

# 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.

# 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.





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Social and Governance (ESG)

**Committee and Chief Executive** 

Officer o-

2023 was the year our globe was faced with economic crisis, either an increase of financial costs resulted from higher interest rate or the international geopolitical tensions causing fuel prices to remain high as the year 2022. These were the factors making the growth of industrial sector slow down. They also affected the nation's economic development and the population's well-being. More importantly, the climate change issue is still a challenge in the energy business to which every sector is continuously giving higher attention.

Thanks to our ability to manage production costs and our focus on risk management, Banpu Power Public Company Limited (BPP) has been able to overcome various challenges. This includes the use of innovations to continuously improve operations, allowing BPP to maintain stability, produce and distribute quality electricity meeting customer's needs In addition, our mission on creating growth for BPP's business portfolio under the Greener & Smarter strategy has yielded a fruitful result. BPP has successfully expanded its power business in the United States of America, by investing in Temple II gas-fired power plant, a large power plant employing advanced and highly efficient Combined Cycle Gas Turbines (CCGT) technology. Such an investment has helped increase BPP's production capacity from COD power operations to 3,534 MWe (equity base). This also opens the opportunity for Temple II Power Plant to make profits in the power merchant market with maximum efficiency, by integrating its operations with Temple I Power Plant, located in the same area. As a result, BPP's earnings before interest, tax, depreciation and amortization (EBITDA) were recorded at THB 12,262 million, an increase of 43% from the previous year.



**Prof. Dr. Patchanita Thamyongkit**Chairman of the Environment, Social and Governance (ESG) Committee



**Dr. Kirana Limpaphayom**Chief Executive Officer

To create a well-balance for sustainable growth, in the past year, BPP established the Environment, Social and Governance (ESG) Committee. The aim is to support the Board of Directors in supervising the ESG-related operations so as to adapt to any transitions arising from external factors in the energy transformation era. This includes conducting operations in accordance with international standards and responding to stakeholders' expectations in a balanced way. Moreover, BPP has no policy to invest more in the coal-fired power plants but focusing more on managing existing power plants to be as efficient and stable as possible. As a result,

clean and environmentally friendly technology and innovations have been employed in order to reduce greenhouse gas (GHG) emissions and control pollutant emissions to a minimum. Besides, BPP has invested in renewable energy business and clean energy technology solutions through Banpu NEXT Co., Ltd., as well as joint investments with other businesses within Banpu Group's business eco-system. This is to take part in reducing carbon dioxide emissions such as a joint investment with BKV Corporation in the Cotton Cove project in the U.S. for Carbon Capture, Utilization and Storage (CCUS).



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BPP has been recognized by various institutions and agencies. both nationally and internationally. This has created confidence among its stakeholders that BPP is committed to driving businesses with great emphasis on environment, social and governance. Moreover, BPP has continuously improved itself in accordance with its commitment to delivering quality energy to society.





# **Powering Society with Quality Megawatts**





- Commended Sustainability Awards under the Sustainability Excellence award group: BPP has been bestowed the Commended Sustainability Award for the 2<sup>nd</sup> consecutive year in a category of market capitalization of THB 30.000-100.000 million. Furthermore, it has been selected as a sustainable stock or SET ESG Ratings for the 6th consecutive year from an evaluation by the Stock Exchange of Thailand. BPP was classified at the AAA level for the year 2023.
- BPP received the **Outstanding Company Performance** Awards under the Business Excellence award group from the Stock Exchange of Thailand.
- Outstanding CEO Awards under the Business Excellence award group from the Stock Exchange of Thailand, was bestowed to CEO of BPP. The award is given to top executives who lead the organization to success with moral principles, vision and a focus on sustainable business operations.



- Corporate Governance Report of Thai Listed **Companies (CGR)** BPP has been rated at the Excellent CG Scoring level for the 4<sup>th</sup> consecutive year. This award is organized by the Thai Institute of Directors (IOD).
- BPP is a member of Thai Private Sector Collective **Action Against Corruption (CAC).**
- · BPP's credit rating has been maintained at A+ with a "Stable" outlook from Tris Rating Company Limited. This reflects predictable cash flows from various power business investments, including the quality of power plant assets and BPP's past operating results.
- BPP participated in the Corporate Sustainability Assessment (CSA), organized by S&P Global. BPP received 70% of scores and was ranked in the 89th percentile in the "Electric Utilities" industry group.

Additionally, preparing personnel who are a key force in driving business to grow forward, is one of the important missions. BPP paying great importance to. BPP also gives the new generations an opportunity to develop their own potential in various forms, such as collaborative working between departments and international units, supporting job rotation and working abroad, in order to make them gain direct experiences Moreover, succession planning and its progress are regularly monitored, while working conditions have been created to attract and maintain the potential people with the organization.

Governance

This includes uniting employee's differences into one by cultivating the "Banpu Heart" corporate culture in every operating country.

On this occasion, the Board of Directors and all executives would like to thank all groups of stakeholders for your confidence and trust as well as support given to BPP as always. We believe that the expertise and professionalism of our executives and employees in operating businesses will enable BPP to overcome any challenges and cope with future transitions to create sustainable success together. -







# **About This Report**

Banpu Power Public Company Limited (BPP) has published the sustainability report (Report) annually. With an aim to disclose BPP's operational management processes as well as environment, social and governance (ESG) performance relating to BPP's core materiality, previously revealed in the sustainability report of Banpu Group, this Report has been issued for the 6<sup>th</sup> consecutive year.

The Report has been developed in accordance to the 2021 edition of Global Reporting Initiative Standards (GRI Standards 2021): Core Options with additional indicators for electric utilities sector disclosures for the year 2010. In addition, the operating results have been reported in alignment with the United Nations Sustainable Development Goals (SDGs), while the financial data revealed has complied with the Thai Financial Reporting Standards. The contents printed out in this Report were analyzed through the assessment of 36 sustainability issues of power business for the year 2023, of which 14 topics are associated with BPP's key sustainability materiality. The 2023 core materiality was not different from the assessment result of the previous year.



#### **Reporting Period**

To provide readers with the most up-to-date data, this Report covers the operating performance from 1 January 2023 to 31 December 2023, including subsequent activities conducted within the first quarter of 2023.



#### **Reporting Boundary**

BPP reviewed and communicated its sustainability performance of all key materiality involved. In the previous year, the key issues enclosed all businesses, in which BPP has direct control, namely:

- The three combined heat and power (CHP) plants in China (Zhengding CHP Plant, Zouping CHP Plant and Luannan CHP Plant).
- The gas-fired power plants in United States of America (Temple I and Temple II). Temple II data was consolidated only July to December, after successfully acquired in July 2023.
- Offices in Thailand, China and the U.S.

The sustainability performance data of joint-venture companies, in which BPP has no direct management control, are not included in BPP's operating results. These business entities, however, are playing the key roles in generating revenue and creating growth. Therefore, some of their sustainability outcomes, which have not yet been certified by the external agency, are separately reported based on stakeholders' interests, namely:

- Renewable energy and energy technology businesses, in which BPP has invested through Banpu NEXT Co., Ltd.
- BLCP Power Plant
- HPC Power Plant



#### **Assurance**

This Report was certified, with a "moderate level of assurance" by an external agency, that it was developed for reference Disclosing information according to GRI Standards reporting standards and under the same database as that of Banpu Group.

Details of environmental performance from thermal power business in China and gas-fired power plants business in the U.S. are as follows:

- GRI 302-1 Energy consumption within organization (2016)
- GRI 302-3 Energy intensity (2016)
- GRI 303-1 Interactions with water as a shared resource (2018)
- GRI 303-2 Management of water discharge-related impacts (2018)
- 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) (BPP has adjusted the Global Warming Potential (GWP) according to the IPCC Fifth Assessment Report, 2014 (AR5). As a result, all calculations have been modified since 2019–2022)
- GRI 305-2 Energy indirect (Scope 2) GHG emissions (2016)
- GRI 305-4 GHG emissions intensity (2016)
- GRI 305-7 Nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>) and other significant air emissions (NO<sub>x</sub>, SO<sub>x</sub>, PM and Hg) (2016)
- GRI 306-1 Waste generation and significant waste-related impacts (2020)
- GRI 306-2 Management of significant waste-related impacts (2020)
- GRI 306-3 Waste generated (2020)
- GRI 306-4 Waste diverted from disposal (2020)
- GRI 306-5 Waste directed to disposal (2020)

Meanwhile, the social performance data contributed by thermal power business in China and gas-fired power business in the U.S. as well as offices in Thailand and China are as following:

- GRI 403-1 Occupational health and safety management system (2018)
- GRI 403-2 Hazard identification, risk assessment, and incident investigation (2018)
- GRI 403-3 Occupational health services (2018)
- GRI 403-4 Worker participation, consultation, and communication on occupational health and safety (2018)
- GRI 403-5 Worker training on occupational health and safety (2018)
- GRI 403-6 Promotion of worker health (2018)
- GRI 403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships (2018)
- 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

In order to ensure that the data published is accurate according to the reporting principles, BPP is committed to certifying the Report continuously and adding indicators on core materiality in the future.









Environment

O Social

Performance

# About Banpu Power

Established in 1996, Banpu Power Public Company Limited or Banpu Power (BPP) is a subsidiary company of Banpu Public Company Limited. Twenty years later, it was listed on the Stock Exchange of Thailand in 2016. BPP generates and supplies electricity from thermal power business and renewable power business, inclusion of energy technologies in the Asia-Pacific region and the United States of America. Currently, BPP's business territory covers Thailand, Lao PDR, China, Japan, Vietnam, Australia and the US.

Over the past 20 years of business operations, BPP has been committed to creating sustainable business growth, both in power business investments and management. Owing to its expertise in the power business combined with the strong synergies within Banpu Group relevant to business management and operations, BPP has been able to strive to accomplish its full potential to operate businesses continuously. BPP is also ready to study and develop an array of innovations for efficient power generation through a use of advanced, safe and environmentally-friendly technologies in alignment with the "Greener & Smarter" strategy, in tandem with operating business with social & environmental responsibility and good corporate governance. This is to deliver quality energy in accordance with the target to increase the power generation capacity to 5,300 MW in 2025.



#### Greener

- Focusing on expanding an investment in renewable energy business.
- Effectively carrying out occupational health, safety, environment and community development activities.
- Employing highly efficient and environmentally-friendly technologies to generate electricity from thermal fuels.



#### Smarter

- Improving the future energy and utility management.
- Applying innovations to develop organizational and financial structures.
- Managing business with expertise and applying digital technology to business operations.

Presently, BPP has a total of 41 power plants/projects with an equity-based power generation capacity of 3,534 MWe from COD (Commercial Operation Date) power plants and 108 MW from under development power projects. BPP strives to transform its power generation towards a use of high efficiency and environmentally-friendly technologies, such as natural gas and renewable energy, including an investment in energy technology and stepping into a new business creating the sustainable growth.

# capacity target of MWe by 2025

**4.500** MWe from thermal power

**800** MWe from renewable energy

#### **Current Status**

**Targets** 

A production

5.300



41 Power plants/



3.534 MWe from COD power plants

- 108 MWe from under development power projects
- Energy technology business, such as smart community development business. energy management business, battery business, e-mobility business, etc.
- Carbon Capture, **Utilization and Storage** (CCUS) business

**Banpu Power Group Structure** 













# Operational Highlights



#### **Greener & Smarter**

- Total power generation capacity COD **3,534** MWe
  - Thermal power generation **3,247** MWe
  - Renewable power generation **287** MWe
- Availability Factor (AF)
- Combined heat and power plant **95.98**%
- Combine cycle gas turbine power plant **82.68**%
- Invest in Temple II combine cycle gas turbine power plant with 755 MW increasing competitive advantage in power merchant market.
- Study and invest in energy technology and decarbonization technology such as Carbon Capture, Utilization and Storage (CCUS), energy trading, battery and energy management solutions.
- No environmental, social and governance incidences.

Governance





# Ranked as one of companies bestowed the Excellent

CG Scoring assessed by the Thai Institute of Directors (IOD)



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



**Greenhouse gas emissions intensity 0.469** ton CO<sub>2</sub>e/MWh

Water consumption intensity **0.958** cubic meters/MWh

**2.30** GJ/MWh

Sulfur dioxide (SO<sub>2</sub>) emissions intensity 0.0119 ton/GWh

Oxide of nitrogen (NO<sub>x</sub>)
emissions intensity
0.0323 ton/GWh

Particulate matter (PM)
emissions intensity
0.0124 ton/GWh

**Social** 



**Zero** major incident and illness caused by work

Zero Lost Time Injury Frequency Rate (LTIFR) in employee and contractor



Average training hours

50 hours/person

Banpu Heart score
Thailand 87%
China 91%













# **Banpu Power Assets**

Sunshine

Temple I & II



- 2 Gas-Fired Power Plant
- Temple I 768 MW (50%)
- · Temple II 755 MW (50%)



Sunshine 2.5 MW (50%)



3 Combined Heat and **Power Plants and** 1 Coal-Fired Power Plant

- Zhenadina 139 MWe (100%)
- Zouping 233 MWe (70%)
- Luannan 246 MWe (100%) · Shanxi Lu Guang
- 1,320 MW (30%) 7 Solar Power Plants

177.32 MW (100%1)

#### Solar Rooftop

12.86 MW (100%)

Solar Rooftop Project

**Thailand** 

Solar Rooftop/

Solar Floating

98.36 MW (100%1)

1 Coal-Fired Power Plant

• BLCP 1,434 MW (50%)

53.24 MW (100%)



BLCP

El Wind Mui Dinh

Nhon Hai

Vinh Chau



1 Coal-Fired Power Plant

HPC 1,878 MW (40%)

Zhenadina

Shanxi

Lu Guang

Lao PDR

Xingyu Haoyuan Huineng (IIII) Hui'en

Jinshan (III) Jixin

Deyuan

1 Solar Power Plants

Luannan

• Nhon Hai 35 MW (100%1)

#### 2 Wind Power Plants

- · El Wind Mui Dinh 37.6 MW (100%1)
- · Vinh Chau 80 MW (100%1)

#### Solar Rooftop

Takeo 2

27.04 MW (49.08%1)

Solar Rooftop Project

Awaii

55.36 MW (49.08%1)

#### Japan

Sustainability Report 2023 

Banpu Power

Kurokawa (

Shirakawa (##)

Yamaqata

#### **1 IGCC Power Plant**

Olympia - Sakura No.1

Olympia - Sakura No.2

(IIII) Muroran 1

Muroran 2

M Nakoso

matsu (III) Yabuki

(IIII) Nari Aizu

Olympia - Hitachi Omiya No.1

Olympia - Hitachi Omiya No.2

Olympia - Ozenosato-Katashina

(IIII) Kesennuma

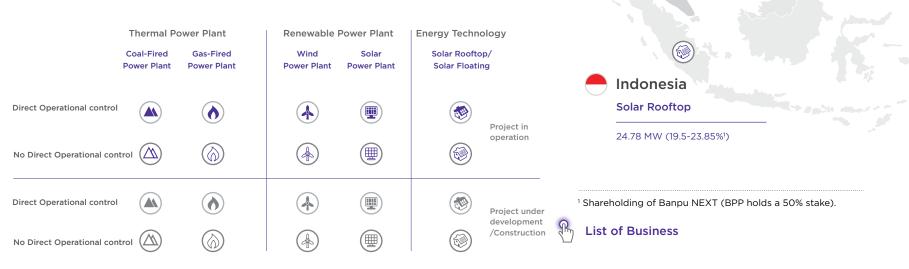
• Nakoso 543 MW (13.4%)

19 Solar Power Plants

153 MW (40-100%1)

Solar Rooftop

2.51 MW (100%1)





(豐

Australia

#### 2 Solar Power Plants

- Beryl 110.9 MW (20%1)
- Manildra 55.9 MW (20%1)

Data as of 31 December 2023









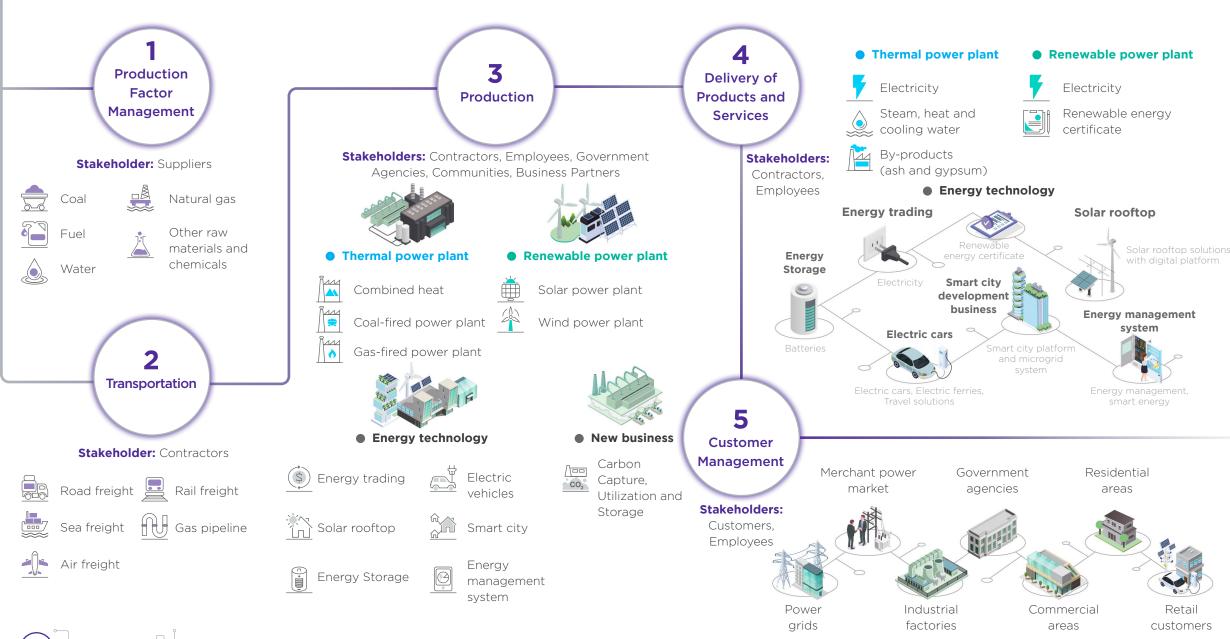








# Banpu Power Supply Chain



Governance —

Environment —

Social

-O Performance

About Banpu Power \_

# **Summary of Major Changes and Development in 2023**

# ⊸ JAN -

 Signed a memorandum of understanding (MOU) with Electricity Generating Public Company Limited or EGCO Group, BLCP Power Company Limited, JERA Co., Inc., Mitsubishi Corporation and Mitsubishi Heavy Industries, Ltd. to conduct a feasibility study on using ammonia as a mixed fuel at BLCP Power Plant. This will help reduce the amount of greenhouse gas (GHG) emissions.



 BLCP Power Plant entered a memorandum of understanding (MOU) with Mitsubishi Corporation and Chiyoda Corporation to conduct a study on "Carbon Capture, Utilization and Storage" or CCUS technology.





**Increased investment proportion** in Durapower Holdings Pte Ltd.

from 47.681% to 65.11% in order to create growth to the energy storage system business - one of the core businesses according to the strategic plan set and to create the marketing potential.

# MAR

- Established the Environment, Social and Governance Committee (ESG Committee) to govern the sustainability
- Invested 4.55<sup>1</sup>% in Green Li-ion Pte. Ltd. a company in Singapore providing a recycling lithium-ion batteries technology service.



Invested 401% in SVOLT

**Limited (SVOLT Thailand)**,

sells lithium-ion batteries for

which manufactures and

**Energy Technology** 

(Thailand) Company

electric cars.

OCT — AUG •

Investing 49% in the "Cotton Cove" project at the Barnett shale gas field,

Texas, in the U.S. to operate a Carbon Capture, Utilization and Storage (CCUS) business.



production capacity of 755 MW. Temple II Power Plant uses advanced and highly efficient with environmentally friendly technology called Combined Cycle Gas Turbines (CCGT).



• Invested 14.21% in Oyika Pte. Ltd., a company in Singapore providing battery swap solutions for electric motorcycles. Oyika services cover many countries in Southeast Asia. On 15 November 2023, BPP increased its stakes in Oyika to 15.91%



 Invested in the Iwate Tono large-scale battery farm project in Japan, with a total electrical energy storage capacity of 58 MWh. The project is expected to commence its commercial operations by 2025.

<sup>1</sup>Shareholding of Banpu Next (BPP holds a 50% stake)















# **Stakeholder Engagement**

Banpu Power has recognized its operational impacts on society, given great importance to all groups of stakeholders and focused on creating proper engagement with each stakeholder group. This is to use opinions gained to develop BPP's operations to create the sustainable development, which is accomplished through three important principles: Participation of all stakeholder sectors or "Inclusiveness," consideration of sustainability issues significant to BPP, including stakeholders in the value chain or "Materiality," and management to meet stakeholders' expectations. These include disclosing operations with transparency manner or "Responsiveness," according to a framework based on the international standard – AA1000 Stakeholder Engagement Standard (AA1000SES).

## Steps of Stakeholder Engagement

#### **Determining the engagement channels**

appropriate for each stakeholder group, such as a visit, a meeting, document preparation to provide information and consultation, etc.

#### **Analyzing and grouping stakeholders**

based on the level to which stakeholders influence BPP's operations and the degree of stakeholders' interests in BPP's operations.





Assessing stakeholder's satisfaction regularly,

such as interviewing stakeholders, developing questionnaires to conduct a stakeholder's satisfaction survey, etc.

#### **Identifying stakeholders**

involved with BPP's operations both inside and outside the organization.









#### **Reporting stakeholder engagement results**

to executives and the Board of Directors for acknowledgement every quarter.



**Guidelines for creating** stakeholder engagement













# Stakeholder Engagement Results

Financial Institutions

Based on stakeholder's analysis and grouping in the past year, it was found that **BPP has 6 groups of key stakeholders** as follows:



Stakeholder Groups	Engagement Channels	Key Issues Interested by Stakeholders	Major Operations Carried-out
1. Joint-venture, Partners, Shareholders, Investors and Financial Institutions	<ul> <li>Board of Directors meetings of subsidiaries and affiliated companies</li> <li>Annual General Meeting of Shareholders</li> <li>Presenting information for investment in various agendas, such as quarterly meetings, roadshows to present BPP data and answer questions, etc.</li> <li>Organizing the analyst meetings.</li> <li>Presenting corporate information at the "Opportunity Day" event organized by the Stock Exchange of Thailand.</li> <li>Creating channels for receiving complaints.</li> <li>Conducting a satisfaction survey.</li> <li>Preparation of annual reports and sustainable development reports</li> <li>Publishing information on the website.</li> </ul>	<ul> <li>A project development performance and business growth in line with climate change.</li> <li>Financial and accounting policy</li> <li>Cash flow management</li> <li>Cost control</li> <li>Accurate and complete financial information within a reasonable period of time</li> <li>Risk management</li> <li>Business operations transparency</li> <li>Developing and inventing innovations to increase competitive advantages</li> <li>BPP executives and Board of Directors' qualifications, including compensation</li> <li>Business operations put high emphasis on environment, social and governance (ESG).</li> </ul>	<ul> <li>Striving towards sustainability in alignment with "Greener &amp; Smarter" strategy through the "Triple E" approach, investing in the power plants with high efficiency and low emissions, such as gas-fired power plants and an investment in renewable energy and energy technology businesses, as well as new businesses creating BPP's growth, such as carbon capture technology (CCUS).</li> <li>Setting up the Climate Change Policy and management guidelines, disclosing risks information, impacts and operations related to climate change in accordance with "Task Force on Climate-related Financial Disclosures (TCFD)".</li> <li>Employing risk management systems covering all business units.</li> <li>Arranging the data accuracy assessment regarding ESG performance from external agencies.</li> <li>Participating in Thai listed companies' "Corporate Governance Reporting Project" for the year 2023, which was assessed by the Thai Institute of Directors (IOD) and receiving an excellent rating (five stars), including being a member of Thai Private Sector Collective Action Against Corruption (CAC).</li> <li>Evaluating Board of Directors' qualifications to prepare a composition of BOD's knowledge and expertise or the skills matrix.</li> <li>Participating in the ESG operations evaluation, being selected as a sustainable stock at the AAA level and receiving the "Commended Sustainability Awards" from the Stock Exchange of Thailand (SET).</li> <li>Taking part in the international sustainability assessment organized by S&amp;P Global in the Electric Utilities industry.</li> <li>Joining the "Carbon Disclosure Project" (CDP) assessment on the topic of climate change and water.</li> <li>Establishing an environment, social and governance (ESG) committee to drive effective sustainability management.</li> </ul>

Governance

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**About Banpu Power** –

	Stakeholder Groups	Engagement Channels	Key Issues Interested by Stakeholders	Major Operations Carried-out
		<ul><li>Conducting an employee engagement survey.</li><li>Conducting the "Banpu Heart" corporate culture survey.</li></ul>	Business direction and corporate sustainable growth	<ul> <li>Conducting a two-way communication to build understanding and regular engaging with employees.</li> </ul>
		<ul> <li>Running the employee's ESG awareness survey.</li> <li>Setting up the Welfare committee.</li> <li>Establishing the Occupational Health and Safety Committee.</li> </ul>	The organization's business ethics and corporate responsibility on employees	<ul> <li>Communicating about corporate governance and integrating CG as part of the organization's culture.</li> </ul>
	2. Employees	<ul> <li>Instituting the Innovation Promotion committee.</li> <li>Instituting the Innovation Promotion committee.</li> <li>Organizing activities to promote social responsibility.</li> <li>Arranging corporate culture promotion activities.</li> <li>Providing channels for receiving grievances (Whistleblowing).</li> <li>Employing the performance assessment system.</li> <li>Disseminating press releases within the organization.</li> <li>Producing annual reports and sustainable development reports.</li> </ul>	<ul> <li>Providing fair compensation</li> <li>A performance evaluation</li> <li>Career advancement</li> <li>Competency development</li> <li>Being allowed to take part in making decisions and having a chance for giving opinions.</li> <li>Work-life balance</li> </ul>	<ul> <li>Carrying out labor work as required by laws and in accordance with international principles.</li> <li>Establishing clear, transparent and fair key performance indicators (KPIs) for evaluating employee's performance.</li> <li>Allocating budgets and courses to develop employee's competency and creating individual development plans.</li> <li>Cultivating a "Banpu Heart" corporate culture.</li> </ul>
		Publishing information on the website.	Working environment/condition and safety	<ul> <li>Regularly inspecting working environment and safety.</li> <li>Providing welfares to employees, such as an annual health check-up, "Flexi Hour", "Flexi Benefits" and "Work from Anywhere", etc.</li> </ul>
		<ul> <li>Arranging meetings and visits on various occasions.</li> <li>Site visits and inspecting operations.</li> <li>Submitting reports and data required by laws.</li> <li>Disclosing information as requested.</li> <li>Participating in various projects organized by the</li> </ul>	Compliance with laws and regulations, including appropriate risk management.	<ul> <li>Developing a legal register and keeping it up to date.</li> <li>Employing a system to check and monitor legal compliance risks, especially a monthly inspection and report, including an inspection from independent agencies.</li> <li>The power plants in which BPP has direct management control has been certified with operational standards for quality, safety and environment.</li> </ul>
7	. A Government	<ul><li>government sector.</li><li>Developing annual reports and sustainable development reports.</li></ul>	Corporate governance according to business ethics principles.	<ul> <li>Announcement of corporate governance policy and business ethics principles and regularly inspecting and following up CG operation performance.</li> </ul>
	Sector	<ul> <li>Publishing data on the website.</li> </ul>	Creating economic, social and environmental value.	<ul> <li>Organizing corporate social responsibility (CSR) projects, paying taxes as required by laws and promoting local employment and procurement.</li> <li>Giving cooperation and supporting the government's sustainability projects.</li> </ul>
			Utilizing natural resources for maximum benefits.	<ul> <li>Implementing the environmental projects to reduce resource consumption and waste generation.</li> </ul>















Stakeholder Groups	Engagement Channels	Key Issues Interested by Stakeholders	Major Operations Carried-out
4. Customers	<ul> <li>Having a meeting with customers to set plans, make understanding about the market situation and scheduling for delivering work according to the targets set.</li> <li>Meeting with operators to exchange experiences in machine operations and contract management.</li> <li>Arranging customer visits to acknowledge problems and find solutions for improvement.</li> <li>Disclosing information as requested.</li> <li>Conducting a customer satisfaction survey.</li> <li>Setting up a mechanism to receive complaints through multiple channels, such as through telephone and website.</li> </ul>	<ul> <li>Availability Factor of electricity and other forms of energy is in accordance with the agreed plan.</li> <li>Delivering quality products and services as agreed at a reasonable price.</li> <li>Employing business continuity management to continue delivering products and services if unexpected events occur.</li> </ul>	<ul> <li>Carrying out production and maintenance efficiently, able to maintain an availability factor in supplying electricity and other forms of energy according to requirements with reasonable prices.</li> <li>Establishing a business continuity management plan to assure customers that BPP is able to continuously deliver products and services even in times of crisis.</li> <li>Implementing a quality management system (ISO 9001).</li> </ul>
5. Suppliers/Contractors	<ul> <li>Disclosing procurement data through websites or applications.</li> <li>Conducting a meeting with suppliers/contractors.</li> <li>Arranging trainings to build suppliers/contractors competencies and working safety.</li> <li>Conducting supplier/contractor satisfaction survey.</li> </ul>	<ul> <li>Transparent procurements and fair compensations</li> <li>Making payments in a specified period of time.</li> <li>Carrying out operations as specified in related project timeline.</li> <li>Workplace safety and environment</li> </ul>	<ul> <li>Equally disclosing procurement data.</li> <li>Transparent procurement with fair selection requirements through the supplier/contractor selection committee</li> <li>Regularly communicating operational plans and progress of joint operations.</li> <li>Specifying environmental and workplace safety measures for contractors and those involved in operations equally to employees.</li> </ul>
ค. Communities	<ul> <li>Conducting a community opinion survey.</li> <li>Surveying basic information and community's opinions before starting the project.</li> <li>Providing grievance channels through telephones and websites.</li> <li>Conducting meetings with communities.</li> </ul>	Environmental management	<ul> <li>Using highly efficient and environmentally-friendly technology for project designs and production process improvement.</li> <li>Employing an effective environmental management and monitoring system and using clear technology with ultra-low pollution emissions.</li> <li>Communicating environmental performance to communities surrounding the power plants regularly.</li> </ul>
and Society	<ul> <li>Establishing a joint development committee with the community.</li> <li>Carrying out community relations operation and</li> </ul>	Human rights	<ul> <li>Defining human rights policy and guidelines for assessing human rights related risks.</li> <li>Conducting human rights due diligence for joint-venture power plants in Thailand and wind power plants in Vietnam.</li> </ul>
	organizing activities with communities.  Organizing BPP site visits for communities.  Publishing annual reports and sustainability reports.  Disseminating information on the website.	Corporate social responsibility projects	<ul> <li>Continuously engaging with communities and looking for opportunities to carry out corporate social responsibility (CSR) projects to build potentiality and sustainability in the area.</li> <li>Vigorously giving assistance to communities and society during disasters, such as providing aid during the COVID-19 outbreak and floods, etc.</li> </ul>

15 POWER UP

TO INFINITE ENERGY

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civil society, and non-governmental organizations (NGOs). BPP, therefore, has regularly created appropriate participation and listened to opinions of these stakeholder groups.



