BANPU
POWER

EDGE OF ENERGY TRANSFORMATION

Sustainability Report
2021

BANPU
POWER

Mission

- To develop, own and promote both conventional and renewable power businesses using the most efficient technologies available for sustainable growth in pursuit of a position of leadership in Asia.
- To conduct all business in an ethically, socially, and environmentally responsible manner.
- To create sustainable value for shareholders, customers, business partners, employees, and communities while being a good corporate citizen in all countries of operations.

Vision

To be recognized as a pioneer
Asian power company
with a strong reputation for sustainable
development, friendly community relations,
and respect for the natural environment.

Contents

Operational Highlights

Sustainability Yearbook
Member 2022
S&P Global

Having been selected as a member of the Sustainability Yearbook 2022, organized by **S&P Global** which has assessed companies' **ESG** performances across the world.

RISING STAR Sustainability Excellence 2021

Obtaining the Rising Star Sustainability Excellence Awards in the

THB **30 - 100** billion market capitalization category from the Stock Exchange of Thailand.

Having been listed as **Thailand Sustainability Investment (THSI)** for the 4th consecutive year.

THSI THAILAND SUSTAINABILITY INVESTMENT 2021

TRIS RATING
A Strategic Partner of S&P Global

Receiving a corporate credit rating of **"A+"** with a "Stable" outlook from **TRIS Rating.**

Environment

Acquiring the Nakoso IGCC power plant and **Temple I CCGT gas-fired power plant** using high-efficiency and environmentally friendly technology

BANPUNEXT

Investing in renewable energy, power generation technology and smart energy utilization through Banpu NEXT, with an **equity-based renewable generation capacity of**

352 MW

The availability factor (AF) of power plants in which BPP has direct management control was in an **average of**

95.05%

CO_2

The greenhouse gas (GHG) emissions intensity

0.603

tonnes CO_2e/MWh

decreasing **10.8%** compared to target

Deploying the high-efficiency and low-emissions technology for excellent environmental performance.

The sulfur dioxide (SO_2) emissions intensity

0.025

tonnes/GWh

The oxides of nitrogen (NO_x) emissions intensity

0.044

tonnes/GWh

The particulate matters (PM) emissions intensity

0.003

tonnes/GWh

The water consumption intensity

0.877

cubic meters/MWh

Social

0

ZERO ACCIDENT

Zero serious work-related accidents causing lost time injuries or fatalities

The employee engagement scores were

69% in Thailand and 93% in China

BanpuHeart

Cultivating the **"Banpu Heart"**, a strong corporate culture helping unite the employees in driving businesses with a "Banpu Heart" score at

79% in Thailand and 95% in China

Banpu Group and its business partners establishing the "Mitr Phol-Banpu Solidarity to Aid Thailand on COVID-19 Confrontation Endowment" with a financial support of THB **1,000** million to aid the society to mitigate the impacts of COVID-19 pandemic

Governance

Ranked as 1 of 268 listed companies bestowed the "Excellence CG Scoring", assessed by the Thai Institute of Directors (IOD)

CAC
COLLECTIVE ACTION AGAINST CORRUPTION

Having been a member of the Thai Private Sector Collective Action Against Corruption (CAC)

Continuing operating business without any interruptions **amid the COVID-19 pandemic**

No incidents and complaints associated with the environment, society and corporate governance

Messages from Chairman of the Board of Directors and Chief Executive Officer

The year 2021 marked another year Banpu Power (BPP) has faced with various challenges, both from the COVID-19 pandemic and the fuel cost fluctuation, hitting the historical high record. This also included a dynamic change in the energy business due to the enhanced responses to climate change of many countries across the globe after the COP26, moving towards the targets of "Carbon Neutrality" and "Net Zero" greenhouse gas (GHG) emissions. These challenges have been the major factors making BPP, as a power and energy producer, to quickly adapt itself to move through this transitional era. Meanwhile, BPP has to create a balanced sustainable portfolio from the thermal power and renewable energy businesses as well as the energy technology business in order to achieve the goal to deliver the quality power at affordable prices with reliable and eco-friendly manners for the society in accordance with its missions and to support the sustainable development goals (SDGs).

Moreover, BPP has also placed great importance on preparedness for dealing with any unusual conditions derived from the COVID-19 pandemic. As a result, the business continuity management system which has been implemented for a long time can be used immediately. This has made the company's resources management, inclusive of personnel, working systems, and information technology, effectively modified working styles suitable for any situations. More importantly, it has enabled the company to continuously operate during such crises. And since the beginning of the COVID-19 widespread, our employees have been able to work from homes or anywhere while measures have been established to protect our employees from infections and to keep the operations running continuously in order to reduce the impacts on stakeholders as minimal as possible during that period.

The climate change issues directly related to businesses have resulted in a revolution on the power and energy production industry, moving towards a "Low Carbon Society" in the future. Thus, BPP has expanded its investments according to the "Greener & Smarter" strategy focusing on investing in the power plants using advanced and eco-friendly technologies, which have created a rewarding return in the long run. In addition, the synergy with Banpu Group has also increased the company's investment opportunities in countries where Banpu Group has already operated, such as Japan, the U.S. and Australia. This included the investment in Banpu NEXT Company Ltd., which is an entry into the energy technology business for smart energy generation and utilization, corresponding to the needs of growing customer groups in the future.

Assoc. Prof. Dr. Naris Chaiyasoot
Chairman of the Board of Directors

Dr. Kirana Limpaphayom
Chief Executive Officer
and Chairman of
the Sustainability Committee

These challenges have been the major factors making BPP, as a power and energy producer, to quickly adapt itself to move through this transitional era.

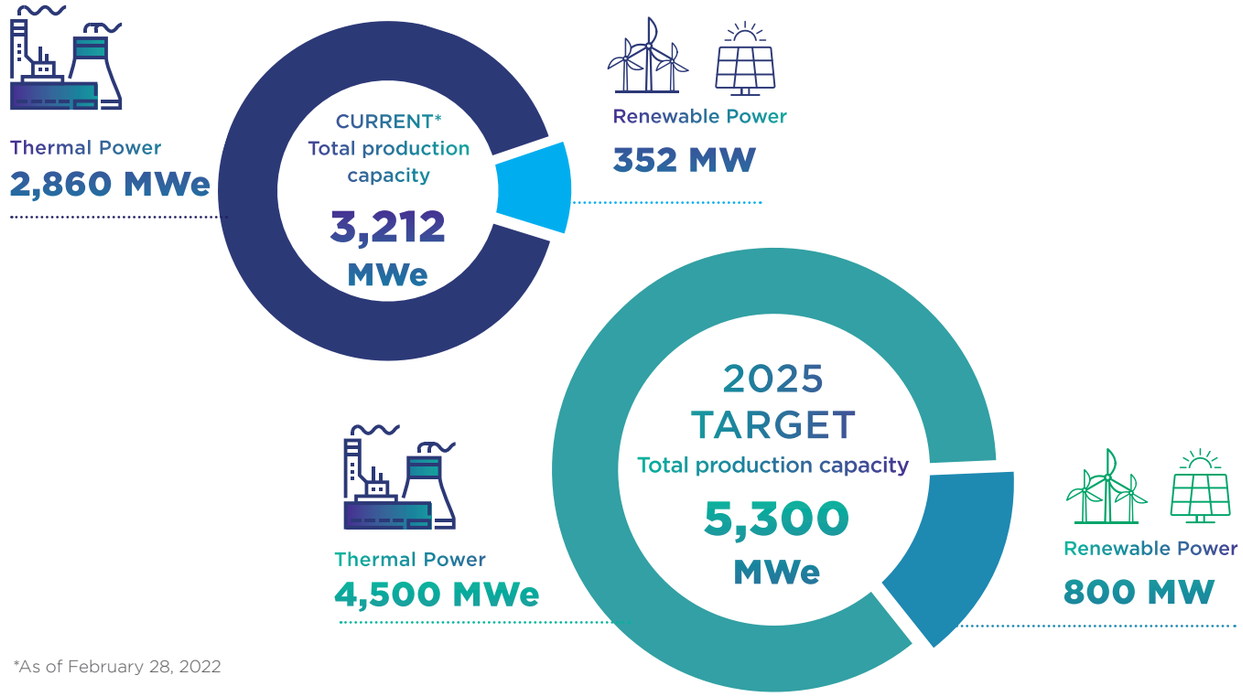
During this challenging period, BPP has successfully invested in the Nakoso IGCC power plant in Japan, the Temple I CCGT gas-fired power plant in the U.S. and the Beryl and Manildra solar power plants in Australia. In pursuant of the Greener & Smarter strategy to achieve the power generation target of 5,300 MWe in 2025, the company's current power generation capacity has increased to 3,212 MWe covering 7 countries, namely Thailand, Lao PDR, China, Japan, Vietnam, Australia, and the U.S. Additionally, the company has also achieved in environmental, social and governance (ESG) operations including:

1 **Receiving the Rising Star Sustainability Awards** from the Stock Exchange of Thailand and having been selected as Thailand Sustainability Investment (THSI) for the 4th consecutive year.

2 **Having been selected as a member of the Sustainability Yearbook,** organized by S&P Global which has assessed companies' ESG performances across the world.

3 **Obtaining a corporate credit rating of "A+"** with a "Stable" outlook from TRIS Rating.

4 **Being ranked in the Excellence CG Scoring** from the corporate governance survey of listed companies conducted by the Thai Institute of Directors (IOD).



*As of February 28, 2022

In preparation for future growth, BPP has attached priority to human capital. Consequently, the employee's competencies have been developed so that they are equipped with knowledges and expertise, being ready for any arising opportunities and challenges both from the reform of the power generation industry and the transition of technologies and future business models. BPP, therefore, has arranged various competency development models for our employees. These included organizing a learning course specific to the business, encouraging work rotations so as to give our employees a hands-on experience, and coaching from executives as well as creating the sound working environment and human resources management to attract high potential people to join and stay with BPP. In addition, the succession plans have been also mapped out and monitored regularly.

On this occasion, we would like to thank all of our stakeholders for the trusts and supports continuously given to BPP, inclusion of all BPP employees who have made this success happened. Although, there will be either change or new challenge in the future, we believe that operating business in accordance with the ESG principles along with our solidarities and commitments will be the key success factors enabling us to overcome every challenge to come as well as to achieve our targets to endlessly deliver the valuable and sustainable energy to the society.

About Banpu Power

BPP has strived to create sustainable business growth with Greener & Smarter strategy along with good corporate governance principles.

Banpu Power Public Company Limited or Banpu Power (BPP) is a subsidiary of Banpu Public Company Limited. Established in 1996, BPP was listed on the Stock Exchange of Thailand (SET) in 2016. The company produces and distributes electricity from thermal power generation and renewable power generation in the Asia-Pacific region, including Thailand, Lao PDR, China, Japan, Vietnam, Australia and the U.S.

Over the past 20 years, BPP has strived to create continuous and sustainable business growth both in terms of investment and management of power generation. With a power business expertise combined with a strong synergy within Banpu Group in relation to business management and operations, BPP has accomplished its full potential in operating business while studying and developing an array of innovations to generate power in a more efficient way. In pursuant of the greener & smarter strategy and an attachment to the good corporate governance principles, the advanced and high technologies, which are safe and environmentally-friendly, have been employed so as to become a leading power producer and distributor in the region, responding to the needs of customers, communities, societies and environment.

Presently, BPP has a total of 42 power plants and projects with an equity-based power and steam generation capacity of 3,121 MWe from the power plants already commencing commercial operations, and 91 MW from the projects under development. By the year 2025, the company targets to achieve the equity-based power generation capacity of over 5,300 MWe, of which 800 MW are from the renewable energy.

Power plants and projects

42 plants/projects

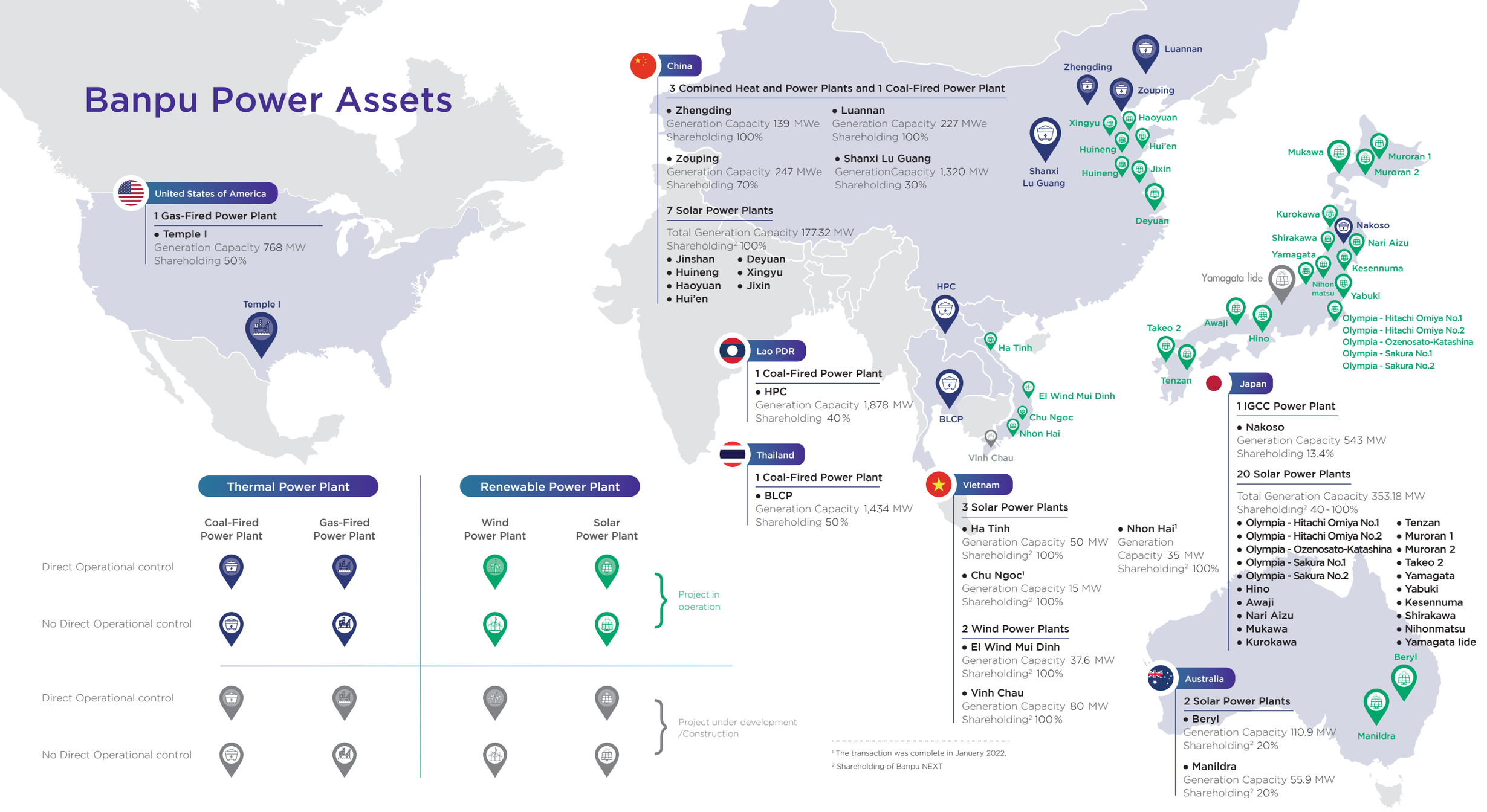
Commencing commercial operations

3,121 MWe

Under project development 91 MW

(As of February 28, 2022)

Banpu Power Assets



	Thermal Power Plant		Renewable Power Plant		
	Coal-Fired Power Plant	Gas-Fired Power Plant	Wind Power Plant	Solar Power Plant	
Direct Operational control	●	●	●	●	Project in operation
No Direct Operational control	●	●	●	●	Project in operation
Direct Operational control	●	●	●	●	Project under development /Construction
No Direct Operational control	●	●	●	●	Project under development /Construction

¹ The transaction was complete in January 2022.

² Shareholding of Banpu NEXT

*As of February 28, 2022

Banpu Power Supply Chain

1 Production Factor Management

Stakeholders: Suppliers/ Trading partner

- Coal
- Natural Gas
- Fuel Oil
- Waste Gas
- Water
- Other Raw Materials and Chemicals

2 Transportation

Stakeholders: Contractors

- Road Freight
- Gas Pipeline
- Rail Freight
- Air Freight
- Sea Freight

3 Production

Stakeholders: Contractors, Employees, Government Agencies, Communities

Thermal Power Plant

Renewable Power Plant

Energy Technology and Smart Energy Solutions

4 Delivery of Products and Services

Stakeholders: Contractors, Employees

Products from Thermal Power Plant

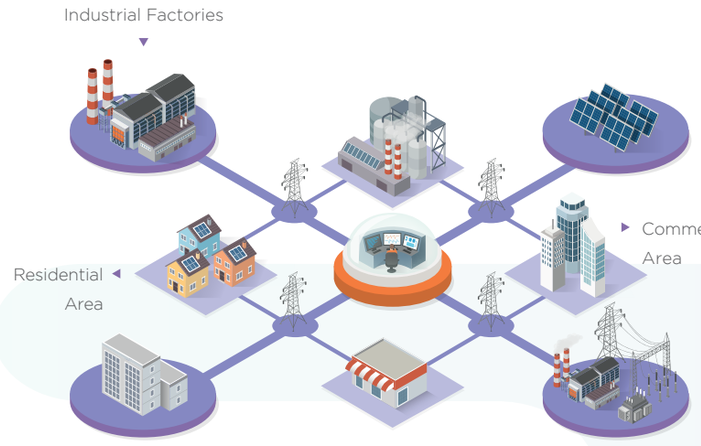
- Electricity
- Steam and Heat
- Cooling Water
- By-products (Ash and Gypsum)

Products from Energy Technology and Smart Energy Solutions

- Electric Cars
- Electric Ferries
- Batteries
- Solar Rooftop Solutions
- Energy Trading Platforms
- Smart City and Energy Management

5 Customer Management

Stakeholders: Customers, Employees



About This Report

Banpu Power Public Company Limited (BPP) has annually published the sustainability report (Report), with an aim to disclose its management processes and environmental, social, and governance (ESG) performances relating to core issues of BPP, previously disclosed in the sustainability report of Banpu Group. The Report has been developed for the fourth year.

The Report has been prepared in accordance with the Global Reporting Initiatives Standards (GRI Standards): Core Options with additional indicators for electric utilities sector disclosures. Additionally, the operating results have been presented and aligned with the United Nations Sustainable Development Goals, while the financial information disclosed has complied with the Thai Financial Reporting Standards. More importantly, the contents published in the Report have been analyzed through the assessment of 37 sustainability issues of the power business for the year 2021, 12 topics of which are associated with the company's core sustainability materials.

Reporting Boundary

BPP reports its sustainability performance on all related key issues, covering the businesses in which BPP has direct management control, namely:

- **The three combined heat and power (CHP) plants in China** (Zhengding CHP Plant, Zouping CHP Plant, and Luannan CHP Plant)
- **Offices in Thailand and China**

The sustainability performance of Temple I Gas-fired Power Plant in the U.S., where BPP has direct management control, however, is not included in this Report since the company has successfully invested in November 2021. It is, therefore, in the process of updating the information to be the same standard.

The sustainability outcome of BPP's businesses operated as a joint venture company, and the company has no direct management control, are not included in BPP's operating results. Nonetheless, these businesses are playing a key role in generating revenue and growth, some of their sustainability performances have been reported based on the interests of stakeholders, including:

- **The renewable energy and energy technology businesses invested through Banpu NEXT Co.,Ltd.**
- **BLCP Power Plant**
- **HPC Power Plant**

Reporting Period

This Report covered the operational performance from 1 January 2021 to 31 December 2021, including the ongoing activities within the first quarter of 2022, in order to provide readers with the most updated information.

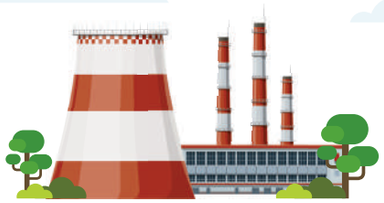
Assurance

This report has been certified by external agencies under the same database as Banpu Group. Meanwhile, the social and environmental performance of the thermal power business in China are reported in following categories:

- GRI 302-1 Energy consumption within organization (2016)
- GRI 302-3 Energy intensity (2016)
- GRI 303-3 Water withdrawal (2018)
- GRI 303-4 Water discharge (2018)
- GRI 303-5 Water consumption (2018)
- GRI 305-1 Direct (Scope 1) GHG emissions (2016)
- GRI 305-2 Energy indirect (Scope 2) GHG emissions (2016)
- GRI 305-4 GHG emissions intensity (2016)
- GRI 305-7 Nitrogen oxides (NO_x), sulfur oxides (SO_x), and other significant air emissions (NO_x, SO_x, PM and Hg) (2016)
- GRI 306-3 Waste generated (2020)
- GRI 306-4 Waste diverted from disposal (2020)
- GRI 306-5 Waste directed to disposal (2020)
- GRI 403-8 Workers covered by an occupational health and safety management system (2018)
- GRI 403-9 Work-related injuries (2018)
- Lost Time Injury Frequency Rate (LTIFR) and Injury Severity Rate (ISR)
- Tier-1 Process safety event rate

To ensure that the data presented is correct in accordance with the reporting principles, BPP is committed to undertaking the data assurance of the Report continuously as well as increasing more key indicators for sustainability material topics in the future.

Summary of Major Changes and Development in 2021



03
March

Acquiring the Nakoso IGCC Power Plant in Japan

the first ever power plant commercially developed by using today's largest Integrated Gasification Combined Cycle (IGCC) technology, **with a generation capacity of** 543 MW

Investing in two Solar Power Plants in Australia

with a total capacity of 166.8 MWdc

- Beryl Solar Power Plant **with a generation capacity of** 110.9 MWdc
- Manildra Solar Power Plant **with a generation capacity of** 55.9 MWdc

06
June

08
August

Investing in the Temple I Gas-Fired Power Plant in the U.S.

with a generation capacity of 768 MW

Investing in the Club Car business,

which can be customized for varying models and purposes. It provides a wide range of services including sales, rental fleets, and concessions of Club Car in Thailand, Lao PDR, and Cambodia.

Commencing a commercial operation of the Kesennuma Solar Power Plant in Japan

with a power generation capacity of 20 MW, capable for generating and supplying electricity to approximately 6,000 households in the community.

Entering into the agreement to acquire shares in an energy management service company,

officially registered with the Thai Energy Management Company Association.

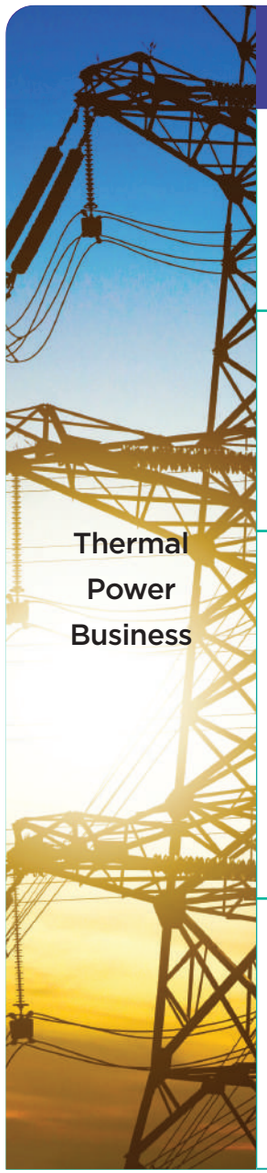
11
November

12
December

Signing a power purchase agreement to invest in the Ha Tinh Solar Power Plant

in Vietnam, **with a generation capacity of** 50 MW

Challenges and Opportunities



Country	Challenges and Opportunities	Banpu Power's Strategies
Thailand	• The improvement of Thailand's power development plan, which considered the targets to purchase renewable power on an annual basis, taking into account the fuel consumption potential as well as available infrastructure in each region, including risks possibly arisen from disruptive technology. • Focusing on environmental impacts with higher standards.	• Conducting a study on details and impacts from changes of related policies, including looking for investment opportunities and assessing competitive advantages as well as preparing to participate in various projects open for development by the government sector. • Operating businesses corresponding to the market conditions through managing costs and increasing production efficiency as well as maintaining equipment in accordance with the environmental standards, inclusion of monitoring and investigating the environmental impacts possibly arisen.
Lao PDR	• The Lao government putting great emphasis on reforming the country into the ASEAN energy source (Battery of ASEAN) and being the major power exporter of the region. • An urbanization development and a continuous infrastructure improvement in the country.	• Managing the power transmission and generating systems to ensure that the power plants have the utmost availability and efficiency at all times, which is important for the electricity systems of both Thailand and Lao PDR. Moreover, the power plant increased readiness by stocking equipment parts and improving the speed and efficiency of maintenance, contributing to smooth power generation. • Promoting a community engagement in the area in tandem with an improvement of local people's living standards and a support for community development, inclusive of consistently managing relationships with local agencies and communities.
China	• The Chinese government has announced that it would peak its carbon emissions by 2030 and achieve carbon neutrality by 2060, raising the proportion of non-fossil-fuel energy power generation to 80%. • Energy crisis caused by production problems of coal exporters in many countries coupled with the decline in domestic production. As a result, coal prices, the primary fuel for power generation, climbed up steadily. Moreover, the Chinese government continued the fixed electricity price scheme, prompting some power plants to scale down their production. • Reforming the electricity market by opening a wholesale market for all coal-fired power plants. The liberalized wholesale market allows commercial and industrial consumers to buy and sell electricity directly from the producers. • Formation and regulations on the Emission Trading Scheme (ETS). • Establishing measures to improve air quality by continuously reducing the number of pollutants released into the atmosphere.	• Efficiency enhancement and strict cost control by having a strategy to purchase and reserve coal at the right time. • Using high efficiency, low emissions (HELE) technology, in such a new project as Shanxi Lu Guang power plant. Moreover, keeping ultra-low emissions of air quality released from stacks in order to be an example of power plant using advanced and environmentally friendly technology contributing the economic and environmental protection values to society. • Assessing the greenhouse gas (GHG) emissions from the three combined heat and power (CHP) plants and improving the energy efficiency in order to maintain the GHG emission level set by the government as well as seeking opportunities to participate in the ETS. • A readiness to adjust sales of electricity, steam, hot water, and chilled water either in the summer season or according to market conditions, inclusion of a plan to expand the power generating capacity to increase the power plant's availability in producing and supplying both power and steam.
The U.S.	• Electricity demand in the U.S. would increase steadily at an annual average growth rate of around 1% with the increasing power generation from natural gas and renewables. • Low gas prices due to the discovery of natural gas resources from shale gas in the U.S.	• Operational readiness during the time when electricity consumption peaks in winter and summer, by maintaining the power plant according to the annual plan as well as installing equipment that increases generation capacity to suit the needs of the market. • Taking advantage of own gas storage facilities to manage the cost of gas prices that have been volatile during the year. • Managing predictable cash flows, such as Heat Rate Call Options Agreement that will earn a fixed revenue amount as agreed in the agreement. • Seeking opportunities to invest in various projects that are aligned with the country's energy development policy and also looking for an opportunity to enter into a power purchase agreement with major electricity consumers or expand the business into the retail markets.

Challenges and Opportunities

Country	Challenges and Opportunities	Banpu Power's Strategies
Thailand	• Allocation of new renewable power plants according to the government's promotion policy, such as the community waste power plants, Pracharat biomass power plant projects, the public sector's solar energy projects, including the transmission system development plan to enhance the power system stability and efficiency, being the grid connection center and linking with the distribution system in order to be able to accommodate renewable energy in the future (Grid modernization). • Promoting a tangible utilization of clean energy and creating the integrated clean energy consumption ecosystem.	• Seeking investment opportunities and assessing competitive advantages, inclusion of preparation for participating in various projects open by the governmental sector. • Making a difference by offering full-range smart energy solutions, using advanced and suitable technologies, designing products and services based on customer pain points and requirements with an aim to improve the quality of life for customers.
China	• The Chinese government has announced that it would peak its carbon emissions by 2030 and achieve carbon neutrality by 2060, raising the proportion of non-fossil-fuel energy power generation to 80%. • Preparedness for formulating and regulating the GHG emission reduction credit (China Certified Emission Reduction or CCER).	• Monitoring policies of the government and other related agencies to assess the investment opportunities in the solar rooftop installation business, etc. • Conducting studies in order to look for opportunities to participate in the CCER projects from solar power plants.
Japan	• Japan's energy development plan is clear with a target to increase the proportion of electricity consumption from renewable energy by 22 - 24% by the year 2030. • Having lowered the Feed-in Tariff (FiT) scheme and adjusted the solar energy's purchase prices from the FiT scheme throughout the project life-cycle to the auction scheme since 2017. • Regulatory changes for the solar power plants' development for example, a project with a production capacity of more than 40 MW is required for reporting the environmental impact assessment (EIA) results, effective April 2020.	• Preparedness for assessing the investment opportunities and project development as well as conducting feasibility studies on investing in the solar rooftop installation business and the virtual power plants, including the energy trading and retail electricity platform, etc. • Conduction studies on details and impacts from policy and regulatory changes by relevant government agencies, inclusive of analyzing the impacts on projects under a continuous development in order to enable the power plant projects to commence their commercial operations as planned.
Vietnam	• Supporting an increase in renewable power production proportion, aiming to increase wind capacity to 18% and solar capacity to 20% of the total installed capacity by year 2045 (The 8th Draft Power Development Plan). • Presently, the Feed-in Tariff (FiT) scheme offers a fixed purchased price throughout the project's life cycle. However, such a FiT scheme will be binding on the projects operated within the specified period. • Adjusting the solar power purchase from the FiT scheme to the auction scheme.	• Building a relationship with local government agencies and focusing on becoming a mutually responsible partner with government agencies to sustainably engage in local community development by providing continuous support for community activities. • Studying primary data and thoroughly evaluating the possibility to seek additional investment opportunities as well as following up the project development progress able to commence commercial operations as planned by engaging consultants in various fields, such as engineering and environmental experts, legal counsels, financial advisors, and accounting and tax specialists, etc.
Australia	• Supporting renewable power production, the Australian government announced its commitment to net-zero emissions by 2050.	• Continuously sought investment opportunities, focusing on project development capabilities, building trust with business partners and promoting growth in renewable energy and related businesses. In addition, the Company is studying the feasibility of developing the integrated energy solution platform and energy trading business.

Banpu Power Sustainable Development

BPP is dedicated to operating the energy business through proper innovation and technology utilization with an aim to deliver energy creating values for economic and social development with affordable prices and reliable & eco-friendly manner. Not only continuously improving its operational efficiency and investing in the clean energy, BPP has also increased its ability to adapt itself to today's rapid changes. The COVID-19 pandemic and the climate change leading to the growth of renewable energy and production technology as well as smart energy utilization, in particular, are the challenges and opportunities for BPP to develop its strategies and lay the sustainable development foundation by taking into account the value creations for all stakeholders in the long term.

Affordable

- **Clean and appropriate innovations and technologies**
- **Investment structure and proper management for each project**
- **Engagement of business partners throughout the supply chain**

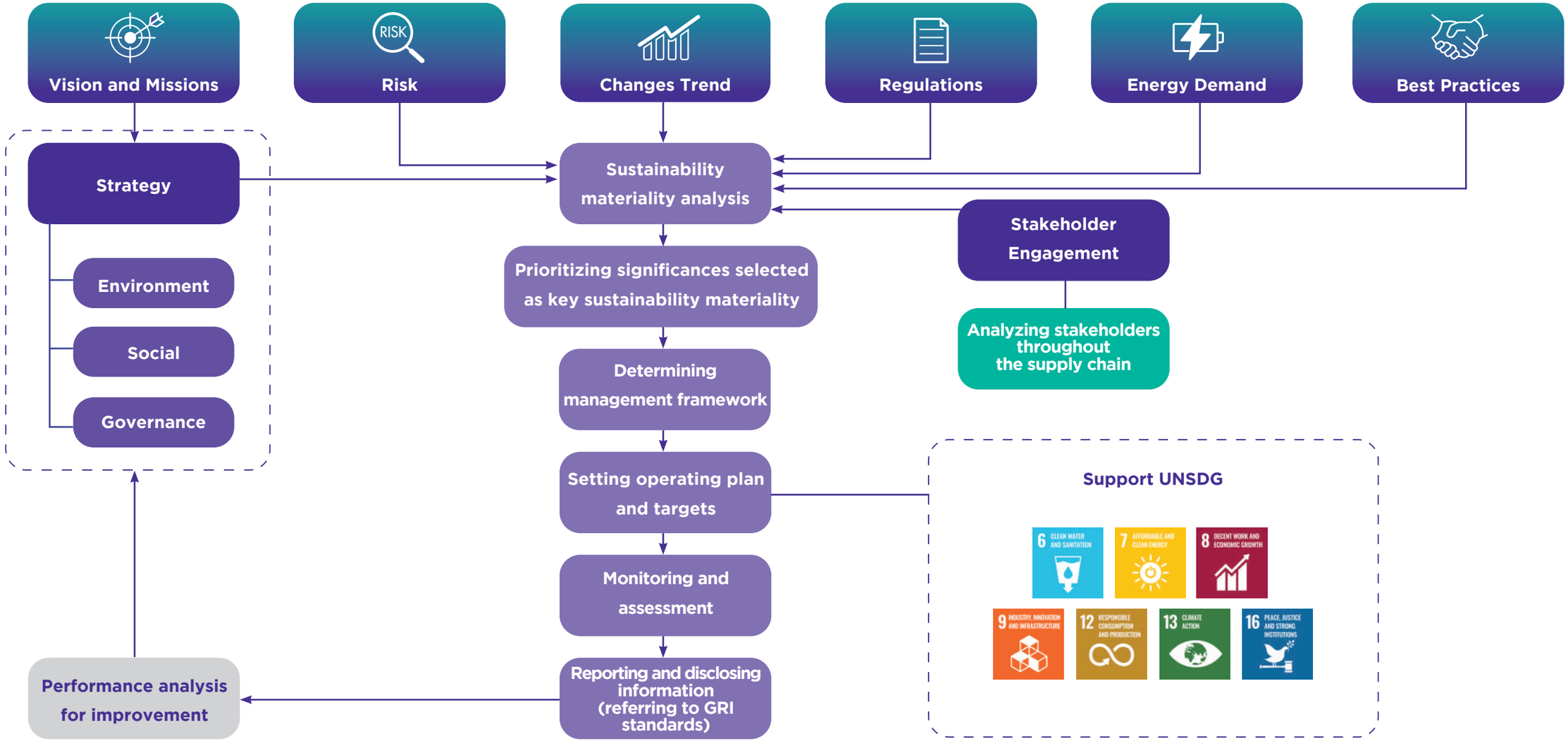
Reliable

- **Corporate governance**
- **Risk management**
- **Employee management and human capital development**

Eco-Friendly

- **Implementation of the eco-friendly operational standarads and high technologies**
- **Stakeholders and surrounding community engagement**
- **Occupational health and safety**

BPP has set a framework to drive its operations and growth through the sustainable development principles, taking into account the stakeholders and all aspects of changes. Additionally, the short- and long-term strategies have been established, inclusive of assessment of the sustainable development performance by determining key indicators covering environmental, social and governance (ESG) dimensions. Consequently, all executives and employees are assigned to mutually drive these strategies to the success.



Sustainability Policy and Strategy

Creating Competitive Advantages

Human Resources Development: BPP has developed professionalism as well as enhanced competencies and leaderships of its employees so that they can adapt themselves to any changes, including promoting a cross-functional collaboration through a corporate culture. Thus, they have learnt to know each other.

Process Development: BPP has focused on operational excellence through innovation and continuous improvement since the effective procedure will help reducing natural resources consumption and waste generation as well as enhancing competitive advantages. Additionally, the efficient risk management will make the management and monitoring processes as well as a decision making better.

Products: Delivering valuable products and services with stability, reliability, environmentally friendly and reasonable prices.

Creating Values for Stakeholders

Legal Compliance: BPP has conducted its business with good corporate governance and code of conduct. It has also fully complied with various laws and regulations as well as applied to the international best practice standards.

Occupational Health and Safety: A safe working environment has been created for employees and those involved.

Environment: BPP has been looking for opportunities to develop renewable energy projects, use clean technology, and reduce negative environmental impacts through an effective environmental management system, while lowering resource consumptions and waste generations as well as promoting the efficient resource utilization with maximum benefits.

Society: BPP has governed its business with transparency and social responsibility, respecting to stakeholders' human rights, strengthening relationships and acceptance from the communities through the effective stakeholder engagement process. Additionally, the sustainable values have been created via taxation for development, employment, and community development projects focusing on learning and self-reliance.

Sustainability Committee Structure

BPP has set up the Sustainability Committee to govern and oversee the corporate sustainability's strategies and operations. The Sustainability Committee consists of top management from each department/business unit with following responsibilities:

- Formulate and review sustainability policy, ESG strategy and related policies
- Govern the deployment of sustainability policy and ESG strategy into day-to-day business operations
- Review stakeholder engagement and materiality assessment processes including the outcomes
- Review ESG targets and performance

The sustainability policy and operating directions were approved by the Board of Directors prior to further implementation. Additionally, BPP has driven the sustainability through the **Banpu Heart** corporate culture, consisting of the shared value related to **Sustainable Development**, of which all employees and executives have a duty to create sustainability. Thus, they have performed with social and environmental responsible manners, inclusive of making decisions based on the principle of corporate and stakeholder sustainability and being a good corporate representative to communicate correct information to stakeholders, such as joint-venture companies, business alliances, suppliers, contractors, sub-contractors, customers and communities.

Sustainability Performance Assessment

Since the sustainability operations must be consisted of formulating good policies and strategies with appropriate key performance indicators (KPI) initiated by management, drawing employee participation to turn these policies and strategies into actions, BPP has assessed the sustainability performance in various levels through the following procedures and KPIs:

- **The Board of Directors Performance Appraisal**

  BPP has determined to evaluate the Board of Directors performance once a year through self-assessments divided into three levels as follows:

The individual performance appraisal

The whole Board's performance review

The sub-committees' performance evaluation

- **The performances of chief executive officer (CEO) and top management** have been assessed against the annual and long-term targets twice a year, with contributions related to environmental, social and corporate governance (ESG), namely:
  - **Carrying out operations by maintaining the Availability Factor (AF) of the power plants to meet the annual target set** in order to manage the returns on projects and maintain the production efficiency. This in turn, will contribute to an increase of resource consumption efficiencies such as fuel, water, etc.
  - **Keeping the ESG performance at the national level** and being a member of Thai Private Sector Collective Action Against Corruption (CAC).
  - **Fully complying with laws** with no incidents involved with violations of both local and international ESG laws.
  - **Implementing occupational health and safety operations without serious work-related accidents**, no work-related fatalities of employees and contractors, and no lost time injury frequency rate (LTIFR).
  - **Executing environmental operations, fully complying with environmental laws**, maintaining environmental quality as required by laws, including managing the business units BPP has management control in order to emit a greenhouse gas (GHG) of no more than 0.676 tonnes CO_2e/MWh and consume water lower than 0.868 cubic meters/MWh.
  - **Establishing employee engagement**, recruiting and developing employee competencies according to the Greener & Smarter strategy.
  - **Creating stakeholder engagement** across multiple channels.

- **Conducting the employee and executive performance reviews twice a year via the key performance indicators (KPI) in two aspects,** operating performance and behaviors relating to corporate culture promotions.

- **Coordinating with Banpu Group to analyze the performance in comparison with the best practices or standards of the industry group (Gap Analysis)** for example, the analysis for better improvement via various sustainability assessment tools including S&P Global Corporate Sustainability Assessment (CSA), Carbon Disclosure Project (CDP), and the annual sustainability assessment by the Stock Exchange of Thailand, etc.

Performance 2021

4 March 2021

BPP arranged the Sustainability Committee Meeting 2021 to review ESG targets and performance in the past year, and review the results of materiality assessment.

12 October 2021

Due to the COVID-19 epidemic situation, **BPP organized the online conference on occupational health, safety, environment and community development as well as sustainable development, or called as ESG Summit 2021** to develop strategies and promote environmental, social, and corporate governance practices across the organization. In this event, sustainability consultants were invited to share knowledge on the topic of ESG: from Strategy to Action, including presentations of ESG strategic plans by executives in each business unit.

2 December 2021

BPP held the BPP Sustainability Workshop 2021 to provide ESG knowledge and raise awareness among executives, employees and related parties. It presented an analysis of sustainability assessment results from S&P Global and the Stock Exchange of Thailand, including sustainability issues that the company would like to improve performance to respond the expectations of stakeholders. This will be used to adjust the annual action plan and improve performance in the next year.

Stakeholder Engagement

The Company focuses on creating stakeholder engagement and inclusiveness in order to help determine material ESG issues in its operations, prioritize issues for implementation to respond to all stakeholders' expectations, and disclose performance information with transparency in accordance with the international engagement practice – the AA1000 Stakeholder Engagement Standard (AA1000SES).

Stakeholder Analysis Process

1. Identify stakeholders involved with BPP's operations, both inside and outside the organization.
2. Determine levels of BPP's impacts on stakeholders in environmental, social and governance aspects.
3. Determine levels of stakeholder influence on BPP regarding finance, operations, rules and regulations, reputation and strategies, etc.
4. Classify stakeholders based on levels of BPP's impacts and levels of stakeholder influence.
5. Prioritize the importance of stakeholders to determine appropriate engagement channels for each group of stakeholders.

Stakeholder Engagement Standard

In past year, the Company reviewed stakeholder identification in May 2021 and found six groups of **key direct stakeholders** as follows:

1. **Joint Venture Partners, Shareholders, Investors and Financial Institutions**
2. **Employees**
3. **Government Agencies**
4. **Customers**
5. **Suppliers/ Contractors**
6. **Communities and Society**

Stakeholders	Engagement Channels	Stakeholders' Issues of Interest	Key Activities
1 Joint Venture Partners, Shareholders, Investors and Financial Institutions	• The Board of Directors meetings of subsidiaries and joint ventures • The Annual General Meeting of Shareholders • Presentation of investment information on various agendas such as the quarterly meetings and the roadshows, to present information and answer questions • Organizing the analyst meetings • Presentation of information at the Opportunity Day event organized by the Stock Exchange of Thailand • Providing channels for receiving complaints • Conducting a satisfaction survey • Preparation of the annual report and sustainability report • Dissemination of information via the website	• Performance, project development, and business growth related to climate change • Financial and accounting policies • Cash flow management • Cost control • Provision of accurate and complete financial information within an appropriate time frame • Risk management • Business operation transparency • Developing and creating innovations to enhance competitive advantage • Qualifications and compensations of the Board of Directors and executives • Operation of socially responsible businesses with strong ESG management	• Establishing the Greener & Smarter strategy; investing in renewable energy business through Banpu NEXT and investing in natural gas-fired power plants • Formulating climate change policy and management approach; disclosing risks, impacts, and climate-related activities • Implementing a risk management system in all business units • Aligning business operations with the Corporate Governance Policy and Code of Conduct; participating in the annual CG assessment, in 2021, the Company received a five-star rating (Excellent) from the Corporate Governance Report of Thai Listed Companies (CGR) 2021, organized by the Thai Institute of Directors (IOD); being certified as a member of Thai Private Sector Collective Action Against Corruption (CAC) • Evaluating qualifications of the Board of Directors for the preparation of a board skill matrix, and appointing an additional director whose qualifications and experience align with BPP's performance targets • Participating in the ESG performance assessment (In 2021, BPP received the Rising Star Sustainability Award from the Stock Exchange of Thailand) • Participating in the Corporate Sustainability Assessment 2021 and being selected as a member of the S&P Global Sustainability Yearbook 2022
2 Employees	• Conducting an employee engagement survey • Conducting a Banpu Heart corporate culture survey • Setting up the Welfare Committee • Setting up the Occupational Health and Safety Committee • Setting up the Innovation Committee • Organizing CSR activities • Organizing activities to promote the corporate culture • Providing channels for receiving complaints • Developing a performance appraisal system • Dissemination of news release within the organization • Preparation of the annual report and sustainability report • Dissemination of information via the website	• Business directions and the organization's sustainable growth	• Establishing two-way communication with employees to regularly create understanding and employees' participation
		• Business ethics and responsibility for employees	• Communicating about corporate governance and integrating it with the corporate culture
		• Fair compensation • Performance appraisal • Career path • Capacity building • Participation in decision-making and allowing employees to voice their opinions • Work-life balance	• Ensuring that labor management complies with laws and international standards and establishing clear, transparent, and fair Key Performance Indicators (KPI) • Allocating budget and providing capacity-building programs; preparing individual development plans • Cultivating Banpu Heart corporate culture
		• Working environment and occupational safety and health	• Monthly checking on working environment and safety • Determining appropriate preventive measures against the COVID-19 pandemic for each workplace, such as developing information systems and other systems to support remote working; providing health checks before starting work; facilitating vaccination for employees, etc.

Stakeholders	Engagement Channels	Stakeholders' Issues of Interest	Key Activities
 **3** **Government Agencies**	• Meetings and visits on various occasions • Site visits and operation inspections • Submission of reports and information as required by laws • Disclosure of information as requested • Participation in the projects organized by the government • Preparation of the annual report and sustainability report • Dissemination of information via the website	• Legal and regulatory compliance, and management of potential economic, social, and environmental impacts from non-compliance	• Compiling and regularly updating relevant laws • Implementing a compliance risk inspection and monitoring system, particularly monthly audits and reporting and independent auditing • Power plants under BPP's direct management are certified for quality, safety, and environment management.
		• Corporate governance according to the Code of Conduct	• Announcing the Corporate Governance Policy and Code of Conduct and regularly reviewing and monitoring performance
		• Creating economic, social, and environmental values	• Carrying out corporate social responsibility (CSR) projects; paying taxes as required by laws; and promoting local procurement and employment
		• Optimal utilization of natural resources	• Carrying out environmental projects to minimize resource utilization
 **4** **Customers**	• Meeting with customers to devise the work plan, understand market situations, and set delivery targets according to the plan • Meeting for operators to share their experiences on power plants operations and contract management • Visiting customers to learn about their problems and find ways to improve • Disclosing information as requested • Conducting a customer satisfaction survey • Establishing a complaints mechanism via multiple channels such as by telephone and via website	• Availability Factor (AF) of electricity and other energy forms as specified in the agreements • Delivery of quality products and services as agreed at affordable prices • Business continuity management to deliver products and services without interruption in case of unexpected crises	• Implementing efficient production and maintaining the AF of electricity and other energy forms as specified to supply affordable and accessible energy according to customers' needs • Preparing the business continuity management plan to ensure continuous delivery of products and services without interruption even amid crises • Implementing the ISO 9001 quality management system

Stakeholders	Engagement Channels	Stakeholders' Issues of Interest	Key Activities
 **5 Suppliers/Contractors**	• Disclosure of procurement information via the website or applications • Meeting with suppliers/ contractors • Training for suppliers/ contractors to build capacity and create working safety • Conducting a satisfaction survey	• Procurement and returns • A fair selection process • An operation/maintenance outage plan • Working environment and work safety	• Ensuring equitable disclosure of procurement information • Carrying out transparent procurement with fair selection criteria overseen by the Supplier/Contractor Selection Committee • Establishing environmental and safety measures as guidelines for contractors and relevant parties at the equivalent standard for employees
 **6 Communities and Society**	• Conducting a community attitude survey • Surveying the community's basic information and opinions prior to the start of a project • Providing channels for receiving grievances over the phone and on the website • Meeting with the community • Establishing a joint development committee with the community • Carrying out community relations and activities with the community • Site visits to BPP's operations • Preparation of the annual report and sustainability report • Dissemination of information via the website	• Environmental Management	• Deploying High Eefficiency, Low Emissions (HELE) technology in project design and the improvement of the production process • Establishing an efficient environmental management and monitoring system. Using clean technology for limiting pollutant level to ultra-low emissions.
		• Community Development Projects • Social Responsibility	• Regularly involving communities and looking for opportunities to carry out projects to build capacity and sustainability • Providing aid to communities and society during the COVID-19 pandemic, such as financial support to curb the spread and donation of medical equipment and survival bags

In addition, the Company also has other groups of stakeholders, which are considered to have minor influence on the BPP's operations and may indirectly affect by BPP's activities, such as the media, civil society and non-governmental organizations (NGOs).

Stakeholder Satisfaction Survey

In 2021, BPP held a satisfaction survey with five stakeholder groups, i.e., joint venture partners, regulatory bodies, consultants, trading partners, and financial institutions. The satisfaction survey questionnaire was sent to respondents via online channels to gather information, and result was used to improve BPP operation. The result revealed that 97.56% of the stakeholders rated their satisfaction level at "Very Good" and 2.44% rated at "Good".

Topics	Score (%)
Working with BPP people	95
Compliance with partnership terms and conditions	100
Transparent treatment and selection criteria	99
Communication channel effectiveness	93
Partnership contribution together	98
Cooperation in information provision and exchange	97

Materiality Assessment

BPP conducted a materiality assessment related to its business operations to prioritize short and long-term sustainability issues. BPP has established strategies and targets for 2021 - 2025 in alignment with the **Greener & Smarter** strategy, with an action plan and appropriate indicators. There are regular performance monitoring and assessment by business units, the Sustainability Committee, the Risk Management Committee, and the Board of Directors. In addition, the external assessment results at the national and international levels are reviewed to devise a plan to elevate the Company's sustainability operations to keep us with the content changes, comply with international standards, and satisfy stakeholder expectations.

BPP's materiality will be assessed by prioritizing its significances in accordance with the Global Reporting Initiative (GRI) and AA1000 AccountAbility Principles (AA1000AP). The materiality prioritization has been considered based on the importance on BPP and stakeholders covering environmental, social, and governance (ESG) issues. The significant materiality has been annually reviewed by the Sustainability Committee. The sources of sustainability issues include:

- Trends or directions of changes in the energy and related businesses
- Related laws and change trends in the future
- Current and future demand of customers
- Operational strategies and growth
- Best practice standards in the power and other related businesses
- Operational and growth-related risks
- Social and environmental risks

Materiality Assessment Process

1

Identifying related sustainability topics

BPP has identified the sustainability materiality by studying on various sources and stakeholder participation. This has done through collecting business related issues and expectations, inclusive of a thorough assessment of risks and changes arisen. In 2021, stakeholder's opinions were taken for reviewing and identifying the core materiality presented in this report, for example,

- International stakeholder expectations, such as the ESG performance questionnaire from assessment agencies and financial institutions.
- Arranging visits to clarify the projects and listen to suggestions from the government agencies.
- Organizing visits to explain and hear the opinions from joint venture partners, regulatory agencies, consultants, suppliers, customers and financial institutions.
- Satisfaction survey results from stakeholders who have been collaborated with BPP by sending the online questionnaires to joint venture partners, regulatory agencies, consultants, suppliers and financial institutions.
- Satisfaction survey results from power plants' customers by meeting.
- Holding meetings to update the progress of BPP and listening to opinions from various meetings conducted such as the shareholder meetings and the analyst meetings, etc.
- Monitoring of the ESG policies, laws, and expectations at the local and international level.
- The results of the employee engagement and Banpu Heart scores and employee feedback both from online surveys by external consultants and organizing focus group meetings within the organization.

2

Identifying each materiality significance on BPP's operations

Levels of impacts on financial and operational performances, strategies, reputation, and legal compliance of BPP have been assessed in conjunction with the magnitudes and likelihoods. These include a forecast of risks and newly arising risks or the situation of BPP when the sustainability materiality is evaluated.

3

Identifying each materiality significance on stakeholders

A degree of impacts on all stakeholders, focusing on key stakeholders in each issue that are affected both positively and negatively from BPP's operations.

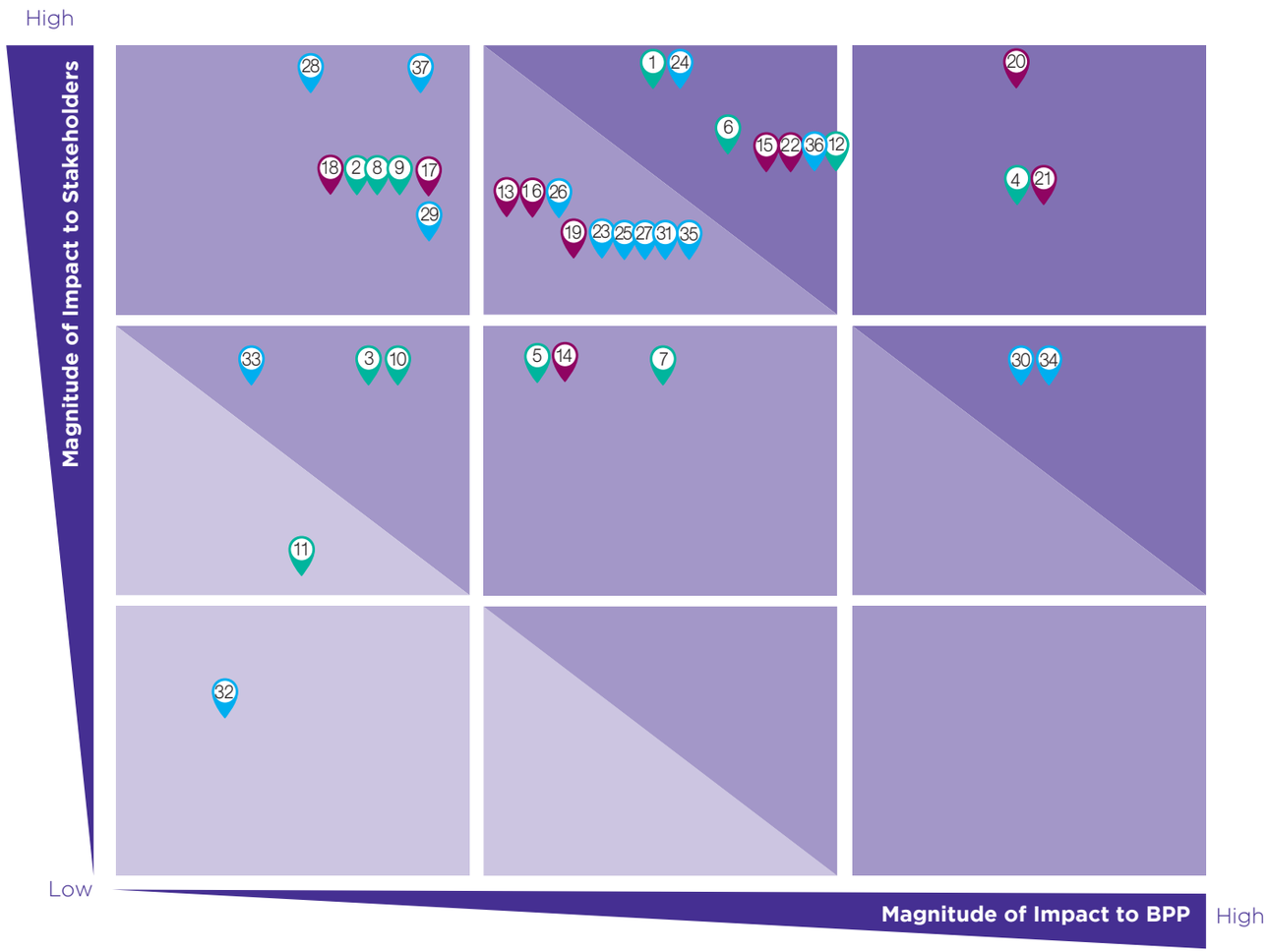
4

Materiality significance prioritization

Each material topic is screened and prioritized according to its impacts on BPP and the stakeholders in order to select the significant materiality to formulate the sustainability strategies and operations reviewed by the Sustainability Committee and the Board of Directors.

