

# SMART ENERGY *FOR* EVOLVING LIFE

Sustainability Award  
Bronze Class 2022

S&P Global







### **Vision:**

The global leading innovative and sustainable power company



### **Aspiration:**

To be top 3 power company in Southeast Asia with more than half of MW from green portfolio



### **Mission:**

To be a PTT GROUP power and smart energy flagship that innovatively pursue operational excellence to create value for stakeholders by delivering reliable products to customers with responsibility for the planet





# ROADMAP TO NET ZERO EMISSIONS

## KEY 4 PILLARS

REDUCE FOSSIL  
USAGE



GROW  
RENEWABLES



ENHANCE  
INFRASTRUCTURE



TRADING/OFFSET  
ACTIVITY



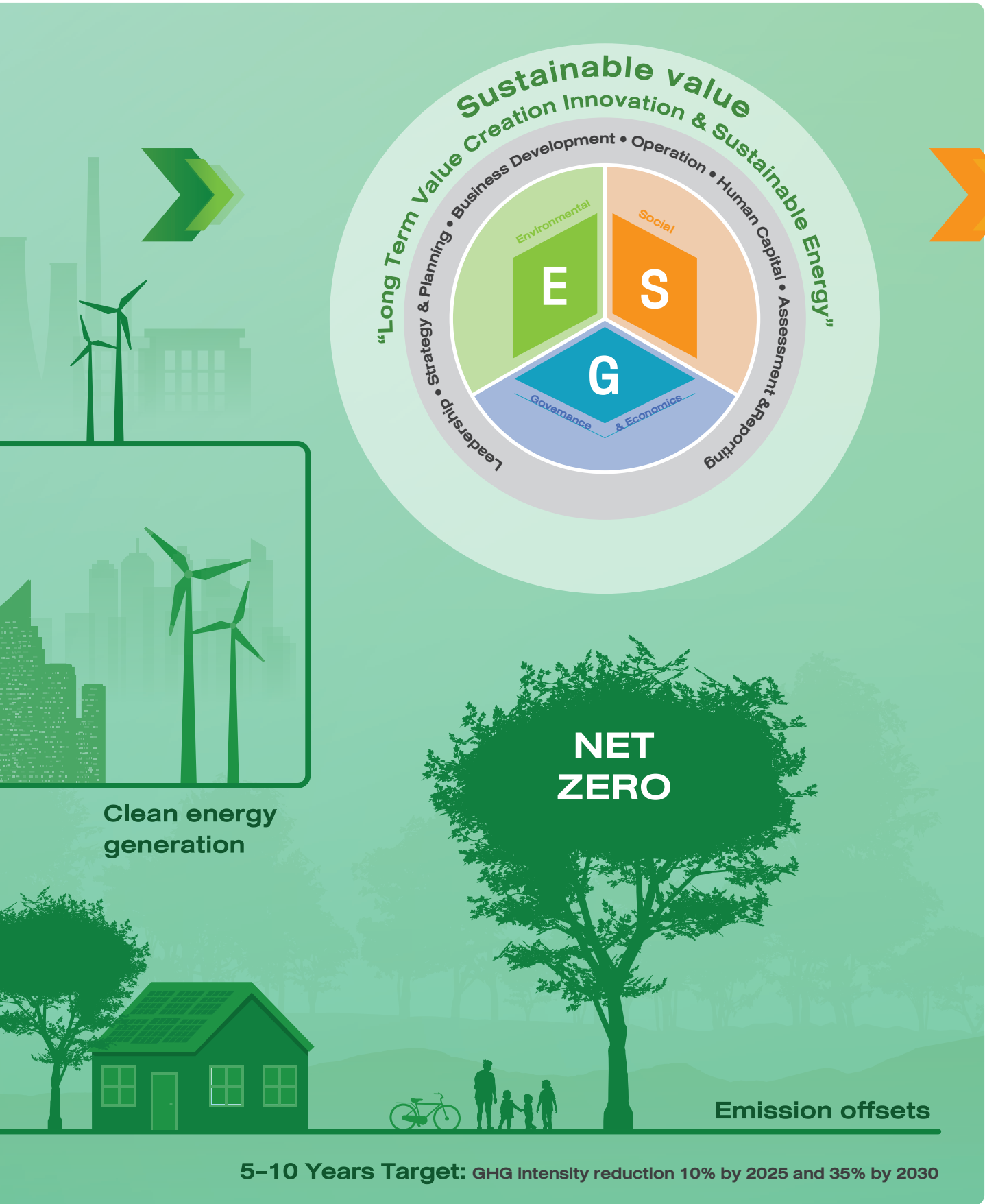
## TARGET

Net Zero Missions



Efficiency





# ABOUT THIS REPORT

GRI 102-49, 102-50, 102-51, 102-52, 102-53, 102-54

In preparing its annual sustainability report, Global Power Synergy Plc (GPSC) strives to disclose its economic, social, and environmental performance and illustrate how its operations have taken into account sustainable development of issues considered critical to business and all stakeholders. This ISR embraces GPSC Group, meaning companies where GPSC holds 75% or more shares or is a strategic owner.\* Data collection has now included Combined Heat and Power Producing Co., Ltd. (CHPP) and GHECO-ONE. Since 2019, GPSC has modified the report under the Integrated Sustainability Report (IR) approach of the International Integrated Reporting Council (IIRC) in parallel with its selection of materiality assessment and disclosure management and performance data in line with the Global Reporting Initiative (GRI Standards) at the Core Option level. This report incorporates additional indicators (Electric Utilities Sector Disclosures), regarded as an internationally accepted approach. In addition, GPSC has set a goal and reported performance aligning with UN Sustainable Development Goals (SDGs). It also discloses financial data related to climate, as recommended by the Taskforce on Climate-related Financial Disclosure (TCFD).

This ISR has been partly reproduced on the company website. For greater credibility, accuracy, and alignment with the GRI Standards, this report has undergone verification for limited data assurance for this publication and the website contents by SGS (Thailand) Co., Ltd. Additional information appears on pages 65-67 This is the fifth year of third-party certification. GPSC intends to keep up this practice.

Determined to keep improving the quality of its sustainability reports and hoping to upgrade the quality of information disclosure, GPSC welcomes advice so that it may integrate it with the process to promote sustainable development in conjunction with all stakeholders. Below are our contact channels.

\* Remarks:

The scope of this report is detailed on pages 60–61







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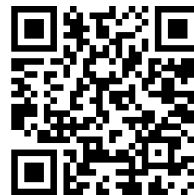
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**Materiality  
Assessment**



**Performance  
Data**



**Stakeholder  
Engagement**



**Online Reader  
Survey**



**GRI Content  
Index**





# MESSAGE FROM THE PRESIDENT & CHIEF EXECUTIVE OFFICER

GRI 102-14, 102-20



**Mr. Worawat Pitayasiri**

President and Chief Executive Officer

In 2021 the world continued to be haunted by the COVID-19 pandemic, posing grave challenges to its management with continuing impacts on lives and businesses. Starker impacts of climate change were reported during the year at the COP26 meeting of the associates of the United Nations on Climate Change to forge cooperation while driving countries (Thailand included) to take a stride toward Net Zero emissions. This move accommodated trends of customers desiring to change their behavior and energy consumption patterns, turning to renewable energy for decarbonization, decentralization, digitalization, and convergence. These issues will inevitably affect the power generation business.

Global Power Synergy Plc (GPSC) is fully aware of these situations and trends. We closely monitor and brace ourselves for such impacts to give ourselves

more resilience. We also remain committed to transparent business operations in parallel with sustainable development and supporting Sustainable Development Goals (SDGs). This year we revised long-term strategies to cope with future change while speeding up our move toward a global leading innovative and sustainable power company. To this end, our 4S Strategies consist of S1: Strengthen and Expand the Core (with emphasis on improvement of generation efficiency together with reliability), S2: Scale-up Green Energy (including solar energy and wind power worldwide), S3: S-curve & Batteries (with emphasis on energy storage systems (ESSs) and batteries), and S4: Shift to Customer-Centric Solutions (blending smart-energy innovations for optimized energy management to accommodate future energy transition for consumers).

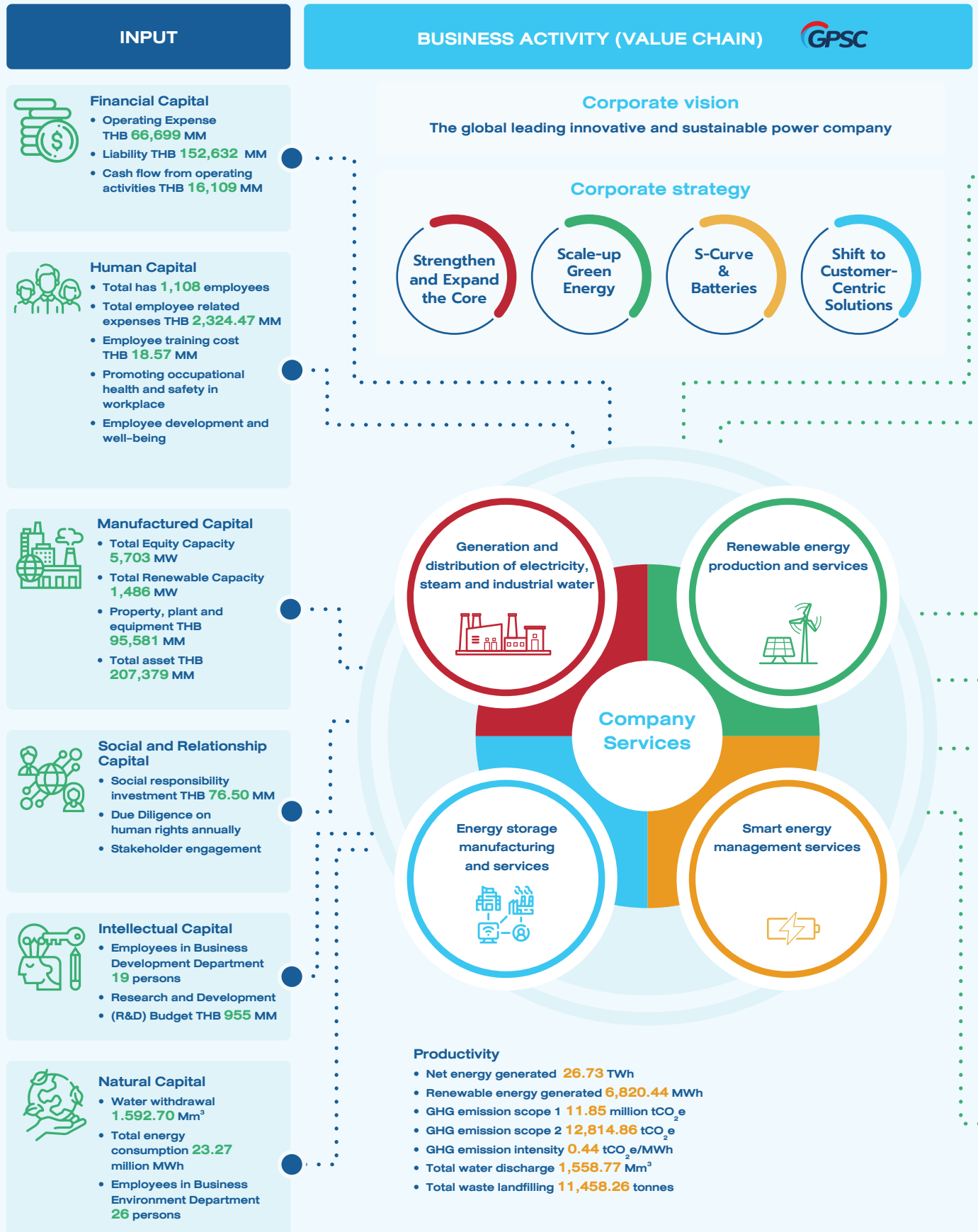
Future challenges are on our mind: capacity-building for business competition in ESSs, energy management services, achievement of the goal to raise the renewables power proportion to 8 GW by 2030, and aiming to achieve Net Zero Emissions by 2060. More important, we value our employees, who represent our main resources for driving our ongoing businesses by advocating equality and non-discrimination. At the same time, we remain true to our commitment to communities and society by this year focusing on developing social innovations to ease the plight of stakeholders reeling from the COVID-19 crisis. We also support energy access for remote areas, promote community hiring and income generation, and create business shared values with all stakeholders.

Our commitment to the environment, society, and governance (ESG) in business engagement has underlined our goal achievement as well as fostering stakeholders' trust worldwide:

- In terms of operating results, GPSC's operating revenue is 74,874 million baht, an increase of 8% compared to 2020
- Proportion of renewables power worldwide improvement to 37% of our total capacity, or 2,635 megawatts in increment
- The Company received the S&P Global Sustainability Award at the Bronze Class level in the Electric Utilities Industry. The Company was selected to be in the Sustainability Yearbook 2022 for the second consecutive year according to S&P Global's assessment of participation in the Dow Jones Sustainability Indices (DJSI) assessment
- Participation in the Carbon Disclosure Project (CDP), an internationally standardized and credible institute rating organizational climate change management. For the third consecutive year, GPSC maintained its carbon emission rating at the Management Level (B).
- SET Awards 2021: Rising Star Sustainability Award along with Thailand Sustainability Investment (THSI), attested by SET, for the fourth successive year.
- The Low Carbon and Sustainable Business Index (LCSi) award at the Outstanding Level, attested by the Thailand Greenhouse Gas Management Organization (Public Organization), for the second consecutive year.
- 5-Star (Excellent) rating by the Corporate Governance Report of Thai Listed Companies (CGR) for the sixth straight year, a testament to GPSC's corporate governance capability.

On behalf of GPSC, I therefore sincerely thank the shareholders, customers, business partners, and all stakeholders for their consistently excellent support and trust. GPSC will devote its full energy under the sustainable development framework while moving ahead with communities and stakeholders for long-term business growth as well as remaining dedicated to our balanced benefit and international acceptance.

# VALUE CREATION THROUGH THE BUSINESS MODEL 2021





## OUTCOME

### To GPSC

### To stakeholders

### IMPACT ON STAKEHOLDER GROUP

### CONTRIBUTION TO SDGs

### MATERIAL ISSUES



- Total Revenue THB **78,148 MM**
- Earnings Before Interest/Tax/ Depreciation (EBITDA) THB **17,724 MM**
- Net Profit THB **7,841 MM**

- Total shareholder return **6.93%**
- Earnings per share THB **2.60**
- Dividend per share THB **1.50**



- Governance, Risk management, and Compliance
- Maintaining Reliability and Availability



- Employee turnover rate **3.16%**
- Key Positions in Succession Planning **100%**
- Employee engagement **71%**
- Zero Lost Time Injury Frequency Rate (LTIFR) per **1** million man-hours

- Average hours of training **27.94** hours/person
- Return on Employee Development Investment **1.61%**
- **159** training courses for employees



- OHS,
- Workforce Development and Well-Being
- Human Rights



- Other non-current asset THB **3,041.10 MM**
- Direct and indirect cost saving THB **1,453.7 MM**

- Industrial Customer Availability **99.99%**
- Annual forced outage time **15,558** hours



- Maintaining Reliability and Availability



- Community satisfaction **75%**
- Customer satisfaction **91%**
- **12** corporate social responsibility (CSR) projects evaluated by Social Return on Investment (SROI)

- No human rights violation complaint
- Tax paid THB **369.16 MM**
- Install and deliver solar power and energy storage systems from the Light for a Better Life project, which can reduce total GHG emissions of **77,104.71 tCO<sub>2</sub>e/year**
- Generate income for communities in the area from the Zero Waste Village project of over **100,000** baht.