# Stakeholder Engagement Survey

In 2023, BPP conducted the external stakeholder satisfactory survey with business partners, contractors, suppliers, investors, investment analysts, media, the public sector, NGOs, academic institutions, government agencies and regulators in order to inquire about their satisfaction and expectations from BPP's operations.

The survey was carried out by a consulting company through online channels during August to October 2023. The survey results revealed that the overall stakeholder's satisfaction was at a high level, equaling to 93%, from a respondent rate of 66%.

In addition, BPP plans to improve its communications and continuously monitor this area throughout the year 2024. More importantly, stakeholder's opinions received from the survey will be taken into consideration in assessing core issues related to sustainability (Materiality Assessment) in 2024.

Topics	Scores (%)
Working with BPP's people and business relationship	88
Transparency and fairness	97
Professionalism	100
Communication channels effectiveness	79
Stakeholder engagement	83
Overall satisfaction	93

BPP has strategized ongoing enhancements to stakeholder engagement.







# Materiality Assessment

Banpu Power has assessed the sustainability materiality related to its businesses in order to prioritize the short- and long-term sustainability issues. The sustainability strategies and targets for the years 2021-2025 have been set up, in alignment with the "Greener & Smarter" strategy. Moreover, the action plan and appropriate indicators have been developed, while the sustainability progress has been monitored and reviewed regularly by various parties, ranging from business units, the Sustainability Committee, the Risk Management Committee, the Environment, Social and Governance (ESG) Committee to the Board of Directors. Besides, the external assessment results from both national and international agencies are also in consideration on developing improvement plans and raising BPP's sustainability performance standards, corresponding to endless changes and meeting the international standards and stakeholders' expectations.

BPP's key sustainability 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 upon its importance to BPP and stakeholders covering the ESG issues. Moreover, the outstanding materiality has been annually reviewed by the "Sustainability Committee" and the "ESG Committee".



Sources of sustainability issues include:



Trends or directions of changes in the energy business



**Applicable laws and future change trends** 



**Current and future energy demand of customers** 



Practice guidelines, best practices of power business and others associated



Operations and growth-related risks, inclusion of ESG risks













Identifying relevant sustainability issues 2 Core materiality prioritization

Reviewing core materiality by senior management

Considering core materiality

- 1. Identifying relevant sustainability issues by studying from various sources and stakeholder's engagement, compiling business-related issues and expectations and thoroughly assessing risks and arising changes. In 2023, stakeholders' opinions were used for reviewing and identifying the core materiality in this report, such as:
  - Expectations from international stakeholders, such as ESG performance questionnaires from appraisal agencies and financial institutions.
  - The results of meetings with governmental agencies to clarify the projects and obtain suggestions.
  - The outcomes from meetings with joint-venture partners, regulatory agencies, consultants, suppliers, customers and financial institutions to clarify the projects and obtain their opinions.
  - The satisfactory survey results conducted with stakeholders who have jointly worked with BPP, namely joint-venture partners, regulatory agencies, consultants, suppliers and financial institutes, through online questionnaires.
  - Consequences from the power plants' customer satisfaction survey organized via a joint meeting.
  - The results of meetings arranged to update BPP's operational progress and listen to opinions, such as the shareholders' meetings and the security analyst meetings.
  - The sequels of keeping track on local and global policy trends, legislation and ESG expectations.
  - The results of employee engagement survey and "Banpu Heart" corporate culture scores, including employee feedback gained from the online surveys carried out by external consultants and a focus group within the organization.

#### 2. Core materiality prioritization

- 2.1 Identifying each materiality significance on BPP's operations
  - The levels of impacts on BPP are evaluated, which are consistent with BPP's risk assessment criteria combined with likelihood or probability, including risk forecasts, emerging risks or BPP status during the time when the sustainability assessment is conducted.
- 2.2 Identifying each materiality significance on stakeholders

The impact levels on all stakeholders have been assessed by concentrating on key stakeholders of each materiality affected by BPP's operations both positively and negatively throughout the value chain. The impacts can be divided into three dimensions, including the effect on natural capital, social capital and human capital. The human rights risk has been integrated into all areas of consideration.

- **3. Reviewing core materiality by senior management** through the Sustainability Committee meeting convened annually where BPP President is the chairman and top executives of each operational country are the committee members.
- **4. Considering core materiality** by the ESG committee and approved by the Board of Directors.

Additionally, the outcomes of core materiality prioritization have also been used to communicate and obtain opinions from external experts/consultants to ensure a comprehensive and complete assessment.







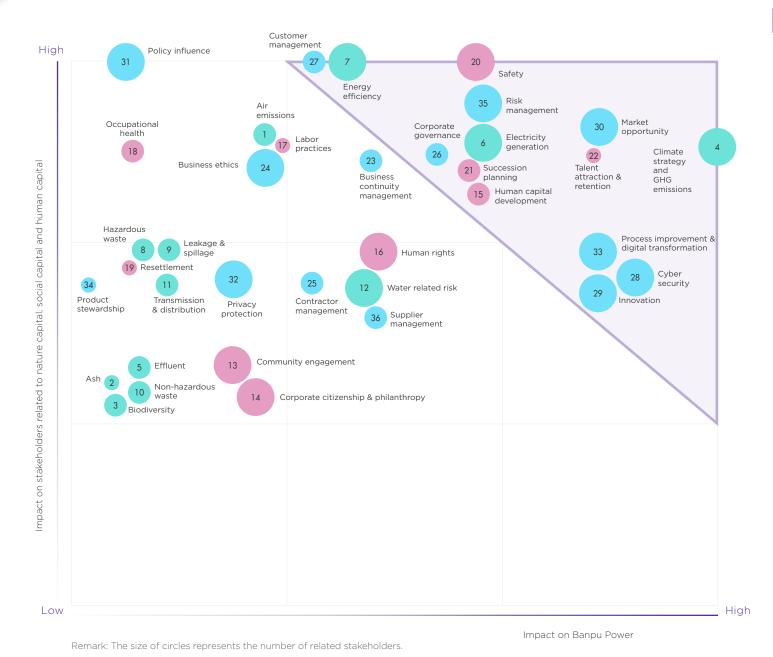








# O Materiality Assessment Results



Sustainability Materiality Air emissions 2. Ash Biodiversity Climate strategy and GHG emissions Effluent Electricity generation **Energy efficiency** Hazardous waste Leakage & spillage 10. Non-hazardous waste Transmission & distribution 12. Water related risk 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 23. Business continuity management 24. Business ethics 25. Contractor management 26. Corporate governance 27. Customer management 28. Cyber security 29. Innovation 30. Market opportunity 31. Policy influence 32. Privacy protection 33. Process improvement & digital transformation 34. Product stewardship 35. Risk management 36. Supplier management





# **Operation** Core Sustainable Materiality in 2023

BPP identified 14 major materiality related to sustainability. This materiality was reviewed by executives and the ESG Committee and approved by the Board of Directors shown in this SD report as following:

	Scope of Signature	gnificance on Stakeholders		
Key Materiality	Within the organization	Outside the organization	٦	Topics in the report
d. Climate strategy and GHG emissions [strategy on climate change and greenhouse gas (GHG) emissions]	• Banpu Group	<ul> <li>Joint-venture companies/ joint-venture partners</li> <li>Customers</li> <li>Financial Institutions</li> <li>Governmental sector and regulatory agency</li> <li>Shareholders/investors</li> </ul>	P	Climate change and GHG emissions
i. Electricity generation	• Banpu Group	Joint-venture companies/ joint-venture partners     Customers     Financial institutions     Government sector and regulatory agencies     Shareholders/investors	P	Electricity generation
. Energy efficiency	Banpu Group	<ul> <li>Joint-venture companies/ joint-venture partners</li> <li>Customers</li> <li>Financial institutions</li> <li>Government sector and regulatory agencies</li> <li>Shareholders/investors</li> </ul>	P	Energy efficiency
5. Human capital development	Employee     Banpu Group	Joint-venture companies/ joint-venture partners	P.	Human capital development
O. Safety	Employee     Banpu Group	Joint-venture companies/ joint-venture partners     Contractors     Customers     Communities     Government sector and regulatory agencies	P	Occupational health and Safety
1. Succession planning	- Employee - Banpu Group	Joint-venture companies/ joint venture partners	<u>ም</u>	Talent attraction

	Scope of Sig	gnificance on Stakeholders					
Key Materiality	Within the organization	Outside the organization	Topics in the report				
26. Corporate governance	Employee     Banpu Group	<ul> <li>Joint-venture companies/ joint-venture partners</li> <li>Financial institutions</li> <li>Government sector and regulatory agencies</li> <li>Shareholders/investors</li> </ul>	Ph	Corporate governance			
27. Customer management	Employee     Banpu Group	• Customers	P	Customers Management			
28. Cyber security							
29. Innovation	• Employee	Joint-venture companies/ joint-venture partners	6	Process improvement			
33. Process improvement & digital transformation	• Banpu Group	Suppliers/contractors     Customers	S. W.	and innovation			
30. Market opportunity	• Banpu Group	<ul> <li>Shareholders/investors</li> <li>Joint-venture companies/ joint-venture partners</li> <li>Suppliers</li> <li>Customers</li> </ul>	P	Market opportunities			
35. Risk management	Employee     Banpu Group	Suppliers/contractors     Customers     Financial institutions     Government sector and regulatory agencies     Shareholders/investors	P	Risk management			



& retention











# **Banpu Power Sustainable Development**

Banpu Power operates the energy business through the heart of innovations and advanced & environmentally-friendly technologies so as to deliver the sustainable energy contributing values for economic and social development with affordable prices, reliable and eco-friendly manner. BPP does not only continuously improve operational efficiency and invest in clean energy, but it also increases an ability to adapt itself to today's rapid changes, such as climate change, which originates risks and opportunities for energy business throughout the value chain. This

has led to the growth of renewable energy and energy generation technology as well as smart energy utilization, including an investment in the new S-Curve industry. Such a move, however, is considered as the try-out and opportunity for BPP to formulate strategies and lay down a foundation for the sustainable development, putting great emphasis on value creation for all groups of stakeholders in the long-run.





- · Investing in sound properties with efficient cost management.
- Creating competitive advantages via innovations and employee competency development.
- Establishing business partners throughout the supply chain.



# Reliable

- Enhancing good corporate governance (CG) standard.
- Implementing a risk management system and seeking business opportunities in pursuant to the integrated energy producer and distributor.
- Employing the monitoring and inspection systems as well as communicating a transparent performance to stakeholders.



# Eco-friendly

- Utilizing innovations and high efficiency, low emission technologies.
- Drawing participations from stakeholders and communities surround the project areas.
- Employing the environmental, occupational health and safety management system standards.



Sustainable Development Policy











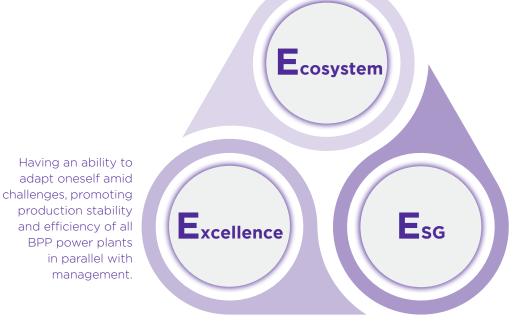




# Q Banpu Power's Strategies towards Sustainability

BPP is adhered to deliver sustainable energy under the concept of "Powering Energy Sustainability with Quality Megawatts", aiming to create energy sustainability through quality megawatts. To achieve the production capacity of 4,500 MW from thermal power plants and 800 MW from renewable energy in the year 2025, BPP manages its operates with the "Triple E" approach as follows:

Aiming to create quality megawatts with a balanced business portfolio by adding upon the business ecosystem in Banpu Group.



Conducting business in accordance with the sustainable development principles, being a good corporate citizen with social responsible manner in all countries where BPP has invested and operated.

## **Sustainability Governance Structure**

BPP set a management framework to drive operations by taking into account the external factors and changes occurring all around. Strategies are laid out and indicators are set for both the short- and long-terms. The missions are then assigned to executives and all employees to drive towards success.

**The Board of Directors** determined the organization's sustainability policy, the environment, social and governance (ESG) strategies and other related policies. It also sets the operational goals and stakeholder engagement procedures, as well as assessment results of key sustainability issues.

BPP established **the Environment, Social and Governance Committee (ESG Committee)** to support the Board of Directors in overseeing, strategizing and following up on progress. The ESG Committee is also responsible for evaluating sustainability performance, reviewing and providing recommendations with regard to stakeholder engagement processes and assessment results on key sustainability issues. The ESG Committee is convened quarterly.

BPP set up **the Sustainability Committee** to drive operations with the Chief Executive Officer (CEO) as a chairman and all senior executives as directors. The purpose is to ensure that the sustainability policies are implemented throughout the organization, corresponding to the goals set.

BPP has also driven the sustainability through instituting **the Sustainable Development and Risk Management** department responsible for coordinating and communicating about policies, best practices, setting up goals, following up operation performances across the organization. In order to report to ESG Committee and communicate and disclose information to stakeholder.

BPP has cultivated the **Banpu Heart** corporate culture, of which the sustainable development is one of the shared values all employees and executives are adhered to. Respectively, they must be aware of their social and environmental responsibilities, make decisions based on sustainability principles and be a good corporate representative in communicating correct information to stakeholders, such as joint venture companies, business partners, suppliers, contractors, sub-contractors, customers and communities.







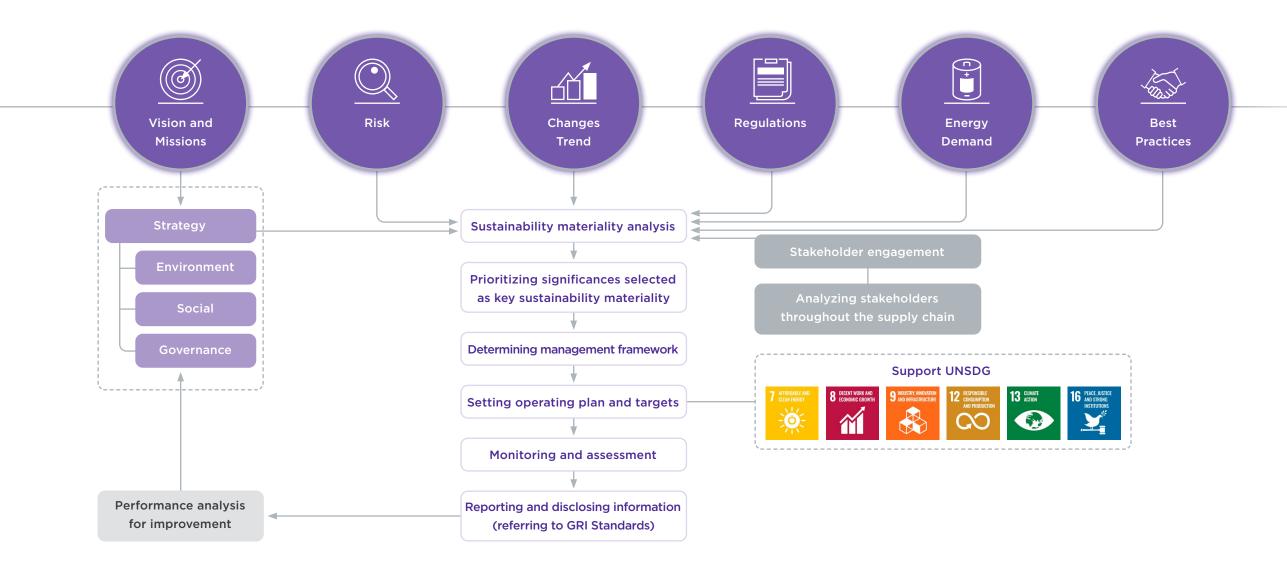








In addition, BPP annually reports its operating results through a sustainability report. The information published is examined by external agencies regarding key materiality for accuracy and being ready to build confidence among stakeholders.















# Sustainable Development Performance Assessment Results

BPP has evaluated its sustainable development performance in various levels as following:

#### The Board of Directors Performance Assessment

BPP sets an agenda for the Board of Directors' appraisal once a year through self-assessment, divided into 3 levels as following:

- · Individual self-assessment
- The entire Board of Directors' performance evaluation
- Appraisals of each sub-committee's performance



The Performances of Chief Executive Officer (CEO) and Top Management are appraised against BPP's sustainable development targets, twice a year, divided into annual and long-term assessments, including:

- Creating growths in High Eefficiency, Low Emissions (HELE) power plants in pursuant to the Greener & Smarter strategy.
- Operating productions to generate returns in line with the targets.
- Enhancing ESG operation standards and being internationally recognized in order to create competitive advantages and respond to stakeholders' expectations.
- Fully complying with laws with no incidents associated with violations of local or international ESG laws.
- · Creating employee engagement, recruitment and competency development.
- Engaging stakeholders via various channels.



For more information about UNSDGs –



#### **Performance Appraisals for Executives and Employees**

twice a year, through a use of key performance indicators (KPIs) related to both operational performance and behaviors promoting the corporate shared values.



#### Analyzing the Operating Results Against Best Practices or Standards in the Industry (Gap Analysis)

such as analysis for better improvements through international sustainability assessments – S&P Global Corporate Sustainability Assessment (CSA), Carbon Disclosure Project (CDP) and sustainability assessment conducted by the Stock Exchange of Thailand, etc.















## Annual SD Operation Results

# MAY

#### 11 May 2023

The Sustainability Committee meeting for the year 2023 was held in order to review the goals set and acknowledge ESG performance, as well as to formulate strategies for environment, social, corporate governance and decarbonization operations.

#### 17 May 2023

The ESG Committee Meeting No. 1/2023 was organized to consider and provide suggestions for improving the Environmental Policy and Human Rights Policy, as well as to review operating results and goals related to ESG.

#### 25 May 2023

The Board of Directors approved the improvement of the Environmental Policy and Human Rights Policy.

#### 10 October 2023

The ESG Summit 2023 was organized by Banpu Group to strategize and promote ESG operations and to make the policy into practices throughout the organization according to the "Greener & Smarter" strategy, including presentations of ESG strategic plans by executives of each business unit. In the past year, the ESG Summit was arranged under the concept of "Sustainability Horizons: Pioneering Decarbonization and Data Privacy & Cybersecurity".



# **AUG** ~

#### 15 August 2023

The ESG Committee Meeting No. 2/2023 was conducted to follow up the ESG performance progress on key issues and to report the stakeholder engagement result for the 3rd quarter of 2023.

#### **22 November 2023**

The ESG Committee Meeting No. 3/2023 was organized in order to consider the meeting plans for 2024 and follow up on ESG performance progress relating to key materiality as well as to report the stakeholder engagement performance for the 4<sup>th</sup> quarter of 2023.



#### 6 December 2023

Conducted by external consultants, the training on the topic of ESG Risks and Trends in Power Business was arranged for the Board of Directors, executives and employees to provide knowledge about ESG related risks and trends.



# **Environment, Social and Governance Committee** (ESG Committee) Meeting ......

BPP established the ESG Committee in March 2023. consisting of 3 independent directors. Held every quarter, the meeting is aimed at following up on ESG performance progress against BPP's goals, and considering key sustainability issues, including stakeholder engagement results from various agencies. Due to the first year establishment, the ESG Committee meeting was organized only 3 times, with details as follows:

#### **Core Agendas**

#### 17 May 2023

- · Considering the 2023 meeting plan.
- Considering an improvement of environmental and human rights policies.
- Announcement of the establishment of the Sustainability Committee for the year 2023.
- Reviewing ESG operational performance and goals.

#### 15 Aug 2023

- · Following up on ESG performance progress, especially on core issues.
- · Reporting the stakeholder engagement result for the 3<sup>rd</sup> quarter 2023.

### 3rd

#### 22 Nov 2023

- · Cogitating the 2024 meeting plan.
- Following up on ESG performance progress, particular to key materiality.
- · Reporting the stakeholder engagement result for the 4th quarter of 2023.













# Banpu Power and Sustainable Development Goals

- GHG emissions intensity < 0.676 ton CO<sub>2</sub>e/MWh
- Renewable energy generation capacity no less than 800 MWe
- Disclose climate change information according to TCFD
- Establish business continuity management system and conduct drill at all operating assets 100% coverage of critical business function conduct business continuity plan drill
- Water consumption intensity
   0.868 m<sup>3</sup>/MWh
- Energy consumption intensity
   1.55 GJ/MWh
- 100% re-used/recycled of fly ash and bottom ash
- All operational control assets assessed for potential biodiversity impact
- Ultra-low emissions intensity
- No significant environmental and social incident
- No significant ESG complaint from communities
- All combined heat and power plant in China was certified ISO 14001.
- Cybersecurity and privacy maturity score not less than 2.5 (full score = 5)



- 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 the Thai Private Sector Collective Action Against Corruption (CAC)
- Power generating capacity 5,300 MW
- Availability Factor (AF) not less than 90%
- Forced Outage Factor (FOF) not more than 5%
- Key ESG issues are part of senior management's KPI.

- No major incident and occupational illness in employees and contractors
- Employee Engagement score of no less than 70% in Thailand and 85% in China
- Banpu Heart Score of no less than 70% in Thailand and 90% in China
- No significant human rights complaints
- No complaint about customer privacy and product use







# The United Nations Sustainable Development Goals (SDGs)

#### BPP's 2025 Targets



- 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 MW comprising of 4,500 MWe from thermal power generation and 800 MW from 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.



- 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 70% in Thailand and 85% in China.

- Banpu Heart Score of no less than 70% in Thailand and 90% in China.
- 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 used.
- All customers' complaints are investigated and resolved within an appropriate timeframe.

# The United Nations Sustainable Development Goals (SDGs)

#### BPP's 2025 Targets



- 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<sub>2</sub> < 0.0776 ton/GWh
- NO<sub>x</sub> < 1.184 ton/GWh
- PM < 0.0230 ton/GWh
- Hazardous waste disposal to landfills < 210 ton/year.
- Non-hazardous waste disposal to landfills < 793 ton/year.
- 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 resolve 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 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 (full score = 5).



- 12.2 By 2030, achieve the sustainable management and efficient use of natural resources
- Water consumption intensity < 0.868 m<sup>3</sup>/MWh.
- Energy consumption intensity < 1.55 GJ/MWh.</li>
- 100% re-used/recycled of fly ash and bottom ash.
- All operational control assets assessed for potential biodiversity impact.



- 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.
- GHG emissions intensity < 0.676 ton CO<sub>2</sub>e/MWh in all operational control thermal power plants.
- Increase energy generation capacity from renewable energy to 800 MWe.
- Disclose climate change information according to the recommendations of 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 function conduct business continuity plan drill.



- 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 the Thai Private Sector Collective Action Against Corruption (CAC).









Environment

O Social

Performance

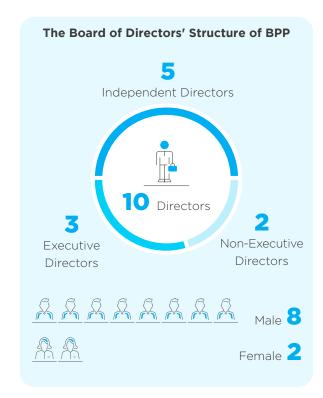


# **Corporate Governance**

**Stakeholders:** • Business partners, shareholders, investors, employees, financial institutions and the government sector

The Board of Directors is committed to and puts a great emphasis on operating business transparently and efficiently. As a result, the corporate governance (CG) and business ethics policy has been set up for the Board of Directors, executives and employees to use as a guideline for operating business both nationally and internationally. In order to build confidence among all sectors of stakeholders, the principles of CG Code 2017, Corporate Governance Report for Thai Listed Companies (CGR) and best practices of the Securities and Exchange Commission (SEC) and the Stock Exchange of Thailand (SET), including international criteria - the ASEAN Corporate Governance Scorecard, as well as compliances with applicable laws and regulations, have been adopted and used as guidelines for corporate development, appropriate risk management and internal control. This is a significant foundation in running a business for the sustainable growth. Additionally, the environment, social and governance (ESG) strategies have been integrated into BPP's operational master plan. Meanwhile, CG has been promoted through the Banpu Heart corporate culture regarding Adhere to Integrity and Ethics, to which directors, executives and employees are attached and use as a code of conduct in operating business in order to upgrade BPP's CG system and build confidence among shareholders, investors, customers, business partners, communities and all stakeholders in the short- and long-terms. The Board of Directors has assigned the Chief Executive Officer (CEO) to be responsible for business operations along with CG operations. Key ESG issues are included as part of the annual performance indicators for CEO and senior management of all business units.

#### O Corporate Governance Structure



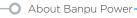
The Board of Directors' structure of BPP consists of 10 directors, divided into 5 independent directors, 2 non-executive directors and 3 executive directors. of which independent directors account for 50% of the entire Board. Under this BOD structure, there are 4 sub-committees, namely the Governance and Nomination Committee, the Audit Committee, the Remuneration Committee and the ESG Committee.

BPP has determined that the term of office for an independent director shall not exceed nine years or three consecutive terms. The nominee must not be a director of more than five listed companies on the Stock Exchange of Thailand and a quorum must be at least two-thirds of directors from the entire BOD to vote at a meeting.

BPP holds a joint meeting between independent directors and non-executive directors, exclusion of executive directors and management, once a year. In 2023, such a joint meeting was organized on 14 October, with all 7 non-executive directors attending this meeting. The meeting was aimed at providing the opportunity for all directors to present and discuss issues freely, as well as express their opinions and suggestions beneficial for the collaboration between the Board of Directors and BPP management to mutually work. This included setting up management guidelines for business administration in accordance with BPP's action plans and targets. At the meeting, opinions related to BPP's top executives succession plan were also recommended.















	The Corporate Governance and Nomination Committee	The Compensation Committee	The Environment, Social and Governance (ESG) Committee	The Audit Committee
Entire Board of Directors	3	4	3	4
• Executive Directors	-	1	-	-
Non-Executive Directors	1	1	-	-
• Independent Directors	2	2	3	4
Related Charters	The Charter of the Corporate Governance and Nomination Committee	The Charter of the Compensation Committee	The Charter of the ESG Committee	The Charter of the Audit Committee
	Pro	P	Phy	
Major Responsibilities	<ul> <li>Considering the policy and practice guidelines regarding corporate governance and business ethics.</li> <li>Looking into compliance with policies and practices within the ethics framework.</li> <li>Recruiting and selecting individuals to serve as the company's directors, CEO and executive officers.</li> <li>Following up succession plans of high-ranking executives.</li> </ul>	<ul> <li>Giving suggestions regarding remuneration and other benefits for management, the Board of Directors, sub-committees and CEO.</li> <li>Considering the overview and structure of salary and annual bonus.</li> </ul>	<ul> <li>Providing suggestions on strategy and operational guideline related to ESG.</li> <li>Pondering and reviewing policies, goals, operations and performance results related to ESG.</li> <li>Reviewing and following up on environmental risk management.</li> <li>Examining and following up on stakeholder engagement processes.</li> <li>Considering and reviewing environmental data disclosures.</li> </ul>	<ul> <li>Examining financial statements, internal control and risk management systems, as well as legal and regulatory compliances.</li> <li>Examining action plans and performance of the Internal Audit Office.</li> <li>Considering BPP's information disclosure in case of connected transactions or conflicts of interest.</li> <li>Supervising the company to comply with the anti-corruption policy.</li> <li>Selecting, proposing, appointing and terminating auditors, inclusive of proposing for consideration of BPP' auditor's remuneration.</li> <li>Determining the internal audit unit's independence, including giving opinions on its action plans and performance, budgets and manpower as well as approving the appointment, performance appraisal, transfer, dismissal of the chief of internal audit unit.</li> <li>Continuously reviewing and monitoring critical risk management from the risk management committee, inclusion of managing cyber security risk and other information technology risks as well as the overall picture of corporate risks.</li> <li>Reviewing and supervising BPP to duly comply with its anti-corruption policy.</li> </ul>









#### **Significance and Corporate Commitments**

Additionally, the Board of Directors prescribes that the Chairman of the Board of Directors and CEO must not be the same person. BPP has clearly divided the duties of the Board of Directors and its management. Thereby, the Board of Directors appoints and assigns the CEO to be responsible for business operations and development as well as strategy implementation. Meanwhile, the CEO delegates his/her authority to the next level executives of both domestic and international business units by using the Delegation of Authority (DOA) to create a balance between corporate governance and management.

BPP is committed to strictly operating business in compliance with rules and regulations as well as the resolution of the shareholder meeting, while paying great attention to environment, social and corporate governance (ESG). This is to increase the sustainability management efficiency, which is a good basis for operating business. As a result, the Board of Directors established the Environment, Social and Governance Committee (ESG



Moreover, BPP's Sustainability Committee has been established to carry out ESG operations. The Sustainability Committee consists of corporate senior executives and business units' executives from all countries, in which BPP has operated business. The Chief Executive Officer (CEO), who is a BOD member, is responsible for setting up policies, targets, strategic plans, indicators and monitoring performance. This is to ensure that all BPP's business units are able to create complete value for all stakeholders. have competitive advantages and appropriate risk management, adaptive to change and grow sustainably.

#### **Performance to Drive Towards Sustainability** in the Year 2023 -

- Establishing the ESG Committee as BPP's additional sub-committee in order to raise the supervision level on ESG operations, in particular.
- Continuing to improve policies related to sustainability management to be consistent with current standards and guidelines used to assess international sustainability performance. The BOD meeting resolved to approve policies and guidelines related to ESG, with 2 updates, namely: the Environment Policy and the Human Rights Policy.
- Assessing, monitoring and investigating operational and ESG risks, including integrating ESG risk issues into the organization's risk management system.
- Reviewing and evaluating BPP's materiality assessment to be consistent with operational scope expansion, ESG risks and trends in emerging changes.









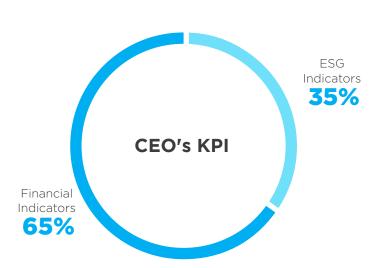






#### **Sustainability Performance Assessment**

The Board of Directors determines the performance indicators (KPIs) for CEO, consisting of both financial and ESG measures. The ESG indicator accounts for 35%, such as including employee engagement levels, number of significant CG complaints, number of cyber security incidents and number of fatalities resulted from working, etc. In addition, the performance indicators of senior executives are consistent with those of CEO. The CEO performance is evaluated by the Board of Directors, while that of senior executives are appraised by CEO.



#### **Board of Directors Nomination**

BPP established the BOD nomination policy, focusing on diversified qualification regarding independence, knowledge, competency, skills, experience, specific expertise, as well as genders, races and ages. The components of the committee's knowledge and expertise or Skills Matrix have been prepared. The Governance and Nomination Committee has been assigned to determine the criteria and processes for selecting individuals who are appropriate and worthy

of being nominated as directors. The selection process is done by both giving opportunities to minority shareholders and major shareholders to nominate and a selection by the Governance and Nomination Committee. This is to ensure that the overall composition of the Board of Directors is appropriate to supervise the organization in accordance with BPP's directions and strategic plans, able to meet stakeholders' needs.



In addition, the Governance and Nomination Committee is responsible for nominating and appointing the CEO and senior executives before proposing to the Board of Directors for further approval. The selection and nomination are based upon qualifications, knowledge, competencies, energy

business operations, experiences in various fields, including managerial capabilities. Moreover, specific qualifications in various areas have also been considered, including conflicts of interest and leadership to drive the organization efficiently and for the utmost benefit of BPP's businesses.