Materiality Matrix

In the past year, BPP reviewed sustainability issues for the year 2021 by the Sustainability Committee and approved by the Board of Directors in May 2021. The assessment results of such materiality sustainability issues were used to define the content of this report.



Environment	1. Air emissions 2. Ash 3. Biodiversity 4. Climate strategy and GHG emissions 5. Effluent 6. Electricity generation 7. Energy efficiency 8. Hazardous waste 9. Leakage & spillage 10. Non-hazardous waste 11. Transmission & distribution 12. Water related risk
Social	13. Community engagement 14. Corporate citizenship & philanthropy 15. Human capital development 16. Human rights 17. Labor practices 18. Occupational health 19. Resettlement 20. Safety 21. Succession planning 22. Talent attraction & retention
Governance	23. Anti-corruption 24. Business continuity management 25. Code of conduct 26. Contractor management 27. Corporate governance 28. Customer management 29. Cyber security 30. Innovation 31. Market opportunity 32. Policy influence 33. Privacy protection 34. Process improvement & digital transformation 35. Product stewardship 36. Risk management 37. Supplier management

Significant Materiality Topics 2021

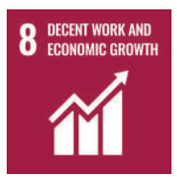
12 Significant materiality issues can be identified and presented in this report as follows:

Significant Materiality Issues	Boundary on Stakeholders		Topics in This Report
	Within Organization	Outside Organization	
1 **Air emissions**	• Employee • Banpu Group	• Joint venture companies/partners • Government and regulatory agencies • Communities	Air emissions
4 **Climate strategy and GHG emissions**	• Banpu Group	• Joint venture companies/partners • Customers • Financial institutions • Government and regulatory agencies • Shareholders/investors	Climate change and GHG emissions
6 **Electricity generation**	• Banpu Group	• Joint venture companies/partners • Customers • Financial institutions • Government and regulatory agencies • Shareholders/investors	Electricity generation
12 **Water related risk**	• Banpu Group	• Joint venture companies/partners • Government and regulatory agencies • Communities	Water related risks
15 **Human capital development**	• Employee • Banpu Group	• Joint venture companies/partners	Human capital development
20 **Safety**	• Employee • Banpu Group	• Joint venture companies/partners • Contractors • Customers • Communities • Government and regulatory agencies	Occupational health and safety

Significant Materiality Issues	Boundary on Stakeholders		Topics in This Report
	Within Organization	Outside Organization	
21 **Succession planning**	• Employee • Banpu Group	• Joint venture companies/partners	Talent attraction & retention
22 **Talent attraction & retention**	• Employee • Banpu Group	• Joint venture companies/partners	
24 **Business continuity management**	• Employee • Banpu Group	• Joint venture companies/partners • Suppliers/contractors • Customers • Financial institutions • Government and regulatory agencies • Shareholders/investors • Communities	Business continuity management
30 **Innovation**	• Employee • Banpu Group	• Joint venture companies/partners • Suppliers • Contractors	Process improvement and innovation
34 **Process improvement & digital transformation**	• Employee • Banpu Group	• Joint venture companies/partners • Suppliers/contractors • Customers	
36 **Risk management**	• Employee • Banpu Group	• Suppliers/contractors • Customers • Financial institutions • Government and regulatory agencies • Shareholders/investors	Risk management

Banpu Power and Sustainable Development Goals

United Nations Sustainable Development Goals (SDGs) is a framework that reflects a stakeholders' expectation and directions of policy both internationally and locally in the future. BPP has established the performance targets aligning with the SDGs as follows:

The United Nations Sustainable Development Goals (SDGs)		Banpu Power's Targets by 2025
	**Goal 7: Affordable and Clean Energy** 7.1 By 2030, ensure universal access to affordable, reliable, and modern energy services. 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix. 7.3 By 2030, double the global rate of improvement in energy efficiency.	• Achieve the power generating capacity target of **5,300 MWe** comprising of 4,500 MWe from the thermal power generation and 800 MW from the renewable power generation. • Improve energy efficiency and Availability Payment (AP) with the Availability Factor (AF) **not less than 90%** and Forced Outage Factor (FOF) **not more than 5%.** • Key ESG issues are part of the CEO's performance appraisal and cascaded to senior managements.
	**Goal 8: Decent Work and Economic Growth** 8.8 Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.	• All working place environment comply to regulatory requirements and standards. • **No** major incident and occupational illness in employees and contractors - **Zero** Fatality - **Zero** Lost Time Injury Frequency Rate (LTIFR) - **Zero** Total Recordable Injury Frequency Rate (TRIFR) - **Zero** high-consequence injury rate - **Zero** fatality caused by occupational ill-health - **Zero** total recordable occupational ill-health frequency rate - **Zero** Tier-1 process safety event rate • Employee Engagement score of **no less than 80%** • Banpu Heart Score of **no less than 80%** • Proportion of employees having Individual Development Plan (IDP) equivalent to **100%** • All critical positions are identified for succession planning. • Proportion of business units conducing human rights risks assessment of **no less than 70%** in 2021 • **No** significant human rights complaints and **100%** of significant human rights complaints resolved by a dispute resolution mechanism • All business units have a risk management plan with ESG issues. • Customer and Product - **Zero** complaint about customer privacy - **Zero** complaint about safety and environment concerning product use - All customers' complaints are investigated and resolved within an appropriate timeframe.

The United Nations Sustainable Development Goals (SDGs)		Banpu Power's Targets by 2025
	**Goal 9: Industry, Innovation and Infrastructure** 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.	• Reduce air emissions intensity of the thermal power plants for ultra-low emissions - SO_2 **≤ 0.0776 tonnes/GWh** - NO_x **≤ 1.184 tonnes/GWh** - PM **≤ 0.0230 tonnes/GWh** • **No** significant environmental and social incident, and fines of non-compliance at all operation assets • **No** significant ESG complaint from communities, both operation and resettlement • All significant complaints must be resolved through dispute mechanism. • All thermal power plants in China was certified **ISO 14001** (Environmental management system standards). • **Not less than 50%** of spending on local suppliers • **100%** of critical tier-1 suppliers assessed for ESG risks • **100%** of contracts contain ESG requirement clauses • Cybersecurity and Privacy Maturity Score **not less than 2.5** (total score is 5)
	**Goal 12: Responsible Consumption and Production** 12.2 By 2030, achieve the sustainable management and efficient use of natural resources.	• Water consumption intensity **≤ 0.868 m^3/MWh** • **100% re-used/recycled** of fly ash and bottom ash • **Zero** hazardous waste to landfill • **All operational control assets** assessed for potential biodiversity impact
	**Goal 13: Climate Action** 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.	• GHG emissions intensity **≤ 0.676 tonnes CO_2e/MWh** in all operational control thermal power plants • Increase energy generation capacity from renewable energy to **800 MW** • Disclose climate change information according to Task Force on Climate-Related Financial Disclosures (TCFD) • Establish business continuity management system and conduct drill at all operating assets • **100% coverage of critical business functions** conduct business continuity plan drill.
	**Goal 16: Peace, Justice and Strong Institutions** 16.5 Substantially reduce corruption and bribery in all their forms.	• Achieve **zero** incidents involving non-compliance, corporate governance and corruption • 100% of significant corporate governance complaints resolved through a dispute mechanism • Be a **member of Thai Private Sector Collective Action Against Corruption (CAC)**

Governance

BPP has always been attached to the Good Corporate Governance (CG) principles, which are the fundamental of sustainable business growth.

Corporate Governance

The Board of Directors of BPP has always been attached to the Good Corporate Governance (CG) principles, which are the fundamental of sustainable business growth and have been implanted through the “Banpu Heart” Corporate Shared Values, covering core behaviors on “Adhere to Integrity and Ethics” to which all of the Board of Directors, executives and employees have sticked as a business practice. The aim is to enhance the company’s good governance system and to build confidences among shareholders, investors, customers, business partners, communities, and all groups of stakeholders. The Board of Directors has assigned the Chief Executive Officer (CEO) to be responsible for operating businesses along with governing the business operations. Hence, BPP does not focus only on seeking financial returns, but also concerning on the environmental, social, and governance (ESG) in order to create the values and sustainable returns on investment.

Corporate Governance Structure

The Board of Directors structure of Banpu Power Public Company Limited is comprised of 10 members, divided into four Independent Directors, three Non-executive Directors and three Executive Directors. In addition, there are three sub-committees namely, the Corporate Governance and Nomination Committee, the Audit Committee, and the Compensation Committee, respectively.

4 Independent Directors

3 Non-executive Directors

3 Executive Directors

The Independent Directors shall serve a term of office no more than nine years or three consecutive terms while those nominated as the company’s Directors shall be directors of listed companies not exceeding five firms. Moreover, a resolution at a meeting of the Board of Directors must have a quorum of no less than two-thirds of the whole Board members.

BPP has set a meeting between the independent directors and non-executive directors without attendances of executive directors and its management once a year. In 2021, the aforementioned meeting was convened on 2 October 2021 to provide an opportunity for free discussions on various issues or expressing opinions regarding the effective business management. In addition, the Board of Directors stipulates that the Chairman of the Board and the CEO must not be the same person. Accordingly, BPP has clearly separated duties of the Board of Directors and management. The Board of Directors appoints and assigns the CEO to be responsible for business operations, development and implementation of strategies. Whereas, the CEO delegates his/her authority to the next level executives of both domestics and international business units to ensure a balance between the corporate governance and management.

	The Corporate Governance and Nomination Committee	The Audit Committee	The Compensation Committee
Board of Directors • Executive Directors • Non-executive Directors • Independent Directors	4 - 2 2	4 - - 4	3 1 1 1
Related Charters	The Charter of the Corporate Governance and Nomination Committee	The Charter of the Audit Committee	The Charter of the Compensation Committee
Major Responsibilities	• Determining the policy and practice guidelines regarding Corporate Governance and business ethics. • Following up the implementation of policies and practice guidelines in the framework of Code of Conduct. • Recruiting and nominating persons to be the Directors, Chief Executive Officers and Executive Officers. • Monitoring a succession plan of senior executives.	• Reviewing the financial statements, internal control and risk management systems as well as law and regulatory compliances. • Examining action plans and performances of the Internal Audit Office. • Considering the information disclosure of BPP in case of Related Parties Transaction (RPT) or conflict of interest. • Governing BPP to duly comply with the Anti-Corruption Policy. • Selecting and appointing as well as terminating the auditor, including proposing for consideration of the Company's auditor remuneration. • Considering the action plans, operating performances, budgets, and manpower of the Internal Audit Office. • Continuously review and monitor significant risks management from the Risk Management Committee, including cyber security risk management and related information technology risks. • Review and govern to ensure implementation of Anti-Corruption policies.	• Providing suggestions on compensation management and other benefits for the Board of Directors, the sub-committees and the CEO. • Reviewing the overall compensation and salary structure and annual bonus.

Board of Directors Selection

The Corporate Governance and Nomination Committee has laid down the effective criteria and procedures for the Board's nomination, taking into account the diversity of qualifications, namely, independences, knowledges, skills, experiences, genders, nationalities and ages. Such qualifications have been assessed by the Board Skill Matrix system to ensure that the overall compositions of the Board are appropriate for overseeing BPP and being able to respond to stakeholder's expectations. Details of current compositions of the Board of Directors are as follows:

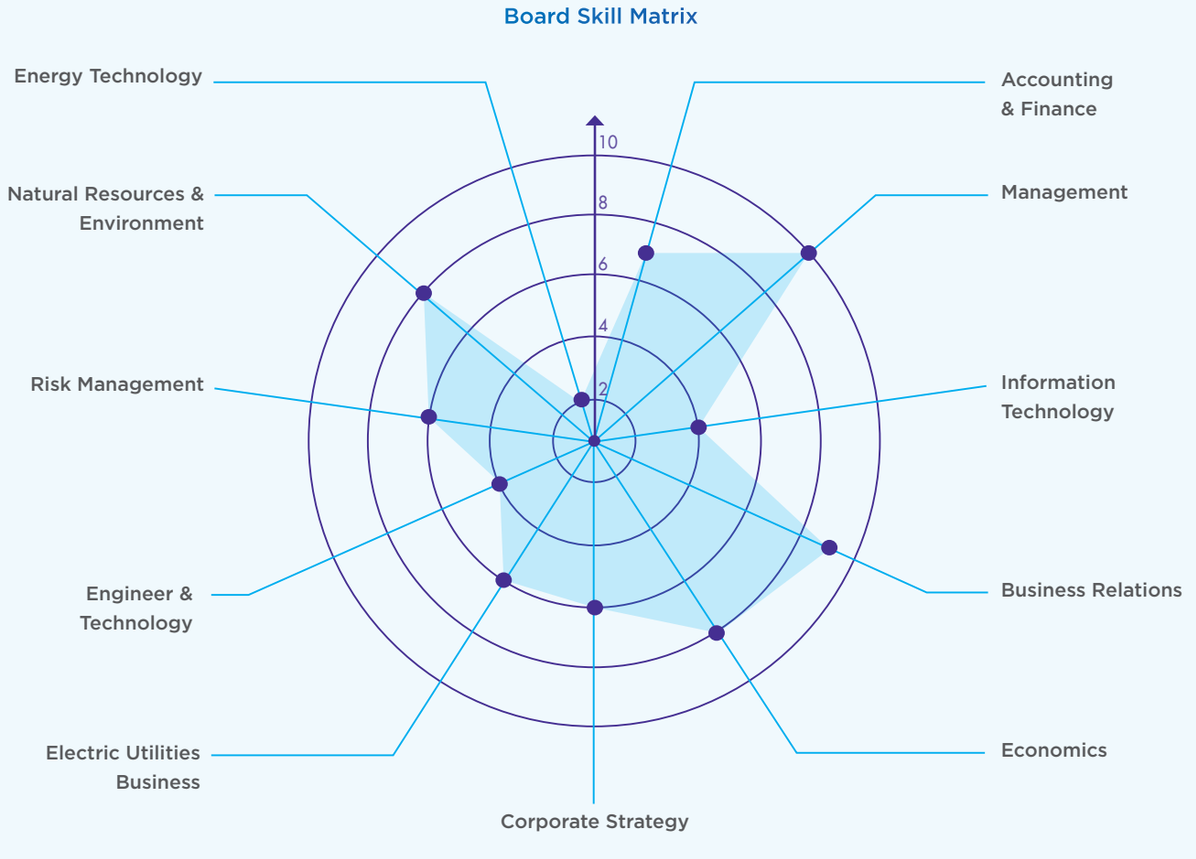
Composition of the Board of Directors

Gender

- Female 2
- Male 8

Status

- 4 Independent Directors
- 3 Non-Executive Directors
- 3 Executive Directors



In addition, the Corporate Governance and Nomination Committee is responsible for selecting and appointing the CEO prior to proposing to the Board of Directors for further approval. The consideration of CEO appointment is based upon qualifications, knowledges, capabilities and energy business operations as well as other experiences, including management capabilities. Furthermore, the characteristics of various aspects have been also considered, inclusion of conflicts of interest and leaderships in order to drive the organization efficiently and for the greatest benefit of the company's businesses.

Board Meeting Attendance

In 2021, Directors consistently attended the Board of Directors meetings and three sub-committee meetings as follows:

98.3% The Board of Directors Meeting Attendance

100% The Compensation Committee Meeting Attendance

100% The Corporate Governance and Nomination Committee Meeting Attendance

91.7% The Audit Committee Meeting Attendance

The overall performance evaluation results were higher the previous year.

Board of Directors Performance Evaluation

BPP requires the performance evaluation of the entire Board, sub-committees, and individual Directors. The evaluation criteria and procedures are in accordance with the standards of the Stock Exchange of Thailand. Whereas, the evaluation results with recommendations will be informed at the Board meeting where opinions are exchanged among the Board members for further improvement and the greatest benefits for BPP. Details of the overall performance evaluation are as follows:

Board/ Committee	Average Score (5 Scores)	Assessment Result
Entire Board of Directors	4.75	Excellent
Sub-committees	4.85	Excellent
Individual Directors	4.69	Excellent

Board of Directors Competency Development

In the previous year, Directors attended the trainings in order to develop their competencies and knowledges as following:

Program	Organizer	Number of Attending Directors
Corporate Transformation - The Traps	BPP	4
PDPA Virtual Sharing	BPP and Tilleke & Gibbins	7
Hydrogen Market	BPP and WoodMackenzie	8
Hydrogen Business	BPP	10
Energy Transition Towards Net-Zero	BPP and KPMG	9
Cybersecurity Update and Awareness	BPP	4
Virtual Power Plant	BPP	8
Risk Management Program for Corporate Leaders (RLC), Class 23/2021	Thai Institute of Directors (IOD)	1
Advanced Audit Committee Program (AACP), Class 40/2021	Thai Institute of Directors (IOD)	1

Business Ethics

Strategy:
- Operating business to improve the company's Code of Conduct, and cultivating the ethical working culture to build confidences among shareholders, investors, customers, business partners, communities and all groups of stakeholders.

Key Indicators:
- A proportion of all significant CG complaints is considered and resolved.
- A proportion of executives and employees accepting CG and business ethics policies and testing their knowledge about these two topics.
- The number of incidences related to CG and corruption.

Target:
- All significant corporate governance (CG) complaints are considered, while corrective actions are taken, including measures to prevent recurrences.
- The CG assessment score is at a very good level or accountable for 90%.
- No CG and corruption related incidences.

Performance:
- No significant CG grievances.
- The CG assessment was in a very good level, representing for 94%.
- No CG and corruption relating incidences.

Significance and Reporting Boundary

BPP aims at operating its business in the best interests of shareholders, investors, customers, business partners, communities and all groups of stakeholders. The company, therefore, has put its utmost efforts to develop the business to grow and generate good returns along with conducting business with honesty, integrity, morality and ethics. A Code of Conduct manual compiling the best practices has been prepared for its directors, executives and employees to acknowledge and adhere as the operational guideline. In addition, BPP is committed to respecting and complying with applicable laws, rules and regulations in all areas where the company has operated in order to operate the business and heighten the Code of Conduct, as well as to build confidences among shareholders, investors, customers, business partners, communities and all stakeholder groups. The boundary of this report covers all business entities in which BPP have direct management control.

Management Approach

BPP has prepared a Code of Conduct manual and communicated to all directors, executives and employees in order for them to use as a guideline for performing their duties with honesty and transparency, upholding to the rules of law, standing firms in justice and ethics, inclusion of putting top priority to customers and social responsibility, not being involved with politics and taking into account all group of stakeholders. These also include non-violations of human rights, anti-corruption, no gifts and bribes, no conflicts of interest, no actions violating others' intellectual properties or copyrights, and having channels for stakeholder's whistleblowing.

More importantly, the company has paid high attention to improve its business ethics to meet the international standards and adhered to operating business in accordance with the laws, rules, regulations and mandates related to business operations both domestically and internationally, such as:

- The Good Corporate Governance principle for listed companies by the Stock Exchange of Thailand and the Securities and Exchange Commission
- Articles of Association of the Company according to the Securities and Exchange Act
- Policy Statement on Code of Best Practices of Directors of Listed Companies
- The CG ASEAN Scored Card by ASEAN Capital Market Forum
- Principles of Corporate Governance by the Organization for Economic Co-operation and Development (OECD)

BPP has always fought against all forms of corruption, either directly, indirectly or through the third parties by establishing the anti-corruption measures in its anti-corruption policy. In addition, the practice guidelines in accordance with the anti-corruption policy on accepting and offering of gifts, hospitality, or other similar forms of rewards have been set up as a clear practice guideline in conducting business with integrity, transparency and veritableness in order to further develop into a sustainable organization.

Corporate Governance Policy & Code of Conduct

Performance

In 2021, BPP was assessed by the Corporate Governance Report of Thai Listed Companies (CGR) project conducted by the Thai Institute of Directors Association. The company has received the Five-Star CG Rating, ranging within the excellent criteria for two consecutive years, equivalent to 94% and higher than the average score of listed companies in overall.

The company has also been appraised by the Thai Investors Association on the topic of "Tutoring Intensively, receiving 100% Scores", or "Tiwkhem Hai Temroi" in Thai, receiving a full 100% score. In addition, it has also been certified as a member of the Collective Action Against Corruption (CAC) from the Thai Institute of Directors Association since 2019.

BPP has cultivated the ethical working culture and set the ethics as one of its corporate shared values and one of the performance indicators for all executives and employees. In 2021, the company continually promoted various activities so as to ensure that all personnel in the organization be knowledgeable about business ethics and anti-corruption. Activities organized were as follows:

- Organizing the Code of Conduct trainings covering 100% of new employees.
- Conducting a test for executives and employees regarding the CG and business ethics related knowledges and 100% of them undertook this policy.
- No significant CG grievances.
- No incidences relating to CG and corruption.
- The employee's corporate shared values survey found that the "Adhere to Integrity and Ethics" value was one of the behaviors expressed the most by employees.
- Organizing the annual business ethics related activity called the CG Day under the theme of CG be my Guest to create understandings about the business ethics principle.
- Communicating about CG in the form of VDO podcast every Friday through the program called "Friday Morning News Program" to enable executives and employees to be aware of the CG principles that can be seen up close, including reviewing the correct understandings.

- Assessing the corruption risks and prevention measures for the year 2021, covering all businesses in every country in which the company has invested, both at the subsidiaries and joint venture companies.
- Having continuously adhered to the guidelines for giving-receiving gifts, entertainments or any other similar forms of rewards in accordance with the No Gift Policy for four consecutive years.

Grievances and Anti-corruption Handling Process

Filing Channels

- Submitting a letter to the Secretary of the Corporate Governance and Nomination Committee
  Banpu Power Public Company Limited
  26th Floor, Thanapoom Tower, 1550 Petchburi Road, Makkasan,
  Ratchathewi, Bangkok 10400
- Company Website: www.banpupower.com/complaints_handling
- Banpu Portal: http://portal.banpu.co.th (BPP Whistleblower)
- E-mail: GNCchairman@banpupower.co.th and/or BPP_Comsec@banpupower.co.th

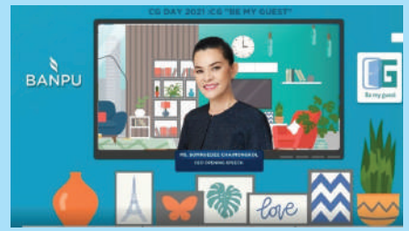
Complaint Receivers

- Chairman of the Corporate Governance and Nomination Committee
- The Secretary of the Corporate Governance and Nomination Committee

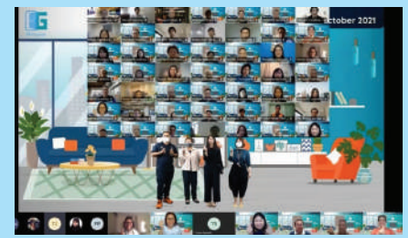
The complaints will be brought to the corporate fraud management procedure. The Investigation Committee will inspect the grievances received in accordance with the Corporate Fraud Management guidelines while the investigation result with recommendations will be presented to the CEO for making decisions and guiding appropriate corrective actions. Additionally, such complaints will be quarterly reported to the Corporate Governance and Nomination Committee and will be later summarized and further reported to the Board of Directors. If anyone commits a breach of disciplines, he/she must be responsible for compensating the damages caused by his/her actions to BPP. He/she will also be legally liable for those who have been damaged or effected by the said actions. In addition, BPP also reviews the procedures to find ways to prevent the repetitive incidents.

More importantly, BPP continues focusing on a two-way communication with employees. Besides, the best practices the company upholds and promotes with tangible actions are communicated through other internal public relations activities and channels so that they can perform their duties in accordance with the organization standards and business ethics. In addition, employees are encouraged to express their opinions, make inquiries, or submit related complaints via various channels, including e-mails, telephones or a whistleblowing system, etc.

CG Day 2021 Activity



BPP organized an internal communication activity called **CG Be My Guest** by inviting executives and employees to share their work experiences with CG practices. In addition, case studies from the news relating to violations of CG and anti-corruption policies, including the impacts, were given as examples through the VDO podcasts channel called **Friday Morning News Program.** The activity was also communicated via **emails** in order **to help employees know and understand the CG principles, being a preventive guideline for them not to breach the CG policy and Code of Conduct.**



On 18 October 2021, BPP in collaboration with Banpu Group organized the CG Day 2021 activity with an aim **to promote and instill employees' awareness on the importance of conducting business ethically and adhering to integrity.** This year, the Corporate Governance Department was honored by Mr. Chanin Vongkusolkit, Chairman of the Board of Director of Banpu Public Company Limited and Director of Banpu Power Public Company Limited, to share his views on CG and the organization management under the COVID-19 situation.

In addition, employees were invited to join the infographic contest under the topic of Anti-Corruption Policy and Whistleblower Policy to promote an understanding about CG principles and support the implementation of the CG policy and Code of Conduct.

Legal and Regulatory Compliance

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Strategy: Employing the effective internal control system in both prevention and monitoring of operational performance, which is categorized into several levels, including self-auditing and an examination by the independent unit reporting directly to the Audit Committee and the Board of Director; developing applications to integrate data derived from the regulatory and legal compliance monitoring system, risks management, and corporate governance.

Key Indicators:
- Coverage ratio of the internal control and legal compliance system.
- The number of significant fines from legal non-compliance.

Target:
- The internal audit and compliance systems covering all business entities, in which the company has direct management control.
- No significant incidents associated with non-compliance, including significant fines.

Performance:
- Operating in accordance with the internal audit and compliance systems covering all business units where the company has management control.
- Conducting the internal audits and compliance assessments among the joint venture companies as well follow up deficiency resolutions in accordance with the common standards with partners.
- No significant incidents involved with non-legal compliance both in the businesses the company has direct management control, joint venture companies, and suppliers operating in the areas.

Significance and Reporting Boundary

Legal compliance is a fundamental principle to which BPP has adhered in operating its businesses. It is also a major challenge for the company since it has operated business in many countries where regulations are different and changing rapidly nowadays. This includes laws and policies relating to climate change and air quality improvement in large cities, which is an important driving force in the rapid change of environmental laws in the power industry. Respectively, if BPP cannot adapt itself promptly, it would affect the company's business operations.

BPP's business operations are involved with various laws and regulations the company must fully comply with, such as the environmental and safety laws, the labor laws, the trade and investment laws, the security and exchange regulations as well as various permits, etc. This also includes running businesses by adhering to business ethics, for example, anti-corruption, fair competition, human rights principle, and non-discrimination. Thus, a failure to comply with these laws will affect the company's sustainable business operations.

The boundary of this report covers all business entities in which BPP has direct management control, namely the three combined heat and power (CHP) plants in China, including the offices in both Thailand and China. But, it is exclusion of Temple I Gas-fired Power Plant in which the company has just invested late last year.

100%

Operating in accordance with the internal audit and compliance systems covering all business units

0

No significant incidents involved with non-legal compliance

Management Approach

To prevent risks possibly having a severe impact on business operations, and to create confidence among all groups of stakeholders that BPP has been operating its businesses in accordance with laws and regulations, the company has established the Internal Audit and Corporate Compliance as a major force to coordinate and monitor legal compliance with two main duties, including:

The Corporate Compliance
is responsible for promoting, monitoring and auditing operational performances in accordance with laws and external regulations.

The Internal Audit
is responsible for assessment of internal control systems including a compliance with policies, regulations and operational practice guidelines within the organization.

Auditing of Internal Control System and Compliance with Policies and Regulations within the Organization

To ensure that all departments have operated in compliance with policies, laws, regulations and operational practice guidelines, BPP has frequently examined the operational performance and internal control systems within the organization and its subsidiary companies, covering major legal and regulatory compliance. The company's internal audit has been conducted based on the framework of the Committee of Sponsoring Organizations of the Treadway Commission (COSO), consisting of five areas. These include internal control, risks assessment, operational control, information and communication technology system, as well as monitoring system.

Additionally, BPP has established the Internal Audit Department as an independent body, with a duty to evaluate adequacy and efficiency of the internal control system as well as corporate compliance. It is reporting directly to the Audit Committee and the Board of Directors.

Monitoring of Environmental Quality, Safety and Labors Required by Laws

BPP has set up a system to monitor environmental qualities required by legislation and has monitored the possibility of changes related to laws in order to adjust itself promptly through a follow up of the central corporate compliance and internal departments among its business units. This is one of the requirements of the quality, safety, and environmental management system. Besides, the operating performances in the areas have also been regularly audited via following methodologies:

Internal audits conducted through the company's measurement systems,
such as the continuous emission monitoring (CEM) and the water quality monitoring system, etc.

Inspections by external agencies,
such as examining water and air quality by external agencies, auditing the implementation of environmental impact mitigation measures in accordance with the environmental impact assessment (EIA) report, and the audits of environment and workplace safety, etc.

Quality Assurance Review (QAR)

BPP in collaboration with Banpu Group has assigned all supporting units under the supervision of Corporate Services Department, namely Health, Safety, Environment and Community Engagement (HSEC) Department, Information Technology Department, Legal Department, Procurement and General Administration Department as well as Business Process Management Department, to assess operational qualities and legal compliance. The QAR working group from Bangkok Office has been set up to inspect the operational performances of subsidiaries in each country. Meanwhile, the QAR working group of each subsidiary will conduct a regular review on all business units located in that country at least once a year. In the year 2021, the review benchmarks were revised to be in line with the international standards. In addition, remote audits in the form of self-examination and interviews, as well as remote evidence verification were used during the COVID-19 epidemic.

BPP has deployed the standardized criteria for reviewing the legal compliance quality to suit its business operations, covering five dimensions.

Corporate Governance

Compliance Risk Management

Culture & Education

Technology

Continuous Improvement

Operational Audits by the International Certified Body

BPP has continuously applied the international standards to its operational management in order to improve the operational standards and create confidence among all groups of stakeholders. Thus, the company has implemented the internationally recognized operating standard systems in its business units' operations in order to create internal control and continual development, namely the ISO 9001 Quality Management System Standard, the ISO 14001 Environmental Management System Standard, the ISO 45001 Occupational Health and Safety Management System, the ISO 22301 Business Continuity Management Standard, and the ISO 27001 Information Security Management System. The legal compliance is part of the requirements for operating in accordance to these systems.

Country	Business Unit	Certification Body				
		ISO 9001	ISO 14001	ISO 45001	ISO 22301	ISO 27001
China	Zouping CHP Plant	/	/	/		
	Zhengding CHP Plant	/	/	/		
	Luannan CHP Plant	/	/	/		
	Beijing Office				/	
Thailand	Bangkok Office*				/	/

*Headquarters in Thailand incorporated with Banpu Group

Legal Compliance Audits at Joint Venture Companies

Due to its no direct management control in the joint venture companies, BPP has cooperated with the business partners who have invested in that business to inspect the legal operation and internal management at least once a year. Moreover, the monitoring is required to be run through the risk reports covering legal compliance at least once a month.

Compliance Audits in Key Suppliers

BPP has audited legal compliance of suppliers who sell key products and services to the company, such as maintenance and operation contractors, engineering and construction contractors, by stipulating in the selection and hiring conditions. An inspection on suppliers when operating, has been carried out; and if finding any defects, the company will work with supplies in laying out corrective actions in accordance with the laws and best practices. This is considered as part of the company's management system standards.

Performance

BPP conducted the legal compliance audits completely, most of which were carried out online due to the COVID-19 pandemic. The review results showed no significant non-compliance incidents involved with violating environment, labors, societies and human rights, including unethical operations. Additionally, the environmental quality measurement results such as air quality, water quality, waste disposal and all environmental management of BPP were in the better level than those required by laws.

In order to operate our business in accordance with legislation and regulations of each country in which BPP has invested, the company proactively operated its businesses and regularly monitored the operational performance in 2021 as follows:

- **Upgrading the operational standards by adopting the ISO 19600 Compliance Management Systems - Guidelines** as a framework for legal operation and compliance together with risk governance in order to ensure that the organization's compliance risks control be the most effective. This was done by using a model known as the "Three lines of defense" to create risk control mechanisms for operations across the organization. Whereas, a framework for implementation and regular follow-up was laid down, including the audits from an independent agency to guarantee the operations' achievements.
- **Initiating and improving the compliance obligation list (COL)** by interviewing operating staff about working procedures so as to collect all activities and related laws with which the departments must comply. Subsequently, every department has to conduct **the Quarterly Self-Assessment Report** and submit it to the Corporate Compliance every quarter.
- **Developing a compliance obligation list (COL)** for new business entities BPP just started developing projects, including the joint venture companies, such as the electronic vehicle business, etc.
- **Appointing the Compliance Champion,** a representative from each department to coordinate, support and operate legal compliance in order to make risk management processes the most efficient.
- **Complying with the Personal Data Protection Act 2019** by setting up a working group and announcing policies and practice guidelines, as well as communicating with employees to make them understand about personal data, collecting personal details and establishing the system to prevent information leakage, inclusive of educating and raising awareness among employees.
- **Adhering to the Royal Decree on Electronic Meetings,** such as the meeting attendees must present himself/herself; recording data transmission (log collection), voting either openly or confidentially, preparing meeting documents in both paper and electronic formats, recording video or audio throughout the meeting, and arranging security measures as required by laws.
- **Continuously conducting the annual monitoring on legal and regulatory compliance by the Corporate Compliance Department** In the past year, the monitoring was conducted through online due to the COVID-19 pandemic.
- **Arranging a meeting to assess legal violation risks related to environment, social and corporate governance,** including labor practice and human rights in all business units BPP has direct management control and joint venture companies such as Banpu NEXT and HPC Power Plant.
- **Preparing internal media** to raise awareness on legal compliance, including providing knowledge about changing laws and regulations for all levels of employees on a regular basis.
- **Initiating the Compliance Risk Management (C-RIM)** application to monitor and prevent risks associated with legal compliance from business operations and reporting the operational results to the management consistently. This application is an integration of the corporate compliance system operation into the corporate governance and risks management so as to accommodate management and reduce working repetition.
- **Developing the Laws in Hand application** to communicate about legislative changes, announcements or news related to business operations and regularly show the results to executives and related employees.

For other businesses of which BPP has less than 50% of shares with no direct management control, the legal and regulatory compliance monitoring has been conducted through the Board of Directors of such companies. Meanwhile, the monthly risks reporting, including risks relating to legal compliance, and the joint-audit with business partners conducted by the internal audit unit/company's assets management unit have been organized at least once a year. In the previous year, there were no significant incidents involved with non-compliance.

Personal Data Protection

Thailand announced the Personal Data Protection Act of 2019 or Personal Data Protection Act (PDPA), which is a central legislation providing personal data protection in accordance with the international standards, and established appropriate remedial measures for data subjects from breaches. Although the enforcement of PDPA in Thailand has been postponed to 1 June 2022, BPP has taken responsive actions, such as establishing a **Privacy Policy** and a **Privacy Notice,** recording processing activities, stating the purpose of collecting/using/disclosing information and setting a period of time to use and delete such data in order to not store more personal information than necessary.

During the 2020 – 2021, Banpu Group has set up a **Personal Data Protection Working Group** to be responsible for preparing personal data protection standards in accordance with the Thai and international laws. In addition, BPP is planning to scale up the appointment of working groups in countries where personal data protection laws have been promulgated.

The Personal Data Protection Working Group conducts communication to raise awareness and understanding of personal data protection laws and help all employees to operate properly in accordance with the legislation to avoid risks arising in the organization through various channels. On 10 May 2021, the **PDPA Virtual Sharing for All Employees session** was organized by inviting speakers who were experts from Tilleke & Gibbins to provide knowledge and answer questions to the Board of Directors, executives and employees.

Compliance Summit

On 3 – 5 August 2021, BPP, together with Banpu Group, organized the annual **Compliance Summit**, with an aim to present, exchange, and review corporate risk management and legal and regulatory risks management so that relevant agencies in every country are able to use knowledge gained from the session to plan for operation implementation. Furthermore, the company has also managed and controlled its internal business risks appropriately, ensuring that the company be operating in accordance with all laws and regulations completely.

Marketing Opportunity

7 AFFORDABLE AND CLEAN ENERGY

Strategy:
- Seeking opportunities to expand a production capacity according to the Greener & Smarter strategy by investing in advanced, clean, and eco-friendly technology.
- Expanding the production capacity of renewable energy, energy technology, and smart energy utilization through an investment in Banpu NEXT.
- Collaborating with Banpu Group to create the business ecosystem contributing mutual benefits.
- Looking for opportunities for expanding the power plant business towards the integrated energy services provider.

Key Indicators:
- The production capacity growth

Target:
- Having the power generation capacity of 5,300 MW by the year 2025, consisting of:
  - 4,500 MWe from thermal power
  - 800 MW from renewable energy

Performance:
- Posting the power generation capacity of 3,212 MW, comprised of:
  - 2,860 MWe from thermal power
  - 352 MW from renewable energy

Significance and Reporting Boundary

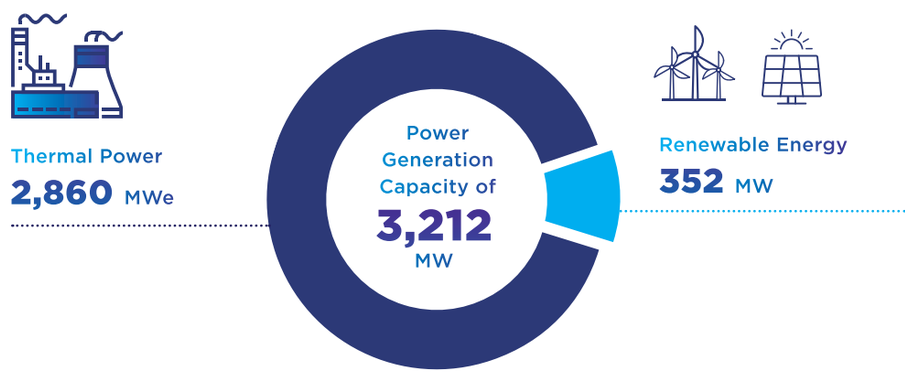
BPP is pursuing the Greener & Smarter strategy, looking for investment opportunities and growth in the power and energy generation business using high-efficiency and eco-friendly technologies in order to prepare itself for a smooth transition towards a cleaner and more efficient energy utilization pattern in the future. This includes not only in the field of electricity generation from clean energy, but also looks for new business growth opportunities delivering goods and services related to demand-side management of customers who need to produce and use energy efficiently, reduce greenhouse gas (GHG) emissions, and respond to a low-carbon society in the future.

The boundary of this report covers the business entities in which BPP has direct management control, namely the three combined heat and power (CHP) plants in China, excluding Temple I Gas-fired Power Plant, in which the company has just invested at the end of the year. In addition, BPP has reported the performance of Banpu NEXT because it is an investment in renewable energy business, energy technology and smart energy utilization, playing a key role in the company's growth.

Affordable

Reliable

Eco-Friendly



Management Approach

BPP has invested in the form of both acquisitions with direct management control and joint venture companies in thermal power plants using advanced, clean, and eco-friendly technology along with the investments in renewable energy, energy technology and smart energy utilization. Since the energy production contributed for economic and social development must be stable with affordable prices, and can create competitive advantages in parallel with taking into account the climate change impacts and meeting the Net-Zero target.

Balancing the transition from today's energy model towards a low-carbon energy in the future is, therefore, a priority for the company to make it happened smoothly. The key operational principles taken included:

- Expanding a production capacity by building upon the business ecosystem within the Banpu Group (Banpu Ecosystem).
- Driving the energy technology business growth through an investment in Banpu NEXT.
- Making investment decisions by considering all aspects of return on investments and risks associated with environmental, social and corporate governance issues (ESG), especially factors related to climate change.
- Looking for opportunities to expand business operations into the integrated energy services to meet the growing demand for clean energy.
- Creating stability and improving the power plants' efficiency to continuously deliver energy to customers, creating opportunities to sell additional electricity from the power plants with the long-term power purchase agreements (PPA).
- Building competitive advantages in an energy trading business, which is the merchant market likely to increase and replace PPA in the future.
- Utilizing digital technology to build competitive advantages, such as using data to analyze energy trading in power plants in the merchant market, providing electricity generating services in conjunction with supporting customers the applications for using in energy management, inclusion of after-sales service, and integrating applications with vehicle services.

Performance

- BPP has created its growth continuously, with an equity power generation capacity of 3,212 MW, consisting of 2,860 MW equity power generation capacity from thermal power plants and 352 MW from renewable power plants (as of 28 February 2022).
- Successfully investing in power generation projects according to the Greener & Smarter strategy through Banpu NEXT such as:

The Solar Rooftop and Floating Solar Power Generation Systems
with a capacity of 37 MW.

The Energy Storage System
with a capacity of 1.0 GWh.

Electric Vehicles
such as Banpu NEXT e-Ferry, a marine electric sightseeing ferry, FOMM One electric car, MuvMi Electric Tuk Tuk service

Smart City Development
with 20 smart city projects under development

- Zhengding CHP Plant has been selected as the operator of the solar rooftop installation project in Zhengding City, targeting to install 167 MW of solar panels on the roofs of governmental buildings, factories and communities by the year 2023.

Balancing the transition from today's energy model towards a low-carbon energy in the future

Expanding Production Capacity to Renewable Energy, Generation Technology, and Smart Energy Utilization at Banpu NEXT

BPP has continuously invested and developed the renewable energy business. The company has also expanded its scope to a development of power generation technology and smart energy utilization as well as related businesses in a comprehensive manner corresponding to today's challenge – the climate change. In addition, BPP joined hands with Banpu to invest in Banpu NEXT Company Ltd., in which each holding 50% of shares. The investment in Banpu NEXT has not only strengthened BPP's renewable energy investment, but also increased diversifications of related businesses in supporting operations of each other. In response to the company's growth, a new power generation target has been adjusted to 5,300 MW by the year 2025, consisting of 4,500 MWe form the conventional fuels and 800 MW form the renewable energy.

BANPUNEXT Smart Energy Solutions for Sustainability

Smart energy solutions to drive five business segments of Banpu NEXT include the renewable energy business, the battery business, the electricity trading business, the e-mobility business, and the smart energy business in order to offer comprehensive services, create values for money (VFM), build reliability and be eco-friendly, ready to develop every business towards sustainability. The five smart energy solutions include:

- **Smart Data Analytics Solution** is the key driver added in every solution, making energy management smartly and efficiently. This solution will help in assessing energy efficiency, monitoring and analyzing energy utilization through state-of-the-art technology equipment. Meanwhile, its digital platform will help operators to track real-time energy usage and browse historical data as well as compare energy utilization data in order to offer measures helping customers utilize the energy with maximum efficiency and reduce the electricity expenses in the long run. In addition, the solution can also be used to diagnose security issues both the dangers of epidemics, crimes and environment in order to design a safety system meeting the needs of each area, such as a system for checking population density in the area, a screening of body temperatures, a detection of people who do not wear masks, a warning of abnormal events, and a notification weather station, etc.
- **Smart Energy Generation Solution** is a comprehensive solar power generation system installation service for both solar rooftops, solar car ports and floating solar solutions. Also, the digital platform has been applied for energy management so as to be able to analyze, track, and monitor the power production, electricity utilization from clean energy, electricity bill saving, and GHG emissions reduction. Moreover, it can real-time monitor the system operations through applications, inclusion of the 24-hour professional after-sales service.
- **Smart Energy Storage Solution** is the energy storage system for numerous smarter applications integrated with digital platforms. which will help control energy productions and power storages as well as ensure consistent availability for continuous operations in all situations with high efficiency and cost savings. Moreover, this solution can also be applied in various ways, for example e-PromptMove, Thailand's first fully integrated clean energy power generation and storage solution, which can produce-store-distribute electricity and freely connect electrical devices anywhere and at any time, able to be adopt to various needs.
- **Smart Energy Utilization Solution** offers a wide range of smart solutions based on customer needs and meeting all service needs. The technology, digital platforms and electric vehicles have been used to drive the smart travel in order to help manage transportations more systematic and to monitor traveling time. It can be used real-time with environmentally-friendly manner. The services of smart energy utilization solution include EV ride sharing, MuvMi Electric Tuk Tuk, EV car sharing, vehicle rentals through applications, electric vehicle transportation management platform together with EV fleet management and charger management and e-Ferry – Thailand's first marine tour e-Ferry. These include operation & maintenance and customer services, e-Mobility services for traveling conveniences, cost and time savings, and environmental pollution reduction.
- **Smart Circular Economy Solution** turns "waste disposal" to "waste management". In addition to helping reduce waste volumes for landfills, this solution helps customers in utilizing resources cost-effectively as well as reducing waste management costs by using a digital platform to design and manage wastes efficiently starting from sorting, recording, analyzing, monitoring movements to reusing and recycling.

2025 Target

Renewable Power Generation

800 MW

See more information about Banpu NEXT

Risk Management

Strategy:
- Utilizing risk management for decision making and operating according to the plans in order to mitigate business related risks.
- Employing key risk indicators (KRI) to manage risks within the organization.
- Enhancing a risk management system to meet the international standards.

Key Indicators:
- Coverage ratio of risk management system.
- Coverage ratio of risk management system relating to ESG issues.

Target:
- Coverage ratio of risk management system is accountable for 100% by the year 2025.
- Coverage ratio of risk management system related to environmental, social, and governance (ESG) issues equals to 100% by the year 2023.

Performance:
- Deploying a risk management system covering all business units equivalent to 100%.
- Coverage ratio of risk management system associated with ESG issues was 94%.

Significance and Reporting Boundary

Risk management is a key factor BPP has used for operating its businesses to stably and sustainably grow in both investments and project constructions as well as productions in order to meet the targets set. Presently, emerging risks driven from business transitions, environment, society, corporate governance, and stakeholder expectations are arising very quickly. BPP, therefore, needs to be vigilant in order to adapt itself to the arising risks as well as look for investment opportunities in the new businesses derived from changes happening.

The boundary of this report covers all businesses in which BPP has direct management control.

Risk management system
covering all business units equivalent to **100%**

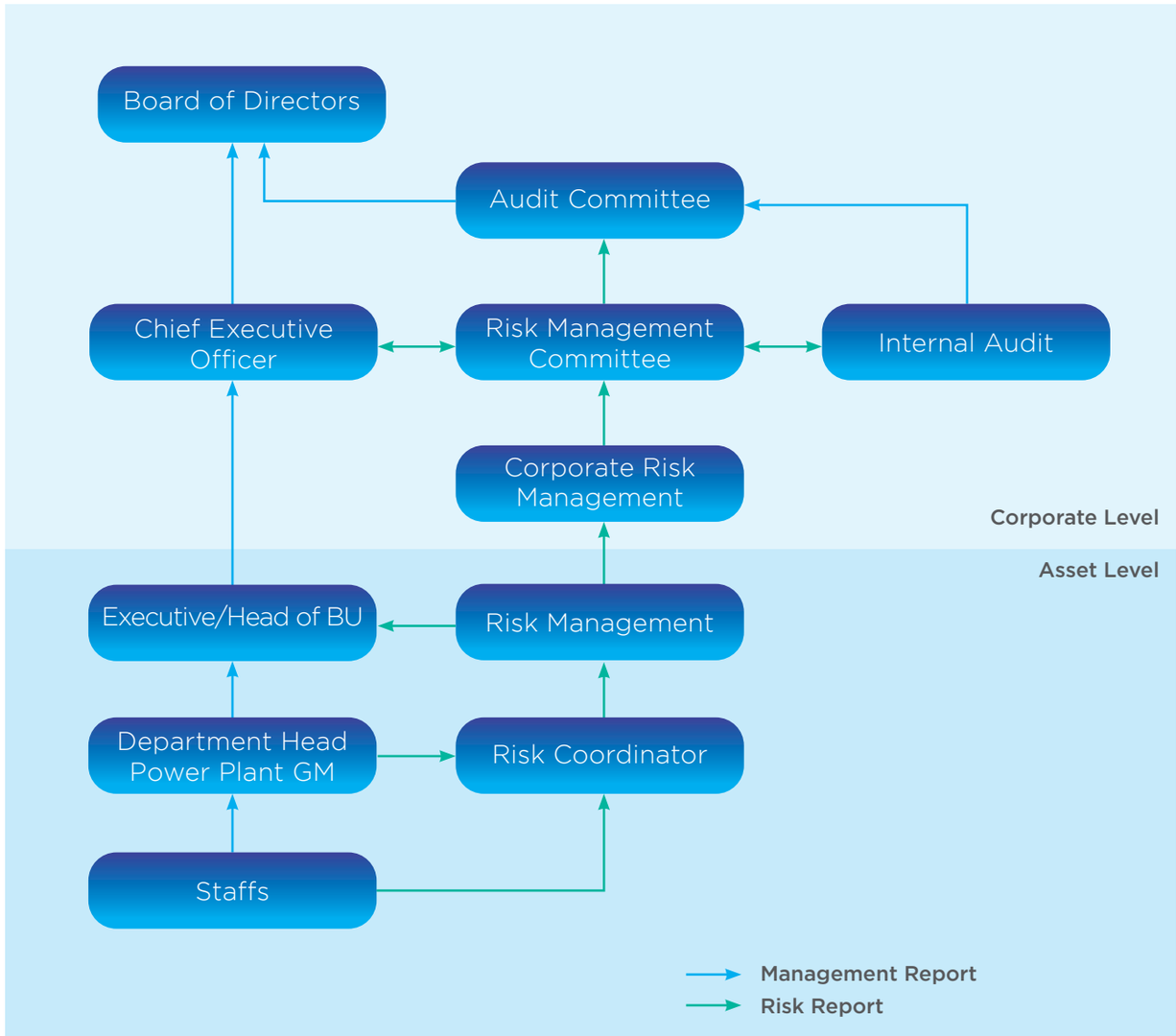
Management Approach

The risk management of Banpu Power is under supervision of the Board of Directors through the Audit Committee. The Risk Management Committee (RMC) has been set up with the roles to manage stakeholders and improve the risk management responsibilities at operational levels. The RMC is comprised of the chief executive officer (CEO) and senior management whose duties are as follow:

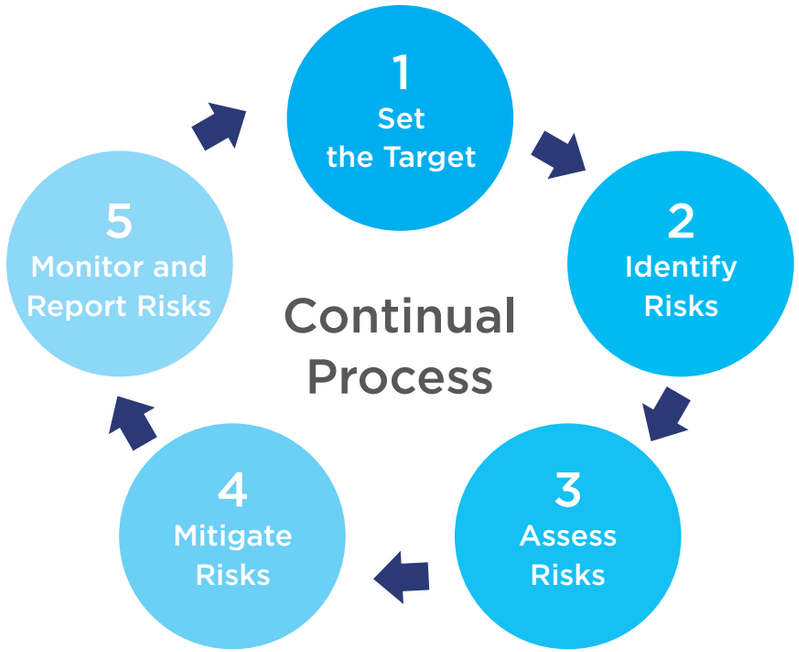
1. Assessing and managing risks to mitigate any risks possibly affecting BPP's operational performance.
2. Providing policy related supports in order to help mitigate risks efficiently and to create awareness on any risks arisen from the activities implemented by BPP.
3. Supporting internal and external resources necessary for efficient risks management.

BPP has declared its risk management policy with continued updates. A direct responsibility unit was established to coordinate with all departments to push the effective risk management forward across the organization. A mechanism to find out and identify key business risks covering the areas of environmental, social, and governance (ESG), has been provided in the annual corporate strategy development procedure. This is in line with BPP's strategic directions and related to the context of corporate sustainability management. The impact likelihoods to stakeholders have been assessed in order to consider priorities prior to defining them as a list of organizational risks. The responsible persons have also been assigned to mitigate risks to be at the level acceptable by the organization. Moreover, a progress of risks management has been regularly monitored, while risk issues have been continuously reviewed. Additionally, BPP has integrated the risk management principles into various procedures within the organization so as to raise awareness on business uncertainty and promote risk management as part of its operations, in preparation for any events arisen in the future. The risk management committee meetings have been convened on a quarter basis in order to monitor risks and risks management results according to the risk mitigation plan as well as report the results of risk management system review to the internal audit committee and the Board of Directors.

Risk Management Structure



Risk Categories	Risks
1. Strategic Risks	• Risks relating to human resources (HR) management and competency development to facilitate future growths • Risks associated with operating business in accordance with the plan set • Risks involved with a delay of construction projects
2. Financial Risks	• Exchange rate fluctuation risks
3. Operating Risks	• Risks involved with not achieving a return on investment as targeted • Safety, occupational health, environmental and social risks • Risks related to natural disasters • Risks associated with the COVID-19 pandemic
4. Regulatory and Legal Compliances Related Risks	• Risks resulted from regulatory, legal, and policy changes in the countries in which BPP has operated, especially changes relating to climate change, energy consumption and environmental quality control
5. Emerging Risks	• Climate change related risks • Risks associated with cyber security and personal data protection • New technology risks
6. Other Risks	• Human rights risks



Operating Mechanisms

To maximize risk management effectiveness, BPP has integrated risk management into its business plan, putting great emphasis on values creation for the company and its stakeholders. Hence, the risk correlation principle has been utilized to analyze correlations of each risk in both positive and negative aspects. BBP's risk management process begins with defining objectives according to the business plan and allocating them into the business units, departments, and sections. For identifying risks, the operational level employees who have knowledge and expertise in that activity will determine operational risks under his/her areas in details. The likelihood and impacts of such risks will be assessed along with preparing practice guidelines to mitigate risks possibly arisen. The risk management process also includes reporting the results to commander-in-chief and supervisors as well as monitoring the progress continuously.

Over the past several years, the outcomes of integrating risk management with BPP's business plan, have been able to further enhance the company's operational strategies. Moreover, other committees involved with risk management such as the financial management committee meeting to monitor financial risks has been convened every month, etc.

In terms of new business investments, BPP has conducted a comprehensive risk assessment on return on investment and ESG of each project. The assessment results and risk mitigation plans will be presented to the investment committee in order to ensure that the company's investments be assessed and mitigated risks properly.