- Customer Relationship Management
- Supply Chain Management
- Sustainable Community



- Revenue from collaborations of Open Innovation THB **14.02 MM**
- The successful production of the first cell battery
- The successful construction of Southeast Asia's first G-Cell Energy Storage Plant with SemiSolid technology

- Open Innovation **10** projects
- Collaborate with external agencies to research and develop innovations in energy and environment for sustainable communities



- Evolving The Business Model



- Fuel saved **4.20** MMBTU
- Energy saved **1.23** million MWh
- No fine from environmental violation

- Reduce landfill waste by **0.20** million tonnes
- Reduce GHG emissions from Thailand Voluntary Emission Reduction Program (T-VER) by **581,930 tCO<sub>2</sub>e**
- GHG reduction from using renewable energy by **215.30 tCO<sub>2</sub>e**
- Water withdrawal reduction **18.46%**



- Environmental Management, A Clean Energy Future and Climate Resilience

• Increase from the previous year • Decrease from the previous year • Beginning of monitoring this year

# BUSINESS STRATEGY AND CORPORATE OUTLOOK

GRI 102-14, 102-20


The 10-year corporate business strategy beginning in 2021 and ending in 2030 was formulated to cope with the energy industry shift toward clean energy, constructed on four major pillars: S1: Strengthen and Expand the Core, S2: Scale-up Green Energy, S3: S-curve & Batteries, and S4: Shift to Customer-Centric Solutions. The focus areas are domestic Thailand and the 2nd home country group including India, Vietnam, and Taiwan. The strategy demands simultaneous development in six enablers including (1) partnership, (2) financial discipline, (3) technology & digitalization, (4) sustainability, (5) agile & resilient organization, and (6) operational excellence. These enablers are key success factors driving toward sustainable business growth collectively with environmental care and responsibility to stakeholders, positioning GPSC to become the true power generation leader in Southeast Asia.



## S1

### STRENGTHEN AND EXPAND THE CORE


Promote and develop the Company's core business with the aim of creating maximum satisfaction for shareholders. Accessing customer needs and building confidence through Operational Excellence principles to develop and maintain a level of security, stability, profitability at the international level (through continuous talent development), management standards system, and the application of digital technology to help drive and enhance operations in various fields as well as expanding to other nearby businesses both at domestic and internationally

Key Success Indicators	2021 Performance	Long-term targets (2030)	Additional Details
• <b>Realized synergy value</b>	✓	• <b>EBITDA ≥ 1,6000 millian baht</b>	Page 52 Please scan 
• <b>SAIFI</b>	✗	• <b>≤0.10</b>	
• <b>TRIR</b>	✗	• <b>0.00</b>	

## S2

### SCALE-UP GREEN ENERGY


Increasing the proportion of clean energy project development both from solar power and wind power while integrating renewable energy with energy storage system (ESS), focusing on the target country (India, Vietnam, Taiwan) and committed to reducing Carbon Intensity to expand the company's growth. In parallel to the reduction of carbon dioxide emissions

• <b>Additional MW growth</b>	✓	• <b>Increase electricity production with renewable energy by stake at approximately 8,000 MW</b>	Page 26 Please scan 
		• <b>Reduce the intensity of greenhouse gas emissions by 35 percent</b>	
		• <b>Increase the proportion of renewable energy to more than 50 percent</b>	

## S3

### S-CURVE & BATTERIES


Investing in innovation to generate revenue from the battery business and New S-curve to support the changes in energy and electricity business in the future. It aims to become a leader in the production of energy storage systems, batteries for electric vehicles, and service providers related to batteries within Thailand and other regions like India. In addition to batteries, other new S-curve businesses that the company may place more emphasis on in the future include digital energy businesses, Hydrogen Energy Business, and Carbon Capture, Utilization, and Storage

• <b>Battery production</b>	✗	• <b>Battery Gigawatt-hour scale in Thailand</b>	Page 35 Please scan 
• <b>Application using G-Cell for pilot test</b>	✓	• <b>International Battery OEM</b>	

## S4

### SHIFT TO CUSTOMER-CENTRIC SOLUTIONS

Moving towards the Energy Management System business, the Company aims to develop businesses related to power systems and energy management for commercial entrepreneurs and customers in industrial estates such as Building Energy Management, Energy Storage System, District Cooling, as well as electricity trading through the Energy Trading Platform to meet the demand of electricity users in both industrial and household sectors effectively and respond to the future energy trends

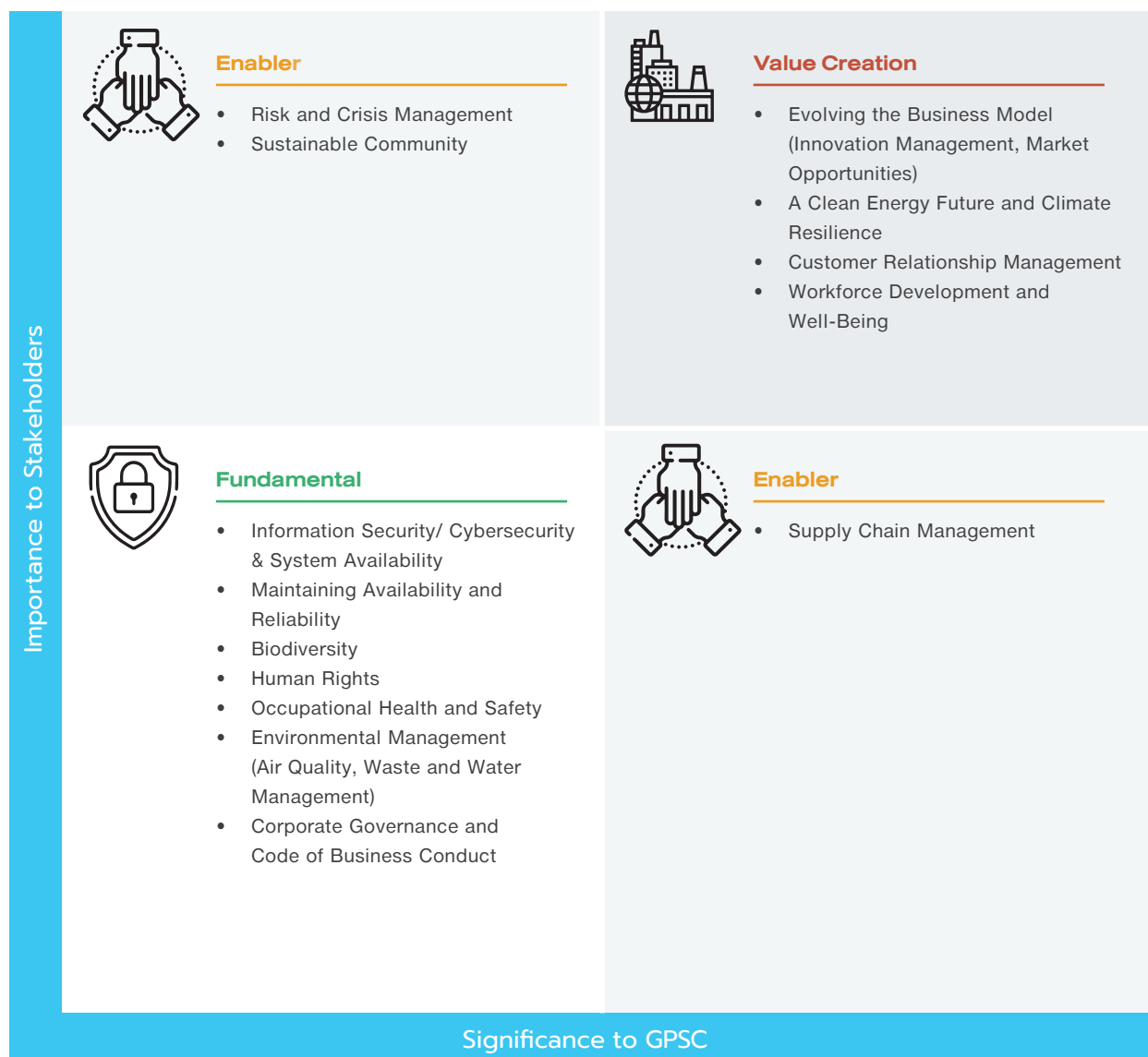
• <b>Determine the operational direction through affiliated companies to use as a key strategy to grow as an Energy Management Solution Provider</b>	N/A	• <b>Subsidiary's income increased by more than 5,000 million baht from being an Energy Management Solution Provider in 2030</b>	Page 44 Please scan 
• <b>Promote collaboration with business partners</b>			



# MATERIALITY ASSESSMENT 2021

GRI 102-46, 102-47

In conducting this year's materiality assessment, we found a change in external factors and the valuing of sustainability for creating long-term value for stakeholders and the business itself: the COVID-19 pandemic, technological transformation, digital transformation, data security, climate change, and various environmental problems. These led to awareness of the impacts of pollution and degraded environment, thus persuading people to pay more attention to clean energy. As a result, GPSC's materiality assessment featured new entries and modification from last year.



Remarks:

- **Value Creation** Value-adding and high-risk issues, seen as the most important issues to create value for GPSC's stakeholders or business (economic, environmental, and social) with maximum impacts; create long-term values; or cause risks to GPSC's stakeholders or business:
  - Value-adding issues: healthy business profits, business growth
  - High-risk issues: cost-intensiveness, severe business losses, etc.
- **Enabler** Value-adding issues and issues promoting risk management, namely issues seen as promoting value creation for GPSC's stakeholders and business
- **Fundamental** Issues needing management actions required by laws, standards, or general guidelines, seen as basic to GPSC's business

## GPSC's Materiality Assessment 2021: Value Creation

SCOPE OF ESG RISKS AND OPPORTUNITIES	CAPITAL VALUE	GLOBAL REPORTING INITIATIVE: GRI	RELATED STAKEHOLDER	CONSISTENCY WITH THE SUSTAINABLE DEVELOPMENT GOALS (SDGs)
<b>EVOLVING THE BUSINESS MODEL</b>				
<ul style="list-style-type: none"> <li>Research and Innovation Development</li> <li>Distributed Generation</li> <li>Market Opportunities</li> </ul>	Financial, Intellectual	<ul style="list-style-type: none"> <li>Management Approach (103-1, 103-2, 103-3)</li> </ul>	<ul style="list-style-type: none"> <li>Shareholders</li> <li>Investors</li> <li>Partners</li> <li>Government Agencies and Related Organizations</li> <li>Employee</li> <li>Suppliers and Contractors</li> <li>Customers</li> <li>Community and Society</li> </ul>	 
<b>A CLEAN ENERGY FUTURE AND CLIMATE RESILIENCE</b>				
<ul style="list-style-type: none"> <li>Decarbonization</li> <li>Energy Production from Renewable Energy</li> <li>Reducing Greenhouse Gas Emissions</li> <li>Climate Change Risks and Opportunities</li> <li>Internal Carbon Pricing</li> </ul>	Natural, Manufactured	<ul style="list-style-type: none"> <li>Management Approach (103-1, 103-2, 103-3)</li> <li>Energy (302-1, 302-2, 302-3, 302-4)</li> <li>Emission (305-1, 305-2, 305-3, 305-4, 305-7)</li> </ul>	<ul style="list-style-type: none"> <li>Shareholders</li> <li>Investors</li> <li>Partners</li> <li>Government Agencies and Related Organizations</li> <li>Employee</li> <li>Suppliers and Contractors</li> <li>Customers</li> <li>Community and Society</li> </ul>	  
<b>CUSTOMER RELATIONSHIP MANAGEMENT</b>				
<ul style="list-style-type: none"> <li>Customer Satisfaction</li> <li>Customer Relationship Management</li> <li>Customer Data Privacy Protection</li> </ul>	Social and Relationship	<ul style="list-style-type: none"> <li>Management Approach (103-1, 103-2, 103-3)</li> </ul>	<ul style="list-style-type: none"> <li>Employee</li> <li>Customer</li> </ul>	 
<b>WORKFORCE DEVELOPMENT AND WELL-BEING</b>				
<ul style="list-style-type: none"> <li>Capacity Development</li> <li>Career Development and Succession</li> <li>Diversity and Equal Opportunity</li> <li>Employee Well-Being</li> <li>Benefits and Compensation</li> </ul>	Human	<ul style="list-style-type: none"> <li>GRI Standards</li> </ul>	<ul style="list-style-type: none"> <li>Government Agencies and Related Organizations</li> <li>Employee</li> </ul>	   
<b>COMMUNICATION &amp; CREDIBILITY</b>				
Targets, management approaches and performance of companies in which GPSC owns 75% or more of shares or has controlling power over its operations (Strategic Owner)	–	<ul style="list-style-type: none"> <li>GRI Standards</li> </ul>	<ul style="list-style-type: none"> <li>Shareholders</li> <li>Investors</li> <li>Partners</li> <li>Government Agencies and Related Organizations</li> <li>Employee</li> <li>Suppliers and Contractors</li> <li>Customers</li> <li>Community and Society</li> </ul>	

Follow  
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the Materiality  
Assessment at



# BUSINESS RESILIENCE AND COVID-19

## Measures for coping and adaptation during a crisis

The COVID-19 pandemic has affected all sectors' business operations since the beginning of 2020 and has persisted since then. Recognizing its impacts on the business, GPSC has closely monitored the situation and adjusted its business approach to remain prepared and respond to any potential incidents. It focused on two goals to urgently establish infection prevention measures and guidelines to ensure all employees' safety and to stay committed to the power generation and utility production to serve customers' needs. It formulated various measures, regulations and guidelines as well as providing COVID-19 prevention equipment, essential academic information and COVID-19 vaccines for employees, their families and stakeholders. Moreover, GPSC regularly communicated with internal and external stakeholders to foster confidence.



## Employee protection

Amid the pandemic, GPSC has established a dedicated COVID-19 surveillance and prevention taskforce to most effectively manage, prevent, control, and monitor outbreaks. It also defined measures and provided essential resources to prevent transmission while ensuring employees' safety and gaining their reassurance.

- Established a communication center on operational guidelines to mitigate COVID-19 impacts. Its communication channels, such as LINE Official, E-mail and Hotline, accurately provided key information, measures, guidelines and news to help employees closely monitor the situation.

- Provided essential academic information on COVID-19, such as by organizing online sessions with physicians as speakers on several topics, such as “How to Stay Safe” and “Necessity of Vaccination and Self-Preparation”, to educate staff on how to take care of themselves or ease their concerns about vaccination.
- Stipulated work-from-home measures, overseas travel measures, screening measures before entering the company premises, sanitizing measures and measures for conducting oneself in the office under universal prevention guidelines.
- Offered COVID-19 prevention supplies and vaccines to employees, their families and stakeholders to ensure everyone's quick access to vaccines.