#### **Skills Matrix**

				Sub-Committee			[	Diversity Education & Experience												
No	Name of Director	Type of Director	Audit Committee	Compensation Committee	GNC Committee	ESG Committee	Gender	Age	Nationality	Accounting & Finance	Management	Information Technology	Business Relation	Economics	Strategy	Power Business	Technical/Engineer	Risk Management	Natural Resources and Environment	Energy Technology
1	Assoc. Prof. Dr. Naris Chaiyasoot	ID	•		•		М	68	Thai	•	•		•	•	•			•		
2	Mr. Yokporn Tantisawetrat	ID	•			•	М	68	Thai	•	•	•		•	•			•	•	
3	Prof. Dr. Bundhit Eua-arporn	ID	•	•			М	58	Thai		•	•	•		•	•	•		•	
4	Mr. Chanin Vongkusolkit	NED			•		М	70	Thai	•	•		•	•	•	•			•	•
5	Mr. Metee Auapinyakul	NED		•			М	69	Thai	•	•		•	•	•	•			•	
6	Mr. Kijja Sripatthangkura	ID		•		•	М	62	Thai		•		•	•	•	•	•	•	•	•
7	Mrs. Somruedee Chaimongkol	ED		•			F	61	Thai	•	•	•	•	•	•	•		•	•	•
8	Mr. Voravudhi Linananda	ED					М	65	Thai		•		•	•	•	•	•	•	•	•
9	Dr. Kirana Limpaphayom	ED					М	48	Thai	•	•	•	•	•	•	•		•	•	•
10	Prof. Dr. Patchanita Thamyongkit	ID	•		•	•	F	46	Thai		•		•		•	•	•		•	•

#### Remarks

ID Independent Director

NED Non-Executive Director

ED Executive Director









#### **Board Meeting Attendance**

In 2023, the directors continuously attended the BOD meetings and all 4 sub-committee meetings as follows:

· 100%	The Board	of Directors
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#### **Board of Directors Performance Assessment**

BPP requires that the performances of the entire Board of Directors, subcommittees, including individual directors be evaluated. In 2023, the Board of Directors resolved to approve the improvement of the Board performance assessment form to be consistent with the criteria and evaluation procedures according to standards of the Stock Exchange of Thailand, the Thai Institute of Directors and the 2017 CG principles. Every year, BPP presents the BOD performance assessment result together with recommendations at the Board of Directors' meeting. So that the Board members can jointly exchange opinions with each other and develop as well as improve various issues for maximum benefit to BPP. Details of 2023 assessment results are as follows:

Committees	Average Scores (5 Scores)	Assessment Results
The Entire Board of Directors	4.94	Excellent
4 Sub-Committees	4.89	Excellent
Individual Directors	4.83	Excellent

#### 

In 2023, the Board members attended various training courses in order to develop their knowledge and skills as follows:

Programs	Organizers	Number of Attending Directors
Carbon Capture, Utilization and Storage (CCUS) and Future Opportunity	Banpu Academy from Banpu Group	7
Cybersecurity and Privacy Awareness Sharing no.1/2023	Banpu Group	9
Cybersecurity and Privacy Awareness Sharing no.2/2023	Banpu Group	8
BPP ESG Committee Knowledge Sharing	Banpu Power	3
Direction of the World Economy and the Thai Economy	Banpu Power	10
ESG Risks and Trends in Power Business	ERM Consultant	7
Power Retail Business Update	Banpu Power	6
ERCOT Power Market Overview	Banpu Power	6
US Power Business Briefing (Trends and Update)	Banpu Power	6
Overview Retail Business and Mark to Market Monitoring	Banpu Power	6
Independent Director Forum: The Role in Preventing Corporate Frauds.	Thai Institute of Directors (IOD)	1











# **Business Ethics**



#### **Stakeholders:**

• Shareholders, investors, business partners, financial institutions, suppliers, customers, employees, communities, business competitors, the government sector, media

#### Strategy:

• Operating business to develop, enhance and promote good corporate governance (CG) system by adhering to honesty, justice, responsibility and transparency in business conduction via cultivating the culture of ethical operation. The aim is to create confidences among shareholders, investors, customers, business partners, communities and all stakeholder groups in both short- and long-terms.

#### **Key Indicators:**

- Conducting business on the basis of good corporate governance and being part of fighting against corruption.
- All BPP's executives and employees acknowledge the CG policy and code of conduct, using them as an operating framework.
- All significant grievances related to CG are reviewed and resolved, including establishing preventive measures to stop recurrences.
- None of incidents associated with CG business ethics violations and corruption.

#### **Target:**

- BPP's CG operation performance is in the excellent level.
- Proportion of executives and employees counting on the CG policy and taking a knowledge test on CG and business ethics.
- Proportion of all significant CG related complaints to be pondered and resolved.
- The number of incidents involved with CG, code of conduct violation and corruption.

#### **Performance:**

- The CG assessment result was in the excellent level, representing 97%.
- Conducting a knowledge test regarding CG and business ethics, with 100% acceptance from executives and employees at the headquarters.
- None of incidents related to CG.
- None code of conduct violation and corruption.

#### **Significance and Reporting Boundary**

BPP is committed to operating business in accordance with the CG and code of conduct principles. It aims at conducting business for the sake of shareholders, investors, customers, business partners, communities and all groups of stakeholders. As a result, BPP puts its utmost efforts to create business growth with sound return, along with conducting business with honesty, integrity and adhering to morality and ethics. It also operates business based on the operational guidelines according to laws and regulations related to business operations both within the country and abroad. BPP also supports the creation of good conscience in order to be an organization operating business efficiently and transparently, including driving the organization towards the sustainability leader in terms of good corporate governance.

#### **Management Approach**



Establishing a Governance and Nomination Committee



Training and communication on CG and anti-corruption



Promoting knowledge and understanding of good operations



Prepareing the code of conduct manual

BPP established a Governance and Nomination Committee responsible for setting and reviewing the CG policy and code of conduct manual, including the anti-corruption policy in order to be in line with the CG principles of legal and regulatory agencies as well as international practices appropriately. In addition, BPP provides training and communication on CG and anti-corruption to executives and employees at all levels. This includes arranging a knowledge test in order to create awareness and promote knowledge and understanding of good operations according to the CG principles.

BPP has prepared the code of conduct manual and communicated about such a guidebook to all directors, executives and employees to use as a guideline for working and performing their duties with honesty and transparency, upholding to the rules of law, standing firms in justice and ethics, including paying great attention to customers and social responsibility, not being involved with politics and taking into account all groups of stakeholders. These also include non-involvement in human rights violations, anti-corruption, no gifts and bribes, no conflicts of interest, no actions infringing others' intellectual properties or copyrights, as well as having channels for stakeholder's whistleblowing.















In addition, BPP focuses on improving its business ethics to meet the international standards and adheres to operating business in accordance with applicable laws, rules, regulations and criteria relating to business operations both domestically and internationally, for example:

- The CG 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
- ASEAN CG Scorecard by ASEAN Capital Markets Forum
- Principles of Corporate Governance by the Organisation for Economic Co-operation and Development (OECD)

In 2023, BPP updated its CG policy and code of conduct manual. The role and duties of the Environment. Social and Governance (ESG) Committee have been specified so as to raise the level of sustainable business management, covering the areas of environmental, social and corporate governance.

More importantly, BPP continues fighting against all forms of corruption, whether directly, indirectly or through the third parties. BPP's anti-corruption operation is in accordance with the anti-corruption guidelines and policy regarding accepting and offering of gifts, hospitality or other similar forms. The aim is to be a clear practice guideline for operating business with honesty, transparency and verifiability. In the fourth quarter of 2022, BPP was renewed as a member of the Thai Private Sector Collective Action Against Corruption (CAC) for the first consecutive period, with a certification period of 3 years.

#### **Performance**



- None of significant incidents related to corporate governance.
- None of incidents involved with corporate governance and corruption.
- Receiving the Excellence CG Scoring for the fourth consecutive year from the 2023 corporate governance survey of listed companies carried out by the Thai Institute of Directors (IOD). The score obtained accounted for 97%, an increase of 3% from 2022. This reinforces BPP commitment and success in sustainability operations, taking into account the ESG issues.
- BPP was assessed by the Thai Investors Association on the topic of Tutoring Intensively, Receiving 100% Scores. BPP received a full 100% score.
- Conducting a corruption risk assessment, including measures to prevent risks likely arising for the year 2023, covering business units in all countries where BPP has invested, at both subsidiary and joint venture levels.









Environment





In addition, BPP has cultivated a culture of ethical operation by defining it as one of the corporate core values and one of the key performance indicators (KPIs) of all executives and employees. In 2023, BPP continued promoting various activities so as to ensure that all of its personnel know about business ethics and anti-corruption as follows:

- Arranging training on corporate business ethics for newly hired employees, with 100% attendances.
- Conducting a knowledge test related to corporate governance and business ethics with 100% acceptance from executives and employees.
- The 2023 corporate culture survey conducted with employees found that the Adhere to Integrity and Ethics, one of the attributes of Committed core value was in a satisfactory level.
- Continuing proceeding according to the guidelines on accepting and offering of gifts, hospitality or other similar forms in line with the No Gift Policy, while communicating the Anti-Corruption Policy to directors, executives and employees throughout the organization, including stakeholders in order to make such a policy into materialized practices.
- Organizing an internal communication activity under the topic of CG Safeguard, with an aim to create awareness and understanding about business ethics through various activities as following:

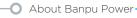
- Conducting CG communications in the form of VDO Podcast every Friday via the program called Friday Morning News Program so as to make executives and employees well aware of the CG principles.
- Organizing the CG STORYTELLING CONTEST: EVERY STORY NEEDS TO BE TOLD, an activity allowing employees to tell a story expressing the impressions regarding his/her CG practices towards co-workers. The top three stories receiving the highest scores were transformed into video clips produced by Corporate Governance Department. These video clips were used as CG communicating tools for all employees.
- Arranging the interactive e-mail communication under the topic of CG Safeguard, an interactive e-mail presenting information related to good practices according to the CG policy and code of conduct manual, as well as collecting information and news related to CG Trend.
- Holding the CG Day activity to promote and encourge employees to get involved in CG implementation and create understanding about CG policy.
- Promoting employee knowledge and conducts in accordance with CG policy and business ethics manual through the E-testing and E-learning system available on the B SUCCESS platform, BPP's knowledge management system.



BPP has cultivated a culture of ethical operation by defining it as one of the corporate core values and one of the key performance indicators (KPIs).













## **Grievances and Anti-corruption Handling Process**

The grievances submitted will be turned into the internal fraud management process whereby the Investigation Committee will inspect the complaints received in accordance with the Corporate Fraud Management guideline. The investigation results and recommendations will be collected and presented to the CEO for making decisions and guiding appropriate corrective solutions. Such complaints will be reported to the Governance and Nomination Committee (GNC) every quarter and will be later summarized and further submitted to the Board of Directors. If anyone commits a breach of disciplines, he/she must be responsible for compensating the damage caused by his/her actions to BPP. He/she will also be legally liable for those who have been damaged or affected by the said actions. In addition, BPP also reviews the procedures to find ways to prevent recurrences.

BPP continues focusing on a two-way communication with its employees. In addition to communicating about the best practices it upholds, BPP also encourages its employees at all operational levels to turn these best practices into actions according to the organizational standards and business ethics. The communication on best practices is carried out through internal activities and other public relations channels. Moreover, employees are also encouraged to express their opinions, make inquiries or submit relevant grievances through various channels, either emails, telephones or a whistleblowing system.

### **Complaint Receivers**

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



## **Reporting and Whistleblower Policy**

#### **Filing Channels**

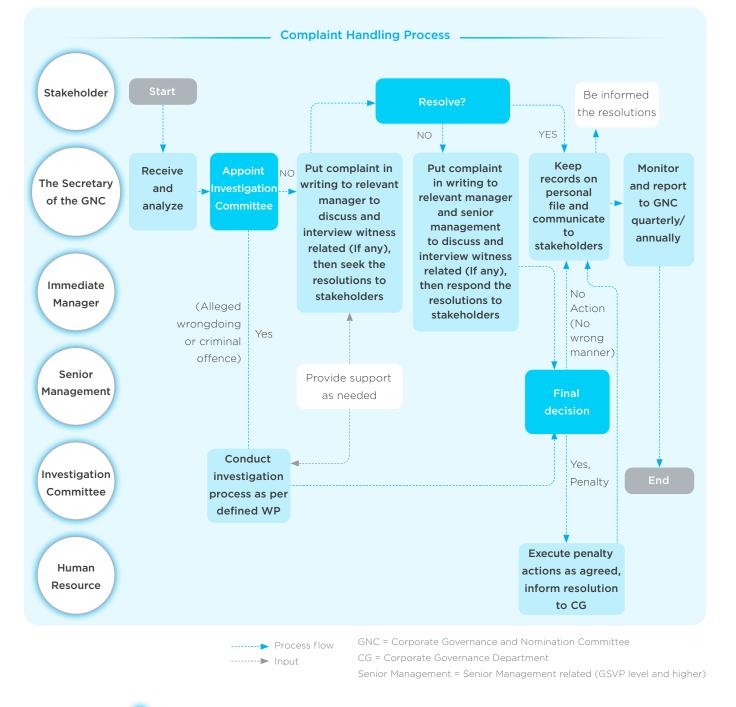
- Submitting a letter to the Secretary of the Corporate Governance and Nomination Committee
- Banpu Power Public Company Limited 26<sup>th</sup> Floor, Thanapoom Tower, 1550 Petchburi Road, Makkasan, Ratchathewi, Bangkok 10400
- E-mail: GNCchairman@banpupower.co.th and/or BPP Comsec@banpupower.co.th



**Company Website** 



Banpu Portal: (BPP Whistleblower)

















# Legal and Regulatory Compliance



### Stakeholders:

• The government sector, shareholders, business partners, suppliers, customers, employees, communities, the public sector.

### **Strategy:**

- Employing the effective internal control system in both prevention and operational performance monitoring, which is categorized into several levels, including self-auditing and an examination by the independent unit directly reporting to the Audit Committee and the Board of Director.
- Initiating applications to integrate the monitoring system data regarding legal and regulatory compliance, risk management and corporate governance (CG).

### **Key Indicators:**

- · Coverage ratio of the internal control and legal compliance systems.
- The number of significant fines from failure to comply with applicable laws.

#### **Target:**

- The internal audit, corporate governance and compliance systems are implemented covering all business entities in which BPP has direct management control.
- None of significant incidents involved with non-compliance, including significant fines.

#### **Performance:**

- All businesses, in which BPP has management control operated in accordance with the internal audit and corporate governance as well as legal compliance systems.
- None of business entities, in which BPP has direct management control, joint venture companies and suppliers operating in BPP's operational area failed to comply with applicable laws.
- Examining internal operations and legal compliance of joint venture companies, including monitoring, solving defects to meet the mutual standards with business partners.

## **Significance and Reporting Boundary**

Complying with legal requirements is a fundamental principle to which BPP has adhered in operating its businesses. This is also a major challenge for BPP since it has operated business in many countries where regulations are different and changing rapidly nowadays. These include laws and policies relating to climate change and air quality improvement in large cities, which is a significant driving force in rapidly changing environmental laws in the power industry. If BPP cannot adapt itself promptly, its business operations will be affected.

BPP's business operations are associated 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 operating businesses by adhering to business ethics, for example, anti-corruption, fair competition, human rights principle compliance, and non-discrimination. Therefore, failure to comply with those applicable laws will affect BPP's sustainable business operations.

The boundary of this report covers all business units in which BPP has direct management control, including the three combined heat and power (CHP) plants in China, Temple I & II gas fired power plants in the United States of America. the offices in Thailand and China, but excluding the office in the U.S.

## **Management Approach**





The Internal Audit has been established. **Corporate Compliance** has been established.

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

- **1. The Corporate Compliance** is responsible for promoting. monitoring and examining operational performances in accordance with applicable laws and external regulations.
- **2.The Internal Audit** is responsible for assessing internal control systems, including 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, applicable laws, regulations, and operational practice guidelines, BPP has frequently inspected the operational performance and internal control systems within the organization and its subsidiary companies, covering major legal and regulatory compliance. BPP'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.

As a result, the Internal Audit Department has been established as an independent body, with a duty to review and assure that BPP has an effective internal control system and appropriate legal compliance. The Audit Department is reporting directly to the Audit Committee and the Board of Directors

## Monitoring of environmental quality, safety and labors required by laws

BPP set up a surveillance system to monitor environmental qualities to comply with legal requirements and observe the possibility of legal changes so as to adjust itself promptly. The surveillance has run through a follow up by the central Corporate Compliance and internal unitsof each subsidiary will conduct a regular audit of all business of its business units. This is one of the requirements of the quality, safety, and environmental management system.



In addition, the operating performances in the areas have also been regularly audited via the following activities:

- 1. Internal audits conducted through BPP's measurement systems, such as the continuous emission monitoring (CEM) and the water quality monitoring system, etc.
- 2. 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 measuring the 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 Department of Occupation Health, Safety, Environment and Community Engagement, Information Technology Department, Legal Affairs, Procurement and General Administration 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 audit of all business units located in that country at least once a year. Since 2020, the review benchmarks have been revised to be consistent with the international standards, while a remote assessment in

the form of self-inspection and interviews, including a remote evidence verification, were used during the COVID-19 epidemic. These benchmarks have been applied for quality assurance review up to now.

BPP has implemented the standardized criteria for reviewing the legal compliance quality to be suitable for its business operations, covering five dimensions, namely governance, compliance risk management, culture & education, technology, and continuous improvement.

## Operational audits by the international certified body

BPP has continuously applied international standards to operational management in order to upgrade its operational standards and create confidence among all groups of stakeholders. Therefore, BPP has employed the internationally recognized operating standard systems in its business units' operations in order to create internal control and continuous 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 with these systems.

Country	Business Unit	Certified Management System by Certification Body				
		ISO 9001	ISO 14001	ISO 45001	ISO 22301	ISO 27001
China	Zouping CHP Plant	•	•	•		
	Zhengding CHP Plant	•	•	•		
	Launnan CHP Plant	•	•	•		
	Beijing Office				•	•
Thailand	Bangkok Office*				•	•



\*The headquarters in Thailand incorporated with Banpu Group

Governance

Environment





## Legal compliance audits at joint venture companies

Since BPP has no direct control in the joint venture companies, it has cooperated with its business partners who have invested in such a business to review the legal operation and internal management at least once a year. Furthermore, the audits are required to be carried out through the risk reports covering legal compliance at least once a month.

## Compliance audits in key suppliers

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

## **Performance**

BPP conducted the legal compliance audits completely, most of which were carried out online since COVID-19 was widespread. The review results showed no significant non-compliance incidents involved violating the 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 at the better level than those required by applicable laws.

In the past year, BPP proactively operated and regularly monitored the operational results in order to control business operations in accordance with applicable laws and regulations of each country where BPP has invested as follows:

- Enhancing the operational standards by adopting ISO **37301** Compliance Management Systems – Requirements with guidance for use as a framework for legal operation and compliance together with risk governance in order to ensure that the organizational compliance risks control is the most effective. This was carried out through using a model known as the "Three lines of defense" to create risk control mechanisms for operations across the organization. Meanwhile, a framework for implementation and regular monitoring was laid down, including the audits from an independent agency in order to guarantee the operations' achievements.
- Creating and improving the compliance obligation list (COL) by interviewing operating staff about working processes in order to collect all activities and applicable laws with which the departments must comply. Then, every department must conduct the quarterly self-assessment report and submit it to the Corporate Compliance every quarter. Since 2021, the compliance self-assessment report system has been developed so as to make it easier to report the assessments.
- 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 B.E. **2562** by establishing a working group and announcing policies & practice guidelines, as well as communicating with employees to make them understand about personal data, collecting personal details and setting up a system to prevent information leakage, including educating and raising awareness among employees via various channels.
- Adhering to the Royal Decree on Electronic Meetings B.E. **2563**, such as the meeting attendees, must present oneself; 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 applicable laws.
- · Continuously conducting the annual monitoring on legal and regulatory compliance by the Corporate Compliance **Department**; In the past year, the monitoring was conducted online due to the COVID-19 epidemic.
- · Regularly organizing a meeting to examine legal violation risks related to environment, society, and governance, inclusive of labor and human rights in all business units in which BPP has direct management control and core joint venture companies, such as Banpu NEXT and HPC Power Plant.
- Creating 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 Laws in-Hand application as an information and service center for legal compliance and compliance risk management, facilitating a search for legal information and various news related to the organization. The Law

in-Hand application is an integration of the existing system. namely the Compliance Risk Management application (C-RiM) and the Laws in-Hand application, to reduce redundant work.

Meanwhile, for other businesses of which BPP has less than 50% of shares, with no direct control, the legal and regulatory compliance monitoring has been conducted through the Board of Directors of such companies by:

• Quarterly reporting risks, including compliance risks, to further

collect and report to the Risk Management Committee and the Audit Committee.

• BPP's internal audit department and assets management department together with business partners have jointly audited legal compliance at least once a year. In the past year, there were no significant incidents related to failing to comply with legal requirements.



# Internal Quality ..... **Assurance in Occupational** Health, Safety, Environment and Community Engagement

BPP together with Banpu Group have carried out internal quality assurance in the areas of occupational health, safety, environment and community engagement (HSEC) every year in order to ensure that HSEC operations meet Banpu Group's standards.

In the past year, the quality assurance activities were carried out at BPP's subsidiary in China - Banpu Investment (China) Limited or BIC, and its joint venture wind power plant in Vietnam regarding compliance with the environmental policy revised in the beginning of 2023. The results revealed that there were some issues required slight improvement. It is expected that the corrections can be completed within the first quarter of 2024.



















## 

Thailand announced the Personal Data Protection Act B.E. 2562 (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.

During the years 2020 - 2022, Banpu Group implemented the personal data protection operations to comply with applicable laws and respect human rights according to the international principles, such as:

- Establishing the privacy policy.
- Appointing the Data Protection Officer (DPO)
- Setting up the Personal Data Protection Working Group responsible for preparing personal data protection standards in accordance with the Thai and international legislation levels, conducting communications to create awareness and correct understanding of personal data protection laws. In order to avoid creating risks on the organization and to plan for scaling up, the Personal Data Protection Working Group has been set up in BPP's operating countries where the Personal Data Protection Act has been enacted.
- Announcing the privacy notice, recording activities proceeded, stating the purpose of collecting/using/ disclosing information, and determining the period for data use and deletion in order not to store personal information longer than necessary.

- Developing a personal data protection standard practice manual.
- Creating a data breach management procedure in the event of data leakage.
- Developing a data subject rights management procedure.
- Exercising a crisis communication plan (BCP) in the event of a personal data breach incident following specified internal standards and procedures.
- Creating internal media to communicate and provide knowledge about personal data protection.
- Raising awareness among employees within the organization through organizing PDPA in Action lectures and testing basic knowledge about the Personal Data Protection Act B.E. 2562.



- Organizing a lecture on Strengthen Cyber Readiness at the 2023 ESG Summit held in October.
- Improving risk assessment methodologies to be consistent with secondary laws, in the event of data leakage.
- Inspecting and updating data and activities related to personal data processing or data inventory to be up to date.

#### Personal data protection abroad

#### China

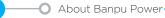
- Appointing a personal data protection working group responsible for preparing personal data protection standards in accordance with the national and international legislations.
- Communicating to create awareness and correct understanding about personal data protection laws to prevent creating any risks to the organization.
- Specifying a scale-up plan to appoint working groups in countries where personal data protection laws have been enacted.
- Preparing activity records and processing data inventory.
- Proceeding to request consent from employees in accordance with the principles of employee's personal data protection.
- Providing legal knowledge training to employees.
- Creating a Privacy Impact Assessment Report for personal data exported from China.

#### Vietnam

- Arranging legal knowledge training for employees.
- Preparing activity records and processing of data inventory.















# **Market Opportunity**



### **Stakeholders:**

• Shareholders, employee, business partners, suppliers, customers, and communities located surrounding the power plants.

## **Strategy:**

- Looking for opportunities to build up production capacity in accordance to the Greener & Smarter strategy towards business sustainability.
- Focusing on increasing profit efficiency in the assets already commercial operations (COD) and maintaining competitive advantages for future growth.
- Seeking investment opportunities in core business the power generation business, and others in the value chain with acceptable risk levels for business operations.
- · Combining both conventional energy using high efficiency, low emissions (HELE) production technology with various forms of renewable energy to balance the investment portfolio.
- Driving Banpu NEXT's growth by focusing on investing in renewable energy business, energy technology and smart power utilization.
- Synergizing within Banpu Group to leverage Banpu Ecosystem for accessing customer base technologies and suppliers, including seamlessly sharing energy expertise in potential countries.

### **Key Indicators:**

• The production capacity growth

## **Target:**

- The power generation capacity of 5,300 MW by 2025, consisting of:
- 4.500 MWe from thermal fuels.
- 800 MW from renewable energy.

#### **Performance:**

- Generating a committed capacity of 3,642 MWs, divided into:
- 3,247 MWe from thermal fuels
- 395 MW from renewable energy

## **Significance and Reporting Boundary**

BPP continues pursuing the Greener & **Smarter** strategy to look for opportunities to invest and grow in the electricity and energy generation business, using high-efficiency and environmentally-friendly technologies. This is to prepare itself for a smooth transition to a cleaner and more efficient energy model in the future, covering not only electricity production from clean energy, but also looking for new business growth opportunities related to energy management. This includes being able to easily manage energy on a single platform or Integrated Digital Platform, resulting in efficient

> The Target of 5,300

energy utilization and greenhouse gas (GHG) emissions reduction responding to a low-carbon society in the future.

The boundary of this report covers the business entities BPP has direct management control, including Temple I & II gas-fired power plants in the United States of America and the three combined heat and power (CHP) plants in China. In addition, BPP also reports Banpu NEXT Company's operating performance as it is a significant investment in the renewable energy business, energy technology, and smart energy utilization, which is a significant part of BPP growth.



**A**ffordable Reliable **E**co-Friendly

## **Management Approach**

**BPP** operates

over 40 power

plants with an

equity-based

capacity

BPP continues seeking business growth opportunities under its plan to scale-up the growth of electricity generation and distribution business. Currently, BPP operates over 40 power plants with an equity-based capacity totaling 3,642 MWe in strategic countries with economic growth and high power demand in the Asia-Pacific region and the United States of America. BPP is focusing on expanding quality megawatts in alignment with the **Greener & Smarter** strategy, putting great emphasis on a balance of business portfolios between the thermal power with

High-Efficiency, Low-Emissions (HELE) technology, and renewable energy businesses as well as energy technology business. In parallel with putting great importance on climate change impacts and supporting a low-carbon society, BPP is ready to tirelessly drive the growth of renewable energy and energy technology businesses. It is also seeking more investment opportunities in the merchant market in potential countries with an aim to raise its power generation capacity to 5,300 MWe by the year 2025.







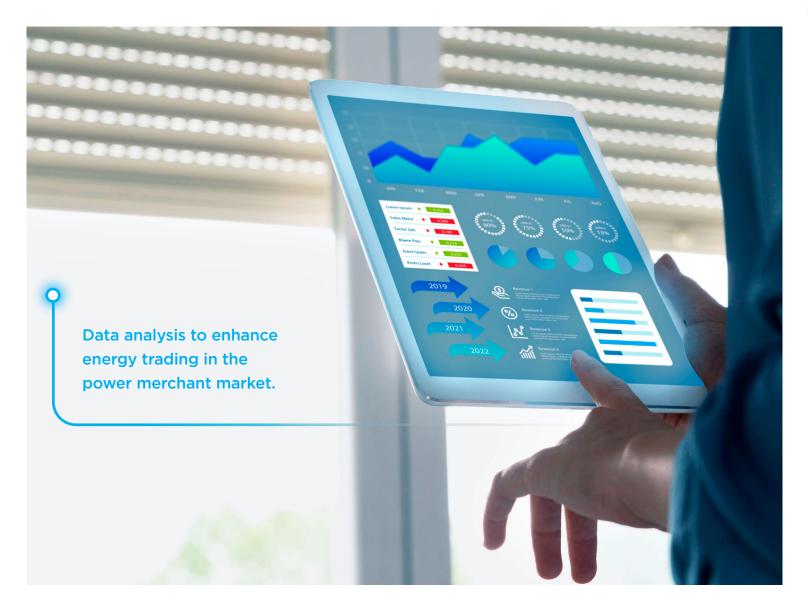




by 2025







To ensure a smooth transition, BPP puts top priority on balancing a transition of current energy patterns to low-carbon energy in the future by using the following key operating principles:

- Conducting a feasibility study on using environmentally**friendly energy** to generate electricity, such as using biomass energy in combination with coals used in the CHP plants in China. etc.
- Driving the energy technology business growth via an investment in Banpu NEXT and looking for opportunities to expand BPP businesses towards the integrated energy services manufacturer in response to higher demand for clean energy.
- · Making investment decisions by thoroughly cogitating both the return on investment and the risks associated with environment, social and governance (ESG) issues, especially those related to climate change.
- Stabilizing and improving the power plant's efficiency so as to deliver power to customers continuously as well as to create competitive advantages for the energy trading business in the merchant market, which is likely to increase in the future, replacing the power purchase agreement (PPA) in various countries.
- · Utilizing digital technology to build competitive advantages, such as using data to analyze the power plant's energy trading in the merchant market, providing customers the power generation services in conjunction with applications for use in energy management, after-sales services, and using applications together with vehicle services.













## **Performance**



- BPP has created continuous growth with an investment capacity of **3,642 MWe,** comprising **3,247 MWe** from thermal power plants and **395 MW** from renewable power plants.
- BPP acquired the 755 MW Temple II Gas-fired Power Plant, located in Texas, the United States of America. The acquisition of this COD power plant has led BPP to have outstanding growth in the U.S., where benefits will be gained from the synergy with the existing Temple I Power Plant, including its ability to create immediate cash flows.
- BPP has entered into a joint venture with BKV dCarbon Ventures, LLC, a subsidiary of Banpu Public Company Limited, to operate a carbon capture, utilization and storage (CCUS) business under the name of "Cotton Cove" project, located in Barnett onshore natural gas field in Texas State, the U.S. The investment in the "Cotton Cove" project is considered a significant starting point for BPP in stepping into the CCUS business in the United States of America where BPP can use this experience to further build upon its businesses in other countries where it has investments in the future.
- Zhengding Combined Heat and Power (CHP) Plant has been selected as the operator of a solar rooftop installment project in Zhengding City. The target is to install solar panels on the roofs of governmental buildings. factories and communities for a total of 66 MW.

• Successfully investing in power generation projects according to the Greener & Smarter strategy through Banpu NEXT. for example:



- Acquiring 40% of shares in SVOLT Energy Technology (Thailand) Company Limited (SVOLT Thailand), which focuses on the production and distribution of lithium-ion batteries, including research and development as well as integrated services.



- Partnering with Durapower Holdings Limited, a global leader in performance lithium-ion battery storage solutions, to set up a lithium-ion battery assembly plant for electric buses (e-Bus) as well as batteries for electric vehicles across Thailand and Asia-Pacific region with a plan to expand its production capacity to 1 GWh/Year by 2027.