Performance

Currently, BPP is employing a risk management system covering all business units, while its operations are also expanded in accordance with the company's rising investments. This includes a rise in risks management system's coverage ratio on ESG-related issues, accountable for 94% and meeting the annual target. It is expected to be entirely implemented in 2023.

Presently, a risk management system has been implemented in all company's businesses, including the projects under development. In addition, the business units have used key risk indicators (KRI) and incorporated risk appetize principles in assessing and mitigating their risks. Meanwhile, the results have been reported to the risk management committee every quarter. In the previous year, BPP put top priority on raising awareness on the ESG risks. Moreover, the workshops were organized over the past three years so as to assess the ESG related risks in all business entities in which BPP has management control, including the three combined heat and power (CHP) plants in China, as well as the joint venture power plants under Banpu NEXT and HPC Power Plant.

Coverage ratio of risk management system associated with ESG issues was

94%

Emerging Risks

According to BPP's risk assessment, it was found that there are emerging risks or existing risks having significant changes in three categories as follows:

1. Climate Change Risks

Climate change is an environmental issue on which the international community has placed great concerns as can be seen in various activities organized. In the 26th session of the United Nations Framework Convention on Climate Change (COP26) meeting, the measures to reduce greenhouse gas (GHG) emissions have been set. In addition, investors and financial institutions consider managing risks and opportunities resulted from climate change as one of their investment factors. BPP, therefore, has implemented measures to control and reduce the impacts caused by climate change as following:

- Operating businesses under Banpu Group's Greener & Smarter strategy by focusing on utilizing advanced technology for a power generation process.
- Reducing GHG emissions in all business units, targeting to have GHG emission intensity not exceeding 0.676 tonnes CO_2e/MWh.
- Increasing investment proportions in renewable power plants and energy technology through an investment in Banpu NEXT.
- Raising investment proportions in thermal power plants using clean and environmentally-friendly technology with low GHG emissions intensity, such as the power plants employing the ultra-supercritical technology, the integrated gasification combined cycle (IGCC) and the combined cycle gas turbines (CCGT), etc.
- Conducting a study on developing plans and disclosing financial information following the Task Force on Climate-Related Financial Disclosures (TCFD) to assess climate change impacts and risks management, expected to implement and disclose information by the year 2023. Currently, BPP is assessing the financial impacts and opportunities in the power plants generating core incomes to the company as the first priority, including the three CHP plants in China, BLCP Power Plant, and HPC Power Plant. The study found that these power plants have marginal financial impacts because they were designed to accommodate physical changes possibly arisen from a rise of sea levels. More importantly, they can manage the coal prices specified in a long-term power purchase agreement and control the GHG emission intensity in a level specifed by laws. However, there may be the financial implications raising their costs, such as changes in legislation related to climate change, an increase in insurance costs and water prices, etc.

2. Risks Related to Cyber Security and Personal Data Protection

Cyber threats are on the rise. They are made in various forms and causing widespread impacts. BPP is well aware of and recognizes the importance of preventive actions and impacts reductions. The company, therefore, has carried out major activities as follows:

- Defining the information and cyber security policies with references to the ISO 27001 and ISO 27701 standards. Moreover, a global information security officer (GISO) has been appointed to oversee relevant operations and implementation in accordance to improvement plans.
- Setting up a data privacy policy, announcing a privacy notice, and appointing a data protection officer (DPO) to supervise related operations.
- Raising employees' awareness about the cyber threats, including practical and preventive measures such as communicating to employees at the meetings, and through phishing emails to raise their awareness, etc.
- Annually conducting the exercise to practice dealing with the cyberattack threats and to recover the information system in order to cope with the event in a timely manner and reduce the impacts and damage possibly affecting BPP's operations.
- Conducting a crisis communication exercise by simulating scenarios associated with critical data leakages resulted from cybersecurity threats.
- Endorsed by the ISO 27001 Information Security Management Systems (ISMS) certification, inclusion of countermeasures and action plans in the event of a cyberattacks.

3. Technology Disruption Risk

A transition in energy technology such as micro grid system, renewable energy system, energy storage system, and big data system, etc., has resulted in the consumer's energy consumption behaviors, including related regulations focusing more on clean energy technologies and a reduction of their dependency on the centralized transmission systems. This has caused changes in the nature of electricity demand in many countries, including Thailand. In response to such risks, BPP is collaborating with Banpu Group to increase business opportunities in renewable energy and energy technology, including the separation and grouping of businesses under Banpu Group to be clear and agile. The objective is to research data for developing into products in the future in addition to building upon a development of existing projects. This includes considering the possibility to restructure the organization to be aligned with business strategies, and to enhance the future competitive advantages through an investment in Banpu NEXT, focusing on renewable energy generation, energy technology, and smart energy utilization.

Enterprise Risk Management Forum 2021: Energy Transition to Net Zero

BPP has placed great importance on and aimed to create an understanding about the effective management of risks related to climate change. The company, therefore, has set a strategic direction to create the sustainable growth and improve the risks and opportunities associated with climate change, aligned with the Financial Disclosure Framework relevant to the Task Force on Climate-Related Financial Disclosures (TCFD) conditions. The online forum entitled Enterprise Risk Management Forum 2021: Energy Transition to Net Zero was organized by inviting speakers from the leading international consulting firm to provide knowledge to participants who were the Board of Directors and involved employees.

Board Retreat and Others

In October last year, BPP organized the board retreat with an aim to plan and determine the company's strategic directions, including opportunities and risks involved with emerging technologies. In addition, a lecture was given to the Board of Directors on the topic of **Pathway to Net Zero emissions by 2050** with the following contents:

- Outcomes of the Paris Agreement
- Upcoming discussions at the 26th COP, a net zero emissions commitment from foreign countries and leading companies worldwide, energy supply and transformation by the year 2050, according to the IEA report.
- A current status and a future of the company

In addition, a training session on Cybersecurity Update and Awareness was held to the Board of Directors in November last year. The lecture's contents were as follows.

- Cybersecurity technology trends
- Emerging risks management in the year 2022
- A progress of data security and privacy protection operations
- The company's overall readiness to fight against cyber threats and a compliance to cyber regulations
- Lessons learned from the "Colonial Pipeline Cyber-attack" case

Human Rights Risk Assessment

BPP has attached top priority to human rights and conducted a comprehensive human rights due diligence self-assessment in order to determine which human rights issues may pose a risk to the organization. The assessments covered the thermal power business in China and solar power business in China and Japan. The six key human rights risks include employment, occupational health and safety, customers and products, communities, securities, contractors and supply chains. The company has also taken into account both internal and external stakeholders such as employees, business partners, customers, contractors and communities, as well as vulnerable groups From the assessment, it was found that BPP has no risks related to all six human rights issues due to its human rights prevention and avoidance in violating civil-liberties when operating businesses, by adhering to the principles of liberty and rights, equalities and human dignities without discriminations based on genders, races, religions or skin colors. During the past three year, BPP has carried out human rights activities such as:

- Human rights policy announcement
- Setting up targets to assess human rights risks by the year 2025.
  - Proportion of businesses assessed in terms of human rights equivalent to **100%**.
  - Proportion of businesses with high human rights risks must have a risk management plan equals to **100%**.
  - **No** significant complaints related to human rights
  - All complaints related to human rights must be resolved through dispute resolution mechanisms.
- Co-operating with Banpu Group to assess human rights risks in the businesses in which BPP has a full direct management control, accountable for **100%**, namely the three CHP plants in China, Bangkok Office and Beijing Office. The assessment found that there are no business units having a high human rights risk.
- Conducting the human rights risk assessment covering some businesses BPP has invested in, namely the renewable energy production business and energy technology in Banpu NEXT and HPC Power Plant.

Business Continuity Management

Strategy:
- Implementing a business continuity management (BCM) plan, covering key business entities.
- Regularly conducting the business continuity plant (BCP) simulation exercise both at the corporate and country levels.
- Communicating proper and adequate information to the public in the event of crisis.

Key Indicators:
- Proportion of business units organizing the annual BCP simulation exercises at both corporate and country levels.

Target:
- Proportion of business units conducting the annual BCP simulation exercises at both corporate and country levels equivalent to 100%.

Performance:
- Bangkok Office and Offices in China organized the BCP simulation exercises at national level, representing 100% of business units conducting the annual BCP drills at both corporate and country levels.
- Certified with the ISO 22301 Business Continuity Management System for Bangkok Office in conjunction with Banpu Group and the Offices in China.

Significance and Reporting Boundary

Rapid and unpredictable changes resulted from natural disasters, including the COVID-19 pandemic and human actions such as terrorisms, cyberattacks, protests, fires, and chemical spills, etc. are all risks affecting BPP's production operations. Therefore, preparedness to respond and resume operations amid emergencies efficiently and quickly as well as communications with appropriate and sufficient information, will help reduce the company's loss and build confidence among stakeholders.

The boundary of this report covers the business entities, in which BPP has direct management control, namely the three combined heat and power (CHP) plants in China, the offices in Thailand and China, but exclusive of Temple I Gas-fired Power Plant, in which the company has just invested late last year. In addition, BPP has reported details of the operating performances of some joint venture companies since they are the core production units generating sound returns and interested by stakeholders.

Management Approach

Banpu Power has established its business continuity management system with reference to the principles and requirements of the international standard, ISO 22301, ranging from the process of identifying key work procedures, business impact analysis and risk assessment to creating business continuity plans as well as organizing BCP drills. The aims of BCM operations include:

Response
Responding to the incidents and preventing extended damage effectively, while properly communicating information to internal and external stakeholders.

Recover
Able to restore key necessary activities in order to rapidly deliver products and services within a time acceptable by stakeholders.

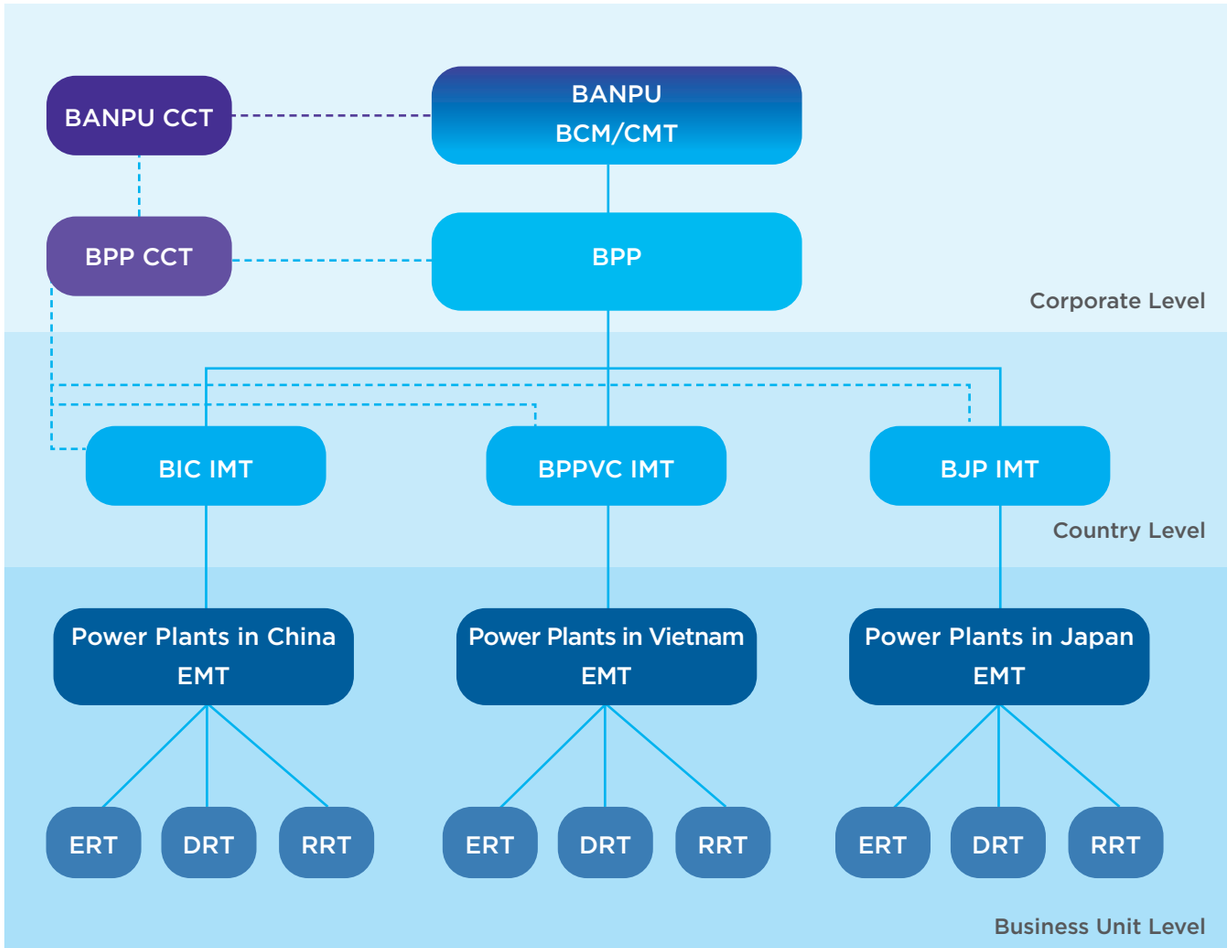
Restore
Quickly restoring all BPP's activities in the time accepted by stakeholders.

A significant challenge for power business continuity is the damage of large power plants where activity recovery takes time. As a result, BPP has put great emphasis on investing in risks management, incident's severity impacts prevention and control, including identifying appropriate and timely communication channels to general public.

BPP has integrated its BCM with the supervision and management of Banpu Group where BPP's CEO is one of the Crisis Management Team (CMT), and is also assigned to be the event commander as well as provide information to the public during the power business crisis. This integrated BCM operation reflects a harmonious way of working, helping save operational resources with maximum effectiveness.

BPP has conducted the annual BCP exercise, at both corporate and country levels consistently. The exercise will be organized alternately, inclusion of monitoring and reviewing the system's operating performance through internal audits and management reviews annually. Furthermore, each business unit is encouraged to share what they have learned in response to various threats in order to adapt lessons learned to the context of each country.

Crisis Comunication Management Structure



CMT: Crisis Management Team
EMT: Emergency Management Team
RRT: Relative Response Team

IMT: Incident Management Team
ERT: Emergency Response Team

CCT: Crisis Communication Team
DRT: Disaster Recovery Team

For the joint venture power plants, such as BLCP Power Plant and HPC Power Plant, as well as Banpu NEXT where BPP has no direct management control, the BCM of joint venture companies is not included in this structure. BPP, however, has assigned a liaison officer to report data and current situations in preparation for communications involved with Banpu Power as a joint venture company.

Performance

In 2021, BPP was able to operate continuously without any production unit's interruptions or any production stoppages during the COVID-19 pandemic. This was due to the implementation of BCM system and the company's long-time preparedness.

On 8 September 2021, BPP together with Banpu Group, conducted a BCP exercise operated by the incident management team (IMT) at the Office in Thailand, where the drill was arranged as an online exercise. In addition, the BCP drill for the Office in China was conducted on 23 September 2021, covering the crisis management process in accordance with the business continuity plan and ISO 22301 standard. Cybersecurity attacks were stimulated in this exercise to align with the threats affecting today's business.

At the business unit level, a real-life business continuity management has been implemented through the COVID-19 pandemic, which has been managed by the EMTs as seen appropriate in each area. Then, the result has been reported to the IMT and CMT for overall organizational management.

BPP was able to operate continuously without any production unit's interruptions or any production stoppages during the COVID-19 pandemic.

Business Continuity Management during the COVID-19 Pandemic

BPP was able to operate continuously during the COVID-19 pandemic, while its business units did not have either disruptions or operational stoppages. BPP has prepared its readiness for a long time by implementing Business Continuity Management System Standard (ISO 22301). Therefore, BPP was possible to flexibly respond during the crisis and it was able to resume operations quickly, helping reduce losses and build confidences among stakeholders. The key operational targets were:

- **Response:** Effectively responding to incidents and preventing damage spreading as well as communicating information to internal and external parties appropriately.
- **Recover:** Able to restore major necessary activities in order to quickly deliver products and services acceptable by stakeholders.
- **Restore:** A fast recovery of the whole activities acceptable by stakeholders.

BPP has set the following measures to prevent the widespread of COVID-19:

Travel Restrictions
by allowing all power plant's operators to live in the power plants' areas in order to reduce the infections caused by traveling.

Meeting Management
by avoiding unnecessary meetings, reducing the number of meeting attendees, keeping social distancing in the meeting, and conducting the online meetings instead.

Sterilizing the Organization/Workplaces

- Daily registering and checking temperatures of all operators and contractors prior to starting working.
- Keeping social distancing during operations.
- Cleaning and disinfecting by obligating to clean up the areas and various equipment and supplies every day.
- Providing adequate personal protective equipment for all operators and always checking it before using.

Working from Home
by allowing all employees working at offices both in Thailand and abroad to work from their residences during the epidemic.

Business Continuity Management
Due to being restricted from traveling across the areas by the government, BPP has requested for special permissions from the government to allow vehicles to transport raw materials from different areas to its power plant's areas. The control measures have been strictly proceeded with trucks delivering raw materials in order to keep operating businesses normally.

Preparation for the Emergency Response Plan
BPP has developed the Emergency Response Plan in accordance with the local government's regulations and has been inspected by the local government for strictly adhering to the measures set.

The key success factors helping BPP maintain its ability to operate business during the COVID-19 pandemic include:

- Implementing the ISO 22301 Business Continuity Management system prior to the crisis occurrences, putting top priority on employee's safety.
- Preparedness for uploading the information system on the cloud computing system to support employees to work anywhere without presenting at office, inclusion of an enhancement of abilities to restore the systems as well as necessary information more quickly.
- Determining preventive measures and mitigation plan in response to the COVID-19 impact, allowing the working team in each country to be able to make decisions on any measures quickly taking into account the safety of employees.
- Defining the clear and fast communication channels.
- Regularly organizing trainings and simulation exercises annually.

All offices and power plants were able to operate continuously, delivering product and services to internal and external customers as normal operation. Moreover, Beijing office has been certified ISO 22301 Business Continuity Management System standards since December 2020 to present.

China's Office Conducted a Business Continuity Plan (BCP) Exercise at a Country Level

On 23 September 2021, the Office in China organized a country-level BCP drill by simulating a cyberattack scenario in which hackers encrypted employees' data and shut down the company's various logins, requesting for a large ransom. The results from this exercise were in accordance with the objectives set, including a response to the incident and a business continuity plan promulgation by IMT. In addition, a period for recovering and rehabilitating key business units met the targets set. This exercise has raised awareness of cyber threats magnificently.

HPC Power Plant Operations during the COVID-19 Widespread

Operating during the COVID-19 pandemic is a huge challenge for HPC Power Plant. Since the power plant is located in a remote area, there are restrictions on transportations, medical supplies and other facilities. Moreover, many employees and contractors are at risks of being exposed to the COVID-19 derived from the international travels. For this reason, HPC Power Plant has prepared for coping with such a situation as follows:

- **Crisis Communication:** By setting up the emergency hotline or the Emergency Call Center as an agency to communicate information and measurements related to the COVID-19 to employees, contractors and nearby communities.
- **Measure, Strategy and Planning:** By adjusting the maintenance plans and making resources available, including dividing employee's working shifts to prevent the spread of COVID-19, a lockdown plan of some workspaces, a work from home plan, and a plan to limit and prohibit travelling to the community areas in order to continue operating productions under the target of "Operating smoothly and safely for everyone."
- **Health Screening, Monitoring and Medical Treatments:** By stipulating that the countermeasures of COVID-19 escalations are important so that all employees must follow, heightening health screening more strictly before entering the area, limiting accesses to the surrounding community areas, and establishing the isolation center in the areas for symptoms observation and medical treatment.
- **Coordination and Supporting:** By accommodating 4,000 employees to get 8,000 doses of vaccines supported by the governmental sector by June 2021, including a close coordination with the Thai Embassy and the Lao Government on cross-border transportation arrangements.
- **Employee Well Being:** By providing adequate personal protective equipment, such as hygienic masks, foods, cleaning gel, medicines, etc., and allowing employees to reserve the leave periods to manage their annual leave plans for holidays and returning to Thailand.

Process Improvement and Innovation

Strategy:

- Promoting production process and innovation development for enhancing competitive advantages and production stability.
- Identifying "Innovative" as one of the corporate shared values.
- Setting up the Innovation Committee to encourage the innovation creations across the organization.
- Fostering a transition of working procedures towards the complete digital era (Digital Transformation).

Key Indicators:

- Availability Factor (AF)
- Forced Outage Factor (FOF)
- The operational progress in accordance with the Digital Transformation Roadmap.

Target:

- The AF is no less than 90%.
- The FOF is not exceeding 5%.
- The operational actions according to the Digital Transformation Roadmap meet the annual target.

Performance:

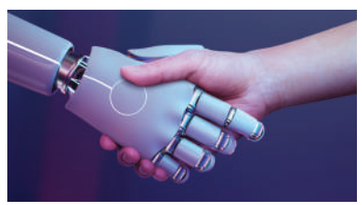
- The AF was accountable for 95.05%.
- The FOF was equivalent to 4.87%.
- The power plant's production process and innovation improvement project, such as:
  - A project to improve the power plant's boilers to be able to accommodate wastes generated from customers' production process at Zouping Combined Heat and Power (CHP) Plant.
  - A project to improve the power plant's boilers to handle low-calorific coal in order to reduce the fuel costs at Zhengding CHP Plant.
- Carrying out the digital transformation project aligned with the target set.
- Having the assessment result related to digital mutuality level of 42%, which was classified in the digital leader group, an increase of 30% from the year 2018 when the digital transformation started implementation.

Significance and Reporting Boundary

"Innovative", in the context of BPP, is the design and selection of high-efficiency, clean, and environmentally-friendly technologies proper for each project. It is also the initiation to change the working process to be more efficient in the long-term. This can be proceeded through studying on how to improve the procedures, probably including applying emerging technologies to current tasks. The production process development and innovations are the basis of competitive advantages enhancement and creating stable and sustainable growth amid the fast-changing industry during the disruptive technology era.

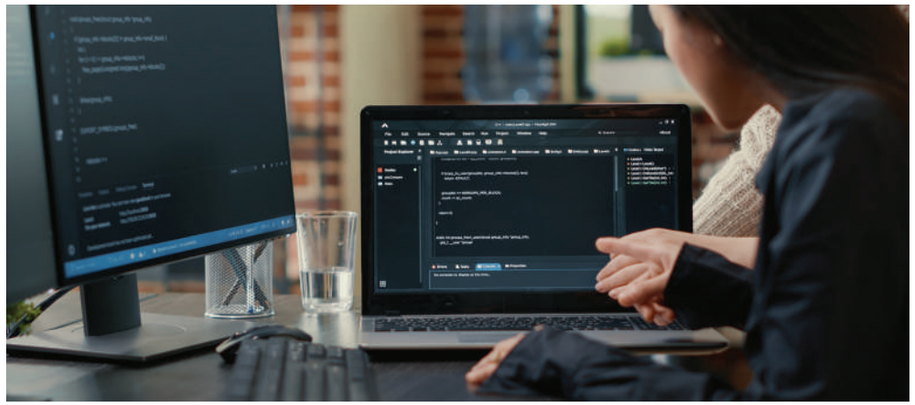
The boundary of this report covers the business entities in which BPP has direct management control, namely the three CHP plants in China, exclusion of Temple I Gas-fired Power Plant where the company has recently invested late last year. Moreover, the company has separated the performances of joint venture power plants, including HPC Power Plant, BLCP Power Plant, and Banpu NEXT since they are the company's major production forces and interested by stakeholders.

Management Approach



BPP has applied the principles of operational excellence together with innovations to improve its production efficiency through employee engagement. All employees at all levels will collaborate to identify problems possibly arisen during working, including finding their root causes through a systematic process and continuous improvement so as to increase working efficiency and process reliability as well as to reduce costs and losses in a production procedure. This process starts with training employees to enable them to identify the problems possibly arising during their responsible working processes with the support from a corporate team. In addition, a knowledge exchange between business units for mutual learning has been conducted, while employees have opportunities to present a project initiated and implemented with fruitful results.

BPP has driven innovation via corporate culture cultivation – the "Innovative" value, one of the three core values. Innovation has been promoted through various activities in order to help all employees understand the importance of applying innovation to their works. The company has created a system for employees to propose their initiatives called the Wow Idea and Innovation so that they can present their ideas and innovations leading to the concretely tangible actions. Moreover, the Learning Application Project has been implemented to promote learning within the organization by encouraging employees from many departments to collaborate on conducting projects through creativity and innovation. The project initiated, then, will be presented to the committee to approve the budget for further implementation.



BPP has established the Innovation Committee, comprised of employee representatives who are responsible for promoting the innovation creation within the organization. In addition, innovation has been exchanged within the company through knowledge management and the Innovation Convention organized annually with an aim to exchange knowledge, experiences and demonstrate the employee's outstanding performances on innovation projects implementation.

BPP has paid great attention to the transformation of work processes towards the digital transformation since it has realized that the digital technology will play an important role in the future operations where digital will help enhance production processes and create competitive advantages. Consequently, the hardware and sensors to monitor device operations all the time together with applications convenient to use and support decision making for maximum efficiency, have been developed. Moreover, employee's digital skills and working ideas related to digital have been enhanced through creating learning courses and setting up a Digital Capability Center at Beijing Office and Luannan Power Plant as a learning resource to facilitate employees. So that they have digital tools truly used for building upon various project quickly.

BPP has employed a mechanism for screening the production processes and innovation development projects as well as digital projects. These projects have been thoughtfully considered and the criteria used for projects' assessment include the investment worthiness, risks, financial returns, environmental, social and governance (ESG) improvement issues, including sustainability and scalability of operations in other production units.

Performance

BPP has implemented the innovation projects with an aim to create a competitive advantage, increase efficiency and stability in the long-term. In the past year, it was found that the operations of process improvement and innovation made the power plants in which BPP has direct management control, had the availability factor (AF) and forced outage factor (FOF) as targeted. They were able to carry out production with efficiency and stability as the target set.

Availability Factor (AF) was

95.05%

better than the target set
of no less than 90%.

Forced Outage Factor (FOF) was

4.87%

better than the target set
of no more than 5%.

The company has carried out several projects to improve its production processes and innovations such as:

- A project to improve the power plant's boilers to handle wastes from the customer's production process at Zouping CHP Plant.
- A project to improve the power plant's boilers to be able to manage coal with low calorific values in order to reduce the fuel costs at Zhengding CHP Plant.
- A study project on storage of carbon dioxide (CO_2) derived from power plant's fuel combustion for the industrial use at Zhengding CHP Plant and BLCP Power Plant.
- A project to improve heat exchanger station's efficiency by using digital technology at Zhengding CHP Plant.
- A project using artificial intelligence (AI) to monitor employee's safety at BLCP Power Plant.
- Predictive Maintenance: An application for predictive maintenance in the power plants by measuring critical parameters able to indicate potential malfunctions since the beginning at HPC Power Plant
- ENIGMA: An application BPP developed by itself in order to manage operations in various business units and present data in an easy format for executives and involved parties to make decisions (asset and monitoring management).
- B-Link: An in-house application the company developed to collect ESG data in accordance with the GRI Standards. It is a pilot application to support the company's sustainability report.

BPP has established Banpu Digital Academy to provide digital training courses for employees throughout the organization according to their job responsibilities. The company was assessed Digital Maturity with Banpu Group according to the Smart Industry Readiness Index (SIRI) framework in comparison to companies across the world. BPP has been rated in the Digital Leaders group when compared with over 550 companies across the globe.

BPP has invested in Nakoso IGCC Power Plant, using the Integrated Gasification Combined Cycle (IGCC) technology. IGCC is the power generation innovation, which has been researched and developed for over 20 years. This technology is also a combination of Coal Gasification Technology and the Gas Fired Combined Cycle plant, resulting in high efficiency and low emissions. Presently, Nakoso IGCC is the first IGCC power plant developed into the largest commercial power plant.

Scaling Up Digital Maturity

Four areas of management best practices were measured, including:

Strategy

Corporate culture

Right structures and internal processes

Digital skills and technology capabilities

As digital technologies have drastically been reshaping the way we live and work, digital transformation has been on Banpu Group and BPP's agendas as one of the key success factors to drive its business transition aligned with the **Greener & Smarter** strategy.

To reflect the progress of Banpu group's digital transformation journey, starting since 2018, Banpu Group assessed its digital, automation, industrial-internet-of-things (IIoT) and analytics maturity at a group level.

The assessment, which was done by leveraging a third party self-diagnostic tool from one of the globally leading digital consulting companies, helped the company to discover digital opportunities as well as identify gaps between current capabilities with the final goal of becoming a leading digitally driven organization. The methodology has a proven track record and has been used by more than 550 companies across multiple industries globally. More than 80 energy, gas, and mining companies were used in the benchmarking.

SMART INDUSTRY READINESS INDEX

At the asset level, Zhengding CHP Plant became the first CHP plant in China to be assessed by using **the Smart Industry Readiness Index (SIRI)**, created by the Singapore Economic Development Board (EDB) in partnership with a network of leading technology companies, consultancy firms, and industry and academic experts. SIRI is comprised of a suite of frameworks and tools to help manufacturers – regardless of size and industry – in starting, scaling, and sustaining their manufacturing Industry 4.0 transformation journeys. Zhengding CHP Plant has shown the areas for improvement in only 4 out of 16 dimensions of the SIRI framework, which now helps identify the development priorities for the operations.

Accelerating Digitization by Using Low-code Platforms:

User-designed applications using low code platforms such as Microsoft PowerApps and Microsoft Power BI are the instruments for increasing the digitization of business processes across Banpu Group. These applications provide structured data for further analytics, visualization, and decision-support, which was previously impractical or inefficient.

Robotic process automation, cost-effective IIoT networks linked to cloud data platforms and visualization tools are enabling us to drastically improve the efficiency and accuracy of the collection, analysis and reporting of environmental, social, and governance (ESG) information from the front-line operators to stakeholders. The applications BPP has used in many cases include:

BLiNK — An application for collecting sustainability data and reporting

IRIS — An application for market intelligence of coal supply chain

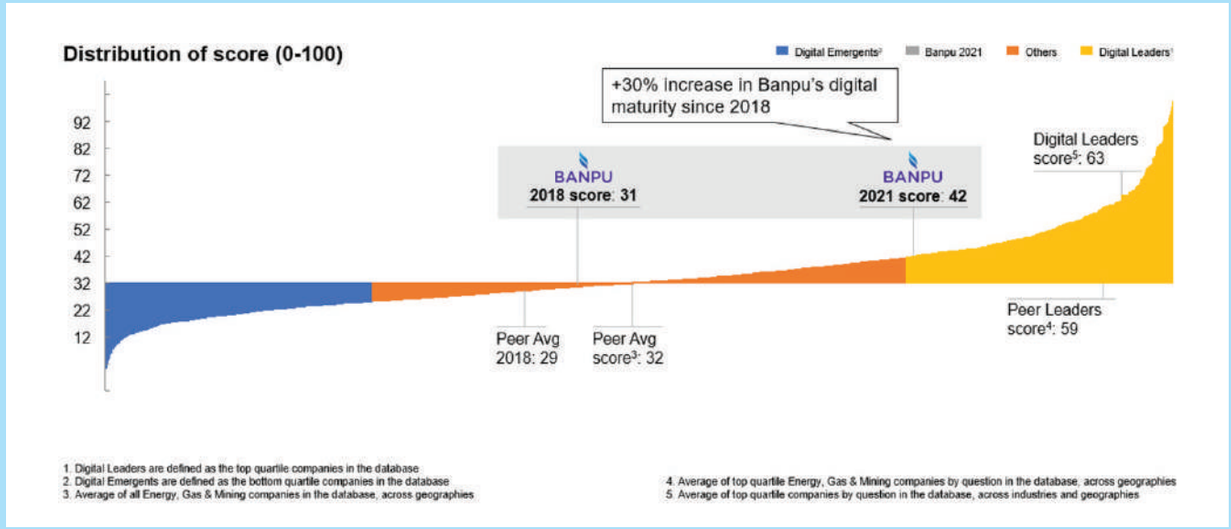
ENIGMA — An application for BPP asset monitoring dashboard, focusing on renewable energy generation assets

People Transformation Eenabling Home-grown Agile Digital Studio

The importance of digital and transition to tech-enabled work environments is everywhere across the globe. More importantly, attracting and retaining people with right capabilities and talents will continue being a growing challenge in all business domains. Up-skilling and re-skilling existing workforces deeply understanding the company's culture and having hands-on experiences in the functional business process is the key factor to sustain the transition to the workplace of the future.

HPC Power Plant in Lao PDR

Successfully completed Phase-1 of its boiler improvement program, focusing on reconfiguring and deep analytics of data from the existing acoustic sensors. The whole process, starting from diagnostics to prioritization, workstream planning and execution, was done by an energetic inhouse team whose achievement we are proud of. Besides, Phase-2 will activate prediction capabilities or the system and lay down the foundations for building digital-twins of mission critical equipment.



Going Forward

The transition pathways to a low-carbon, clean and green world will remain at the core of all business strategies in the years to come. With the Greener & Smarter strategy taken place since 2015 and the Digital Transformation program executed since 2018, Banpu Group has been well positioned in focusing its transformation efforts and agile change on decarbonization of our energy value chains as well as bring step-change improvements in operational safety of all our assets and operations and the communities.

Our network of Digital Capability Centers (DCC) at Beijing and Luannan Power Plant act as the innovation and ecosystem engagement hubs to continue our journey towards a digitally enabled enterprise. We will continue the re-skilling programs through Banpu Digital Academy (BDA) and improving the way our people collaborate with each other under the digital environments via the constant user experience and user interface (UX/UI) design improvements, as well as pursuing new growth opportunities by commercialization of relevant digitized cases to other industry peers.

Example of Courses Offered by BDA:

- Scrum 101
- Design Thinking
- Creativity
- Design Thinking and Innovation for Business
- New Lean Startup Principle
- Product Management Fundamental
- Introduction to Business Analytics

The Innovation Projects to Reduce Wastes and Greenhouse Gas (GHG) Emissions at BLCP Power Plant

BLCP Power Plant has signed an agreement to extend the academic cooperation with Thailand Institute of Scientific and Technological Research (TISTR) to conduct an experimentation and develop wastes left over from the power generation process in September 2021. The aim is to apply the scientific knowledge, technology and innovations to create added values for the power plant's wastes. BLCP Power Plant and TISTR have jointly develop the projects since 2018 and the cooperation agreement was signed in 2021. These projects are built upon and have integrated the cooperation between the Expert Centre of Innovative Clean Energy and Environment, and the Expert Centre of Innovative Materials, as well as the Biodiversity Research Centre by focusing on utilizing and creating added values from wastes, moving towards to the sustainable economic and social development.

The cooperation between BLCP Power Plant and TISTR consists of five projects as follows:

1. **A project to capture carbon dioxide from the power plant's (Carbon Capture, Utilization and Storage: CCUS)** for methanol production in conjunction with alternative hydrogen gas sources: This project is planned to produce 100 liters of methanol per day (Phase 3) with an aim to reduce carbon dioxide emissions of 55 tonnes per year and produce methanol 57 tonnes annually. Moreover, this project will be used as a guidance for further development at the pilot plant level. It is also a starting point for reducing carbon dioxide emissions to the environment as well as for commercial utilization.

2. **An algae culture system project, which has the potential to absorb carbon dioxide from the power plants to produce biomass and high-value joint products:** The objective of this research is to select and assess the potential of algae species, having capabilities to fix carbon dioxide residues left over from the industrial production processes, to develop a method for cultivating algae. The carbon dioxide has been used as both a primary and supplementary source of raw materials, while the products yielded can be used in various industries such as food possessing and cosmetics, etc.

3. **A study on improving the biomass fuel quality and its cost-effectiveness when using with coal:** With a desire to reduce its fossil fuel consumptions, BLCP Power Plant has used biomass such as rubber wood and bagasse, etc., together with coal as the fuels in the combined power generation in order to reduce the GHG emissions.

4. **A development and knowledge transfer of gels production from coal ash extracts at the semi-industrial scale (pilot scale):** The aim is to conduct an economic feasibility study for extraction processes and product development in order to expand the scope of gels produced from the leftover coal ashes, currently under a pilot scale with a production capacity of not less than 800 kg per day. Moreover, the training is also conducted to transfer the know-how of gel production process to BLCP Power Plant.

5. **A production of adsorbents from coal ash extractions at the semi-industrial level (pilot scale):** This project has been developed with a purpose to conduct the economic feasibility study on extraction processes and product development in order to expand the production scale of gels made from coal ashes, currently under the semi-continuous production level with a capacity of 300 grams of released ashes per hour. In addition, a study on recycling of waste residues released from the extraction process has been conducted to promote the efficient full cycle of waste material recycling.

BLCP Power Plant is one of the power plants, in which Banpu Power has 50% of shared. With a power generation capacity of 1,434 MW, the power plant has been in operation since 2006. BLCP's innovation projects are the cooperative projects with the governmental sector, with an aim to develop the innovations able to truly utilize the research's results for the industrial sector, and to reduce the environmental impacts, as well as increase the industry's competitive advantages in the future.

Supplier Management

Strategy:

- Defining the Supplier Code of Conduct for supplier and contractor management, covering the areas of business ethics, environment and social aspect.
- Managing suppliers sustainably in business units by integrating the ISO 9001 Quality Management System Standard with the ISO 45001 Occupational Health and Safety Management System Standard, and the ISO 14001 Environmental Management System Standard.
- Creating participation and promoting the environmental, social, and governance (ESG) operations with suppliers.

Key Indicators:

- The number of complaints associated with the ESG relating supplier management.
- The number of incidents in which suppliers violate laws, human rights, labor and environment.
- Proportion of local procurement values.
- Supplier's working safety, such as fatalities resulted from working, and lost time injury frequency rate (LTIFR).

Target:

- No grievances involved with supplier management.
- No incidents associated with contractors violating laws, human rights, labors, and environment.
- Local procurements of over 50%.
- Zero fatality.
- Zero LTIFR.

Performance:

- No grievances relating to supplier management.
- No incidents in which suppliers violate the laws, human rights, labors and environment.
- Achieve zero fatality.
- Achieve zero LTIFR.

Significance and Reporting Boundary

BPP has operated its business by putting high concern on the sustainable supply chain management. Realizing that the supplier's operation influences the quality of products and services and is also an important factor in creating competitive advantages, including playing a major role in their ESG operations both directly and indirectly, BPP, therefore, has to draw participation and promote the suppliers' ESG operations in order to create mutual benefits.

The boundary of this report covers every business entity BPP has direct management control, namely the three combined heat and power (CHP) plants in China, exclusion of Temple I Gas-fired Power Plant in which the company has recently invested late last year. The renewable power plants and the thermal power plants, which are the joint venture companies in which the company has no direct management control, but are interested by stakeholders, therefore, have been reported only their operating performances shown on the annex table.

Management Approach

BPP has instituted the operating guidelines for supplier management according to the sustainable supply chain policy in order to achieve its goals to create sustainable values throughout the supply chain. The supplier code of conduct has also been prepared to communicate the company's expectation on suppliers clearly. In addition, the company has focused on working with its main suppliers categorized based on the criteria such as trading values, product specificity which may be limited in the market, and suppliers who play an important role in ESG operations in the company's operational areas. BPP has three main supplier groups as following:

1. **Fuel Suppliers:** Coal is the major raw material for power generation of BPP's thermal power plants. Managing suppliers for a purpose of reducing risks relating to quality coal supply with prices and quantity according to the production plan of each production period, is an important factor for managing production availability and reliability. Additionally, coal is categorized as a commodity product, of which its prices are volatile with the world market, while coal production and transportation from its original production sites may be affected by severe natural disasters caused by climate change, etc.
2. **Machinery Suppliers:** Manufacturers of machinery parts specific for the power plant's maintenances, which cannot be purchased in the general market.
3. **Contractors:** i.e. operation & maintenance contractors, maintenance and service contractors, and engineering and procurement & construction contractors.

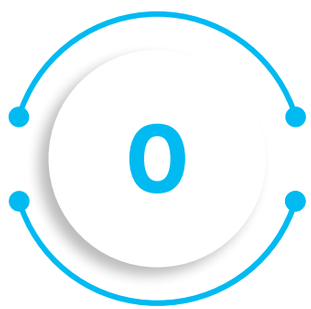
BPP has established the operating guidelines for supplier management as follows:

- **Selecting suppliers transparently and fairly** in line with the company's code of conduct principle.
- **Integrating the targets on safety, occupational health, environment, social and good corporate governance** into the supply chain management strategies and other related policies.
- **Driving the sustainable supplier management** in production units through the integration of ISO 9001 Quality Management System Standard, ISO 45001 Occupational Health and Safety Management Standard and ISO 14001 Environmental Management System Standard.
- **Reviewing supplier's qualifications relating to ESG** in order to be able to properly identify and mitigate supply chain risks.
- **Promoting business operations with suppliers adhering to ethical principles** with social and environmental responsibility, respecting to human rights in accordance with the supplier code of conduct and any associated policies.
- **Implementing any procedures to ensure that suppliers comply with laws and local regulations as well as international labor standards**, such as setting up selection criteria, stipulating in the procurement contracts, and monitoring suppliers' operations related to environment, society and corporate governance, etc.
- **Supporting local procurements** in order to create economic returns in areas where BPP has operated.
- **Establishing the Supplier Code of Conduct** and applying it to supplier management starting with the critical suppliers.
- **Encouraging suppliers to expand the implementation of sustainable practice guidelines throughout the supply chain** for continuous and efficient development.
- **Setting up the key performance indicators and frequently monitoring operations** to ensure that the suppliers operate in accordance with the standards and laws set, for example inspecting the operating sites of suppliers and contractors, etc.
- **Managing to have a safe working environment for contractors, organizing trainings** to educate them about safety and workplace environment as well as assessing risks deprived from working activities prior to starting working (Job Safety Analysis or JSA).
- **Regularly inspecting and assessing contractors while performing their duties in the area** to ensure safety and continually improving operational quality.
- **Establishing the ESG assessment forms** with reference to the company's supplier code of conduct.
- **Continuously disclosing the supply chain's sustainable performance** to stakeholders.

Performance

In the previous year, BPP had no complaints related to supplier management, while there were no incidents where key suppliers were involved in violating the ESG-related laws. Meanwhile, contractors working in the operation areas ran the operations safely, being able to achieve the safety targets as following:

- Fatalities resulted from working **= 0**
- Lost time injury frequency rate (LTIFR) **= 0**
- Total recordable injury frequency rate (TRIFR) **= 0**
- High-consequence injury rate **= 0**
- Fatality caused by occupational ill-health **= 0**
- Recordable occupational ill-health frequency rate **= 0**
- Tier-1 process safety event rate **= 0**



ZERO ACCIDENT

BPP managed its key suppliers as following:

- **Identifying clear criteria and qualifications for selecting suppliers aligned with the company's sustainability policy and business ethics principle** for example, specifying transparent criteria and qualifications for choosing suppliers for construction to expand the production capacities and improve the power plants in China, covering supplier's operations on quality, environment, social and governance.
- **Procuring transparently** through bidding processes, clearly determining the evaluation criteria in all steps by communicating information thoroughly, notifying suppliers via online systems, such as the coal procurement system of the three CHP plants in China, which were made through the centralized coal procurement system in order to select suppliers whose qualifications meet the company's requirements.
- **Verifying supplier's qualifications in the areas of operational histories, reputations, and legal compliance** to reduce operational risks before procurements as well as visiting supplier's operations in the areas, such as key component manufactures for the power plants, etc.
- The three CHP plants in China have driven the contractors' operations through the systems implementation and **have been certified for ISO 9001 Quality Management System Standard, ISO 45001 Occupational Health and Safety Management System Standard, and ISO 14001 Environmental Management System Standard.** In addition, BPP has created engagement with contractors regularly. This is part of the implementation of these management systems to achieve their goals. Moreover, trainings and verification of contractor operations have been regularly conducted in order to develop the joint operational improvement plans.
- **Conducting a critical tier-1 supplier review:** It was found that the company's supply chain operating in China will have fuel and machinery procurements, including hiring contractors. But, the supply of such goods and services can be quickly replaced since China is the world's largest coal trading source and there is a large number of coals with various properties nearby the power plant areas. Moreover, there are also a large number of machinery manufacturing operators and contractors with expertise in maintenance and construction as the country is the industrial center. There is a fast and convenient transportation system as well.
- **Conducting the business partner's satisfactory survey, including suppliers.** The survey found that 100% of suppliers were satisfied with the company's operations.
- **Promoting cooperation with suppliers,** such as operating in accordance with policies of the International Maritime Organization (IMO) for BLCP Power Plant's coal suppliers in order to reduce sulfur emissions from coal transportation. The IMO has adjusted the standards, requiring large vessels to use fuel with a sulfur content of no more than 0.5% from 3.5%.
- **BPP is in the process of adjusting the standards for collecting data on local procurement to be the same level**, expecting that such data can be report in 2022.

Maintenance Management during the COVID-19 Pandemic via Applying Digital Technology at BLCP Power Plant

Amid the COVID-19 pandemic since the end of 2019 up to present, BLCP Power Plant has managed its contractors and planned for maintenance inspections by using digital technology to help the plant in running many parts of its operations in order to maintain maintenances according to the annual plan. Consequently, a remote monitoring has been implemented by the engineering consultants via a teleconference system. For real-time working monitoring, the data has been transmitted with high quality images and complete details, especially the important and complicated tasks requiring expertise such as inspecting boilers, turbines, and generators as well as maintaining the power plant balances, etc. These have also included adjusting machinery maintenance sequences and properly assigning the manpower who will come in for on-site maintenances. In order to reduce the risks associated with COVID-19 spreading, travel records of employees and contractors who will be working at the power plant, have been thoroughly examined and recorded. Moreover, the number of workers in the area of responsibility has been limited, while encounters between employees and contractors have been reduced. Besides, a digital system tracking the contractor's access to and out of the area, which leads to retrospective checks if there is an epidemic, has been deployed.

Utilizing the digital technology to manage maintenance works has helped mitigate risks relating to a widespread of COVID-19 infections. As a result, BLCP Power Plant has not found any infections within the plant during the epidemic situation. More importantly, the power plant has been able to carry out the annual maintenance in accordance with the targets set. This can significantly reduce the traveling costs and employment expenses paid to engineering consultants. The digital technology has also offered flexibilities in on-site inspections and accesses as well as maintained the work quality with acceptable standards. Furthermore, BLCP employee's abilities have been upgraded and are able to solve more complicated problems via their experiences gained from working under the guidance of consultants through a teleconference system. This practice will lead them to sustainably solve the problems with knowledge and resources within the organization in the future.

BLCP Power Plant has managed for maintenance inspections by using digital technology to carry out the annual maintenance in accordance with the targets set during the COVID-19 Pandemic.

Customers Management

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Strategy:
- Sustainably managing customers in production units via the integration of ISO 9001 Quality Management System Standard, ISO 45001 Occupational Health and Safety Management System Standard, and ISO 14001 Environmental Management System Standard.
- Amalgamating customer management with the code of conduct, environmental and social policies.
- Consistently surveying customers' satisfaction and expectation for continuous improvement.

Key Indicators:
- Customer's satisfactory scores.
- Proportion of customer complaints with a timely manner correction.
- The number of customer grievances associated with customer's privacy data protection.
- The number of customers' accusations related to safety and environment of product usage.

Target:
- More than 85% of customer satisfaction scores.
- Proportion of customer complaints resolved in a timely manner, equivalent to 100%.
- No customers' grievances related to keeping customer's privacy data.
- No customer accusations involved with safety and environment issues relating to product usage.

Performance:
- The customer's satisfactory scores equivalent to 100%.
- Proportion of customer's complaints resolved in a timely manner accountable for 100%.
- No customer's grievances associated with customer's privacy data protection.
- No customer's complaints associated with safety and environment of product used.
- Responding to the customer's demand for clean energy. Zhengding CHP Plant has been selected by the government as the solar rooftop developer in Zhengding City.
- Investing in renewable energy and energy technology through Banpu NEXT in response to customers' low-carbon energy needs in the future.

Significance and Reporting Boundary

BPP has been committed to producing and supplying power and other forms of energy to ensure quality and stability in accordance with the international standards and customers' needs. Realizing that BPP's operations have contributed to the electricity's system stability and are the important factors for the industrial sector's production as well as have affected the community's well-being, it is, therefore, the company's responsibility in delivering products to meet the customer expectations and conducting its business with honesty, including having standards to protect customer's data. Moreover, the international operation standards have been employed so as to deliver electricity and other forms of energy meeting the customer's expectations and enhancing their trust.

The boundary of this report covers all business entities in which BPP has direct management control, including the three combined heat and power (CHP) plants in China, exclusive of Temple I Gas-fired Power Plant where the company has just invested late last year.

Management Approach

BPP has five key customers groups, namely:

- Governmental agencies, electricity state enterprises, or legal entities of which the government is a major shareholder, primary buyers under the power purchase agreement (PPA).
- Steam buyers from the industrial sector.
- The trading sector buying cold water for a cooling system in the commercial areas.
- Retail customers in the residential areas and communities who purchase steam during the winter.
- Customers buying fly ash and waste for a purpose of reusing or recycling.

The primary customers mainly generating revenues are the government agencies and state enterprises under the long-term power purchase agreements, as well as the steam buyers from the industrial sector.

BPP has managed its customers by applying the ISO 9001 Quality Management System Standard to its production units requiring contacts with various customers. One of the quality management principles is Customer Focus of which processes are able to help understand the needs and expectation between producers and customers.

1. **Identifying the operational targets** in accordance with customers' needs and expectations.
2. **Communicating about customers' needs** and expectations throughout the organization to create understanding among employees.
3. **Measuring customers' satisfaction.**
4. **Establishing a systematic customer relationship.**
5. **Concerning the balance** in responding to the needs of customers and other stakeholders.

100%

Customer's satisfactory scores

0

No customer's complaints associated with safety and environment of product used.

In addition, BPP has focused on creating relationships with customers as the partners of mutual achievements by giving top priority to deliver the sustainable values to all customers, taking into account of four values as follows:

1. **Product values** by using technology with High Efficiency Low Emissions (HELE) having ability to control the quality of air and water as well as environmental management to meet the international standards.

2. **Service values** by enhancing production efficiency with availability and reliability in accordance with the customers' needs, as well as to be flexible to meet customers' demand, inclusive of controlling the product quality to meet the standards and agreements made with customers.

3. **People values** by enhancing employee capability development and cultivating the corporate culture, to be a qualified staff who ready to accurately solve the customers' problems in a timely manner.

4. **Reputation values** by operating businesses professionally aligned with the code of conduct and good corporate governance.

Giving top priority to deliver the sustainable values to all customers

Performance

Throughout the year 2021, the three CHP plants in China were able to maintain their availability factor (AF) in accordance with customer's demand from both public and private sectors during the COVID-19 pandemic. Moreover, the three CHP plants were still able to continue their production continuously by strictly complying with the government's epidemics preventive measures and the occupational health and safety standards in order to deliver power and other energy to customers consistently. BPP carried out important operations as follows:

- Conducting a satisfactory survey of industrial customers who are the company's main purchasers. The survey results of three CHP plants in China, are as follows:
  - The survey covered 89% of the total number of customers, with a response rate equaling to 100%.
  - The customer satisfaction scores were 100%.
- Proportion of customers' complaints resolved in a timely manner representing 100%.
- No complaints from customers relating to protecting customer's privacy data.
- No grievances from customers involved with safety and environment of product's usage.
- Zouping CHP Plant used the waste from the customer's production process, containing activated carbon, to reduce coal utilization and to create mutual benefits with customers in waste disposal.
- Zhengding CHP Plant has been selected by the government to operate a solar rooftop project in Zhengding City, targeting to install 167 MW of solar panels on the roofs of governmental buildings, factories and communities by the year 2023.
- Expansion of production capacity at Zhengding Power Plant in response to the rising demand for steam resulted from population growth since 2018. In 2021, the power plant's heat exchanger station was upgraded by using digital technology to increase its efficiency, stability and reduce system losses. This made it possible to continually deliver heat to the community during winter.
- Joint venture Companies
  - **Banpu NEXT**: BPP has invested in renewable energy, energy technology, and smart energy utilization through Banpu NEXT, a joint venture company, in order to meet the future demand for low-carbon energy.
  - **BLCP Power Plant**, a joint venture company located in Thailand with a long-term power purchase agreement (PPA) in Thailand, was able to maintain its availability factor (AF), completing the availability hours as stated in the PPA. Moreover, the power plant could finish a maintenance faster than the target set, enabling it to generate additional electricity from the power trading hours specified in the PPA smoothly.
  - **HPC Power Plant**, a joint venture company located in Lao PDR and having the PPAs in Thailand and Lao PDR, had an unplanned maintenance outage, making its availability factor marginally lower than the plan set.

Environment

BPP has applied high efficiency, low emissions technology for the operational excellence.

Electricity Generation

7 AFFORDABLE AND CLEAN ENERGY

Strategy:
- Increasing the power generation capacity through investing in advanced, clean, and environmentally-friendly technology in accordance with the Greener & Smarter strategy.
- Building confidences in the power plants' availability in response to the customer's needs with efficiency and stability, by keeping the power plants' machinery maintenance aligned with the international standards.
- Improving the power plants' efficiencies via utilizing innovations.

Key Indicators:
- The power generation capacity growth
- Availability Factor (AF)
- Forced Outage Factor (FOF)

Target:
- Having the power generation capacity of 5,300 MWe by the year 2025, consisting of:
  - 4,500 MWe of thermal power
  - 800 MW of renewable energy
- AF is no less than 90%
- FOF is not exceeding 5%

Performance:
- Having the power generation capacity of 3,212 MWe in 2021, consisting of:
  - 2,860 MWe from thermal power
  - 352 MW from renewable energy
- AF was 95.05%
- FOF was 4.87%

Power Generation Capacity
3,212 MWe

Thermal Power
2,860 MWe

Renewable Energy
352 MW

Significance and Reporting Boundary

BPP has carried out the **Greener & Smarter** strategy in response to the shift towards more clean energy generation in the future. This includes a more efficient energy consumption model resulted from a development of various energy technologies. BPP, therefore, is focusing on investments creating growths for thermal power generation by using clean and high efficiency with environmentally-friendly technology along with expanding electricity production from renewable energy, energy technology, and smart energy utilization. Moreover, BPP has also attached great emphasis on stable and high-efficiency production operations in order to deliver power and energy in various forms for economic and social development during the transition of energy consumption patterns in the society, making it moved smoothly.

The boundary of this report covered the businesses of which BPP has direct management control, including the three combined heat and power (CHP) plants in China, exclusion of Temple I gas-fired power plant where the company has recently invested late last year. In addition, BPP separately reported the operating results of thermal power plants, which are the joint venture companies, namely HPC Power Plant, BLCP Power Plant, and Banpu NEXT because they are the key production forces for the company and are interested by the stakeholders.

Management Approach

- **Production**

BPP has emphasized the creation of stability and the power plants' efficiency improvement in order to continually deliver energy to customers through strictly operating productions in accordance with the operating procedures. Moreover, the company has focused on quality maintenance aligned with specified standards and setting criteria for supervisions, surveillances, audits, risk assessments, as well as regularly monitoring the power plants' performances. It has also paid high attention to supply chain management so that fuels and raw materials can be supplied to the production line according to the action plans set.

