy and standards related to child labor to related suppliers and contractors	p. 48 - 50 and 78 - 84
6. The elimination of discrimination in respect of employment and occupation.	• Equity in employment and occupation.	p. 78 - 84
Environment		
7. Businesses should support a precautionary approach to environmental challenges.	• Announcement and implementation of Quality, Security, Safety, Health and Environmental Policy (QSHE Policy) • Environmental protection and mitigation controls that align with Environmental Impact Assessment (EIA) report	p. 62 - 67

UNGC Principle	Progress	Information is available at
	• Environmental performance audit by external party and verified for compliance with international standard (ISO 14001)	
8. Undertake initiatives to promote greater environmental responsibility	• Improving and monitoring air quality project • Continuous program on monitoring water discharge quality • Building environmental management culture	p. 62 - 67 and 73 - 76
9. Encourage the development and diffusion of environmentally friendly technologies	• Improving efficiency of electricity and steam production by following the eco-efficiency principle	p. 51 - 55 and 62 - 67
Anti-Corruption		
10. Businesses should work against corruption in all its forms, including extortion and bribery	• Announcement of Anti-Corruption Policy • Established anti-corruption grievance channels • Risk assessment on anti-corruption	p. 36 - 39 and http://www.gpscgroup.com/ th/cg/policy

Assurance Statement

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Independent limited assurance report

To the Directors of Global Power Synergy Public Company Limited ("GPSC")

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 2018 (the "Report") for the year ended 31 December 2018, are not, in all material respects, prepared in compliance with the reporting criteria (the "Criteria").

Our Responsibilities

We have been engaged by GPSC and are responsible for providing a limited assurance conclusion in respect of the Subject Matters for the year ended 31 December 2018 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.* 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 2018:

- GRI 102-17 Mechanisms for advice and concerns about ethics
- GRI 302-1 Energy consumption within organization
- GRI 303-1 Total water withdrawal by source
- GRI 305-1 Direct (Scope 1) GHG emissions
- GRI 305-2 Energy indirect (Scope 2) GHG emissions
- GRI 305-4 GHG intensity
- GRI 305-7 Nitrogen Oxide (NOx), Sulfur Oxide (SOx), and other significant air emissions
- GRI 306-2 Waste by type and disposal method
- GRI 403-2 Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities
- EUSD - EU11 Average generation efficiency of thermal plants by energy source and by regulatory regime
- EUSD - EU30 Average plant availability factor by energy source and by regulatory regime

Criteria

The Subject Matters were assessed according to the following criteria:

- The Sustainability Reporting Standards of the Global Reporting Initiative ("GRI Standards"); and
- The Electric Utilities Sector Disclosures ("EUSD").

Directors' and management's responsibilities

The directors and management of GPSC 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 to 1 sites; CUP-2 sites, 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 GPSC, for any purpose or in any other context. Any party other than GPSC 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 GPSC for our work, for this independent limited assurance report, or for the conclusions we have reached.

KPMG Phoomchai Audit Ltd.

KPMG Phoomchai Audit Ltd.

Bangkok

8 March 2019

SURVEY OF READER OPINIONS

Your views and suggestions after reading the Sustainability Report 2018
will be incorporated to improve our business performances and future Sustainability Report
Global Power Synergy Public Company Limited (GPSC) appreciates your valuable feedbacks.

1. **Please fill in the basic information.**

   Gender   ◯ Female   ◯ Male   ◯ Unspecified

2. **Which of the following stakeholder groups applied to you?**

   ◯ Financial Institutions, Investors & Shareholders   ◯ Government Agencies

   ◯ Employees   ◯ Partners Suppliers & Contractors

   ◯ Customers   ◯ Society & Communities

   ◯ Other (Please specified_____)

3. **How did you find out about GPSC's Sustainability Report?**

   ◯ GPSC's Website   ◯ Seminar / Lecture / Exhibition

   ◯ GPSC's Employees   ◯ Other Websites

   ◯ Newspaper / Magazine   ◯ Other (Please specified_____)

4. **What is the reason for your interest in GPSC's Sustainability Report?**

   ◯ To obtain investment information   ◯ In purpose of research and education

   ◯ To understand GPSC   ◯ To obtain specific information (Please explain_____)

   ◯ To prepare a sustainability report of your company (or Corporate Social Responsibility Report)

   ◯ Other (Please explain_____)

5. **Please rate your satisfaction in the presentation of GPSC's Sustainability Report 2018**

Completeness of the report	◯ High	◯ Medium	◯ Low	◯ Dissatisfied
Relevance of issues presented in the report	◯ High	◯ Medium	◯ Low	◯ Dissatisfied
Interesting content	◯ High	◯ Medium	◯ Low	◯ Dissatisfied
Easy to understand	◯ High	◯ Medium	◯ Low	◯ Dissatisfied
Report design	◯ High	◯ Medium	◯ Low	◯ Dissatisfied
Overall satisfaction of the report	◯ High	◯ Medium	◯ Low	◯ Dissatisfied

6. **Which chapter of the sustainability report 2018 do you find most interesting? (Please explain)**

   _____

7. **Which chapter of the sustainability report 2018 do you find least interesting? (Please explain)**

   _____

8. **Does this report include all material issues for the sustainability of GPSC?**

   ◯ Yes, it does.   ◯ No, it does not.

   If not, please specify which issues should be added to?

   _____

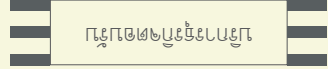9. **After reading this report, do you recognize the commitment of GPSC in sustainability? (Please explain)**

   _____

10. **Additional suggestions for the future sustainability report.**
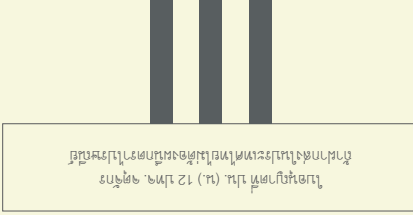
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GPSC