- NSP Smart Tech Company (BNSP Smart Tech), a joint venture company between Banpu NEXT and SP Group, a leading energy utility system provider in Asia Pacific, was granted the right to design, build, own and operate an innovative district cooling system in Zone C of the Government Complex Commemorating His Majesty The King's 80<sup>th</sup> Birthday Anniversary, 5<sup>th</sup> December 2007 (Government Complex Center Zone C). It is expected to save approximately THB 40 million per year on electricity costs and reduce carbon emissions by up to 3,000 tons annually if the installation is completed.



- Installing floating solar cells in Apex Green Industrial Estate with a total capacity of 32 MW.





- Providing electric vehicles such as Ride Sharing; MuvMi Electric Tuk Tuk service, which has expanded its service areas to 30 locations in 2023; Car Sharing service, which arranges vehicle rental through the HAUP application; EV Charger Service Station (EV Charger Management); and after-sales service (Operation & Maintenance and Customer Services).
- Smart Community Development with 27 smart city projects under development.



















## 

## **BANPUNEXT** Smart Energy Solutions for Sustainability

Banpu NEXT, a leading smart energy solutions provider in Asia-Pacific, is a long-term partner aiming to create total solutions for smart energy for sustainability, suitable for every need and every step of business operations. It also intends to support the sustainability operation without limitations and helps businesses achieve the ESG and SDG goals while creating values and opportunities for sustainable growth. Moreover, it focuses on supporting a low-carbon society and smart city development in Thailand and abroad along with promoting a better quality of life for service users and people in the society. Banpu NEXT has operated 5 business groups as following:



1. Solar Rooftop and Floating Business: Banpu NEXT has generated and distributed electricity from rooftop solar power and buoyancy to its strategic markets in Asia-Pacific, namely China, Japan, Vietnam, Indonesia, Australia and Thailand. In addition to the clean energy production and distribution business, Banpu NEXT also provides the system installation services in various formats, serving every industry in Thailand, inclusion of schools, hospitals, factories, hotels, department stores, markets and gas stations. It aims to be a model for creating a low-carbon and sustainable society, creating all-round values for entrepreneurs, communities, and the environment.



2. Energy Storage Systems Business: Banpu NEXT with its partner — Durapower Holdings Company Limited, a Singaporean energy storage provider and a global leader in performance lithium-ion battery storage solutions, has developed energy storage systems for electric vehicles (EV) and stationary batteries such as solar systems. Lately, Banpu NEXT has acquired 40% stakes in SVOLT Thailand, a manufacturer and distributor of lithium-ion batteries for electric cars. The battery assembly factory is located in Thailand, expected to have a battery production capacity of 2 GWh by 2025.



**3. Energy Trading Business:** Conducting the electricity trading business overseas. The energy trading business has already been operated in Japan while looking for opportunities to expand the markets to other countries in which electricity can be freely traded.



- **4. E-Mobility Business:** Banpu NEXT Thailand's first integrated alternative transportation system in the form of "Mobility As a Service" (MaaS), including ride sharing, MuvMi electric Tuk Tuk, EV charger management, and operation & maintenance and customer services or after-sales services.
  - In addition, a design of travel management and transportation with electric vehicles or "EV Fleet Management" service is offered with a digital platform to monitor real-time travel and transportation.



- 5. Smart City & Energy Management Business: With an aim for energy consumption efficiency and energy saving, this business offers smart energy solutions for sustainability covering the solar system, energy management system (EMS), safety management system, waste management system, and various intelligent infrastructure systems. These will help customers' businesses become the "Smart Business" moving towards a carbon-free society and contributing to the smart city. Banpu NEXT's integrated EMS will have energy and technology experts take care of the customers at every step, starting from checking the energy consumption, analyzing, designing the appropriate system, installing equipment and solutions with digital platforms, to after-sales service serving customers professionally 24 hours a day. This will run through designing a digital platform and
- This will run through designing a digital platform and an application allowing customers to easily manage energy consumption in real-time on a single platform or the "Integrated Digital Platform".













# **Risk Management**



## **Stakeholders:** · Shareholders, business partners, suppliers, customers, employee, community **Strategy:** Leveraging risk management to help making decisions and operating according to the plan in order to mitigate business-related risks. Employing key risk indicators (KRIs) for risk management within the organization. Improving risk management systems to be in line with international standards. • Coverage ratio of risk management system. **Key Indicators:** Coverage ratio of risk management systems related to ESG issues. • Risk management system coverage ratio is **Target:** equivalent to 100% by the year 2025. Coverage ratio of risk management system related to environment, social and governance (ESG) issues equally to 100% in 2023. **Performance:** • Employing a risk management system covering all business units, equivalent to 100% • Coverage ratio of risk management system related to ESG issues was 98%.

## **Significance and Reporting Boundary**

Nowadays, various environments and situations are rapidly changing, especially in the areas of environment, social and governance (ESG), which inevitably affect business operations. Therefore, risk management is a core element in corporate governance. It is also a key factor that BPP has used for governing its business operations in order to prevent losses and stably grow in both strategies and

investments. In addition, risk management makes the project construction and production operations meet the target set, creating sustainable values for stakeholders.

The boundary of this report covers all business entities where BPP has direct management control and joint-venture companies.

## **Management Approach**

BPP's risk management structure is divided into 2 levels - the corporate level and the business unit level, as follows:

- Risk management at business unit level: To create flexibility and be able to closely monitor various situations, a risk manager of each asset will analyze and evaluate risks in such an asset, then report risk management progress and performance to the Sustainable Development and Risk Management Department responsible for compiling and summarizing risks of each asset before submitting the report to the "Risk Management Committee".
- Risk management at corporate level: Under the supervision of the Board of Directors through the Audit Committee, the ESG Committee and the Risk Management Committee. The role of "Risk Management Committee" covers stakeholder management and improving the roles and responsibilities regarding risk management and

ESG risks at operational level. The Risk Management Committee consists of Chief Executive Officer (CEO) and senior executives with the following important duties.

- 1. Assessing and managing risks to reduce risk impacts on BPP's operations.
- 2. Providing support relating to policies to efficiently mitigate risks and create awareness on risks arising when implementing any BPP's activities.
- 3. Supporting internal and external resources necessary for efficient risk management.

















Performance

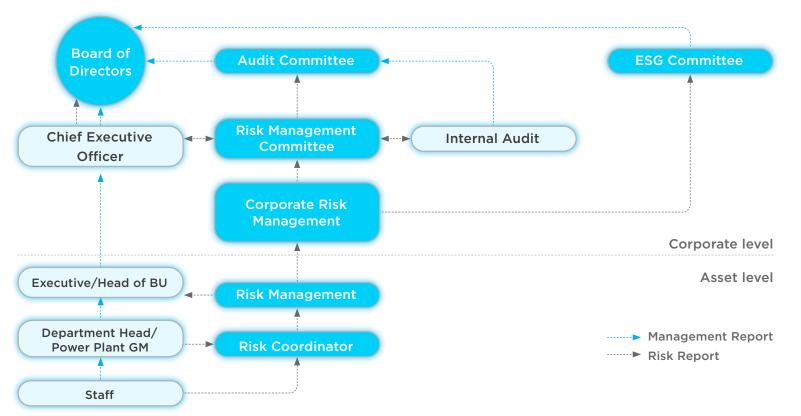
BPP has announced its risk management policy with continuous updates, including establishing a department with direct responsibility to coordinate with all departments. The aim is to drive effective risk management throughout the organization and to have a mechanism for finding and identifying key business risk issues, placing the ESG-related dimension in the annual plan development process. This is in line with BPP's strategic direction, connecting to corporate sustainability management. Besides, the likelihood and impacts on stakeholders have been assessed and prioritized prior to defining them as a list of enterprise risks. Then, the responsible officers will be assigned to mitigate risks at the acceptable level by the organization. Moreover, the progress of risk management has been regularly monitored, while risk issues have been continuously reviewed. In addition, BPP has integrated risk management principles into various processes within the organization in order to create awareness on uncertainty in business operations and to promote risk management as part of operations in preparation for any events arising in the future. In terms of managing risks related to business operations interruptions, the Risk Management Committee has held a meeting to monitor risks and risk management results according to the risk mitigation plan. This includes reporting the results of reviewing risk management systems to the Internal Audit Committee and the Board of Directors on a quarterly basis.

Governance

Environment

About Banpu Power-

## **Risk Management Structure**



Risks Category	Risks
1. Strategic Risks	<ul> <li>Risks associated with investments and operating business in accordance with the plan set.</li> <li>Risks relating to human resources management and competency development to facilitate future growth.</li> <li>Climate change risks</li> </ul>
2. Financial Risks	<ul><li>Exchange rate risks</li><li>Interest rate risks</li></ul>
3. Operational Risks	<ul> <li>Power generation related risks</li> <li>Risks associated with power merchant markets</li> <li>Safety, occupational health, environmental and social risks</li> <li>Risks related to natural disaster</li> <li>Risks associated with cyber security and safety as well as personal data protection</li> <li>Supply chain risks</li> </ul>
4. Regulatory and legal compliances related risks	<ul> <li>Risks associated with changes and compliance of regulations and applicable laws.</li> </ul>
5. Emerging Risks	<ul> <li>Risks involved with new business and technology investments</li> <li>Global geo-economic confrontation risks</li> </ul>
6. Other Risks	Human rights risks

-O Social

## **Operating Mechanisms**



Defining objectives according to the business plan and allocating them into business units



Determining operational risks under his/her areas in details



Preparing practice guidelines to mitigate risks possibly arising

To maximize efficiency in risk management, BPP has integrated risk management into its business plan, putting great emphasis on value creation contributed to the company and its stakeholders and covering ESG aspect. Hence, the risk correlation principle has been utilized to analyze correlations of each risk in both positive and negative aspects.

BPP's risk management process begins with defining objectives according to the business plan and allocating them into 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 detail. The likelihood and impacts of such risks will be assessed along with preparing practice guidelines to mitigate risks possibly arising. Then, the risk management results will be reported to commander-in-chief and supervisors as well as monitoring the progress continuously.

Over the past several years, the integration of risk management into BPP's business plan has resulted in promoting operational strategies and meeting the targets set. According to new business investments, BPP has thoroughly assessed risks regarding investment returns and ESG issues of each new project. The risk assessment result and risk mitigation plan will be presented to the Investment Committee to ensure that risks related to BPP's investments are assessed and managed properly.

## O Performance

Currently, risk management systems cover all BPP's businesses, including projects under development. It also defines key risk indicators (KRI) and incorporates risk appetite principles into its risk assessment and management. The results are reported to the Risk Management Committee and Audit Committee every quarter. In addition, BPP has established the Environment, Social and Corporate Governance Committee (ESG Committee) to closely oversee its ESG operations.

BPP has also implemented risk management systems covering every business unit. Its risk management operations have risen and are in line with BPP's increased investments. This includes a 98% coverage ratio of risk management systems relating to ESG issues. Due to investment expansion in various businesses, such as an investment in Temple II gas-fired power plant in the middle of the year, ESG-related risk assessment, however, must be addressed after the year 2023.

In the past year, BPP reviewed and improved its risk management policies so as to be consistent with those of Banpu Group. Meanwhile, its risk management operations were efficient, covering more ESG aspects.



















# **Emerging Risks**

According to the "Greener & Smarter" strategy to expand growth and prepare for the energy transition to be cleaner and more efficient, BPP has had to continuously step into new business and Decarbonization technology in order to respond to the future energy transition era. These cause the emerging risks or existing risks with significant changes have increased to 2 aspects as follows:

- 1. Risks associated with new business and technology investments: Nowadays, technology plays an increasingly important role in the business sector and daily living. In addition, consumer behaviors have changed, being well aware of the environment. They are also alert to the Energy Transition, focusing on clean energy, including innovations in energy technology that are changing rapidly. As a result, BPP has faced changes in business operations. Consequently, the technology business has been developed, while the new s-curve business has been invested in order to support its long-term business expansion beyond power generation and to maintain its business stability in the long-term, as well as to avoid losing business competitive advantages, such as:
  - Carbon Capture, Utilization and Storage (CCUS) technology is employed at Cotton Cove project in the United States of America.
  - Coal-Ammonia Co-firing Technology: This technology is using ammonia as a co-fuel in power generation at BLCP Power Plant, in which BPP holds 50% of its stakes.
  - Energy Storage System: BPP has invested in this business through Banpu NEXT Co., Ltd., which acquired S.V. Energy Technology (Thailand) Co., Ltd. (SVOLT Thailand), a company focusing on research

- and development as well as producing and distributing lithium-ion batteries.
- Power Trading & Power Retails in the United States of America

The investment in new business and technology which BPP has not had that experience yet, may pose strategic risks, including unsuccessful implementation of the new business projects, unable to meet the goals set. As a result, BPP has determined to closely monitor and analyze trends on changing and developing innovations regarding new technologies. It has also conducted a study on market conditions, applying for a license, and related goals. This includes synergizing with Banpu Group and business partners with knowledge and expertise in business, research, new product development, operational efficiency improvement, and adding upon development. The aim is to enable BPP to create business opportunities and stakeholder returns according to the set goals.

2. Geo-economic Confrontations Risks: The geo-political conflict is continuing, while political tensions in various regions are more violent, causing social divide, competition and polarization between superpowers. This has led to conflicts in world geography and economics. As a result, many countries are increasingly facing challenges in economic cooperation, which affects the economic system or causes uncertainty in the economic direction, such as interest and exchange rate fluctuations, increasing inflations and higher energy prices, changes in governmental policies, etc. These have a direct impact on business operations. Due to operating businesses in many countries and regions across the world, BPP cannot avoid such impacts in various aspects, ranging from investment uncertainty

resulting from interest rates, factor costs used in production, to customers' demand for energy and electricity. As a result, BPP has given great importance to and be prepared for reducing such impacts as follows:

- Studying economic trends, monetary policy trade measures in the countries where BPP has investments so as to analyze investments and develop a business plan to accommodate uncertain situations. But it is still consistent with BPP's long-term goals and strategies.
- Closely monitoring and analyzing significant global change trends or megatrend, such as trends in technological advancement, directions of the merchant market and various related factors regularly in order to adapt or evaluate the impacts on business plans or long-term strategic plans.

· Establishing internal measures to create operational options and flexibility, able to rapidly adapt oneself in uncertain situations in order to create stability and security for BPP.















## ESG Summit 2023 ·····

BPP places great emphasis on and aims at creating understanding & awareness of effective risk management related to environment, social and governance (ESG), including setting strategic directions for creating sustainable growth. In October, the on-site and online ESG Summit 2023 was organized and participated by the Board of Directors and involved employees. The summit highlighted the importance of decarbonization, cyber security preparedness, and personal data protection. At the ESG Summit, the international executives, employees and consultants joined in exchanging views on ESG related risk management.

Creating understanding & awareness of effective risk management related to environment, social and governance (ESG)





# **ESG Risks and Trends in Power Business**

In December, BPP organized both on-site and online training on the topic of "ESG Risks and Trends in Power Business" for its Board of Directors, executives, and employees. The training was conducted by external speakers from leading consulting firms, who gave a lecture and provided knowledge about sustainability and ESG, in terms of both risks and trends associated with ESG in the energy business group, especially in the power business. The lecture provided knowledge about ESG in 3 areas: environment, society and corporate governance with examples for practicing. This made the participants increase their knowledge and understanding of the principles of sustainable development and able to apply the knowledge gained for developing the organization's strategic goals. This will enable BPP to operate businesses with sustainable growth.

Able to apply the knowledge gained for developing the organization's strategic goals

















## Human Rights Risks Assessment .....

BPP puts great emphasis on human rights. It has announced the human rights policy and integrated human rights related risks into corporate core materiality assessment. A comprehensive human rights due diligence has been conducted 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 assessment included 6 key human rights risks, namely employment, occupational health and safety, customers and products, communities, securities, contractors and supply chains. BPP has also taken into account both internal and external stakeholders. such as employees, business partners, customers, contractors and communities, as well as vulnerable groups. According to the assessment, it was found that BPP has no significant risks associated with all 6 human rights issues due to its human rights prevention and avoidance of civil-liberties violations when operating businesses. In addition, BPP has adhered to the principles of liberty and rights, equality and human dignity without discrimination based on gender, race, religion or skin color.

During the past 4 years, BPP has carried out human rights activities such as:

- Publishing the Human Rights Policy
- Setting up targets to evaluate human rights risks by the year 2025.
- Proportion of businesses already assessed on human rights, equivalent to 100%.
- Proportion of businesses with high human rights risks must have risk management plans equal to 100%.
- No significant grievances related to human rights
- All complaints associated with human rights must be corrected via dispute resolution mechanisms.
- Reviewing Banpu Group's human resource management policy by integrating human rights issues according to international principles, including:
- Human rights policy
- Non-discrimination and anti-harassment policy
- Employee recruitment and selection policy
- Compensation management policy
- Employee relations policy
- Employee training and development policy

- Human rights due diligence: BPP in cooperation with Banpu Group conducted a comprehensive human rights due diligence in the businesses where it has direct management control equal to 80%, including the three combined heat and power (CHP) plants in China, Bangkok and Beijing offices. According to the due diligence conducted, it was found that none of its business units had significant high human rights risk. BPP has also planned to assess human rights risks at business operations in the U.S. by 2025.
- Conducting human rights risks due diligence, covering some joint-venture businesses, including Banpu NEXT's renewable energy production and energy technology businesses, and HPC Power Plant. In addition, comprehensive human rights due diligence was carried out in additional joint venture power plants in 2023,

















# **Business Continuity Management**



### **Stakeholders:**

• Shareholders, business partners, financial institutions, suppliers, customers, employees.

#### **Strategy:**

- Implementing business continuity management (BCM) covering core business units.
- Conducting a business continuity plan (BCP) simulation exercise at corporate and country levels continuously.
- Conveying appropriate and adequate information to the public when crisis arising.

## **Key Indicators:**

 Proportion of business units organizing BCP drills at corporate and/or country levels.

## Target:\*

- 100% of business units implementing BCP simulation exercises at corporate and/or country levels during the years 2021-2025.
- Proportion of core business units conducting BCP simulation exercises is over 50% in 2023, and 100% in 2025

#### **Performance:\***

- Proportion of business units running BCP exercises at corporate and country levels equaled to 100%.
- 66.7% of core business units conducting BCP drills.
- BPP's crisis communication team (CCT) conducted the BCP simulation exercise at Bangkok Headquarter.
- Implementing the country-level BCP simulation exercise at headquarters in Thailand and China's office.
- Bangkok Office (collaborated with Banpu Group) and China Office were certified with ISO 22301 Business Continuity System from external agencies.

Remarks: \*Covering the three combined heat and power (CHP) plants in China, excluding of gas-fired power generation and power trading businesses in the United States of America.

## **Significance and Reporting Boundary**

Rapid and unpredictable changes from both natural disasters, such as earthquakes and epidemics, and human actions, such as terrorism, cyberattacks, protests, fires, chemical spillages, etc., are all risks affecting BPP's business operations and stakeholders. As a result, preparedness for responding and restoring operations efficiently and immediately, with appropriate and adequate communication during emergencies, will help reduce BPP's losses. In addition, it makes BPP

resume normal operations in a short-period of time, reduce impacts and build confidence among stakeholders.

The boundary of this report covers business entities where BPP has direct management control, namely the three combined heat and power (CHP) plants in China and offices in Thailand and China, but excludes businesses in the United States of America.

## **Management Approach**

BPP has employed a business continuity management system based on the principles and requirements of the international standard – ISO 22301, covering the process of identifying key

work processes, business impact analysis, and risk assessment, as well as creating business continuity plans and conducting simulation exercises. Main objectives of BCM operation include:



#### Response

Effectively responding to incidents and preventing extended damage with appropriate communications to internal and external stakeholders.



#### Recover

Able to restore key essential activities to quickly deliver products and services within the time satisfied by stakeholders.



#### Restore

Restoring all BPP's activities rapidly within the time accepted by stakeholders.

A crucial challenge for power business continuity is the damage of large power plants where activity recovery takes time. BPP, therefore, places great emphasis on risk management, preventing and

controlling incidents' severity impacts, as well as determining communication channels for general public properly and in a timely manner.















The joint venture power plants, namely BLCP Power Plant and

HPC Power Plant, as well as Banpu NEXT, in which BPP has

no direct control, however, are governed by their directors. As

a result, the BCM of joint venture companies is not included

in this structure. These three joint venture power plants have

conducted their own business continuity plan (BCP). As such,

BPP has assigned a liaison officer to report data and current

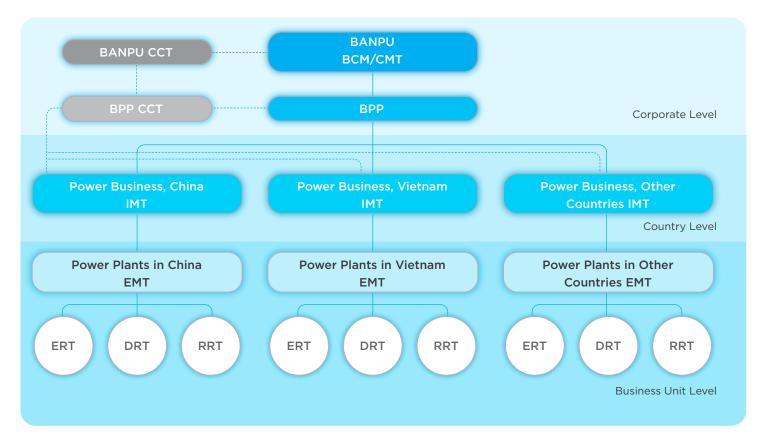
situations in preparation for communications relating to BPP

as a joint venture company.

BPP's business continuity management has been integrated into Banpu Group. It is supervised and managed by Banpu Group where BPP CEO is one of the Crisis Management Team (CMT), assigned to be the event commander and providing 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 continuously conducts the annual BCP exercise at both corporate and country levels. The drill is arranged alternately, while surveillance and review of system's efficiency are annually conducted through internal audit system and management's reviews. Additionally, each business unit is encouraged to share what they have experienced and learned in response to various threats so as to apply the lessons learned in the context of each country.

### **Business Continuity Management Structure**



CMT: Crisis Management Team

EMT: Emergency Management Team

IMT: Incident Management Team
ERT: Emergency Response Team

**CCT:** Crisis Communication Team **DRT:** Disaster Recovery Team

RRT: Relative Response Team











- Proportion of business units conducting BCP exercises at corporate and country levels was 100%. This was a result of BPP together with Banpu Group organizing the country-level BCP simulation exercise for Incident Management Team (IMT) at China's Office and Bangkok Office on 18 September 2023 and 22 September 2023, respectively. Both exercises covered the procedures of business continuity plan and the requirements of ISO22301 standards.
- Proportion of critical business units practicing BCP exercises was 66.7%. This was calculated from the number of critical business functions conducting the BCP drills (4 units) out of a total of 6 business operations from the 3 CHP plants in China.
- BPP's crisis communication team (CCT) participated in the crisis communication plan (BCP) exercise at headquarters in Bangkok on 7 August 2023. The aim was to help executives and employees to be able to regularly practice communicating appropriate and sufficient information to the public in the event of crisis.

Performance

Social



# Banpu Power's Crisis Communications ..... Team (CCT) Drill

To prepare Banpu Power's crisis communications team (CCT), both executives and employees to communicate information to stakeholders appropriately, Banpu Group's Corporate Communications Department arranged the crisis communication team (CCT) simulation exercise for CCT members of BPP on 7 August 2023, at the head office in Bangkok. The exercise simulated hypothetical situations possibly affecting the organization's operations from the cyberattack for ransom, theft of BPP's stakeholders' personal data, and acute flooding from the effects of climate change in Lao PDR. The exercise results have been considered to find means to improve the crisis communication system to be more effective.

The exercise simulated hypothetical situations possibly affecting the organization's operations from the cyberattack for ransom





# Business Continuity Plan (BCP) ...... Exercise at Country Level

Banpu Group places great importance on business continuity management (BCM) in various countries where its business bases are located. Therefore, the country level business continuity plan (BCP) exercise has been organized annually. On 18 September 2023, Banpu Investment China Company Limited or BIC, a subsidiary company in China, organized the country-level BCP exercise so as to ensure that BCM team is ready to respond to any crisis, including having abilities to restore business operations according to the BCP set. This exercise simulated situations consistent with climate change related risks, including storms and floods at Beijing Headquarters. Such situations were combined with the typhoon and drought events at its CHP plants and solar power plants in China.

The drill results were in line with the set objectives. The country-level BCM team was able to respond to incidents and activate the BCP promptly. The suggestion to organize a joint BCP exercise between the country-level BCM team and the business unit level team was raised and taken into account for the next BCM exercise

Be able to respond to incidents and activate the BCP promptly















# **Process Improvement and Innovation**

# **Stakeholders:**

• Employees, contractors, customers, business partners, shareholders, investors, the government sector.

## **Strategy:**

- Promoting production procedure development and innovation to enhance competitive advantages and stabilize production.
- Determining Innovation as one of the corporate shared values.
- Establishing an innovation working group to foster innovation across the organization.
- Fostering a complete transformation of work processes into the digital transformation era.

### **Key Indicators:**

- Power plant's availability factor (AF)
- Forced outage factor (FOF)
- Cybersecurity and privacy maturity score (Banpu Group's total score)

#### **Target:**

- No less than 90% of AF
- Not over 5% of FOF
- Cybersecurity and privacy maturity score is not less than 2.5 (A full score is 5)

#### **Performance:**

- The combined heat and power (CHP) plants achieved 95.98% AF and 0% FOF
- The gas-fired power plants achieved 82.68% AF and 0.51% FOF
- Overall cybersecurity and privacy maturity score was 3.5
- Offices in Thailand and Beijing were certified by ISO 27001:2013 Information Security Management Standard.
- Conducting a business continuity plan (BCP) drill in order to test a response plan in the event of business and personal data leakage.

## **Significance and Reporting Boundary**

Innovation, in the context of BPP, is the design and selection of high-efficiency, clean and environmentally-friendly technology suitable for each project. Innovation is also an initiative to transform work processes to be more efficient in the long term through conducting a study on how to improve the procedures. This may include applying emerging technology to current tasks. The development of production processes and innovations are major factors in increasing competitive advantages, especially using digital technology in the production process, supply chain management and energy trading.

The boundary of this report covers business entities, in which BPP has direct operational control.

## **Management Approach**



Improved its production efficiency based on the principle of **Operational Excellence** 



To increase workforce efficiency, as well as to reduce costs in a production process



Business unit are encouraged to exchange knowledge to create mutual learning



**Drives innovations** through creating a corporate culture

BPP has improved its production efficiency based on the principle of Operational Excellence in combination with innovations carried out through employee's participation at all levels. The aim is to increase workforce efficiency and process reliability, as well as to reduce costs and cut losses in a production process. The operation process improvement begins with training to ensure that all employees have abilities to identify problems possibly arising in the work processes for which they are responsible, with support from corporate team. Moreover, employees of each business unit are encouraged to exchange knowledge to create mutual learning. They also have the opportunity to present their own projects initiated and put them into practice with fruitful results.

















BPP drives innovations through creating a corporate culture. The Innovative value is one of the three core values, which has been promoted through various activities in order to make all employees understand the importance of applying innovation to their work. BPP also encourages its employees to present ideas and innovations so as to turn those initiatives into practical implementations. Moreover, learning within the organization in the form of a Learning Application Project is also promoted. encouraging employees from different departments to jointly work on projects through using creativity and innovation. The project initiated, then, will be presented to the committee to approve budgets for the project's further operations.

In addition, the Innovation Committee has been established. consisting of employee representatives responsible for promoting innovation within the organization. Furthermore, exchanging of innovations within the organization has been organized via

knowledge management and arrangement of the Innovation Convention annually so as to interchange knowledge and experiences, as well as to showcase the outstanding performance of employees in implementing their innovative projects.

More importantly, a mechanism to thoroughly screen production development projects, innovations and various digital initiatives was set up. The screening mechanism includes setting up evaluation criteria on the areas of investment values, risks. financial returns, and environment, social and governance (ESG) factors, as well as sustainability. This includes scaling up the projects for implementing in other production units.

Realizing the future operations, in which digital technology will play an important role in creating competitive advantages according to the Greener & Smarter strategy, Banpu Group places top priority on the transformation of work processes towards the digital age (Digital transformation). In addition, a selection of technology and a development of information systems must be suitable for 1) a level of business necessity, 2) meeting the objectives and 3) having opportunities to realize the returns rapidly. Meanwhile, the infrastructure laid down must be highly flexible to support business expansions. More importantly, a system to prevent cyber security risks has been installed since a power business is a security part in the area possibly being a target for cyber threats. As a result, a risk assessment is necessary, while safety must be tested. Furthermore, preventive measures have also been established and must be always up-to-date, while a Global Information Security Officer (GISO) has been employed with duties and responsibilities for managing information security, digital technology risks and legal compliance across Banpu Group.



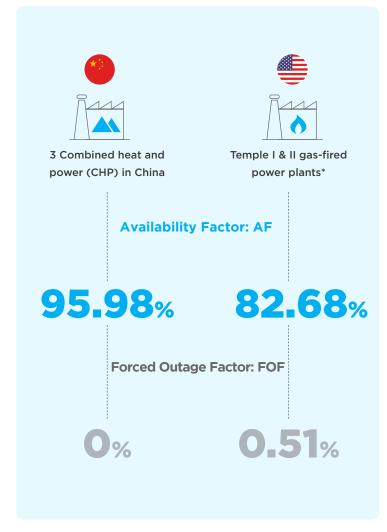
About Banpu Power-



Environment

Social

Performance



<sup>\*</sup> Temple II performance was calculated after the completion of acquisition since 10 July 2023

With an aim to create competitive advantages, improving its performance and stability in the long term, BPP has implemented innovation projects. Thanks to production process improvement and innovation implementation, the availability factor (AF) and forced outage factor (FOF) of power plants, in which BPP has management control, met the target set last year, the power plants were able to operate their production efficiency and stability according to the target set.

## **Process Improvement and Innovation Projects**

- The waste heat recovery by utilizing de-white facility project carried out at Luannan CHP Plant.
- The thermal energy conservation for maximum efficiency project, operated by Zhengding CHP Plant.
- The project to increase production availability of Temple I & II Power Plant.
- The Advanced Leakage Monitoring and Alerting Software (ALMA) project.
- The project to increase boiler's combustion efficiency at HPC Power Plant.
- The Digital Twins, the Booster of CHP Greener & Smarter project to improve operating efficiency of Luannan CHP Plant.
- The smart water management project to increase efficiency of integrated water resource consumption at Zhengding CHP Plant.
- The complex to simple boiler slag removal system reform at Zouping CHP Plant.

## **Information Security Operations of Banpu Group**







Conducting a business continuity plan



Adopting the ISO 27001 Information Security Standard System to help in strengthening

- The data security system and risks were inspected by an external consulting agency to look for improvement opportunities. BPP and Banpu Group received an overall score of 3.5 points (against a full score of 5), up from 3.0 in the previous year due to measures' improvements to prevent and solve cyber risks resulting from suppliers' operations (Third-party risk).
- Conducting a business continuity plan (BCP) drill to test a responsive plan, in the event of business and personal information leakage. Objectives of BCP exercise were as following:
- To examine relevant incident response plans and business
   personal data leakage plans.
- 2. To review and understand the concept, roles and responsibilities of involved employees.
- 3. To verify internal communication efficiency.
- 4.To operate in accordance with ISO 27001: 2013 requirements for measurement, analysis and evaluation.
- Adopting the ISO 27001 Information Security Standard System to help in strengthening data security management, reducing risks, and protecting data from thefts in the Bangkok and Beijing offices. It is in the process of studying the possibility of expanding the scope to a CHP plant.