BPP has deployed the quality, occupational health, safety, and environment management standards in every CHP plant in order to carry out productions in accordance with the entire operating procedures. The company has also promoted innovation adoptions, particularly the digital technology, which can be widely applied to measurements of various parameters related to production operations. That information will be later utilized for creating the production's availability and stability.

BPP has also communicated its production plans and machinery maintenance plans with customers, partners and contractors in advance so as to create the effective collaboration, which is important in maintaining the power plants' Availability Factor (AF) and stability. The annual machinery maintenance is the main activity, making the engine's conditions efficient with a long-service life. As a result, the machines can be operated continuously according to the customer's needs and the plans set.

The three CHP plants' maintenance will be carried out in the summer season in order to continue generating power during winter when the energy demand is the highest. In order to prepare in advance for machineries requiring maintenances and to improve their efficiencies, the maintenance will be based on a 3-year medium-term plan and an annual action plan. All power plants' maintenances will avoid simultaneous operations across all production units since the power plants still have to supply steam to the industrial customers even during the summer maintenances. The lengths of time required for an annual minor maintenance are 10 - 20 days/time, while the major maintenance will be conducted every 2 years, taking 30 - 45 days per time. The maintenance period will depend mainly on the items specified by the equipment manufacturers, and refer to the inspections of machinery deteriorations or damages as well. So as to assure customers that the power plants will be ready and stable in supplying electricity and energy continuously, each maintenance will be completed before the winter.

- **Expansion of Production Capacity and Investments**

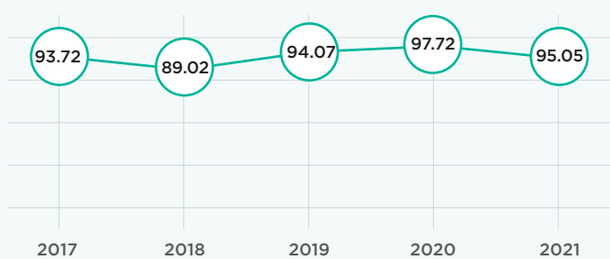
BPP is focusing on investing in the power plants using advanced, clean, and environmentally-friendly technology in accordance with the **Greener & Smarter** strategy, such as the thermal power plants employing clean technology, the renewable energy power plants, the energy technology, and the smart energy utilization. These investments made are in the forms of both business operations with direct management control and joint venture companies. Prior to investing, each project must be carefully considered on both risks and return on vestments, including examining environmental, social, and governance (ESG) issues of the project. Additionally, the variables related to ESG issues, such as carbon prices, greenhouse gas (GHG) emissions intensity, and etc. are taken into consideration for each investment to ensure that the company invest in businesses able to grow sustainably. Meanwhile, the risk is mitigated to an acceptable level. In addition, the existing CHP plants are looking for opportunities to expand their business operations into the integrated energy services to meet the rising demand for clean energy.

Performance

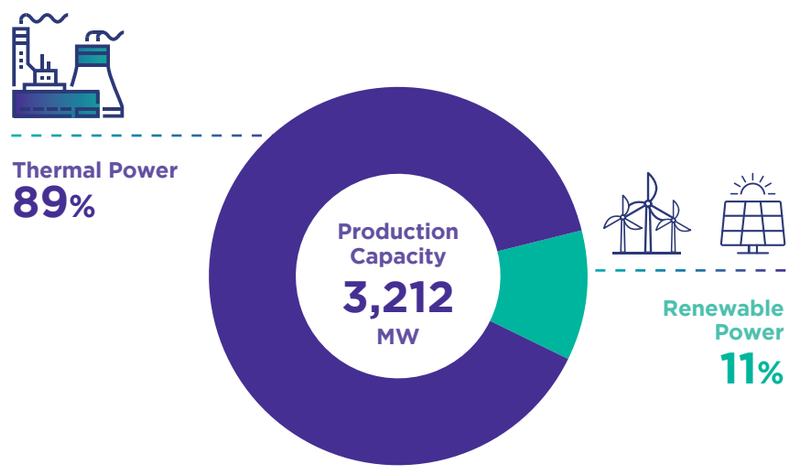
- The company has improved the power plants to keep their abilities continue generating power and maintain the availability factor according to customers' needs through efficient maintenance planning during the COVID-19 pandemic. Moreover, the power plants' efficiency has been enhanced to be more flexible in handling a variety of fuels, such as industrial wastes and coal with low calorific values, etc., in order to reduce the production costs when the coal prices are high. In the past year, BPP was able to carry out productions with efficiency and stability according to the target, including:
  - The Availability Factor (AF) was 95.05%.
  - The Forced Outage Factor (FOF) was 4.87%.
- All three CHP plants in China have been continuously certified for the ISO 9001 Quality Management System Standard, the ISO 14001 Environmental Management System Standard, and the ISO 45001 Occupational Health and Safety Management System Standard by the external certification bodies. They have also carried out their productions according to the international standards.

Availability Factor (AF) of 3 CHP Plants in China

(%)



- BPP has created growths continuously. The company has an equity-based power generation capacity of 3,212 MW, of which 2,860 MW are from thermal power plants, and 352 MW are from renewable power plants (as of 28 February 2022).
- BPP successfully invested in the power generation projects according to the Greener & Smarter strategy, for example:
  - Temple I gas-fired power plant in the U.S., with a production capacity of 768 MW.
  - Nakoso IGCC power plant in Japan, with a production capacity of 543 MW.
  - Two solar power plants in Australia, namely Beryl Solar Power Plant and Manildra Solar Power Plant with total production capacity of 166.8 MWdc.
  - Commencing the commercial operation of Kesennuma Solar Power Plant in Japan, with a power generation capacity of 20 MW.
  - Zhengding CHP Plant has been selected as the developer of the solar rooftop installation project in Zhengding County, targeting to install totaling 167 MW of solar panels on the roofs of governmental buildings, factories and communities by 2023.



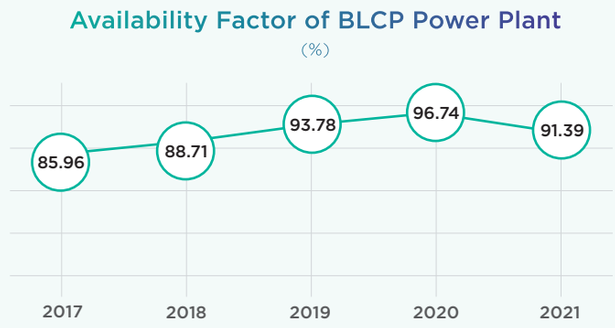
Joint Venture Power Plants' Operations

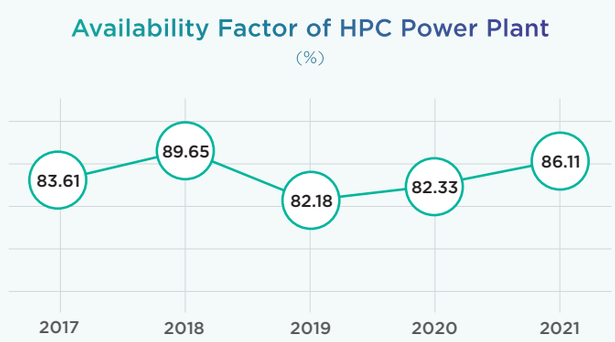
BPP has invested in thermal power plants in Thailand and Lao PDR, namely BLCP Power Plant and HPC Power Plant, respectively. The two power plants are the base load power plants under the power purchase agreements (PPA) to sell electricity to Electricity Generating Authority of Thailand (EGAT) in order to maintain the stability of the power distribution system and the nation's overall electricity costs. Details of the number of availability hours and annual maintenance plans of BLCP Power Plant and HPC Power Pant are specified in the 25-years PPAs. The PPA's practice principles stipulated that the power plants must submit an annual maintenance plan to EGAT and clearly implement the goals under the specified period as informed to EGAT.

BLCP Power Plant was able to maintain its Equivalent Availability Factor (EAF) as planned, completing the contracted availability hours earlier than the deadline. Although, the two BLCP production units had to cease their operations due to the unplanned maintenances, the plant was able to generate more electricity from its production plan in response to the nation's higher demand for electricity.

Whereas, HPC's EAF was marginally lower than the plan set due to the maintenance shutdown impacts from its three production units. HPC Power Plant, however, was able to keep its Availability Factor (AF) better than the previous year. In addition, the power plant also implemented the project to improve the inspection of its machinery operations and maintenances to be more efficient.

BLCP Power Plant was able to maintain its Equivalent Availability Factor (EAF) as planned, completing the contracted availability hours.





Predictive Maintenance Software

Reduce costs and maintenance downtime

Reduce the opportunity loss for power generation

An opportunity to earn additional income

HPC Power Plant, a joint venture power plant, has developed a predictive maintenance program to solve unplanned maintenance downtime due to the power plant's machinery and equipment breakdowns, causing operational stoppages for maintenances. This has led to a loss of profit and resources.

The predictive maintenance has used digital technology in the part of artificial intelligence (AI) to help in predicting the deteriorations of machines and equipment before they are actually malfunctioned. Various measurements data from the machinery sensors such as heats, noises, vibrations, etc. have been used and developed as a model for predicting the deteriorations of machinery parts ahead of engine's worn out. When detecting an abnormal signal, the system will notify automatically. This allows the power plant to plan for maintenances in advance before its machines are actually broken down, making the plant have more availability and stability. This project has been run continuously and expanded its operations' scope for two consecutive years, making HPC Power Plant's availability factor increased consistently since 2019. Currently, the power plant's AF is 86.11%, an increase of about 4%

Benefits:

- The power plant can prevent and plan in advance for equipment's parts maintenance prone to malfunction. This makes it possible to reduce costs and maintenance downtime.
- The power plant can continue its productions and reduce the opportunity loss for power generation caused by the unplanned maintenance. The power plant can Generate electricity according to the power purchase agreement and create an opportunity to earn additional income from selling more power in addition to the amount specified in the contract.
- The power plant can use statistical data to analyze the cause of damages in order to apply it to prevent machinery and other equipment breakdowns more quickly. This is due to the data gained from one of the power plant's production units able to be applied to other production units with the same functionality.

An Investment in Nakoso IGCC Power Plant (Nakoso IGCC)

Located in Fukushima Prefecture, Japan, Nakoso IGCC Power Plant is a 543 MW - thermal power plant, using high quality coal as the main fuel. The plant was developed by a collaboration between Mitsubishi Group of Companies, Tokyo Electric Power Company (TEPCO), and Joban Joint Power Company with an aim to increase diversifications of power generating fuels in accordance with Japan's energy development plan. It also contributes to the economic recovery of Fukushima Prefecture after the tsunami devasted the Tohoku region in 1997.

Nakoso IGCC employs the Integrated Gasification Combined Cycle (IGCC) technology, which has been researched and developed for a long time through combining gasification technology, using a gasifier to turn coal into gas as fuel, with the gas fired combined cycle plant technology for generating electricity. As a result, **the power generation efficiency has been higher** when compared with that of coal-fired power generation. Furthermore, **the greenhouse gas (GHG) emissions have been tangibly reduced**, while **the air pollution released from the power plant's stacks has been at the ultra-low emission level**. Nakoso IGCC Power Plant is the first power plant deploying the IGCC technology and has been developed into the largest commercial power plant today.

BPP has invested in Nakoso IGCC Power Plant in March 2021, holding 13.4% of stakes with an equity-based power generation capacity of 73 MW. Nakoso IGCC can operate continuously and adjust its production capacity corresponding to the electricity demand at different times. The power plant has also supplied electricity to the Japanese power grid in accordance with the long-term power purchase agreement. The acquisition of Nakoso Power Plant is, therefore, an investment aligned with the company's Greener & Smarter strategy, focusing on investments able to meet the local power demand via using high-efficiency and environmentally-friendly technology.

An Investment in Temple I Power Plant

Located in Temple City, Texas, U.S., Temple I Power Plant is a 768 MW - Combined Cycle Gas Turbine (CCGT) power plant, using the U.S.-produced natural gas as the fuel to generate electricity. The power plant sells electricity through a 345 kV-transmission line to the wholesale power market, which is under the supervision of the Electric Reliability Council of Texas (ERCOT).

The U.S is a country with high energy security and a large energy market. Presently, it is considered a country generating and exporting energy more than importing (Net Export of Energy). This is due to research and a development of technologies to produce natural gas from shale gas with large reserves and lower prices than that of conventional natural gas production. This has led the U.S., previously relying mainly on coal-fired power plants, to reduce the proportion of power generated from coal and increase the proportion of gas-fired power generations. As a result, a new generation of gas-fired power plants with higher efficiency and lower GHG emissions has been emerged.

Additionally, Temple I Power Plant is **ranked in a sound merit order**, suited for competitive conditions in the Electric Reliability Council of Texas (ERCOT) market, where electricity is freely traded. It is also **fully equipped with gas transportation and gas storage**, helping the power plant effectively manage its costs and increase the flexibility to operate the power production machines to meet electricity demand patterns in the areas. The Temple I Power Plant is under a 30-year-long contract of water supply for the production process. It also has **an efficient discharged-water management system**, able to reduce wastewater to near zero discharge facility, which helps create stability and is conducive for production processes in the long-term.

BPP has invested in Temple I Power Plant in November 2021, holding 50% of shares with 384 MW equity-based power generation capacity. It is a joint investment with BKV, a subsidiary of Banpu Plc., specializing in the exploration and drilling of natural gas from shales. This investment has built upon Banpu Group's ecosystem, which has already operated the natural gas production business in the U.S. It is also in line with the company's investment direction aligned with the Greener & Smarter strategy, focusing on investing in the power plants with high efficiency and environmental friendliness.

Climate Change and Greenhouse Gas (GHG) Emissions

13 CLIMATE ACTION

Strategy:

- Reducing GHG emissions intensity per unit of products by enhancing the power plant efficiency through promoting innovations and using high efficiency and environmentally friendly technologies.
- Investing in the renewable energy so as to be part of a low-carbon society in the future.
- Upgrading an ability to adapt itself to risks involved with climate change.

Key Indicators:

- GHG emissions intensity
- An investment in renewable power generation projects

Target:

- GHG emissions intensity is not exceeding 0.676 tonnes CO_2e/MWh during the year 2021 - 2025.
- The renewable energy production capacity of no less than 800 MWe by 2025.

Performance:

- GHG emissions intensity per unit of products was 0.603 tonnes CO_2e/MWh, a decrease of 10.8% compared to the target set and a reduction of 4.4% in comparison with the year 2012 baseline.
- The renewable energy generation capacity of 230 MWe, representing a progress of 28.8% of the year 2025 target.

Significance and Reporting Boundary

Climate change is an issue having an effect on sustainable development and human well-being. Therefore, it has become the global issue pulling collaborations across the world to reduce the GHG emissions and alleviate its impacts. Many countries have jointly set the common goals to reduce GHG emissions in order to control an increase of the earth's average temperature to well below two degrees Celsius. Consequently, policies and laws have been put in place to promote the GHG emission reductions in many countries, including the People's Republic of China, such as the Emission Trading Scheme (ETS), and the fuel consumption restrictions for energy production.

Major activities causing the GHG emissions conducted by BPP are summarized as following:

Direct GHG Emissions (Scope 1)	Indirect GHG Emissions (Scope 2)
• Using coal and waste gases from the industrial factories, and activated carbons – a waste from the industrial factories, as fuels to generate power, steam and heats. • Utilizing diesels for igniting the boiler's combustions, heavy equipment, substitute power generators, and internal transport vehicles, etc. • Using gasoline for vehicles. • Making use of calcium carbonates ($CaCO_3$) to control the air quality. • Employing SF_6 gases.	• A power purchase from external sources.

GHG emissions intensity was

0.603 tonnes CO_2e /MWh,

a decrease of 10.8% compared to the target set and a reduction of 4.4% in comparison with the year 2012 baseline.

The renewable energy generation capacity

230 MW

representing a progress of 28.8% of the year 2025 target.

The boundary of this report covers all business entities in which BPP has direct management control in accordance with the principle of The GHG Protocol Corporate Accounting and Reporting Standard (Revised Edition), which is in line with that of Banpu Group, including the three combined heat and power plants (CHP) in China. This is exclusion of Temple I Gas-fired Power Plant in which the company has invested late last year.

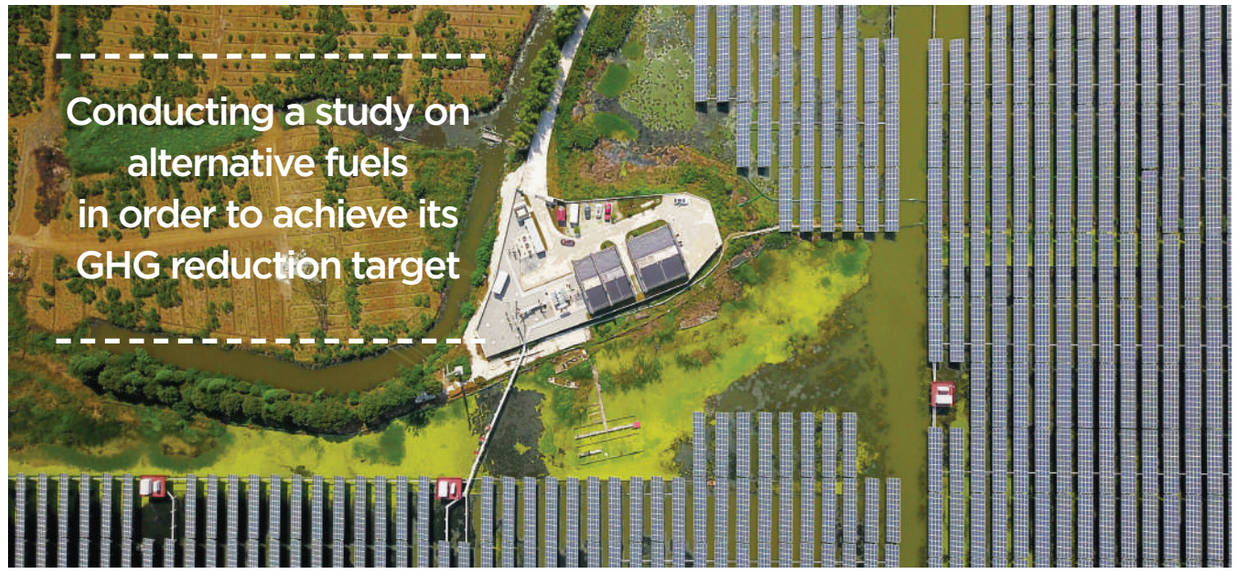
The operating results of the renewable power plants and the joint venture thermal power plants where BPP have no direct management control, but are interested by the stakeholders, however, are reported in the table annexed. They are not integrated with BPP's GHG emissions database.

Management Approach

Due to its power and energy generation business, BPP has directly consumed fuels for energy productions. As a result, the company has mainly focused on operations to reduce the direct GHG emissions (Scope 1) resulted from various fuel consumptions. BPP's direct GHG emissions released from using various fuels, are accountable for 99% of its total GHG emissions since the company's business operations are the upstream business on generating power and other energy supplied for industrial and residential consumptions.

BPP sees the opportunities and capabilities to reduce the GHG by improving the energy utilization efficiency, reducing losses in the production process, conducting a study on alternative fuels in order to achieve its GHG reduction target. It is also seeking chances to invest in the renewable energy, energy technology and smart energy solutions in accordance with the Greener & Smarter strategy.

BPP has closely monitored policy changes and assessed risks associated with climate change in preparation for adapting itself to both physical, policy, and legal changes in several countries. Therefore, the company has to adjust itself in various ways, for example, using the business continuity management system to assess risks, impacts and opportunities associated with changes in order to align with the Task Force on Climate-Related Financial Disclosures (TCFD), including setting the carbon pricing as part of the investment consideration in various projects.



In the past year, BPP in conjunction with Banpu Group established an additional working group on climate change. At present, there are 3 working groups, namely:

The Climate Change Committee is responsible for driving holistic climate change operations and managing the associated risks in order to reduce GHG emissions.

The Task Force on Climate-Related Financial Disclosures Working Group (TCFD Working Group) is accountable for handling information disclosure in accordance with the TCFD guidelines.

The Decarbonization Project Study Committee has a duty to conduct a feasibility study in various GHG emission reduction projects.

BPP's management approaches to reduce the GHG emissions are as follows:

Existing Thermal Power Plants

- **Combined Heat and Power (CHP) Plants where BPP has direct management control** include three CHP plants in China, which have high energy consumption efficiencies, having 25% energy loss during a full production capacity of power and steam. Meanwhile the thermal power plants solely generating electricity will lose energy about 65% when generating power. This has led the CHP plants to have low energy consumption rate and marginal GHG emissions intensity. The customer's demand to purchase steam at different time periods, however, has directly affected the efficiencies of energy consumptions and GHG emissions. BPP, therefore, has placed great emphasis on using innovations to improve the power plant efficiency and production processes, as well as managing the power plants to be flexible in order to correspond to the volatile steam demand. As a result, BPP together with Banpu Group have monitored and checked the accuracy of GHG emissions database. The three CHP plants' GHG emission database have been conducted external data assurance since 2018 up to present.

  Additionally, BPP is also seeking opportunities to reduce GHG emissions in the CHP plants, for example using Carbon Capture, Utilization and Storage (CCUS) technology, as well as transforming the business operations towards the integrated energy producer and service provider, such as being an operator on renewable energy projects, etc.

- **Thermal power plants which are the joint venture companies**, namely BLCP Power Plant and HPC Power Plant, have emphasized the quality management and annual maintenances, inclusion of initiating to use the information system to predict a machinery maintenance before it is broken down (predictive maintenance). This will have an effect on the power plants' efficiency, lowering the fuel consumption intensity and performing the Availability Factor (AF) as designed. These factors are the key performance indicators reflecting the readiness and efficiencies of the power plants, directly affecting the GHG emissions' reduction. Consequently, BPP has assigned the Asset Management Department in collaboration with its business partners who jointly invest in the power plants, to monitor the power plants' GHG emissions.

Emphasis on using innovations to improve the power plant efficiency and production processes, as well as managing the power plants

Under Development Thermal Power Plant Projects and Production Capacity Expansions

For thermal power plant's projects or the upcoming CHP plant's programs, BPP chooses to employ the clean and highly efficient technology. The company is looking for opportunities to invest in the power business generated by a variety of fuels in the future, such as natural gases, industrial waste gases, wastes, biomasses, etc. This includes the investments in the environmentally-friendly industry, for example the hydrogen industry, which is considered as one of the clean energies with rapid growth. Using hydrogens as the fuel source can play a significant role in reducing GHG emissions.

Renewable Power Plant and Energy Technology Projects

BPP aims to invest in the renewable power plant projects of no less than 800 MWe by 2025 through Banpu NEXT, in which the company holds 50% of shares. It also expands its businesses to the energy technology and operates electricity generations from solar and wind power plants. This includes supplying clean energy together with integrated energy management solutions to customers in order to reduce GHG emissions, such as the rooftop solar power generation system, the energy storage system, the electric vehicle business, the smart city, and the energy management system business, etc.

BPP has collected data on diesel, biodiesel and benzene volumes by gathering information from the receipts, while the coal quantities have been obtained from a scale attached to a conveyor belt. Meanwhile, the amount of flue gas has been gained from the gas flow intensity meter. For calculating the energy consumption amount, the company has used the energy conversion factor based on the GHG Protocol: Emission Factors from Cross Sector Tools for diesel, biodiesel and benzene. The values of coal and waste gas have been derived from the monthly measurements.

In addition, the company has used the Global Warming Potential (GWP) with reference to the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) to calculate the amount of GHG emissions. The GHG emission factors are in accordance with a Corporate Accounting and Reporting Standard (Revised Edition) and specific coefficients if there is a region-specific GHG emission coefficient. The gas used in the calculations consisted of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF_6).

Performance

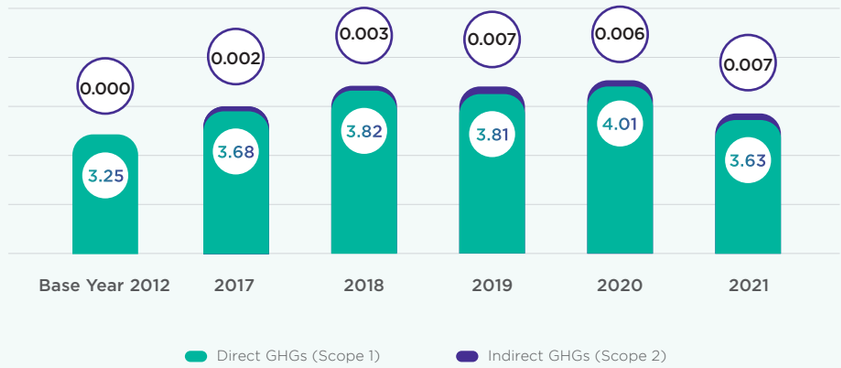
- **BPP recorded the GHG emission intensity of 0.603 tonnes CO_2e/MWh, a decrease of 10.8%, compared to the target set and a reduction of 4.4% when compared to the 2012 baseline.** This was due to the power plants' efficiency improvements over the years. The improvement programs included the project to reduce energy and water losses in the systems, and the enhancement of steam boilers to burn fuels with various heat values. In addition, the company has also adapted itself to the regulations issued by the Chinese government, stipulating the amount of coal able to be used in the power plants and the emission trading scheme recently started implementing in China. In the past year, BPP's CHP plants in China were able to control the amount of GHG emissions according to the standards set by the government and have the opportunities to either sell or retain the remaining GHG emission rights for future use.

- **BPP has invested in renewable energy and energy technology businesses through Banpu NEXT**, a joint venture company in which the company holds 50% of shares. The company has an equity power generation capacity of 230 MW from renewable energy, representing a 28.8% progression of its target to have at least 800 MW from renewable energy by the year 2025.

- **Organizing a workshop to assess risks related to climate change**, including physical risks affecting operations, and risks associated with a transition to a low-carbon society (Transition risk) both in the short- and long-term periods. This is part of the climate change operation's performance disclosure. Conducting a study to align with the Task Force on Climate-Related Financial Disclosures (TCFD), starting with the three CHP plants in China and the major joint venture power plants significantly generating incomes, namely BLCP Power Plant and HPC Power Plant. Criteria considered included the impacts of various related factors such as changes in fuel costs, carbon prices, insurance costs, and costs from the changing water volumes and the effects of sea levels, including the opportunities to run the renewable energy and energy technology business.

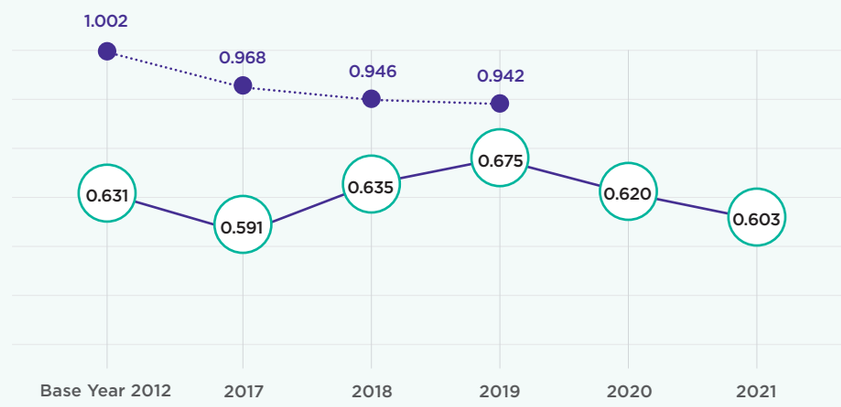
The Amount of Direct and Indirect GHG Emissions

(million tonnes of CO_2e)



GHG Emission Intensity from the CHP Plants in China

(tonnes CO_2e/MWh)



Reference: IGES List of Grid Emission Factors (2021)

- **Enhancing the capabilities for adaptation to climate change related risks** such as:
  - **Operations Risk Management:** BPP has adopted a business continuity management system (BCMS) in preparation for any events causing business operation halts, such as natural disasters and epidemics in order to be able to operate continuously or to recover operations quickly, and able to deliver products and services meeting the stakeholders' expectations. The business continuity management exercises have been regularly organized, and the company has been certified by the ISO 22301 Business Continuity Management System.
  - **Changes in policies and regulations related to energy, environment and GHG emissions:** BPP has a unit to follow up, monitor, and anticipate regulatory changes in all areas in which it has operated, both locally and internationally, as well as from the central authority in order to be able to adapt itself to the changing environmental quality standards, which are more intensively. BPP is also looking for more investment opportunities in renewable energy business receiving supports from the government.

- **Disclosing the climate change's operation performance** and under conducting a study to align with the TCFD guidelines as well as assessing risks and opportunities relating to climate change, including the impacts on current and future businesses.

- **Organizing trainings to create understanding and awareness of climate change** – a challenge and opportunity for BPP, to the Board of Directors, executives and employees, such as setting up a net zero emission target, disclosing information in accordance with the TCFD guidelines and the results of the 26th session of the UN Framework Convention on Climate Change (COP26), as well as knowledge about various forms of energy storage technology, etc.

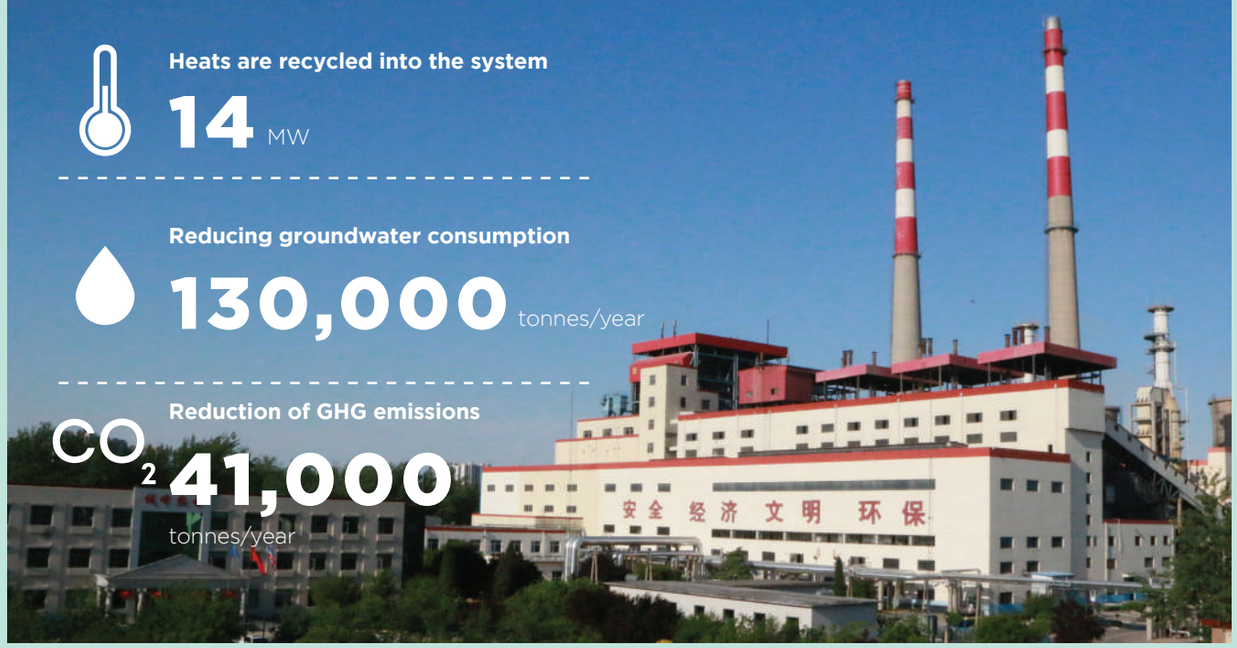
- **Implementing the innovation projects to improve energy consumption efficiency and reduce GHG emissions,** such as:
  - **The multisource Solid Waste compound fuels project** implemented at Zouping CHP Plant.
  - **The power plant improvement project** to blend low-calorific coal used as the fuel at Zhengding CHP Plant.
  - **The project to utilize digital systems in energy management** at Luannan CHP Plant.
  - **The project to enhance the intelligent monitoring and control system** in the heat exchanger station for safety and efficiency increasement at Zhengding Power Plant.
  - **A project to study the feasibility of investing** in CCUS for industrial use at Zhengding CHP Plant.
  - **Zhengding CHP Plant was selected as the developer of the Zhengding Rooftop Solar PV project** to install solar panels on the roofs of government buildings, factories and communities, totaling 167 MW by 2023.

- **In the past year, BPP has successfully invested in the power plants using high-efficiency power generation technology with a low GHG and pollutant emissions intensity**, namely Nakoso IGCC Power Plant in Japan and Temple I Gas-fired Power Plant in Texas, the U.S., Nakoso IGCC is employing the Integrated Gasification Combined Cycle (IGCC) technology, which is the integrated technology, turning coal into gases for generating power. Meanwhile, Temple I is using the Combined Cycle Gas Turbine (CCGT) technology with high efficiency and low GHG and pollutant emissions intensity.

GHG Emission Reduction Project at Zhengding CHP Plant

The People's Republic of China has gradually announced laws related to energy consumption control, GHG emissions and environmental quality control over the years. In responding to the nationally determined contributions (NDCs) policies to reduce GHG emissions announced in the meeting of states parties to the United Nations Framework Convention on Climate Change, the local clean energy projects are continuously planned and promoted.

Zhengding CHP Plant has continuously implemented projects to increase its energy efficiency and to reduce the GHG emissions in response to policy and legislative changes related to energy consumptions and climate change including adapting itself to change in energy consumption patterns. Throughout the past three years, the plant has undertaken projects to reduce GHG emissions as following:



- **A project to control exhaust gases emitted from stacks and reduce heat losses:** A study on engineering design was conducted by using a heat pump for heat exchanger instead of constructing a steam distiller. The heat pump can separate steam mixed with exhaust gases and control the generation of white smoke. It can also recycle heats from exhaust gases. The investment budget for construction is about CNY 35.5 million, while the operating cost is about CNY 2.4 million per year. Benefits contributed from this project include:
  - About 14 MW of heats are recycled into the system, covering an additional heat supply area of about 340,000 square meters, or about 5,000 households, equivalent to CNY 10.56 million per year of revenue.
  - Able to recycle all water resulted from condensation, reducing groundwater consumption by 130,000 tonnes/year.
  - Reducing sulfur dioxides and particular matters emissions by approximately 30%.
  - Decreasing energy consumption, leading to a reduction of GHG emissions by approximately 41,000 tonnes/year.
  - Selected as one of the top 100 Eco-environmental innovation projects in 2020.

- **The Intelligent monitoring and control system for heat exchangers station:** About CNY 4.1 million was invested in installing the sensors such as temperatures, pressures and flow rates, including developing a remote monitoring and control system. This makes it possible to quickly monitor and control operations. As a result, it can reduce electricity consumption by about 18.4% or decrease the electricity consumption intensity by 0.36 KWh/square meter (from 1.96 KWh/square meter to 1.6 KWh/square meter). This represents a reduction in GHG emissions of approximately 0.34 kilograms of CO_2e/square meter, valued to approximately CNY 864,000 per year of annual energy cost savings.

- **Conducting a feasibility study project to invest in carbon captures used in the industrial sector:** The study was completed in 2021 and is in the process of studying on constructions. It is expected to capture about 100,000 tonnes of CO_2, or about 10% of the total GHG emissions from Zhengding CHP Plant. CO_2 can be sold to industrial factories in the vicinity where CO_2 is used in the production process.

- **Conducting a feasibility study on investment in solar rooftop installation:** In response to the government's policy that has been promoted for more local clean energy projects, Zhengding CHP Plant has been selected to be the operator of the solar rooftop installation project. It aims to increase the installation of solar panels on the roofs of governmental buildings, factories and communities to a total of 167 MW by 2023. It is expected to generate power of approximately 200,000 MW per year and reduce GHG emissions by 119,000 tonnes of CO_2e/year.

Other Indirect GHG Emissions (Scope 3)

BPP conducted a preliminary assessment of indirect GHG emissions (Scope 3) which involved operational activities as follows:

Activities	Association	Description
1. A purchase of goods and services	✓	A production and transportation, coal, (exclusion of the HPC Power Plant, which is a mine-mouth power plant) oils, electricity, several chemical substances, constructional materials, contractors' services, etc.
2. Capital goods	✓	BPP's capital goods mostly include machineries, spare parts, vehicles, project's constructional materials.
3. Fuel and energy consumption related activities, exclusive of direct GHG emissions (Scope 1) and indirect GHG emissions (Scope 2) reports	o	The energy consumption in offices has no production activities.
4. A seller's transportation	✓	The oil consumption for materials delivered by sellers or sub-contractors via key transportation channels including ships, trains and roads.
5. Effluent generated from operations	✓	Effluent treatments or disposals by external persons/parties such as hazardous waste treatments and disposals, water treatment, as well as a utilization of fly ash and bottom ash, etc.
6. Business trips	o	BPP's business trips have been conducted via airplanes, trains and cars, etc. The amount of GHG emitted from traveling is minimal when compared with the ones generated by other activities.
7. Employee commuting	o	The employees commute from their residences to the workplaces via their own cars or other public transportations. The amount of GHGs emitted from this activity is not significant when compared with those generated by other activities.
8. Leased assets	x	BPP has no leased assets for production, but only for leasing offices.
9. Products transportation and distribution	o	A loss from the transmission grid, steam, hot and chilled water pipelines which are not owned by BPP.
10. Processing of sold products	o	Electricity, steam, hot and chilled water can be used immediately without being processed. The voltages, however, may be changed a little before being used or sold to customers.
11. Usage of products	✓	The consumer's consumption of electricity, steam, hot and cold water.
12. Expired products treatment	o	The electricity consumption doesn't need for treatment. The steam, hot and cold water, on the other hand, are used for other purposes or further recycled.
13. Leasing assets	x	There is no associated operation in providing leasing assets for production.
14. Franchises	x	There is no associated operation.
15. Investments	✓	Investments in joint-venture companies including the conventional power plants and renewable power plants.

Notes: ✓ Associated with the Company's operations o Associated with the Company's operations but without significance x Not associated with the Company's operations

Risks, Impacts, and Opportunities Resulted from Climate Change

Risks	Impacts/Opportunities	Strategies and Operations	Lengths of Time Expected to Happen
1. Physical Risk			
1.1 Changes in climate patterns and seasonal fluctuations	• Lengths of time in the winter season deviating from its normality affect the production plan of combined heat and power (CHP) plants to generate heat to the community in winter. • The temperature significantly higher than normal has resulted in lower heat sales for residents and costs from controlling the discharged water temperatures. • Significantly high/low temperature has resulted in the machinery unable to carry out productions due to exceeding its design values. • The amount of light and wind intensity deviated from the estimates has enabled the renewable power plants to generate less electricity than the target.	• Designing production with multiple production units for flexibility and having more options to produce with the highest efficiency in accordance with the community's demand for thermal energy. • Investing in a power plant designed to withstand high/low temperatures, and create opportunities to generate power when other power plants or renewable power plants cannot operate, such as Temple I Gas-fired Power Plant. • Assessing the project's worthiness prior to investing by allowing for higher light and wind discrepancies.	1 - 5 years
1.2 Severe natural disasters such as storms, floods	• Production halts due to natural disasters have resulted in expenses on investing in natural disasters prevention, damage repair, and production opportunity loss.	• Investing in wind and flood prevention in the high-risk production units or those having a frequency of recurrence by taking into account the cost effectiveness in relation to the power plant's lifespan. • Designing and constructing a project by putting top concerns on natural disaster factors. • Procurement of property damage insurance and business interruption insurance suitable for various incidents.	1 - 5 years
1.3 Rising sea level	• Having an effect to production units located in coastal areas, possibly causing construction costs to prevent floods.	• BLCP Power Plant, a joint venture company, has been designed and constructed to exceed the estimated sea level rise over the power plant's life time. • Other power plants are not affected because they are not located on the coast.	10 years up
1.4 A decrease of precipitation volumes and fresh water shortages	• Less rainfall has resulted in a shortage of fresh water in the area.	• All 3 CHP plants have taken steps to reduce water loss in the system, while the extension is designed to be able to recycle water as much as possible until it does not discharge water anymore (zero discharge). • BLCP Power Plant produces fresh water from seawater through the reverse osmosis method, making it not to draw fresh water in the area, and create opportunities to sell the fresh water produced to the nearby industrial plants. • HPC Power Plant manages its water sources with two wellsprings and monitors water levels management regularly.	1 - 5 years

Risks	Impacts/Opportunities	Strategies and Operations	Lengths of Time Expected to Happen
2. Transition Risk			
2.1 Policy and legal changes	• The government sector establishing policies and laws to reduce the greenhouse gas (GHG) emissions according to the Net-Zero target, has resulted in the limitation of fuel consumption and GHG emissions, which has been rising rapidly in China and Japan. This leads to costs in improving the production process/opportunities to invest in the renewable power plants supported by the government. • Expenses incurred from carbon tax/opportunity to sell electricity generated from clean energy. • An increase in financial costs or receiving no supports for the fossil fuel projects/ lower financial costs of clean energy projects.	• Improving the power plant efficiency for maximum energy consumption efficiency. • A transition of fossil fuels consumptions, such as biomass, waste, etc. • Adjusting the business plan to become an integrated energy solution and service provider such as providing solar rooftop installation services in China. • Conducting studies and investing in carbon capture, utilization and storage (CCUS). • Using the cost incurred from carbon taxes to calculate the investment worthiness of each project. • Looking for opportunities to sell carbon credits from clean energy production. • Upgrading the operations relating to environment, social and governance (ESG) to a sound level recognized internationally in order to create confidence among stakeholders and financial institutions.	1 - 5 years
2.2 Increased demand for clean energy	• Fluctuations in light intensity and wind speeds have resulted in the inconsistency and instability of renewable power generation. • An increase in demand for clean energy, but still unable to create stability in the local electricity system due to inadequacy of energy storage technology and a concentration of renewable energy power plants in some areas, has caused wastefulness from generating more power than the local demand, including stability of the power transmission and distribution system, which is derived from external management.	• Investing in energy technologies such as energy storage systems to stabilize the power supply. • Applying digital technology to analyze data to forecast production and energy consumption in each area, including a competitive advantage for sales of energy in the merchant market. • Investing in high-technology and low-emission energy, such as gas-fired power plants so as help stabilize the power generation of the area. • Investing in smart energy management technology (demand-side management).	1 - 5 years
2.3 An increase in coal and other fossil fuels prices	• Higher coal and other fossil fuels prices due to lower production/opportunity to use other fuels from the government support.	• The power plants with long-term power purchase agreements (PPA) are not affected since the fuel costs are borne by the purchasers. • Managing coal purchases such as having long-term contracts, expanding coal stockyard areas to be able to accommodate coal reserves. • Seeking opportunities to use other fuels such as biomass, natural gas, waste, etc.	10 years up
2.4 Restriction of water consumption and rising water prices	• The governmental restriction on using fresh water in the production process has resulted in improvements to reduce the amount of water used as specified by the government. • A shortage of fresh water in the area increases water prices.	• All 3 CHP plants have taken steps to reduce water loss in the system, while the extension is designed to bring water back to use as much as possible until the waste water is not released from the power plant. • BLCP Power Plant produces fresh water from seawater through the reverse osmosis methodology, making it not to draw fresh water in the area. • HPC Power Plant manages water sources with two wellheads and monitors water levels management continuously.	1 - 5 years
2.5 Higher insurance costs	• Insurance companies increase their insurance premiums from natural disasters, which are more severe with higher frequency.	• Investing in the installation of equipment to prevent and reduce damage severity from natural disasters.	1 - 5 years

Energy Efficiency

7 AFFORDABLE AND CLEAN ENERGY

Strategy:
- Controlling fuel consumption at the maximum efficiency.
- Employing the high efficiency and environmental-friendly technology.
- Supporting projects and innovations involved with energy saving.

Key Indicators:
- The energy consumption intensity

Target:
- The energy consumption intensity not exceeding 1.72 GJ/MWh

Performance:
- The energy consumption intensity was 1.20 GJ/MWh, better than the set target of 30% and decreasing 22% compared to 2020.

Significance and Reporting Boundary

The major costs of thermal power plants and combined heat and power (CHP) plants are from fuels used for generating power, steam and other forms of energies. The energy consumption efficiency, therefore, directly affects costs and competitive advantages as well as greenhouse gas emissions. Meanwhile, the regulations specifying the amount of coal consumption in China have been the challenge, BPP has to adjust itself to cope with such changes. These include improving the energy consumption of existing power plants and developing the future power projects to have lower energy consumption intensity as well as to be part of alleviating the climate change.

Activities involved with energy consumption in generating power, steam and heat include:

Using coal as a fuel for productions.

Using diesels to ignite the boilers and as a fuel for heavy equipment and transportations.

Using gasolines and diesels for transportations.

Using other fuels for productions such as waste gases from the blast furnace gas industry.

Purchasing electricity from external sources.

The energy consumption intensity was

1.20

GJ/MWh

better than the set target of 30%

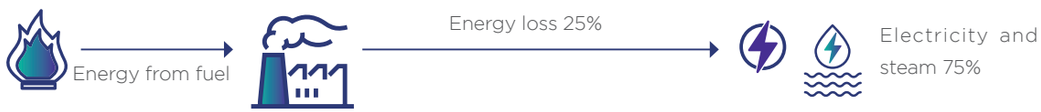
The boundary of this energy consumption report is in accordance with the greenhouse gas (GHG) statement covering all business entities where BPP has direct management control. These include the three CHP plants in China, exclusion of Temple I Gas-fired Power Plant in which the company has invested in late 2021. For the renewable power plants and joint venture thermal power plants, which are the key investments, only their operating performances are reported in the table annexed.

Management Approach

The CHP plants in China are highly energy efficient power plants, with only about 25% energy loss during the production and at the highest power generating capacity. Meanwhile, the thermal power plants solely generating electricity will lose the energy during operations of around 65%.

Thermal Power Plant

Combined Heat Power Plant



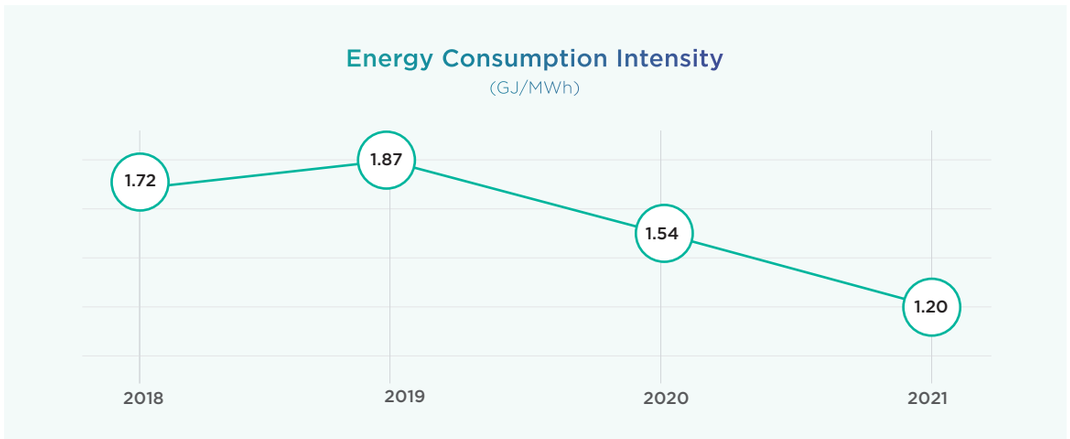
BPP has focused on providing energy management services for the maximum efficiency, namely:

- Selecting the high-performance technology with minimal fuel consumptions and environmentally friendly.
- Improving the boiler efficiency to have the most complete combustion.
- Planning for efficient maintenances to increase the power plants' Availability Factor (AF), reducing the planned outage factor and the unplanned outage factor, as well as lessening energy losses from stopping running and starting operating the machine.
- Looking for opportunities to lower heat and power losses in the system and reuse it.
- Improving other supportive systems such as upgrading water quality inside the boiler for longer use, reducing water discharges and filling up new water to the system.
- Seeking opportunities for using more energy sources in the area such as waste gases from the blast furnace gas industry, natural gases, biomass fuels, etc.
- Planning to purchase multiple fuels from various sources in order to manage the fuel supply with high quality and reasonable prices and to reduce any risks associated with fuel shortages.
- Developing the integrated energy management applications for power plants, starting from purchasing, storage, and blending to production's combustion process.

BPP has collected its energy consumption data, such as the amount of diesel, biodiesel and benzene contents by gathering information from the receipts, while the coal quantities have been obtained from a scale attached to a conveyor bel and the amount of flue gas has been taken from the gas flow intensity meter. Consequently, all data collected will be consolidated to the total amount of energy consumption. Moreover, the energy conversion factor the company has used is based on the GHG Protocol: Emission Factors from Cross Sector Tools for diesel, biodiesel and gasoline. The values of coal and waste gas are derived from the monthly measurement report.

Performance

In 2021, BPP recorded the energy consumption intensity of 1.20 GJ/MWh, reducing 22%, when compared to 2020, and 30% better than the target set. This was due to the production process improvement such as low-calorific coal blending at Zhengding CHP Plant and using activated carbons - wastes from the customers' industrial factories, to replace coal at Zouping CHP Plant. Through the experiments, the power plants' equipment improvement, and the energy efficiency and safety inspections, BPP was able to improve its energy consumption efficiencies, reduce coal utilization, and utilizes wastes from the industrial sector for commercials. Moreover, the company was able to decrease fuel costs by about CNY 44.25 million from both projects, allowing it to adapt itself, though the coal prices hit the record-high in the history. Besides, it was able to control coal consumption volumes as specified by the government, while the energy consumption intensity per unit of products was significantly improved.



BPP has frequently monitored and compared the imported energy to the energy generated as well as the energy consumption of each production unit because it is the power generation's main cost for thermal power plants and CHP plants. The company has also looked for opportunities to reduce fossil energy consumptions as it is a fuel cost and generates the greenhouse gases. In the past year, various projects to increase the energy consumption efficiency were implemented as following:

- Generating and using more clean energy to replace fossil energy, such as installing solar cells on coal storage plants, streets, and parking lots, etc.
- Improving the energy efficiency of power plants such as:
  - Improving the techniques to spray fuels.
  - Decreasing the power loss in the system, such as the pipe system loss, the energy consumption of supportive machineries, etc.
  - Applying the digital technology to the development of applications and device deployments for holistic energy management.
  - Upgrading the power plants to be able to use other fuels such as coal with lower calorific values, and wastes from the customer's factories.
- Selling by-products generated from power generations according to the market demand such as steam and cold water, which can reduce energy losses and energy consumption intensity per unit of products.
- Conducting a study on fuels modification available in each area, such as industrial waste gases, industrial wastes, natural gases, biomasses, etc.

Low Calorific Value Coal Blending at Zhengding CHP Plant

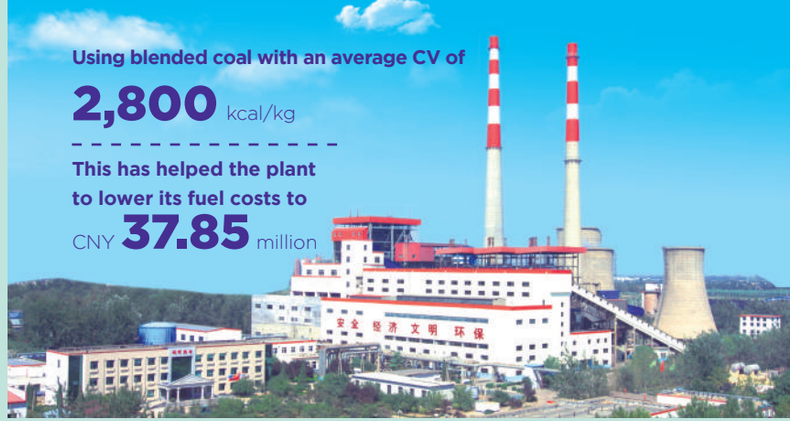
As coal with low calorific value (CV) of about 2,000 - 3,000 kcal/kg is far cheaper and has more volumes than that with higher heating value of 3,400 kcal/kg, currently used in the market, Zhengding CHP Plant conducted a study and an experiment enabling the plant to use lower CV coal in the steam boilers without compromising on safety, production capacity, and stability as well as reducing the power plant's fuel costs.

The experiment's key processes included:

1) The process of controlling the calorific value and coal quality after blending coal with different heating values from various sources in a coal stockyard.
2) Each boiler's operation process, surveillance, and emergency plans preparations.
3) The boiler's maintenance with an emphasis on additional damage inspection possibly caused by corrosion and special protection.

The experiment's results showed that the power plant's equipment has the ability to handle coal with the lowest CV of 2,600 kcal/kg. Zhengding CHP Plant, therefore, is currently using blended coal with an average CV of 2,800 kcal/kg, a reduction of about 600 kcal/kg. This has helped the plant to lower its fuel costs to CNY 37.85 million.

The implementation of the aforementioned project together with many years of continuous energy efficiency improvements, such as the power plant improvement project to reduce energy losses in conjunction with the air quality control, the reduction of wastes in the pipeline system and the continual energy utilization in supportive machines, enabled Zhengding Power Plant to increase its energy efficiency and significantly reduce the GHG emissions in the year 2021. The GHG emission intensity, however, increased since in the past year, the power plant had to adjust its production processes so as to increase the proportion of power generation to steam production from its normalcy level in order to adjust itself to a decrease in steam demand in the industrial sector. Nonetheless, it is expected that the GHG emission intensity will get better when steam demand returns to normal levels.



Energy Consumption of Zhengding CHP Plant	2020	2021	Changes
Total energy consumption (GJ)	3,278,250.16	2,566,770.86	Decreasing 21.7%
Energy consumption intensity (GJ/MWh)	1.835	1.736	Reducing 5.4%
Direct and indirect GHG emissions (scope 1 & 2) (tonnes CO_2e)	1,191,052	1,041,468	Decreasing 12.6%
GHG emission intensity (scope 1 & 2) (tonnes CO_2e/MWh)	0.667	0.704	Increasing 5.6%

In addition, Zhengding CHP Plant has been looking for opportunities to expand its businesses, being the energy producer with integrated energy services in response to the governmental policies, encouraging more local clean energy projects in order to reduce GHG emissions. Therefore, Zhengding CHP Plant has conducted a feasibility study to invest in installing solar rooftops to supply clean energy for the city. In the past year, the power plant was selected to be the developer of a solar rooftop installation project in Zhengding City. It aims to increase the installation of solar panels on the roofs of governmental buildings, factories and communities to a total of 167 MW by the year 2023.

Air Emissions

Strategy:
- An efficient improvement of the pollutant treatment system.
- A selection of proper fuel.
- An efficient enhancement of the combustion system.