Additionally, GPSC stipulated stricter measures commensurate with the pandemic's severity. It shifted to complete work from homes to lower the risk of infection and provided all employees with COVID-19 insurance.

Furthermore, the Company values employees' mental health. Because the COVID-19 situation especially made people feel stressed, exhausted and discouraged, GPSC provided phone or video call consultation services by psychologists around the clock.



### Business protection

GPSC reviewed and prepared a business continuity plan (BCP) in response to the pandemic. It prepared a contingency plan if employees were infected and the incident affected business operations, such as a plan to contact customers in an emergency, a production plan if employees were infected, and internal and external communication during crises. GPSC has implemented various measures as follows:

- Set up a dedicated taskforce selected from operators of each power plant to supervise compliance with special control measures, such as ATK screening before daily shifts, shuttle arrangement and operational area control. These efforts aimed to prevent viral transmission and ensure continued production.
- Prepared a BCP for operators to prevent and cope with COVID-19 if 10% - 100% of employees were infected (Bubble and Seal).
- Designated production areas as special control areas by strictly prohibiting unauthorized persons from entering them.
- For cleaning and hygiene, regularly sanitized process rooms and disinfected risk areas.

Moreover, GPSC communicated operational information and related measures to all business partners. It assigned a team responsible for monitoring partners' situations and assessing the risks and impacts on both parties, such as partners' status, delivery rescheduling and adjustment of operational plans. Furthermore, GPSC held meetings to follow up on maintenance plans and warehouses to track procurement progress and ensure on-time delivery as planned. It also coordinated with partners. In the past, the procurement process has not been affected by COVID-19.

Regarding customer treatment, GPSC notified customers of the COVID-19 prevention measures that might affect its operations, such as employees' access restriction and the modified way of work geared toward technologies in communication. It helped increase operational efficiency, convenience and speed. GPSC has maintained the product delivery quality, and production for customers remained highly reliable.







#### Support and assistance for society

GPSC remained committed to supporting and taking care of communities and society by taking part in relieving people's suffering from the COVID-19 outbreak. It has been helping communities both inside and outside operation areas since November 2019 under the project called "GPSC Ruam Jai, Ruam Thai, Chuai Chat", aligned with the government's approach to strengthening the grassroots economy. The activity was divided into four main formats:

1. Cash donation to COVID-19 patients
2. Donation of medical supplies and devices as well as needed items, such as masks, Personal Protective Equipment (PPE), garbage bags and septic waste bins, to support public health agencies and communities affected by COVID-19
3. Innovation promotion to mitigate COVID-19 transmission, for instance, providing community isolation centers with G-Robots to deliver food and medical supplies to patients. These robots eased the workloads of medical personnel and lowered the risk of infection. Furthermore, GPSC collaborated with Nanotec (a government agency) in producing N-Breeze M03 masks made from special fiber filters. It delivered them to hospitals and medical personnel to prevent the spread.
4. Implementation of projects or activities to remedy those affected by COVID-19, such as online instruction for solar cell installation and training sessions to develop cooking skills for small businesses.

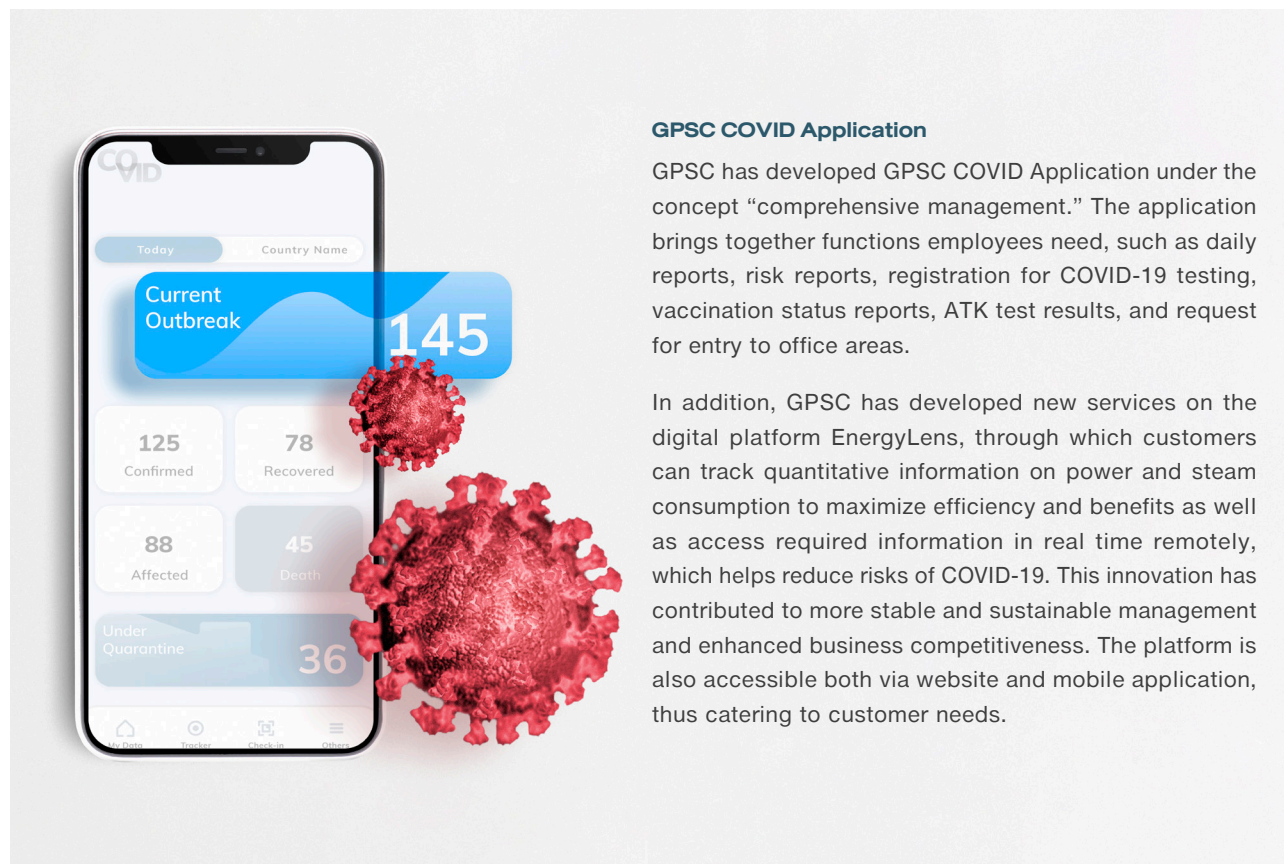
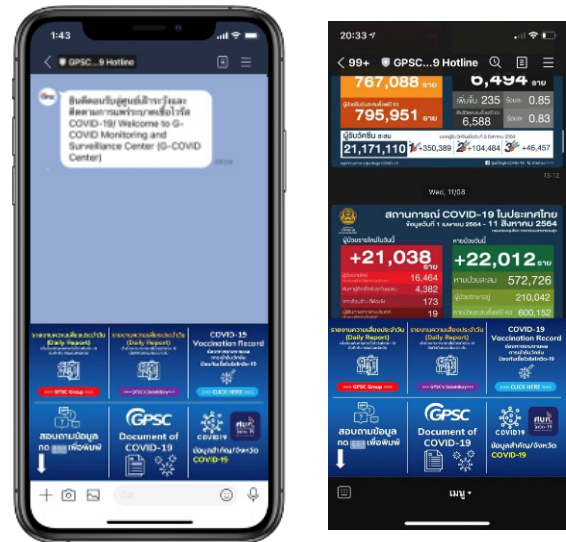
#### New Normal and the creation of energy innovations

The COVID-19 outbreak has revolutionized people's way of work. Staff had to shift their workplaces from offices to homes with the assistance of online systems. Furthermore, they must value communication under such circumstances. In particular, GPSC had to communicate information on COVID-19 prevention measures rapidly and accurately while ensuring that every employee could access information quickly. Consequently, it deployed digital technology in its operations. It developed the GPSC Covid Application to manage various data aspects under the "comprehensive management" concept. The system incorporated essential functions for employees, such as reporting risks, promoting measures and practices, registering for COVID-19 testing, offering vaccination reports, reporting ATK test results, and requesting approval to work in offices. The objective was to provide quick, timely internal communication, and prevent and control viral spread within the Company effectively.



### G-COVID Center Line Official

Prompt communication is a vital factor that promotes the effective implementation of various measures and gives employees 24/7 access to information and risk reports. Because Line application allows for prompt and accessible communication and the majority of the employees are already using the application, GPSC has developed G-COVID Center Line Official as a channel for communication and access to data. Through this, contractors can log into G-COVID Application to log daily reports, while users can access information and documents related to COVID-19 and links to vital data provided by provincial administrative offices and the Center for COVID-19 Situation Administration (CCSA) as well as request information through the chat function.



### GPSC COVID Application

GPSC has developed GPSC COVID Application under the concept “comprehensive management.” The application brings together functions employees need, such as daily reports, risk reports, registration for COVID-19 testing, vaccination status reports, ATK test results, and request for entry to office areas.

In addition, GPSC has developed new services on the digital platform EnergyLens, through which customers can track quantitative information on power and steam consumption to maximize efficiency and benefits as well as access required information in real time remotely, which helps reduce risks of COVID-19. This innovation has contributed to more stable and sustainable management and enhanced business competitiveness. The platform is also accessible both via website and mobile application, thus catering to customer needs.

# STAKEHOLDER'S VOICE

## SHAREHOLDERS

### Mr. Somchai Meesen

**Independent Director /  
Member of the Corporate  
Governance Committee**

“GPSC has clear business directions and places a great deal of emphasis on renewable energy by increasing investment ratios, both domestic and abroad, especially investment in solar power plants in India. It also pursues innovation and new business opportunities to provide profitable returns to shareholders, thus contributing to steady growth and responsibility to multi-sectorial stakeholders while focusing on sustainable co-existence.”



## EMPLOYEES

### Ms. Nontawan Amnuaymucha

**Engineer, Flash Project**

“At present, innovative or novel alternative-energy businesses are rapidly assuming importance. GPSC has performed well as one of the first companies to have pioneered the G-Cell battery plant. What would be exciting is further development and study of clean-energy trends in the future such as hydrogen so that GPSC may completely become a clean-energy green company. GPSC should also develop new businesses to generate income from recyclables, such as the batteries we are currently working on.”

### Mr. Narakorn Kukreja

**Senior Analyst, Strategic Planning Division**

“GPSC already exercises corporate governance in environmental management and social responsibility. If there is a good business growth plan that addresses future social energy demand both in terms of security and eco-friendliness, GPSC can become an energy leader that can attract talents and thus raise more funds for business expansion. It should study novel forms of electrical power, such as open trading of electricity as well as seeking to become an energy solution provider for overall maximum efficiency of energy management. It should also scale up the development of energy innovations that are looming large.”





## INVESTORS

### Mr. Varorith Chirachon

**Executive Director, Investment Research Group  
SCB Asset Management Co.Ltd.**

“Currently, GPSC commands good financial performance. It is also a leader in sustainable business management as specified in its objectives. It has also increased the ratio of clean-energy production, both domestic and abroad, and continually developed innovations.”



## GOVERNMENT AGENCIES AND RELATED ORGANIZATIONS

### Mr. Watthanaphong Kurovat

**Energy Policy and Planning Office (EPPO)**

“GPSC is a private energy producer in support of the public energy purchase policy. Therefore it forms a key part of national energy security and stability structure that benefits the country and Thais. GPSC also performs well in identifying clean-energy business opportunities and innovation trends while maintaining healthy cooperation with domestic and international partners. With the launch of GPSC’s G-Cell battery plant, I am most pleased to see a Thai company invent and manufacture its own innovations. GPSC should also consider future perspectives to become a robust leader and create even more innovations and competitive business opportunities in clean energy in the future.”



## SUPPLIERS AND CONTRACTORS

### Mr. Takeshi Sameshima

**Managing Director  
Thai Takasago Co. Ltd**

“GPSC dearly values occupational health and the safety of their operators, which is the same policy that Thai Takasago maintains to treat safety as the top priority in all our undertakings. The objectives and visions of GPSC and Thai Takasago in conducting sustainable businesses with consideration for stakeholder benefits are also well-aligned. We work with GPSC as a business development partner that relies on eco-friendly technological innovations and future clean-energy production for sustainable growth.”



## PARTNERS

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### **Dr. Pimpa Limthongkul**

**Team Leader of the Energy Storage**

**Technology Research**

**Energy Innovation Research Group**

**National Energy Technology Center (ENTEC)**

**National Science and Technology Development  
Agency (NSTDA)**

“Under the global energy transition, GPSC has a good grip on innovation management. It has also stressed business opportunities and laid out plans to develop clean energy. GPSC is expected to be one of the nation’s drivers and leaders of sustainable energy.”



## CUSTOMERS

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### **Mr. Piyabut Charuphen**

**Managing Director**

**Bangkok Industrial Gas Co. Ltd. (BIG)**

“BIG has conducted trade with GPSC as a client and a business partner for years since the construction of the Central Utility Plant 1. Our sustainability in trading comes from two parts: 1. trust in the products and personnel of GPSC because sales of its products foster confidence and trust in BIG Production. At the same time, nitrogen trading also forms a key utility part of business with PTT Group. 2. all GPSC personnel are easily accessible and there is trust between us to support, exchange, and share ideas, comments, or information. Based on this trust in products and personnel, innovations or business opportunities can be created. We are both also on a path to Net Zero Emissions and can create a business ecosystem together.”





## COMMUNITY AND SOCIETY

### Mr. Adul Bumrungsuntorn

**Chief Executive, Nong Tapan Tambon**

**Administrative Organization, Rayong**

“GPSC values the community and actively supports various activities and cultural traditions of the community. Throughout the COVID-19 outbreak, GPSC looked after the community by distributing survival packages to us. We can co-exist normally and sustainably by assisting each other. However, we want the Company to provide increased job opportunities and consider employing more knowledgeable members of the community



## COMMUNITY AND SOCIETY

### Mr. Worachat Worasawat

**Village Headman, Moo 3, Ban Laemyang-**

**Troksamut, Tambon Namkhok, Rayong**

“I would like to commend GPSC on establishing a waste separation center for refuse-derived fuel (RFD) and the use of RFD to produce electrical energy. This has allowed us to reduce problems and impacts of community waste accumulation. The center has also eased bad odor, and we can use the sorted waste to generate income for the community as well. Throughout the operation, the Company has taken good care of the community and provided information and knowledge so that the community can understand its work and are able to live well alongside each other.”