Performance



# Structural Improvement of Water Pump Station in the Demineralization ••••••••• System to Prevent Damage Caused by Extreme Weather Conditions

Every winter, Temple Gas-fired Power Plant, located in the United States of America, experiences extreme weather conditions causing its water pumping station in the demineralization system to stop running when the temperatures are below a freezing point. Because the pumping station has been located in the open-air area since its operation, it is inevitable to be exposed to such severe weather. Initially, Temple Power Plant mitigated such impacts by installing temporary scaffolding and using plastic to protect its water pumping station during the winter. This, however, pushed the power plant's operating costs up annually. To this end, the idea of installing a permanent automatic guideway structure for a water pumping station in the demineralization system was initiated to protect key structures and valves of water pumps from severe weather conditions. The permanent automatic guideway structure was installed in October 2023, costing approximately USD 59.700.

The installation of permanent automatic guideway structure is considered as the improvement of power plant's equipment efficiency. It helps Temple Power Plant be able to generate power continuously during the winter when electricity demand is high. This initiative has helped reduce downtime due to water pump failure during winter, lower costs from installing temporary scaffolding, and protect water pumps from wind and sunlight, making the service life of water pump station longer. More importantly, the water pump's structural improvement of Temple Power Plant has been recognized as a best practice by the climate inspectors from Electric Reliability Council of Texas (ERCOT), which can be well applied to other power plants in this region.





The installation of permanent automatic guideway structure is considered as the improvement of power plant's equipment efficiency. It helps Temple Power Plant be able to generate power continuously during the winter.













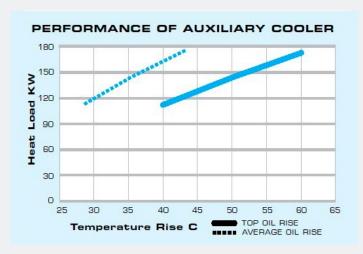




# Improving Power Generation by Installing an Auxiliary Transformer Cooler System

Temple Gas-fired Power Plant has installed an auxiliary cooling system for its electrical transformers so as to reduce the operating temperature of generator step-up (GSU) during the summer. Installing an auxiliary cooling system will help reduce the transformer's temperature and increase the power plant's production capacity during times of electricity peak demand. The auxiliary cooling system was implemented in March 2023, with an investment cost of approximately USD 446,000.

The auxiliary cooling system installed helps keep the transformer's temperature at an acceptable level within the designed temperature range and lower than the specified threshold during the high electricity production period. In addition, the cooling system helps extend the transformer service life, allowing Temple Power Plant to generate more electricity and increase its opportunity to generate income from continuous power production, including enhancing the power plant's stability.





**Auxiliary Transformer Cooler** 

The auxiliary cooling system installed helps keep the transformer's temperature at an acceptable level within the designed temperature.

















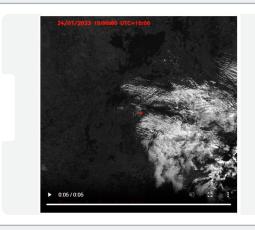
# Increasing an Accuracy of Power Generation ..... Forecasts by Installing a SkyCam Forecasting Device

Electricity trading from Beryl Solar Power Plant in Australia is conducted by dispatching power every 5 minutes as controlled and announced by the Australian Energy Market Operator (AEMO). In the past, Beryl Solar Power Plant had encountered problems with inaccuracies in predicting power production volumes, losing its opportunity to supply some electricity to the merchant market.

The accuracy of forecasting electricity production volumes from solar power plants under a variety of environmental conditions will affect BPP's revenue since the accurate forecasts will help increase electricity volumes supplied to the market and reduce loss from fines in the event of being unable to supply electricity as specified in the contract. Thereby, Beryl Solar Power Plant has improved its methodologies to predict power production more accurately by installing the SkyCam forecasting device.

The SkyCam device has an investment cost of AUD 93,000 for installation and operation. The device is designed to make predictions on its own by adjusting itself to the cloud images moving over the power plant area. The SkyCam analyzes data from: 1. The latest electricity quantity data, 2. The forecast values from meteorological stations, such as heat radiation, temperatures, wind speeds and directions, etc. and 3. Photos of various weather conditions.

SkyCam devices greatly increase the accuracy on predicting the amount of electricity produced, when compared with the amount of power loss resulting from the previous forecast in 2022, including a forecast when there is a high variability condition. This helps enhance the efficiency of supplying electricity according to the power dispatch order. It also helps in lowering costs from frequency control and ancillary services (FCAS) as well.



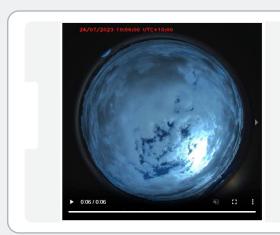
Images from the SkyCam camera



**SkyCam System** 

Reduce loss from forecast error from 2.2% in 2022 to 1.7% in 2023

SkyCam device at Beryl Solar Power Plant.

















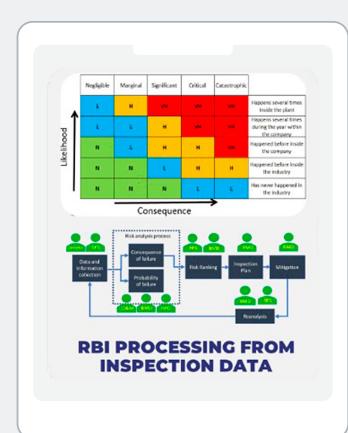


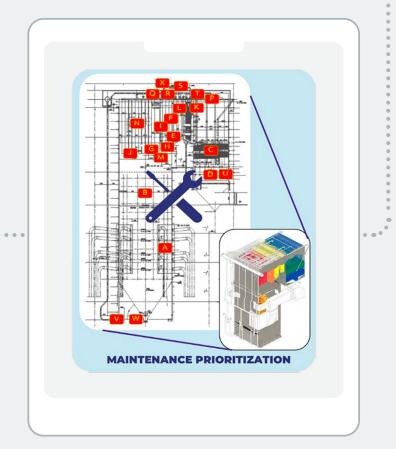
# Boiler Examination Through Risk •• Base Inspection (RBI)

Since inspecting boilers during the annual maintenance shutdowns covers a large amount of work and areas needed to be checked, HPC Power Plant, together with the Boiler Engineering Division of the Electricity Generating Authority of Thailand (EGAT), have implemented an inspection methodology using the Risk Base Inspection (RBI) to determine a boiler inspection plan. RBI uses boiler inspection data during the annual maintenance shutdowns, together with boiler's damage history of each area, to develop a Risk Matrix in order to be able to give an inspection and correction priority to the high-risk areas first. In addition, RBI also helps in choosing the most cost-effective and efficient method for boiler maintenance and examination. This helps HPC Power Plant and maintenance contractors to collaborate and work smoothly with clear communication. It also helps control the maintenance period to meet the target set.

The RBI implementation has helped reduce revenue loss derived from power plant shutdowns by approximately USD 5.9 million. Moreover, HPC Power Plant plans to develop RBI into a software format, replacing the current use of spreadsheets (Microsoft Excel) so as to make data management more systematic, making it easier to use in the future.

The RBI implementation has helped reduce revenue loss derived from power plant shutdowns by approximately USD 5.9 million



















BPP focuses on using digital technology to strengthen its business and to create the organization's sustainability. Under the vision of "Digital Business Enablement Focus", BPP has brought in the latest technology, such as artificial intelligence (AI), linking various electronic devices together via the Internet or Internet of Things (IoT), and data analytics to create operational processes that are as automated and modern as possible. This is in line with the organization's business direction in the next 2-3 years in order to reduce risks arising from using technology.

In 2023, BPP has taken steps to enhance its cyber security supervision as follows:

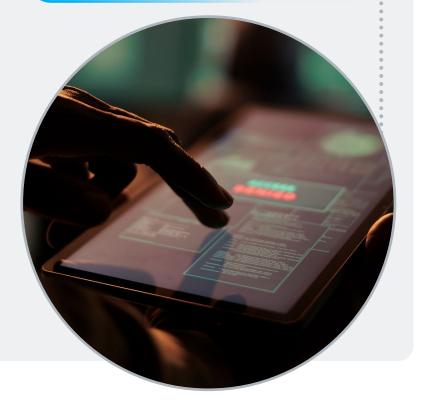
- Assessing cyber security together with the power
  plant business unit by external experts in order to be
  in line with expanding the scope of cyber security to
  cover both information technology and operational
  technology. The assessment results will be used to
  improve cyber security management in the areas of
  People, Process and Technology.
- Changing the vulnerability discovery process in existing applications to be continuous in order to take corrective action in time. The results will be used to upgrade the quality assurance process to cover

more businesses and to be in line with the modern agile working world that is changing rapidly.

- Increasing risk management regarding security and data privacy from the third parties, which currently has an increasing number and is involved with BPP in various roles, such as IT service providers and software developers, etc. The results will be used as part of the evaluation and selection of business partners.
- Raising awareness of cyber security for people, making them well aware of new forms of threats driven by the latest technology. A new and different design will be created to raise awareness corresponding to different target groups. This is to scale up from raising awareness to changing behavior until becoming a corporate cyberculture.

A continuous cybersecurity operation throughout the past year has pushed the cybersecurity and privacy maturity score assessed by external agencies up to 3.5 points or 0.5 points higher than the previous year, achieving the set target of no less than 2.5 points out of a full 5 points.

The cyber security and privacy maturity score has increased to 3.5 points from the previous year.















# **Supplier Management**



#### Stakeholders:

Suppliers, contractors

## **Strategy:**

- Determining the Supplier Code of Conduct to cover the areas of business ethics, environment and society.
- Maintaining sustainable supplier management in all business units via 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 supplier engagement and promoting environment, social and governance (ESG) operations to suppliers.

## **Key Indicators:**

- Proportion of new suppliers selected by using ESG criteria.
- The number of grievances on supplier management related to ESG.
- The number of incidents on suppliers violating laws, human rights, labors and environment.
- Proportion of local procurement value.
- Suppliers' work-place safety, such as fatality resulting from working, and lost time injury frequency rates (LTIFR).

#### **Target:**

- None of ESG related grievances regarding supplier management.
- None of incidents related to suppliers violating applicable laws, human rights, labors and environment.
- None of supplier's fatalities resulted from working.
- Suppliers' LTIFR equals to zero.
- Proportion of critical tier-1 suppliers (key suppliers directly conducting) business with BPP) are completely assessed on ESG risks by the year 2025.
- Proportion of contracts specifying ESG criteria completely by the year 2025.

### **Performance:**

- None of ESG related complaints regarding supplier management.
- No incidents suppliers violating applicable laws, human rights, labors and environment.
- None of fatalities resulted from supplier's works.
- · Suppliers' LTIFR was zero.
- Developing supplier ESG checklist for integrating into the procurement system across the organization.

## **Significance and Reporting Boundary**

Realizing that supplier's operations have an impact on product and service quality and being a key factor in creating competitive advantages as well as playing a key role in the ESG operations directly and indirectly, BPP operates its businesses with top priority to the sustainable supply chain management. Consequently, it focuses on creating participation and promoting

suppliers' ESG operations in order to create mutual benefits.

The boundary of this report covers business entities in which BPP has direct management control, namely the three combined heat and power (CHP) plants in China and gas-fired power plants in the United States of America.

## **Management Approach**

The operating guidelines for supplier management in alignment with the sustainable supply chain policy were developed so as to achieve BPP's goals to create sustainable value throughout the supply chain. The Supplier Code of Conduct was also established to clearly communicate

BPP's expectations on suppliers. In addition. BPP has focused on operating with its key suppliers categorized based upon the criteria, such as trading values, product specificity, which may be limited in the market, and suppliers playing a key role in ESG operations at BPP's operational areas.

BPP's main suppliers can be divided into 3 groups, including:



1. Fuel Suppliers: Coal and natural gas are major raw materials for power generation of BPP's thermal power plants. The supplier management to mitigate risks relating to quality coal supply with prices and quantity in line with the production plan of each production period, is a key success factor for availability and reliability management. Moreover, coal is categorized as a commodity product, the prices of which are volatile within the global market. Meanwhile, coal production and transportation from its original production sites may be affected by severe natural disasters caused by climate change, etc.



2. Machinery Suppliers: A machinery supplier is a manufacturer of machinery parts specific to the power plant's maintenance, which cannot be purchased in the general market.



3. Contractors: Contractors are BPP's key trading partners working in the operational areas. So that they directly affect the production operations and operational safety. BPP's contractors consist of operation & maintenance contractors, engineering, procurement and construction contractors.















## BPP manages its suppliers as following approaches:

- Selecting suppliers transparently and fairly according to code of conduct principles.
- Integrating safety, occupational health, environment, social and corporate governance targets into supply chain management strategies and other associated policies.
- Driving towards the sustainable supplier management in all production units via the integration of ISO 9001 Quality Management System Standard, ISO 45001 Occupational Health and Safety Management Standard and ISO 14001 Environmental Management System Standard.
- Inspecting and reviewing supplier's qualifications associated with ESG annually so as to be able to identify and mitigate ESG-related risks in the supply chain appropriately and reporting the result to executives of each production unit for acknowledgement.
- Promoting joint working with suppliers adhering to ethical principles with social and environmental responsibility, respecting human rights, and complying with Supplier Code of Conduct and any associated policies.
- Setting up procedures to ensure that suppliers comply with applicable laws and local regulations, as well as international labor standards, such as establishing the selection criteria, stipulating selection criteria in the procurement contracts, and monitoring environmental, social and governance operations of key suppliers.
- Promoting local procurement to create economic contributions to the areas where BPP has operated.

- Setting up Supplier Code of Conduct, paying great attention to suppliers who do business directly with BPP or critical tier-1 suppliers, and translating the Supplier Code of Conduct into Thai, English, Chinese, Vietnamese and Japanese languages in order to communicate efficiently.
- 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 continuously monitoring operations to ensure that suppliers operate in accordance with the standards and applicable laws, for example inspecting the operation sites of suppliers and contractors.
- Providing a safe working environment for contractors, organizing training to educate them about safety and workplace environment, as well as conducting risk assessment on operational activities or job safety analysis (JSA) prior to starting working.
- Regularly inspecting and evaluating contractors when performing their duties in the area to ensure safety and improve operational quality continuously.
- Continuously disclosing the supply chain's sustainable performance to stakeholders.



**Sustainable Supply Chain Policy** 



Supplier Code of Conduct

## **Performance**

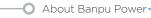


In 2023. BPP received neither grievances associated with **supplier management nor incidents**, in which key suppliers were involved in violating the ESG-related laws .The contractors working in the three CHP plants in China performed operations safely, being able to achieve safety targets as follows:

- Zero Fatalities
- 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



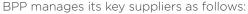












- Specifying clear criteria and qualifications for choosing suppliers in accordance with BPP's sustainability policy and Code of Conduct principles, such as identifying transparent criteria and qualifications for selecting suppliers to construct a power generation unit to scale up production capacities and to improve the power plants in China. This included supplier's operations related to quality, environment, social and governance (ESG).
- Procuring transparently through bidding processes, clearly determining evaluation criteria in all steps by communicating information thoroughly and notifying suppliers through online systems. For example, a coal procurement system of the three CHP plants in China was conducted through the centralized coal procurement in order to select suppliers whose qualifications meet BPP's requirements.
- Examining supplier's qualifications regarding operational history, reputation, and legal compliance to reduce operational risks prior to procurement, as well as arranging supplier's site visits in the areas, such as key component manufactuing for the power plants, and coal mines, etc.
- The three CHP plants in China drive contractors' operations through system implementation. They have been continuously certified for the ISO 9001 Quality Management System Standard, ISO 45001 Occupational Health and Safety Management System Standard, and ISO 14001 **Environmental Management System Standard.** Moreover, the three power plants have created safety awareness among their contractors regularly, including improving the safety management system, conducting regular training and verifying contractors' operations so as to create jointoperational improvement plans. Besides, lessons learned from accidents in China's energy industry have been summarized while a safety culture has been cultivated in all levels. This is considered as part of implementing these management systems to achieve their goals.

- Scrutinizing BPP's critical tier-1 supplier and assessing operational risks in China.
- Coal procurement: BPP uses the centralized coal procurement and bidding system to purchase coal in order to make coal procurement done quickly and transparently, as well as to reduce costs on coal procurement during high price periods. In addition, it is looking for opportunities to enter some long-term coal contracts to mitigate risks related to coal price volatility.
- Machinery and spare parts procurement: As China is the industrial center with fast and convenient transportation system, there are a lot of machinery manufacturers specializing in maintenance and construction in the country. However, the nation may be partially affected by geopolitical pressures, possibly delaying operations.
- Hiring contractors: The COVID-19 pandemic has created risks on contractor procurement. This may result in inability to meet the targets and timeline set, such as power plant operations and construction, which have impacts on production, maintenance, and construction.





# Supplier Screening ···· and Selection **Standards According** to ESG Principles

To ensure that all suppliers in the supply chain conduct business on the basis of social, environmental and ethical responsibility, BPP has applied the ESG criteria to screen and select the suppliers. It is now in the process of developing standards for screening and selecting suppliers according to ESG guidelines to be used within the organization. In addition, BPP has also improved the assessment form, including various dimensions of criteria, such as occupational health, safety, environment, service quality, location availability, technical features and management. The assessment was designed in the

form of a questionnaire the contractors can use as a tool to evaluate their own ESG outcome based on past performances.

















## 

BPP's joint venture power plants have organized activities to promote safety, occupational health and the environment (SHE) for their contractors annually. On 29 November 2023. BLCP Power Plant held the Safety, Occupational Health and Environment Day 2023 or SHE Day 2023 under the theme of "Creating safety innovations for the community and environment in a sustainable way". The event was aimed at emphasizing the importance of safety and health at work. It was attended by BLCP executives, employees and contractors. Additionally, the amount of greenhouse gas (GHG) emissions generated from the event was calculated. Approximately 1 ton CO<sub>2</sub>e emitted from this event's activities was compensated through the biogas generated from the pig farms project, phase 3 of Tha Manao Sub-district, Chai Badan District of Lop Buri Province. Moreover, the event also provided opportunities for employees and contractors to present their safety and environmental ideas to improve the power plant operations.

Meanwhile, HPC Power Plant, organized the SHEQ & KM DAY 2023 for its employees and contractors on 9 December 2023 under the concept of "Go Beyond Compliance and Sustainable Success" in order to promote safety awareness and develop knowledge for business units, contractors and communities, in which BPP operates business sustainably.



SHE Day held on 29 November 2023 at BLCP Power Plant



SHEQ & KM DAY 2023 at HPC Power Plant on 9 December 2023















# **Customers Management**



## Stakeholders: Customers **Strategy:** • Sustainably managing customers of production units through an amalgamation of ISO 9001 Quality Management System Standard, ISO 45001 Occupational Health and Safety Management System Standard and ISO 14001 Environmental Management System Standard. Integrating customer management into business ethics, environmental and social policies. Consistently surveying customer's satisfaction and expectation for continuous improvement. **Key Indicators:** · Scores of customer's satisfaction. Proportion of customer grievances resolved in a timely manner. • The number of customer complaints related to customer's privacy data protection. • The number of customers' accusations associated with safety and environment of product usage. Target:\* • Customer satisfactory scores are over 85%. Proportion of customer grievances dissolved at the appropriate time equals 100%. • None of customer's complaints related to customer's privacy data protection. None of customer's accusations associated with safety and environmental issues regarding product usage. Performance:\* Customer's satisfactory scores were accountable for 100%. • Proportion of customer's complaints corrected in a timely manner equaled 100% • None of customer's grievances associated with customer's privacy data • None of customer's complaints connected to safety and environment of

Remarks: \*Covering the three combined heat and power (CHP) plants in China, excluding of gas-fired power generation and power trading businesses in the United States of America.

product consumption.



## About Banpu Power





## Social



## **Significance and Reporting Boundary**

BPP is committed to generating and supplying power and other forms of energy to ensure quality and stability in accordance with the international standards and customers' demands. Realizing that BPP's operations have stabilized the nation's electricity system and are the key factor for the industrial sector's production leading to better community's well-being, it is, therefore, a responsibility of BPP to deliver products meeting customer's expectations better. Consequently, BPP

has to operate its businesses with honesty and aligned with standards in order to protect customer's data. Additionally, the international operation standards have been integrated into its power generation system so as to deliver electricity and other forms of energy meeting customer's expectations and creating trust from customers.

The boundary of this report covers all business entities where BPP has direct control, namely the three combined heat and power (CHP) plants in China, the gas-fired power plants and power trading business in the United States of America.

## **Management Approach**

BPP customers can be classified based on their business characteristics and countries where BPP operates its business.

•		
CHP plants in China	Gas-fired power plants in the U.S.	Power trading in the U.S.
<ul> <li>Government agencies, electricity state enterprises, and legal entities, in which the government is a major shareholder, primary buyers under the power purchase agreement (PPA).</li> </ul>	Customers in the merchant market in Texas state overseen by the Electric Reliability Council of Texas (ERCOT). The power plants will supply electricity via grid lines according to	Retail customers who require various forms of energy, such as fuel and renewable energy sources, certification standards, quantity of carbon emissions per unit, price
<ul> <li>Steam and power buyers from the industrial sector.</li> </ul>	ERCOT's orders in real time.	per unit, etc.
<ul> <li>The trading sector buying cold water for a cooling system in the commercial areas.</li> </ul>		
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.		

Since BPP operates more variety of businesses, customer management differs in each country, such as customers of CHP plants in China, major groups of customers generating income are the government agencies and state enterprises, which are the main power purchasers under the long-term power purchase agreements, as well as the industrial sector buying steam. As a result, the ISO 9001 quality management system standard has been used in customer management in the production units having to deal with a variety of customers. Moreover, the principle of quality management is to focus on customers and to have a process to understand needs and expectations between manufacturers and customers. The important operations carried out are as follows.



#### Specifying operational targets

to be in line with customers' needs and expectations.



Communicating about customers' needs and expectations throughout the organization

to create the right understanding among employees.



Measuring customers' satisfaction regularly

in order to immediately respond to customer's needs.



Creating a systematic customer relationship continuously.



#### Paying attention to a balance

in corresponding to customers and other stakeholders.

Regarding the power trading business in America, since electricity buyers are retail customers with various power demands, BPP focuses on mitigating risks possibly arising such as:

- Establishing a retail risk management policy to serve as a guideline for the retail pricing committee and management team in managing market risks of retail electric providers.
- Setting up a pricing policy to be used as a guideline for setting daily trading prices. The policy requires checking customer's quotation whether it is accurate or up to date. while maintaining the price difference to be in line with the target set.
- Determining a credit and collection policy to manage credit risk from entering into sales contracts with customers. The policy requires checking whether or not appropriate measures and controls are used in order to gain quality customer groups in the long term. The policy also obligates to limit risks associated with bad debt and write-offs, including curbing losses possibly occurring from data disclosed by the contracting party.
- Utilizing technology to help analyze the market needs to be used for designing packages and prices to meet customer demand.
- Studying retail customer's credit rating so as to use it as a guideline for analyzing customers' creditability before entering into a contract.

In addition, BPP also focuses on creating relationships with customers, treating them as the partners of mutual success. This is done by giving high importance to delivering the sustainable value to every customer and taking into account 4 main values as following:

- **1. Product value:** Using High Efficiency, Low Emissions (HELE) technology and having an ability to control air and water quality as well as environmental management to meet the international standards in order to create product values.
- 2. Service value: To create service values, BPP has upgraded its production efficiency with availability and reliability aligned with customers' needs. Its operations are also flexible to reach customers' demands, including controlling.
- **3. People value:** To build people's values, BPP supports its employees to develop their knowledge and skills and cultivate a corporate culture with qualified staff daring to solve the customers' problems properly and quickly.
- **4. Reputation value:** In order to create a good reputation, BPP operates its businesses professionally in accordance with the code of conduct and good corporate governance.

Furthermore, BPP is closely monitoring legal and policy changes in order to adapt itself to any changes in energy demand from the government sector aiming to reduce greenhouse gas (GHG) emissions from power and energy production. It is also an opportunity to transform the business towards renewable energy and energy technology derived from market demand and government support.













## **Performance**

In 2023, the three CHP plants in China were able to keep their availability factor (AF) in accordance with customer's demand from both public and private sectors throughout the year. The three power plants were still able to continue their production consistently, being able to deliver power, steam and chilliness/heat as agreed. In the previous year, key operations carried out were as follows:

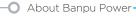
- Conducting a satisfactory survey with industrial customers who are BPP's main purchasers. The survey results of the three CHP plants in China, which take part in implementing the ISO 9001 Quality Management system, are as follows:
- The survey covered 100% of the total number of 54 customers
- The response rate was 100%.
- The customer satisfaction scores were 100%.
- Proportion of customers' grievances settled in a timely manner equaled 100%.
- None of customers' complaints associated with safety and environment of product's usage
- Communicating about personal data protection and raising awareness of keeping and using customer's data.
- Improving information security of offices in Thailand and China. The two offices have been accredited for the ISO 27001 Information Security Standard. This has strengthened the information security systems and reduced risks, as well as protected data from thefts.
- None of complaints from customers regarding the safety and environment of product utilization.



- Zouping CHP Plant used waste from its customer's production process, containing activated carbon, to reduce coal consumption and to create mutual benefits with customers in disposing of waste of 26,250 tons/year. This can reduce production costs by RMB 6.4 million/year.
- Zhengding CHP Plant has been selected by the Chinese government to operate a solar rooftop project in Zhengding City. The power plant targets installing solar panels on the roofs of governmental buildings, factories and communities.
- Luannan CHP Plant, which serves 41 industrial steam customers, has improved its operations to meet customer demand by quickly increasing steam production capacity to meet customer needs. The production capacity can be increased within 4 hours after receiving the order from customers. As a result, customers can carry out production flexibly. The power plant also provides technical and engineering advice to help customers run production smoothly. This has resulted in a high satisfaction rate among all customers, representing 100% from the satisfactory survey conducted in 2023.
- The power trading business in the United States of America where BPP has just invested can achieve its target on creating customer base at least 37,400 customers in 2023.

















# Using Digital Technology to Drive the Future Power Business Responding to Customer Needs in the Merchant Market

In the past two years, BPP has invested in gas-fired power plants and power trading business in the U.S., which is a merchant market and exists in the entire value chain. starting from electricity generation from large power plants to selling power in the wholesale and retail markets, including power trading. This is to drive the business to grow forward. Moreover, BPP sees the importance of using digital technology in managing power production and distribution business in the merchant market. In addition to enhancing knowledge and expertise for employees, the technology is still needed to be developed in order to raise the level of service meeting different customers' needs and to build good relationships with customers. This has helped BPP expand its customer base and increase the amount of electricity sold and future profits. The digital technologies used in operations are as followings:

BPP has invested in gas-fired power plants and power trading business in the U.S., which is a power merchant market.



**Developing software** to store and analyze factors affecting the amount of power supply in the market in order to track movements in the real-time power trading market.



Using artificial intelligence (AI) to analyze power consumption behaviors of customers in order to design a variety of service packages at reasonable prices. Moreover, AI is also used for responding to customer needs and proceeding with information from social media to increase opportunities to reach the target customers. In addition, AI is used for developing attractive and interesting marketing activities so as to build good relationships with customers.



Generating power through digital systems, which allows the power plants to flexibly adjust their production capacity levels, corresponding to the rapidly changing merchant market. The digital system also creates opportunities to increase income while the market is faced with electricity shortage. Moreover, it is transparent and can be traced back by releasing production data to the public in real time.

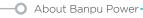


**Using software systems to record, monitor and control emissions** from gas-fired power plants with accurate and transparent data that can be traced back.



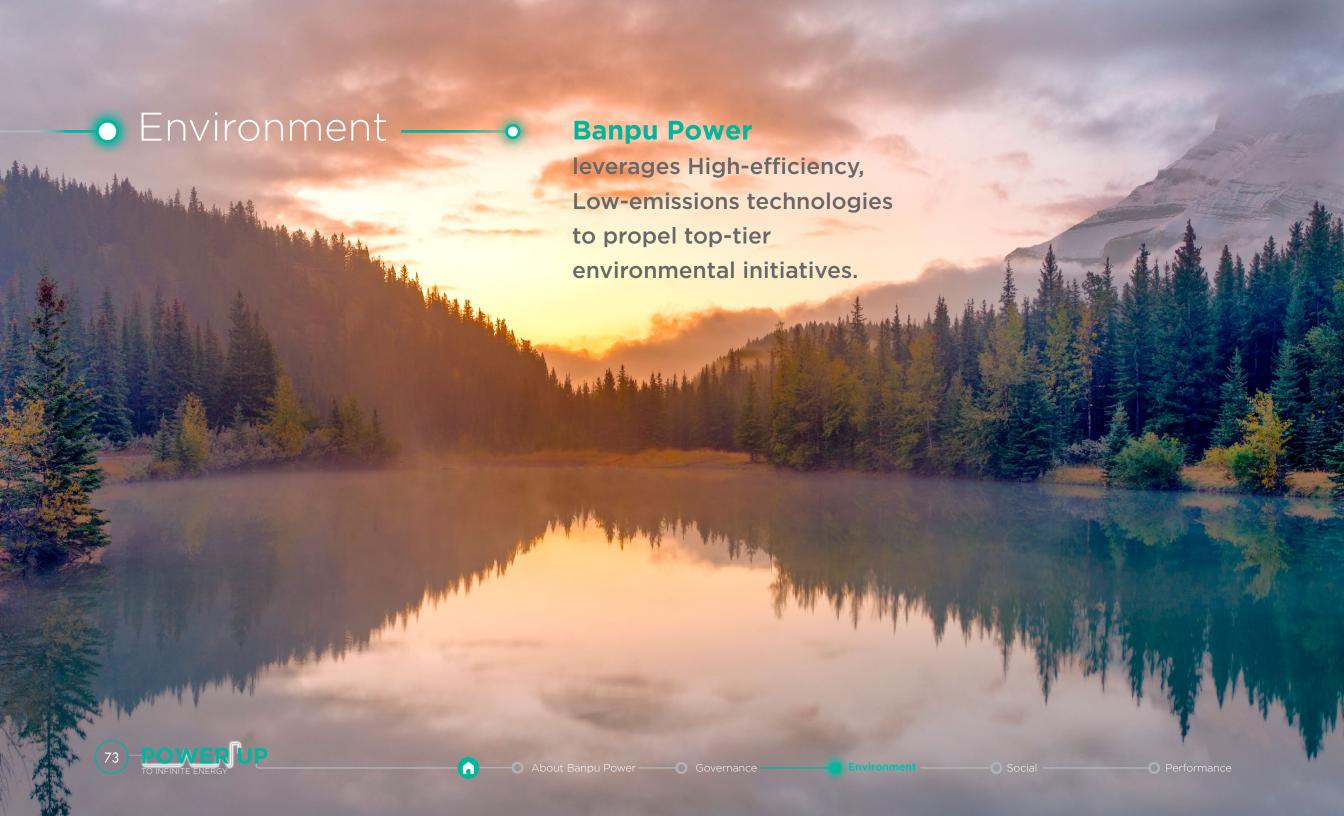












## **Electricity Generation**



#### **Stakeholders:**

• Customers, employees, business partners, shareholders, financial institutions

#### **Strategy:**

- Scaling up power production capacity through an investment in advanced, clean, and environmentally-friendly technology in pursuant to the "Greener & Smarter" strateav.
- Building confidence in the power plants' availability in response to customer's needs efficiently and stably, by maintaining power plants' machinery according to the international standards.
- Enhancing power plants' efficiencies through innovation utilization.