Key Indicators:
- The air quality released at stacks
- Sulfur dioxide (SO_2) emission intensity
- Oxide of nitrogen (NO_x) emission intensity
- Particulate matters (PM) emission intensity

Target:
- The air quality released at stacks in compliance with the laws set.
- SO_2 emission intensity ≤ 0.0766 tonnes/GWh
- NO_x emission intensity ≤ 1.184 tonnes/GWh
- PM emission intensity ≤ 0.0230 tonnes/GWh

Performance:
- The air quality released at stacks was in accordance with the laws set.
- The emissions intensity was lower than the target.
  - SO_2 emission intensity was at 0.025 tonnes/GWh
  - NO_X emission intensity was at 0.044 tonnes/GWh
  - PM emission intensity was at 0.003 tonnes/GWh

Significance and Reporting Boundary

Sulfur dioxide (SO_2) and oxides of Nitrogen (NO_x) as well as particulate matters (PM) are the indicators of air quality released at stacks from thermal power plants since they may have the impacts on human health in the area. As a result, the government sector needs to improve the air quality in large cities determining more stringent preventive measures and standards for many consecutive years. It is also a challenge for BPP to improve its pollutant treatment efficiency and control the released air quality to comply with the laws.

The boundary of this report covered the businesses of which BPP has direct management control, including the three combined heat and power (CHP) plants in China. The joint venture thermal power plants, namely BLCP Power Plant and HPC Power Plant, however, only report their operating results on the table annexed.

Management Approach

BPP has set up measures to control air quality in accordance with legal requirements in order to have the air quality in a safe level for the health of its employees and communities surrounding the project's areas.

- **Continuously using proper technologies** to improve a pollutant treatment system before releasing any contaminations from stacks, for example a SO_2 precipitator called the Flue Gas Desulfurization (FGD), a particular matter treatment system, namely the Electrostatic Precipitator, and a dust filter-the Bagfilter, etc.
- **Opting to use coal with low sulfur contents** to lower the SO_2 amount generated at its original point; BPP has developed a long-term purchase agreement for the quality coal resources as specified. The online trading system has also been open for coal traders to offer the coal quality meeting the requirements of BPP.
- **The clean technology has been employed to help boilers igniting completely**, such as using the effective production and environmentally friendly technology called the High Efficiency, Low Emissions (HELE), the clean technology for boiler's combustions namely, the Pulverized Fuel Combustion and the Fluidized Bed Combustion to reduce SO_2 and NO_x as well as PM during the boiler's combustion.
- **Implementing the continuous monitoring system for air quality discharges throughout the production process** and defining preventive measures as well as being regularly audited from the outside agencies.

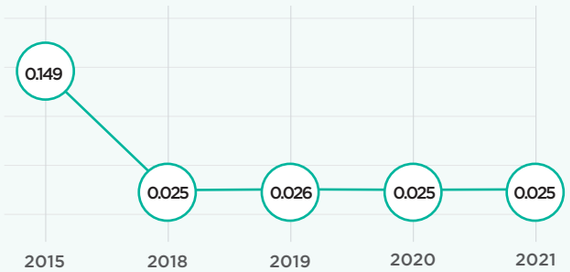
Performance

The amount of pollutants emitted through the power plants' stacks depends on coal quality, combustion efficiency and pollution treatment effectiveness prior to being released. Since 2013, the three combined heat and power (CHP) plants in China have continuously improved the efficiencies of their combustions and pollutant treatments before emitting them to the air. This has resulted in the notable emissions' reduction of SO_2, NO_x and PM, which are the significant indicators of power plants. Additionally, the air quality emitted from stacks is better than the standards required by laws.

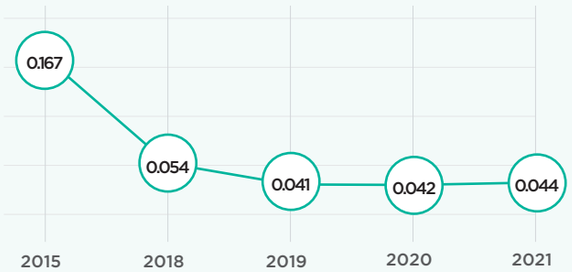
In the past year, although the three CHP plants in China have adjusted their fuel consumptions to reduce costs derived from using high-priced coal, such as using coal with lower heating values, and employing activated carbons, which are wastes from customers' industrial plants, etc., it was found that the three CHP plants still had their abilities to control pollutions at very low levels. The air quality emitted from stacks was better than the standards set by laws and met the set targets. Consequently, the three CHP plants received high recognitions and special subsidies from the government as the power plants with excellent air quality control. In addition, the company has measured additional Mercury(Hg) contents in these three CHP plants with a total emission of 0.009 tonnes. Meanwhile, a total of 0.010 tonnes of sulfur hexafluorides (SF_6) was released.

BPP has jointly invested in Nakoso IGCC Power Plant using the advanced technology to capture pollutants before combustions, and acquired Temple I Gas-fired Power Plant, the emission level of which is very low. The investments in both power plants are in line with the Greener & Smarter strategy, of which the company has focused on investing in the high-efficiency and environmentally-friendly power plants.

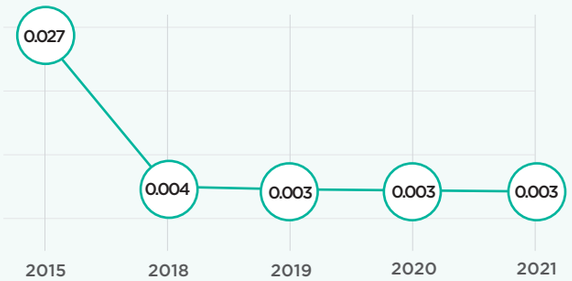
SO_2 Emission Intensity
(tonnes/GWh)



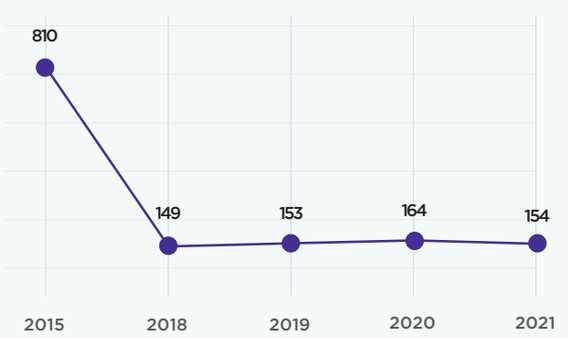
NO_x Emission Intensity
(tonnes/GWh)



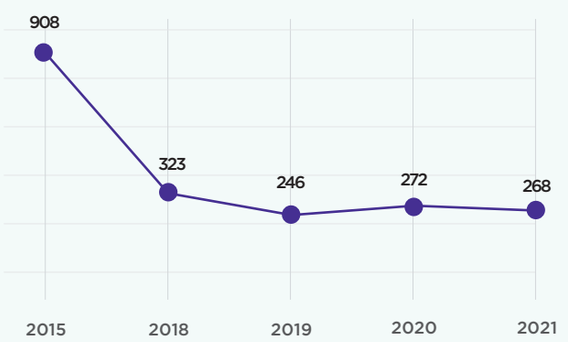
PM Emission Intensity
(tonnes/GWh)



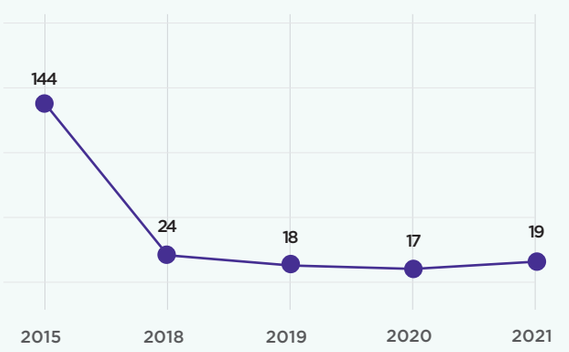
SO_2 Emissions
(tonnes)



NO_x Emissions
(tonnes)



PM Emissions
(tonnes)



Water Related Risks

Strategy:
- Improving a production process, reducing water loss in the system, and consuming water with maximum benefits.
- Managing water holistically, inclusive of raw water withdrawal to the system and water discharged to the public in order to reduce the impact of water consumption in the area.
- Promoting stakeholder's participation in water management in the area.

Key Indicators:
- Water consumption intensity
- The quality of discharged water compared to the standards prescribed by laws.

Target:
- Water consumption intensity not exceeding 1.103 cubic meters/MWh
- Discharged water quality complied with the legal standards set.

Performance:
- Water consumption intensity was 0.877 cubic meters/MWh.
- A released water quality was in accordance with the standards required by laws.

Water consumption intensity was

0.877
cubic meters/MWh

A released water quality

was in accordance with the standards required by laws.

Significance and Reporting Boundary

Water is an essential raw material for the production process of thermal power plants inclusion of controlling the temperatures in the cooling system and the air quality. The efficient management of water resources and discharges will reduce any impacts on the community and the environment regarding risks associated with water, including a risk on water shortages in the area, and a risk on discharged water quality beyond the required standard. Moreover, the current water shortage problem derived from climate change has led BPP to consider the risks associated with water shortages in its production as well as the governmental regulations limiting water consumption and the amount of water released for the industrial sector.

The reporting boundary covers all business which BPP has direct management control, inclusion of the three combined heat and power (CHP) plants in China. For the joint venture companies which are renewable power plants and the thermal power plants, only their operating performances are reported in the table annexed.

Management Approach

Since the sources of water for steam production of the CHP plants in China are from groundwater and water purchased from external manufacturers. the water management has been emphasized on recycling water as much as possible in order to reduce the amount of water discharge and release water quality in accordance with the laws set and under the water management policy, details of which are as follows:

- **Managing water consumption with the maximum benefit** and looking for opportunities to reduce water consumption, and reuse or recycle the water.
- **Improving the discharged water quality in accordance with the standards specified by laws** and developing measures to prevent chemical leakages and contaminations at its original sources.
- **Implementing a holistic water management** to ensure that water resources consumption for operations be in accordance with the righteousness and effectiveness with no effects to stakeholders in the area.
- **Assessing risks associated with water resources** and setting up measures and operational practices in the event of any emergency in order to reduce the impact on and the recovery of the area.
- **Developing a surveillance system for both quality and quantity** to ensure that water be well managed while the discharged water is compiled with the standards required by laws.
- **Promoting stakeholder's participation** especially the local communities and the research sector in order to conserve water resources, improve water quality and management in the area.

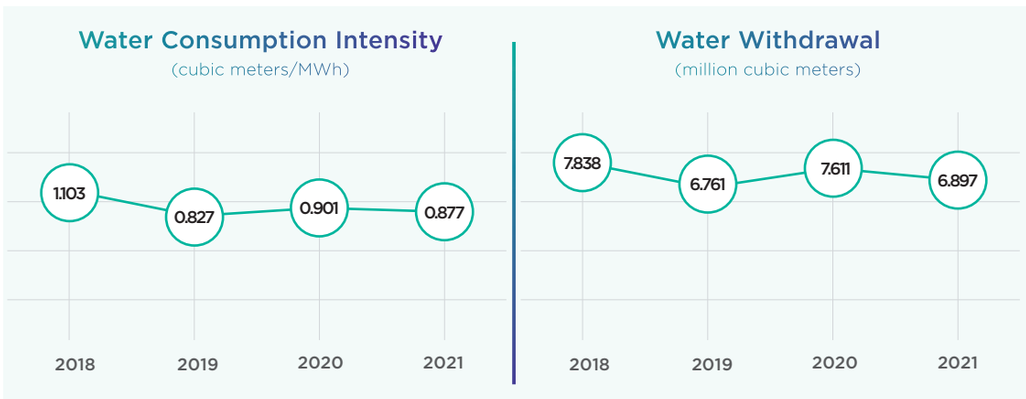
BPP has collected water consumption data of its businesses in order to use them for water management. The water withdrawn from a water source is comprised of the amount of surface water pumped from the water source, and the amount of groundwater used, as well as the amount of water supplied by external agencies. This does not include the amount of rainfall in the area since the company doesn't consume such precipitation. The data collected are under the assumption that local water reservoirs have a minimal capacity when compared with the water amount drawn from all water sources.

In addition, the company has established measures to examine the water quality before releasing it to outside, which is measured by BPP and external agencies. The measured pollution types, its frequency, and the measurement methods of each business unit, however, may vary according to project requirements and as required by laws.

Performance

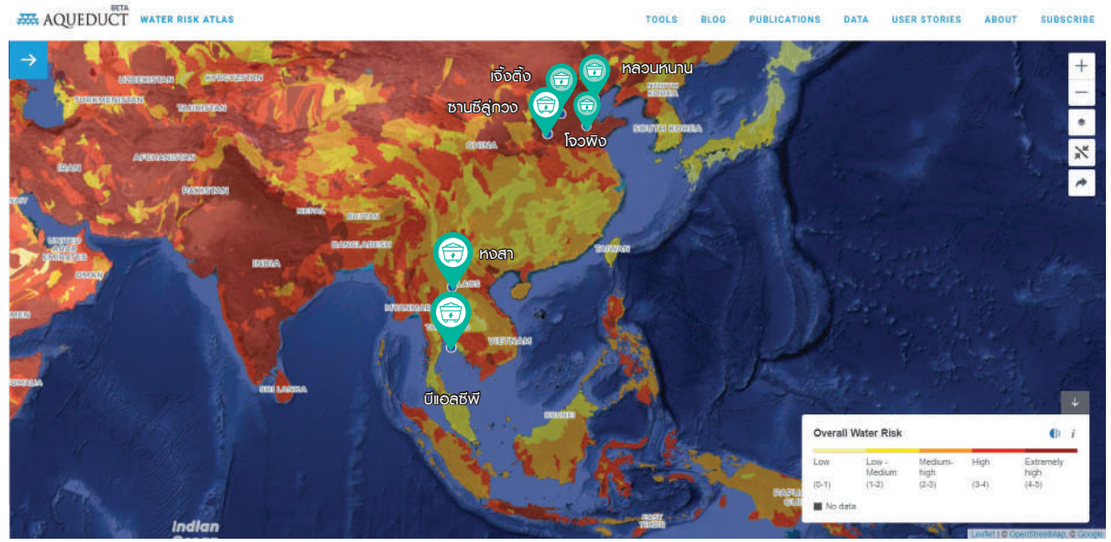
In 2021, the three combined heat and power (CHP) plants in China had a total water consumption of 5.293 million cubic meters, with a water consumption intensisity equivalent to 0.877 cubic meters/MWh, decreasing 2.7% when compared to the previous year. The plants were able to successfully achieve the target of water consumption per unit of products of no more than 1.103 cubic meters/MWh or better than the target set by 20.5%. Furthermore, they were able to control their water consumptions and discharged water to meet the standards required by the government.

BPP was still able to control the amount of water withdrawals totaling 6.897 million cubic meters, a decrease of 0.714 million cubic meters, or 9.3% when compared with the previous year. This was a result of the water treatment system project to recycle water from the production process with zero discharge in order to comply with the Chinese government's regulations. Whereas, all discharged water from the power plants was sent for treatment by the authorized external water treatment provider. In addition, the water quality discharged from all power plants was in accordance with the standards prescribed by laws, while no incidents associated with chemical contaminants leaking into the water sources.



Water Resource Risk Assessment

Banpu Power assesses its water scarcity risks from the business unit's locations based on the WRI Aqueduct Water Risk Atlas (2019), a program categorizing areas with water resource risks relating to physics, economics, and legality, as well as anticipating future risks. The 2021 assessment using data on areas facing the water shortage risk in the next 20 years, reveals that all thermal power plants in China are located in the areas with extremely-high water resource risks. The three CHP plants,



Sources: World Resource Institute

however, have made improvements to reduce the amount of water consumptions and water discharges in accordance with the government's regulations. The power plant's extensions have also installed a recycling system, making them able to reuse all of their released water.

The thermal power plants which are the joint venture companies, namely BLCP Power Plant in Thailand and HPC Power Plant in Lao PDR, have the medium-high levels risks. BPP, therefore, has regularly reviewed the water management plans of all business units to reduce such risks. BLCP Power Plant has invested in a construction of the desalination plant, producing fresh water and tap water from seawater through the Reverse Osmosis Seawater Desalination Plant (ROSDP) with a capacity of 1,000 cubic meters/day. The aim is to alleviate the water shortage crisis in the eastern region, making water sufficient for the people and farmers. Since 15 February 2020, the desalination plant has reduced 100% of the total fresh water amount BLCP has withdrawn from water sources in the area.

HPC Power Plant through the external experts, conducted a study to use models to forecast water balances in the areas and plan for water management from the water resources areas, including Nam Leuk and Nam Khan water sources, as well as set water indicators at various points for surveillance and determine appropriate measures. The sedimentation ponds were constructed within the area to control water quality and recycle water discharges.

Power Plant	Country	Water Stress Area	Overall Water Risk	Flood Risk	Drought Risk	Future Water Demand in 2040	Future Water Stress in 2040
Luannan	China	Extremely High	Extremely High	High	Medium-High	Increasing around 1.2 Time	Near Normal
Zhengding	China	Extremely High	Extremely High	Low	Medium-High	Increasing around 1.2 Time	Near Normal
Zouping	China	High	Extremely High	Low-Medium	Medium-High	Near Normal	Increasing around 1.4 Time
Shanxi Lu Guang	China	High	Extremely High	Medium-High	Medium-High	Increasing around 1.2 Time	Increasing around 1.4 Time
HPC	Lao PDR	Low	Medium-High	Extremely High	Low-Medium	Near Normal	Near Normal
BLCP	Thailand	-	Medium-High	Low-Medium	Medium-High	Near Normal	Increasing around 1.4 Time

Wastes

Strategy:

- A reduction of using wastes originated at its original sources.
- A promotion of reuse and recycling of wastes.
- Establish measurement to prevent and solve the leakages of hazardous wastes.

Key Indicators:

- Proportion of hazardous wastes to landfill.
- Proportion of reused and recycled fly-ashes.
- Proportion of reused and recycled synthetic gypsums.

Target:

- Zero hazardous wastes to landfill.
- Non-hazardous waste to landfill not exceeding 0.13 kg/MWh.
- Proportion of fly ashes disposed by reused and recycled is no less than 100% per annum.
- Proportion of synthetic gypsums disposed by reused and recycled is no less than 100% per year.

Performance:

- A zero hazardous waste to landfill.
- Non-hazardous waste to landfill is 0.131 kg/MWh.
- 100% of fly ashes were reused and recycled.
- 100% of synthetic gypsums were reused and recycled.

Significance and Reporting Boundary

A conservation and valuable utilization of resources is the best practice guideline to minimize wastes from operations. It can also reduce the waste disposal costs arisen as well. For the thermal power business, aside from non-hazardous and hazardous wastes generated, there are also by-products created from fuel combustions and air quality treatment processes, including ashes and gypsums. Both ashes and gypsums can be utilized and added values by selling them as mixtures of construction materials. Additionally, the spillage or improper disposal of hazardous wastes possibly has an impact on the environment and surrounding communities.

The boundary of this report covered the businesses of which BPP has direct management control, including the three combined heat and power (CHP) plants in China, exclusion of Temple I Gas-fired Power Plant where the company has recently invested late last year. For the renewable power plants and joint venture thermal power plants, only their operating performances are reported in the table annexed.

Management Approach

BPP has managed its wastes under the environmental policy, using the 3Rs principles, including Reduce, Reuse, and Recycle. The aim is to achieve a target of zero hazardous waste to landfill and operating in accordance with best the practice standards and legal compliance of each country. As a result, wastes from the CHP plants have been classified into three types: hazardous wastes, non-hazardous wastes, ashes and gypsums. The waste management guidelines can be summarized as follows:

Waste		By-product
Non-hazardous Wastes • Papers and office equipment • Metal scraps materials and equipment as well as packaging • Household wastes • Organic wastes generated from tree trimmings and mowing in the area	**Hazardous Wastes** • Used oils, lubricants • Used batteries • Chemicals used to improve water quality and other chemicals including packaging	**Ashes and Gypsums** • Fly ashes • Bottom ashes • Synthetic gypsums
Management Approach • Consumption reduction • Storage and classification for reuse and recycling	**Management Approach** • Decreasing consumption. • Looking for opportunities to transforming hazardous wastes to those able to be treated and reused better. • A reduction of packaging usages by transporting and installing hazardous wastes in the chemical storage tanks. • Storing and classifying wastes for reuse and recycling. • Defining measures to prevent and handle waste leakages in the event of emergency. • Transportation, disposals and sales for recycling must comply with the standards required by laws. • Delivering wastes for disposal by the certified external parties.	**Management Approach** • Separating fly ash sizes corresponding to the customers' needs and the market demand. • Exploring the market to sell fly ashes, bottom ashes and gypsums for utilization such as construction materials. • Arranging the areas for ashes and gypsums storages appropriately and adequately. • Transporting ashes and gypsums for disposals by the certified external parties.

Waste Management System

Procurement

- Selecting a partner with good operating standards.
- Reducing package usages.

Storage

- Storing wastes in accordance with the good operational standards and legal compliance.
- Regularly inspecting the hazardous waste stockyard areas to prevent leakages to the environment.

Transportation

- Transporting wastes in accordance with the best practice standards and legal compliance.
- Selecting and evaluating the standardized transportation contractors.

Elimination

- Classifying wastes for reusing or recycling.
- Distributing or eliminating wastes by means of proper operations in accordance with the good operating standards and legal compliances.
- Recording waste management data on a regular basis.

BPP has collected the amount of waste generated and sent for disposal by weighing and recording it prior to either administration or disposals. The amount of waste sent for disposal by outside agencies has been recorded from the receipts.

Meanwhile, ash and synthetic gypsum are included as the non-hazardous waste, of which the company has sorted out their sizes in order to create added values and sell to customers for using in the construction industry.

Performance

In 2021, the three combined heat and power (CHP) plants in China generated wastes in a total of 777,757 tonnes, consisting of 176 tonnes of hazardous wastes and 777,581 tonnes of non-hazardous wastes (include ash and gypsum). All wastes were disposed by external parties, no on-site disposal. Most of wastes were disposed through reusing and recycling. The performance is following:

- Achieved target - a zero hazardous waste to landfill.
- Non-hazardous waste to landfill is 0.131 kg/MWh, slightly over the target set at 0.13 kg/MWh.
- Achieved target - 100% of fly ashes were reused and recycled.
- Achieved target - 100% of synthetic gypsums were reused and recycled.

Total Wastes

777,757 tonnes

Hazardous Wastes

176 tonnes

Non-hazardous Wastes

777,581 tonnes
(including ash and gypsum)

Waste Disposal	Hazardous Waste	Non-hazardous Waste
Total waste disposal (tonnes)	176	777,424
Waste diverted from disposal (tonnes)	175	776,631
Waste directed to disposal (tonnes)	1	793

Remark: Total waste disposal were not equal to total waste generation because some of waste were under disposal process as power plant procedure.

There were non-hazardous waste which is 688,623 tonnes of ash resulted from fuel combustion and 87,964 tonnes of synthetic gypsums. For fly ashes, the company has classified its sizes before being sold as a component used for the construction materials. Classifying the fly-ash size meeting customers' needs has helped create added values to the products so that fly ashes can be sold at a higher price because it meets the market demand.

In addition, BPP created a project to use the industrial waste – the activated carbon, from its customers' factories to replace coal, which was high cost in the past year. This project made it possible to reduce the amount of wastes, build cooperation and satisfactions for customers.

The Utilization of Industrial Waste Compounded with Coal as Fuels (multisource solid waste compound fuels) at Zouping CHP Plant

The multisource solid waste compound fuels of Zouping CHP Plant is one of the innovative thinking processes to reduce the power plant's production costs. Zouping CHP Plant studied on how to utilize the solid wastes left over from production processes or from industrial plants with maximum benefits. This initiative was done by surveying industrial wastes in the vicinity where wastes still have calorific values and can be used for boiler's combustions. The survey found that wastes such as used activated carbons, fly ashes and sludges from the wastewater treatment plants, etc., still have calorific values, and can be used for further combustions.

Zouping CHP Plant conducted a study and carried out a test by using activated carbons with a heat value of about 2,300 kcal/kg from the customer's sugar factory to mix with coal until the blending ratio does not affect its production capacity, while the air quality released from stacks does not exceed the standard ratio of 10 - 20%. The experiment found that approximately 2,000 - 4,000 tonnes of activated carbons can subsidize 600 - 1,260 tonnes of coal. This initiative project can help **reduce the operating costs by CNY 6.4 million per year** and decrease dependency on coal consumption in a sustainable way. Moreover, it is another way to help lessen the waste problems from customer's industries, which can recycle waste to use as fuel approximately 26,250 tonnes/year, though, the waste-blending has resulted in a slight decrease of boiler efficiency by about 0.66%.

Biodiversity

Strategy:
- Avoiding operating in areas with high biodiversity values.
- Conducting a biodiversity study in the area prior to project operations in order to use the study results for designing the project before constructions.

Key Indicators:
- Proportion of business units assessed on the areas of biodiversity.
- Proportion of business units located in the areas identified as high potential of biodiversity already assessed on biodiversity values.

Target:
- Assessing biodiversity of all business units.
- Assessing the biodiversity values in all business units located in the areas having high potential of biodiversity (if any).

Performance:
- A complete biodiversity assessment in all areas of business unit.s
- No business units located in the areas of high biodiversity.
- Conducting a biodiversity study in the areas of three combined heat and power plants in China.

Significance and Reporting Boundary

Presently, biodiversity is threatened for many reasons, such as habitat loss, a beyond balance utilization of the biological ecology resources, climate change, threats from invasive alien species and pollutions from human activities, etc., especially those in the areas where high biodiversity is existing. BPP is well aware of the importance of biodiversity and has commitment to conducting the power business with cautions, taking into account the project's potential impacts in order to prevent and reduce the effects to a minimum.

The boundary of this report covers the power plants that BPP has direct management control, including the three combined heat and power (CHP) plants in China and Temple I Gas-fired Power Plant.

Management Approach

BPP has laid down the biodiversity management guidelines by avoiding any impacts as the first priority since the beginning of selecting operating areas that do not affect the high biodiversity areas. We are committed to conducting biodiversity operations as following:

- **Assessing risks related to biodiversity** in all business units.
- **Conducting a biodiversity study in the project areas possibly having high biodiversity** so as to collect data and develop the operational plan to reduce impacts prior to commencing operations.
- **Taking into account the biodiversity impacts in all project operations' stages**, ranging from the exploration, construction, operation phases to the end of project life cycle.
- **None of business units operating in the areas of the World Heritages and in the protected areas of the International for Conservation of Nature (IUCN)**, Category I-IV.
- **Committing to operating projects promoting the net positive impact on biodiversity** through following guidelines:

Avoidance:
Avoiding conducting activities possibly causing negative impacts to biodiversity.

Reduce:
Reducing unavoidable impacts by setting the operational plan and clear measurements.

Rehabilitation:
Rehabilitating the affected areas.

Offset:
Operating biodiversity projects in compensation of biodiversity effects.

- **Engaging stakeholders** especially the local communities and academic institutions in order to implement the biodiversity conservation projects.
- **Supporting in biodiversity research initiatives.**

Performance

BPP has operated neither power plants nor business units located in areas having high potentials of biodiversity, such as the World Heritage Area, the protected areas by the International Union for Conservation of Nature (IUCN) Category 1-4. This indicates that the company's operations are not located in the strictly natural reservation areas, national parks, natural monument and habitat/species management areas or wildlife sanctuary areas. BPP, however, has conducted the preliminary biodiversity related risks assessment in all areas where it has operated in order to ensure that its operations do not create any impacts on the biodiversity of the operating areas.

The company has conducted a biodiversity study in the areas of three combined heat and power (CHP) plants in China, namely Zhengding CHP Plant. Luannan CHP Plant, and Zouping CHP Plant by using secondary data, including satellite images, conservation area declaration laws, and incidences related to biodiversity possibly affected by the power plants, etc. to research changes relating to space utilization. Accordingly, the study area was defined in a 5-km radius surrounding the power plants, covering an area of approximately 80 square kilometers. The study found that the areas used around the three CHP plants are still the urban space. And most of the activities conducted are the industrial undertakings, while some are agricultural and residential areas. The study results revealed that there are no incidences related to biodiversity impacts derived from the air quality and power plants' operations. In addition, there haven't been any conservation areas announcement near the three power plants.

For Temple I Gas-fired Power Plant, located in Texas, the U.S., where BPP invested at the end of the year, the consulting firm has been hired to conduct an environmental assessment study before the investment. The study found that Temple I has a low level of biodiversity related risks and is located in the empty lands and agriculture area.

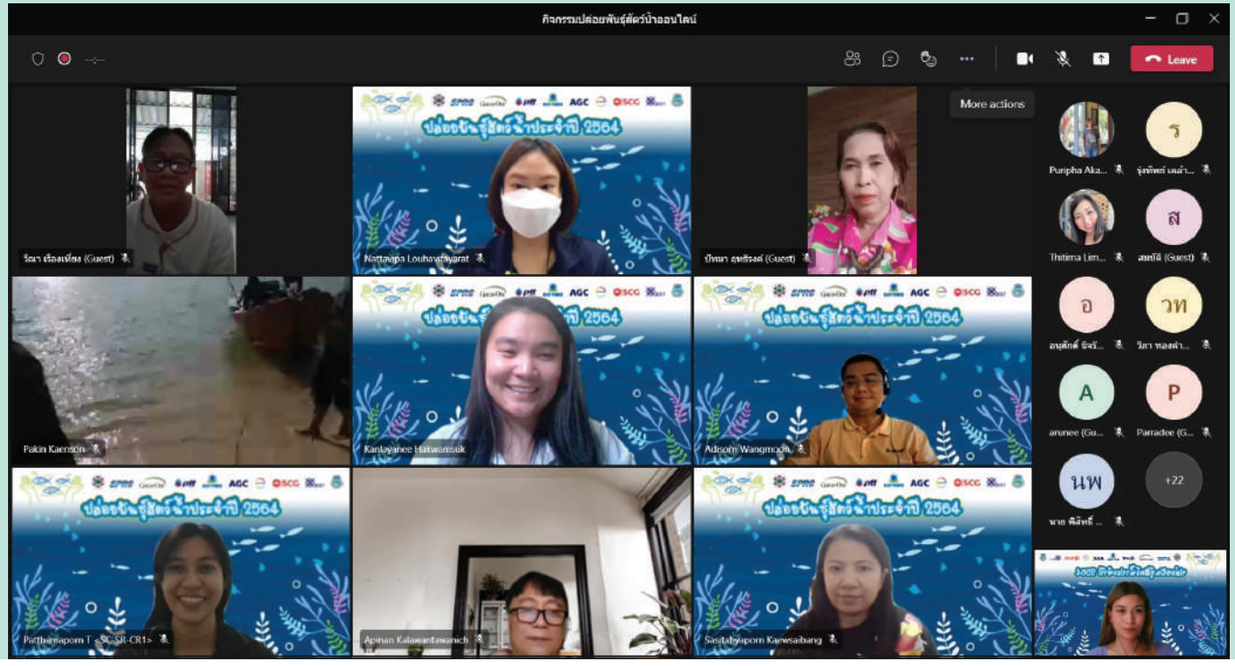
Biodiversity Conservation Activities at BLCP Power Plant

Located in Map Ta Phut Industrial Estate, Rayong Province, BLCP Power Plant is a joint venture power plant where BPP has held 50% of shares. In the previous year, BLCP Power Plant in collaboration with the community enterprise, and the locally small fishing boat club of Mueang Rayong District and Ban Chang Samakkhi District, as well as the industrial operators in Map Ta Phut Industrial Estate, organized an event called **"Releasing Aquatic Species, Increasing Marine and Coastal Resources in Rayong Province".** With an aim to cultivate awareness of taking good care and conserving the environment, increase the capability on marine and coastal fish production, create occupations and generate stable incomes, as well as cultivate sustainability for Rayong people, this activity has been continuously held every year. The year 2021 marked the 19th year of this event, of which activities were conducted in an online format in order to prevent the impacts possibly caused by the COVID-19 pandemic.

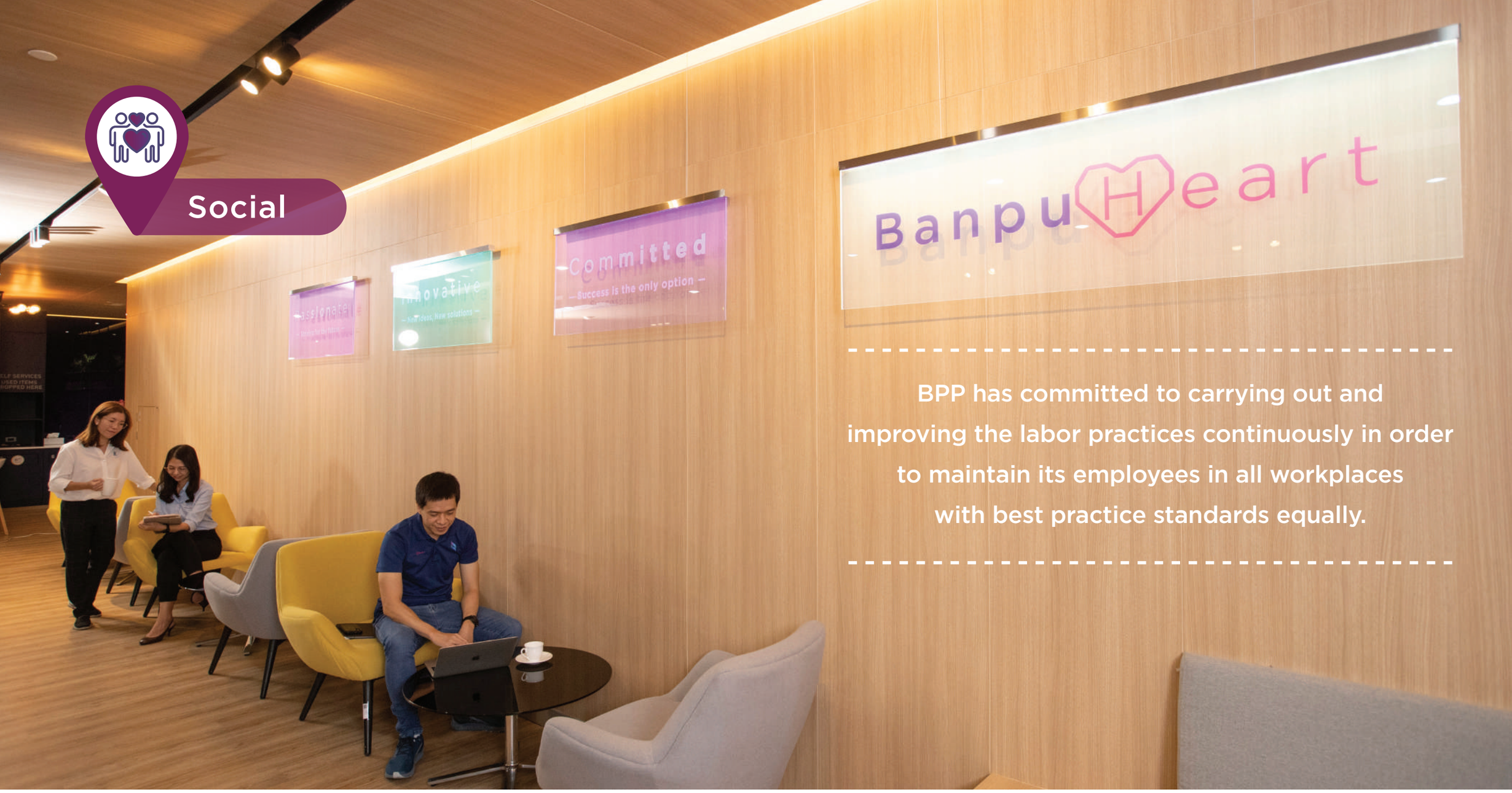
This activity is focusing on protecting the marine environment so as to increase the number of aquatic species living in the sea, balance the ecosystem, and sustainably increase incomes for the surrounding fisheries groups. Two species of aquatic animals were released into the sea, including 300,000 black tiger prawns and 3,500,000 baby blue swimming crabs. All of these marine species were taken from the aquaculture farm of Ban Phayoon Small Fishing Boat Club in Mueang Rayong District and Ban Chang Samakkhi District, located close to BLCP Power Plant. This activity, having been continuously operated by BLCP Power Plant, helps in promoting the biodiversity and contributing benefits to the surrounding communities.

Over the years, BLCP Power Plant has endlessly conducted various projects to conserve the biodiversity and promote the community participation. The projects are focusing on creating the sustainable development and promoting the natural resources conservation by drawing participations from the communities, such as:

- The Organic Agriculture in a Sufficiency Way Project
- Khamang Khongman Community Reforestation Project
- Conserving Mangroves with BLCP Project
- Marine Ecosystem Restoration in Saket Island Project
- Preserving Seagrasses with BLCP Project
- Junior Guide with BLCP Project
- Hanging Mussel Culture Method Project



Social



BPP has committed to carrying out and improving the labor practices continuously in order to maintain its employees in all workplaces with best practice standards equally.

Labor Practice

Strategy:
- Conducting labor practices based on the international best practice standard.
- Promoting equality, non-discrimination and resisting harassment or infringement of rights in the workplace.
- Establishing communication channels with employees, receiving complaints and putting them into the remedial process.

Key Indicators:
- The number of incidences related to violations of labor laws and practices.
- Safe working environment.
- A level of employee engagement.

Target:
- No incidents related to labor laws and practices violations.
- The working environment assessment results are in accordance with the standards prescribed by laws.
- The employee engagement scores of more than 70% in Thailand and more than 75% in China.

Performance:
- No incidents related to violations of labor laws and practices, discrimination, rights violation, sexual and other harassments in the workplace.
- The employee engagement survey result was 69% in Thailand and 93% in China.
- The working environment examination results were in accordance with the standards prescribed by laws, and there were no serious working accidents in all operational areas.
- Improving welfare and set measures to prevent the spread of the COVID-19.
- Upgrading welfare by listening to employees' opinions.

Significance and Reporting Boundary

Employees are the most important factor in running operations and driving the organization growth. Since BPP has operated and expanded its businesses to many countries with differences in in both culture and labor law, the company has focused on conducting good labor practice standards according to the international principles. Moreover, it has committed to carrying out and improving the labor practices continuously in order to maintain its employees in all workplaces with best practice standards equally.

In addition to providing a safe working environment and allocating resources and welfare to facilitate employee's operations appropriately and adequately, BPP has also paid great importance on promoting equality and non-discrimination. This starts from the recruitment process to measurement of employee's performance and growth within the organization. It also includes creating employee's participation and listening to their opinions in order to improve the labor practices on a regular basis. The aim is to be an organization with good labor practices, which is recognized internationally.

The boundary of this report covers the businesses in which BPP has direct management control, namely the three combined heat and power (CHP) plants in China, inclusion of the offices both in Thailand and China, but exclusion of Temple I Gas-fired Power Plant, in which the company has just invested late last year.

Management Approach

BPP has employed the good human resource management system, consisting of three principles, namely the employee's equality (Equitability), the performance-based management (Performance Base), and the competenc management and development (Competency Base). These three HR management principles have been applied with all employees across the organization without discrimination regardless of races, religions, languages, cultures, ages, genders, beliefs, etc.

The working environment examination results were in accordance with the standards prescribed by laws.

0

No serious working accidents in all operational areas.

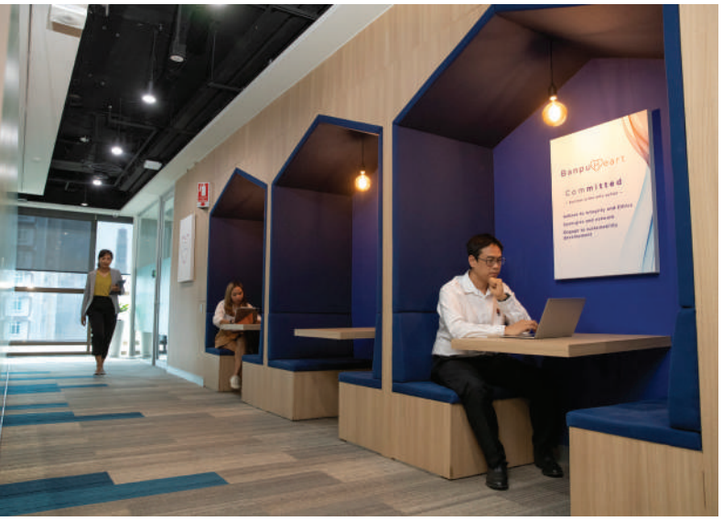
BPP has managed its human resources efficiently with the concept of **One Banpu, One Goal**. The aim is to have employees in every country use this concept and turn it into tangible actions in accordance with the international labor best practices, including reviewing it for further improvement and adjustment to be aligned with their operations and the social context regularly. BPP's human capital management guidelines are summarized as follows:

- **Employee's Recruitment Process:** BPP equally considers applicants based on their qualifications, knowledge and experiences by using job position's characteristics as the criteria regardless of other qualifications are not related to the applicant's effectiveness, such as genders and ages.
- **Encouraging Collaborative Working under the Diversity of Employees:** This guideline has been implemented for a long time in all countries where BPP has run its businesses in order to strengthen collaboration and drive the company's innovation towards the sustainable business growth.
- **Cultivating the Banpu Heart Corporate Culture:** The company aims to develop its personnel to be **a professional employee**, by treating and giving them equal opportunities regardless of their diversities. The professional employee will be committed to working under the clear vision and goals as well as the corporate shared values.

The company aims to develop its personnel to be a professional employee, by treating and giving them equal opportunities.

- **Performance Appraisal:** The company has determined a key performance indicators (KPIs) system, which is clear and consistent with the company's goals. The employee's KPI consists of two parts, including work related KPIs accountable for 70%, and behavior base KPIs, equivalent to 30%. The behavior base KPIs are assessed from behaviors in accordance with the Banpu Heart corporate culture.
- **Renumeration Management:** BPP has determined the remuneration payment based on each job evaluation. The remuneration is set in a competitive range in the labor market in each area where BPP has operated. The remuneration will be in accordance with each job position equally without gender discrimination. Each year, the employee's compensation rate will be determined based on the performance evaluation results of that year.
- **Career Growth within the Organization:** Employees with outstanding performances will be selected by their supervisors based on his/her consistently outstanding performance, both directly relevant to his/her job and behaviors expressing the corporate shared values. Then, these employees will be presented to the committee to consider the promotion. The consideration in the form of a committee will create transparency and ensure that there is no discrimination on genders, ages, etc.
- **Complaint Channel:** Employees can consult or submit complaints on various matters through the supervisors and human resource management department directly. In the event that an employee wishes to submit a complaint anonymously, such a complaint can be sent via an online channel. The complaints could be a matter of things, such as being uncomfortable at work, having conflicts with supervisors/colleagues/executives, non-transparent operations, including sexual harassment and others. BPP has a process to investigate the complaints, take corrective actions, including disciplinary actions as specified in the working regulations.

- **Opinions Receiving Channel:** Employees can submit comments for improvements in welfare and compensation in various ways through the welfare committee or other forms of committees in the context of workplace operations in each country. Additionally, employees can submit opinions through their supervisors, human resources department, an organizational engagement survey, small group in-depth hearings, etc.
- **Human Rights Policy Declaration:** BPP has put great importance on human rights by adhering to the principles of freedom, equality and human dignity without discrimination on genders, races, religions or skin colors. The company has also valued labor law and respected to human rights according to the Universal Declaration of Human Rights (UDHR), the International Labour Organization (ILO), the United Nations Global Compact (UNGC), the UN Guiding Principles on Business and Human Rights (UNGPs), and the labor laws of all countries where BPP has operated businesses. This is to ascertain the company's employee and stakeholder equality, such as suppliers/contractors, and communities.
- **Working Regulations:** The working regulations in accordance with the year 2020 new labor law has been improved and communicated to all employees. Such regulations consist of various categories, such as working days category, holiday category and holiday regulations, dates and places for wages payment, overtime payment, rules for leave, welfare, complaints, termination of employment, compensation payment, etc.
- **Child Labor and Forced Labor Employment:** BPP has a policy not to use any forms of child labor and forced labor. The minimum age of employees hired is clearly defined in accordance with the labor laws of each country in order to prevent any risks relating to child labor employment, including setting up a transparent selection process and requiring to have a contract every time of labor hiring. This has also been established as one of the Supplier Code of Conduct that the suppliers must comply with.



Performance

- **No incidents related to violations of labor laws and practices,** discrimination, rights violation, sexual and other harassments in the workplace.
- In comparison with the 70% target, **the organizational employee engagement survey's scores** in Thailand equivalent to 69%, were slightly below the target set, while those 93% of China's were above the target.
- **Measuring the working environment** and taking corrective actions to meet the standards as required by laws in every workplace, including the contractor's operational sites in the areas.
- **No accidents and serious illnesses leading to working related fatalities** of both employees, contractors and others related to the company's operations.
- **Determining measures to prevent the COVID-19 infection** to reduce the infection risks among employees. Through these measures, employees can work anywhere without presenting at the office. In addition, other measures promoting employee's health have been created, for example:

Providing an antigen test kit (ATK) before entering the workplaces or operation sites.

Arranging vaccines against COVID-19 including providing the special health insurance covering the case of COVID-19 virus infection.

Supporting the Health@work welfare by having a team of doctors give personal health consultations to employees online. The Health@work welfare project accommodates the doctor to perform diagnosis and deliver the medicines to staff quickly.

Providing the RelationFlip psychological counseling services by allowing employees to consult with an external professional psychologist who will keep employees' privacy.

Improving the fitness and health promotion activities in the form of Virtual One-on-One where employees can reserve to train with a trainer online. This is to reduce the risk of COVID-19 infection.

Organizing the Boots Me Up activity which put emphasis on mental and physical health, including financial planning of which activities are organized every quarter.

- **Improve welfare from employees' opinions** such as
  - Enhancing the Flexible Benefits, by increasing the number of benefit items to be more diverse to meet employee's needs.
  - Accommodating health facilities such as medical rooms, places for pumping breast milk for female employees, an automated external defibrillator (AED), etc.
  - Arranging a telephone room for employees' privacy.
- **Organizing a communication session on labor best-practices**, such as labor practice indicators, human rights, human capital development, talent attraction & retention.
- **Announcing the personal data protection policy** and its practice guidelines to employees.
- **Upgrading the human resource management system B-Success**, an application consolidating human resource operational functions in one place in order to facilitate employees with important functions, such as performance appraisals, employee's competency assessments, employee's competency development, and courses open for applications, leaves, complaints submission, etc. This application is also the center for accessing the company's human resource information, while the level to access to information is set according to the user's rights.

Performance Management

BPP has adhered to three human resource management principles, namely the Equitability, Performance Base, and Competency Base. The company has long been supporting collaborative working under diversities of races, languages, cultures, ages and countries where we have operated in order to strengthen collaborations and drive the company's innovations towards the sustainable business growth.

Equitability

Performance Base

Competency Base

The performance management is a significant process driving the organization to achieve its established business goals. It is a linkage to the organizational needs towards each employee's working targets. It is also an administrative tool allowing supervisors to know their subordinates' performances and individual competencies as well as promoting collaborations among supervisors and subordinates in setting up the common goals and KPIs. This has led to cooperation and good relationships between supervisors and subordinates, ultimately escorting to the organizational success.

- **Determining the fair KPIs in order to manage the performances according to the company's targets.** Additionally, BPP has also improved the KPI scoring criteria divided into two parts, consisting of work-related KPIs, representing 70% of the overall performance, and corporate culture behavioral-based KPIs, accountable for the remaining 30%.

- **Improving the performance appraisal standards as the single practice guideline throughout the organization.** Each indicator must have at least one out of four performance evaluation criteria, namely quantity, progress and time, cost, and accuracy & quality. The improved performance appraisal standards have been communicated to employees for their acknowledgement and clear understanding of the performance assessment improvement.

Moreover, BPP has assigned the Leadership KPI, which are included in the work-related KPIs of middle-level management and above. The leadership KPI includes an assessment of leadership skills and his/her behaviors on caring for subordinates. The result was rated by all his/her subordinates one step down.

Legal Compliance and International Concepts

BPP has announced the Human Rights Policy since 2018, adhering to the principles of freedom, equality and human dignity without discriminations on genders, races, religions or skin colors. The company has valued labor laws and respected to human rights in accordance with the Universal Declaration of Human Rights (UDHR), the International Labour Organization (ILO), the United Nations Global Compact (UNGC), the UN Guiding Principles on Business and Human Rights (UNGPs) and labor laws of all countries where BPP has operated its businesses. This is to ensure that the employees and stakeholders be treated equally. In addition, the company has employed the quality assurance review (QAR) system to regularly monitor and review the performances.

With an aim to promote labor and human rights policies, BPP has hired visually impaired people from the Department of Empowerment of Persons with Disabilities, to provide the healing-hands massage services for its employees to reduce their office syndrome symptoms and relieve daily-working stresses. This service is available every Tuesday and Thursday, however the service was suspended during COVID-19 pandemic.

Talents Attraction and Retention

8 DECENT WORK AND ECONOMIC GROWTH

Strategy:
- An effective staff selection process able to choose employees having working potential with values consistent with the corporate culture.
- Analyzing employee's operating performance data used for developing a manpower strategy plan to effectively respond to the organization's operational strategies.
- Setting up an annual high potential development program (HIPO), and providing trainings on new skills necessary for the power business transition.
- Developing a clear, transparent and fair performance assessment and compensation management for employees.
- Cultivating Banpu Heart corporate culture for smooth joint-working and corporate reputation dissemination.

Key Indicators:
- The Banpu Heart corporate culture survey results.
- The employee engagement survey results.

Target:
- The Banpu Heart scores of no less than 70%.
- The organizational engagement scores of no less than 70% in Thailand, and no less than 75% in China.

Performance:
- The Banpu Heart scores of 79% in Thailand, and 95% in China.
- The employee engagement scores of 69% in Thailand, and 93% in China.

Planning in order to be able to prepare manpower **efficiently**

Developing a **clear, transparent and fair** performance assessment and compensation management for employees

Significance and Reporting Boundary

Attracting potential people to join the company and keeping employees with the organization is an important factor supporting BPP to be able to pursue its growth strategies and achieve the targets set in the short- and long-terms. The electric utilities and energy businesses, in particular, require employees with specific qualifications and experiences whom are highly demanded in the labor market. As a result, BPP has to have a process to attract and retain employees with the organization continuously.

The boundary of this report covers the business entities where BPP has direct management control, including the three combined heat and power (CHP) plants and the offices in both Thailand and China. Temple I Gas-fired Power Plant in which the company has just invested in late last year, however, is excluded.

Management Approach

1 Employee's Recruitment and Employment

The Human Resources (HR) Department has employed a recruiting process, which has been designed and clearly identified the qualifications in the job requirement announcement. Both expertise and experiences of applicants will be assessed, including using the culture-fit assessment and behavioral-based interview in the recruiting process in order to know applicants' working attitudes in accordance with the company's corporate shared values.

BPP has internal job openings run through the Internal Job Posting process so as to give its employees the opportunity to apply for the interested jobs. By this mean, employees contact the HR Department and go through a fair selection process. In addition, the company has also provided employees the opportunities to learn and develop themselves through a direct work experience, such as a job rotation for temporary learning in the field close to his/her line of work, or joining projects with a cross-functional working nature (project assignment), or working in the company's foreign affiliates, etc.

In order to obtain high potential employees to work with the organization and retain them with the company, BPP has deployed a compensation management system fair on both salary and welfare, and able to compete in the power business labor market. Meanwhile, the compensation increasement will be based on the employee's annual performance appraisal results. Moreover, the company has also conducted surveys to improve its compensation management on a regular basis in order to stay competitive in the labor market, covering wage rates in the same business, the consumer price index, and the economic impacts affecting the cost of living.

2 People Analytic System

BPP collects data and analyzes it in many dimensions, such as measuring the employee performance, assessing and developing the employee competency in order to create a database of potential employees or Talent Pool, employee's engagement scores in each area, and issues to be improved to retain the employees. These data can be used for developing the manpower plan in response to the future needs.

BPP has deployed a compensation management system fair on both salary and welfare, and able to compete in the power business labor market.

3 Strategic Workforce Planning

BPP has adopted its business strategies and personnel data analysis results in various fields to develop the strategic workforce planning in order to be able to prepare manpower for supporting the operations in the future sufficiently and efficiently.

One of the strategies for planning and managing the organization's personnel to achieve working quickly and agilely, is continuous development of successors for key positions and high potential management. The succession plan committee will select, review and follow up the senior management's successors' competency development continually, including recruiting new employees and executives to enhance the readiness for growth according to the company's strategies.

4 Employee Performance Appraisal

BPP has established a fair key performance indicators (KPIs) system to manage employee's performances and compensation to be in line with the company's goals. The KPIs assessment is carried out throughout the organization twice a year. The assessment criteria for scoring KPIs are divided into two parts, namely, work related KPIs, representing 70% and behavioral base KPIs, which is assessing employee's behaviors according to the corporate culture and accounted for 30%.

70%

Work Related KPIs

30%

Behavior Base KPIs

BPP has also established the leadership KPIs, which are included in the work-related KPIs of middle-level management and above. The leadership KPIs include an assessment of leadership skills and his/her behaviors on caring for subordinates in a responsible line of work. This KPI is assessed by subordinates one step down.

For the benefit of employees' self-improvement, BPP has initiated a 360-degree assessment system by providing means for asking for opinions on the employee's performances and behaviors from supervisors, colleagues and subordinates. The information of employees and those providing comments or suggestions will be kept privately.

In addition to identifying the annual KPIs, BPP has established the long-term KPIs, which are applied to middle-level management and above to measure the 5-year strategic plan's success, consisting of the indicators for achievements according to the company's strategies.

5 Cultivating Banpu Heart Corporate Culture

BPP is focusing on building a corporate culture in order to help executives and employees in all areas in working together seamlessly with the same common values, and combining employee differences into strengths, as well as working together efficiently and happily. This will finally lead to the increased engagement with the organization. The **Banpu Heart** corporate culture consists of three core values: Passionate, Innovative and Committed.

Moreover, the creation of corporate culture is also a presentation of the company's reputation through working values and employees' expressions to the public to attract potential people to join the organization.

6 High Potential Employees Development

Employees with outstanding performances and behaviors consistent with the corporate values will be recruited into the Talent Pool and developed in various projects, such as attending training courses, being coached by top management, having opportunities for job rotations to gain a wide range of working experiences.

7 Listening to Employees' Opinions for Improvement

BPP has regularly listened to employee's opinions for continuous improvement in order to become the organization that employees want to work with in the long-term. The company has established various channels to receive its employee's opinions, including conducting the organizational engagement survey, arranging a focus groups meeting to get in-depth opinions.

Banpu Heart

Banpu Heart is a corporate culture to which all executives and employees of Banpu Group, including BPP, have continuously adhered for a long time as the working principle. Banpu Heart is consisting of three corporate shared values, including:

Passionate

1 **Pursue for success:**
Leveraging full potential and professionalism for continuous growth and success.

2 **Can do more:**
Valuing different ideas and encouraging each other to create things beyond expectation without hesitation.

3 **Be agile and change:**
Strengthening teamwork to enhance positive changes in responsive and effective ways.

4 **Express care and share:**
Embracing differences and sincerely valuing one another.

Innovative

1 **Transcend the trend:**
Maximizing contributions to the organization by thinking ahead of the game and working smarter.

2 **Ideate and get real:**
Making a difference, experimenting prototype, and making it happen for continuous improvement of process, products, and services.