## GLOBAL TRENDS AND SITUATIONS

In the current situation, all sectors of society, especially the business sector, have been inevitably struck by the COVID-19 pandemic, resulting in an overall economic slowdown. People had to embrace the New Normal and work from homes, which was unprecedented. These circumstances posed grave challenges to corporate management. Additionally, the world faced a real challenge from technological transformation. What was more, the climate change issue has been a concern of the international community. Therefore, the 26<sup>th</sup> United Nations Framework Convention on Climate Change (COP26) set long-term goals as the goal to achieve net-zero greenhouse gas emissions more intensely and faster than ever. Environmental issues have become an essential condition for global trade. They might lead to the use of trade barrier measures, potentially an obstacle or risk if businesses failed to adjust themselves. On the other hand, they could represent new opportunities if companies stayed alert, understood the shifting scenarios, and adapted themselves quickly. The major challenges faced by the power business in the short term and long term are:

**Decentralization:** Decentralized power generation from large-scale to small-scale power plants enables peer-to-peer energy trading and results in more distributed power generation through microgrids for the smart-grid system. This effort also caused a transition from consumers to prosumers, where small power producers could serve as both buyers and sellers. Power generation from renewable energy, possibly in tandem with energy storage, could rely on additional renewable energy such as solar rooftops.

**Decarbonization:** Energy consumption shifts to clean energy and green products. Furthermore, new technologies, such as Carbon Capture, Utilization & Storage (CCUS) and hydrogen, are introduced to reduce CO<sub>2</sub> emissions.

**Digitalization:** Businesses apply technologies to maximize their efficiency of production and distribution systems while minimizing turnaround time and costs of peer-to-peer trading.







**Convergence:** It reduces barriers to the power business by offering a better chance of free energy trade. Consequently, it promotes business competition among existing and new players. Furthermore, it enables better and faster distribution of power generation and trading.

Recognizing challenges and opportunities from these issues, GPSC has formulated a strategy to stay adaptive. It monitored current energy demand in domestic and global markets, such as increasing consumer demand for clean energy. Moreover, advanced technologies played a role in generation and energy management processes, leading to energy service transformation, which applies digital platforms in the future. The Company always came up with innovations and was ready to grow in new energy. GPSC also manages relationship with existing customers and builds new customer bases. The implementation is a key strategy that must be

developed in parallel with business adjustment to keep up with changes and enjoy sustainable growth in the long term. This would accommodate the global trend, which has played a crucial role in promoting greater consumption of clean energy by all. GPSC also supports the government's zero emission policy and is aware that the key success factor is employees' capability. It therefore stresses organizational development, together with corporate human resource development. Finally, it enhances personnel's capacity, develops leaders, and increases staff productivity by promoting reskilling and upskilling, including deploying technologies at work to maximize employees' efficiency.

GPSC believes that its awareness of transforming global trends and situations allowed it to adapt quickly, leading to risk reduction and new business opportunities. Moreover, effective management would increase the business's competitiveness and drive the organization toward goals. This would help GPSC achieve the vision to be a global leading and sustainable power company.





# A CLEAN ENERGY FUTURE AND CLIMATE RESILIENCE





## Behavioral Changes Forecast in Energy Consumption



The International Energy Agency (IEA)<sup>1</sup> has projected that the power business group released an average of 12.3 gigatons per year of greenhouse gases (GHGs), topping all other business groups because of its combustion of coal and fossil fuels for the most part. To absorb all these GHGs, one needs 565 billion tons of fully grown trees to balance the concentration of carbon in the atmosphere. Many power producers have therefore lowered the proportions of coal while raising power generation proportion from renewables. It is a growing trend of new policies found in each country to drive the renewables proportions to over 30% by 2030.

After the 26<sup>th</sup> meeting of the United Nations Framework Convention on Climate Change Conference of the Parties (UNFCCC COP 26 or COP26), the findings of the Intergovernmental Panel on Climate Change<sup>2</sup> stated that it would be too late to set a goal of net zero GHG reduction by 2050 to stop the earth's average temperature from growing by over 2 degrees Celsius. Therefore the net zero goal of each country was moved up. It is now projected that in nine years the proportion of renewables in the power sector would exponentially rise to 45%. This includes Thailand, an associate member of the body, which took part in the Nationally Determined Contribution (NDC)<sup>3</sup> and raised its target for GHG reduction to 40% by 2030 and set a target for Thailand to approach the Net Zero goal by 2065. This situation is the key factor for GPSC's driving business under a new model to inevitably respond and cope with problems arising from climate change.

<sup>1</sup> International Energy agency (IEA) <https://iea.blob.core.windows.net/assets/888004cf-1a38-4716-9e0c-3b0e3fdbf609/WorldEnergyOutlook2021.pdf>

<sup>2</sup> Intergovernmental Panel on Climate Change (IPCC) [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_Full\\_Report.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf)

<sup>3</sup> National Determined Contributions (NDCs) <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Thailand%20First/Thailand%20Updated%20NDC.pdf>



## Business Drivers



Besides the prominent physical impacts of climate change, numerous critical shifts arising from it include legal regulations and new policies made by stakeholders who expect energy businesses to modify their power generation models and rely more on renewables while lowering their release of GHGs. GPSC is therefore committed to such drive to raise the proportion of renewables, cut fossil fuel-based power generation, lower GHG emissions from generation processes, which represents risk reduction and an increase in business opportunities that can be extended in the future. It is also part of the international physical mitigation of climate change.

## Strategies for Success



**GPSC formulated the S2: Scale-up Green Energy strategy**, focusing on raising the proportion of renewables, including solar and wind power worldwide, and running projects and activities in support of GHG reduction, namely

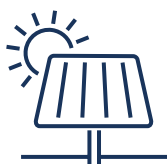
- Research on ESS technology and energy management for greater efficiency and accommodation of renewable energy
- Risk and opportunity assessment to identify guidelines for coping with climate change impacts under the TCFD recommendation
- GHG reduction from processes and efficiency improvement of corporate energy consumption
- Introduction of internal carbon pricing (ICP) to complement decision-making on renewables power project investment and low-carbon innovations

## Corporate KPIs



- Absolute GHG emission reduction
- Implementation of climate change strategies\*
- Power generation efficiency improvement\*

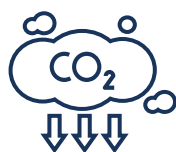
\* Supporting Corporate KPIs



Ratio of  
renewables-based  
power generation

at **37%**,

totaling **2,655** MW



Reduce GHG  
from T-VER 5

**581,930**  
tCO<sub>2</sub>e



**Net Zero**

GHG emissions  
by 2060

## Performance and Value Creation



- Had 37% power generated from renewables
- Reduce GHG emissions from using renewable energy by 215.30 tCO<sub>2</sub>e
- Reduce fuel consumption by 4.20 MMBtu
- Reduce energy consumption by 1.23 million MWh
- Had GHG emission intensity of 0.44 kgCO<sub>2</sub>e/kWh
- Reduce GHG emissions under T-VER by 581,930 tCO<sub>2</sub>e
- Won the Low Carbon and Sustainable Business Index (LCSI), rated outstanding
- Supported Nationally Determined Contributions (NDCs) through corporate GHG reduction
- Participated in and supported through membership of external climate-change network, namely Carbon-Neutral Thailand, Carbon Market Thailand, and RE100 Thailand Club, to build on and promote entry into the low-carbon business.

## 2021 Targets



- Intensity of GHG emissions does not exceed 0.49 kgCO<sub>2</sub>e/kWh
- Jointly invest with PTT to raise the proportion of renewables power generation in other countries

## Long-term Targets



- Raise renewables power capacity through greater equity of about 8,000 MW by 2030
- Raise the proportion of renewables power generation by over 50% by 2030
- Cut the intensity of GHG emissions by 35% by 2030 (from the 2020 base year)
- Carbon-neutrality by 2050 and Net Zero Emissions by 2060

## Challenges



- Efficiency improvement of power generation processes & integration of technology in power plants for efficient GHG reduction, including Carbon Capture, Utilization, and Storage (CCUS)
- Increase in proportion of corporate renewable energy consumption
- Expanding the implementation of internal carbon pricing
- Improvement and development of simulation models for assessing impacts of climate change with reference to updated investigation outcomes, including the socioeconomic pathway simulation model (from the IPCC's Sixth Assessment Report (AR6))

## Aspiration



GPSC takes steps to become a leading global power producer through investing to raise the proportion of renewables, lower fossil fuel-based power generation, and leverage corporate carbon pricing to raise its total generation capacity from renewables to more than a half of the total capacity. That said, GPSC still strives to deliver secure and reliable energy, which serve as our strength and ability to efficiently meet the expectations of stakeholders.

For more information about  
A Clean Energy Future and Climate Resilience, please scan QR code



## Harmonization of Energy Tune: Solar Orchestra

Thanks to technological advancement and lower costs of some 82% over the past decade, today one sees growth in installation and generation of power from renewables, particularly solar power, in high demand. As a result, power demand has taken an exponential leap in parallel with stakeholders' rising expectation for renewables power in their manufacturing processes.

GPSC has therefore formed a network to integrate solar power strengths under the name Solar Orchestra, featuring CHPP (a GPSC Group company) joining hands with financial institution allies and business partners. The network drives investment in serving power derived from solar rooftops to align

with market shifts where numerous entrepreneurs have become keen on solar energy. In addition, Solar Orchestra commands proficiency in ESS technology, efficiency improvement, and energy management that can improve solar energy consumption.

It is expected that Solar Orchestra will garner warm responses from customers in other business groups domestically and internationally, since they stand to benefit without having to invest, and from lower power tariffs, after-sales service spanning seven years, and countless other benefits—whether corporate GHG reduction that also yields carbon credit, meeting domestic policies, or lowering international pressure.

### Benefit of Solar Orchestra Project

Power tariff lowered by

**30%**

Project-based lending

up to **100%**

Special interest rate of

**3.93%**



**7 years**

of after-sales service  
after complete installation



Formal registration  
for carbon-credit benefit for

**7 years**



**No advance  
expenses**

as well as discount on  
corporate tax of 50% of total investment



Installation & care by

**expert teams**



**Mrs. Rosaya Teinwan**

**Executive Vice President, Business Development**

“ Solar Orchestra leverages GPSC’s energy caliber and skills in presenting to commercial and industrial consumers this extraordinary innovation. These customers desire clean energy and lower expenses, seek to eliminate operating complications, cut GHGs, and can register their investment as carbon credit simply by forming an alliance with financial institutions and solar energy experts. This project can unlock constraints for running small-scale solar projects under the concept of Sustainable Energy Management for All. ”

## Raising the proportion of renewable energy toward Net Zero emissions

In view of numerous studies illustrating impacts of climate change, various countries worldwide have declared their intention to cut the release of greenhouse gases, which are becoming more intensified in the atmosphere. GPSC has closely tracked the situation and supported such mitigation by declaring Net Zero emissions by 2060. To this end, it relies on its main strategy of S2: Scale-up Green Energy.

This year GPSC invested some THB 14.285 billion in Avaada Energy Pte. Ltd. (Avaada) in a solar power plant in India. As of year-end 2021, GPSC commanded an equity capacity of 1,917 MW since India commands extraordinary potential for energy growth. The goal is to raise energy generation from renewables by 500 gigawatts by 2030. In addition, India’s terrains and climate hugely favor solar power generation because of some 300 days on average per year of intense sunlight, tremendously benefiting the plant, especially during the summer, by producing a massive supply of electricity. This investment is

being made in partly commercial operation, assuring GPSC of ongoing creation of value for stakeholders.

GPSC also signed a share trade agreement with Copenhagen Infrastructure Partners (CIP) for its investment in the Changfang and Xidao Project (CFXD), an offshore wind power plant with an equity capacity of 149 MW. The project is under construction, due for commercial operation by the first quarter of 2024. GPSC expects share trading to be completed for share transfer by the second quarter of 2022. This was GPSC’s first investment project in an offshore wind power project with a highly experienced company known for developing these projects, thus giving GPSC an opportunity to grow its own skills and knowledge on offshore wind power project development; this calls for knowhow on construction technology and specialized skills fitting the project’s environment. The project is capable of continuously and safely generating electricity and feeding it into the grid.

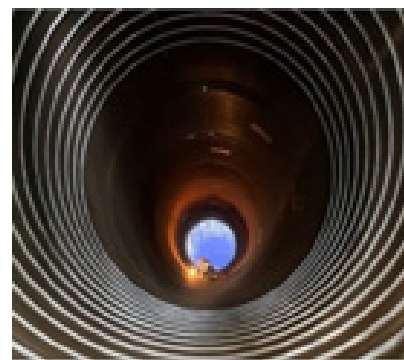


## Operational Projects



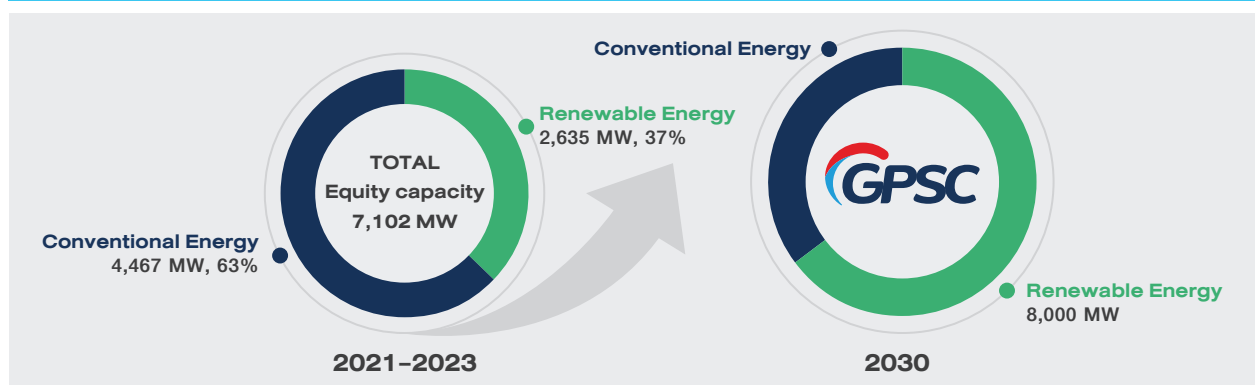
## CFXD: Offshore Wind Power Plant in Taiwan

### Under Construction Project

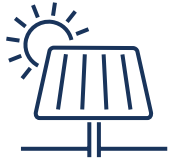


### GPSC Aspiration:

**"To be top 3 power company in SEA with more than half of MW from green portfolio"**



This investment resulted in GPSC's share of renewables power rising to 37% (2,655 MW), which is steadily zooming in on the goal of 8,000 MW by 2030, thus supporting GPSC's stride toward its goal of significant GHG reduction.