#### **Key Indicators:**

- A production capacity growth
- Power plants' availability factor (AF)
- Forced Outage Factor (FOF)

#### **Target:**

- A power generation capacity of 5,300 MW by the year 2025, consisting of:
- 4,500 MWe from thermal power
- 800 MWe from renewable energy
- At least 90% of AF
- FOF is not over 5%.

#### **Performance:**

- Generating power capacity of **3,642 MW**, consisting of:
- **3.247 MWe** from thermal power
- **395 MWe** from renewable energy
- The CHP plants recorded 95.98% AF and 0% FOF
- The gas-fired power plants' AF and FOF was **82.68%** and **0.51%**, respectively.

## **Significance and Reporting Boundary**

BPP has pursued the Greener & Smarter strategy corresponding to a transition towards more clean energy generation in the future. This includes a more efficient energy consumption model derived from the development of various energy technologies. As a result, BPP concentrates on investment in creating growths from thermal power generation, by using clean and high-efficiency environmentally-friendly technology in combination with transitioning electricity generation towards renewable energy, energy technology, and smart energy utilization. BPP also focuses on continuous improvement to scale up its power plant's stability and efficiency, with high availability and low forced outage factor. Besides, it puts top priority on creating competitive advantages corresponding to an increase

in the merchant markets in the future so as to deliver various forms of power and energy contributed to economic and social development during the transition of energy consumption patterns in the society, making it move smoothly.

The boundary of this report covers business entities, in which BPP has direct management control, including the three CHP plants in China, and Temple I & II gasfired power plants in the United States of America. Besides, BPP separately reported the operating results of its thermal power plants, which are the joint venture companies, namely HPC Power Plant, BLCP Power Plant, and Banpu NEXT, since they are BPP's key production forces and are interested by stakeholders.

## **Management Approach**



Creating stability and improve the power plants' efficiency



Emphasize supply chain management



Promote innovation utilization. particularly digital technology



Communicate its production and machinery maintenance plans with customers, suppliers and contractors

#### **Production**

BPP places great importance on creating stability and improving the power plants' efficiency to continuously deliver energy to customers, by strictly operating productions according to operating procedures. This includes keeping quality maintenance according to specified standards and determining criteria for supervision surveillance, audits and risk assessments, as well as regularly monitoring the power plants' operating performances. It also emphasizes supply chain management so that fuels and raw materials can be supplied to the production line according to the action plan set.















BPP implements the quality, occupational health, safety, and environment management standards in all of its CHP plants in order to operate their productions according to the entire operating processes. It also promotes innovation utilization, particularly digital technology, which can be widely adopted for measurements of various parameters associated with production. The data will be later utilized to create the production's availability and stability.

BPP communicates its production and machinery maintenance plans with customers, suppliers, and contractors in advance to create effective collaboration. Collaboration is very important in maintaining the power plants' availability factor (AF) and stability. The annual machinery maintenance is the main activity making the engine conditions efficient with a long service life. Therefore, the machines can be operated continuously according to customer's needs and the plans set.

Machinery maintenance of thermal power plants is carried out in accordance with the maintenance standards set for each power plant. The standards include selecting skilled maintenance contractors and evaluating their performance for improvement. Each year, the power plants choose to perform their maintenance during the times when there is less energy demand in the area. The aim is to prepare machines before entering the peak energy demand period. For example, all power plants avoid carrying out maintenance simultaneously across all production units because they still have to supply electricity and steam to customers even during their maintenance periods.



#### **Expansion of Production Capacity and Investment**

BPP puts great attention on investing in the power plants equipped with High Efficiency, Low Emissions (HELE) technology according to the Greener & Smarter strategy, such as the gas-fired power plants, the renewable energy power plants, the energy technology, and the smart energy solution. These investments are made in the form of both business operations with direct management control and joint venture companies. Prior to investing, each project must be thoroughly examined regarding both risks and return on investments, including inspecting the project's environment, social and

governance (ESG) factors. Additionally, the variants related to ESG issues, such as carbon prices, greenhouse gas (GHG) emissions intensity, etc. are taken into consideration for each investment to ensure that BPP invests in businesses able to grow sustainably. Meanwhile, risks are mitigated to an acceptable level. In addition, the thermal power plants currently operating are looking for opportunities to expand their business operations into Integrated Energy Services to meet rising demand for clean energy.

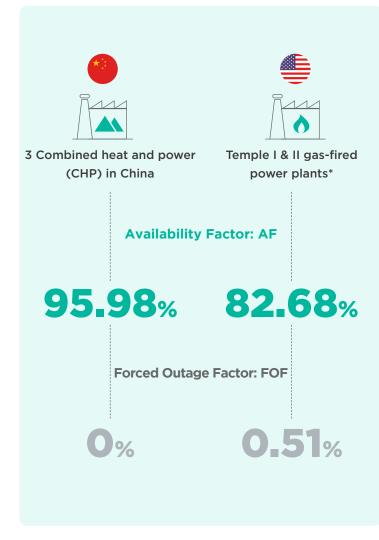








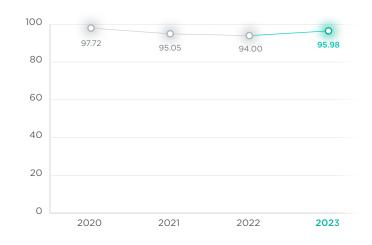
## Performance



\* Temple II performance was consolidated after completion of acquisition since 10 July 2023

• BPP has improved its power plants to maintain their ability in generating electricity continuously, keeping their availability factors, corresponding to customer's demand, with efficient maintenance plan. The power plants' efficiency has been upgraded to be more flexible in using various fuel types, such as industrial waste, low-caloric value coal, etc., so as to reduce production costs when the coal prices are high. In addition, investing in gas-fired power plants in the merchant market must be ready to generate electricity at all times in order to be able to distribute electricity as specified in the contract and prevent damage resulting in from risks associated with selling electricity in the merchant market. This includes increasing the opportunities to make profits during periods when the market has high demand for power, and when lacking production capacity from other energy sources.

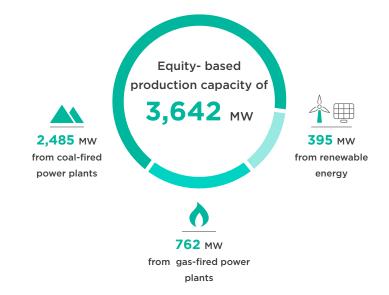
## Availability Factor of 3 CHP plants in China (%)



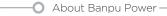
 All three CHP plants in China have been continuously certified for the ISO 9001 Quality Management System Standard, the ISO 14001 Environmental Management System Standard, and the ISO 45001 Occupational Health and Safety Management System Standard by the external certification bodies. The three power plants have also operated their production according to international standards.



41 COD power plants of Banpu Power





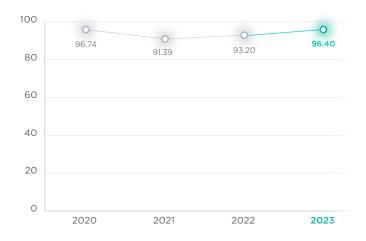




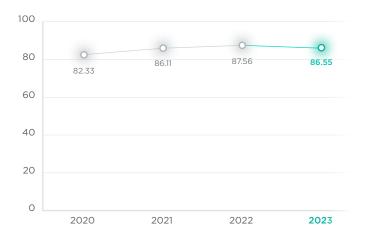




## Availability Factor (AF) of BLCP Power Plant (%)



## Availability Factor (AF) of HPC Power Plant (%)



## **Operations of Joint-Venture Power Plants**

BPP has invested in thermal power plants in Thailand and Lao PDR, namely BLCP Power Plant, and HPC Power Plant, respectively. Such power plants are the base load power plants under the power purchase agreements (PPA) to supply electricity to the Electricity Generating Authority of Thailand (EGAT), with an aim to maintain the power distribution system's stability and the nation's overall electricity costs.

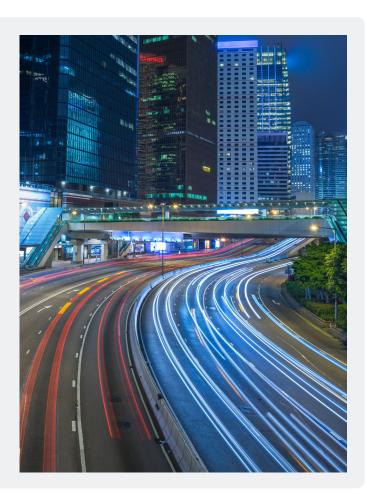
The number of availability hours and annual maintenance plans of BLCP Power Plant and HPC Power Pant are detailed in the PPAs throughout 25 years. The PPA practice principles stipulated that the power plants must submit an annual maintenance plan to EGAT and clearly operate to completely meet the targets set under the specified period as informed to EGAT.

Energy technology business under Banpu NEXT, in which BPP has jointly invested 50%.

- Solar Rooftop and Floating Business: Having an equity-based production capacity of 213 MW\*
- Electricity Trading Business: Having a power purchase capacity of 760 gigawatt-hours\*
- Smart cities & Energy Management Business: This business has operated 27 projects.
- E-mobility Business: Providing travel services, such as "Ride Sharing" service served by MuvMi, the Electric Tuk Tuk, "Car Sharing" service, and EV charger stations.
- Battery Business: Collaborating with partners to develop energy storage systems, and setting up a battery assembly plant in Thailand, namely:
  - Dura Power with a capacity of 1.0 GWh\*
  - The battery assembly factory in Thailand with a production capacity of 3.0 GWh (in progress).
  - The battery farm in Japan, with a capacity of 58 MWh (in progress).
- Maintenance Business and Customer Services: Flectric train maintenance and after-sales services

Remarks:\* Such figures represent 100% of production capacity.

Governance











## Climate Change and Greenhouse Gas (GHG) Emissions



#### **Stakeholders:**

 Government sectors, investors, shareholders, communities, financial institutions, partners, civil society, media

#### **Strategy:**

- Lowing GHG emissions intensity per unit of products by enhancing power plant's efficiency through promoting innovations and employing high efficiency and environmentally-friendly technologies.
- Stopping investing in coal-related businesses in addition to existing assets but investing in gas-fired power plants during the energy transition period in response to the creation of energy stability.
- Investing in renewable energy, energy technologies, and decarbonization projects in order to be part of a low-carbon society in the future.
- Enhancing ability to adapt oneself to risks involved with climate change.
- Disclosing climate change-related data in accordance with Task Force on Climate-Related Financial Disclosures (TCFD).
- Joining with Banpu Group to develop the decarbonization roadmap.

#### **Key Indicators:**

- GHG emissions intensity per unit of products.
- Investing in renewable energy generation project.

#### **Target:**

- GHG emissions intensity per unit of products (Scope 1 & 2) does not exceed 0.676 tonnes CO<sub>a</sub>e/MWh during the years 2021-2025.
- Having a renewable energy generation capacity of at least 800 MWe by 2025.

#### **Performance:**

- GHG emissions intensity (Scope 1 & 2) was 0.469 tonnes CO<sub>2</sub>e/ MWh, down 30.6% when compared with the target set, and 25.7% lower than the year 2012 baseline.
- Combined heat and power plant **0.511 tonnes CO<sub>3</sub>e/MWh**
- Gas-fired power plant **0.424 tonnes CO<sub>2</sub>e/MWh**
- **395 MWe** from renewable energy generation capacity, representing 49.4% progress of the year 2025 target.

## Significance and Reporting Boundary

Climate change is a key factor affecting sustainable development and human well-being. As a result, it becomes the global issue pulling collaborations across the world to lower GHG emissions and alleviate its impacts. Many countries have jointly set the common goals to lessen GHG emissions so as to control a rise of the earth's average temperature to well below two degrees Celsius. Consequently, the policies and applicable laws have been

set up in many countries to promote GHG emission reductions and efficient energy consumption, such as a system permitting to trade GHGs or the Emission Trading Scheme (ETS), limitation of fuel consumption for energy production, a promotion of more renewable energy investments, carbon tax, etc. As such, these are both challenges and important opportunities for BPP to grow in the energy business.

#### BPP's major activities causing GHG emissions are as followings:

Direct GHG Emissions (Scope 1)	Indirect GHG Emissions (Scope 2)
<ul> <li>Using natural gas, coal and waste gas from industrial factories, as well as activated carbons – waste released from manufactories, used as fuels to generate power, steam, and heat.</li> <li>Utilizing diesels to ignite boiler's combustions, heavy equipment, substitute power generators, and internal transportation vehicles, etc.</li> <li>Using gasoline to operate vehicles.</li> <li>Making use of calcium carbonates (CaCO<sub>3</sub>) to control the air quality.</li> <li>Utilizing SF<sub>6</sub> gas.</li> </ul>	A power purchase from external sources.

The boundary of this report covers all businesses in which BPP has direct management control according to the GHG Protocol Corporate Accounting and Reporting Standard (Revised Edition), and in line with that of Banpu Group. This includes the three CHP plants in China and Temple I & II gas-fired power plants in the U.S.

The renewable power plants and thermal power plants, which are joint venture companies of which BPP does not have direct management control, but are interested by stakeholders, only their performances are reported in the table annexed. However. these data are not integrated into BPP's GHG emissions database.









Environment

Social

Performance

## **Management Approach**

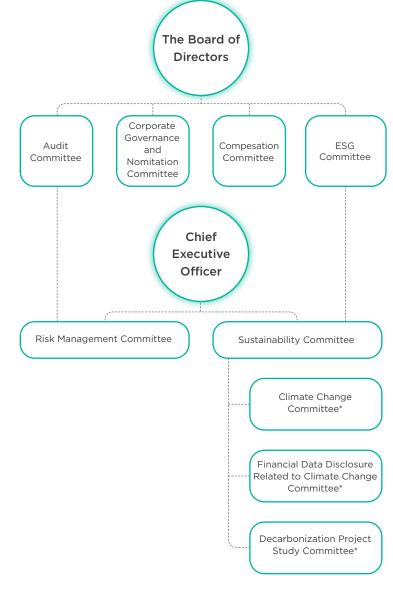
Since BPP operates a power and energy generation business, it directly consumes fuels for energy production. As a result, BPP mainly focuses on decreasing direct GHG emissions (Scope 1) released from various fuel consumptions. BPP's direct GHG emissions are accountable for 99% of its total GHG emissions since its operations are the upstream business, generating power and other energy supplied for industrial and residential consumptions.

BPP sees the opportunities and capabilities to reduce GHGs through improving energy utilization efficiency, lessening losses in the production process, and conducting a study on alternative fuels to achieve its GHG reduction target. In alignment with the

Greener & Smarter strategy, BPP is also looking for chances to invest in renewable energy & technology businesses and smart power utilization. BPP closely keeps an eye on policy changes and assesses risks related to climate change in preparation for adapting itself to a transition of structures, policies and applicable laws in various countries. For example, employing a business continuity management system, assessing risks and opportunities related to changes in alignment with the Task Force on Climate-Related Financial Disclosures (TCFD), including defining the carbon pricing as part of its investment consideration in various projects.

BPP has established working groups to govern climate change operations as follows:

Committees	Responsibilities	Frequency
Levels of BPP's Board of Directo	ors .	
The Board of Directors	<ul> <li>Governing and making strategic decisions for BPP's growth in the long-term by taking into account the environment, social and governance (ESG), inclusion of climate change.</li> <li>Supervising the operational direction and growth to be in line with vision and missions.</li> <li>Cogitating returns related to performances in accordance with ESG targets.</li> </ul>	On a monthly basis
ESG Committee	<ul> <li>Directing ESG operations, including key materiality related to climate change and GHG emissions, energy consumption, and looking for opportunities to invest in new business involved, such as decarbonization projects</li> </ul>	On a quarterly basis
Management and Operational L	evels	
Sustainability Committee	<ul> <li>The chief executive officer (CEO) is the chairman of the committee, while high-ranking executives are directors.</li> <li>Establishing and reviewing corporate policies and strategies, taking into account the ESG operations to be presented to the Board of Directors for approval.</li> <li>Communicating about policies and assigning responsibilities to involved parties in order to make these policies into practical implementation across the organization.</li> <li>Examining and governing ESG operations, including materiality-related climate change in accordance to the target set.</li> </ul>	On a yearly basis or more than a year as see necessarily
Risk Management Committee	<ul> <li>CEO is the chairman of the committee, while high-ranking executives are the committee members.</li> <li>Auditing, gauging, and managing risks and opportunities, including issues related to climate change, then reporting risk management results to the Audit Committee.</li> </ul>	On a quarterly basis
Climate Change Committee	The Climate Change Committee is driving holistic climate change operations and managing related risks to reduce GHG emissions. The committee is jointly working with Banpu Group.	On a quarterly basis, o more than a quarter a seen necessarily.
Task Force on Climate-Related Financial Disclosures Working Group (TCFD Working Group)	The TCFD Working Group is responsible for analyzing and assessing financial risks and opportunities, as well as disclosing information in alignment with the TCFD guidelines.	On a quarterly basis, o over a quarter as seen necessarily.
Decarbonization Project Study Committee	<ul> <li>Conducting a feasibility study to set the operational targets and a plan driving towards a Net Zero roadmap.</li> <li>Conducting a feasibility study to jointly implement the decarbonization project together with Banpu Group.</li> </ul>	On a quarterly basis of over a quarter as seen necessarily.



Remark: \*Operating in collaboration with Banpu Group















BPP uses management approaches to reduce GHG emissions in various businesses as follows:



#### Existing Thermal Power Plants

- Combined Heat and Power (CHP) Plants consist of three CHP plants in China, which have high energy consumption efficiency. The energy loss during their maximum production capacity of power and steam is 25%, while thermal power plants solely producing electricity will lose energy around 65% once generating power. This leads the CHP plants to have low energy consumption rate and marginal GHG emissions intensity. However, customer's demand for steam in certain periods directly affects the efficiency of energy consumption and GHG emissions. BPP, therefore, emphasizes the use of innovations to improve its power plant efficiency and production processes and operates the power plants to be flexible in response to dynamic demand for steam.

Gas-fired Power Plants in which BPP has direct management control, namely Temple I & II gas-fired power plants, are located in the United States of America. These two power plants have high energy efficiency and use natural gas to generate power supplied to the power merchant market. In addition, they manage their operations and annual maintenance efficiently according to standards set. This will affect the efficiencies of both power plants in terms of fuel consumption per unit of products.

Moreover, the investment in constructing a solar power plant was made in order to increase production volumes and reduce GHG emissions per unit of products of Temple I & II power plants, as well as to create opportunities to respond to customers who require electricity from clean energy. This solar power plant is expected to commence production by 2024.

Joint-venture thermal power plants, namely BLCP Power Plant and HPC Power Plant focus on quality management and efficient annual maintenance including using the information system to predict machinery maintenance before it is broken down (Predictive Maintenance), etc. This will affect the power plants' efficiency, decrease the fuel consumption intensity per unit of products, and have the availability factor (AF) as designed. In addition, the Asset Management Department is assigned to jointly monitor the power plants' GHG emissions operations with business partners who also invested in such power plants, including seeking opportunities to reduce GHG emissions. such as a project to conduct a feasibility study on using ammonia as a substituted fuel at BLCP Power Plant and using electric trucks to transport limestone at HPC Power Plant. etc.

#### Renewable Power Plant and Energy Technology Projects

BPP set up the target to invest in renewable power plant projects of at least 800 MWe by the year 2025 through Banpu NEXT, in which BPP holds 50% of stakes. It also expands its operations to the energy technology business and electricity generation business from solar and wind power plants. This includes supplying clean energy together with integrated energy management solutions to customers so as to decrease GHG emissions, such as the rooftop solar power generation system, the energy storage system, the electric vehicle business, the smart community development, and the energy management system business, etc.

## • Under Development Power Plant Projects and Production **Capacity Scale-up**

BPP has a policy to not invest in the new coal-fired power plants but will invest in the thermal power plant projects or the combined heat and power (CHP) plants using clean technology with high efficiency and environmentally friendly. The focus is on gas-fired power plants since natural gas has stable production and is highly flexible to production adjustment in response to the rising power merchant markets. BPP is still investing in renewable energy and energy technology through its subsidiary company – Banpu NEXT Company. It also started implementing the Cotton Cove project, a Carbon Capture, Utilization and Storage (CCUS) in the United States of America. Cotton Cove is a joint venture project between BPP and BKV dCarbon Ventures.

BPP is also looking for opportunities in the environmentallyfriendly energy industry, such as ammonia and hydrogen, which are considered as a fast growing clean energy. Using hydrogen as a fuel source can play an important role in reducing GHG emissions. -











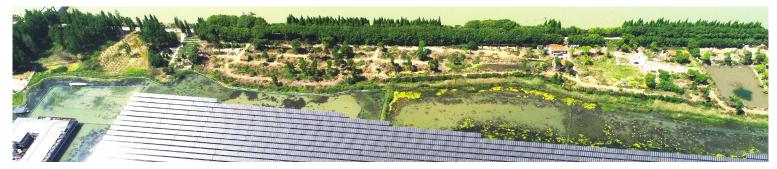
BPP gathers data on consumption volumes of diesel, biodiesel and benzene by accumulating figures from receipts, while the coal quantity used is obtained from a scale attached to a conveyor belt. Meanwhile, the amount of natural gas is collected from the gas flow meters. As for calculating the amount of energy consumption, BPP uses the energy conversion factor based on the GHG Protocol: Emission Factors from Cross Sector Tools for diesel. biodiesel and benzene. The consumption of coal and natural gas is gathered from the monthly measurements.

To calculate greenhouse gas emissions, BPP consolidates emissions specifically from activities over which it has direct operational control. BPP uses Global Warming Potential (GWP), with reference to the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) to calculate its GHG emissions. The emission factors used are based upon A Corporate Accounting and Reporting Standard (Revised Edition). Moreover, specific coefficients will be used if there is a region-specific emission coefficient. The gases used in GHG calculations consist of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF<sub>s</sub>).



#### Climate Change Policy

## **Performance**



- BPP recorded the GHG emissions intensity (scope 1&2) of 0.469 tonnes CO<sub>2</sub>e/MWh, a decrease of 30.6% when compared with the target set and 25.7% lower than the 2012 base year. This was a result of combining the operating performance of Temple I & II gas-fired power plants into BPP's for the first year. These two gas-fired power plants have high efficiency and low GHG emissions with the 2023 GHG emissions intensity of **0.424 tonsne CO<sub>2</sub>e/MWh**.
- The combined heat and power (CHP) plants in China posted the GHG emissions intensity of 0.511 tonnes CO<sub>a</sub>e/MWh, a 16% decrease when compared to the previous year, thanks to a continued improvement of power plants' efficiency over the

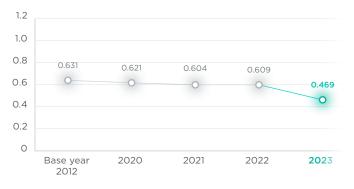
years. BPP has carried out various projects to reduce energy and water losses in the systems, including the enhancement of steam boilers to burn fuels with various heat values. Moreover, BPP has also adjusted itself to the regulations issued by the Chinese government, stipulating the amount of coal used in the power plants, and the emission trading scheme recently commencing implementation in China. Last year, BPP's CHP plants in China were able to control the amount of GHG emissions in accordance with standards set by the government and had the opportunity to either sell or retain the remaining GHG emissions rights for future use.

## The amount of direct and indirect GHG emissions (million tonnes of CO<sub>2</sub>e)



O Direct greenhouse gas (scope 1) O Indirect greenhouse gas (scope 2)

## **GHG** emissions intensity (tonnes of CO<sub>2</sub>e/MWh)



Remark: The performance of Temple I & II gas-fired power plants was additionally included in 2023.















- · BPP has invested in renewable energy and energy technology businesses through Banpu NEXT Company Limited, a joint venture company, in which BPP holds 50% of stakes. It has an equity-based power generation capacity of 395 MW from renewable energy (COD 287 MW and Under Development 108 MW), equivalent to 49.4% progress of its target of no less than 800 MW from renewable energy by the vear 2025.
- Investing in the Cotton Cove project, which is the carbon capture, utilization, and storage (CCUS) business, located at the Barnet Shale natural gas field, Texas State, United States of America, with a 49% stake investment.
- Organizing a workshop to assess risks relating to climate change, including physical risks affecting operations, and transition risk – a risk associated with a transition towards a low-carbon society both in the short- and long-term periods. This is part of disclosing the performance of climate change operations. Conducting a study in alignment with the Task Force on Climate-Related Financial Disclosures (TCFD), starting with the three CHP plants in China, and other major joint venture power plants significantly generating incomes, namely BLCP Power Plant and HPC Power Plant. Criteria considered included the impacts of various associated factors. such as changes in fuel costs, carbon prices, insurance costs and costs from changing water volumes, as well as the effects of sea levels, including the opportunities to run the renewable energy business and energy technology.



- Heightening capabilities to adapt oneself to climate change related risks such as:
  - Operational Risk Management: BPP has adopted a business continuity management system (BCMS) in preparation for any events causing operation halts, such as natural disasters and epidemics, in order to be able to operate continuously, or to recover operations quickly, being able to deliver products and services meeting stakeholders' expectations. The business continuity management (BCM) exercises have been regularly organized. BPP 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 established a unit to follow up, monitor and anticipate regulatory changes from local and central authorities in all areas, in which it has operated in order 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 as the government has provided more support.
- BPP discloses its climate change operational performance and is under conducting a study to create guidelines aligned with the TCFD approaches, as well as assessing risks and opportunities associated with climate change, including the impacts on current and future businesses.

- · BPP arranged training to create understanding and **awareness of climate change** – a challenge and opportunity for BPP, to the Board of Directors, executives and employees. The training organized included a set-up of a Net Zero Emission target, data disclosure according to the TCFD guidelines, technologies to reduce GHG emissions, energy storage technologies, etc.
- The innovation projects to improve energy consumption efficiency and to reduce GHG emissions were implemented, such as:
- The Multisource Solid Waste compound fuels project, carried out at Zouping CHP Plant.
- The power plant improvement project to blend low-calorific coal used as fuel at Zhengding CHP Plant.
- The project to utilize digital systems in energy management, implemented at Luannan CHP Plant.
- The project to upgrade the intelligent monitoring and control system in heat exchanger stations for safety and heightening efficiency, executed at Zhengding CHP Plant.
- The project to decrease heat loss from the white smoke reduction process implemented 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.
- The project to improve the transport and storage system of slag from steam boilers at Zouping CHP Plant.



About Banpu Power –



**Environment** 

Social

Performance



## **Cotton Cove Project Banpu Power's** First Step in Running a Business in "Carbon Capture, Utilization and Storage" (CCUS)

On 25 August 2023, BPP entered into a joint venture with BKV dCarbon Ventures, LLC (BKV dCarbon), a subsidiary of Banpu Public Company Limited, with an investment proportion of 49% to operate the CCUS business called Cotton Cove project at the Barnett Shale natural gas field in Texas State, United States of America.

Cotton Cove is a project initiated in late 2022 by BKV dCarbon to separate, dispose and store carbon dioxide (CO<sub>2</sub>) generated from the natural gas production process at the Barnett Shale natural gas field. The project is expected to have an average sequestration rate of up to approximately 45,000 metric tonnes of CO<sub>2</sub> per year during its initial phase. It will be able to start carbon dioxide sequestration activities within the 4<sup>th</sup> quarter of 2024. An investment in

Cotton Cove project marked the first and important step for BPP in running the CCUS business in the U.S. The experience gained from Cotton Cove project will help build upon BPP's power plant

business in the future.

Carbon capture and storage approximately **45,000 tonnes** of CO, per year



## Using Electric Drawbar Trailers to ...... **Transport Limestone at Hongsa Thermal Power Plant Project**

HPC Power Plant is a joint venture company in which BPP holds 40% of stakes. The power plant started replacing 11 diesel-powered drawbar trailers with electric drawbar trailers for transporting limestone within the project area. The project is in the initial phase and will be a pilot project for a study on replacing existing vehicles with electric vehicles for internal use in the future. Using electric drawbar trailers to transport limestone within the project area will reduce transportation costs by THB 750,000 per annum and lower CO<sub>2</sub> emissions by 1.7 million tons per year. In addition, a feasibility study on using electric drawer trailers to operate other jobs, such as mining and transporting coal and soil in the future, is being conducted.

Reduce transportation costs by THB 750,000 per annum and lower CO<sub>2</sub> emissions by 1.7 million tonnes

per year













## Other Indirect GHG Emissions (Scope 3)

BPP preliminarily assessed other indirect GHG emissions (Scope 3), of which activities are as follows:

Activities	Association	Annotation
A purchase of goods and services	•	Production of fuels, chemicals and construction materials, including services from contractors, etc.
2. Capital goods/assets	•	Production of major capital assets includes machinery, spare parts, vehicles and project's constructional materials.
<ol> <li>Fuel consumption activities excluded from a report on direct GHG emissions (Scope 1) and indirect GHG emissions (Scope 2)</li> </ol>	0	The office's electricity consumption without production activities.
4. Seller's transportation	•	Using oils to transport materials by sellers or sub-contractors via key transportation channels, including gas pipelines, ships, railways and roads.
5. Waste generated from production	•	Treatments or disposal of waste by third parties, such as hazardous waste treatment & disposal, water treatment, etc.
6. Business trips	0	BPP's business trips are conducted via airplanes, trains and cars, etc. However, the amount of GHG released from traveling is minimal when compared with those generated by other activities.
7. Employee travels	0	BPP employees commute from their residences to the offices by their own cars or other public transportation. But GHG emitted from this activity is marginal, in comparison with GHG emitted from other activities.
8. Leasing assets	•	BPP does not lease any assets for production, but it only leases office spaces.
9. Product transportation and distribution	0	Losses incurred in the power transmission lines and the steam, hot & cold-water pipelines, which are not owned by BPP.
10. Product transformation	0	Electricity, steam, hot and cold water can be consumed immediately, without being processed. The voltages, however, may be slightly adjusted prior to being used or sold to customers. This may lose little energy.
11. Usage of products	•	Consumption of electricity, steam, hot and cold water by customers.
12. Expired product treatments	•	Electricity and other products doesn't require any treatments.
13. Leasing of assets	•	BPP does not have assets for leasing.
14. Franchises	•	BPP does not operate businesses related to franchises.
15. Investments	•	An investment in joint-venture companies, such as thermal power plants, renewable power plants, energy technologies and Carbon Capture, Utilization and Storage (CCUS) project.

#### Notes:

- Associated with BPP's operations
- Associated with BPP's operations, but insignificant
- Not associated with BPP's operations











## Assessments of Risks, Impacts, and Opportunities Related to Climate Change

BPP has assessed risks, impacts and opportunities arising from climate change during the years 2022-2040, with a scope covering investments of all business units with significant investment proportion, or over 30%.