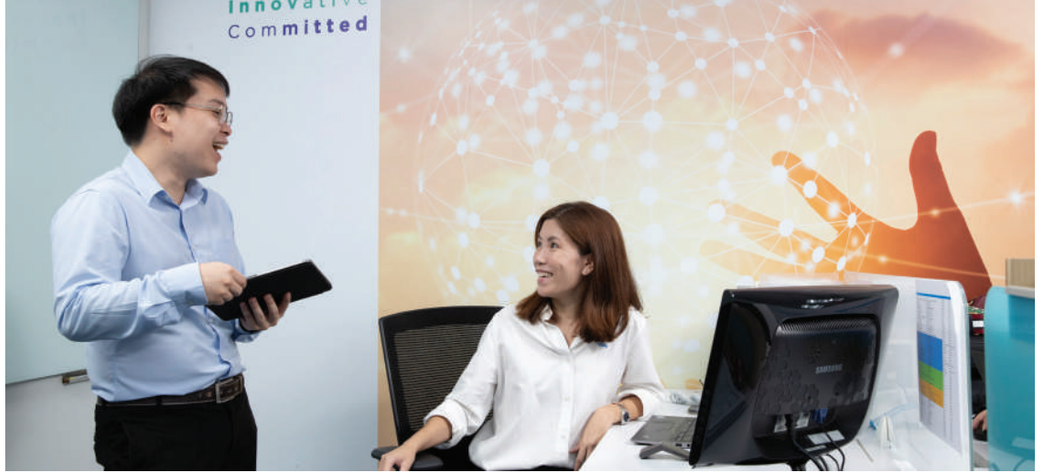
3 **Learn fast, do first:**
Daring to take risks, doing, learning, and growing together.

Committed

1 **Adhere to integrity and ethics:**
Doing the right things, always.

2 **Synergize and network:**
Building strong connections to all stakeholders for win-win outcomes.

3 **Engage to sustainability:**
Responsible for the well-being of society and environment.



To strengthen the corporate culture in all countries, BPP has developed a long-term **Banpu Heart strategic roadmap** for years 2018 - 2025 and made the operational plans systematically as following:

- **Using the Culture-Fit Assessment** test in the employee's recruitment process so as to know all applicants' characters and behaviors whether they are fit/embrace with the corporate culture for each job position or not. After obtaining the candidate's test results, another validation will be confirmed by the Behavioral-Based Interview prior to employing candidates whose values are consistent with the company's corporate culture.
- **Conducting the orientation on Banpu Heart corporate culture** and the Banpu Heart in Action activity for new employees. Through the Banpu Heart in Action activity, new employees will have a chance to play board games and discuss various points of view from experiences shared by the fellow employees. This aims to build understanding about the backgrounds and rationales for having the Banpu Heart corporate culture - a set of successful business behaviors, be able to link Banpu Heart actions towards the business goals. It also helps employees see a big picture and understand their own roles and positions able to apply the Banpu Heart into their working and daily lives, which will finally extend to working together towards the organizational targets.
- **Conducting a behavioral based performance assessment based on the 10 core values of Banpu Heart or the Banpu Heart behavioral KPIs**, which is accountable for 30% from the whole KPI (100%). It is expected that the desired behaviors aligned with each of the Banpu Heart values, will be continuously applied into operational practices.
- **Organizing a variety of activities to encourage all employees to express their behaviors corresponding to the corporate shared values or Banpu Heart corporate culture**. The Banpu Heart Change Leaders (BCLs) working group, a group of employees from various departments, has volunteered to cultivate and strengthen the corporate culture by initiating and driving activities accessible to employees at all levels together.
- **A survey on the degree of behaviors expressed by employees, which are consistent with the corporate core values (Banpu Heart Score)**, was conducted by the external agencies annually.

Performance

BPP has annually conducted the survey on **Banpu Heart** and employee engagement, which is operated by external agencies. Last year, the number of employees participating in the survey accounted for 98% of the total workforce. The survey results are as follows:

Banpu Heart Scores

Target 70%	Scores	79%
Target 70%	Scores	95%

Employee Engagement Scores

Target 70%	Scores	69%
Target 75%	Scores	93%

BPP has operated various forms of projects to attract and retain employees as following:

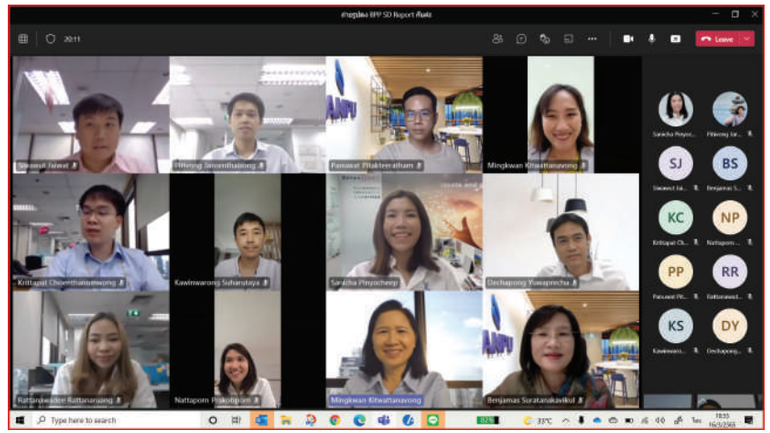
- **Disseminating the corporate reputation through the corporate culture presentation on various channels**, such as Facebook fan pages in order to enable stakeholders to understand the principles of the company's work and to attract potential people to join the company.
- **Continuously implementing employee's competency development projects** in preparing employees for more challenging works in the future. In the past year, a Leadership Pipeline Development project was initiated with an aim of enhancing the readiness of middle-level management to manage people and jobs as well as be able to grow as the company's future leaders. A systematic selection process has been employed to choose participants of this project. Leadership capability and characteristics are assessed so that these talents are well aware of his/her strengths and weaknesses need to be developed, including developing his/her Individual Development Program (IDP) in order to prepare themselves to be the leaders in the future both in Thailand and overseas. In addition, the company has strengthened and developed leadership skills of these high potential employees in order to enhance their capability relating to business knowledge, analytical thinking skills, and management skills through various development processes, such as a cross functional working, a cross country working, and job rotations, etc. The progress of the aforementioned development plan is monitored on a quarterly basis.

2021 Targets	2021 Performance
Developing the annual High Potential Development program (HIPO) and organizing the training courses related to new skills needed for the power business transformation.	• Organizing the training on knowledge sets relating to new skills needed for the power business transformation for high-potential employees. • Preparing the power business-specific employee development plan of key positions for the year 2022.

- **Organizing the high-potential employee development programs to develop leadership skills,** such as the Banpu Global Leadership Program and Hi-Coach.
- **Arranging the training programs to empower employees' potentials** responsive to the future business strategies, such as digital skills development, business skills trainings, business acumen, growth mindset, and Manager Boost Camp, in preparation for becoming a middle-level supervisor, etc.
- **Disseminating corporate reputations and Banpu Heart corporate culture images to the public** through Facebook fan page in order to communicate the organization's working principles and attract potential people to join the company.
- **Improving the policies and practices related to Work Anywhere and Flexi-time**, taking into account the nature of work to design collaborative working between supervisors and subordinates, who may not need to work in the offices. This project is in line with the changing trend of working style in the future and reduces risks during the COVID-19 pandemic. Starting implementing at the Bangkok Office, it is a pilot project to further escalate the results.
- **Implementing the Boost-Me-Up project,** a long-term ongoing project to enhance employee's quality of life all around. The project's activities are run through communication management to provide guidance and inspiration, such as mental health care, financial planning. The aim of this project is to make employees happy in work and life, which will finally help promote work efficiency and retain employees to stay with the organization.
- **Conducting the corporate social responsibility (CSR) projects** with employee's participation. Drawing participation from employees is another way to create the organizational engagement. Many CSR projects carried out include:
  - Recruiting employees to be the CSR Committee to consider and implement the projects.
  - Organizing the Banpu Heartwarming Kitchen to deliver food to the needy during the COVID-19 pandemic over a period of 10 weeks. Through this project, employees jointly donated money, food and drinks to nine communities in Bangkok.
  - Joining hands with the governmental sector to run the Partnership School project to enhance the educational achievement. BPP employees joined this project as the School Partner, the company's representatives to work with the project's participating schools.

Banpu Heart Corporate Culture Creation

In the past year, the company continued designing and organizing activities to promote corporate culture, reinforcing the core values of Banpu Heart. The working style called **One Banpu, One Goal** was designed with an aim to achieve success in accordance with the common business goals, inclusion of creating cooperation in all sectors to work smarter and faster in order to keep up with business transition in the "Never normal" era. The activities conducted to promote Banpu Heart are as follows:



- **Adjusting activity formats to be more online** in response to all changes and continuously strengthen the corporate culture, such as the orientation of new employees through mobile applications, using gamification to make employees in every country understand the corporate culture in a fun way via games encouraging employees to create innovative thinking, including a commitment to creating a culture of innovation to stay strong. It is also "open to all opinions" and providing spaces for everyone to present their ideas to create innovation and better results.

- **Arranging a workshop on Banpu Heart Experience #2: How to be innovative** for executives and employees from all countries in order to use Banpu Heart behaviors for creating new things, designing work smarter and faster, ready to respond to every change, and adapting with forward thinking.
- **Organizing activities to promote corporate culture:** In the past year, the BCLs working group committed to arranging various activities to strengthen Banpu Heart corporate culture during the COVID-19 pandemic, such as
  - **Banpu Family Connect:** An activity to promote participation especially conveying expressions of concern and sharing (Express Care and Share) and giving employees the opportunity to present their creativity.
  - **Banpu Value U Project: Good Friends Lead to Recommendation:** A project allowing employees to tell good stories about colleagues expressing 10 core behaviors as good examples for each other.
  - **Banpu Heart AM(BASSADORS) activity:** Conducted under the "I can see your heart" campaign, this activity is aimed to encourage employees to express the 10 core behaviors of Banpu Heart by having employees submit the names of co-workers exemplifying their expressions of these values.
  - **Banpu Mind Space activity:** An area inspiring creativity for employees to jointly learn about the innovation development procedure and listen to staff's feedbacks for developing various projects to be better.
  - **SEED Project:** A project is to improve a learning process for creating innovations, starting from project initiation to product owner to develop products. The products created will be screened in State-gate process and measured the Minimum Viable Product (MVP) to assess the market potential. High-level executives have joined this project as the coaches in every process. The project will help support the creation of an innovation culture and can be extended to further innovation in the organization in the long term.

Promoting Innovative Value through Banpu WoW Ideas Project

Banpu WoW Ideas is an ongoing project, with an aim to encourage employees to come up with new ideas, which is the basis for creating innovations driving the organization forwards continuously. Three criteria are used in the idea assessment as follows:

- The proposed idea must be new for the Banpu Group.
- The proposed ideas must create values for Banpu Group, such as reducing costs, increasing productivity, and etc.
- The idea presented must be feasible and practical.

Banpu Group has a total of 165 WoW Ideas submitted in 2021, 11 of which are ideas from Banpu Power's employees.

BANPU WOW IDEAS

"I have been working with Banpu for 15 years. I can tell you that I enjoy working here since I have learned a lot over here, such as business knowledge, project management, and how to work with others. More importantly, I get along well with my colleagues so that I wish this large family, Banpu, to move forward and to be more prosperity in the future."

Doris Nie
Manager - HR Development, China
15 Years of working experience with Banpu Group

"Banpu is a company highly valuing its employees. I have been given the opportunity to relocate within Banpu Group. During the COVID-19 pandemic, the company still cares for its employees by adjusting the working style to suit with its employees. Moreover, I can get along well with my colleagues and we have been working together happily. I can say that I am very happy to work with Banpu."

Siwawut Jaiwat
Section Manager - Asset Management, Bangkok
3 Years of working experiences with Banpu Group

Employee Engagement

Strategy:
- Establishing the organizational engagement through drawing participation from leaders of each department.
- Creating communication channels and listening to employees' opinions for further improvement.

Key Indicators:
- Employee Engagement Scores

Target:
- The employee's engagement scores in Thailand and China are over 70% and 75%, respectively.

Performance:
- The employee engagement survey results in Thailand and China were 69% and 93%, respectively.

8 DECENT WORK AND ECONOMIC GROWTH

Significance and Reporting Boundary

BPP believes that taking good care of employees and making them feel as part of the organization as well as encouraging them to be satisfied with their works, including providing opportunities for fair career growth and listening to their opinions for further improvement, will make employees to work happily. This will also be a driving force for continuously improving their works and reducing the turnover rates, as well as keeping the potential manpower with the organization. Moreover, the employee engagement is significantly related to the competitive advantage, growth, stability, and sustainability of the company as well as the shareholder's returns.

The boundary of this report covers the business entities of which BPP has direct management control, including the three combined heat and power (CHP) plants in China as well as the offices in both Thailand and China, but exclusion of Temple I Gas-fired Power Plant in which BPP has invested at the end of the year.

Management Approach

BPP has established the employee relation policy used as a practice guideline for building good relationships with its employees. The employee engagement is fostered with three principles, consisting of:

Say

Employees speak to people both internally and externally about BPP with a good attitude.

Stay

Employees work happily and are willing to continue working for the organization in the future

Strive

Employees are deeply bonded to the organization and strive to jointly develop the company to be even better.

The key drivers helping engage employees with the organizations include:

1. **Agility** consists of cooperation and collaboration, customer focus, decision making, difference and unity, inclusive of infrastructures and resources.
2. **Engaging Leadership** is comprised of the leaderships of senior executives and supervisors.
3. **Talent Focus** includes corporate reputation, opportunities for career growth, learning and development, performance management, renumeration management system, welfares, rewards, and prides, as well as human resources management.
4. **The Work** is associated with the nature of work and work-life balance.
5. **The Basics** contain working safety.

BPP has annually conducted the employee engagement survey by working with external consulting firms. The analyzed survey results and suggestions from employees will be later used for developing the engagement action plan executed at both the organizational and departmental levels. Additionally, the reporting system has been created to update the progresses to executives every quarter in order to continue strengthening the organizational engagement.

Performance

In the previous year, the employee's engagement survey results found that the level of employee engagement in China was higher than the average scores when compared with the market average. For Thailand, due to the employee engagement plan developed in 2020, the level of employee engagement for the year 2021 was equal to 69%, an increase of 21% when compared with that of 2020. BPP, therefore, will prepare the plan for further improvement in the year 2022.

Country	Respondents (%)	A level of employee engagement of Banpu Power (%)	Average employee engagement level in the labor market (%)
Thailand	100	69	70
China	99	93	75

For operating the employee engagement in 2021, the employee's opinions gained from the survey conducted in 2020 were analyzed in order to find ways to create the tangible employee engagement. More importantly, dividing the management of employee engagement into three dimensions, has notably helped raise the scores of these areas as following:

1 Work-Life Balance

BPP has paid great emphasis on and encouraged employees to create a balance in life via the "Work-Life Balance" or a balanced life in both working and healthy living. Various methodologies were promoted as follows:

- **The Work Anywhere and Flexi-time policy** was improved for our employees by unlimiting the number of days and periods of times, letting them consider working either at the office or outside the workplace. Via the improved system, employees have to focus on their responsible assignments and mutually plan as well as agree with their supervisors to clearly define the targets and outcomes. The aim of announcing Work Anywhere and Flexi-time policy is to provide employees with more flexible working hours and in line with the current situation. Through this system, employees must be contacted at any time and have to report their work performances to supervisors, including having sound safety awareness on using the public internet.
- Enhancing the **Flexible Benefits** to be more varied in response to the needs of employees at all levels. The documents submitted for reimbursements of medical expenses/Flexible benefits/COVID-19 examination fees during working from homes, have been modified, allowing employees to fill in the data online, while the original documents can be submitted later so as to make it easy and faster.
- In order to help employees have healthy minds and strong bodies, **a fitness room** has been provided for staff at Bangkok Office. Moreover, they can also choose to join various sports clubs such as a golf club, a walking club, a badminton club, a tennis club and a futsal club, etc.
- Modifying the **exercise activities at Bangkok Office** by providing an online personal-fitness consultation and recommendation, allowing employees to reserve a time to get the personalized advices from a trainer during the home workouts.

- Providing consultations on both working and personal matters for employees through the project called **RelationFlip See your Heart and Ooca buddy**, conducted by the externally experienced psychology consultants who will keep employees' personal information confidential.
- Redesigning a variety of **provident fund's investment options** such as an investment in the foreign countries.
- Adjusting **a channel to provide various services to be an online solution on mobile phones** such as the Mobile Insurance Card, etc.

2 Career Opportunity

In the year 2021, the human resources development model was adjusted to be an online self-learning properly for changes and supporting the Flexible Workplace in order to make our employees more prepared for coping with the new trends of working at Banpu Group in the future. Furthermore, BPP has committed to strengthening its human capital development with a more comprehensive way in every critical process at all operating countries. With an aim to seriously create more competitive advantages and support the rapid business growth in the future, various projects have been implemented, such as improving the Global Talent Pool project to be more efficient by planning a systematic workforce strategy in every group of companies. And so as to define the skills needed for the current and future businesses as well as to analyze and design the learning models meeting diversities of Banpu Group, the Learning Solution Design (L&D) process able to design the learning models suited for each business and each job position, has been employed. Additionally, the personalized training program has been intensively enhanced for key positions in parallel with learning and development measurements in terms of working behavioral modifications and evaluating business impacts in accordance with the Return on Investment (ROI) principle rather than measuring satisfactions or asking for opinions applied for general works.

More importantly, BPP continues focusing on the development of general basic training courses and training programs for executives and employees at all levels in the form of blended learning by collaborating with the leading consulting firms and executive development institutes, both domestically and internationally. The aim is to create newly necessary skills (reskill) and develop the existing skills to be stronger (upskill) with a solid speed of change mostly appropriate for each job position and business direction.

- **Basic Training Program:** Such as Banpu Digital Academy Program, program relating to strategic thinking and planning, project management, operational business modeling workshops and sustainable development principles, etc.
- **Engaging Leader & Great Coach Program:** The company has continuously organized this program to develop executives to be the leaders who strengthen employee engagement with the organization. This training course provides an opportunity for supervisors to practice listening to suggestions relating to both works and personal life from their subordinates with whom they have a close relationship and can always learn from at all times. This also includes an emphasis on developing skills on coaching and creating motivations so as to understand how to develop a unified teamwork.
- **Banpu Global Leadership Program:** This training course will pull management from all countries to participate in a joint training program in order to promote diversity and inclusion and create the networks between departments so as for creating collaborations and joint-working internationally, including the self-development courses to build leadership skills, the team leadership development course and the business leadership skills development program.

3 Communication Effectiveness

BPP has enhanced the communication effectiveness of various information involved with employees, making it to be clearly and meeting the employees' needs even more. Various forms of communication channels able to reach employees easily have been used, for example:

- Arranging the Investor Relations Quarterly Communication
- Creating internal magazine, Banpu Synergy.
- Organizing a workshop on the topic of Banpu Heart Experience in order to make employees understand and express the behaviors truly reflecting the Banpu Heart corporate value, etc.
- The proactive communication management has been conducted for employees at all levels by top management through the informal meetings every two months in order to provide opportunities for employees to express their opinions. Such activities have made employees understand more about the company's policies and management approaches, drawing more participation in presenting their ideas to improve the work processes. This has resulted in higher scores in this area from the previous year.

Human Capital Development

Strategy:
- Developing employee's competencies and leaderships to be equipped with newly necessary skills and roles in accordance with business directions by establishing the individual development plan (IDP).
- Establishing a succession plan for key positions for a continuity of management and business strategy supports.

Key Indicators:
- Proportion of employees having IDPs
- Proportion of key positions with succession plans

Target:
- Proportion of employees having IDPs, equivalent to 85% in Thailand and 60% in China for the year 2021.
- Proportion of key positions with succession plans accountable for 100%.

Performance:
- Proportion of employees having IDPs were 85% in Thailand, and 69% in China.
- The succession plans covering key positions representing 100%.

Significance and Reporting Boundary

Amid the rapidly changing technology disruption era, developing employees' competencies to be equipped with knowledge and occupational expertise as well as managerial skills, including promoting their leaderships, are the key success factors for achieving in the organizational management. It is also one of the human resources management strategies in response to business expansions and increase competitive advantages. Consequently, BPP has prepared the comprehensive competency development plans for both executives and employees to heighten their learning ability and working efficiency in parallel with the leadership development plan corresponding to the organization's targets and missions.

The boundary of this report covers the businesses in which BPP has direct management control, namely the three combined heat and power (CHP) plants in China and the offices in both Thailand and China, exclusion of Temple I Gas-fired Power Plant where the company has just invested late last year.

Proportion of employees having IDPs

in Thailand **85%**

in China **60%**

The succession plans covering key positions representing **100%**

Management Approach

BPP has developed the IDPs and training roadmap, divided into short-term (annual basis) and long-term employee development courses (according to the business strategic plan), the management approaches of which are as follows:

Development of Short-term Training Courses	Development of Long-term Training Courses
Focusing on designing the training courses appropriate with each employee' needs by taking following criteria into consideration. 1. **Employee's competency assessment** in comparison with both leadership and functional competencies. 2. **The knowledge urgently needed for development** in order to be aligned with business operations, inclusion of adding newly necessary skills (upskills/reskills), and learning new technologies or practicing essential skills and able to apply these knowledge areas to improve their current and future work more efficiently. 3. **Learning methodologies consistent with the 70:20:10** learning and development model, for example learning and developing from attending the trainings as well as various educational courses officially organized by the company, learning from coaching, real practices, and real work as well as through direct experiences.	Emphasizing on designing the courses in accordance with BPP's strategies and responding to the trend of business needs, as well as the demand for new skills in the global market. This is to prepare our employees to be ahead of the changing business trends and to link diversities of each country where the company has operated.

As a result, BPP has set different employee development formats according to the position level to be in line with the most effective learning process and support the employee's performances at each level as follows:

- **Developing the Banpu Group Learning and Development Road Map** by taking into account the knowledge necessary for working system, people system and managerial skills. BPP's employee development is focusing on leadership and functional competencies so that our personnel, ranging from the employee level to the managerial level, can enhance their working skills in parallel with leadership capabilities.

- **Improving the leadership compute** in accordance with the business strategies for the years 2021 - 2025, namely.

- **Establishing a specific people capability development for power business** and is in the process of organizing training courses for employees in 2022.
- **Designing the High Potential Development Program** for employees at all levels to train them with a set of knowledge relating to new skills required for the power business transition.
- **Evaluating the IDPs** and applying the results for continual improvement.

In addition, BPP has also encouraged its employees to learn in various ways such as:

- **Providing opportunities for employees to gain direct working experiences,** e.g., transferring to work in other functions having work characteristics close to such an employee's function, attending the cross-function projects, and working in overseas affiliates, etc.
- **Learning through online course platforms** that the employees can choose the topics they want to learn by themselves.
- **Instilling all employees to realize the importance of continuous learning and development** through enhancing the Growth Mindset.

BPP has selected employees with outstanding performances and sound attitudes consistent with the corporate shared values in order to formulate a development plan for these employee groups. The aim is to develop the competencies and work experiences beneficial to their future work, inclusion of managing these talents in the succession plan appropriately. For a continuity of business management and strategic support, the succession plan for key positions has been laid down as follows:

- Establishing the succession plan committee to develop and manage the succession plan for significant positions. The committee is obligated to prescribe a policy and determine the key and critical positions.
- Setting up the key and critical position profiles and developing criteria for further nomination and selection.
- Nominating and selecting persons who will succeed such positions. Consequently, the Human Resources (HR) Department will work together with the succession plan committee.
- Developing, monitoring, and evaluating the IDPs of selected persons. Thus, the HR Department will work together with the Succession Plan Committee.
- Reviewing the key position succession plan in accordance with the company's strategies as well as identifying critical roles for further developing a guideline to select the persons to succeed these positions, including a development plan for critical positions. In addition, the Succession Plan Committee meeting has been convened quarterly so as to monitor a progress of such a development plan.
- Initiating an assessment for a group of employees identified as high potential employees according to the international consulting standards.

Performance

In 2021, 85% of employees in Thailand developed their individual development plans (IDPs), while 60% of those in China completed setting up theirs. At the same time, the employees were trained in an average of 29 hours/person/year. Whereas, the key positions having a succession plan covered 100%.

BPP organized the competency and leadership development trainings for employees as follows:

Leadership Development Programs	Main Objectives/ Benefits Gained	Target Groups
1. Banpu Engaging Leader & Great Coach: Helping Others Succeed	In order to develop and train managements as the leaders who encourage employee engagement, and as the persons with whom employees are close and feel comfortable to learn at all times. Various managerial skills development programs were provided to these management in the areas of coaching, motivation, and inspiration etc. The aim is to help management understand and know how to build a unified teamwork as well as promote effective management. In addition, the continued course called Great Coach is provided for them to learn about coaching skills, and how to apply this skill to coach his/her team members properly, as well as to encourage their subordinates to achieve successes in working.	• Vice Presidents • Division managers and higher
2. Hi-Coach	Developing and enhancing coaching abilities, including practicing coaching skills with cross-functional staff in order to develop the employees' competencies relating to leadership and working for excellent results.	• Division managers and above who attended the Great Coach program
3 BANPU Global Leadership Program	Developing diverse talents in team management to drive the strategic planning into actions, including promoting the sharing of real work experiences.	• Division managers and higher
4. BANPU Leadership Program: Future Leader	Development in preparation for becoming a future management.	• Section Managers

In addition, BPP has also organized a course to develop employee's competencies held within the organization at Bangkok Office, and provided opportunities for employees interested in applying for the trainings equally, such as:

Courses	Objectives	Duration (Days)	Trainers	Target Groups
1. Basic fire-fighting and evacuation during emergencies	Complying with labor laws and providing basic knowledge on fire fighting	1	External Agencies	• All levels of employees
2. Safety for new employees	Complying with laws and providing safety knowledge to new employees	1	Occupational Health, Safety, Environment, and Community Development Department	• All levels of employees
3. Basic Contract Knowledge	Basic law knowledge for contract execution	2	Legal Department	• Section Managers • Division managers
4. HR Management tools for new employees	Principles of human resource management and tools used for functional development	0.5	Human Resource Department	• Section Managers • Division managers
5. HR Management tools for new managers	The human resources management principles and tools for managers to develop functional work	0.5	Human Resource Department	• Division managers
6. The 7 Habits of Highly Effective People	The self-development principle, interpersonal relationships, leaderships, and efficiency increasement	3.5	External Agencies	• Section Managers • Division managers
7. Hot Risk	Effective risk management according to the company's business operations and understand the real practices through business simulations	2	External Agencies	• Section Managers • Division managers
8. Energy Titan	Learning about BPP's business operations throughout the supply chain and via the business simulation games	3	External Agencies	• Section Managers • Division managers
10. Power Apps	Designing and using applications to increase work efficiency	2	External Agencies	• All levels of employees
11. Virtual Professional Personality	Learning working perspectives in different cultures for creating successes	2	External Agencies	• Section Managers • Division managers
12. Design Thinking	Encouraging employees to learn and develop new skills through self-learning	2.5	Digital Center of Excellence External Agencies	• All levels of employees
13. YourNextU online course platform	Developing a good visual personality for presentation and how to build credibility	365	External Agencies	• All levels of employees

Employees attending the leadership development training program of Banpu Group

Level	Total Number (Persons)	Total Number of Participants (%)	Training Hours (Hours)	The Number of Training Hours per Person (Hours)
Executives (Vice Presidents and higher)	14	90	250	18
Middle-level Management (Division managers and higher)	61	70	1,776	29
Junior Management (Section Managers)	76	65	2,285	30

- **Arranging the trainings for new independent directors**, including Virtual Power Plant and Hydrogen Market, Personal Data Protection (PDPA), Corporate Transformation, the Traps for the fulfillment of BoD capability, and Advanced Audit Committee Program (AACP).
- **Knowledge sharing for power business activities** have been held every quarter. The topics presented in the past year were as follows:
  - Australia - M&A renewable - challenges and opportunities – business development perspective
  - Carbon Capture, Utilization and Storage (CCUS) Technology
  - DJSI requirements for electric utilities
  - Career path development
  - Anti-corruption and road to re-certified CAC
  - ESG for One-Report
  - Electricity trading in Japan
  - USA Power Business

Banpu Global Leadership Program

Banpu Group has organized the leadership development program in response to the future business directions, with an aim to create a new generation of effective leaders having innovative ideas in working. The training is also promoting exchanging of experiences and building a collaborative network among participants selected from leaders in different functions across the organizations in every country.

All participants are initially selected by senior management in all countries where the company has operated. All of those selected will be considered by the selection committee to attend this training each year.

The Banpu Leadership Program is divided into four levels as following:

4 **Banpu Global Leadership Program for Strategic Leader is set for Senior Vice Presidents.**

3 **Banpu Global Leadership Program for Business Leader is held for Vice Presidents.**

2 **Banpu Global Leadership Program for First Line Leader is organized for middle-level management.**

1 **Banpu Global Leadership Program for Future Leader is arranged for junior-level management.**

The Banpu Group Leadership Development program is organized annually and lasts approximately 8 - 10 months. It is divided into modules so as to develop leadership competencies for each level of employees. The training will be run together with learning from the leading consulting firms as well as exchanging experiences among participants throughout the program. In addition, the participants will learn various working styles and cultures in Banpu Group, which will lead to a collaboration in the future.

Occupational Health and Safety

8 DECENT WORK AND ECONOMIC GROWTH

Strategy:
- Cultivating the work safety culture in all operational areas.
- Conducting Occupational Health and Safety (OHS) risk assessments and developing measures to control the OHS related risks within the acceptable level.

Key Indicators:
- The Lost Time Injury Frequency Rate (LTIFR).
- The number of severe working accidents causing fatalities.

Target:
- The LTIFR of employees and contractors is zero.
- Zero working accident resulting in fatalities of employees, contractors, and others involved with the operations of BPP.

Performance:
- The LTIFR of employees and contractors was zero.
- Zero working accident resulting in fatalities of employees and contractors as well as others involved with the operations of BPP.

0

The LTIFR of employees and contractors was zero

0

Working accident resulting in fatalities was zero

Significance and Reporting Boundary

Workplace safety is the utmost target for operations since unsafely working may cause losses of lives and assets as well as have an effect on the environment and employee's health. Therefore, creating a work safety culture to proactively prevent accidents must be carried out and improve continuously, for example, creating a safe working environment, establishing clear preventive measures, evaluating performances, promoting knowledges and raising awareness, as well as drawing participations from all employees and stakeholders.

The safe workplace environment is counted as the human rights of which employees, contractors and those working in the areas should get sufficiently and equally. In addition, promoting employee participation in expressing their ideas to improve their workplace environment will finally help in creating their contributions, encouragements, and engagements with the organizations.

The boundary of this report covers all business entities in which BPP has direct management control, inclusion of the three combined heat and power (CHP) plants in China, but exclusion of the joint venture power plants, of which data are separately reported in performance table.

Management Approach

BPP has focused on cultivating a safety culture within the organization with the "3 ZEROs" target as followings:

Zero Incident
There is no incident by preventing and correcting unsafe behaviors and working conditions.

Zero Repeat
There is no recurrence by investigating for the real cause and correcting a mistake at its root cause as well as informing employees to prevent a recurrence of such an incident.

Zero Compromise
Do not ignore complying with the safety rules, regulations, and practice standards.

To achieve the above targets, BPP has managed its safety as following:

Duties and Responsibilities on Occupational Health and Safety (OHS)
Management ranging from the top to operational levels has a commitment and responsibility to create work safety. The process starts with construction designs to operations as well as a prevention and collection of unsafe working conditions and behaviors. The determination of short- and long- term safety goals demonstrate the good leadership and example in safety. In addition, all employees have duties to create a safe working environment for each other.

Complying with Laws and Regulations as well as Safety Standards of BPP
BPP has strictly complied with laws and best practice standards on safety. The safety is regularly monitored according to safety laws and regulations. Furthermore, BPP has employed the internationally recognized safety management systems in all of its production units.

Safety Related Risks Management
BPP has assessed the OHS risks in all areas where it has operations. Hence, all business units have measures to prevent and reduce safety related risks appropriately. Operational works with high possibility of severe risks, therefore, have to develop a plan to mitigate risks to the acceptable level.

Creating a Safety Culture
BPP has given great values on promoting and cultivating a safety culture among its employees and contractors working in all areas where it has operations. The safety concerned behaviors have been valued by integrating into the corporate culture to express care and share. Additionally, the employees and contractors are encouraged to give warning to each other if seeing unsafe working behaviors.

Encouraging Employees to Gain Sufficient Knowledges and Expertise in OHS
BPP has supported and educated its employees and contractors about OHS so that they have sufficient OHS abilities to work safely, including frequently examining and reviewing their understandings.

Innovation and Safety Technologies
BPP has promoted the adoption of innovations and modern technologies to further improve its safety operation standards to be better, such as using the digital technology for safety monitoring, etc.

BPP has recorded its safety statistics, covering all workers within the scope of the company's control work and control workplace, including employees, contractors and persons who have been permitted to enter the areas. For workers who are in the scope of neither control work nor control workplace, the company will record them in the accident report, but will not include in the accident statistics calculation.

Performance

In 2021, all production units of the power plants in which BPP has direct management control had no serious accidents causing injuries or fatalities. Meanwhile, the lost-time injury rate was zero and there was no incidence of occupational diseases.

The company has attached great importance on working safety of its employees and contractors. Consequently, the ISO 45001 Occupational Health and Safety Management System has been employed and integrated with the ISO 9001 Quality Management System as well as the ISO 14001 Environmental Management System. As a result, the three combined heat and power (CHP) plants in China have been certified to operate in accordance with the three management system standards by certification bodies.

Activities to promote working safety

BPP organized the work-safety promotion activities, for example:

- **Measuring the workplace environment** and making it safe.
- **Training and testing on safety and environment**, safety rules and risks in the areas prior to working, as well as strictly reviewing them at a defined time.
- **Promoting working safety and regularly inspecting a workplace** by top management.
- **Conducting safety inspections carried out by employees, supervisors and safety officers** during operations.
- **Setting up the safety improvement committee** for offices and power plants.
- **Communicating with involved parties to raise safety awareness through various activities**, such as emails, games and posters, etc.
- **Exercising the emergency plans** by simulating various scenarios regularly.
- **Providing incentives for safe working**, such as special rewards for contractors having outstanding safety practices, celebrations on common achievements, etc.

Employee Health Promotion

BPP has provided the health promotions for its employees such as:

- **Conducting a health check-up for employees in accordance with the COVID-19 preventive measure strictly** and preparing health insurances for medical treatments and coordinating for the provision of COVID-19 vaccines for our employees.
- **Conducting an annual health check-up** and a physical fitness measurement based on risks arising from a nature of work for the employees.
- **Measuring working conditions** in both offices and production units, and frequently improving and standardizing working conditions.
- **Promoting exercising and maintaining good health among employees**, such as setting up sports clubs, providing health related knowledges, including providing an individual exercise trainer for interested staff, etc.
- **Arranging the physiological consultation project called RelationFlip** for employees so that they can consult with the externally experienced physiologists on both personal life and working matters in order to relieve their stresses. Additionally, all employees' personal information will be kept confidential.
- **Conducting the online doctor visit program for employees**, allowing them to make an appointment with and being preliminarily diagnosed by the doctor via the online system. By this way, the doctors can prescribe medicines and deliver them to the staff quickly.
- **Organizing the Flexible Benefit project**, of which THB 12,000 financial support is annually provided for each employee who can utilize this financial support for other benefits, including their health such as additional medical treatment's expenses, sports club membership fees and equipment costs to facilitate working from homes with a right physical way, etc.

Smart Inspection and Control System for Heat Exchange Station at Zhengding CHP Plant

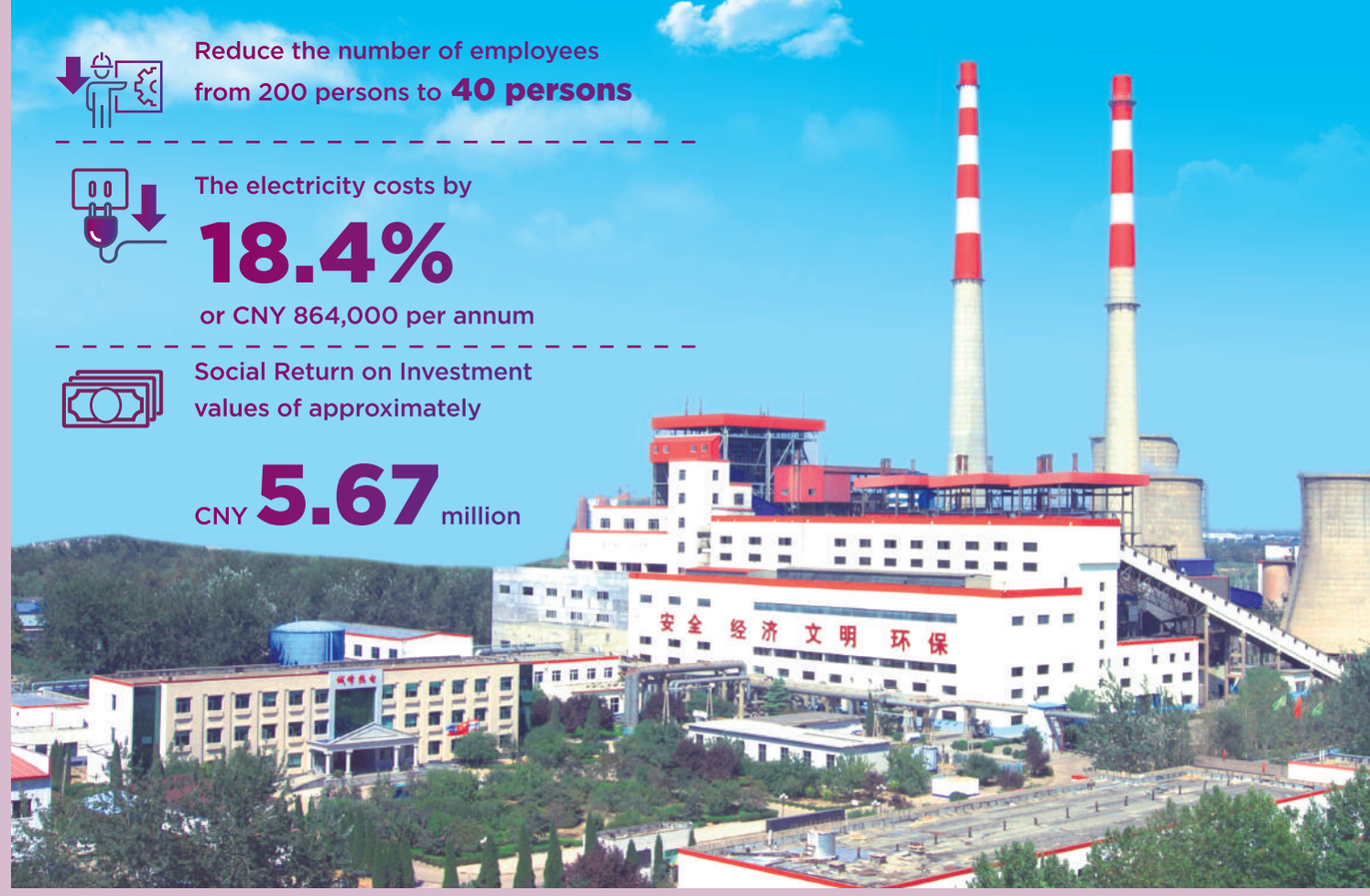
Located in Shijiazhuang City, Zhengding County, Hebei Province, People's Republic of China, Zhengding CHP Plant has a total installed capacity of 139 MW and produces approximately 10 million Gigajoules (GJ) of heat per year, contributed for users in Zhengding County where around 58,000 residents and more than 180 of the industrial sector, trades and others are living. It is the only power plant producing heat supplied for a centralized heating system in the area, which is essential to residents during winter when the average outdoor temperatures are around 0.3 Degree Celsius.

Zhengding Power Plant has tried to stabilize its heat transmissions and improve the safety by installing equipment and establishing a real-time remoted monitoring system applied to the heat exchange station in order to replace staff visits to the station area, reducing risks and operating times from entering the station zone. More importantly, it has made it possible to quickly detect abnormalities so that they can be corrected immediately, including increasing the power plant's stability of heat supplies.

The installation of intelligent thermal inspection and control equipment includes:

- Remotely inspecting via video cameras
- Remotely controlling and adjusting the water pump's recirculation frequencies.
- Remotely controlling and adjusting the steam and hot water flows intensity in the heat exchanger station.
- Employing the information collection system related to pressures and temperatures from various devices in the system such as water pumps, pressure regulator valves, water tanks, etc.

This project implementation has enabled Zhengding CHP Plant to reduce the number of employees inspecting the heat exchanger station from 200 persons to 40 persons, reducing the employee safety risks derived from being exposed to noises and heats and the electricity costs by 18.4%, or CNY 864,000 per annum. **When assessing this project's safety with the Social Return on Investment (SROI), the project has generated values of approximately CNY 5.67 million.**



In addition, Zhengding CHP Plant has also upgraded its heating equipment to accommodate thermal generations in accordance with the growing populations in Zhengding County. The plant has also improved its equipment inspections, including developing and exercising the emergency plans. As a result, the plant has been certified by the ISO 45001 Occupational Health and Safety Management System continuously. This has made the power plant to operate stably and safely. **There were no working accidents while the availability factor was maintained at a high level of 94.04%. More importantly, the power plant was bestowed the Advanced Unit of Central Heating award from the government sector.**

Zhengding CHP Plant operates stably and safely, which was bestowed the Advanced Unit of Central Heating award from the government sector.

Double Control Application Project for Safe Maintenance at Luannan CHP Plant

Typically, a power plant needs to be planned for maintenance so that the machines can continue operating. The maintenance planning is conducted by the maintenance department, which will proceed the documentations specifying work details, persons working in the area, operational periods and risk assessments to the production department to consider and cut off some working systems so as for safe operations of the maintenance department. However, there are too many of such documents, which must be sent to different departments for inspections, such as the production and safety units, etc. This has resulted in document losses during operations. Additionally, these documents must be used together by many parties, making it inconvenient and difficult to access risk details of each maintenance. Or if the document is lost, it will not be able to trace back.

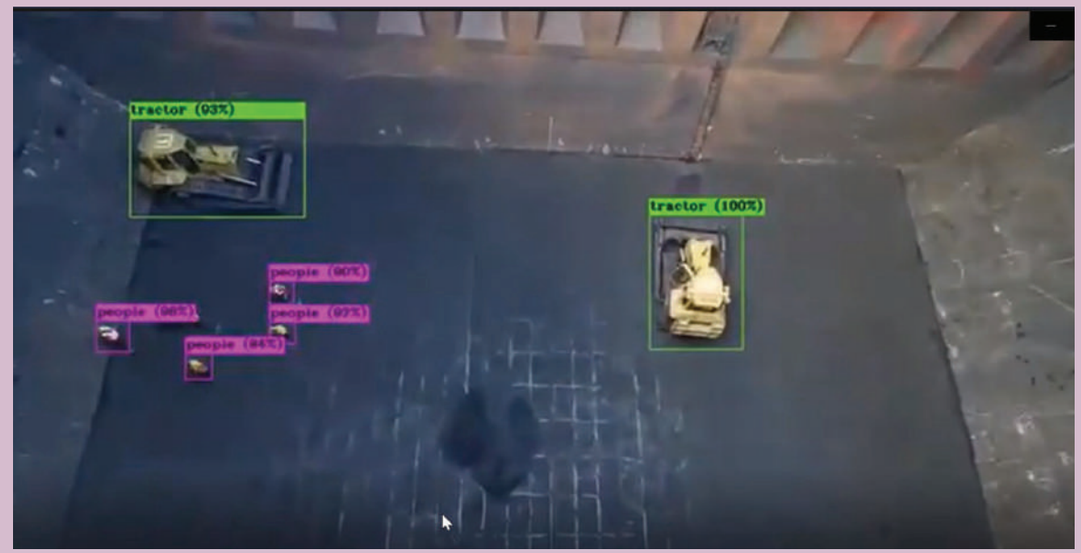
Luannan CHP Plant, therefore, has developed the **Double Control application** to replace all documental operations. In the form of digital, the Double Control application allows relevant parties to create documents requested for approval, giving approval and checking the data simultaneously. It also prevents document losses, making maintenance operations go smoothly while operators stay safe from working. Around 50% of time was also saved. When assessing this project result relating to safety with **the Social Return on Investment (SROI) tool, the value of about CNY 104,800** was estimated from this project. The value was gauged from time-saving, enhancing employee's knowledge, keeping documents for legal retrospection and securities arisen from using this application. This was exclusive of the value from project expansion to other BPP's power plants.

In the past year, Luannan CHP Plant had no major working accidents and has consistently accredited by the Occupational Health and Safety Management System (ISO 45001). Moreover, the plant was selected as the outstanding occupational health enterprises. It was awarded as the outstanding prefectural workers' vanguard from the government sector as well.

Social Return on Investment (SROI), the value of about

CNY 104,800

Utilizing Artificial Intelligence for Image Analysis (AI Vision) to Monitor Operations at BLCP Power Plant's Port Area



To prevent accidents possibly occurring during unloading coal from the vessels, BLCP Power Plant has applied the AI Vision to detect and alert contractors and employees when they are operating on coal vessels and bulldozers, which have limited visibility and environmental conditions, such as field of vision, hearing noises, etc. Using the AI Vision will help in identifying the characteristics of people and machines, safe operating distances as well as immediately alerting the operators when the distance between the local operator and the machine is closer than the safe distance. This can significantly reduce the risks involved with working accidents.

Community Engagement

Strategy:
- Developing a community engagement and development through the joint consultative committee between BPP, the community and the government sector.
- A continual two-way communication.
- Grievance channels and effective corrections.

Key Indicators:
- Significant complaints from the community.
- Business disruptive incidents caused by the community's complaints.

Target:
- No significant grievances from the community.
- All complaints are proceeded with the analysis process and corrected at the right time.
- No business disruptions resulted from the community's grievances.

Performance:
- No significant complaints from the community.
- No business disruptions resulted from the community's grievances.

No significant complaints from the community

No business disruptions resulted from the community's grievances

Significance and Reporting Boundary

Communities surrounding the power plants are the valuable stakeholders for operations of BPP because they have received both positive and negative impacts throughout the projects life cycle. Consequently, the community's acceptance is a significant factor for the project's sustainability.

BPP has placed great emphasis on building community engagements and listening to their opinions since the project's feasibility study gets started in order to collect comments and concerns from the communities, using them for engineering designs and reducing any impacts likely arising, inclusion of determining the monitoring and preventive measures during the project's construction and operational stages. In addition, BPP has used opinions received from the community engagement to improve its operations and support the sustainable development corresponding to the local needs.

The boundary of this report covers the power plants in which BPP has direct management control, including the three combined heat and power (CHP) plants in China and Temple I Gas-fired Power Plant.

Management Approach

BPP has determined to conduct a social baseline study in the areas during the project's feasibility study stage by adhering to the international standards in order to understand economic and social conditions in the project's area. It has also established the guidelines for building community engagements and applying them as appropriated.

BPP has engaged the communities through stakeholder analytic procedures, dividing into directly and indirectly affected groups as well as beneficiaries since beginning to conduct a feasibility study in order to listen to opinions and concerns from the communities. These opinions and concerns are used for designing the projects and developing proper measures to mitigate social and environmental impacts for each area. Generally, the project's stakeholders are classified based on the impact levels. The distinguishment may differ from local conditions and laws of each country.

1. **Communities living in the project area** are those staying in the project's zones and necessarily being relocated. They are the most affected people at the project's beginning stage since the relocation has an impact on the community's traditional living and possibly affects their occupations, cultures, and traditions, etc. As such, making understanding and well planning for relocations as well as supporting the communities for their best benefits with minimal effects, is a must. The unwilling relocation is avoidable and challenging for the project accomplishment.

2. **Communities located closest to the project** are those living adjacent to the project's areas or five kms away from the project (radius may vary upon each area). These communities are directly affected and in proximity to the project. BPP has considered them as the most affected stakeholders during its operational stage. Consequently, the communities residing closest to the project together with those staying in the project's areas will be provided the utmost opportunities from the project such as job recruitments and occupational supports, etc.

3. **Communities located in the moderate vicinity of the project** are communities living over five kms from the project but not exceed 10 kms (radius may vary upon each area) or the communities BPP purchased lands for operating, but do not have to relocate. These communities are directly affected by the project, but less than the first two groups. Hence, this community group is considered as the moderate affected stakeholders.

4. **Indirectly effected communities** are the communities located far away from the project's areas or those supporting the relocation which may be indirectly affected, for instance, increasing the population and transportation densities. BPP considered these communities as the least affected stakeholders, compared to the first three groups.

BPP has assigned a direct responsible function to engage communities in order to develop the operational plan appropriate for each community, covering a vulnerable group such as persons unable to protect their rights or have no freedom to make decisions on effects they may receive, such as children, the elderly, refugees, and native people.

The CHP plants in China, namely Luannan CHP Plant, Zhengding CHP Plant and Zouping CHP Plant are located in the industrial and city areas for generating power, steam, and cold water to factories and local communities. BPP, therefore, has collaborated with customers, business partners, government agencies and nearby companies to engage communities through various activities for each location. As communities are also one of the key customers buying heats from the power plants during winter, the power plants have to operate in accordance with the community's expectations. These include the stable operations, continuous quality heat supply, and flexibility to community's needs.

Performance

In 2021, BPP had neither significant complaints from the surrounding communities in the project areas nor production halt incidents or business interruption resulted from the community complaints. Moreover, there were no incidents related to violations of social-economic compliance, both in the power plants the company has management control and the joint venture power plants.

Centralized Heating System to Serve the Community of Zhengding Combined Heat and Power (CHP) Plant

Located in Shijiazhuang City, Zhengding County, Hebei Province, People's Republic of China, Zhengding CHP Plant has a total installed capacity of 73 MW, generating about 10 million gigajoules of heat per year for users in Zhengding County, consisting of the industrial sector and communities in Zhengding City. It is the only power plant supplying heat into a centralized heating system, which is essential to people during the cold winter months.

Recognizing its responsibility on the well-being of local communities, Zhengding CHP Plant has carried out the production process improvement projects in parallel with responding to the community needs, for example:

Contributions to a community of approximately **58,000** residents

The community heat sales volume exceeded the target by **35.2%**

- **Improving the air quality released from power plant's stacks**, with an investment of about CNY 200 million. The project has helped the power plant's released air quality being significantly better than the standards required by laws. The plant can control pollution to an ultra-low emission level in both the amount of particular matters, sulfur dioxides and nitrogen oxides. As a result, Zhengding CHP Plant has been recognized by the government and has been selected as one of then Top 100 Eco-environmental Innovation Projects in 2020.
- **Enhancing and expanding the production capacity in order to accommodate people in the area** to be allocated heat from a centralized heating system thoroughly, responding to urbanization and population expansion. Currently, the plant has covered about 96% of the services.
- **Extending the period of heat supply to the community** during the winter season for several consecutive years in response to community needs.
- **Increasing convenience for users** by improving the payment system to be in the digital format.
- **Providing 24-hour hotline service** to solve problems that may arise with customers and communities, especially hospitals, schools, etc.
- **In 2021, the plant collaborated with the government sector to improve heat exchange station for providing efficient service to the community**, by improving the heat supply system, such as installing signal receivers, maintaining and building a remote monitoring system to increase the stability and efficiency of the heat supply system, which can operate continuously and efficiently.

Such operations have yielded fruitful contributions to a community of approximately 58,000 residents who continuously use heat with high quality and cost-effectiveness during the winter. This has caused people in the area to switch to a centralized heating system from the traditional heating method. As a result, the number of customers of Zhengding CHP Plant has continued to increase. In 2021, the community heat sales volume exceeded the target by 35.2%, with community heat sales revenue of CNY 27.3 million. Meanwhile connection fee income was recorded at CNY 12.2 million and CNY 24.3 million of a governmental subsidy (tariff).

Due to its efficient operations with environmentally-friendly manner, Zhengding CHP Plant has been trusted by the government and community. More importantly, the plant has been selected by the government to develop a solar rooftop project in Zhengding City, with an aim to install a total of 167 MW of solar panels on the roofs of governmental buildings, factories and communities, expected to be completed by the year 2023.

Improving the Quality of Life and the Community Economy Surrounding the Solar Power Plants in China

The solar power plants in China have continually implemented the projects for improving the quality of life and improving the economy according to the needs of each locality, especially that in rural areas where quality of life is still required for better improvement. The goal of this project is to upgrade the quality of life and promote occupation creation in the communities, including building an understanding between the power plant and the communities. A number of professional skills development projects have been undertaken in order to generate income from co-working with the power plants, such as cleaning solar panels to increase power generation efficiency, weeding and cleanliness to prevent fire, cable routing, construction and cleaning, etc.

In addition, safety and environmental training has been provided in tandem with supporting safe operation in the workplace. The participants of this project are residents from surrounding communities, most of whom are working in the agriculture field. The project has resulted in an additional earning in a total of CNY 1,286,600 for local people. Moreover, it has created engagement and good relationships with the community as well as yielded benefits to the company in maintaining the power plant to be able to generate electricity with the highest efficiency.

Throughout the past year, the company's solar power plants in China have been able to generate power continuously without any interruption. In addition, the surrounding communities have also helped monitor security around the projects in another way. Besides, other quality of life improvement projects have been also implemented, such as:

- Having been supporting the improvement of the quality of life of the elderly, who are the major population in the areas surrounding the power plants since 2017. In 2021, 74 elderly people have been supported in this project.
- The installation of solar lighting in the village roads for safety.
- Home maintenance for the elderly so that they have a better life.
- Conduction of the cultural activities to build relationships with the communities, such as cooking food for a traditional festival, providing support for living during winter, giving hands to local communities during the COVID-19 pandemic.

Participation in Uplifting Educational Quality towards the Sustainable Development Schools

Education is the cornerstone of developing a country towards sustainability. This is in line with Banpu Group's corporate social responsibility (CSR) philosophy as following:

"Learning is the Power of Change and Development."

With a belief that education and learning are the core power leading to the creative change and sustainable development of people and societies, Banpu Group is determined to carry out the CSR activities both at the corporate and local levels. Banpu Group's CSR activities are focusing on promoting and supporting children and youths, who are the human capital and future of the nation to learn continuously so that they can drive the community and society to stably develop in the long run. Banpu Group's learning and educational promotion activities are conducted in various forms of both inside and outside the classrooms whether it's a learning from real experiences and daily lives. The aim is to enable young adults to develop their competencies and skills, including practicing, learning and discovering knowledge either on their own or with others, as well as helping and filling in what is scarce.

"School is the smallest unit, but it is the utmost importance in the educational system development."

Since the year 2017, Banpu Group has participated in the Public-Private Partnerships in Education and Leadership Development Project (CONNEXT ED) in order to improve the quality of Thailand's basic education. This project is part of the Thai government's strategy to bring about equality and develop human capital for Thailand. The company has partnered with the government sector and involved parties to develop 12 schools, all of which are the small sub-district-level schools and need to develop their teaching and learning systems. The project aims to enable students to develop academic capabilities as well as life skills, so that they are "smart, good, and happy" driving towards the sustainable education. In addition, employees have been recruited as School Partners (SP) Volunteer, who will work closely with schools to improve teaching & learning method by taking into consideration the local culture and context. There have been 26 SPs, who take part in this project in order to mutually develop the schools for a period of three academic years.