**1,917** MW

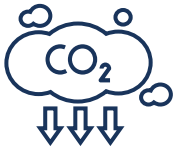
from solar power plants,  
a prominent source  
of renewable energy



The proportion of  
renewables power rises

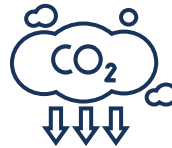
by **149** MW

from an offshore wind power project



Our solar power plants  
lowered GHG emissions

by **2.2** MtCO<sub>2</sub>e/year



The offshore wind power plant  
is capable of lowering GHG emissions

by **723,000** tCO<sub>2</sub>e/year



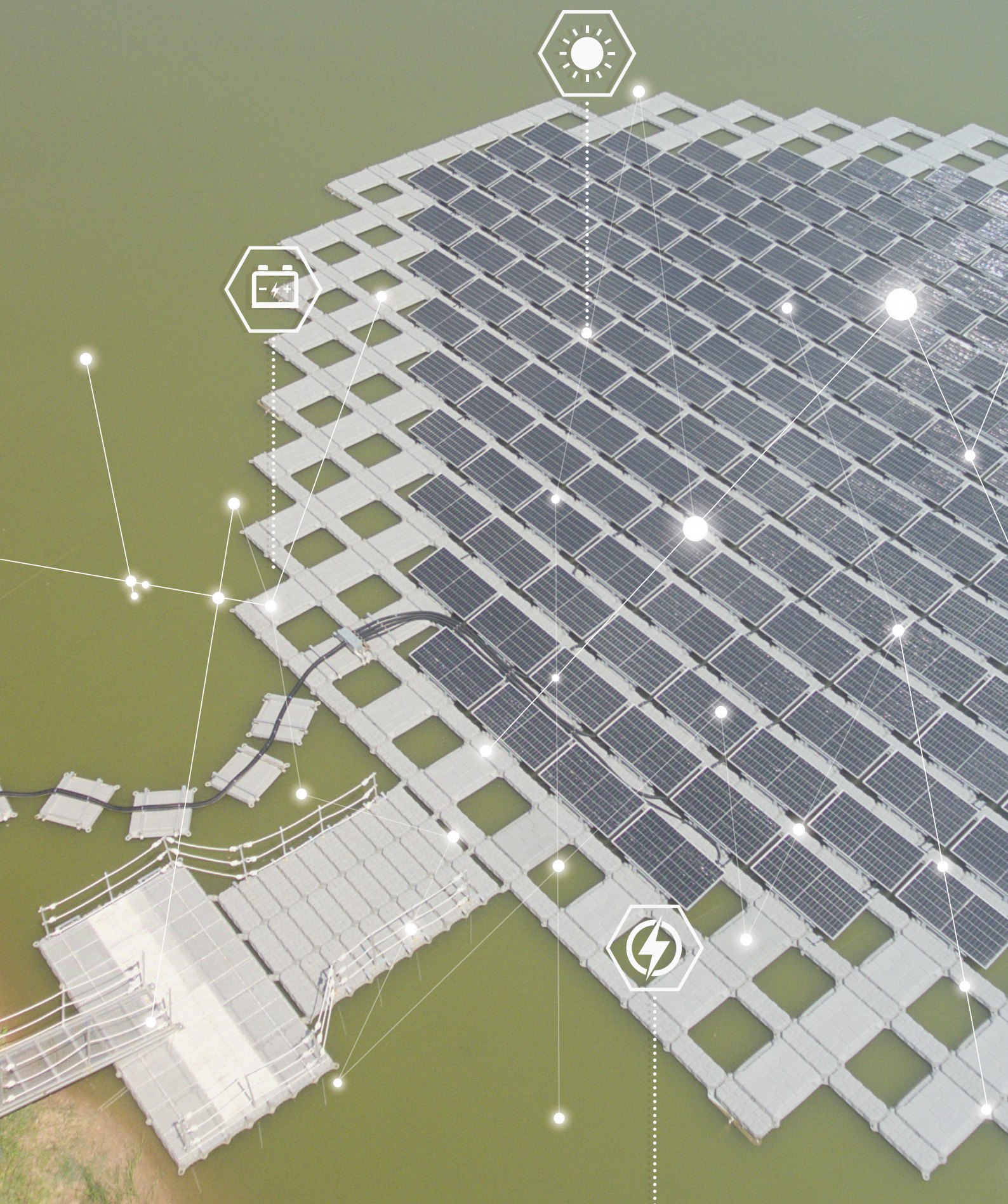
**Mr. Kulapat Permbhusri**

**Acting Executive Vice President, Corporate Strategy and Subsidiary Management**

“ GPSC's shift in the proportion of renewable energy is a crucial challenge because of recent impacts of climate change worldwide, which are worsening every year. As a member of the power business group, GPSC views itself as a key variable and part of the solution to this global problem. That is why we are investing with leading European and Asian companies to grow such proportion from the sun and wind here and in foreign countries. We will pursue greenhouse gas emission reduction every year while hiking renewable energy—a clean form of energy—in our drive toward a low-carbon society in other business groups. ”



# EVOLVING THE BUSINESS MODEL





## The need for energy storage systems and the shift in energy consumer behavior in the future



Research conducted by the International Banker<sup>1</sup> predicted growth of the energy storage system (ESS) at 14.1% per year with a total market value of THB 10.4 trillion in 2027. The rapid ESS market growth stems from higher demand for power in the transport sector, a rapid jump in power generation capacity from renewable sources, and the shift in power consumer behavior from pure consumption to consume and produce at different periods known as prosumers, aligned with the concept of small-scale power generation at users' locations or decentralized generation interconnecting with the ESS as a key to higher efficiency of the entire power system.

The integration of environmentally friendly ESSs with other utilities directly supports the government policy on promoting power generation from renewable energy sources. Under the current policy, the energy platform is shifting from distribution of power generated by large-scale power producers through the national grid to consumers (or one-way power distribution system<sup>2</sup>) to more and more small-scale power generation under decentralized distribution systems. However, the new decentralized power distribution system demands numerous digital systems to monitor, measure, collect and reconcile data, communicate among data systems, and control the storage system. All these digital systems are perceived to be the breakthrough and key success factors to the shift in energy platforms into the future for both large-scale economic urban areas and small-scale rural remote areas.

<sup>1</sup> International Banker (2021), The Outlook For The Global Battery Market (<https://internationalbanker.com/brokerage/the-outlook-for-the-global-battery-market/>)

<sup>2</sup> Ministry of Energy, Thailand Smart Grid Development 2015 – 2036 ([http://www.eppo.go.th/images/Power/pdf/smart\\_gridplan.pdf](http://www.eppo.go.th/images/Power/pdf/smart_gridplan.pdf))



## Business Drivers



Energy disruption has created changes in many ways: formation of decentralized power distribution systems, digital energy platforms, and more use and generation of energy from renewable sources. Such disruption also provides significant drivers to improve the quality and value of products and services, thus leading to a jump in performance and profitability. With a solid corporate business structure, highly secured and reliable power generation and distribution networks, continuously developed innovations, and modernization of digital platforms, GPSC is set to significantly increase energy management efficiency capable of better responding to future consumer behavioral changes as a total energy solution provider.

## Strategies for Success



GPSC has formulated two major strategic key success factors to meet future customer demand: development of S-Curve businesses and batteries as innovation for ESS (S3 Strategy), and a Shift to Customer-Centric Solutions (S4).

- ESS R&D
- Development of various types of batteries for electric devices, energy system for buildings, ECs, and others.
- Initiation of power distribution systems for prosumers.
- Investment and research on smart energy management and solution provider.
- Promotion of joint research and experience sharing between GPSC's staff and external organizations.
- Promotion of joint investments and cooperation between GPSC and external organizations on technological research.

## Corporate KPIs



- Construction of pilot battery production plant.
- Trial battery packs installation to customers for actual uses and officially commercialize installation services, the number of agreements/contracts related to batteries installation, not less than 5 project\*

\* Supporting Corporate KPIs



**Completion of the first SemiSolid battery plant in Southeast Asia with**

**30**

**MWh/yr capacity**



**Becoming a production center of ESSs in Southeast Asia.**



**Introduction of new products and services**

**to cope with changing customers' demand in the future.**

## Performance and Value Creation



- Complete battery facilities construction and successfully manufacture the First Cell
- Develop a pilot project and experiment an ESS installation with a COD for four customers
- Develop five service level agreements or memorandums of understanding for ESS installation

## 2021 Targets



- Forge awareness and share knowledge of battery products with customers and business partners
- Develop an ESS pilot project and install it for customers in various industries, including telecommunication and EV sectors
- Complete preparation of service level agreements or memorandums of understanding on installation of battery ESSs, both of stationary and of mobility application types.
- Command more products available for the energy industry and EV industry.

## Long-term Targets



- Ability to produce high-quality products at reasonable costs that can be integrated to support power systems and increase competitiveness for GPSC within 2022.
- Being an industrial leader in Thailand in ESSs in 2022.
- Development of a new business model to cope with the power business in the future (2022).
- Capacity expansion of ESSs to giga-scale to meet commercial customers' demand by 2025.
- Battery production capacity expansion to 5-10 GWh by 2030.
- Setting up R&D center to conduct studies on battery recycling under the government concept of Circular Economy.
- Becoming the Southeast Asian center on ESSs.

## Challenges



- Achieving acceptable customers' confidence through the transition period with more diversified energy services.
- Reducing environmental impacts from battery life cycles and production costs.
- Setting up R&D center to conduct studies on battery recycling processes and investment under the Circular Economy concept.
- Ability to control and reduce volatility on costs of production of solar panels and accessories, as well as partnership management.
- Forming alliance with other organizations on battery development for EVs, telecommunication and other industries.
- Co-investment with various business startups to advance energy technology and innovation.
- Various regulatory controls such as smart grids and smart meters.
- Development of a virtual power plant.

## Aspiration



GPSC is committed to continuously advancing its ESS technologies, fully integrated intelligent energy services, development of SemiSolid toward multiple-use battery packs, availability of products and services to meet current and shifting customers' demand. The corporate future plan is set to fully comply with the government policy to become a Southeast Asian center for ESSs and EV production. The business goal is set to introduce innovative products and services to the industrial, commercial and transport markets continuously, as well as to promote and develop business models to better respond to the future digital economy and clean energy economy for the country.

For more information about  
Evolving the Business Model, please scan QR code



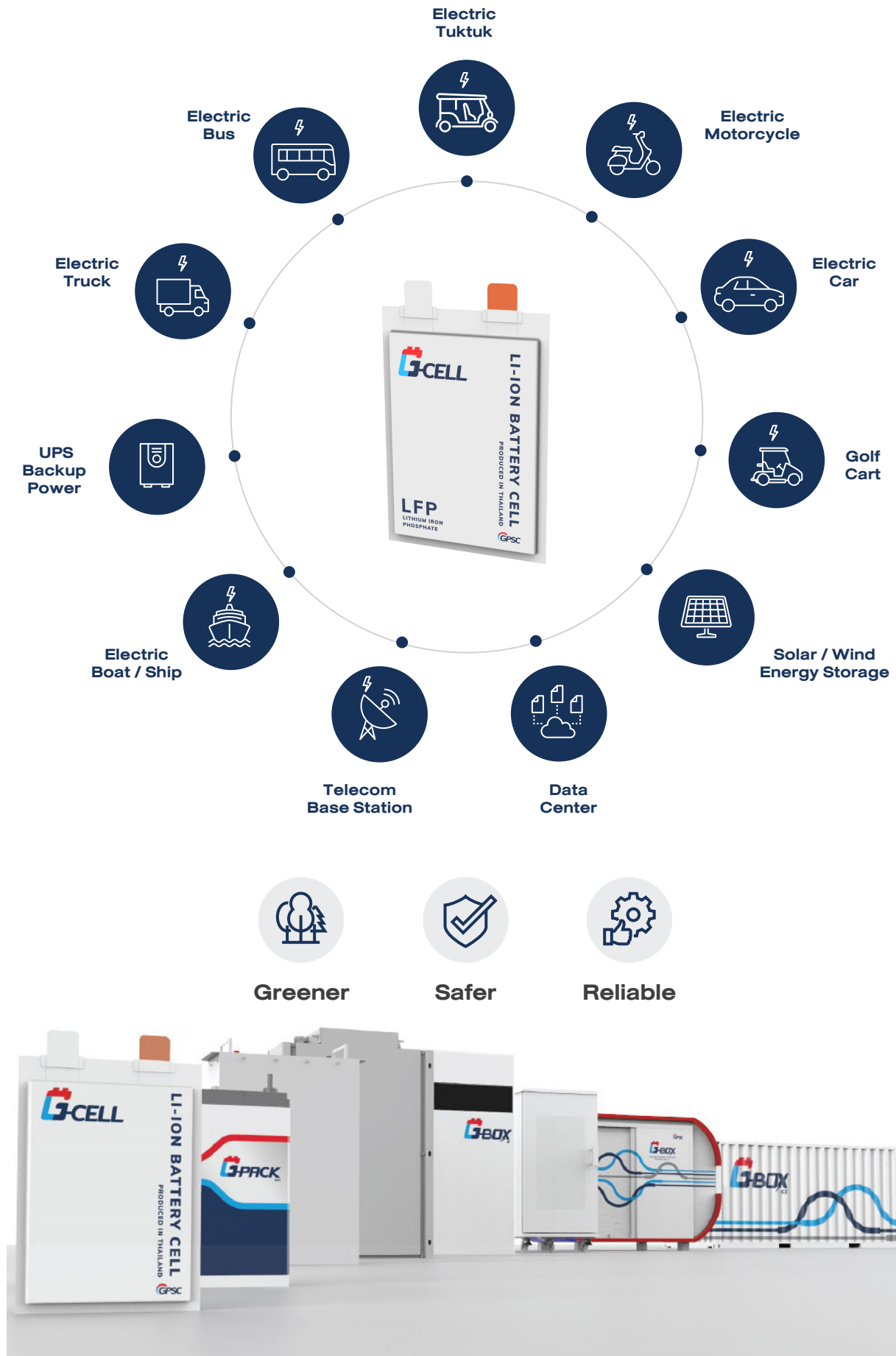
## G-Cell, Future battery innovation

The major concern on the use of power batteries these days is the contamination of certain chemicals from old or recycled batteries to the environment. This is the priority challenge facing the development of environmentally responsible ESSs. GPSC has therefore, for the last seven years, continuously invested in research and technologies to develop highly efficient batteries with maximum storage capacity and minimum toxicity to the environment. GPSC, in conjunction with 24M Technologies, Incorporation or 24M a reputable R&D firm specializing in lithium-ion batteries, successfully developed SemiSolid battery known as G-Cell. Following the success, GPSC continued with the launch of the first commercial G-Cell battery plant in Thailand in 2021.

G-Cell has a very long life cycle and can be recharged up to 4,000 times. Unlike other lithium-ion batteries, G-Cell battery is specially designed to prevent short-circuiting at the unit cell and help eliminate the probability of fire. Thanks to higher safety protection, GPSC believes that G-Cell is the future battery for EVs due to its light weight and environmental friendliness. Moreover, without any binder (material used to bind all chemicals used as coating in the battery cell),



G-Cell can be recycled more easily and cheaply. It can therefore be used in many industries, either stationary or mobility, such as development as a G-Pack and a G-Box for charging stations, telecommunication stations and data centers demanding absolute reliable power distribution systems.







G-Cell life cycle supports up to

**4,000**

recharges.



**G-Cell is environmental friendly,**  
manufactured without binders  
and can be recycled easily  
with lower costs.



The target is to expand  
manufacturing capacity

to **5-10** GWh

by 2030.



**Executed cooperation  
agreements with 9 companies**  
to further advance SemiSolid battery  
technologies for EVs, including battery  
package swaps and charging service  
stations.