Risks	Impacts/Opportunities	Financial Impact Estimation	Strategies and Operations	Lengths of Time Expected to Happen
1. Physical Risk				
1.1 Changes in climate patterns and seasonal fluctuations	s and seasonal CHP plants, which have to generate heat for communities in winter.		<ul> <li>Controlling maintenance to meet the target on quality time, and costs.</li> <li>Creating a production design with multiple sub-production units so as to have flexibility and options to operate the most efficient production in line with the community's demand for thermal energy.</li> <li>Investing in power plants designed to withstand higher/lower than normal temperatures and creating opportunities to generate power when other power plants or renewable power plants are out of production, such as Temple I gas-fired power plant.</li> <li>Assessing the project's worthiness before making an investment by allowing for higher light and wind discrepancies.</li> </ul>	0-5 years
1.2 Severe natural disasters, such as storms and floods	<ul> <li>Production halts affected by natural disasters, have resulted in expenses related to investments in natural disaster prevention and damage repairs, as well as creating opportunity loss in production.</li> </ul>	•	<ul> <li>Investing in storm and flood prevention in the units with high production risks, or those having a frequency of recurrences by taking into account the cost effectiveness in relation to the power plant's lifespan.</li> <li>Designing and constructing the projects by putting top priority on natural disaster factors.</li> <li>Procuring property damage insurance and business interruption insurance suitable for various events.</li> </ul>	0-5 years
1.3 Rising sea level	Having an effect on production units located in coastal areas, where construction costs are likely to incur to prevent floods.	•	<ul> <li>BLCP Power Plant, a joint venture company, was designed and constructed to exceed an estimation of the rising sea levels over the power plant's lifetime.</li> <li>Other power plants are not affected because they are not located in the coastal area.</li> </ul>	10 years up
1.4 Fluctuations in rainfall volumes resulted from El Nino and La Nina phenomena	Rainfall is less during the El Nino phenomenon. This results in a shortage of fresh water in the areas where the CHP plants, gas-fired power plants, BLCP Power Plant and HPC Power Plant are located.	•	<ul> <li>All three 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 they do not discharge water anymore (zero discharge).</li> <li>BLCP Power Plant produces fresh water from seawater through a reverse osmosis methodology, making it unnecessary to draw fresh water in the area, including creating opportunities for the power plant to sell the fresh water produced to nearby industrial factories.</li> <li>Temple I &amp; II gas-fired power plants were designed to have water reservoirs for supplying water within the system without discharging.</li> <li>HPC Power Plant manages its water sources by constructing two wellsprings and monitoring water levels regularly</li> </ul>	0-5 years
2. Transition Risk				
2.1 Policy and legal changes	<ul> <li>The establishment of policies and laws by the government sector to reduce GHG emissions to reach a Net Zero target, has resulted in the limitation of fuel consumption and GHG emissions. This move has been rising rapidly in China and Japan and created costs in improving the production process/opportunities to invest in renewable power plants subsidized by the government.</li> <li>Expenses incurred from carbon tax/opportunities to sell power generated from clean energy.</li> <li>Higher financial cost or receiving no supports for fossil fuel projects/lower financial cost for clean energy projects.</li> </ul>		<ul> <li>Improving the power plant efficiency to maximize energy consumption capabilities and reduce GHG emissions. At present, all three CHP plants in China are able to control the volume of GHG emissions to be better than the criteria set by the government, creating an opportunity to sell carbon credits.</li> <li>The joint venture power plants, namely BLCP Power Plant and HPC Power Plant are under the long-term power purchase agreements (PPA) and the regulations to mitigate risks associated with legal changes to a minimum level.</li> <li>Looking for opportunities to convert the use of fossil fuels to other energy sources, such as biomass, biodiesel, ammonia, etc.</li> <li>Adjusting a business plan to be an integrated electricity supplier and provider, such as providing solar rooftop installation services in China.</li> <li>Investing in energy technology, Carbon Capture, Utilization and Storage (CCUS).</li> <li>Using expenses incurred from carbon taxes to calculate investment worthiness of each project.</li> <li>Looking for opportunities to sell carbon credits from clean energy production.</li> <li>Enhancing ESG operation to a decent level, with international recognition to build confidence among stakeholders and financial institutions.</li> </ul>	0-5 years















Risks	Impacts/Opportunities	Financial Impact Estimation	Strategies and Operations	Lengths of Time Expected to Happen
2.2 The demand for clean energy is increasing, while the technology and infrastructure for transmitting electricity in the area are still immature.	<ul> <li>Fluctuations in light intensity and wind speeds have resulted in inconsistent electricity production from renewable energy.</li> <li>Lack of stability in the transmission and distribution system.</li> <li>The concentration of renewable power plants in certain areas causes higher volumes of produced power than demand in the area, leading to losses.</li> </ul>	•	<ul> <li>Investing in energy technologies, such as energy storage systems to create stability for supplying electricity generated from renewable energy.</li> <li>Employing digital technology to analyze data for forecasting energy production and consumption in each area, including competitive advantages for energy trading in the merchant market.</li> <li>Investing in high technology and low pollution energy, such as natural gas power plants in order to help create stability in the electricity production areas.</li> <li>Investing in smart energy management technology or demand-side management.</li> </ul>	0-5 years
2.3 Rising prices of coal and other fossil fuels	Prices of coal and other fossil fuels are rising due to lower production/ opportunity to use other fuels subsidized by the government sector.	•	<ul> <li>Investing in the power plants using different fuels with appropriate proportion to manage fuel risks.</li> <li>The power plants with long-term PPAs, namely BLCP and HPC power plants, are not affected since the fuel costs are borne by the purchasers.</li> <li>The gas-fired power plants entered the forward contracts to purchase electricity and fuel in appropriate proportions to reduce energy price risk.</li> <li>A control of coal prices by the Chinese government has made coal prices less volatile than those of the world markets.</li> <li>Managing coal purchases by using applications to compare prices and making purchasing decisions at the right time, procuring coal with a long-term contract, and expanding storage areas to stock more coal.</li> <li>Looking for opportunities to use other fuels, such as biomass, natural gas, waste, etc.</li> </ul>	0-5 years
consumption and rising water prices	<ul> <li>The governmental restriction on using fresh water in the production process has resulted in improvements to reduce the amount of water consumption as specified by the government.</li> <li>A shortage of fresh water in the area increases water prices.</li> </ul>	•	<ul> <li>All three CHP plants have taken steps in reducing water loss in the system, while the extension is designed to reuse water as much as possible until the wastewater is not discharged from the power plants.</li> <li>BLCP Power Plant produces fresh water from seawater through the Reverse Osmosis Methodology, making it unnecessary to draw fresh water in the area.</li> <li>HPC Power Plant manages its water sources by constructing two wellheads and monitoring water level management continuously.</li> <li>Temple I &amp; II gas-fired power plants were designed to have reservoirs to supply water within the system without discharges.</li> </ul>	1-5 years
2.5 Higher insurance costs	<ul> <li>Insurance companies increase their insurance premiums from natural disasters, which are more severe and have higher frequency.</li> </ul>	•	Investing in equipment installation to prevent and reduce damage severity from natural disasters.	0-5 years
3. Business Opportunities				
associated with renewable energy, energy technology, and CCUS	<ul> <li>Solar power plants</li> <li>Wind power plants</li> <li>Energy technologies such as batteries, energy solutions, smart cities</li> <li>Biomass</li> <li>CCUS</li> </ul>	•	<ul> <li>Investing in renewable energy and energy technology through an investment in Banpu NEXT, in which BPP holds 50% of stakes.</li> <li>Seeking opportunities in GHG emissions reductions technologies, such as CCUS and hydrogen.</li> </ul>	0-5 years



Having negative impacts

Having positive impact















## **Energy Efficiency**



## **Stakeholders:** Customers, contractors, investors **Strategy:** Fuel consumption control with maximum efficiency. Implementation of high efficiency and environmental-friendly technology. Providing support to projects and innovations associated with energy saving. **Key Indicators:** • Energy consumption intensity per unit of products. **Target:** • Energy consumption intensity is not over 1.55 GJ/MWh **Performance:** The energy consumption intensity was **2.30 GJ/MWh**. - Combined heat and power plants' energy consumption intensity of 0.82 GJ/MWh. - Gas-fired power plants' energy

consumption intensity of

3.92 GJ/MWh.

## **Significance and Reporting Boundary**

The main costs of power plants are from fuels used for generating electricity, steam and other forms of energy. Thus, the energy consumption efficiency directly affects costs and competitive advantages, as well as greenhouse gas (GHG) emissions. Meanwhile, the applicable regulations determine the amount of coal consumption in China. These are the challenges that BPP has to adapt itself to promptly cope with such changes, inclusion of improving the energy consumption of existing power plants and developing the future power projects to consume less energy and create competitive advantages in the merchant market, as well as to be part of alleviating the climate change.

## Activities involved with energy consumption for power and steam generation include:



Using natural gas as a fuel for production



Utilizing coal as a production fuel



Using diesels to ignite boilers and operate heavy equipment and transportations



Using benzenes and diesels for transportation



Using other fuels for production, such as industrial waste



Buying electricity from external agencies

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 and Temple I & II gas-fired power plants in the United States of America. In addition, the operating performances of joint venture thermal power plants, namely HPC Power Plant, BLCP Power Plant and Banpu NEXT are separately presented since they are BPP's core production base and interested by stakeholder.

## **Management Approach**

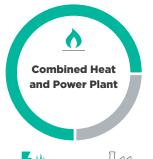
The CHP plants in China have highly efficient energy consumption, losing energy approximately 25% during their maximum production capacity of power and steam. Meanwhile, the thermal power plants solely generating electricity suffer the energy loss of around 65% during operations.



Energy transformed to Electricity **35**%

Energy loss

65%



Energy transformed to Electricity and Steam

Energy loss 25%

**75**%













As a result, BPP puts great importance on managing maximum energy efficiency by using various means, as follows:

- Managing the power plant's operations efficiently and providing adequate energy to meet customer's needs.
- Opting to use high-efficiency technology consuming minimal fuel and being environmentally-friendly.
- Enhancing boiler efficiency to combust completely.
- Planning for efficient maintenance to increase the power plants' availability factor (AF), reduce the planned outage factor and the unplanned outage factor, as well as to lower energy losses from operation stoppages and commencements.
- Seeking opportunities to reduce energy and heat losses in the system, including recycling.
- Upgrading other supportive systems, such as enhancing water quality inside the boiler for longer use, reducing water discharges and filling up new water to the system.
- Looking for opportunities on using other fuel sources available in the areas, such as waste gas from the metal smelting industry, natural gas, biomass fuel, etc.
- Planning to buy multiple fuels from various sources to supply fuels with quality and reasonable prices, and to mitigate any risks associated with fuel shortages.
- Creating applications for power plants' integrated energy management, starting from purchasing, storage and blending, to production's combustion process.

BPP gathers its energy consumption data, including the amount of diesel, biodiesel and benzene contents by collecting data from the receipts. Meanwhile, the coal quantities are obtained from a scale attached to a conveyor belt. Moreover, the amount of gas is taken from the gas flow intensity meter. And all data collected is consolidated and calculated into the total amount of energy consumption. The energy conversion factor BPP uses is based on the GHG Protocol: Emission Factors from Cross Sector Tools for diesel, biodiesel and gasoline, while the values of coal and gas are derived from the monthly measurement report.



## Performance

In 2023, BPP's energy consumption intensity was 2.30 GJ/MWh, an increase of 48.4% in comparison with the set target because BPP combined the operating results of Temple I & II gas-fired power plants into its annual performance for the first year. This resulted in a higher energy consumption intensity for BPP from the past year.

The combined heat and power (CHP) plants in China, on the other hand, recorded their energy consumption intensity of 0.82 GJ/MWh, a 12% decrease when compared to the previous year. The power plants were able to achieve their target energy consumption intensity per unit of products not exceeding 1.55 GJ/MWh, which was 47% better than the set target. BPP, however, continues improving the power plants' production process, such as adjusting the machine's operational methodology to suit with customers' demand for steam and electricity at each time, collaborating with the government sector to improve heat distribution stations to minimize steam loss, and using waste from customers' industrial plants to replace coal, etc.

The energy consumption intensity for Temple I & II gas-fired power plants was **3.92 GJ/MWh**. This was due to technology's energy efficiency of gas-fired power plants solely selling electricity in combination with a real-time adjustment of production capacity according to electricity demand in the power merchant market at different time periods. As a result, Temple I & II gas-fired power plants have higher energy consumption intensity than the CHP plants. supplying both power and steam. BPP, therefore, is in a process of studying and collecting data to set appropriate goals for Temple I & II gas-fired power plants.







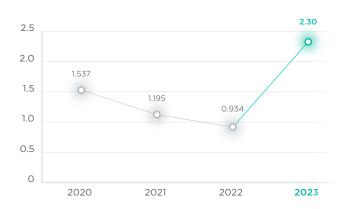








## **Energy Consumption Intensity** (GJ/MWh)



Remark: The performance of Temple I & II gas-fired power plants was additionally included in 2023.

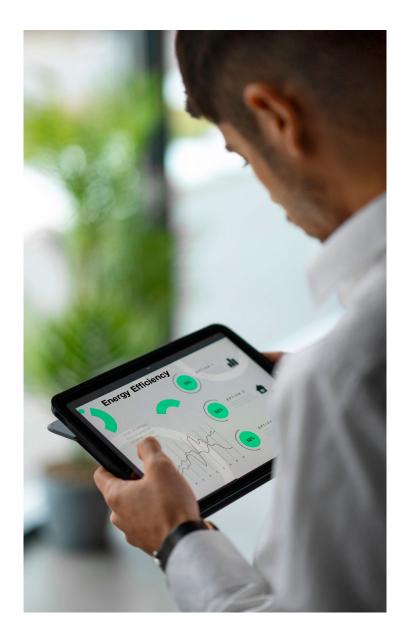
BPP has frequently monitored and compared imported energy with the one its production units generated since it is the main costs for generating power. It has also sought for opportunities to reduce fossil energy consumption as it emits GHGs. In the past year, various projects to increase the energy consumption efficiency were carried out as follows:

• Producing and using more clean energy to replace fossil fuels, such as using mixed biomass as a fuel, installing solar panels on coal storage plants, street areas and parking lot, etc.

• Improving energy related efficiency at the power plants, such as:



- Selling by-products related to power generation, in alignment with the market demand, such as steam and cold water, which can reduce energy losses and energy consumption intensity per unit of products.
- Carrying out a study on fuels modification available in each area, such as waste, natural gases, biomasses, etc. -



Sought for opportunities to reduce fossil energy consumption as it emits GHGs.







Governance



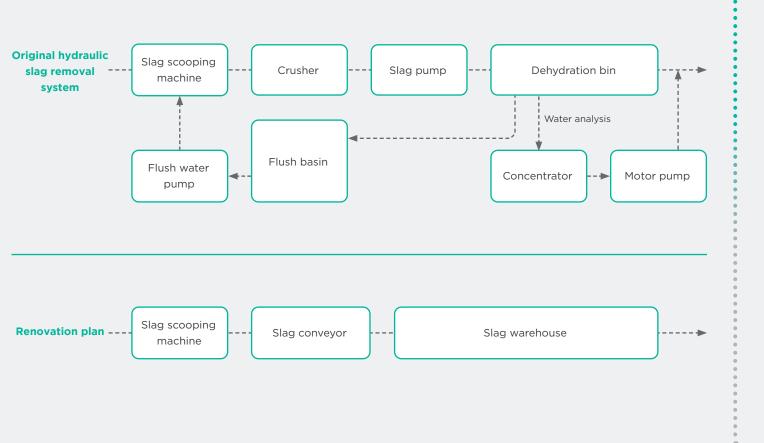


## Renovation of Boiler Slag Removal System •••••• and Warehouse

Zouping combine heat and power (CHP) plant transports wet slag by pumping it through a pipeline system. Due to a long-time service, the machinery and equipment efficiency has decreased, causing the system to consume a large amount of electricity with approximately 245 kilowatthours. In addition, machinery and equipment require frequent maintenance, causing the maintenance costs to increase as well.

As a result, Zouping CHP Plant conducted a study on improving the system to transport and store slag from boilers. The power plant changed its slag transport method from a pipe system to a slag conveyor system to carry slag directly to the storage area. In addition, unused areas are used as a closed slag warehouse to be in line with government policy in the area.

Improving the slag transportation system and storage area has helped Zouping Power Plant reduce the amount of electricity consumed in the system to only 51 KWh or 1.69 million KWh/year. This represents a reduction in electricity costs of approximately RMB 670,400 per annum and maintenance costs of up to RMB. 111,300. Additionally, through this improvement, slag can be stored for a longer period from 2 days to 7 days and reduce GHG 779 tonnes  $CO_2e/year$ .











## **Air Quality**



#### **Stakeholders:**

· Communities, employees, contractors, the government sector

#### Strategy:

- Investing in power plants with high efficiency and environmentally-friendly.
- Improving a pollutant capture system to be more efficient.
- · Opting to use proper fuel.
- Enhancing combustion system's efficiency.

#### **Key Indicators:**

- Sulfur dioxide (SO<sub>2</sub>) emission intensity per unit of products
- Oxide of nitrogen (NO<sub>2</sub>) emission intensity per unit of products
- Particulate matters (PM) emission intensity per unit of products

#### **Target:**

- SO<sub>2</sub> emission intensity is not over 0.0766 tonnes/ GWh.
- NO emission intensity doesn't exceed 1.184 tonnes/GWh.
- PM emission intensity is less than 0.0230 tonnes/ GWh

#### **Performance:**

- The air quality released from stacks was in accordance with applicable laws.
- The pollution emission intensity was better than the target set.
- SO<sub>2</sub> emission intensity was at **0.0119 tonnes/GWh**
- NO emission intensity was at 0.0323 tonnes/GWh
- PM emission intensity was at **0.0124 tonnes/GWh**

## **Significance and Reporting Boundary**

Sulfur dioxide (SO<sub>2</sub>) and oxides of nitrogen (NO<sub>2</sub>), as well as particulate matters (PM) volumes are the key indicators of air quality released from stacks of thermal power plants because they may have the impacts on human health in the area. Consequently, the Chinese government needs to improve the air quality in large cities with severe air pollution in China. As a result, standards and measures to protect air quality have been increasingly rigorous for many years. This is also a challenge for BPP to improve its pollutant capture efficiency and to control the quality of air released to comply with applicable laws.

The boundary of this report covers the combined heat and power (CHP) plants in which BPP has direct management control, including the three CHP plants in China and Temple I & II gas-fired power plants. The operating performances of renewable and joint venture thermal power plants, in which BPP does not have direct management control but being interested by stakeholders, are separately presented by excluding of pollutant emissions database.

## **Management Approach**



Investing in gas-fired power plants and renewable power plants



Utilizing proper innovations



Selecting coal with low sulfur contents



Employing clean technology to help boilers combust completely



Establishing a continuous monitoring system for air quality

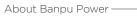
BPP has employed measures to control the air quality in accordance with applicable laws so as to keep the air quality in the safe level for the health of its employees and surrounding communities.

- Investing in gas-fired power plants and renewable power plants in order to reduce pollutant emissions intensity.
- Utilizing proper innovations to improve a pollutant capture system before being released from stacks, such as a SO<sub>2</sub> precipitator called the Flue Gas Desulfurization (FGD), a particular matter (PM) treatment system, namely the Electrostatic Precipitator and bag filter system, etc.















- · Selecting coal with low sulfur to decrease the amount of SO, generated at its original point; BPP seeks to enter into a long-term purchase agreement for quality coal reserves as specified. The online trading system has also been open for coal traders to sell coal with quality meeting BPP's requirements.
- · Employing clean technology to help boilers combust completely, such as using effective production and environmentally-friendly technology called the High Efficiency, Low Emissions (HELE), the clean technology for boiler's combustions named the Pulverized Fuel Combustion and the Fluidized Bed Combustion to decrease SO<sub>2</sub> and NO<sub>3</sub> as well as PMs during the boiler's combustion stage, etc.
- Establishing a continuous monitoring system for air quality discharges throughout the production process and setting up preventive measures, as well as being regularly audited by external agencies.

**Using HELE technologies** to control emissions at an ultra-low level.

### **Performance**

In 2023, BPP reported the combined operating performance of its three combined heat and power (CHP) plants in China and Temple I & II gas-fired power plants for the first year, resulting in the improved pollutant emissions intensity since these power plants had minimal emissions, excepting for particulate matter emissions, which were higher. The amount of pollutants released from stacks of CHP plants, on the other hand, depends on coal quality used for combustion, combustion efficiency and pollutants capturing efficiency prior to be released. Since 2013, all three CHP plants in China have continuously improved their efficiencies on combustion and pollutants capturing before releasing. This has resulted in a reduction of SO,, NO, and PMs emissions, which are the power plants' significant indicators. The air quality

emitted from stacks was better than the standard set by applicable laws.

Despite the three CHP plants in China adjusted their fuel consumptions to reduce costs resulted from using high-priced coal last year, such as using coal with lower calorific values and activated carbons - waste from customers' industrial plants, etc., it was found that these CHP plants still had their abilities to control pollutions at a minimal level. The air quality released from stacks was better than the standards set by applicable laws and met the targets set. As such, the three CHP plants received high recognition from the government as the power plants with excellent air quality control. .







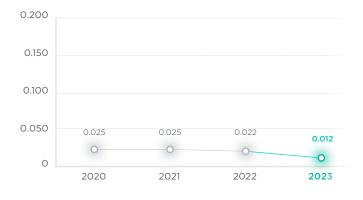


Governance

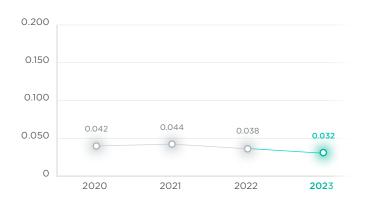




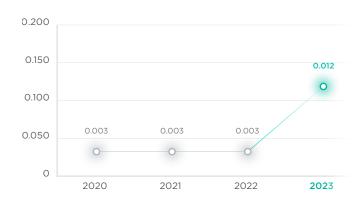
## SO<sub>2</sub> Emission Intensity (tonnes/GWh)



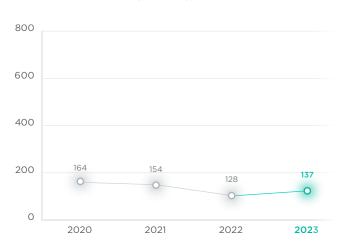
**NO**<sub>v</sub> Emission Intensity (tonnes/GWh)



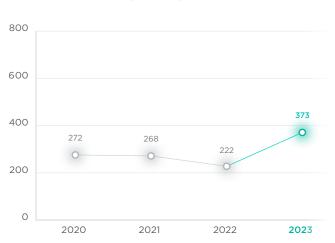
**PM Emission Intensity** (tonnes/GWh)



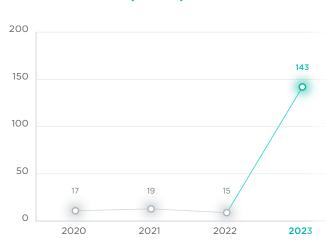
SO<sub>2</sub> Emissions (tonnes)



NO<sub>v</sub> Emissions (tonnes)



**PM Emissions** (tonnes)



Remark: The performance of Temple I & II gas-fired power plants was additionally included in 2023.





About Banpu Power —



**Environment** 

-O Social

-O Performance





Stakeholders:

· Communities, customers, employees, shareholders, business partners, suppliers, the government sector

Water Resources

#### Strategy:

- Improving production processes, decreasing water loss and consuming water with maximum benefits.
- Employing holistic water management, covering both drawing water to the system and discharging water to the public in order to reduce water consumption impacts in the area.
- Encouraging stakeholder's participation in water management in the area.

#### **Key Indicators:**

- Water consumption intensity per unit of products.
- The quality of water discharge in comparison with standards prescribed by applicable laws.

#### **Target:**

- Water consumption intensity not over than 0.868 cubic meters/MWh.
- The quality of discharged water is in accordance with standards set by applicable laws.

#### **Performance:**

- Water consumption intensity per unit of products was 0.958 cubic meters/MWh.
- Combine heat and power plants **0.719** cubic meters/MWh
- Gas-fired power plants 1.216 cubic meters/MWh
- The quality of discharged water met the standards set by applicable laws.

## **Significance and Reporting Boundary**

The impact of climate change is a key factor making the situation related to water risks become more severe in the future as water is a key driver for thermal power plants' production processes, such as generating steam in a boiler, controlling temperatures in a cooling system and air quality and etc. As such, the efficient management of water resources used in the production process and discharged water, both qualitatively and quantitatively, will help lower the impacts on communities from limited freshwater resources and from

water quality problems possibly affect the environment. It also mitigates BPP's risks related to production costs. compliance with applicable laws and community relations.

The boundary of this report covers the power plants in which BPP holds 50% of shares, with direct management control, including the three combined heat and power (CHP) plants in China and Temple I & II gas-fired power plants. The operating performance of Temple I & II was reported for the entire year because of the combined data collection system of both power plants.

## **Management Approach**

Since water sources of China's CHP plants for steam generation systems are from groundwater and water supplied by external manufacturers, the water management is focused on recycling water as much as possible in order to reduce the amount of discharged water with quality complying with applicable laws. The target on water consumption intensity per unit of products has been set not over 0.868 cubic meters/MWh between the years 2021 to 2025. Meanwhile, the quality of discharged water in all operating areas must meet the standards set by applicable laws.

The gas-fired power plants in the United States of America. on the other hand, use water only from external producers supplying used reclaim water from the community to the power plants. Large water storage ponds are in the power plants' areas to treat and reuse water. Water is treated by using biological treatment methods, controlling the amount of algae. Acidity and alkalinity significantly help reduce the amount of chemicals used in water treatment. This is to prepare water quality before entering the Zero-Liquid Discharge (ZLD) treatment system, making the water quality meet standards and be used in the power plant's production processes. Such a holistic water management allows the power plants to have sufficient water reserves and do not release wastewater generated from their production into nearby natural water sources.

Under the water management policy, all power plants in which BPP has management control have managed their water as follows:

- Managing water consumption with maximum benefits, and looking for opportunities to reduce water consumption and reuse or recycle water.
- Improving the quality of water discharge in accordance with the standards specified by applicable laws, and establishing measures to prevent chemical leakages and contaminations at its original sources.
- **Employing the water holistic management** to ensure that water resources used for operations be complied with the righteousness and effectiveness with no effects to stakeholders in the area.
- Conducting a water resource risks assessment and determining measures and operational practices in the event of any emergency, in order to decrease impacts likely to happen from disruptions associated with water resources and to be able to rehabilitate the incident efficiently and in a timely-manner.
- Implementing a surveillance system for both quality and quantity of water to ensure that water is well managed, while the quality of discharged water is in accordance with the standards required by applicable laws.
- Promoting stakeholder's engagement, especially local communities and a research sector, in order to conserve water resources and to improve water quality and management in the area.









Environment



Performance

BPP has collected its businesses' water consumption data 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 BPP does not use such precipitation. The data collected are based upon the assumption that local water reservoirs have a minimal capacity, when compared with the water amount drawn from all water sources. For all data of water volumes are collected from water meters.

Moreover, BPP has set up measures to examine water quality before discharging to the outsides, this discharged water is measured by BPP and external agencies. The measured pollution types, its frequency and the measurement methodologies of each business unit, however, may be varied according to project requirements and as required by applicable laws in each area.



## **Performance**

In 2023, BPP recorded the combined operating results of its three combined heat and power (CHP) plants in China and Temple I & II gas-fired power plants in the United States of America for the first year, with a total water consumption of 11.057 million cubic meters. The water withdrawals totaled 12.510 million cubic meters, while the discharged water totaled **1.453 million cubic meters**. The water consumption intensity was **0.958 cubic meters/MWh**, **10.4%** higher than the set target.

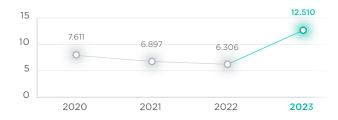
The water consumption intensity from CHP plants in China was **0.719 cubic meters/MWh**, a decrease of **12%** when compared to the previous year. The three CHP plants were able to achieve the target on water consumption intensity per unit of products not exceeding 0.868 cubic meters/MWh, or better than the target set by 17%. In addition, they were able to control volumes of water consumption and water discharges in accordance with the standards required by the government. Moreover, BPP was able to control volumes of water withdrawals totaling 5.759 million cubic meters, descending 0.546 million cubic meters or 9% lower than the previous year since the newly built power generation units in China have been designed to release zero wastewater from the system so as to reduce the use of water resources in the area. As a result, the water consumption intensity per unit of products has continuously decreased over the past several years. Water has also been treated through a recycling process, being able to significantly reduce the amount of water withdrawals from natural sources. All water released from the power plants has been carried to an externally authorized water treatment provider for treatment.

Temple I & II gas-fired power plants had water consumption intensity per unit of products equaling to 1.216 cubic meters/ **MWh**, which was from the reclaim water from the community only and was not released into external water sources. Currently. BPP is studying and collecting data in order to set appropriate targets for the gas-fired power plants.

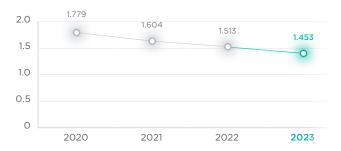
## **Water Consumption Intensity** (Cubic meters/MWh)



## Water Withdrawals from Water Sources (Million cubic meters)



## **Water Discharge** (Million cubic meters)



Remark: The performance of Temple I & II gas-fired power plants was additionally included in 2023.











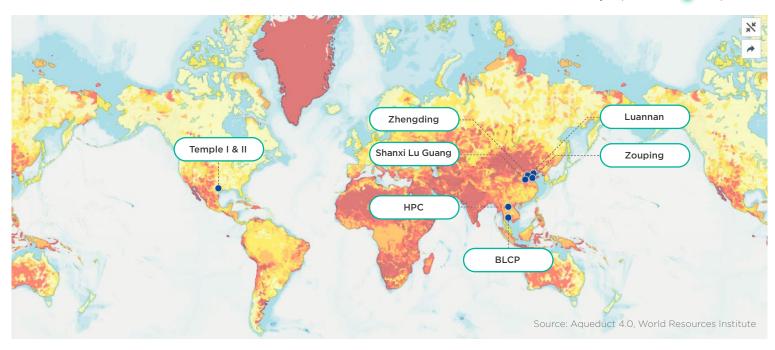




BPP annually assesses risks related to water shortages from all of its business unit's locations, with a focus on thermal power plants due to their high demand for water in the production process. BPP uses the WRI Aqueduct Water Risk Atlas (Aqueduct 4.0) – a program demonstrating categories of areas with water resource risks, in terms of physical, quantity and quality, regulatory & reputational risks, as well as anticipating future risks, as a reference to assess its water-related risks.

The 2023 assessment using data on areas currently faced with water shortage risk and the year 2030 forecast, found that all three CHP plants in China, in which BPP has direct management control, are located in the areas with extremely high risks associated with water resources. As a result, the three CHP plants have made improvements to reduce the amount of water consumption and water discharges to comply with the government's regulations. Meanwhile, the power plant's extensions have also installed a recycling system in order to reuse all of their released water. Moreover, Temple I & II power plants in the United States of America also had an overall water resource risk higher with a medium to high risk related to water shortages. The two power plants have installed a water recycling system, helping them be able to reduce water consumption in the area with no discharged water.