Improve
12 schools

Volunteer employee
28 persons

Training
178 teachers

Cover education of
2,199 students

"Scarcity and distinction from city schools."

This is what the schools in this project have to face, besides the shortages of equipment, tools, teaching and learning materials, computers, science laboratories, and sound condition classrooms, inclusive of a shortage of teachers in terms of numbers. and qualifications matching with the subjects taught. More importantly, the "modern teaching method that appropriate for present and future education", is essential.

The SP Group has carried out the school development strategies through creating school's acceptances and participations as the first priorities. The inquiries and ideas relating to problems and obstacles in learning and teaching management are exchanged with teachers and administrators. Furthermore, the expectations on areas of improvement in the future have been discussed with schools so as to come up with the proper strategic and action plans, meeting each school's needs.

Banpu Group, therefore, has jointly developed the schools in accordance with each school's plan. In addition to supporting essential educational equipment and providing additional teachers who will teach subjects the schools are already lacking, the main activities implemented are teachers' trainings in order to transform the traditional teaching system towards the Active Learning. The teachers' trainings organized include:

Pre-Children Level:
A training on teaching with a High Scope approach.

Elementary School Level:
Conducted by the faculty members of Chulalongkorn University Demonstration School, this training covers the content management, teaching techniques, teaching media preparation for conducting the Active Learning classroom.

High School Level:
The training focuses on career promotion to expand opportunities and provide more choices for students after graduating from a high school by concentrating on applying innovations to product improvement.

Moreover, Banpu Group has also arranged the budget for school development, such as supplying books for the libraries, providing textbooks and exercises, upgrading the classrooms to be ready for accommodating school's teaching and learning systems, and hiring teachers in needy positions such as early childhood teachers, English, computer, science and Thai language teachers, etc. For over three academic years of operations, the project has yielded significant developments and changes in various areas, including:

- **Classrooms and learning environment:** The participating schools have effective teaching materials able to arouse student's interests and make learning and teaching easier as well as significantly increase the educational achievements. There are improvement projects in various fields that can be scaled up, such as the positive classroom project, the safe school project, the modern agriculture project using digital technology in combination with solar energy, the after-classroom library project, the school's waste management and energy saving projects, the artificial flowers project with participation from students and people in the communities, and the organizer project to arrange the events in the communities, etc.
- **Teachers** of the participating schools have skills and techniques in arranging teaching and learning aligned with today's and future education, understand students, and can change teaching mythologies from the traditional one-way communication technique to the active learning using a two-way communication, which can draw greater student engagements.
- **School principals** have increased their management skills, personnel and academic development, providing supports and closely following up and advising teachers.
- **Students** learn with fun, enjoy and understand the lessons faster with assertiveness, and have better academic achievements, as well as can enhance their occupation and life skills.
- **Parents and communities** are confident in the schools, their administrators and teachers as well as give higher cooperation to schools.
- **Nearby schools** have been transferred teaching techniques from the CONNEXT ED schools to develop and enhance the teaching and learning systems in nearby schools.

In addition to the schools' teaching and learning improvement, the co-working between SP and schools has also facilitated the exchange of experiences and operations, resulting in mutual learning and applying the concept of working in the private sector to adapt in schools, such as creating participations, establishing corporate culture and positive motivations, developing human resources' capabilities/skills, knowledge management, and building a collaboration network, etc. At present, Banpu Group continues executing various projects to improve the education as we believe that **"learning is the power of change and development"**, with a hope to create the sustainable development in all areas where we have operated.

39
Academic projects

50
Occupational skills development projects

12
Life skills development projects

"It is an important impression for me to be involved in bringing good intentions from Banpu executives, and encouragement from my colleagues. These include strategies, methodologies, and techniques provided for educational administration and conducting teaching and learning in a modern way to help improve the quality of education for rural schools until the results are clearly visible."

Suthiroj Mongkolsinpong
Head of the Project Working Group

"I feel very proud and appreciate the word living to create value every time I work on this project, although, I am a small part in helping drive Thailand's education. Thank you to management and everyone who came together to make it happen."

Kanyarat Sribunlamay
SP Don Klang Nukulwit School and the Main Project Coordinator

"My heart swells every time I see the children's development, their smiles and laughter. Thank you to the school's director and teachers for showing their willingness to help push the project up to this point."

Pattama Chamnivikai
SP Rong Kham Hong Thong Wittaya School

"I would like to encourage teachers who have devoted themselves to teaching children despite the scarcity of resources in many areas. And I'm glad to be a part of helping children get quality education and be happy in school."

Sanicha Pinyocheep
SP Phon Ngam Phon Sawang Community School

"I'm impressed with Banpu's CONNEXT ED team and all teachers who have dedicated to achieving the same goal. That is to provide better educational opportunities for children."

Kasacha Phawandee
SP Non Sa-at Pittaya School

Additional Information

List of Business

Country	Business Unit	Business Type	Ownership (%)	Capacity		Status	Direct Operational Control
				100%	Equity		
Thermal Power Business							
China	Zhengding	Combined heat and power (CHP) plant	100%	139 MWe	139 MWe	Operating	✓
	Luannan	Combined heat and power (CHP) plant	100%	227 MWe	227 MWe	Operating	✓
	Zouping	Combined heat and power (CHP) plant	70%	247 MWe	173 MWe	Operating	✓
	Shanxi Lu Guang	Coal-fired power plant	30%	1,320 MW	396 MW	Operating[b]	×
Lao PDR	HPC	Coal-fired power plant	40%	1,878 MW	751 MW	Operating	×
Thailand	BLCP	Coal-fired power plant	50%	1,434 MW	717 MW	Operating	×
Japan	Nakoso	IGCC power plant[a]	13.4%	543 MW	73 MW	Operating[c]	×
The U.S.	Temple I	Gas-fired power plant	50%	768 MW	384 MW	Operating[d]	✓
Renewable Power Business[e]							
China	Huineng	Solar power plant	100%	21.51 MW	21.51 MW	Operating	×
	Jinshan	Solar power plant	100%	28.95 MW	28.95 MW	Operating	×
	Haoyuan	Solar power plant	100%	20.00 MW	20.00 MW	Operating	×
	Hui'en	Solar power plant	100%	19.70 MW	19.70 MW	Operating	×
	Deyuan	Solar power plant	100%	51.64 MW	51.64 MW	Operating	×
	Xingyu	Solar power plant	100%	10.30 MW	10.30 MW	Operating	×
	Jixin	Solar power plant	100%	25.22 MW	25.22 MW	Operating	×
Japan	Olympia – Hitashi Omiya No.1	Solar power plant	40%	2.00 MW	0.80 MW	Operating	×
	Olympia – Hitashi Omiya No.2	Solar power plant	40%	2.00 MW	0.80 MW	Operating	×
	Olympia – Ozenosato-Katashina	Solar power plant	40%	2.00 MW	0.80 MW	Operating	×
	Olympia – Sakura No.1	Solar power plant	40%	2.00 MW	0.80 MW	Operating	×
	Olympia – Sakura No.2	Solar power plant	40%	2.00 MW	0.80 MW	Operating	×
	Hino	Solar power plant	75%	3.50 MW	2.63 MW	Operating	×
	Awaji	Solar power plant	75%	8.00 MW	6.00 MW	Operating	×
	Nari Aizu	Solar power plant	100%[f]	20.46 MW	20.46 MW	Operating	×
	Mukawa	Solar power plant	56%	17.00 MW	9.52 MW	Operating	×
	Kurokawa	Solar power plant	100%	18.90 MW	18.90 MW	Operating	×
	Tenzan	Solar power plant	100%	1.96 MW	1.96 MW	Operating	×
	Muroran 1	Solar power plant	100%	1.73 MW	1.73 MW	Operating	×
	Muroran 2	Solar power plant	100%	1.63 MW	1.63 MW	Operating	×
	Takeo 2	Solar power plant	100%	1.00 MW	1.00 MW	Operating	×
	Yamagata	Solar power plant	100%	20.00 MW	20.00 MW	Operating	×
	Yabuki	Solar power plant	75%	7.00 MW	5.25 MW	Operating	×
	Kesennuma	Solar power plant	100%	20.00 MW	20.00 MW	Operating[g]	×
	Nihonmatsu	Solar power plant	100%	12.00 MW	12.00 MW	Operating[g]	×
	Shirakawa	Solar power plant	100%	10.00 MW	10.00 MW	Operating[h]	×
	Yamagata Iide	Solar power plant	51%	200.00 MW	102.00 MW	Under development	×
Vietnam	El Wind Mui Dinh	Wind power plant	100%	37.60 MW	37.60 MW	Operating	×
	Vinh Chau	Wind power plant	100%	80.00 MW	80.00 MW	Under construction and development	×
	Ha Tinh	Solar power plant	100%	50.00 MW	50.00 MW	Operating[i]	×
	Chu Ngoc	Solar power plant	100%	15.00 MW	15.00 MW	Operating[j]	×
	Nhon Hai	Solar power plant	100%	35.00 MW	35.00 MW	Operating[j]	×
Australia	Beryl	Solar power plant	20%	110.90 MW	22.18 MW	Operating[k]	×
	Manildra	Solar power plant	20%	55.90w MW	11.18 MW	Operating[k]	×

[a] Integrated Gasification Combined Cycle (IGCC) is a combination of coal gasification technology with the gas-fired combined cycle power plant. The process starts from mixing coal with steam and oxygen by using high pressure and temperature until a chemical reaction occurred. The gas composed of carbon monoxide and hydrogen, which will go through the cleaning process by removing dust, sulfur, and nitrogen prior to the electricity generation cycle. In addition, the heat or waste gas released from the gas turbine will be used to heat the boiler to spin the generator again.

[b] Commercial Operation Date (COD) in October 2021.
[c] Commercial Operation Date (COD) in April 2021.
[d] Completed acquisition in November 2021.
[e] Ownership reported for Banpu NEXT's (BPP holds a 50% stake).
[f] Adjusted to 100% ownership by Banpu NEXT
[g] Commercial Operation Date (COD) in November 2021.
[h] Commercial Operation Date (COD) in January 2022.
[i] Completed acquisition in December 2021.
[j] Completed acquisition in January 2022.
[k] Completed acquisition in July 2021.

Awards

Banpu Power

Awards/Recognitions	Host Institute
Sustainability Yearbook Member 2022	S&P Global
Thailand Sustainability Investment 2021	The Stock Exchange of Thailand
Rising Star Sustainability Excellence Awards 2021	The Stock Exchange of Thailand
Corporate credit rating of "A+" with a "Stable" outlook	TRIS Rating
Corporate Governance Report of Thai Listed Companies (CGR) 2021 with Excellent CG Scoring (5-Star)	Thai Institute of Directors Association
The company obtained a full 100 scores for the quality of the Annual General Meeting of Shareholders for the year 2021	Thai Investors Association

Banpu Power's Subsidiaries

Business Unit	Awards/Recognitions	Host Institute
Luannan CHP Plant	Worker pioneer	Labor Unions of Luannan County
	Youth Civilization	Communist Youth League of Luannan County Committee
	The second staff culture festival excellent organization unit of Luannan county	Labor Unions of Luannan County
	Honor certificate of Boai Yanzhao bronze award	Hebei Red Cross Society
	Health enterprise "demonstration enterprise" of Luannan county	Health Bureau of Luannan county
Zhengding CHP Plant	China AAA Credit Enterprise	China Cooperative Trade Enterprises Association; China Enterprise Reform and Development Association;
	Model Unit for Integrity in 2021	Leading Team Office of Shijiazhuang Social Credit System Construction; Shijiazhuang Credit Union
	Vice Chairman Unit of Charity Federation of Zhengding County	Zhengding County Civil Affairs Bureau
	2020 Zhengding County Civilized Unit (Awarded in 2021)	Zhengding County Party Committee & People's Government of Zhengding County
	2021 National Excellent Honest Entrepreneur	China Cooperative Trade Enterprises Association & China Enterprise Reform and Development Association
	Mechanical maintenance shift was rated as Pioneer Worker Team	Zhengding County Labor Union
	Two workers won May 1 Labor Medal	Zhengding County Labor Union
	An employee was awarded Zhengding Grand Craftsman	Zhengding County Labor Union
	An employee was nominated as Zhengding Best Workers	Zhengding County Labor Union
Zouping CHP Plant	Tax Paying Enterprise with a Credit Rating for Year 2020 (Awarded in 2021)	Zouping County-level City Taxation Bureau of the State Taxation Bureau
	Excellent organizational unit on the City's "Safe Production Month" for Year 2021	Binzhou City Committee of Safety Production
Hui'en Solar Power Plant	High Quality Pioneer Company	Da Sheng Town Regional People's Government
Jinshan Solar Power Plant	Prize for Outstanding Contributor Company	WuShan Town Regional People's Government
Huineng Solar Power Plant	Prize for Outstanding Contributor Company	WuShan Town Regional People's Government

Membership

Banpu Power

Organization	Status	Role
Thai Listed Companies Association (TLCA)	Chairman/ Director	Be a representative consultant on the rules and regulations of the Stock Exchange of Thailand and the Securities and Exchange Commission or other relevant consultation.
Office of the Basic Education Commission (OBEC)	Chairman	Consider and propose policies, development plans and basic education courses in accordance with the National Economic and Social Development Plan and the National Education Plan including monitoring and evaluating of Basic Education Management.
Thail Private Sector Collective Action Against Corruption (CAC)	Committee Member	Support and promote anti-corruption in Thailand.

Banpu Power's Subsidiaries

Business Unit	Organization	Status
Banpu Investment (China) Ltd.	Thai Chamber of Commerce in China	Vice Chairman
	China Association of Enterprises with Foreign Investments	Executive Member
	Henan Association of Enterprises with Foreign Investments	Member
	Shanxi Association of Enterprises with Foreign Investments	Member
	Global Trade in Services Alliance	Member
Zhengding CHP Plant	Zhengding County Charity Federation	Vice Chairman
Zouping CHP Plant	Shandong Overseas Chinese Entrepreneurs Association	Member
	Binzhou Overseas Chinese Entrepreneurs Association	Member
	Shandong Electric Power Enterprises Association	Member

Data Boundary

Sustainability Issues	Direct Operational Control						No Direct Operational Control					
	Office		Zhengding	Luannan	Zouping	Temple 1[(a)]	BLCP	HPC	Shanxi Lu Guang	Nakoso IGCC	Renewable Power Business (Banpu NEXT)	Energy Technology Business (Banpu NEXT)
	Thailand	China	China	China	China	The U.S.	Thailand	Lao PDR	China	Japan	China, Japan, Vietnam, Australia	Thailand, China, Japan
Air emissions	-	-	●	●	●	X	+	+	-	-	-	-
Ash	-	-	●	●	●	X	+	+	-	-	-	-
Biodiversity	-	-	●	●	●	●	+	+	-	-	+	-
Climate strategy and GHG emissions	-	-	●	●	●	X	+	+	-	-	+	- -
Effluent	-	-	●	●	●	X	+	+	-	-	+	-
Electricity generation	-	-	●	●	●	X	+	+	-	-	+	-
Energy efficiency	-	-	●	●	●	X	+	+	-	-	+	-
Hazardous waste	-	-	●	●	●	X	+	+	-	-	+	-
Leakage & spillage	-	-	●	●	●	X	+	+	-	-	+	-
Non-hazardous waste	-	-	●	●	●	X	+	+	-	-	+	-
Transmission & distribution	-	-	-	-	-	-	-	-	-	-	-	-
Water related risk	-	-	●	●	●	X	+	+	-	-	+	-
Community engagement	-	-	●	●	●	●	+	+	-	-	+	-
Corporate citizenship & philanthropy	●	●	●	●	●	X	+	-	-	-	+	-
Human capital development	●	●	●	●	●	X	+	+	-	-	-	-
Human rights	●	●	●	●	●	X	-	+	-	-	-	-
Labor practices	●	●	●	●	●	X	-	-	-	-	-	-
Occupational health	●	●	●	●	●	X	+	+	-	-	+	-
Resettlement	-	-	●	●	●	X	-	-	-	-	-	-
Safety	●	●	●	●	●	X	+	+	-	-	+	-
Succession planning	●	●	●	●	●	X	-	-	-	-	-	-
Talent attraction & retention	●	●	●	●	●	X	+	+	-	-	-	-
Anti-corruption	●	●	●	●	●	X	-	-	-	-	-	-
Business continuity management	●	●	●	●	●	X	+	+	-	-	-	-
Code of business conduct	●	●	●	●	●	X	-	-	-	-	-	-
Contractor management	●	●	●	●	●	X	-	-	-	-	-	-
Corporate governance	●	●	●	●	●	X	-	-	-	-	-	-
Customer management	●	●	●	●	●	X	-	-	-	-	-	-
Cyber security	●	●	●	●	●	X	-	-	-	-	-	-
Innovation	●	●	●	●	●	X	+	+	-	-	-	-
Market opportunity	●	●	●	●	●	X	-	-	-	-	+	+
Policy influence	●	●	●	●	●	X	-	-	-	-	-	-
Privacy protection	●	●	●	●	●	X	-	-	-	-	-	-
Process improvement & digital transformation	●	●	●	●	●	X	+	+	-	-	-	-
Product stewardship	-	-	●	●	●	X	-	-	-	-	+	+
Risk management	●	●	●	●	●	X	-	-	-	-	-	-
Supplier management	●	●	●	●	●	X	-	-	-	-	-	-

● Management approach and performance data cover all parts of such business.
O Management approach covers all parts of such business, but performance data covers some parts.
X Management approach covers all parts of such business, but does not cover performance data.

\+ Management approach and performance data do not cover such business due to the Company has no direct operational control. However, there are some sustainability performances interested by stakeholders, the partial of sustainability performance are reported separately.
\- No relevant to the BPP business or no direct operational control.

Remark[(a)] The sustainability performance of Temple I Gas-fired Power Plant in the U.S., where BPP has direct management control, however, is not included in this Report since the company has successfully invested in November 2021. It is, therefore, in the process of consolidating the information to be the BPP standard.

Performance Data 2021: Banpu Power

Economic Performance

Data	Unit	2018	2019	2020	2021
Revenue	THB Million	6,322	5,687	5,506	6,784
EBITDA[a]	THB Million	5,913	4,802	5,230	3,301
Net profit	THB Million	3,852	2,969[b]	3,702	3,127
Gross profit margin	%	20%	19%	20%	(1%)
Interest coverage ratio	-	NA	NA	3	2
Net debt to equity ratio	-	0.13	0.01	0.07	0.28

[a]Earning before interest, taxes, depreciation and amortization
[b]Updated from the previous report

Tax Payment

Data	Unit	2018	2019	2020	2021
China					
• Profit before tax	CNY Thousand	126,269	161,788	338,724	(50,672)
• Tax expense[a]	CNY Thousand	(31,375)	(45,821)	(73,675)	(18,772)
• Corporate income tax paid	CNY Thousand	(50,146)	(41,322)	(59,790)	(42,144)
• Income tax paid	%	25%	25%	12.5 - 25%[c]	0 - 25%
Banpu Power[b]					
• Profit before tax	THB Thousand	4,144,797	3,206,924	4,083,515	3,231,538
• Tax expense[a]	THB Thousand	(292,729)	(204,083)	(300,491)	(57,203)
• Corporate income tax paid	THB Thousand	(249,920)	(192,913)	(274,644)	(88,751)
• Income tax paid	%	10 - 25%	20 - 25%	20 - 25%	0 - 25%

[a]Consisting of Corporate Income Tax, Withholding Tax and Deferred Tax
[b]Consolidated
[c]Updated from the previous report

Economic Distributions

Data	Unit	2018	2019	2020	2021
Ratio of the dividend payout to net profit	-	0.48	0.64	0.46	0.63
Economic value generated					
• Sales	USD Thousand	192,903	178,015	195,577	219,202
• Other revenues	USD Thousand	159,111	135,921	134,815	138,916
Economic value distributed					
• Shareholder[a]	USD Thousand	56,986	63,444	57,322	61,652
• Supplier and contractor[b]	USD Thousand	53,052	56,450	52,931	56,989
• Employee[c]	USD Thousand	23,309	21,333	21,591	30,517
• Financial institution[d]	USD Thousand	6,115	6,855	(3,757)	(4,127)
• Government[e]	USD Thousand	9,375	9,032	15,086	9,208
• Community[f]	USD Thousand	730	680	685	505
• Environment[g]	USD Thousand	2,245	1,828	2,042	1,906
Economic value retained	USD Thousand	200,202	154,314	184,491	201,468

[a]Dividends.
[b]Includes contractor cost, fuel cost, and other operating costs
[c]Includes remuneration and benefits, provident fund contributions and employee development expenses
[d]Includes interest expense, financial expenses
[e]Includes royalty fee, corporate income tax, local maintenance tax, property tax, specific business tax, and other additional taxes and payment to government
[f]Includes community development expenses, corporate social responsibility activities and land compensation
[g]Includes environmental treatment expenses and other environmental related activities

Corporate Citizenship and Philanthropy

Data	Unit	2018	2019	2020	2021
Philanthropic contributions – by category					
• Charitable donation	% of total costs	-	-	17%[a]	46%
• Community investment	% of total costs	-	-	11%[a]	41%
• Commercial initiatives	% of total costs	-	-	73%[a]	13%
Philanthropic contributions – by type					
• Cash contributions	CNY Thousand	-	-	1,084	1,460
• Time spent by volunteer employees during working hours	CNY Thousand	-	-	7,412[a]	153
• In-kind giving	CNY Thousand	-	-	65	116
• Management overhead	CNY Thousand	-	-	21,611	13,073

[a]Updated from the previous report

Policy Influence

Data	Unit	2018	2019	2020	2021
Contributions and other spending					
• Lobbying, interest representation	THB	-	0	0	0
• Political party or political interest	THB	-	0	0	0
• Trade association or tax-exempt groups	THB	-	305,378	251,450	347,750
• Other contributions	THB	-	0	0	0

Corporate Governance

Data	Unit	2018	2019	2020	2021
Coverage of significant ESG aspects set as corporate ESG targets	%	-	100%	100%	100%
Coverage of corporate ESG targets deployed to senior executives	%	-	100%	100%	100%
Board type					
• Executive directors	person	3	3	3	3
• Independent directors	person	3	3	3	4
• Other non-executive directors	person	3	3	3	3
Number of meeting					
• Board of directors	time/year	12	12	14	12
• Corporate governance and nomination committee	time/year	3	4	3	5
• Audit committee	time/year	8	11	10	9
• Compensation committee	time/year	4	4	4	4
Board meeting attendance					
• Board of directors	%	95.37%	97.22%	98.41%	98.33%
• Corporate governance and nomination committee	%	100%	100%	100%	100%
• Audit committee	%	100%	100%	100%	91.67%
• Compensation committee	%	91.67%	93.94%	96.67%	100%
Performance evaluation[a]					
• Board of directors	-	4.74	4.86	4.37	4.75
• Sub-committees	-	4.79	4.92	4.70	4.85
• Individual directors	-	4.79	4.91	4.68	4.69

[a]Average score in the range of 0 to 5

Business Ethics

Data	Unit	2018	2019	2020	2021
Number of significant corporate governance complaints	case	0	0	0	0
• Corruption & bribery	case	0	0	0	0
• Fraud, embezzlement, theft	case	0	0	0	0
• Dishonesty for own and other benefit	case	0	0	0	0
• Dangers to health and safety or environment	case	0	0	0	0
• Intentional act causing harm or loss to the Company	case	0	0	0	0
• Significant breaches of the Code of Conduct[a]	case	0	0	0	0
• Assistance in wrongdoing[b]	case	0	0	0	0
• Other[c]	case	0	0	0	0
Proportion of significant corporate governance complaints resolved through a dispute mechanism	%	NA[d]	NA[d]	NA[d]	NA[d]

[a]Includes antitrust/anti-competitive practices
[b]Against the law, rules and regulations, corporate governance policy and code of conduct including concealing or assisting in concealing once they have occurred
[c]Includes discrimination and unfair treatment
[d]No significant complaints

Risk Management

Data	Unit	2018	2019	2020	2021
Proportion of business units with key risk indicators	%	100%	100%	100%	100%
Coverage of ESG issues in the enterprise risk management[a]	%	-	-	92%	94%
Proportion of business units with ESG risk management plan[b]	%	-	-	NA[c]	NA[c]

[a]Based on COSO
[b]For business unit(s) with high priority ESG risks
[c]No business unit identified as high ESG risks

Business Continuity Management

Data	Unit	2018	2019	2020	2021
Coverage of CMT/IMT exercise[a]	%	50%	50%	100%	100%

[a]The real activation of CMT/IMT considered as a BCP exercise at Bangkok and Beijing offices

Digital Transformation

Data	Unit	2018	2019	2020	2021
Total digital use cases & initiatives	number	-	-	-	5
• G1-Idea identified	number	-	-	-	1
• G2-Idea opportunity sized	number	-	-	-	2
• G3-Proof of concept completed	number	-	-	-	0
• G4-MVP completed	number	-	-	-	2
• G5-MMP completed	number	-	-	-	0
Impact value	USD	-	-	-	(40,204)
Number of Digital Capacity Center (DCC)	number	-	-	-	2
Number of Tech Ecosystem Partners	number	-	-	-	15[a]
Percentage of employees trained	%	-	-	-	88%[b]

[a]Data reported for Banpu Group due to management service agreement
[b]In-house basic digital training

Customer & Product Stewardship

Data	Unit	2018	2019	2020	2021
Number of complaints	case	0	0	0	0
• Customer privacy	case	0	0	0	0
• Safety and environmental issues from the use of products	case	0	0	0	0
Proportion of customer complaints resolved in a timely manner	%	NA[a]	NA[a]	NA[a]	NA[a]
Customer satisfaction[b]					
• Satisfied respondents	%	-	-	-	100%
• Coverage of customer surveyed	%	-	-	-	89%

[a]No significant complaints
[b]Cover all industrial steam customers of 3 CHPs

Data Privacy & Cyber Security[a]

Data	Unit	2018	2019	2020	2021
Number of cybersecurity breaches	case	-	-	1	0
Number of IT infrastructure incidents	case	-	-	1	1
% of IT and IoT assets securely managed by security operation center (SOC)	%	-	-	-	30%
Cybersecurity & privacy maturity score[b]	%	-	-	-	2.0

[a]Data reported for Banpu Group due to management service agreement
[b]In the range of 1 to 5

Availability & Reliability

Data	Unit	2018	2019	2020	2021
Installed capacity					
• Current capacity	MW	323	348	348	348
• Capacity under construction	MW	25	0	0	0
System efficiency					
• Efficiency rate for electricity generation	g/KWh	270.02	279.00	246.63	202.51
• Efficiency rate for steam production	kg/GJ	37.58	37.94	37.75	37.96
• Availability factor	%	89.02%	94.07%	97.72%	95.05%
• Overall efficiency	%	66.69%	65.07%	74.70%	77.47%
Total outage					
• Total outage frequency	case/year	26	26	15	24
• Total outage hour	hours	15,780	6,480	2,621	5,002
• Average total outage duration	hours/case	1,870	249	175	208
Planned outage					
• Planned outage frequency	case/year	22	25	15	20
• Planned outage hours	hours	13,851	6,023	2,621	4,575
• Average planned outage duration	hours/case	1,867	241	175	229
Unplanned outage					
• Unplanned outage frequency	case/year	4	1	0	4
• Unplanned outage hours	hours	1,928	457	0	427
• Average unplanned outage duration	hours/case	1,914	457	0	107
• Unplanned forced outage factor	%	22%	5.2%	0%	0.05%

Supplier Management

Data	Unit	2018	2019	2020	2021
Number of suppliers					
• All suppliers	number	-	509	910	910[c]
• Critical suppliers[a]	number	-	147	171	171[c]
Proportion of suppliers assessed for ESG risks					
• All critical tier-1 suppliers	%	-	-	11%	11%[c]
• New critical tier-1 suppliers	%	-	23%	-	-[c]
Proportion of critical tier-1 suppliers classified as high-risk	%	-	0%	0%	0%[c]
Proportion of spending on local suppliers[b]	%	-	87%	30%	30%[c]
Proportion of contracts that include ESG clauses	%	-	28%	42%	42%[c]

[a]Defined as high-volume suppliers, critical component suppliers, or non-substitutable suppliers

[b]Supplier that operates in the same region

[c]Consolidated data from 2020. Data collection system is under standardization

Socioeconomic Compliance

Data	Unit	2018	2019	2020	2021
Significant socioeconomic non-compliance					
• Number of non-monetary sanctions	case	0	0	0	0
• Number of cases brought through dispute mechanisms	case	0	0	0	0
Significant fines from socioeconomic non-compliance					
• Number of significant fines	case	0	0	0	0
• Total amount of significant fines	USD	0	0	0	0

Product

Data	Unit	2018	2019	2020	2021
Total energy sold	MWh	6,238,273	5,648,619	6,474,833	6,033,955
Energy sold					
• Electricity (renewable fuel) sold	MWh	1,715,684[a]	112	107	98
• Electricity (non-renewable fuel) sold	MWh		1,495,640	1,563,091	1,178,967
• Steam sold	MWh	3,975,903	3,328,603	3,564,832	3,529,044
• Heat sold	MWh	546,686	824,264	1,346,803	1,325,845

[a]Not separated between renewable fuel and non-renewable fuel

Greenhouse Gas Emissions

Data	Unit	2018	2019	2020	2021
GHG emissions					
• Total (Scope 1 & 2)	tonnes CO_2e	3,824,124	3,822,073	4,016,666	3,641,189
• Direct (Scope 1)	tonnes CO_2e	3,821,632	3,814,884	4,010,147	3,633,788
• Indirect (Scope 2)	tonnes CO_2e	2,392	7,189	6,519	7,402
• Other indirect (Scope 3)[a]	tonnes CO_2e	-	-	-	-
GHG emissions intensity					
• Total (Scope 1 & 2)	tonnes CO_2e/MWh	0.635	0.675	0.620	0.603
• Electricity generation	tonnes CO_2e/MWh	0.991	0.575	0.655	0.732
• Steam & heat generation	tonnes CO_2e/MWh	0.470	0.673	0.609	0.572
SF_6 emissions	tonnes CO_2e	110	1,086	515	241

[a]Data collection system under standardization

Energy

Data	Unit	2018	2019	2020	2021
Total energy consumption	TJ	10,721	11,113	9,937	7,208
Renewable energy consumption					
• Renewable fuel	TJ	0	0	0	0
• Electricity purchased[a]	TJ	0	0	0	0
• Electricity self-generated	TJ	815	1,040	0.39	0.35
Non-renewable energy consumption					
• Non-renewable fuel	TJ	32,354	31,410	33,220	28,900
o Coal	TJ	-	-	-	26,832
o Diesel	TJ	-	-	-	36
o Gasoline	TJ	-	-	-	1
o Waste gas	TJ	-	-	-	2,030
• Electricity purchased	TJ	10	30	27	31
• Steam, heating & cooling	TJ	0	0	0	0
Renewable energy sold					
• Electricity	TJ	809	1,033	0.39	0.35
Non-renewable energy sold					
• Electricity	TJ	5,368	5,384	5,627	4,244
• Steam	TJ	14,313	11,983	12,833	12,705
• Heating	TJ	1,968	2,967	4,848	4,773
Energy consumption intensity[b]	GJ/MWh	1.72	1.87	1.54	1.19

[a]Negligible purchased electricity for solar power plant during nighttime

[b]Includes coal, diesel, gasoline, waste gas, electricity, steam, heating and cooling within organization only

Air Emissions

Data	Unit	2018	2019	2020	2021
Air emissions load[a]					
• NO_x[b]	tonnes	323	246	272	268
• SO_2[b]	tonnes	149	153	164	154
• Particular matters[b]	tonnes	24	18	17	19
• Mercury	tonnes	-	0.0034	0.0085	0.0091
Air emissions intensity					
• NO_x	tonnes/GWh	0.0536	0.0414	0.0420	0.0445
• SO_2	tonnes/GWh	0.0248	0.0258	0.0254	0.0254
• Particular matters	tonnes/GWh	0.0039	0.0030	0.0027	0.0031
• Mercury	tonnes/GWh	-	0.6e-6	1.3e-6	1.5e-6
Ozone-depleting substances (ODS)					
• ODS consumption	Kg CFC-11e	0	1	1	1
• ODS imported	Kg CFC-11e	-	0	0	0
• ODS exported	Kg CFC-11e	-	0	0	0

[a]Direct measurement from Continuous Emissions Monitoring (CEM)
[b]Data only emissions from point source

Water

Data	Unit	2018	2019	2020	2021
Water withdrawal					
• From all areas	Mega Liter	7,838	6,761	7,611	6,897
• From water stress areas	Mega Liter	7,838	6,761	7,611	6,897
Water withdrawal - from all areas[a]					
• Surface water	Mega Liter	5,076	0	0	10
• Groundwater	Mega Liter	2,761	2,497	2,231	2,710
• Seawater	Mega Liter	0	0	0	0
• Produced water	Mega Liter	0	0	0	0
• Third-party water	Mega Liter	1	4,265	5,380	4,178
Water withdrawal - from water stress areas[a]					
• Surface water	Mega Liter	5,076	0	0	10
• Groundwater	Mega Liter	2,761	2,497	2,231	2,710
• Seawater	Mega Liter	0	0	0	0
• Produced water	Mega Liter	0	0	0	0
• Third-party water	Mega Liter	1	4,265	5,380	4,178
Third-party water withdrawal - from water stress areas[a]					
• Surface water	Mega Liter	1	2,897	4,117	3,181
• Groundwater	Mega Liter	0	0	0	0
• Seawater	Mega Liter	0	0	0	0
• Produced water	Mega Liter	0	0	0	0
• Reclaimed water[b]	Mega Liter	-	368	1,263	997
Water discharge[c]					
• To all areas	Mega Liter	960	1,855	1,779	1,604
• To water stress areas	Mega Liter	960	1,855	1,779	1,604
Water discharge (to all areas)[c]					
• Surface water	Mega Liter	0	0	0	464
• Groundwater	Mega Liter	0	0	0	0
• Seawater	Mega Liter	0	0	0	0
• Third-party water	Mega Liter	960	1,855	1,779	1,139
Pollutant load to surface water[c]					
• Chemical oxygen demand (COD)	tonnes	-	-	-	11.18[f]
• Total dissolved solids (TDS)	tonnes	-	-	-	0[f]
• Total suspended solid (TSS)	tonnes	-	-	-	12.65[f]
• Oil & Grease	tonnes	-	-	-	0.31[f]
• Fe	tonnes	-	-	-	0[f]
Pollutant load to third-party water[d]					
• Chemical oxygen demand (COD)	tonnes	-	-	-	54.34
• Total dissolved solids (TDS)	tonnes	-	-	-	1,556
• Total suspended solid (TSS)	tonnes	-	-	-	33.36
• Oil & Grease	tonnes	-	-	-	0.39
• Fe	tonnes	-	-	-	0
Water consumption					
• All areas	Mega Liter	6,878	4,906	5,832	5,293
• Water stress areas	Mega Liter	6,878	4,906	5,832	5,293
Water consumption intensity	m^3/MWh	1.103	0.827	0.901	0.877
Change in water storage	Mega Liter	-[e]	-[e]	-[e]	-[e]

[a]All withdrawal from freshwater (≤1,000 mg/L Total Dissolved Solids)
[b]From wastewater treatment plant
[c]Discharge to freshwater (≤1,000 mg/L Total Dissolved Solids)
[d]Discharge to other water (>1,000 mg/L Total Dissolved Solids)
[e]Data collection system under standardization
[f]Data collection from June to December 2021

Waste

Data	Unit	2018	2019	2020	2021
Waste generated	tonnes	712,186	750,234	763,357	777,757
• Hazardous waste	tonnes	113	22	103	176
• Non-hazardous waste[a]	tonnes	712,073	750,212	763,254	777,581
Waste diverted from disposal[b]	tonnes	710,303	749,309	762,684	776,807
• Hazardous waste	tonnes	10	13	84	175
o Preparation for reuse	tonnes	0	0	0	4
o Recycling	tonnes	10	13	84	59
o Other recovery operations	tonnes	0	0	0	113
• Non-hazardous waste[a]	tonnes	710,293	749,296	762,600	776,631
o Preparation for reuse	tonnes	0	0	334,815	418,328
o Recycling	tonnes	710,293	749,296	427,785	358,103
o Other recovery operations	tonnes	0	0	0	201
Waste directed to disposal[b]	tonnes	1,884	925	675	794
• Hazardous waste	tonnes	104	9	20	1
o Incineration (with energy recovery)	tonnes	101	3	16	1
o Incineration (without energy recovery)	tonnes	3	6	4	0
o Landfilling	tonnes	0	0	0	0
o Other disposals		0	0	0	0
• Non-hazardous waste[a]	tonnes	1,780	916	655	793
o Incineration (with energy recovery)	tonnes	236	0	0	72
o Incineration (without energy recovery)	tonnes	0	0	0	0
o Landfilling	tonnes	1,517	844	583	721
o Other disposals	tonnes	27	72	72	0
Waste direct disposal intensity					
• Hazardous waste	kg/MWh	0.0167	0.0016	0.0031	0.0002
• Non-hazardous waste[a]	kg/MWh	0.285	0.162	0.101	0.131
Ash generated	tonnes	-[c]	-[c]	-[c]	688,623
Ash diverted from disposal[b]	tonnes	619,138	664,199	677,396	688,466
• Preparation for reuse	tonnes	0	0	296,118	369,587
• Recycling	tonnes	619,138	664,199	381,278	318,879
• Other recovery operations	tonnes	0	0	0	0
Ash directed to disposal[b]	tonnes	0	0	0	0
• Incineration (with energy recovery)	tonnes	0	0	0	0
• Incineration (without energy recovery)	tonnes	0	0	0	0
• Landfilling	tonnes	0	0	0	0
• Other disposals	tonnes	0	0	0	0
Gypsum generated	tonnes	-[c]	-[c]	-[c]	87,964
Gypsum diverted from disposal[b]	tonnes	90,346	85,097	85,187	87,964
• Preparation for reuse	tonnes	0	0	38,697	48,741
• Recycling	tonnes	90,346	85,097	46,490	39,223
• Other recovery operations	tonnes	0	0	0	0
Gypsum directed to disposal[b]	tonnes	0	0	0	0
• Incineration (with energy recovery)	tonnes	0	0	0	0
• Incineration (without energy recovery)	tonnes	0	0	0	0
• Landfilling	tonnes	0	0	0	0
• Other disposals	tonnes	0	0	0	0
Proportion of hazardous waste reused & recycled	%	8.8%	59.1%	81.6%	35.6%
Proportion of non-hazardous waste reused & recycled[a]	%	99.8%	99.9%	99.9%	99.9%
Proportion of ash reused & recycled	%	100%	100%	100%	100%
Proportion of gypsum reused & recycled	%	100%	100%	100%	100%

[a]Includes ash & gypsum from power plants
[b]BPP has managed waste disposal only offsite, and there is no onsite management
[c]Collection system has been standardized since 2021 based on GRI 306 (2020)

Biodiversity

Data	Unit	2018	2019	2020	2021
Number of operation	number	-	3	3	4
Business unit(s) in relation to protected area					
• In the area	number	-	0	0	0
• Adjacent to	number	-	0	0	0
• Containing portions	number	-	0	0	0
Business unit(s) in relation to high biodiversity wilderness area outside protected					
• In the area	number	-	0	0	0
• Adjacent to	number	-	0	0	0
• Containing portions	number	-	0	0	0
Number of business units					
• Assessed for potential biodiversity impact	number	-	3	3	4
• Identified as high potential of biodiversity impact	number	-	0	0	0
• Assessed for biodiversity value	number	-	0	0	0
• Required biodiversity management plan[a]	number	-	0	0	0
• Implemented biodiversity management plan[a]	number	-	0	0	0
Proportion of business units					
• Assessed for biodiversity impact	%	-	100%	100%	100%
• Assessed for biodiversity value	%	-	NA[b]	NA[b]	NA[b]
• With biodiversity management plan[a]	%	-	NA[b]	NA[b]	NA[b]

[a]For business unit(s) identified as high potential of biodiversity impact only
[b]No business unit(s) identified as high potential of biodiversity impact

Environmental Compliance

Data	Unit	2018	2019	2020	2021
Number of significant environmental incident[a]					
• Effluent discharge limits	case	0	0	0	0
• Air emissions standards	case	0	0	0	0
• Other	case	0	0	0	0
Fines from environmental non-compliance[b]					
• Number of significant fines	case	0	0	0	0
• Total amount of significant fines	USD	0	0	0	0
Non-monetary Sanctions	case	0	0	0	0
Cases brought through dispute mechanisms	case	0	0	0	0
Spills[a]					
• Number of significant spills	case	0	0	0	0
• Total amount of significant spills	liter	0	0	0	0

[a]Referred to internal definition with criteria such as any damage to widespread area or potential fines that is greater than USD 10,000
[b]Fines or potential fines that is greater than USD 10,000

Occupational Health and Safety

Data	Unit	2018	2019	2020	2021
Workers covered by OHS management system					
• Number of workers	person	-	-	1,415	1,456
• Percentage of total workers	%	-	-	100%	100%
Workers covered by OHS management system that has been internally audited					
• Number of workers	person	-	-	1,310	1,353
• Percentage of total workers	%	-	-	92.6%	92.9%
Worker covered by OHS management system that has been audited or certified by third party					
• Number of workers	person	-	-	1,310	1,353
• Percentage of total workers	%	-	-	92.6%	92.9%
Number of occupational fatalities					
• Employee	person	0	0	0	0
• Contractor	person	0	0	0	0
Fatality rate					
• Employee	person/million man-hour	0	0	0	0
• Contractor	person/million man-hour	0	0	0	0
Number of recordable injury					
• Employee	case	0	0	0	0
• Contractor	case	-	-	0	0
Total recordable injury frequency rate (TRIFR)					
• Employee	person/million man-hour	0	0	0	0
• Contractor	person/million man-hour	-	-	0	0
Lost time injury frequency rate (LTIFR)					
• Employee	person/million man-hour	0	0	0	0
• Contractor	person/million man-hour	-	-	0	0
Injury severity rate (ISR)[a]					
• Employee	day/million man-hour	0	0	0	0
• Contractor	day/million man-hour	-	-	0	0
Number of high-consequence work-related injuries					
• Employee	case	0	0	0	0
• Contractor	case	0	0	0	0
High-consequence work-related injuries frequency rate					
• Employee	person/million man-hour	0	0	0	0
• Contractor	person/million man-hour	0	0	0	0
Number of hours worked					
• Employee	hour	-	-	1,899,082	1,921,094
• Contractor	hour	-	-	598,794	503,206
Tier-1 process safety event[b]	case	0	0	0	0
Tier-1 process safety event rate	case/million man-hour	0	0	0	0
Number of fatalities as a result of work-related ill health					
• Employee	person	-	-	0	0
• Contractor	person	-	-	0	0
Number of total recordable work-related ill health					
• Employee	case	-	-	0	0
• Contractor	case	-	-	0	0
Average OHS Training per employee					
• China	hour/person	-	-	25.42	45.35

[a]Refers to American National Standards Institute (ANSI) standard
[b]Refers to internal definition with criteria such as fatality and catastrophic damage to ecosystem

Employee

Data	Unit	2018	2019	2020	2021
Total employee	person	968	966	786	745
Employee – by gender					
• Male	%	76.96%	77.43%	82.80%	84.97%
• Female	%	23.04%	22.57%	17.20%	15.03%
Employee – by country					
• Thailand	%	4.44%	4.35%	4.30%	3.36%
• China	%	94.63%	93.58%	95.70%	96.64%
• Japan	%	0.83%	1.76%	0%	0%
• Vietnam	%	0.10%	0.31%	0%	0%
• Other	%	0%	0%	0%	0%
Employee – by nationality					
• Thai	%	4.55%	5.38%	4.80%	3.49%
• Chinese	%	94.42%	92.55%	95%	96.38%
• Japanese	%	0.62%	1.04%	0%	0%
• Vietnamese	%	0.10%	0.31%	0%	0%
• American	%	0.31%	0.21%	0%	0%
• Other	%	-	0.52%	0.10%	0.13%
Employee – by age					
• Under 30	%	23.76%	20.70%	18.20%	16.38%
• 30 - 39	%	39.05%	37.68%	43.80%	41.74%
• 40 - 49	%	30.58%	32.40%	31.60%	32.48%
• 50 and over	%	6.61%	9.21%	6.50%	9.40%
Employee – by type					
• Permanent	%	96.90%	74.02%	96.40%	99.60%
• Temporary/contract	%	3.10%	25.98%	3.60%	0.40%
Employee – by level					
• Senior management	%	1.45%	0.31%	0.60%	0.67%
• Middle management	%	4.96%	7.04%	5%	4.56%
• Junior management	%	22.00%	6.94%	5%	6.17%
• Supervisor & staff	%	71.59%	85.71%	89.40%	88.59%
Management – by gender[(a)]					
• Male	%	73.82%	71.74%	81.80%	94.87%
• Female	%	26.18%	28.26%	18.20%	5.13%

[(a)]Included middle and senior management

New Employee

Data	Unit	2018	2019	2020	2021
Total new employee	person	65	56	40	36
New employee – by gender					
• Male	person	56	41	37	31
• Female	person	9	15	3	5
New employee – by country					
• Thailand	person	3	5	0	0
• China	person	57	50	40	36
• Japan	person	4	1	0	0
• Vietnam	person	1	0	0	0
• Other	person	0	0	0	0

Corporate Culture

Data	Unit	2018	2019	2020	2021
Level of alignment between employee behavior and the corporate culture – by country					
• Thailand	%	74%	65%	69%	69%
• China	%	-	95%	94%	93%
• Japan	%	-	79%	56%	31%

Employee Engagement

Data	Unit	2018	2019	2020	2021
Employee engagement level – by country					
• Thailand	%	68%	68%	48%	79%
• China	%	94%	94%	92%	95%
• Japan	%	-	50%	38%	57%
Total turnover rate	%	6.25%	5.69%	4.30%	5.20%
Voluntary turnover rate	%	3.13%	4.87%	4.30%	5.20%
Turnover rate – by country					
• Thailand	%	6.25%	2.38%	2.90%	0%
• China	%	0%	5.97%	4.40%	5.20%
• Japan	%	0%	0%	0%	0%
• Other	%	0%	0%	0%	0%
Employee taking parental leave – by country					
• Thailand	person	0	0	0	0
• China	person	0	7	1	1
• Japan	person	0	0	0	0
• Other	person	0	0	0	0
Employee returning to work after parental leave – by country					
• Thailand	%	NA[(a)]	NA[(a)]	NA[(a)]	NA[(a)]
• China	%	NA[(a)]	100%	100%	100%
• Japan	%	NA[(a)]	NA[(a)]	NA[(a)]	NA[(a)]
• Other	%	NA[(a)]	NA[(a)]	NA[(a)]	NA[(a)]

[(a)]No parental leave

Human Capital Development

Data	Unit	2018	2019	2020	2021
Average training cost per employee – by country					
• Thailand	USD/person	1,540	2,320	1,110	985
• China	USD/person	244	275	271	251
• Japan	USD/person	1,020	1,730	370	-
• Other	USD/person	2,000	7,140	125	-
Average training cost per employee – by level					
• Senior management	USD/person	370	5,100	3,127	2,352
• Middle management	USD/person	883	1,230	1,058	1,280
• Junior management	USD/person	834	775	793	1,590
• Supervisor & staff	USD/person	167	195	193	161
Average training hour per employee – by country					
• Thailand	hour/person	27.5	35.2	30	31
• China	hour/person	20.5	29	35	37
• Japan	hour/person	18	27	20	-
• Other	hour/person	40	27	9	-
Average training hour per employee – by level					
• Senior management	hour/person	21	37	27	17.3
• Middle management	hour/person	44	62	30	31.5
• Junior management	hour/person	38	53	35	40.1
• Supervisor & staff	hour/person	25	25	30	31.1

Succession Plan & Leadership Development

Data	Unit	2018	2019	2020	2021
Proportion of critical positions having a succession plan	%	100%	100%	100%	100%
Critical positions having a succession plan – by level					
• Senior management	%	100%	100%	100%	100%
• Middle management	%	100%	100%	100%	100%
Proportion of employees having individual development plan – by country					
• Thailand	%	-	-	100%	85%
• China	%	-	-	55%	60%
Succession of leadership development program	%	72%	80%	100%	100%
Succession of leadership development program (by course)					
• Strategic Leader	%	100%	100%	100%	100%
• Business Leader	%	77%	82%	82%	82%
• First Line Leader	%	52%	66%	75%	78%
• Future Leader	%	39%	56%	60%	70%
• Engaging Leader	%	90%	94%	94%	94%

Remuneration

Data	Unit	2018	2019	2020	2021
Male to female remuneration ratio	-	-	-	-	1.06
Male to female remuneration ratio – by level					
• Senior management	-	-	-	-	0.88
• Middle management	-	-	-	-	1.07
• Junior management	-	-	-	-	1.08
• Staff and supervisor	-	-	-	-	1.17

Collection Bargaining Agreement

Data	Unit	2018	2019	2020	2021
Employee covered by collective bargaining agreement					
• Thailand	%	0%	0%	0%	0%
• China	%	0%	0%	0%	0%
• Japan	%	0%	0%	0%	0%
• Other	%	0%	0%	0%	0%

Community Engagement

Data	Unit	2018	2019	2020	2021
Significant community resettlement complaints	case	0	0	0	0
Proportion of significant complaints from communities resolved through a dispute mechanism	%	NA[a]	NA[a]	NA[a]	NA[a]

[a]No significant complaint

Community Resettlement

Data	Unit	2018	2019	2020	2021
Significant community resettlement complaints	case	0	0	0	0
Proportion of significant resettlement complaints resolved through a dispute mechanism	%	NA[a]	NA[a]	NA[a]	NA[a]

[a]No significant complaint

Human Rights

Data	Unit	2018	2019	2020	2021
Coverage of business units assessed for human right risks	%	100%	100%	100%	100%
Proportion of business units with risk management plan[a]	%	NA[b]	NA[b]	NA[b]	NA[b]
Number of significant human rights issues	%	0	0	0	0
Proportion of significant human rights issues resolved through a dispute mechanism	%	NA[c]	NA[c]	NA[c]	NA[c]

[a]For business unit(s) identified as high human rights risks
[b]No business units identified as high human rights risks
[c]No significant issues

Performance Data 2021: Banpu NEXT

Product

Data	Unit	2020	2021
Electricity sold	MWh	338,763	531,193

Greenhouse Gas Emissions

Data	Unit	2020	2021
GHG emissions			
• Total (Scope 1 & 2)	tonnes CO_2e	3,273	4,462
• Direct (Scope 1)	tonnes CO_2e	72	441
• Indirect (Scope 2)	tonnes CO_2e	3,201	4,021
• Other indirect (Scope 3)[a]	tonnes CO_2e	-	-
GHG emissions intensity			
• Total (Scope 1 & 2)	tonnes CO_2e/MWh	0.010	0.008
• Electricity generation	tonnes CO_2e/MWh	0.010	0.008
SF_6 emissions	tonnes CO_2e	0	0

[a]Data collection system under standardization

Energy

Data	Unit	2020	2021
Total energy consumption	TJ	24	37
Renewable energy consumption			
• Renewable fuel	TJ	0	0
• Electricity purchased [a]	TJ	0	0
• Electricity self-generated	TJ	1,229	1,931
o Solar	TJ	-	1,775
o Wind	TJ	-	155
Non-renewable energy consumption			
• Non-renewable fuel	TJ	1	1
o Diesel	TJ	-	0.11
o Gasoline	TJ	-	0.57
• Electricity purchased	TJ	14	17
• Steam, heating & cooling	TJ	0	0
Renewable energy sold			
• Electricity	TJ	1,220	1,912
Non-renewable energy sold			
• Electricity	TJ	0	0
• Steam	TJ	0	0
• Heating	TJ	0	0
Energy consumption intensity[b]	GJ/MWh	0.07	0.07

[a]Negligible purchased electricity for solar power plant during nighttime
[b]Includes diesel, gasoline, electricity self-generated and electricity purchased both within and outside organization

Water

Data	Unit	2020	2021
Water withdrawal			
• From all areas	Mega Liter	4	25
• From water stress areas	Mega Liter	4	2
Water withdrawal - from all areas[a]			
• Surface water	Mega Liter	0	23
• Groundwater	Mega Liter	3	1
• Seawater	Mega Liter	0	0
• Produced water	Mega Liter	0	0
• Third-party water	Mega Liter	1	1

Water

Data	Unit	2020	2021
Water withdrawal - from all areas[a]			
• Surface water	Mega Liter	0	0
• Groundwater	Mega Liter	3	1
• Seawater	Mega Liter	0	0
• Produced water	Mega Liter	0	0
• Third-party water	Mega Liter	1	1
Third-party water withdrawal - from water stress areas[a]			
• Surface water	Mega Liter	1	1
• Groundwater	Mega Liter	0	0
• Seawater	Mega Liter	0	0
• Produced water	Mega Liter	0	0
• Reclaimed water[b]	Mega Liter	0	-
Water discharge[c]			
• To all areas	Mega Liter	0	2
• To water stress areas	Mega Liter	0	2
Water discharge (to all areas)[c]			
• Surface water	Mega Liter	0	0
• Groundwater	Mega Liter	0	0
• Seawater	Mega Liter	0	0
• Third-party water	Mega Liter	0	2
Pollutant load[c] [d]			
• Chemical oxygen demand (COD)	tonnes	-	0
• Total dissolved solids (TDS)	tonnes	-	0
• Total suspended solid (TSS)	tonnes	-	0
• Oil & Grease	tonnes	-	0
• Fe	tonnes	-	0
Water consumption			
• All areas	Mega Liter	4	23
• Water stress areas	Mega Liter	4	1
Water consumption intensity	m^3/MWh	0.013	0.044
Change in water storage	Mega Liter	-[e]	-[e]

[a]All withdrawal from freshwater (≤1,000 mg/L Total Dissolved Solids)
[b]From wastewater treatment plant
[c]Discharge to freshwater (≤1,000 mg/L Total Dissolved Solids)
[d]Discharge to other water (>1,000 mg/L Total Dissolved Solids)
[e]Data collection system under standardization

Waste

Data	Unit	2020	2021
Waste generated	tonnes	8	22
• Hazardous waste	tonnes	0	0
• Non-hazardous waste	tonnes	8	21
Waste diverted from disposal[a]	tonnes	0	10
• Hazardous waste	tonnes	0	0
o Preparation for reuse	tonnes	0	0
o Recycling	tonnes	0	0
o Other recovery operations	tonnes	0	0
• Non-hazardous waste	tonnes	0	10
o Preparation for reuse	tonnes	0	0
o Recycling	tonnes	0	10
o Other recovery operations	tonnes	0	0
Waste directed to disposal[a]	tonnes	8	12
• Hazardous waste	tonnes	0	0
o Incineration (with energy recovery)	tonnes	0	0
o Incineration (without energy recovery)	tonnes	0	0
o Landfilling	tonnes	0	0
o Other disposals	tonnes	0	0
• Non-hazardous waste	tonnes	8	12
o Incineration (with energy recovery)	tonnes	0	0
o Incineration (without energy recovery)	tonnes	0	0
o Landfilling	tonnes	0	12
o Other disposal	tonnes	8	0
Waste direct disposal intensity			
• Hazardous waste	kg/MWh	-	0
• Non-hazardous waste	kg/MWh	-	0.022
Proportion of hazardous waste reused & recycled	%	-	33.18%
Proportion of non-hazardous waste reused & recycled	%	-	47.49%

[a]Banpu NEXT has managed waste disposal only offsite, and there is no onsite management.