**Mr. Patti Boonyasukanon**

**Business Development Division Manager**

**New Technology Department**

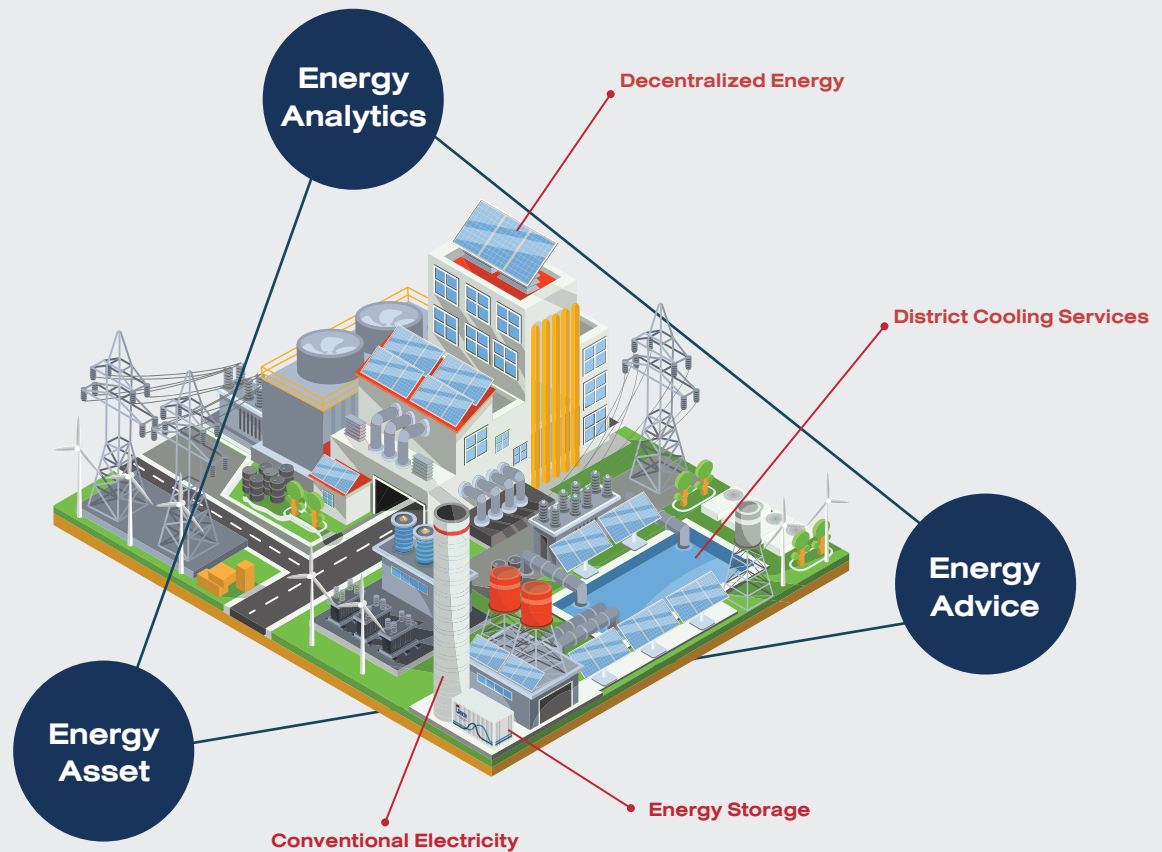
“ G-Cell is a state-of-the-art battery developed from dedicated R&D between GPSC and business partners for more than seven years. This is the battery of the future, equipped with higher efficiency, higher reliability and environmental friendliness.

This year GPSC has successfully commercialized the G-Cell battery. With better responses to highly diversified energy needs, GPSC is ready to move and become a leader of Thailand and Southeast Asia in innovative energy storage systems. ”



For more information about G-Cell,  
please scan QR code

# Intelligent energy management for business opportunities

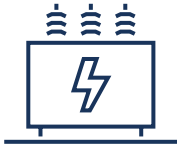


Energy disruption has transformed the change in energy platforms, energy megatrends and energy consumption patterns, particularly toward clean energy. GPSC has developed a business plan to cope with such transformation and turned it into an opportunity for a new flow of revenue through a series of innovations responsive to the new energy value chain.

With direct expertise in energy management, GPSC has adopted a 'Shift to Customer-Centric Solutions' (S4) Strategy, driving all energy management services under customers' demand through modernization service patterns, such as replacement of fossil fuel-based power generators with small-scale cleaner renewable-based power generating units, providing consultation and analyses on energy efficiency to increase energy efficiency and reduce long-term

energy costs, integration of the ESS and existing systems to ensure maximum system reliability. The Company also provides a solution to climate change and higher energy costs to the industrial sector with a centralized cooling control known as 'District Cooling'.

Intelligent energy management is the solution to the power consumption in the future and a key to sustain customers' confidence in GPSC throughout energy disruption. Through an integration of services provided by GPSC, affiliates and subsidiaries such as Combined Heat and Power Producing Co., Ltd. (CHPP), an AI (artificial intelligence) system can provide real-time analysis and best possible recommendations for any customer to optimize its energy consumption.



## Eliminating risks of damaged turbines and key machinery

Integration of the ESS with existing power distribution systems to substitute power supply in case of distribution failure within <10 ms response time,



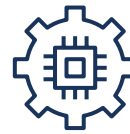
## Integration of an energy management system and peer-to-peer

energy trading so that excess energy can be automatically circulated to other buildings and power users.



## Reduce GHG emissions more efficiently, leading to higher profit.

Integration of energy management innovation from multiple sources for maximum synergy



## Integration of energy management with artificial intelligence (AI) and digitalization

to respond to energy production processes in real-time, leading to higher capability to better cost control.



**Mr. Komsan Saksriwattana**

**General Manager**

**Combined Heat and Power Producing Co., Ltd. (CHPP)**

“ The current customers’ needs have significantly been changed. Several sectors have seriously adopted an environmental policy on greenhouse gas emission reduction, forcing business firms in respective sectors to develop ways to reduce such emission within their organizations. CHPP believes in a new business model that the company can provide a combined service on energy management and expertise on renewable energy system installation, leading to higher profitability, better customer relationship, and higher efficiency in energy management for customers. ”







# CUSTOMER RELATIONSHIP MANAGEMENT



## Customer Demand on the Change in Energy Businesses



The current trend in the transformation of energy businesses is driven by consumers' demand for more clean energy to reduce impacts on the environment and technological advancements that play a role in production processes and energy management. This has led to a shift in energy services toward digital platforms soon, which also includes the transformation of power generation toward decentralization, enabling consumers to produce and sell electricity themselves (Prosumers). Moreover, the challenge of operating an energy business that has competitors both inside and outside the industry (Convergence) who have seen an increase in opportunities within the renewable-energy business and energy management services has resulted in energy business operators having to adapt to key strategic challenges, such as having to adapt their energy generation technologies to reduce greenhouse gas (GHG) emissions, which also includes growth in competitiveness in both its core business and future businesses. It cannot be denied that the management of existing customer relationship and building a new customer base are one of many important strategies that an organization must develop, along with adjusting business operations to keep up with business changes to sustainably grow in the long term.



## Business Drivers



Customer Relationship Management (CRM) is a key strategy in the energy business, especially in the midst of a highly competitive and rapidly changing business direction, including change in customer behavior. GPSC is determined to develop product quality, enhance productivity, distribution and services, maintain and build good relationship with customers, and drive the organization through energy innovation and digital technology, to meet the needs of current customers and expand into new customer bases to grow future income for GPSC.

## Strategies for Success



GPSC has formulated strategies in line with changes within the energy business and has paid more attention to customer services. The strategies include S1: Strengthen and Expand the Core, which focuses on strengthening and expanding services in the core business, and on maintaining reliability at an international level to meet the needs of current customers, and S4: Shift to Customer-Centric Solutions, which focuses on moving towards the Energy Management System business, the Company aims to develop businesses related to power systems and energy management for commercial entrepreneurs and customers in industrial estates such as Building Energy Management, Energy Storage System, District Cooling, as well as electricity trading through the Energy Trading Platform to meet the demand of electricity users in both industrial and household sectors effectively and respond to the future energy trends.



**Customers' Satisfaction Level at**

**91 %**



**Net Promoter Score\* at**

**46 %**



**To define new strategies for long-term business operations**

**that align with business changes and focus on meeting customers' needs.**

\* The comparison between GPSC's Net Promoter Score (NPS) and the NPS of 13 global leader companies in utilities sector shown that 46% of GPSC's NPS was 100 percentiles. However, the lowest and highest NPS of those companies were 5% and 41%, respectively.

## Corporate KPIs



- Customers' satisfaction level\*
- Net Promoter Score\*

\* Supporting Corporate KPIs.

## Performance and Value Creation



- Customers' Satisfaction Level at 91%
- Net Promoter Score at 46%
- No customers' data breach cases and no complaints about customers' data retention

## 2021 Targets



- Customers' Satisfaction Level no less than 85%

## Long-term Targets



- Customers' Satisfaction Level no less than 90%

## Challenges



- Expand services within the core business by focusing on increasing reliability of production at an international level while delivering products according to the production plan to meet customers' needs and build trust.
- An increase in intensity of competition within the energy business due to the openness of the energy market, resulting in more new players both inside and outside the generating and distribution industry who can compete, while also changing the role of consumers to that of a producer and consumer (Prosumer).
- The investigation and preparedness for the development of innovative platforms and digital technologies that meet customers' needs.

## Aspiration



The ability to apply innovative energy and digital technologies in the generation process to achieve maximum efficiency and strengthen the reliability of power supply and energy management services in line with customer needs which will make GPSC a key player in the highly competitive energy business and allow the company to adapt to changing trends that can determine the future direction of the business.

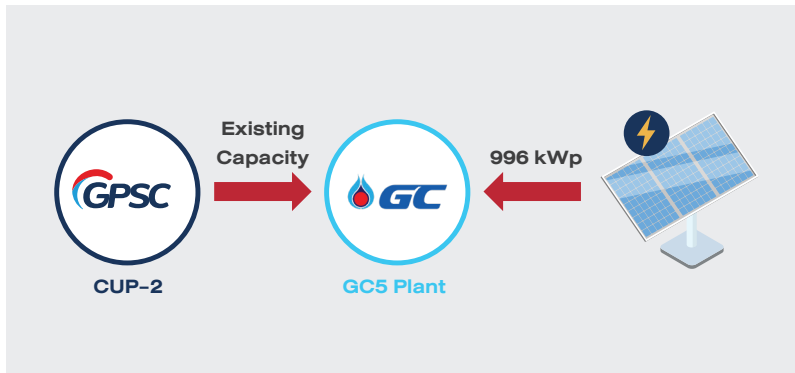
For more information about Customer Relationship Management,  
please scan QR code



## Investing in the Floating Solar Project by Entering a Solar Private PPA with PTT Global Chemical Plc

PTT Global Chemical Plc (GC), one of GPSC's key stakeholders both as a customer and a business partner, needs to install a floating solar power generation system to reduce costs and establish a clear policy for the growing demand for electricity from renewable energy, a driving force of international GHG reduction requirements. Consistent with COP 26 and the current global situation as well as considering product delivery efficiency and distribution system reliability, GC has seen GPSC's potential in delivering electricity to GC from a floating solar PV system. As GPSC is currently the electricity supplier to GC, together with the knowledge and expertise of Combined Heat and Power Producing Co., Ltd. (CHPP), a company in GPSC Group, in the installation of solar

power generation systems, the amount of electricity from the solar floating PV system can be combined with the net energy delivered under the contract without affecting the terms of the original PPA. GC therefore asked GPSC to install a floating solar PV system at GC5: Aromatics 2 Plant, with a capacity of 996 kWp, by entering a solar private PPA with GPSC. GPSC has completed the construction of the system and COD has been scheduled by September 2022. The project demonstrates the strength of our ability to create customers' satisfaction and trust in providing services within its core business, as well as being able to provide solutions for electricity generation from renewable energy to meet current customers' demand.

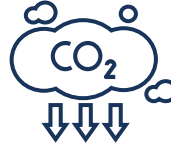






## To expand the renewable energy business

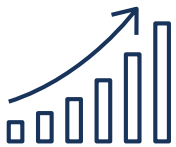
under GPSC's strategic plan



To reduce GHG emissions from fossil fuel power generation by

**523.78**

tCO<sub>2</sub>e/year



To increase the capacity of the renewable

**996-kWp**

Project



To reduce expenses by about

**THB 9.16 million**

throughout the project



**Mr. Chaowalit Jaitang**

Senior Electrical Engineer

PTT Global Chemical Plc

“ From the joint development of the floating solar installation project, we recognize the potential of both companies and the ability of our personnel to work together for project success. The project is expected to reduce costs and GHG emissions from energy purchases. It is hoped that in the future the two companies will continuously develop more clean-energy projects together to help drive clean energy innovations for PTT Group. ”

## 2021 Customers' Satisfaction Survey

GPSC has assigned a third party to conduct an annual survey and analysis of customers' satisfaction to gain insight into the level of customers' satisfaction toward GPSC. This is done by analyzing factors that affect the level of satisfaction and comparing GPSC

benchmark with leading organizations of the same industry—domestic, regional, and global. The survey asked respondents to complete questionnaires, dividing the questions into six main categories:



**Pre-sales  
and sales stage**



**Billing  
and invoicing**



**Quality of products  
and reliability of  
distribution network**



**Maintenance  
and planned  
service outage**



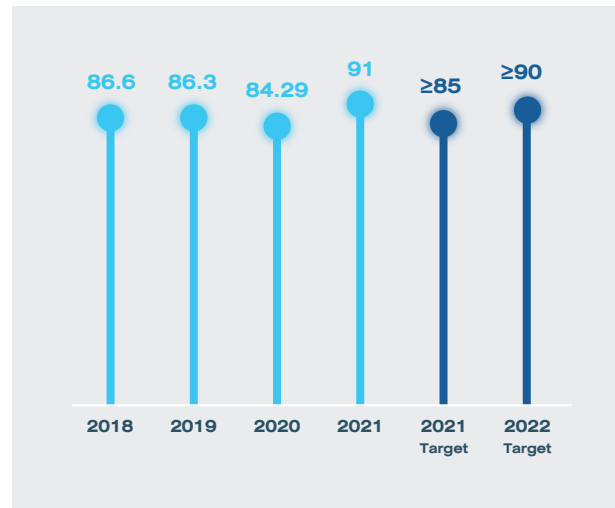
**Requests  
and complaint management**



**Customer engagement  
after service set-up**

The result of the 2021 Customers' Satisfaction Survey showed that GPSC had achieved a satisfaction level of 91%, thus achieving the 2021 goal. The results were presented during a Management Committee meeting to be further analyzed and used as guidelines for planning, managing, developing, and formulating strategies for GPSC's products and services to meet customers' satisfaction and expectations. In addition, GPSC has a plan to develop and improve the EnergyLens Application to support GPSC Group's customers, which includes the development of a customer database management system and the application of new technology for managing customer relationships in the future.