Biodiversity

Data	Unit	2020	2021	
			Operating	Project
Number of operation	number	33	24	2
Business unit(s) in relation to protected area				
• In the area	number	0	0	0
• Adjacent to	number	0	0	0
• Containing portions	number	0	0	1
Business unit(s) in relation to high biodiversity wilderness area outside protected				
• In the area	number	0	0	0
• Adjacent to	number	0	0	0
• Containing portions	number	0	0	0
Number of business units				
• Assessed for potential biodiversity impact	number	0	24	2
• Identified as high potential of biodiversity impact	number	0	0	1
• Assessed for biodiversity value	number	0	0	0
• Required biodiversity management plan[a]	number	0	0	0
• Implemented biodiversity management plan[a]	number	0	0	-
Area				
• Assessed for potential biodiversity impact	hectare	-	0	620
• Assessed for biodiversity value*	hectare	-	0	0
• With biodiversity management plan*	hectare	-	0	-
• Biodiversity offset area	hectare	-	107	-
Proportion of business units				
• Assessed for biodiversity impact	%	100%	100%	100%
• Assessed for biodiversity value	%	NA[b]	NA[b]	NA[b]
• With biodiversity management plan[a]	%	NA[b]	NA[b]	-

[a]For business unit(s) identified as high potential of biodiversity impact only
[b]No business unit(s) identified as high potential of biodiversity impact.

Environmental Compliance

Data	Unit	2020	2021
Number of significant environmental incident[a]			
• Effluent discharge limits	case	0	0
• Air emissions standards	case	0	0
• Other	case	0	0
Fines from environmental non-compliance[b]			
• Number of significant fines	case	0	0
• Total amount of significant fines	USD	0	0
Non-monetary Sanctions	case	0	0
Cases brought through dispute mechanisms	case	0	0
Spills[a]			
• Number of significant spills	case	0	0
• Total amount of significant spills	liter	0	0

[a]Referred to internal definition with criteria such as any damage to widespread area or potential fines that is greater than USD 10,000
[b]Fines or potential fines that is greater than USD 10,000

Occupational Health and Safety

Data	Unit	2020	2021
Workers covered by OHS management system			
• Number of workers	person	236	151
• Percentage of total workers	%	85.8%	100%
Workers covered by OHS management system that has been internally audited			
• Number of workers	person	40	48
• Percentage of total workers	%	14.5%	32%
Worker covered by OHS management system that has been audited or certified by third party			
• Number of workers	person	0	0
• Percentage of total workers	%	0%	0%
Number of occupational fatalities			
• Employee	person	0	0
• Contractor	person	0	0
Fatality rate			
• Employee	person/million man-hour	0	0
• Contractor	person/million man-hour	0	0
Number of recordable injury			
• Employee	case	0	0
• Contractor	case	0	0
Total recordable injury frequency rate (TRIFR)			
• Employee	person/million man-hour	0	0
• Contractor	person/million man-hour	0	0
Lost time injury frequency rate (LTIFR)			
• Employee	person/million man-hour	0	0
• Contractor	person/million man-hour	0	0

Data	Unit	2020	2021
Injury severity rate (ISR)[a]			
• Employee	day/million man-hour	0	0
• Contractor	day/million man-hour	0	0
Number of high-consequence work-related injuries			
• Employee	case	0	0
• Contractor	case	0	0
High-consequence work-related injuries frequency rate			
• Employee	person/million man-hour	0	0
• Contractor	person/million man-hour	0	0
Number of hours worked			
• Employee	hour	256,712	231,904
• Contractor	hour	144,742	49,124
Tier-1 process safety event[b]	case	0	0
Tier-1 process safety event rate	case/million man-hour	0	0
Number of fatalities as a result of work-related ill health			
• Employee	hour	0	0
• Contractor	hour	0	0
Number of total recordable work-related ill health			
• Employee	case	0	0
• Contractor	case	0	0

[a]Refers to American National Standards Institute (ANSI) standard
[b]Refers to internal definition with criteria such as fatality and catastrophic damage to ecosystem

Performance Data 2021: BLCP

		2018	2019	2020	2021
Installation Capacity					
Electricity	MW	1,434	1,434	1,434	1,434
Capacity under construction	MW	0	0	0	0
Planned future investment	THB	0	0	0	0
Production					
Electricity sold	MWh	10,383,584	10,912,012	11,284,046	10,718,875
	GJ	37,380,902	39,283,243	40,622,565	38,587,951
Electricity generated	MWh	10,877,823	11,436,600	11,823,652	11,235,025
System Efficiency					
Production efficiency					
• Efficiency rate (power production)	g/KWh	355.66	357.45	355.78	356.65
• Efficiency rate (steam production)	Kg/GJ	0	0	0	0
• Availability factor	%	88.71%	93.78%	96.74%	91.39%
• Overall efficiency	%	38.7%	38.75%	38.76%	38.60%
Planned outage					
• Planned outage frequency	case/year	2	2	2	0
• Total outage hours	hour	1,968	1,054	532	0
• Average power outage duration	hour/case	984	527	266	0
Unplanned outage					
• Planned outage frequency	case/year	1	1	1	9
• Total outage hours	hour	14	7	10.8	1,464.5
• Average power outage duration	hour/case	14.00	7.00	10.8	162.7
Total outage					
• Planned outage frequency	case/year	3	3	3	9
• Total outage hours	hour	1,982	1,061	542.8	1,464.5
• Average power outage duration	hour/case	660.67	353.67	181	162.7
Transmission					
• Length of transmission line	Km	47	47	47	47
Energy					
Direct fuel consumption					
• Total	GJ	99,917,245	104,652,927	108,553,084	103,281,316
• Coal	GJ	99,894,682	104,633,968	108,529,744	103,233,875
• Diesel	GJ	22,563	18,959	23,341	47,441
Indirect energy consumption					
• Electricity purchased	GJ	0	0	0	14,713
Energy intensity	MJ/MWh	9,620	9,591	9,620	9,635

		2018	2019	2020	2021
GHG emissions					
• Total GHG (Scope 1 & 2)	ton CO_2e	9,111,041	9,589,975	9,902,083	9,933,152
• Direct GHG (Scope 1)	ton CO_2e	9,109,143	9,588,300	9,900,455	9,408,633
• Indirect GHG (Scope 2)	ton CO_2e	1,898	1,675	1,628	2,069
• Other indirect (Scope 3)	ton CO_2e	-	-	-	522,450
GHG intensity (Scope 1 & 2)	Kg CO_2/KWh	0.838	0.839	0.837	0.838
Air Emissions					
Nitrogen oxide (NO_x)					
• Average concentration	mg/m^3	228.6	228.1	272.10	236.10
• Emissions load	ton	12,143	13,263	13,327	13,541
• Degree of compliance	%	100%	100%	100%	100%
Sulfur dioxide (SO_2)					
• Average concentration	mg/m^3	258.10	360.60	366.40	312.10
• Emissions load	ton	12,951	14,894	14,981	15,038
• Degree of compliance	%	100%	100%	100%	100%
Total suspended particles (TSP)					
• Average concentration	mg/m^3	32.4	10.6	16.30	19.30
• Emissions load	ton	611	799	671	612
• Degree of compliance	%	100%	100%	100%	100%
Water					
Total water consumption (by source)	m^3	518,353	491,867	406,162	509,891
• Surface water (including water from rivers, lakes and oceans)	m^3	518,353	491,867	406,162	509,891
• Ground water	m^3	-	-	-	-
• Municipal water supplies or other water utilities	m^3	-	-	-	-
Recycled water	m^3	290,573	354,164	547,185	474,135
Wastewaters released to environment	m^3	181,375	159,411	149,076	226,690
Water quality					
• Biochemical oxygen demand (BOD)	mg/l	< 0.2 - 4.3	< 2.0 - 2.6	< 2.0 - 4.9	< 2.0 - 2.7
• Chemical oxygen demand (COD)	mg/l	< 25.0	< 25.0	< 25.0	< 25.0 - 25.7
• pH (0 - 14)	-	7.61	7.66	7.84	7.73
• Average temperature	Degree Celcius	34.45	35.30	35.47	34.88

		2018	2019	2020	2021
Waste					
Total non-hazardous waste generated including ash	ton	-	-	-	529,832
Total hazardous waste generated	ton	-	-	-	112
Non-hazardous waste - onsite disposal	ton	-	-	-	5,600
• Reuse	ton	-	-	-	0
• Recycling	ton	-	-	-	0
• Other recovery operations (sold)	ton	-	-	-	5,600
Non-hazardous waste - offsite disposal	ton	-	-	-	483,394
• Reuse	ton	-	-	-	2
• Recycling	ton	-	-	-	234
• Other recovery operations (sold)	ton	-	-	-	483,159
Hazardous waste - onsite disposal	ton	-	-	-	0
• Reuse	ton	-	-	-	0
• Recycling	ton	-	-	-	0
• Other recovery operations (sold)	ton	-	-	-	0
Hazardous waste - offsite disposal	ton	-	-	-	82
• Reuse	ton	-	-	-	0
• Recycling	ton	-	-	-	44
• Other recovery operations (sold)	ton	-	-	-	38
Total non-hazardous waste directed to disposal (landfill/incineration without heat recovery) - onsite disposal	ton	-	-	-	0
Total non-hazardous waste directed to disposal (landfill/incineration without heat recovery) - offsite disposal	ton	-	-	-	40,838
Total hazardous waste directed to disposal (landfill/incineration without heat recovery) - onsite disposal	ton	-	-	-	0
Total hazardous waste directed to disposal (landfill/incineration without heat recovery) - offsite disposal	ton	-	-	-	29
Ash					
Total ash and gypsum waste generated	ton	-	-	-	528,440
Total ash and gypsum waste composted, reused, recycled, or recovered	ton	-	-	-	488,754
Total ash and gypsum waste composted, reused, recycled, or recovered	%	-	-	-	92
• Donated	ton	-	-	-	5
• Other recovery operations (sold)	ton	-	-	-	-
Total ash and gypsum waste landfilled	ton	-	-	-	39,682

		2018	2019	2020	2021
Spill					
Significant oil and chemical spill	case	0	0	0	0
Environmental Compliance					
Fines for non-compliance with environmental laws	million THB	0	0	0	0
Number of non-compliance with environmental law	case	0	0	0	0
Biodiversity					
Total number of IUCN red list species and national conservation list species	species	0	0	0	0
Occupational Health and Safety					
Manhours worked	hour	2,425,883	1,918,003	1,418,753	1,347,563
• Employee	hour	642,712	622,640	391,015	476,848
• Contractor	hour	1,783,171	1,295,363	1,027,738	870,715
Safety manhours	hour	2,425,883	1,918,003	1,418,753	1,347,563
• Employee	hour	642,712	622,640	391,015	476,848
• Contractor	hour	1,783,171	1,295,363	1,027,738	870,715
Accumulated safety hours	hour	1,766,775	6,110,661	7,529,414	8,876,977
• Employee	hour	403,132	1,668,484	2,637,237	3,114,085
• Contractor	hour	1,363,643	4,442,177	4,892,177	5,762,892
Fatality	case	0	0	0	0
• Employee – male	case	0	0	0	0
• Employee – female	case	0	0	0	0
• Contractor – male	case	0	0	0	0
• Contractor – female	case	0	0	0	0
Total number of injuries	case	4	5	2	4
• Employee – male	case	0	0	1	2
• Employee – female	case	0	0	0	0
• Contractor – male	case	3	4	1	1
• Contractor – female	case	1	1	0	1
Total number of lost time injuries	case	0	0	0	0
• Employee – male	case	0	0	0	0
• Employee – female	case	0	0	0	0
• Contractor – male	case	0	0	0	0
• Contractor – female	case	0	0	0	0
Number of injured days off work	day	0	0	0	0
• Employee – male	day	0	0	0	0
• Employee – female	day	0	0	0	0
• Contractor – male	day	0	0	0	0
• Contractor – female	day	0	0	0	0
Injury frequency rate (IFR)	case/million manhour	1.65	2.61	1.41	0
• Employee	case/million manhour	1.56	1.61	2.56	0
• Contractor	case/million manhour	0.56	0.77	0.97	0

		2018	2019	2020	2021
Lost time injury frequency rate (LTIFR)	case/million manhour	0	0	0	0
• Employee	case/million manhour	0	0	0	0
• Contractor	case/million manhour	0	0	0	0
Injury severity rate (ISR)	day/million manhour	0	0	0	0
• Employee	day/million manhour	0	0	0	0
• Contractor	day/million manhour	0.56	0.77	0.97	0
Total recordable injury rate (TRIR)	day/million manhour	0.08	0	0	0
• Employee	day/million manhour	0	0	0	0
• Contractor	day/million manhour	0.56	0.77	0.97	0
High consequence work related injury rate	day/million manhour	0	0	0	0
• Employee	day/million manhour	0	0	0	0
• Contractor	day/million manhour	0	0	0	0
OHS Training/ Communication					
OHS training hour					
• Employee	hour	18,173	18,189	18,176	1,680
• Contractor	hour	21,033	18,984	9,216	15,765
Expense and Investment for Safety					
Expense for safety operation					
• Operation expense	THB	24,300,000	24,063,000	25,431,249	23,908,000
• Capex	THB	0	0	0	0
Expense for safety improvement project					
• Operation expense	THB	0	0	0	0
• Capex	THB	550,000	6,020,000	15,860,000	23,020,000
Employee					
Total employee	person	278	280	297	273
Number of employee (by gender)					
• Male	person	229	234	247	229
• Female	person	49	46	50	44
Number of employee (by type)					
• Permanent	person	265	263	267	260
• Temporary/contract	person	13	17	30	13
Number of employee (by level)					
• Senior management	person	7	6	5	5
• Middle management	person	31	33	41	42
• Junior management	person	46	47	41	46
• Supervisor & staff	person	181	180	180	167
Gender Diversity					
Senior management					
• Male	person	6	5	5	5
• Female	person	1	1	0	0

		2018	2019	2020	2021
Middle management					
• Male	person	25	25	31	31
• Female	person	6	8	10	11
Junior management					
• Male	person	39	41	33	35
• Female	person	7	6	8	11
Supervisor & staff					
• Male	person	155	156	161	152
• Female	person	26	24	19	15
Turnover					
Turnover of permanent employee (by age group)					
• Below 30 years old	person	8	3	1	9
• 30 - 50 years old	person	4	4	3	9
• Over 50 years old	person	2	1	2	4
Turnover rate					
• Male	% of total employee	4.80%	2.99%	1.21%	5.68%
• Female	% of total employee	7.59%	2.86%	8.11%	24.32%
New Employee					
New employees hired (by age group)					
• Below 30 years old	person	16	9	7	6
• 30 - 50 years old	person	0	0	1	5
• Over 50 years old	person	0	0	0	1
Total new hired rate					
• Male	% of total employee	5.33%	3.51%	3.48%	2.69%
• Female	% of total employee	10.00%	2.86%	0.00%	16.22%
Parental Leave					
Employee take parental leave	person	6	2	0	3
Number of employee return to work after parental leave	person	6	2	0	3
Employee Development					
Total training hour (by level)					
• Senior management	hour/year	512	648	291	197
• Middle management	hour/year	3,297	3,393	4,615	1,292
• Junior management	hour/year	3,010	3,780	1,628	2,010
• Supervisor & staff	hour/year	11,354	10,368	6,811	5,844
Total training hours (by type)					
• Environment, health, safety	hour/year	419	3,165	3,137	1,680
• Others	hour/year	17,754	15,024	10,208	7,662
Average training hours (by level)					
• Senior management	hour/person/year	145	216	58	39
• Middle management	hour/person/year	229	215	217	62
• Junior management	hour/person/year	114	162	82	87
• Supervisor & staff	hour/person/year	141	129	73	95

Performance Data 2021: HPC

		2018	2019	2020	2021
Installation Capacity					
Electricity	MW	1,878	1,878	1,878	1,878
Capacity under construction	MW	0	0	0	0
Planned future investment	THB	0	0	0	0
Production					
Electricity sold	MWh	12,512	11,406	11,355	11,881
	GJ	45,042	41,062	40,878	42,773
Electricity generated	MWh	13,780	13,087	12,980	13,601
System Efficiency					
Production efficiency					
• Efficiency rate (power production)	g/KWh	1,113	1,099	1,087	1,091
• Efficiency rate (steam production)	Kg/GJ	0	0	0	0
• Availability factor	%	89.65%	82.18%	82.33%	86.11%
• Overall efficiency	%	32.06%	32.49%	32.57%	32.65%
Planned outage					
• Planned outage frequency	case/year	3	3	2	3
• Total outage hours	hour	1,225	1,143	2,367	2,489
• Average power outage duration	hour/case	408.32	381.00	1,183.50	829.67
Unplanned outage					
• Planned outage frequency	case/year	20	17	17	17
• Total outage hours	hour	1,275	3,530	2,273	1,152
• Average power outage duration	hour/case	63.76	207.65	133.71	67.76
Total outage					
• Planned outage frequency	case/year	23	20	19	20
• Total outage hours	hour	1,683	3,911	3,457	1,982
• Average power outage duration	hour/case	73.19	195.55	181.92	99.08
Transmission					
• Length of transmission line	Km	167	167	167	167
• Transmission loss	%	0.21%	0.20%	0.20%	0.21%
• Length of distribution line	Km	6	6	6	6

		2018	2019	2020	2021
Energy					
Direct fuel consumption					
• Total	GJ	154,938,500	145,217,278	143,611,047	150,087,092
• Coal	GJ	154,604,073	144,917,349	143,353,524	149,877,480
• Diesel	GJ	334,427	299,930	257,523	209,612
Indirect energy consumption					
• Electricity purchased	GJ	0	0	0	0
	MWh	0	8,590	5,193	833
Greenhouse Gas (GHG)					
GHG emissions (Power Plant)					
• Total GHG (Scope 1 & 2)	ton CO_2e	16,185,216	15,539,000	15,539,513	16,150,764
• Direct GHG (Scope 1)	ton CO_2e	16,185,164	15,538,951	15,539,471	16,150,714
• Indirect GHG (Scope 2)	ton CO_2e	52	48	42	50
• Other indirect (Scope 3)	ton CO_2e	1,714	1,461	1,939	1,793
• GHG intensity (Scope 1 & 2)	Kg CO_2/KWh	1,384	1,362	1,299	1,359
GHG emissions (Mine)					
• Total GHG (Scope 1 & 2)	ton CO_2e	444,439	459,669	423,071	N/A
• Direct GHG (Scope 1)	ton CO_2e	443,680	459,005	422,693	N/A
• Indirect GHG (Scope 2)	ton CO_2e	759	665	378	N/A
Air Emissions					
NO_x					
• Average concentration	mg/Nm^3	158.70 - 214.68	162.74 - 198.10	200.55 - 222.87	193.88 - 205.64
• Standard	mg/Nm^3	510	510	510	510
• Emission load	ton	9,322	8,249	7,818	8,387
• Degree of compliance	%	100%	100%	100%	100%
SO_x					
• Average concentration	mg/Nm^3	128.74 - 142.23	128.35 - 129.61	131.90 - 135.59	150.80 - 154.87
• Standard	mg/Nm^3	230	230	230	230
• Emission load	ton	6,645	5,099	4,890	6,243
• Degree of compliance	%	100%	100%	100%	100%
Particulate matter (PM)					
• Average concentration	mg/Nm^3	5.18-7.87	4.92-7.99	4.33-12.36	4.05-9.62
• Standard	mg/Nm^3	50	50	50	50
• Emission load	ton	299	270	303	254
• Degree of compliance	%	100%	100%	100%	100%

		2018	2019	2020	2021
Biodiversity					
Total operation area (Concession area of mining, power plant, dams and transmission line)	KM^2	76.20	76.20	76.20	76.20
Total operation area (Concession area of limestone quarry)	KM^2	10.50	10.50	10.50	10.50
Operation area related to protected area					
• Located inside protected area	KM^2	-	-	-	-
• Adjacent to protected area	KM^2	-	-	-	-
• Contain portion in protected area	KM^2	-	-	-	-
IUCN red list species in operation area					
• Critically endangered	number	Conduct every 5 years	Conduct every 5 years	Conduct every 5 years	Conduct every 5 years
• Endangered	number				
• Vulnerable	number				
• Near threatened	number				
• Least concern	number				
Effluent					
Water discharged					
• Total water discharged	ML	During installation of flow meter	8,277,573	16,946,610	5,171,805
• Surface water	ML	8,100,154	8,277,573	16,946,610	5,171,805
• Groundwater	ML	-	-	-	-
• Seawater	ML	-	-	-	-
• Third-party water (total)	ML	-	-	-	-
• Third-party water sent for use to other organization	ML	-	-	-	-
Effluent quality (Power Plant)					
• TSS	mg/L	8.0 - 42.0	5.0 - 36	5 - 82	5 - 23
Standard	mg/L	≤50	≤50	≤50	≤50
Degree of compliance	%	100%	100%	100%	100%
• BOD	mg/L	0 - 1.4	0.1 - 2.4	0.3 - 4.5	0.3 - 7
Standard	mg/L	≤40	≤40	≤40	≤40
Degree of compliance	%	100%	100%	100%	100%
• COD	mg/L	≤40	<40 - 51	<40	<40
Standard	mg/L	≤120	≤120	≤120	≤120
Degree of compliance	%	100%	100%	100%	100%

		2018	2019	2020	2021
• pH	-	8.54 - 9.6	8.5 - 9.2	8.6 - 8.9	8.4 - 8.9
Standard	-	6 - 9	6 - 9	6 - 9	6 - 9
Degree of compliance	%	99.1%	91.7%	100%	100%
• Temperature	°C differential	0 - 1	0 - 1	0 - 2	0 - 0.2
Standard	°C differential	<3	<3	<3	<3
Degree of compliance	%	100%	100%	100%	100%
Effluent quality (Mine)					
• TSS	mg/L	10.2 - 276	5.0-66	10.1 - 49.2	8-50
Standard	mg/L	≤50	≤50	≤50	≤50
Degree of compliance	%	100%	100%	100%	100%
• BOD	mg/L	0.3 - 2.4	0.0 - 2.5	0.1 - 2.7	0.3 - 12.9
Standard	mg/L	≤50	≤50	≤50	≤50
Degree of compliance	%	100%	100%	100%	100%
• COD	mg/L	≤40	<40 - 47	43.2 - 78.4	< 40
Standard	mg/L	≤150	≤150	≤150	≤150
Degree of compliance	%	100%	100%	100%	100%
• pH	-	6.4 - 10.3	6.1 - 8.3	6.0-8.2	6.9 - 8.8
Standard	-	6 - 9	6 - 9	6 - 9	6 - 9
Degree of compliance	%	99.1%	100%	100%	100%
• Temperature	°C differential	0 - 1	0 - 1	0-2	0 - 0.2
Standard	°C differential	<3	<3	<3	<3
Degree of compliance	%	100%	100%	100%	100%
Oil and chemical spills					
• Total number of significant spills	case	0	0	5	1
• Total volume of significant spills	liter	0	0	1,500	200
Waste					
Hazardous waste disposed					
• Total hazardous waste	ton	870,302	261,622	368,543	64,497
• Reuse	ton	0	122	14	5
• Recycle (liquid)	liter	864,802	259,237	368,108	63,910
• Recycle (solid)	ton	-	2,045	7.30	2.25
• Recovery (including energy recovery)	ton	-	-	-	30
• Incineration	ton	-	5	-	-
• Deep well injection	ton	-	-	-	-
• Landfill	ton	-	-	-	-
• On-site storage	ton	5,500	213	414	550
• Other disposal	ton	-	-	-	-

		2018	2019	2020	2021
Non-hazardous waste disposed					
• Total non-hazardous waste	ton	9,316	5,755	5,683	2,675
• Reuse	ton	-	-	-	-
• Recycle (solid)	liter	3,736	5.15	317	836
• Compositing	ton	-	0.846	1	-
• Recovery (including energy recovery)	ton	-	-	-	-
• Incineration	ton	-	-	-	-
• Deep well injection	ton	-	-	-	-
• Landfill	ton	5,580	5,749	5,365	1,835
• On-site storage	ton	-	-	-	4
• Other disposal	ton	-	-	-	-
Total waste disposed (hazardous & non-hazardous)	ton	879,618	267,377	374,226	67,172
Production of ash & gypsum					
• Total production of ash	ton	3,027,776	3,402,781	3,413,872	3,503,887
• Fly ash	ton	3,027,776	3,402,781	3,413,872	3,503,887
• Bottom ash	ton	-	-	-	-
• Gypsum	ton	687,376	740,373	706,477	762,372
Recycled ash & gypsum					
• Fly ash recycled	ton	320,481	355,795	174,556	61,167
• Bottom ash recycled	ton	-	-	-	-
• Gypsum recycled	ton	30	0	2,736	1,021
Environmental Compliance					
Total monetary value of significant fines	case	0	0	0	0
	THB	0	0	0	0
Total monetary sanctions	case	0	0	0	0
Case brought through dispute resolution mechanism	case	0	0	0	0
Supplier Environmental Assessment					
New suppliers screened using environmental criteria					
• New suppliers registered	number	On process	278	162	105
• New suppliers screened by environmental criteria	number	On process	238	162	105
Percentage new suppliers that were screened using environmental criteria	%	On process	85.61%	100.0%	100.0%

		2018	2019	2020	2021
Return on Environmental Investment					
Environmental expenditure and cost					
• Capital investment expense	THB	5,891,397	146,100	571,849	417,547
• Operating expense	THB	10,935,231	22,397,424	25,270,414	18,070,946
Environmental improvement project					
• Operating expense	THB	-	-	604,351	-
• Capex	THB	48,574,584	-	-	500,000
Environmental Grievance Mechanism					
Complaints from related stakeholders on environment					
• Significant environmental complaint	number	5	1	1	0
• Significant complaint resolved	number	5	1	1	0
Safety Performance					
Employee					
Man hour	hour	1,727,688	1,757,550	1,798,075	1,812,908
Number of fatality					
• Male	person	0	0	0	0
• Female	person	0	0	0	0
Number of high consequence work related Injuries (excluding fatality)					
• Male	person	0	0	0	0
• Female	person	0	0	0	0
Number of lost time injury					
• Male	person	0	0	0	0
• Female	person	0	0	0	0
Number of recordable work-related injuries					
• Male	person	5	4	3	0
• Female	person	0	0	0	0
Number of day lost (excluding fatality and permanent disability)					
• Male	day	0	0	0	0
• Female	day	0	0	0	0
Fatality rate	person/million man hour	0	0	0	0

		2018	2019	2020	2021
Lost time injury frequency rate (LTIFR)	person/million man hour	0	0	0	0
High consequence work related injury rate	person/million man hour	0	0	0	0
Total recordable injury rate (TRIR)	day/million man hour	2.89	2.28	1.67	0
Main type of work-related injury					
• Amputation	person	0	0	0	0
• Burn	person	0	0	0	0
• Chemical	person	0	0	0	0
• Contamination	person	0	0	0	0
• Contusion	person	2	1	3	3
• Dry heat friction	person	0	0	0	0
• Fracture	person	0	0	0	0
• Hernia	person	0	0	0	0
• Irritation	person	0	0	0	0
• Laceration	person	3	2	0	0
• Puncture	person	0	1	0	0
• Rash	person	0	0	0	0
• Strain& Sprain	person	0	0	0	0
• Other	person	0	0	0	0
Number of occupational disease					
• Male	person	0	0	0	0
• Female	person	0	0	0	0
Contractor					
Man hour	hour	15,389,796	15,393,461	13,871,450	14,685,149
Number of fatality					
• Male	person	1	1	0	1
• Female	person	0	0	0	0
Number of high consequence work related Injuries (excluding fatality)					
• Male	person	0	0	0	0
• Female	person	0	0	0	0
Number of lost time injury					
• Male	person	3	5	4	0
• Female	person	0	0	0	0
Number of recordable work-related injuries					
• Male	person	21	25	15	9
• Female	person	0	0	0	0

		2018	2019	2020	2021
Number of day lost (excluding fatality and permanent disability)					
• Male	day	189	1,865	56	0
• Female	day	0	0	0	0
Fatality rate	person/million man hour	0.06	0.06	0	0.07
Lost time injury frequency rate (LTIFR)	person/million man hour	0.26	0.39	0.29	0.07
High consequence work related injury rate	person/million man hour	0	0	1.00	2.00
Total recordable injury rate (TRIR)	day/million man hour	1.36	1.62	1.08	0.61
Main type of work-related injury					
• Amputation	person	0	1	0	0
• Burn	person	1	1	0	0
• Chemical	person	0	1	0	0
• Contamination	person	0	0	0	0
• Contusion	person	10	11	8	5
• Dry heat friction	person	0	0	0	0
• Fracture	person	0	2	4	0
• Hernia	person	0	0	0	0
• Irritation	person	1	0	0	3
• Laceration	person	5	8	3	1
• Puncture	person	4	0	0	0
• Rash	person	0	0	0	0
• Strain& Sprain	person	1	1	0	0
• Other	person	0	0	0	0
Number of occupational disease					
• Male	person	0	0	0	0
• Female	person	0	0	0	0
Public				0	
Number of fatalities involving company asset incident	number	0	0	0	0
Number of injuries involving company asset incident	number	0	0	0	0
Number of health and safety related related legal case (including disease)	number	0	0	0	0
Compensation cost	THB	0	0	0	0

		2018	2019	2020	2021
OHS Training/ Communication					
Employee					
• OHS training program	number	38	42	30	25
• OHS training hour	hour	1,024	5,571	2,153	3,936
Contractor					
• OHS training program	number	539	802	423	385
• OHS training hour	hour	17,579	29,989	15,817	23,071
Expense and Investment for Safety					
Expense for safety operation					
• Operation expense	THB	24,701,400	27,232,209	33,446,374	27,935,055
• Capex	THB	2,045,800	1,200,000	328,800	0
Expense for safety improvement project					
• Operation expense	THB	0	0	0	0
• Capex	THB	20,500,000	18,120,000	0	0
Impacted Community					
Plant area					
• Impacted household	household	2,588	2,588	2,588	2,588
• Impacted people	person	12,335	12,335	12,335	12,335
• Compensated household	household	975	975	975	975
• Compensated people	person	5,265	5,265	5,265	5,265
Transmission line					
• Impacted household	household	249	249	249	249
• Impacted people	person	1,345	1,345	1,345	1,345
• Compensated household	household	249	249	249	249
• Compensated people	person	1,345	1,345	1,345	1,345
Employee					
Total employee	person	734	732	720	726
Number of employee (by gender)					
• Male	person	568	564	560	561
• Female	person	166	168	160	165
Number of employee (by nationality)					
• Thai	person	275	268	262	260
• Laos PDR	person	458	463	457	465
• China	person	0	0	0	0
• Japan	person	0	0	0	0
• Others	person	1	1	1	1

		2018	2019	2020	2021
Number of employee (by age)					
• Under 30	person	325	292	232	221
• 30-39	person	251	279	313	325
• 40-49	person	101	101	108	112
• 50 and over	person	57	60	67	68
Number of employee (by type)					
• Permanent	person	692	685	676	673
• Temporary/ contract	person	42	47	44	53
Number of employee (by level)					
• Senior management	person	19	19	18	15
• Middle management	person	90	94	93	90
• Junior management	person	187	179	177	183
• Supervisor & staff	person	403	406	401	410
• Other (worker)	person	35	34	31	28
Total new employee	person	44	29	43	53
• Male	person	27	17	21	33
• Female	person	17	12	22	20
Retainment of employee					
• Average length of service years	year	4.33	5.17	5.98	6.54
Estimated total employee eligible to retired in the next 5 years	person	26	27	29	29
• Senior Management (DD and up)	person	9	7	7	6
• Middle Management (section and manager)	person	5	4	5	5
• Junior Management (senior officer)	person	8	9	11	12
• Supervisor and staff	person	2	6	5	5
• Other (worker)	person	2	1	1	1
Estimated total employee eligible to retired in the next 10 years	person	54	60	66	67
• Senior Management (DD and up)	person	13	12	13	12
• Middle Management (section and manager)	person	13	14	15	16
• Junior Management (senior officer)	person	17	18	20	22
• Supervisor and staff	person	11	12	12	12
• Other (worker)	person	0	4	6	5
Turnover	person	36	33	53	48
• Resignment	person	29	22	35	31
• Retirement	person	0	2	3	7
• Other termination	person	7	9	15	10
Total turnover rate	%	4.09%	4.51%	7.36%	6.61%
Volunteer turnover rate	%	3.95%	3.01%	4.86%	4.27%

		2018	2019	2020	2021
Gender Diversity					
Senior management	person	19	19	18	15
• Male	person	14	15	14	11
• Female	person	5	4	4	4
Middle management	person	90	94	93	90
• Male	person	64	68	69	66
• Female	person	26	26	24	24
Junior management	person	187	179	177	183
• Male	person	128	119	117	122
• Female	person	59	60	60	61
Supervisor and staff	person	403	406	401	410
• Male	person	334	334	333	336
• Female	person	69	72	68	74
Professional and advisor	person	7	6	5	28
• Male	person	7	6	5	26
• Female	person	0	0	0	2
Remuneration					
Remuneration cost	THB	520,566,680	532,526,721	544,169,151	553,262,742
Retirement benefit cost	THB	3,565,901	10,896,977	21,885,457	14,580,697
Employee development cost	THB	4,862,361	24,528,028	2,654,937	3,530,304
Employee Development					
Skill/competency needed assessment in the workforce					
• Employee who was assessed skill/ training needs	person	-	-	-	669
	%	-	-	-	80
Total training hours	hour	18,004	20,397	16,805	19,241
• Senior Management	hour	164	637	141	123
• Middle Management	hour	3,523	5,523	1,794	2,824
• Junior Management	hour	7,828	9,828	5,571	5,742
• Supervisor and staff	hour	6,489	4,409	9,299	10,552
Average training hours/ person	hour/person	25.89	29.39	24.39	27.92

		2018	2019	2020	2021
Total training expense	THB/person	4,862,361	24,528,028	2,654,937	3,530,304
• Senior Management	THB/person	12,000	37,055	35,724	296,957
• Middle Management	THB/person	15,000	32,522	127,892	88,666
• Junior Management	THB/person	16,000	22,030	53,385	78,150
• Supervisor and staff	THB/person	11,000	36,488	71,307	38,852
Average training expense/ employee	THB/person	6,963	29,984	3,734	4,965
Parental Leave					
Employee take parental leave	person	11	8	13	10
	%	7%	5%	8%	6%
Number of employee return to work after parental leave	person	11	8	13	10
	%	7%	5%	8%	6%
Freedom of association and collective bargaining					
Number of employees covered by collective bargaining agreements	person	0	0	0	0
	%	0	0	0	0
Absenteeism Rate (due to illness)					
Absenteeism rate due to common illness	%	0.55	0.65	0.53	0.44
Absenteeism rate due to occupational illness	%	-	-	-	-

GRI Content Index

Disclosure	Description	Page	Detail/Omission	External Assurance
GRI 101: Foundation 2016 **GRI 102: General Disclosures 2016**				
Organizational Profile				
102-1	Name of the organization	Front cover		-
102-2	Activities, brands, products, and services	10		-
102-3	Location of headquarters	Back cover		-
102-4	Location of operations	9		-
102-5	Ownership and legal form	123		-
102-6	Markets served	9, 13-14		-
102-7	Scale of the organization	123, 126,133		-
102-8	Information on employees and other workers	133		-
102-9	Supply chain	10, 57-59		-
102-10	Significant changes to the organization and its supply chain	12		-
102-11	Precautionary Principle or approach	43-47		-
102-12	External initiatives	26-27		-
102-13	Membership of associations	124		-
EU1[E]	Installed capacity, broken down by primary energy source and by regulatory regime	128		-
EU2[E]	Net energy output broken down by primary energy source and by regulatory regime	128		-
Strategy				
102-14	Statement from senior decision-maker	6-7		-
102-15	Key impacts, risks, and opportunities	13-14, 43-47		-
Ethics and Integrity				
102-16	Values, principles, standards, and norms of behavior	33-35		-
102-17	Mechanisms for advice and concerns about ethics	35		-

Disclosure	Description	Page	Detail/Omission	External Assurance
Governance				
102-18	Governance structure	29-32		-
102-19	Delegating authority	29-32		-
102-20	Executive-level responsibility for economic, environmental, and social topics	15-18		-
102-21	Consulting stakeholders on economic, environmental, and social topics	19-22		-
102-22	Composition of the highest governance body and its committees	29-32		-
102-23	Chair of the highest governance body	29-32		-
102-24	Nominating and selecting the highest governance body	29-32		-
102-25	Conflicts of interest	29-32		-
102-26	Role of highest governance body in setting purpose, values, and strategy	29-32		-
102-27	Collective knowledge of highest governance body	32		-
102-28	Evaluating the highest governance body's performance	32		-
102-29	Identifying and managing economic, environmental, and social impacts	15-18		-
102-30	Effectiveness of risk management processes	43-47		-
102-31	Review of economic, environmental, and social topics	15-18		-
102-32	Highest governance body's role in sustainability reporting	15-18		-
102-33	Communicating critical concerns	15-18		-
102-34	Nature and total number of critical concerns	15-18		-
102-35	Remuneration policies	18, 32		-
102-36	Process for determining remuneration	18, 32		-
102-37	Stakeholders' involvement in remuneration	-		-
102-38	Annual total compensation ratio	-		-
102-39	Percentage increase in annual total compensation ratio	-		-
Stakeholder Engagement				
102-40	List of stakeholder groups	19-22		-
102-41	Collective bargaining agreements	135		-
102-42	Identifying and selecting stakeholders	19-22		-
102-43	Approach to stakeholder engagement	19-22		-
102-44	Key topics and concerns raised	19-22		-

Disclosure	Description	Page	Detail/Omission	External Assurance
Reporting Practice				
102-45	Entities included in the consolidated financial statements	123		-
102-46	Defining report content and topic Boundaries	11, 23-25, 125	The environmental performance of Temple I in the U.S. is excluded and will be disclosed in SD Report 2022.	-
102-47	List of material topics	25		-
102-48	Restatements of information	11		-
102-49	Changes in reporting	11		-
102-50	Reporting period	11		-
102-51	Date of most recent report	11		-
102-52	Reporting cycle	11		-
102-53	Contact point for questions regarding the report	Back cover		-
102-54	Claims of reporting in accordance with the GRI Standards	11		-
102-55	GRI content index	149-152		-
102-56	External assurance	153		-
Economic				
GRI 201: Economic Performance 2016				
103-1	Explanation of the material topic and its Boundary	-		-
103-2	The management approach and its components	-		-
103-3	Evaluation of the management approach	-		-
201-1	Direct economic value generated and distributed	126		-
201-2	Financial implications and other risks and opportunities due to climate change	13-14, 46, 74		-
201-3	Defined benefit plan obligations and other retirement plans	-		-
GRI 203: Indirect Economic Impacts 2016				
103-1	Explanation of the material topic and its Boundary	-		-
103-2	The management approach and its components	-		-
103-3	Evaluation of the management approach	-		-
203-1	Infrastructure investments and services supported	126		-
203-2	Significant indirect economic impacts	126		-
GRI 204: Procurement Practices 2016				
103-1	Explanation of the material topic and its Boundary	57-59		-
103-2	The management approach and its components	57-59		-
103-3	Evaluation of the management approach	57-59		-
204-1	Proportion of spending on local suppliers	129		-

Disclosure	Description	Page	Detail/Omission	External Assurance
GRI 205: Anti-corruption 2016				
103-1	Explanation of the material topic and its Boundary	33-35		-
103-2	The management approach and its components	33-35		-
103-3	Evaluation of the management approach	33-35		-
205-1	Operations assessed for risks related to corruption	33-35		-
205-2	Communication and training about anti-corruption policies and procedures	35		-
205-3	Confirmed incidents of corruption and actions taken	127		-
GRI-G4 Sector Disclosure: System Efficiency				
103-1	Explanation of the material topic and its Boundary	63-66		-
103-2	The management approach and its components	63-66		-
103-3	Evaluation of the management approach	63-66		-
EU11[E]	Average generation efficiency of thermal plants by energy source and by regulatory regime	128		-
Environment				
GRI 302: Energy 2016				
103-1	Explanation of the material topic and its Boundary	75-77		-
103-2	The management approach and its components	75-77		-
103-3	Evaluation of the management approach	75-77		-
302-1	Energy consumption within the organization	129		Yes
302-3	Energy intensity	129		Yes
302-4	Reduction of energy consumption	77, 129		-
GRI 303: Water and Effluents 2018				
103-1	Explanation of the material topic and its Boundary	81-83		-
103-2	The management approach and its components	81-83		-
103-3	Evaluation of the management approach	81-83		-
303-1	Interactions with water as a shared resource	81-83		-
303-2	Management of water discharge-related impacts	81-83		-
303-3	Water withdrawal	130		Yes
303-4	Water discharge	130		Yes
303-5	Water consumption	130	The change in water storage is not available because the data collection system is under standardization and will be disclosed in SD Report 2022.	Yes

Disclosure	Description	Page	Detail/Omission	External Assurance
GRI 304: Biodiversity 2016				
103-1	Explanation of the material topic and its Boundary	87-89		-
103-2	The management approach and its components	87-89		-
103-3	Evaluation of the management approach	87-89		-
304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	131		-
304-2	Significant impacts of activities, products, and services on biodiversity	131		-
304-3	Habitats protected or restored	131		-
304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	87		-
GRI 305: Emissions 2016				
103-1	Explanation of the material topic and its Boundary	67-74, 78-80		-
103-2	The management approach and its components	67-74, 78-80		-
103-3	Evaluation of the management approach	67-74, 78-80		-
305-1	Direct (Scope 1) GHG emissions	129		Yes
305-2	Energy indirect (Scope 2) GHG emissions	129		Yes
305-3	Other indirect (Scope 3) GHG emissions	129		-
305-4	GHG emissions intensity	129		Yes
305-5	Reduction of GHG emissions	72, 129		-
305-6	Emissions of ozone-depleting substances (ODS)	130		-
305-7	Nitrogen oxides (NO_x), sulfur oxides (SO_x), and other significant air emissions	130	The NOx and PM emitted from non-point source are excluded and will be disclosed in SD Report 2023.	Yes
GRI 306: Waste 2020				
103-1	Explanation of the material topic and its Boundary	84-86		-
103-2	The management approach and its components	84-86		-
103-3	Evaluation of the management approach	84-86		-
306-1	Waste generation and significant waste-related impacts	84-86		-
306-2	Management of significant waste-related impacts	84-86		-
306-3	Waste generated	131		Yes
306-4	Waste diverted from disposal	131		Yes
306-5	Waste directed to disposal	131		Yes
GRI 307: Environmental Compliance 2016				
103-1	Explanation of the material topic and its Boundary	36-39		-
103-2	The management approach and its components	36-39		-
103-3	Evaluation of the management approach	36-39		-
307-1	Non-compliance with environmental laws and regulations	132		-

Disclosure	Description	Page	Detail/Omission	External Assurance
GRI 308: Supplier Environmental Assessment 2016				
103-1	Explanation of the material topic and its Boundary	57-59		-
103-2	The management approach and its components	57-59		-
103-3	Evaluation of the management approach	57-59		-
308-1	New suppliers that were screened using environmental criteria	129		-
308-2	Negative environmental impacts in the supply chain and actions taken	-		-
Social				
GRI 401: Employment 2016				
103-1	Explanation of the material topic and its Boundary	91-95		-
103-2	The management approach and its components	91-95		-
103-3	Evaluation of the management approach	91-95		-
401-1	New employee hires and employee turnover	133-134		-
401-3	Parental leave	134		-
GRI 403: Occupational Health and Safety 2018				
103-1	Explanation of the material topic and its Boundary	111-115		-
103-2	The management approach and its components	111-115		-
103-3	Evaluation of the management approach	111-115		-
403-1	Occupational health and safety management system	111-115		-
403-2	Hazard identification, risk assessment, and incident investigation	111-115		-
403-3	Occupational health services	111-115		-
403-4	Worker participation, consultation, and communication on occupational health and safety	111-115		-
403-5	Worker training on occupational health and safety	111-115, 132		-
403-6	Promotion of worker health	111-115		-
403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	111-115		-
403-8	Workers covered by an occupational health and safety management system	132		Yes
403-9	Work-related injuries	132	The working hours of contractor with less than 5 consecutive working days are excluded and will be disclosed in SD Report 2023. Moreover, the working hours of employee remaining on site after working hour are not recorded; however, the incident is recorded, if any case occur.	Yes
403-10	Work-related ill health	132		-

Disclosure	Description	Page	Detail/Omission	External Assurance
GRI 404: Training and Education 2016				
103-1	Explanation of the material topic and its Boundary	107-110		-
103-2	The management approach and its components	107-110		-
103-3	Evaluation of the management approach	107-110		-
404-1	Average hours of training per year per employee	134		-
404-2	Programs for upgrading employee skills and transition assistance programs	107-110		-
404-3	Percentage of employees receiving regular performance and career development reviews	135		-
GRI 405: Diversity and Equal Opportunity 2016				
103-1	Explanation of the material topic and its Boundary	-		-
103-2	The management approach and its components	-		-
103-3	Evaluation of the management approach	-		-
405-1	Diversity of governance bodies and employees	31, 133		-
GRI 412: Human Rights Assessment 2016				
103-1	Explanation of the material topic and its Boundary	91-95		-
103-2	The management approach and its components	91-95		-
103-3	Evaluation of the management approach	91-95		-
412-1	Operations that have been subject to human rights reviews or impact assessments	135		-
412-2	Employee training on human rights policies or procedures	-		-
GRI 413: Local Communities 2016				
103-1	Explanation of the material topic and its Boundary	116-121		-
103-2	The management approach and its components	116-121		-
103-3	Evaluation of the management approach	116-121		-
413-1	Operations with local community engagement, impact assessments, and development programs	135		-
413-2	Operations with significant actual and potential negative impacts on local communities	135		-
EU22[E]	Number of people physically or economically displaced and compensation, broken down by type of project	-		-
GRI 414: Supplier Social Assessment 2016				
103-1	Explanation of the material topic and its Boundary	57-59		-
103-2	The management approach and its components	57-59		-
103-3	Evaluation of the management approach	57-59		-
414-1	New suppliers that were screened using social criteria	129		-
414-2	Negative social impacts in the supply chain and actions taken	-		-

Disclosure	Description	Page	Detail/Omission	External Assurance
GRI 416: Customer Health and Safety 2016				
103-1	Explanation of the material topic and its Boundary	60-61		-
103-2	The management approach and its components	60-61		-
103-3	Evaluation of the management approach	60-61		-
416-1	Assessment of the health and safety impacts of product and service categories	128		-
416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	128		-
GRI 418: Customer Privacy 2016				
103-1	Explanation of the material topic and its Boundary	60-61		-
103-2	The management approach and its components	60-61		-
103-3	Evaluation of the management approach	60-61		-
418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	128		-
GRI 419: Socioeconomic Compliance 2016				
103-1	Explanation of the material topic and its Boundary	36-39		-
103-2	The management approach and its components	36-39		-
103-3	Evaluation of the management approach	36-39		-
419-1	Non-compliance with laws and regulations in the social and economic area	129		-
GRI-G4 Sector Disclosure: Access				
103-1	Explanation of the material topic and its Boundary	63-66		
103-2	The management approach and its components	63-66		
103-3	Evaluation of the management approach	63-66		
EU28[E]	Power outage frequency	128		
EU29[E]	Average power outage duration	128		
EU30[E]	Average plant availability factor by energy source and by regulatory regime	128		

[E]GRI-G4 Electric Utilities Sector Disclosures 2010

LRQA Independent Assurance Statement

Relating to Banpu Power Public Company Limited's Sustainability Report for the calendar year 2021

This Assurance Statement has been prepared for Banpu Power Public Company Limited in accordance with our contract but is intended for the readers of this Report.

Terms of engagement

LRQA was commissioned by Banpu Public Company Limited (Banpu) to provide independent assurance on Banpu Power Public Company Limited (BPP)'s Sustainability Report 2021 ("the report") against the assurance criteria below to a limited level of assurance and materiality of the professional judgement of the verifier using LRQA's verification procedure. LRQA's verification procedure is based on current best practice, is in accordance with ISAE 3000 and uses the following principles of - inclusivity, materiality, responsiveness and reliability of performance data.

Our assurance engagement covered BPP's thermal power business consisting of three combined heat and power (CHP) plants in China, Headquarters in Thailand and offices in China and specifically the following requirements:

- Confirming that the performance indicators conform with GRI's specific standard disclosures defined in
  - Sustainability Reporting Standard
  - GRI Electric Utilities sector disclosures.
- Evaluating the reliability of data and information for only the selected performance indicators listed below:
  - GRI 302-1 Energy consumption within the organization (2016)[1]
  - GRI 302-3 Energy intensity (2016) [1]
  - GRI 303-3 Water withdrawal (2018) [1]
  - GRI 303-4 Water discharge (2018) [1]
  - GRI 303-5 Water consumption (2018) [1]
  - GRI 305-1 Direct (Scope 1) GHG emissions (2016) [1]
  - GRI 305-2 Energy indirect (Scope 2) GHG emissions (2016) [1]
  - GRI 305-4 GHG emissions intensity (2016) [1]
  - GRI 305-7 Nitrogen Oxides (NOx), Sulfur Oxides (SOx) and other significant air emissions (2016) [1]
  - GRI 306-3 Waste generated (2020) [1]
  - GRI 306-4 Waste diverted from disposal (2020) [1]
  - GRI 306-5 Waste directed to disposal (2020) [1]
  - GRI 403-8 Workers covered by an occupational health and safety management system (2018) [2]
  - GRI 403-9 Work-related injuries (2018) [2]
  - Lost time injury frequency rate (LTIFR) and injury severity rate (ISR) [2]
  - Tier-1 Process safety event rate[2]

Note:

1) Reporting boundary of these performances data include BPP's thermal power business of three combined heat and power (CHP) plants' operations and activities in China (Luannan Coal-fired CHP Plant, Zhengding Coal-fired CHP Plant and Zouping Coal-Fired CHP Plant)
2) Reporting boundary of these performances data include BPP's thermal power business of three combined heat and power (CHP) plants' operations and activities in China (Luannan Coal-fired CHP Plant, Zhengding Coal-fired CHP Plant and Zouping Coal-Fired CHP Plant) and Headquarter in Thailand and offices in China.

LRQA's responsibility is only to BPP. LRQA disclaims any liability or responsibility to others as explained in the end footnote. BPP's responsibility is for collecting, aggregating, analysing and presenting all the data and information within the report and for maintaining effective internal controls over the systems from which the report is derived. Ultimately, the report has been approved by, and remains the responsibility of BPP.

LRQA's Opinion

Based on LRQA's approach nothing has come to our attention that would cause us to believe that BPP has not, in all material respects:

- Met the requirements above, with the exception of some omissions in the reported data. However, these omissions, and the reason for these omissions, are both clearly stated in the GRI content index within the report i.e.
  - TDS for water discharge is not analysed, so total volume of water discharged is reported without indicating whether it is fresh water or other water.
  - The data for change in water storage is not available, so this data is not included in GRI 303-5.
  - The working hours of contractors with less than 5 consecutive working days and the working hours of employees remaining on site after working hours are not recorded, so these are excluded from GRI 403-9.
- Disclosed reliable performance data and information for the selected performance indicators above.

The opinion expressed is formed on the basis of a limited level of assurance and at the materiality of the professional judgement of the verifier.

Note: The extent of evidence-gathering for a moderate assurance engagement is less than for a high assurance engagement. Moderate assurance engagements focus on aggregated data rather than physically checking source data at sites. Consequently, the level of assurance obtained in a moderate assurance engagement is substantially lower than the assurance that would have been obtained had a high assurance engagement been performed.

LRQA's approach

LRQA's assurance engagements are carried out in accordance with our verification procedure. The following tasks though were undertaken as part of the evidence gathering process for this assurance engagement:

- Auditing BPP's data management systems to confirm that there were no significant errors, omissions, or misstatements in the report. We did this by reviewing the effectiveness of data handling procedures, and systems. We also spoke with those key people responsible for compiling the data and drafting the report.
- Verifying data and information remotely, via video conference, for a selection of BPP's CHP Coal-fired plants in China (i.e. Luannan Plant, and Zouping Plant) and verifying aggregated data, via desktop review, for all selected performance indicators at a corporate level.
  Note: LRQA did not verify the data back to its original sources, nor did it assess the accuracy and completeness of the data reported by individual locations.

Observations

Further observations and findings, made during the assurance engagement, are:

- Responsiveness:
  - TDS of water discharged for Zouping plant should also be analysed at same as other plants to enable categorise its water and report the volume of water discharged under each category, for example: freshwater, or other water.
- Reliability:
  Data management systems are established and centralised for the collection and calculation of data associated with the selected performance indicators. However, we believe that:
  - the reliability and uncertainty of the reported data of water consumption can be improved by monitoring the change of water storage during the reporting period and applying this data for calculation of water consumption.
  - the reliability of the reported data of water withdrawal categories, whether it is withdrawal from freshwater or from other water sources, can be improved by periodically analysing the TDS content of water withdrawn, rather than applying a default to all sources (apart from seawater/brackish water).
  - future reports should include working hours of contractors with less than 5 consecutive working days and the working hours of employees remaining on site after working hours. This will reduce the potential for under reporting of total working hours.

LRQA's standards, competence and independence

LRQA ensures the selection of appropriately qualified individuals based on their qualifications, training and experience. The outcome of all verification and certification assessments is then internally reviewed by senior management to ensure that the approach applied is rigorous and transparent.

The report verification is the only work undertaken by LRQA for BPP and as such does not compromise our independence or impartiality.

Dated: 29 April 2022

Paveena Hengsritawat
LRQA Lead Verifier
On behalf of Lloyd's Register Quality Assurance Ltd.
LRQA (Thailand) Limited
22nd Floor, Sirinrat Building, 3388/78 Rama IV Road
Klongton, Klongtoey, Bangkok 10110 Thailand

LRQA reference: BGK406051

1 https://www.accountability.org/
2 https://www.globalreporting.org
3 GHG quantification is subject to inherent uncertainty.

BANPU
POWER

TALK TO US

Banpu Power welcomes your suggestions and additional information provided for our sustainability policies and operations.

PLEASE CONTACT

Health, Safety, Environment and Community Engagement Department

Banpu Power Public Company Limited
26th Floor, Thanapoom Tower, 1550 New Petchaburi Road, Makkasan,
Ratchathewi, Bangkok 10400 Thailand
Telephone: +66 2007 6000 Ext.: 6066 E-mail: sanicha_p@banpupower.co.th

www.banpupower.com