#### Customer Satisfaction Level (Percent)



**Mrs. Sriprapha Sumruatruamphol**

**Executive Vice President,  
Commercial and Supply Chain Management**

“ GPSC recognizes the importance of customers, who are considered one of our key stakeholders. We therefore aim to develop our CRM guidelines to be more effective to maintain good relations and continuously enhance customers' satisfaction. This is done through the development of reliability in processes and distribution systems, which includes new product offerings such as energy storage systems, batteries, solar cells, and energy management technologies to increase competitiveness and support customer demand in the future. ”





# **WORKFORCE DEVELOPMENT AND WELL-BEING**





## Employee development towards business adaptation at the international level



The current and future world energy situation is leaning towards clean energy. There is a necessity to escalating greenhouse gas emissions reductions or move towards a net-zero emission reduction target to reduce the environmental impacts and climate change that are urgently needed and the world is facing now. As a result of this change, the Company has adjusted its 4 main strategies or 4S, focusing on 3D+1C to drive business with intense sustainability, which will enable the Company to become a leading power generation company in energy innovation and sustainability at the international level. In addition to flexible strategies according to current and future situations, changing the attitude of personnel to raise awareness of cooperation towards clean energy. Continuous self-learning support for employees to drive the potential for the business operation that is constantly changing. These are key factors in ensuring a successful strategy. This also serves as well-being care for employees to grow with the organization and consider as one of the incentives for employees to work for the Company and operate with maximum efficiency

## Business Drivers



Employees are invaluable resources of the company, therefore, the organization is committed to human resource management, which is an important mechanism to drive the business to sustainable growth. Organizational challenges are to prepare and develop the potential of employees in accordance with the organization's strategy under the dynamics of the world in terms of economy, society, and environment along with increased motivation and organizational commitment of employees, which will make employees ready to perform at their full potential. In 2021, the company's employees demonstrated the driving force from everyone in the organization leading to the creation of Synergy Value estimated to be more than 1,633 million baht.

## Strategies for Success



The company has formulated a strategy for human resource management to support business growth by focusing on developing potential, encouraging employee engagement to the organization, and being mindful about equality in the organization with the following strategies

1. Succession Plan - prepare for successor at the executive level for business continuity.
2. SPARK Accelerator - prepare potential employees to support business growth
3. Building corporate engagement and the unity of the GPSC Group through activities that promote ACT SPIRIT values and other projects that will help support employees to live a quality life in changing situations
4. GPSC Academy - human resource development program to support business growth both domestically and internationally including promoting the Company's new business development plan

## Corporate KPIs



- Preparation of a succession plan
- Turnover rate against industry average
- Employee engagement level against industry average



### Key positions

has a **100%**  
succession plan



### Turnover rate at

**3.16%**  
(less than  
industry average)



### Level of corporate engagement at

**71%**  
(more than the  
industry average  
at 60%)



## Performance and Value Creation



- Key positions has a 100% succession plan
- Turnover rate at 3.16% (less than the industry average)
- Level of corporate engagement at 71% (60% more than the industry average)

## 2021 Targets



- Developing a 100% succession plan
- Turnover rate is lower than the average within industry.
- Level of corporate engagement should not lower than the average within industry

## Long term Targets



- Developing a 100% succession plan
- Turnover rate is lower than the average within industry
- Level of corporate engagement should not lower than the average within industry
- Established the Power Academy learning center to disseminate knowledge to employees and outsiders in relation to the new business (New S-Curve) of the Company

## Challenges



- Creating an Agile culture to enable organizations to be agile and able to cope with global changes in every aspect.
- Knowledge development and skills of employees in accordance with the world's future trends, such as renewable energy power plants, battery factory, and the development of electric energy storage systems and batteries
- Creating Employee Experience since starting from onboarding to offboarding (Retirement / Resignation) (Employee Journey), including creating employee experiences to suit the changing world, such as the use of digital systems to support working from home/anywhere principles

## Aspiration



To enable an organization to become flexible and expand the business to its full potential with the most efficient organizational structure, using technology and digital systems to streamline the work of employees as well as supporting employees to have the growth potential together with the Company's business in terms of knowledge, skills, and experience through the human resource development system that focuses on individual employees along with the recognition of the employee's work value from goals and challenging tasks and workplace happiness through accumulation of good experiences in the organization and taking care of the welfare of employees in all situations

For more information about  
Workforce Development and Well-Being, please scan QR code



## GPSC Academy

Employee potential is important in enhancing the competitiveness of the organization in the long term. Especially under the continual changes in the electricity business, the company is therefore aware of the development of employees with the necessary knowledge and skills according to the business direction by setting guidelines for development through the establishment of GPSC Academy. This was aimed to be the center of the development program to support business growth domestically and internationally and also promote the Company's new business development plan

GPSC Academy consists of

- (1) Developing the potential of employees in accordance with the basic needs of the company and related regulations (GPSC Academy Foundation Program)
- (2) Developing the potential of employees at all levels by focusing on the core competencies that the organization required (GPSC Academy Core Program) through the development of core competencies. The company has designed a course together with leading consultants in personnel development and leadership and organized a development program with an emphasis on Business Management, People Management, and teamwork in which the course design will be tailored to the situation each year

- (3) Developing the potential of employees according to each job function group (GPSC Functional Academy) to provide knowledge and expertise in responsible work scope and able to perform within or beyond expectations and extending knowledge to increase even more efficiency and continue to create innovations for the company
- (4) Developing the potential, Upskill, and Reskill of employees to meet the needs of the company's future business (GPSC Power Academy) to create knowledge and understanding about new business (New S-Curve) and provide awareness and understanding of the need for adjustment and self-development. They can also communicate with those involved party by themselves, resulting in a good image of the organization

As a result of GPSC Academy, the employee engagement survey for the year 2021 in the dimension of Career & Development from 1,068 employees participation (95% of the total employees) the score increased from 53% to 64% which increased from the previous year by 11%. In the year 2021, a total of 1,103 employees attended training courses through both classroom and online training, representing 99.55% of all employees



### Employee Engagement score in the Career & Development dimension

increased from 53%

to **64%**



**1,103 employees**  
**attended training**  
**courses representing**

**99.55%**

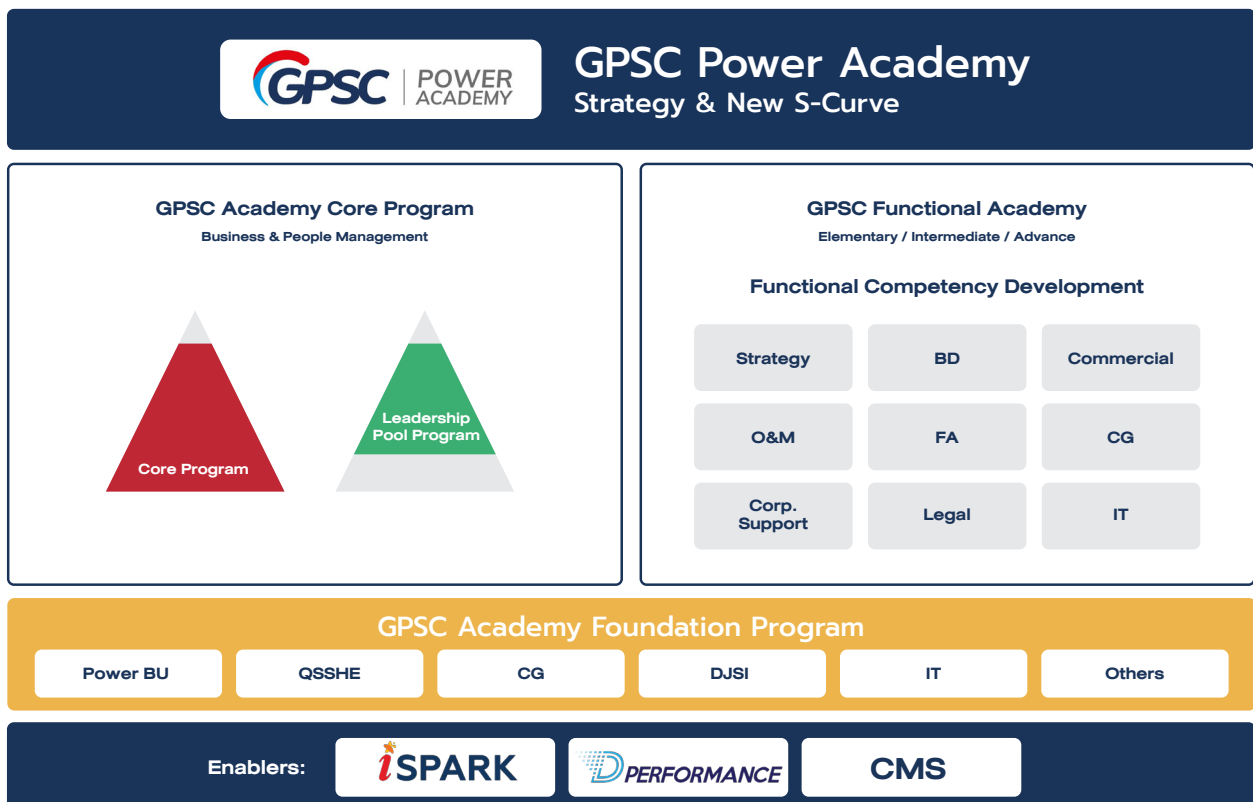
**of all employees**



## Mr. Shinapat Suwanpoom

### Senior Human Resources Officer

“ GPSC Academy is an employee potential development program that will enable us to be ready to work under the ever-changing global situation and to support the growth of the Company. The development program covers the basic knowledge required for all employees, furthermore, to the development of core potential both in business and personnel management which is necessary for the organization and skill development according to workgroups in order for employees to have expertise in each occupation. In addition, GPSC Power Academy educates employees about the company’s new business. In the future, we will expand this knowledge to external parties. ”



## ONE TEAM ONE UNITY

Project “ONE TEAM ONE UNITY” aims to attain the same goal and working together happily to create sustainability as the company has undergone mergers and acquisitions in 2020 and recruited new employees to support continuous business expansion. To encourage employees to work together as one (ONE TEAM ONE UNITY), a program has raised awareness and understanding of the Company’s

Core Value (ACT SPIRIT – Ambition, Commitment, Trust, Synergy, Performance Excellence, Innovation, Responsibility for Society, Integrity & Ethics and Trust & Respect) with corporate plans and functional level that allows all employees to participate despite the epidemic situation of COVID-19, the company has changed its activities to the online format.



Activities to promote Ambition / Commitment value such as

- G Infinite Power (GIP) project, is a collection of representatives from various agencies to brainstorm and create Synergy Value. Project GIP can create Synergy Value at 775 million baht in the year 2020. In the year 2021 have estimated the creation of Synergy Value to more than 1,633 million baht
- CEO Townhall, in which CEO communicated strategic directions performance and share his regards in the epidemic situation to fellow employees

Activities to promote Trust value such as

- KM Day activities, knowledge sharing of fellow employees,

- Provide Care Kits, which are care packages from the company to employees in the situation of the COVID-19 epidemic, including adjusting welfare options to support work from home and organizing programs for employees to have access to online psychologists

The Company has provided continuous monitoring and reporting on the activities results of each work function

resulted in the scores on understanding and awareness in Core Value from the year 2020 at 62% increase to 79% in the year 2021 which is above the target value at 4% and higher than last year 17% In addition, the survey result of employee engagement with the organization was higher from 62% in the year 2020 to 71%, this is more than the industry average by 11%, in addition, the employee turnover rate at 3.16% (lower than the industry average)



**Mrs. Prinda Ma-imjai**

**Senior Vice President, Organization Effectiveness**

“ ONE TEAM ONE UNITY project is the Company’s priority, which has been carried out continuously since the merger with Glow Group in 2020, in line with the Company’s values ACT SPIRIT. The project aims to unite employees’ goal and objective to work together happily even from different workplace cultures, unite and create Synergy from mergers and acquisitions. In addition to making employees work happily, the company also supports sustainable growth for organization by integrate a corporate values into various activities along with taking care of employee welfare continuously in every situation ”



**Core value  
comprehension and  
awareness scores  
in the year 2020 at 62%  
to **79%**  
in the year 2021**



**Employee  
engagement has  
increased  
from 62% in 2020  
to **71%**  
in 2021**



**Employee  
turnover rate  
at **3.16%**  
(lower than  
industry  
average)**









# DATA COVERAGE

Material issues					Economic / Governance										
					Governance, Risk Management and Compliance (GRC)	Customer Relationship Management	Maintaining Affordability and Reliability			Supply Chain Management	Evolving the Business Model				
							Installed Capacity	Net Energy Generated	Other KPIs						
							Country	"Subsidiaries & Associated companies"	Association			Share holding	Operational control		
Thailand	Global Power Synergy Public Company Limited (GPSC)	GPSC	100.00%	Yes	●	●	●	●	●	●	●	●	●	●	●
	Combined Heat and Power Producing Company Limited	GPSC	100.00%	Yes	●	-	●	●	-	-	●	●	●	●	●
	Ratchaburi Power Company Limited	GPSC	15.00%	No	●	-	●	●	-	-	○	-	-	-	-
	Siam Solar Energy 1 Company Limited	GPSC	40.00%	No	●	-	●	●	-	-	○	-	-	-	-
	Nava Nakorn Electricity Generating Company Limited	GPSC	30.00%	No	●	-	●	●	-	-	○	-	-	-	-
	IRPC Clean Power Company Limited	GPSC	51.00%	No	●	-	●	●	-	-	○	-	-	-	-
	Bangpa-In Cogeneration Company Limited	GPSC	25.00%	No	●	-	●	●	-	-	○	-	-	-	-
	Business Services Alliance Company Limited	GPSC	25.00%	No	●	-	○	○	○	-	○	○	○	○	○
	Energy Recovery Unit Company Limited	GPSC	100.00%	Yes	●	-	●	●	-	-	○	-	-	-	-
	N.P.S. Star Group Company Limited	GPSC	50.00%	No	●	-	●	●	-	-	○	-	-	-	-
	World X Change Asia Company Limited	GPSC	50.00%	No	●	-	●	●	-	-	○	-	-	-	-
	P.P. Solar Company Limited	GPSC	50.00%	No	●	-	●	●	-	-	○	-	-	-	-
	Global Renewable Power Operating Company Limited	GPSC	50.00%	No	●	-	●	●	-	-	○	-	-	-	-
	GPSC Treasury Center Company Limited	GPSC	100.00%	Yes	●	-	○	○	○	-	○	○	○	○	○
	Glow Energy Public Company Limited (Glow)	GPSC	99.83%	Yes	●	●	●	●	●	●	●	●	●	●	●
	Glow IPP Company Limited	Glow	95.00%	Yes	●	●	●	●	●	●	○	●	●	●	●
	Glow SPP 2 Company Limited	Glow	100.00%	Yes	●	●	●	●	●	●	○	●	●	●	●
	Glow SPP 3 Company Limited	Glow	100.00%	Yes	●	●	●	●	●	●	○	●	●	●	●
	GHECO-One Company Limited	Glow	65.00%	No	●	-	●	●	●	●	○	●	●	●	●
	Glow SPP 11 Company Limited	Glow	100.00%	Yes	●	●	●	●	●	●	○	●	●	●	●
	Chonburi Clean Energy Company Limited	Glow	33.33%	No	●	-	-	-	-	-	○	-	-	-	-
	Sport Services Alliance Company Limited	GPSC	25.00%	No	●	-	○	○	○	-	○	○	○	○	○
	Sarn Palung Social Enterprise Company Limited	GPSC	10.00%	No	●	-	○	○	○	-	○	○	○	○	○
	Eastern Fluid Transport Company Limited	Glow	15.00%	No	●	-	○	○	○	-	○	○	○	○	○
Laos	Xayaburi Power Company Limited	GPSC	25.00%	No	●	-	●	●	-	-	○	-	-	-	-
	Nam Lik 1 Power Company Limited	GPSC	40.00%	No	●	-	●	●	-	-	○	-	-	-	-
	Houay Ho Power Company Limited	Glow	67.25%	No	●	-	●	●	-	-	○	-	-	-	-
Japan	Ichinoseki Solar Power 1 GK Company	GPSC	100.00%	Yes	●	-	●	●	-	-	○	-	-	-	-
USA	24M Technologies, Inc.	GPSC	14.87%	No	●	-	○	○	○	○	●	○	○	○	○
India	Avaada Energy Private Limited	GPSC	41.60%	No	●	-	●	●	○	-	●	-	-	-	-
Taiwan	Sheng Yang Energy Company Limited	GPSC	45.00%	No	●	-	●	●	○	-	●	-	-	-	-
China	Anhui Axxiva New Energy Technology Company Limited	GPSC	11.07%	No	●	-	○	○	○	-	●	-	-	-	-

## Remarks

- The company **applies** relevant policy, guideline where sustainability performance data cover **full** scope
- The company **partially** applies relevant policy, guideline where sustainability performance data **partially** cover scope
- **Not relevant** to the company
- The company **does not** apply relevant policy, guideline where sustainability performance data **does not cover** in the reporting scope









## Topic boundary

Environmental												Social			
Environmental Management												A Clean Energy Future and Climate Resilience			
Nox Emission	Sox Emission	Ash & Gypsum Waste	Direct Mercury Emission	Dust Emission	Hazardous Waste	SF6	GHG Scope 1	GHG Scope 2	GHG Scope 3	GHG Intensity (Scope 1 and 2)		Occupational Health and Safety (OHS)	Workforce Development and Well-Being	Human Rights	Sustainable Community
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Governance, Risk Management and Compliance (GRC)	Board of director
	Risk and crisis management
	Code of conduct and compliance
	Information security and cybersecurity
Customer Relationship Management	Customer satisfaction
	Privacy protection
Customer Relationship Management	Installed capacity
	Energy generation
	Efficiency of generation
	Transmission and distribution
	Power outage
	Plant availability
Supply Chain Management	Supply chain management
	Spending analysis
	Critical and high sustainable risk suppliers
	Supplier assessment
Evolving the Business Model	Innovation management
	R&D spending
	Market opportunities
Environmental Management	Energy consumption
	Water withdrawal and consumption
	Effluent and waste
	Environmental compliance
	Air emissions
	Other environmental performances (e.g. Ash, gypsum, SF6)
A Clean Energy Future and Climate Resilience	GHG emissions
Occupational Health and Safety (OHS)	Process and personal safety
	All OHS indicators (e.g. work-related injuries, LTI, LTIFR, ill health, day worked by contractor, etc.)
Workforce Development and Well-Being	Human capital development
	Diversity and equal opportunity
	Talent attraction and retention, hiring, turnover, employee engagement, training,
	Freedom of association
Human Rights	Human Rights due diligence
	Human Rights risk assessment and mitigation
Sustainable Community	Community engagement, satisfaction
	Political contribution, spending, philanthropic activities, contribution

# Task Force on Climate-related Financial Disclosures (TCFD)



Recommended Disclosures	GPSC's Status Mapping	Found in	
		ISR	Website
Governance			
Describe governance practices and data on taskforces related to climate change.	Management of risks and opportunities of climate change, including GHG reduction, business adjustment, and strategies on climate change,	-	
Describe roles of management in assessing and managing risks and opportunities of climate change.	is the responsibility of the Board of Directors and the President & CEO.	-	
Strategy			
Describe risks and opportunities of climate change identified by the company in the short, medium, and long terms.	GPSC identifies risk and probability caused by climate change seen as material to business over the short, medium, and long terms as follows: <ul style="list-style-type: none"><li>Physical risks, including floods, drought, lightning strikes, and tropical storms, and rises in temperature at the earth's surface from projections, with reference to a summary of the IPCC's Sixth Assessment Report (AR6)</li><li>Transition risks and opportunities, including changes in policies, laws, requirements, technological shifts, and consumers' behavioral shift, with reference to a study by IEA and NDC.</li></ul>	-	
Describe the impact of climate related risks and opportunities on the corporate business and financial planning.	GPSC sets out strategies for handling climate change through plans and mitigation plans (operating and under activities across the supply chain) with reference to the impacts of climate change on GPSC.	4-5,12-13, 28	



Recommended Disclosures	GPSC's Status Mapping	Found in	
		ISR	Website
Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	GPSC examines risks concerning climate from undertaking scenario planning, including RCP4.5 and RCP8.5, and define business resilience in its strategy on climate change.	-	
<b>Risk Management</b>			
Describe the company's process for identifying and assessing climate-related risks.	GPSC identifies, ranks, analyzes, and assesses levels of climate change risk impacts at the annual workshop attended by various units, including planning, risk, and corporate sustainability departments, whereby GPSC is aware of risks and financial impacts potentially affecting its business.	-	
Describe the company's process for managing climate-related risks.	GPSC manages climate change risks by formulating climate change strategies embracing GHG reduction and future handling. It also monitors performances and reports them to the Board of Directors and the President & CEO at least every 6 months.	4-5, 28-29	
Describe how the process of identifying, assessing, and managing climate-related risks is incorporated with overall corporate risk management.	<p>The outcomes of annual risk assessment identified, assessed, and managed climate risks and are integrated with GPSC's overall risk management to:</p> <ul style="list-style-type: none"> <li>• Review them during the formulation of the corporate strategic plan</li> <li>• Develop mitigation plans and cope with climate change for supporting GPSC's new-project investment decision-making.</li> </ul>	-	



Recommended Disclosures	GPSC's Status Mapping	Found in	
		ISR	Website
Metrics & Targets			
Disclose Metrics used by the company to assess climate-related risks and opportunities in line with strategies and the risk management process.	GPSC discloses indicators from its examination of risks aligning with strategies and the risk management process, including GHG reduction, the increase in proportion of corporate renewable energy, and expansion of services under new businesses. These are reported in the ISR and on the company's website.	28-29	 
Disclose Scope 1, Scope 2, and Scope 3 GHG emissions including related risks.	GPSC discloses GHG emissions in the ISR.	10-11, 28-29	 
Describe the targets used by the company to manage climate-related risks and opportunities and performance against goals. targets	GPSC sets a goal for GHG emissions reduction in line with the targets of PTT Group and Thailand's policy together with its application of low-carbon technology in operations, apart from raising the proportion of renewable energy for power generation.	27-33, 36-42	

ISR = Integrated Sustainability Report



## ASSURANCE STATEMENT

### SGS (THAILAND) LIMITED'S REPORT ON SUSTAINABILITY ACTIVITIES IN THE GLOBAL POWER SYNERGY PUBLIC COMPANY LIMITED'S INTEGRATED SUSTAINABILITY REPORT FOR 2021

#### NATURE OF THE ASSURANCE/VERIFICATION

SGS (Thailand) Limited (hereinafter referred to as SGS) was commissioned by Global Power Synergy Public Company Limited (hereinafter referred to as GPSC Group) to conduct an independent assurance of the Integrated Sustainability Report for 2021 and the Sustainability Report webpage (hereinafter referred to as the Integrated Sustainability Report).

#### INTENDED USERS OF THIS ASSURANCE STATEMENT

This Assurance Statement is provided with the intention of informing all GPSC Group's Stakeholders.

#### RESPONSIBILITIES

The information in the Integrated Sustainability Report and its presentation are the responsibility of the directors or governing body (as applicable) and the management of GPSC Group. SGS has not been involved in the preparation of any of the material included in the Report.

Our responsibility is to express an opinion on the text, data, graphs and statements within the scope of verification with the intention to inform all GPSC Group's stakeholders.

#### ASSURANCE STANDARDS, TYPE AND LEVEL OF ASSURANCE

The SGS ESG & Sustainability Report Assurance protocols used to conduct assurance are based upon internationally recognised assurance guidance and standards including the Principles contained within the Global Reporting Initiative Sustainability Reporting Standards (GRI Standards) 101: Foundation 2016 for report quality, and the guidance on levels of assurance contained within the AA1000 series of standards and ISAE3000.

The assurance of this report has been conducted according to the following Assurance Standards:

Assurance Standard Options		Level of Assurance
A	AA1000ASv3 Type 2 (AA1000APS Evaluation plus evaluation of Specified Performance Information)	Moderate

Assurance has been conducted at a moderate (limited) level of scrutiny.

#### SCOPE OF ASSURANCE AND REPORTING CRITERIA

The scope of the assurance included evaluation of quality, accuracy and reliability of specified performance information as detailed below and evaluation of adherence to the following reporting criteria:

Reporting Criteria Options	
1	AA1000 Accountability Principles Standard (2018)

#### SPECIFIED PERFORMANCE INFORMATION AND DISCLOSURES INCLUDED IN SCOPE

GPSC Group's Integrated Sustainability Report and on website content are adequately in line with GRI Standard and Electric Utilities Sector Disclosures (EUSD) to fulfill all the required content and quality criteria for the identified aspects data expressed numerically or in descriptive text form 01<sup>st</sup> January – 31<sup>st</sup> December 2021 listed as below;

The scope		The boundary
<b>GRI Reporting Standards</b>		
302-1	Energy consumption within the organization	GPSC Head office
303-3	Water withdrawal	Glow Head office
303-4	Water discharge	GPSC Warehouse
303-5	Water consumption	Central Utility Plant 1 : CUP-1
305-1	Direct (Scope 1) GHG emissions	Central Utility Plant 2 : CUP-2
305-2	Energy indirect (Scope 2) GHG emissions	Central Utility Plant 3 : CUP-3
305-3	Other indirect (Scope 3) GHG emissions (Upstream categories)	Central Utility Plant 4 : CUP-4
	3. Fuel and energy related activities	Sriracha Power Plant
	4. Upstream transportation and distribution	Glow IPP plant
	5. Waste generated in operations	Glow Energy Phase 1 plant
305-4	GHG emissions intensity	Glow Energy Phase 2 plant
305-7	Nitrogen Oxides (NOx), Sulfur Oxides (SOx), and other significant air emissions (Including direct Mercury emission, dust emission, SF6 emission)	Glow Energy Phase 4 plant
		Glow Energy Phase 5 plant
306-3	Waste generated	Glow Energy CFB 3 plant
306-4	Waste diverted from disposal	Glow Energy Solar plant
306-5	Waste directed to disposal	Glow SPP 2/Glow SPP 3 plant (Phase 3)
403-9	Work-related injuries	Glow SPP 11 Project 1 plant
403-10	Work-related ill health	Glow SPP 11 Project 2 plant
<b>Electric Utilities Sector Disclosures (EUSD)</b>		Glow SPP 11 Project 3 plant
EU11	Average generation efficiency of thermal plants by energy source and by regulatory regime	GHECO-One Power Plant
EU30	Average plant availability factor by energy source and by regulatory regime	Combined Heat and Power Producing Company Limited
		Solar Private PPA – GPSC & Glow

#### ASSURANCE METHODOLOGY

The assurance comprised a combination of pre-assurance research, interviews with relevant employees, superintendents and the management. Documentation reviewed and recorded were carried out remotely by connecting the GPSC Group's head office with Central Utility Plant 2: CUP-2 via the internet to prevent the spread of COVID-19 infections. The validation with external bodies and/or stakeholders where relevant and interview the person in charge of producing the report were also carried out remotely for the same reason.

#### LIMITATIONS AND MITIGATION

Financial data drawn directly from independently audited financial accounts has not been checked back to source as part of this assurance process.

#### STATEMENT OF INDEPENDENCE AND COMPETENCE

The SGS Group of companies is the world leader in inspection, testing and verification, operating in more than 140 countries and providing services including management systems and service certification; quality, environmental, social and ethical auditing and training; environmental, social and sustainability report assurance. SGS affirm our independence from GPSC Group, being free from bias and conflicts of interest with the organisation, its subsidiaries and stakeholders.

The assurance team was assembled based on their knowledge, experience and qualifications for this assignment, and comprised auditors experienced in one or more of the following standards; AA1000, GRI, CFO, CFP, AWS, GHG Validation & Verification Lead auditors and experience on the SRA Assurance service provisions.

#### FINDINGS AND CONCLUSIONS



**ASSURANCE/VERIFICATION OPINION**

On the basis of the methodology described and the verification work performed, we are satisfied that the specified performance information included in the scope of assurance is accurate, reliable, has been fairly stated and has been prepared, in all material respects, in accordance with the reporting criteria.

We believe that the organisation has chosen an appropriate level of assurance for this stage in their reporting.

**QUALITY AND RELIABILITY OF SPECIFIED PERFORMANCE INFORMATION**

The material topics and their boundaries are properly defined in accordance with GRI's Reporting Principles for Defining Report Content. In year 2021, GPSC Group has expanded the assured performance data to associated company. For future reporting, more descriptions of GPSC Group and subsidiaries' involvement with impact for each material issue and mitigation efforts should be disclosed. The mechanism for internal audit on the data performance should be established to maintain the system in place.

**ADHERENCE TO AA1000 ACCOUNTABILITY PRINCIPLES STANDARD (2018)****INCLUSIVITY**

GPSC Group has considered sustainability's issues related to stakeholders from viewpoints of various sources. The survey and direct two-ways communication with investors, employee, customers, suppliers and other stakeholders were implemented to receive the concerning issues and organization's understanding of stakeholders.

**MATERIALITY**

GPSC Group has concerned the issues which received from internal and external stakeholders, social trends and United Nations Sustainable Development Goals (SDGs). The effective process to determine the material issues to business has been applied. To identify material issues, external expert and internal executive management has reviewed the stakeholders' opinion. The issues that are material to each stakeholder group are reported in appropriateness, and reflected their important and priority.

**RESPONSIVENESS**

GPSC Group has recognized the importance of Environmental, Social, and Governance (ESG) for the corporate value. The material sustainability issues has been communicated to stakeholders by disclosing in the Integrated Sustainability Report and organization's website. GPSC Group has included the channels to receive stakeholders' feedback.

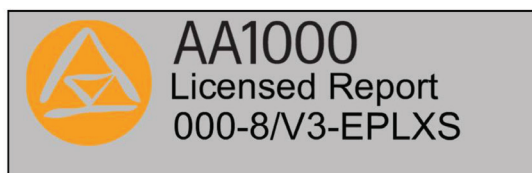
**IMPACT**

Risk evaluation has been demonstrated to identify environmental, social and governance impacts. Performance results related to key issued are reported in the Integrated Sustainability Report Integrated Sustainability Report. Sustainability performances identified have been disclosed changes in data over time. Target setting and performance status in qualitative and quantitative have been measured and reported for material issues.

Signed:

For and on behalf of SGS (Thailand) Limited

Montree Tangtermsirikul  
General Manager  
Bangkok, Thailand  
1 March 2022  
[WWW.SGS.COM](http://WWW.SGS.COM)





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equivalent to turning off **4** bulbs in **1** day and plan a big tree.