According to the joint venture thermal power plants, namely BLCP Power Plant in Thailand and HPC Power Plant in Lao PDR, it was found that BLCP Power Plant has a high risk related to water scarcity as the plant is located on the sea. BLCP Power Plant, therefore, 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, producing sufficient water for the people and farmers. Since 2020, the desalination plant has helped in reducing the total amount of fresh water consumed in the area 100%. HPC Power Plant, though having low risks associated with water shortage, the power plant has managed water sources in the area, namely Nam Leuk and Nam Khan water sources. HPC Power Plant, in collaboration with the experts, conducted a study on using models to forecast water balances in the areas, set up indicators for measuring water quantities in various points for surveillance and determining appropriate measures. The sedimentation ponds were constructed within the area to control water quality and to recycle water discharges.



Po	ower Plants	Overall Water Risk	Physical Risks Quantity		Physical Risk	Regulatory and	Future in 2030 Business as Usual	
r ower r idnes	wei Flants		Water Stress	Drought Risk	Quality	Reputational Risk	Water Stress	Water Demand
*1	Luannan	Extremely High	Extremely High	Medium-High	High	Medium-High	Extremely High	> 30 cm/year
*	Zhengding	Extremely High	Extremely High	Medium-High	Medium-High	Medium-High	Extremely High	> 30 cm/year
*	Zouping	Extremely High	Extremely High	Medium-High	High	Medium-High	High	> 30 cm/year
*>	Shanxi Lu Guang*	Extremely High	Extremely High	Medium-High	Medium-High	High	Extremely High	10-30 cm/year
0	HPC*	Medium-High	Low	Low- Medium	High	Extremely High	Low	1-3 cm/year
•	BLCP*	Medium-High	High	Medium-High	Medium-High	Low- Medium	High	10-30 cm/year
	Temple I & II	Low-Medium	Medium-High	Medium	Low	Low- Medium	Medium-High	3-10 cm/year

\* BPP has no direct management control.













# Efficiency Improvement of Water Treatment Plant at Zouping Power Plant

Thermal power plants consume large quantities of pure water for generating steam in boilers, while its raw water sources often contain bacteria that will block the membrane filter's function. This lowers its ability to treat water by approximately 15%. As a result, Zouping Power Plant has found ways to reduce water consumption and limit bacterial contamination by optimizing chemicals and enlarge water distribution pipes. In addition, it has also conducted research to find proper chemicals for treating water and equipment for removing fluoride.

Such operations resulted in an increase of a recovery rate of the Reverse Osmosis (RO) process from 70.5% to 72.5%. The RO's cleaning period was extended from 10 days to 50 days, while the service life of membrane filters increased from 4 years to 8 years. Moreover, the power plant can save water supplied for boilers approximately 56,000 tons per year, saving up to USD 120,000 per year in maintenance costs and approximately USD 370,000 per annum for fluoride removal values.



The Reverse
Osmosis (RO)
process from
70.5% ---▶ 72.5%



The RO's cleaning period was extended from



The service life
of membrane filters
increased from

10 days --- **50 days** 4 years --- **8 years** 

**56,000** tons per year, saving up to USD **120,000** per year











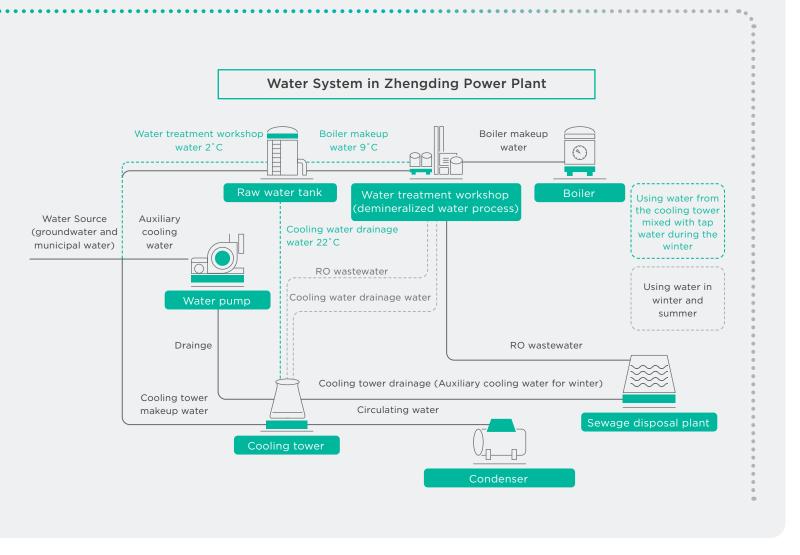




## Reusing Water from Cooling •••• Towers at Zhengding Power Plant

According to the Chinese Government's policy implemented in 2022 to stop using groundwater or deep well water, encouraging to use water supplied from waterworks. This has resulted in an increase in water costs from 2.8 RMB per tonnes to 5.33 RMB per tonnes. Moreover, tap water has a low temperature during the winter, making the power plant's demineralized water plant unable to produce pure water used for steam generation.

For this reason, Zhengding Power Plant has been conducting studies on reusing water without affecting the power plant's efficiency and water pollution. It was found that the cooling tower has a large amount of waste water with sound quality during the summer. Such water can be used to produce pure water. It was also found that the water supplied from the waterworks during the winter has a temperature as low as 2 degrees Celsius, making it impossible to produce pure water. As such, it requires installing a heater to adjust the water temperature. The Zhengding Power Plant uses wastewater with a temperature of approximately 22 degrees Celsius from a cooling tower to be mixed with tap water. This helps the mixed water having a temperature of around 9 degrees Celsius, being able to be further producing pure water. In addition, wastewater from the pure water production process during the winter season can be added to the cooling tower. This project can reuse approximately 280,000 tonnes of water per annum and save about RMB 1.6 million per year for water expenses.













## Waste



#### **Stakeholders:**

• Communities, customers, employees, shareholders, business partners, suppliers, the government sector.

#### Strategy:

- A reduction of waste used at its original sources.
- · Fostering a reuse and recycle of waste.
- Setting up measures to prevent and solve hazardous waste leakages.

#### **Key Indicators:**

- Hazardous waste to landfill.
- Hazardous waste direct disposal intensity.
- Non-hazardous waste direct disposal intensity.
- Proportion of fly ashes disposed by reusing or recycling.
- Proportion of synthetic gypsums disposed by reusing or recycling.

#### **Target:**

- None of hazardous waste to landfill
- Hazardous waste direct disposal is not over 210 tonnes/year during the years 2023-2025.
- Non-hazardous waste direct disposal is not exceeding 793 tonnes/ year in the years 2023-2025.
- Proportion of fly ash eliminated by reusing or recycling is at least 100% per annum.
- Proportion of synthetic gypsums treated through reusing or recycling represented at least 100% per annum.

#### **Performance:**

- 0 tonnes of hazardous waste to landfill.
- Hazardous waste direct disposal was 3 tonnes.
- Non-hazardous waste direct disposal was 300 tonnes.
- Proportion of fly ashes disposed by reusing or recycling equaled to 100%.
- Proportion of synthetic gypsum eliminated by reusing and recycling was 100%.

## **Significance and Reporting Boundary**

Conservation and valuable utilization of resources is the best practice to minimize waste generated from operations. Proper and efficient waste management can also help reduce costs on waste disposals, including a reduction of impacts on environment and surrounding communities. caused by hazardous waste leakages and improper disposals. As for power business, aside from non-hazardous and hazardous waste produced, there are ashes and gypsums created from fuel combustions and air quality treatment processes, which

can be utilized and added values by selling them as mixtures of construction materials.

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 and Temple I & II gas-fired power plants. The operating performance of Temple I & II was reported for the entire year because of the combined data collection system of both power plants.

## **Management Approach**

BPP manages its waste through the 3Rs principles, including Reduce, Reuse and Recycle. The waste management target of BPP is to have zero hazardous waste. to landfill, and to monitor waste disposal operation compared with the annual target. This is to ensure that the power plants' waste disposal operation is conducted according to best practices and legal compliances of each country together with promoting guidelines in managing waste throughout the supply chain.



Reduce



Reuse



Recycle



**Waste Management Policy** 









Environment

Social

Performance

Waste from the three CHP plants is classified into 3 categories with following management approaches:

Types of Waste	Examples	Management Approaches
1. Non-hazardous waste	<ul> <li>Papers and office equipment</li> <li>Metal scraps, materials and equipment, as well as packaging</li> <li>Household waste</li> <li>Organic waste generated from tree trimmings and mowing in the area.</li> </ul>	<ul> <li>A reduction on consumption.</li> <li>Storage and classification for reusing and recycling.</li> </ul>
2. Hazardous waste	<ul> <li>Used oils and lubricants</li> <li>Used batteries</li> <li>Chemicals used to improve water quality and other chemicals, including packaging</li> </ul>	<ul> <li>Reducing consumption.</li> <li>Looking for opportunities to transform hazardous waste into those able to be better treated and reused.</li> <li>Reducing the use of packages by transporting and installing hazardous waste in chemical storage tanks.</li> <li>Storing and classifying waste for reusing and recycling.</li> <li>Setting up measurements to prevent and handle waste leakages, in the event of emergency.</li> <li>Transportation, disposal and distribution for recycling must comply with standards set by applicable laws.</li> <li>Delivering waste for disposal by certified external parties.</li> </ul>
3. Ash and gypsum	<ul><li>Fly-ash</li><li>Bottom-ash</li><li>Synthetic gypsum</li></ul>	<ul> <li>Separating fly ash sizes to meet customers' needs and market demand.</li> <li>Exploring the market to sell fly ashes bottom ashes and gypsums for utilization such as construction materials.</li> <li>Preparing adequate areas for storing ashes and gypsums appropriately.</li> <li>Delivering ashes and gypsums to the certified external parties for disposals.</li> </ul>

#### **Waste Disposal Systems**



#### **Procurement**

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

#### Storage

- Storing waste in accordance with best practices and legal compliance.
- Continuously inspecting hazardous waste stockyard areas to prevent leakages to the environment.



#### **Transportation**

- Transporting waste according to best practice and legal compliance.
- Selecting and appraising standardized transportation contractors.

#### **Disposal**

- · Classifying waste for reusing or recycling
- Distributing or eliminating waste by means of proper operations in accordance with best practice and legal compliance.
- Recording waste management data on a regular basis.

BPP complies the amount of waste generated and delivered for disposal by weighing and recording data prior to either management or disposals. The amount of waste transported for disposal by outside agencies has been recorded from the receipts. Moreover, agencies permitted by the government are selected to transport and dispose of waste so as to ensure that the waste management meets standards according to the requirements of each country and has the least impact on the environment.

Meanwhile, ashes and synthetic gypsums - by-products produced by the CHP plants, are included as the non-hazardous waste. These by-product sizes are separated in order to create added values and sell to customers in the construction industry.















## **Performance**

BPP has collected waste data according to the GRI 306 Waste (2020) since 2021. In the previous year, it reported the overall operating results of the three CHP plants in China and Temple I & II gas-fired power plants in the United States of America for the first time. The amount of waste generated were totaling **744,208 tonnes**, consisting of **163 tonnes** of hazardous waste, 744,044 tonnes of non-hazardous waste (including ash and gypsum). All waste were disposed by external parties, without on-site disposal, while bottom-ash, fly-ash and synthetic gypsum will be completely disposed of through reusing or recycling. More importantly, there were no significant incidents related to oil and chemical leakages.

The combined heat and power (CHP) plants were able to achieve all targets set for waste management. The hazardous waste directly disposed were **3 tonnes**, while the non-hazardous waste directly eliminated was 300 tonnes, lower than the annual target set. The non-hazardous waste, ash from fuel combustion were **648,830 tonnes**, consisting of **495,058 tonnes** of fly-ash, **153,772 tonnes** of bottom ash and **94,103 tonnes** of synthetic gypsum, which can be reused or recycled 100%. As for fly ash, BPP has separated its sizes before selling as a component in construction materials. This size separation has created added values for the fly ash, resulting in higher prices because it has properties meeting the customer's needs. In addition, BPP created a project to use activated carbon – waste from the industrial plants, to be mixed with coal, which has been very expensive in recent years. This makes it possible to reduce the overall amount of waste in the area in another way.

Meanwhile, Temple I & II gas-fired power plants had no hazardous waste and 25 tonnes of non-hazardous wastes directly disposed by the external authorized agencies. The two gas-fired power plants achieved the annual target set.

Waste Disposal	Hazard	lous Waste (t	connes)	Non-hazardous Waste (tonnes)		
	2021	2022	2023²	2021	2022	2023²
Waste diverted from disposal	175	90	161	776,631	791,911	743,741
Waste direct to disposal	1	26	3	793	703	300
Total waste disposal <sup>1</sup>	176	116	164	777,424	792,614	744,041

A total amount of waste disposal is not equal to a total amount of waste generated because some of waste were under disposal according to the power plant's operational processes.



## Leaf Fertilizer Project

BLCP Power Plant conducted an experiment by using leaf scraps to make compost used in the green garden inside the power plant. The compost produced was used as mixed soil for planting and growing vegetables for its employees. The knowledge gained from this experiment has been expanded to the communities surrounding the power plant (1 temple, 3 schools and 12 communities). In cooperation with Map Ta Phut Municipality, this project focuses on using agricultural waste materials to produce compost in each area. The ingredients of making leaf fertilizer include fallen leaves in the garden, fermented water, scented soil or animal manure. The fermented water and fragrant soil mixed are from the Khon Hin-Khao Phai organic farming community enterprise to help the decomposition process go faster. It can also be safely used in gardens. In 2023, the leaf fertilizer was able to help reduce waste from leaf litter by 130 tonnes, and carbon dioxide produced from burning leaf litter was up to 111 tonnes.













<sup>&</sup>lt;sup>2</sup> The performance of Temple I & II gas-fired power plants was additionally included in 2023.

## **Biodiversity**



### **Stakeholders:** • Communities, society, the government sector Strategy: Avoiding operating in areas with high biodiversity value. Studying and assessing risks related to biodiversity in operating areas to avert such areas and to develop preventive and corrective measures **Key Indicators:** • Proportion of business units evaluated on potential biodiversity impact. • Proportion of business units evaluated on biodiversity value (If there are business units located in areas assessed as having high impacts on biodiversity). **Target:** • Proportion of business units evaluated on potential biodiversity impact equals to 100%. Proportion of business units assessed on biodiversity value, represents 100%. **Performance:** Gauging biodiversity in all areas of business units. • No production units are located in areas with high biodiversity. • No complaints or non-compliance with laws related to biodiversity.

## **Significance and Reporting Boundary**

Presently, biodiversity loss is an ongoing issue, such as the loss of forest areas, the excessive utilization of biological resource ecosystems beyond its balance point, climate change, threats from Invasive Alien Species and pollution from human activities especially, in the areas with high biodiversity. BPP realizes the importance of biodiversity. It is, therefore, committed to operating a business with caution and taking into account the potential impact on operating the projects in order to avoid and take preventive actions, as well as minimize the impacts.

The boundary of this report covers the power plants in which BPP has 50% of stakes with direct management control, namely the three combined heat and power (CHP) plants in China and Temple I & II gas-fired power plants.

## **Management Approach**

BPP has set up the biodiversity management guidelines by avoiding creating impacts on biodiversity as the first priority. BPP's biodiversity protection starts by selecting the operational zones with no effects on high biodiversity areas. We are committed to conducting

biodiversity operations as follows:

• Committing to operating the projects creating net positive impacts on biodiversity by using management approaches as follows:

















- Avoiding operating projects in areas with high biodiversity.
- Assessing potential biodiversity impacts in all business units
- Conducting studies on and assessing the biodiversity value so as to collect data and prepare an action plan to reduce the impact before commencing the project.
- Putting high emphasis on biodiversity impacts in every phase of the project, starting from survey, construction, operation, to project's expired period.
- None of business units operating in the World Heritage Area and the International Union for Conservation of Nature (IUCN) protected areas, category 1-4, while there is no deforestation.
- · Creating engagement with stakeholders, especially local communities and educational institutions to run the biodiversity conservation projects.
- Providing supports to research projects on biodiversity.

#### Performance

In the year 2021, BPP revised its biodiversity policy to be clearer, especially its intention to avoid and reduce the impacts on biodiversity to be minimal. This started from selecting operating areas without high biodiversity, not running business causing losses of forest areas or no deforestation in high biodiversity area, assessing biodiversity impacts and risks, to managing operations to create a Net Positive Impact (NPI) on biodiversity in the operating areas.



#### **Biodiversity Policy**

Presently, **BPP does not operate either power plants or business** units located in the areas with high biodiversity, such as the World Heritage Area, the protected areas by the International Union for Conservation of Nature (IUCN) Category 1-4. That means BPP's operations are not located in the strict natural reservation areas, national parks, natural monuments and habitat/species management areas or wildlife sanctuary zones.

BPP has conducted a preliminary assessment on biodiversity related risks in all areas where it has operated in order to ensure that its operations do not have any impacts on biodiversity in the operating areas.

- The three CHP plants in China, namely Zhengding CHP Plant, Luannan CHP Plant and Zouping CHP Plant conducted a biodiversity study to see changes resulted from space utilization by using secondary data, satellite photos, conservation area declaration laws and incidences related to biodiversity possibly affected by the power plants' operations, etc. The study area was defined in a 5-km radius surrounding the power plants, representing an area of approximately 80 square kilometers. According to the study, the areas used around the three CHP plants are still the urban areas where most of the activities conducted are 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**. Moreover, there haven't been any conservation areas announcement near the three CHP plants.
- Temple I & II gas-fired power plants, located in Texas, USA, station on empty land and farmland. Therefore, their biodiversity risks are low. -



















# BLCP Power Plant has joined hands with business and governmental partners, ••••••• releasing over 1.3 million aquatic animals for the 21st consecutive year to continuously strengthen Rayong's marine ecosystem.

On 29 November 2023, BLCP Power Plant, which is BPP's joint venture company, collaborated with business partners and the government sector to organize the aquatic animal releasing activity at Saeng Ngoen Beach Small-Scale Fishing Boats Group in Rayong Province. The aim is to increase aquatic animals, maintain a balance of ecological system, increase fishermen income, create awareness on marine resources conservation and environmental protection in residential communities and to create good relationships among government agencies, local communities and industrial operators in Rayong Province.

A total of 1,317,999 aquatic species were released, including 1,298,000 black-tiger shrimps, 19,000 sweet clams and 999 blue swimming crabs. These aquatic animals released were from Ban Payoon Aquatic Animal Breeding Farm under the small-scale fishing boat community enterprise of Mueang Rayong District and Ban Chang Samakkhi District.

Create good relationships among government agencies, local communities and industrial operators in Rayong Province.

The aquatic animal releasing activity has been organized for the 21st consecutive year, with cooperation among the government sector, industrial sector and fishery groups in the area. The activity aims at making all these groups grow and move together, being ready to cope with future changes in Rayong Province, which will be developed according to the Eastern Economic Corridor Development Project (EEC). The aim is to

enhance the country's competitive advantages, promote economic expansion, increase employment, raise people's quality of life and income, sustainably develop every sector of communities according to the framework of environment, social and governance (ESG) operations and to support the United Nations Sustainable Development Goals (SDGs).















## **Labor Practice**



#### Stakeholders:

Employees

#### Strategy:

- Running labor practice in alignment with the international best practice.
- Promoting equality and non-discrimination, as well as fighting against harassment or infringement of rights in the workplace.
- Determining communication channels with employees, receiving grievances and putting such complaints into a remedial process.

#### **Key Indicators:**

 The number of incidents involved with violations of labor laws and practices.

#### **Target:**

 None of incidents associated with labor laws and practices violations.

#### Performance:

- None of incidents associated with violations of labor laws and practices.
- The work environment assessment. results were in line with the standards set by applicable laws.

## **Significance and Reporting Boundary**

In pursuant of our belief that employees are the heart of constructing business ecosystem to steadily grow, leading to the creation of emerging and diverse business opportunities, BPP is committed to sustainably creating a decent quality of life for its employees in all aspects and developing their competencies, as well as providing sound working environment accommodating them to create positive changes and deliver quality energy to the society. BPP, therefore, has designed every process of its human resource management and employee welfare with employees as a center. Thereby, the human resources management and welfare are developed under the three principles, namely equitability, performance base and competency base, together with employee diversity management regarding races, religions, languages, cultures, ages, knowledge, perspectives and working experiences in all nine countries where BPP has operated. This is to allow employees to utilize their diversified strengths to add in values and competitive advantages, enabling them to

work together happily, flexibly and agilely, as well as properly to their job positions and lifestyles, including daring to change and creating innovation in every aspect, being ready to drive the emerging businesses. The goal is to create the business sustainability, making BPP grown from its strong foundation in the long-term.

BPP recognizes that a strong foundation of **Banpu Heart** corporate culture helps unite all differences of employees into one. In order to be a driving force for the organization and ready for any transitions in accordance with business vision and strategies, all of BPP's executives and employees in all operating countries have been seriously striving towards cultivating a corporate culture continuously and earnestly for almost 40 years so as to make personnel work in the same direction.

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

## **Management Approach**

The human resource management

- Accordance with the labor laws
- The labor practice of each country
- Employees must be treated equally.

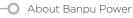
The human resource management suitable for the new context of BPP's business operations will focus on transforming the organization towards the new era of management. The labor practice of each country, in which BPP has invested must be in accordance with the labor laws of each country, while employees must be treated equally and united following the organizational goals, and in accordance with the principles of DEI; Diversity; Equality and Inclusion.

To fulfill the HR management principles, BPP has pursued actions as following:

- Employee recruitment process: BPP focuses on qualifications and knowledge, as well as competencies of all applicants equally, mainly to fit with the needs of each functional job. Thereby, the proportion of male and female workforces is not different.
- Fostering collaborative work under diversity: BPP has long been supporting its human resources in all countries where it has operated to strengthen personnel and to work collaboratively under diversities in order to enhance teamwork and drive the sustainable business growth through innovations.
- BPP strives to develop its personnel to be the **professional staff** by treating and giving them equal opportunities regardless of nationalities, races, languages and genders. These professional employees are committed to working under the clear vision and mutual goals, strongly uniting into one, adhering to and engaging with Banpu Heart corporate culture.















- Performance management: BPP has set up a fair key performance indicators (KPI) system in order to manage its personnel performance to be in line with the goals set. Additionally, it has upgraded a KPI scoring criteria, consisting of two parts: Work related KPIs, accountable for 70% and behavior base KPIs, equivalent to 30%. The behavioral base KPI is scored based on actions/behaviors each individual expressing according to a corporate culture.
- Determining other KPIs beyond individual duties: Other KPIs related to subordinate management skills, such as leadership KPIs have been set up for department managers and above level in order to make them realize that other than department's managerial works, supervising and taking care of subordinates is also helping operate the department better.
- Employing a grievance channel: Employees can submit various complaints through the compensation committee, established as a means for staff to submit their matters for consideration and to further present to executives. In addition, employees can consult or submit their grievances associated with various affairs via supervisors directly, or through the Human Resource Management Department. Importantly, if the employee wants to submit an anonymous matter, he/she can send a story through online channels, such as working discomforts, team conflicts or having problems with supervisors, including lacking transparent practices and sexual harassment. BPP has established a process to investigate such complaints and disciplinary punishments as specified in working regulations.
- Announcing the human rights policy by attaching with the principles of liberty, equality and human dignity, regardless of genders, races, religions or skin colors. BPP has put great attention to labor laws and respected on human rights in accordance with the Universal Declaration of Human Rights (UDHR), the International Labour Organization (ILO), the United Nations Global Compact (UNGC), the United Nations Guiding Principles on Business and Human Rights (UNGPs) and the labor laws of all countries, where it has operated to ensure equality of its employees and stakeholders, such as business partners, suppliers, communities, joint ventures and external contractors.
- Prevention of child and forced labors employment: To block risks related to child labor employment, BPP has a policy not to employ child and forced labors, by clearly specifying the minimum age of hiring employees aligned with the labor laws of each country. This includes setting up a transparent recruitment and selection process, requiring a hiring contract be made every time when hiring the new staff.

None of incidents associated with violations of labor laws and practices.

## **Performance**



- None of incidents associated with violations of labor laws and practices, discriminations, infringements and sexual harassments and other persecutions in the workplace.
- Examining the workplace environment and taking corrective actions to meet the standards required by applicable laws in all operational areas, including the contractors' working areas.
- Upgrading the Human Resource Management Policy by combining the Human Rights Policy with the Non-Discrimination and Anti-Harassment Policy and communicating such a policy to all employees, including disclosing information through BPP's website.
- Communicating about the labor best practices, such as labor practice indicators, human rights, human capital development and talent attraction & retention.
- Employee representatives are eligible to negotiate with **BPP** about deals affecting them by attending the welfare committee meeting with Banpu Group on a quarterly basis. In the past year, BPP made many improvements regarding welfare, including regulations affecting employees in a positive way and in alignment with labor laws. ————



















## HR Technology Transformation ..... Strategy

According to human resources management, BPP has been using technology since 2019 so as to be in line with its business expansion in many countries and be able to manage human resources at an international level more efficiently. Thereby, BPP has taken into account the employee experience rather than focusing on the development of automation systems in order to develop sustainable work efficiently. From these principles, the Human Resources Department has developed strategies according to the 3E2A guidelines.

The starting point of HR technology transformation begins with the implementation of Global HR Information System at the group level. This system will centralize employee information in all countries together with the following purposes:

- Able to manage data in every country correctly and always update information to be current
- Able to efficiently manage succession plans and talents.
- Able to analyze data and develop strategic human resource management plans.
- Able to be the original source of personnel data and connectivity to future systems.

For choosing to use the Global HR Information System in the group of companies, employee representatives from every country are involved in selecting and developing the system to be consistent with the context of each country. In addition, personal data are managed internationally in accordance with the General Data Protection Regulation (GDPR) standards, which are the means with the highest level of control and recognition in the world.

#### **Employee Experience**

A cooperation between both BPP's internal departments and external partners who have employed personnel with expertise in user experience and user interface (UX/UI) to be part of the system development team. This includes conducting surveys to get user's opinions regarding their experiences from using UX/UI system. The aim is to further improve and develop the system to be better as well as to have users get good exposure from using BPP products and services.

## Ε

## **Empowering**

Focusing on giving employees the right to manage their own data usage as much as possible, including giving them the rights to manage, and getting the system either display with information needed or not to show unwanted information.



**Ecosystem** 

Connecting/bridging the

systems with different focuses

by making BPP's overall system

able to respond to each issue

correctly and efficiently.

#### Automation

Making a working process, in particular, daily and detailed works, automatically as much as possible, reducing operating steps and human involvements in order to increase data accuracy and speed of services.



#### **Analytics**

Managing databases and creating data connections will help create analytical results and develop key performance indicators. Moreover, identifying strategic issues regarding human resource management from available data will support BPP to gain a competitive advantage and to develop further.















The group of companies has introduced technology to help develop the human resources management working processes to be automated (Process Automation), which has been deployed in each country as following:

# 2019

- Developing and implementing the KPIs system for employee's performance assessment in Thailand and China.
- · Developing and using a system for all types of leave requests in Thailand and China.

(2022)

- Improving and implementing an automatic work certificate requesting system for Thailand.
- Developing and executing an automatic employee nomination for promotion system in Thailand.
- Developing and executing a system for consideration automatic probation in Thailand.
- Improving and using an automatic employee transfer system in Thailand.
- Developing and employing an automatic overseas work assignment system for Thailand.

2021)

- Developing and implementing an Outside Training Requestion System in Thailand.
- Improving and implementing a COVID-19 vaccination data collection system for all countries.
- Developing and employing a system for automatically issuing a letter related to salary adjustments and annual bonus in Thailand.

(2020)

- Enhancing the system for all types of leave requests to be connected with social media for Thailand via LINE application and via WeChat for China.
- Developing and implementing employee's competency assessment system and preparing individual development plans for use in every country.
- Initiating and employing a system for assessing employee's potential and succession plans to be implemented in every operating country.

(2023)

- Currently, BPP is under developing and implementing a Global Learning Management System in all countries.
   For the first phase, the training staff is allowed to administer the training curriculum. The system was launched in December 2023, while Phase 2 and Phase 3 are expected to be completed by January and April 2024, respectively.
- Developing and implementing the BTalk system for Thailand. BTalk will allow employees to type questions into the system, while other employees can give opinions, answer questions or exchange knowledge with each other regarding the questions raised in the system. In addition, the in-charge officials are assigned to be responsible for matters related to questions and provide official information.
- Improving and employing the BuddyUp system to help strengthen organizational engagement and facilitate a daily-work life in Thailand. These systems include:

- The automatic Flexible Benefit Claim allows employees to claim benefits automatically.
- The employee's automatic identification card with QR Code for recording the entry and exit in various BPP's activities or connecting to log in to various corporate devices.
- Digital name cards.
- The center for various links to be able to log into other organizational systems.
- News articles and activities center.
- A scoring system for participating in activities called FriendChip.
- A system allowing employees to use points to redeem prizes. Additionally, BPP plans to implement these systems in various countries, including employees who are assigned to work abroad in 2024.

- Improving corporate website in Thailand's job recruitment section, making this page be modern and user friendly. Such an activity is also implementing in China.
- BPP is currently developing an experimental system for creating employee personal assistants by using the Artificial Intelligence (AI) technology to provide a channel for answering various questions raised by employees automatically. The system will help remind individual employees of various activities such staff must do when reaching the due date. This system is expected to be available for trial in the first quarter of 2024.

Developing human resources' technology and putting top priority to users as the center (employees and stakeholders within the organization) will be another factor in promoting the employee skills development and human resource management system to be modern and sustainable for supporting the growth of BPP and its business in the future.













# Banpu Power's Human Rights Operations .....

BPP places great importance of respecting human rights. The human rights policy was announced, while risks related to human rights have been integrated into the materiality assessment. BPP respects human rights according to the Universal Declaration of Human Rights (UDHR), the International Labour Organization (ILO), the United Nations Global Compact (UNGC), the United Nations Guiding Principles on Business and Human Rights (UNGPs) and the labor laws of all countries where BPP has operated.

BPP has carried out human rights operations as follows:

- Announcing the **Human Rights Policy** since 2018, with a regular review. The policy was lastly updated in 2023 to cover all aspects of human rights related risks, as well as promoting human rights operations throughout the supply chain.
- Setting up a target for human rights risk assessment in 2025.
- Proportion of businesses assessing human rights equals to 100%.
- Proportion of businesses having high human rights risks with a must risk management plan is 100%.
- None of significant complaints associated with human rights.
- All human rights related grievances must be corrected through a dispute resolution mechanism.

- Integrating human rights issues according to the international principles, including Human Rights Policy, Non-discrimination and Anti-harassment Policy, Employee Recruitment and Selection Policy, Compensation Management Policy, Employee Relations Policy, Employee Training and Development Policy.
- · Conducting Human Rights Due Diligence in accordance with the Guidelines for Human Rights Due Diligence of Banpu Group. 80% of business entities, in which BPP has direct control, including all 3 combined heat and power plants, Bangkok office and Beijing office conducted human rights due diligence. The 2023 human rights due diligence was carried out in collaboration with Banpu Group. The assessment found that none of BPP's business units has high human rights risks. The human rights risk assessment is planned for implementing with the businesses in the United States of America by 2025.

 Communicating and providing knowledge about human rights to BPP personnel on the topic of "Guidelines for conducting Human Rights Due Diligence (HRDD)" in August 2023 so as to make employees and executives understand the relationships between businesses, corporate supply chain, key stakeholders involved with human rights, including presenting guidelines for evaluating the results in order to improve business operations related to human rights.

In 2023, BPP also conducted a Human Rights Impact Assessment under a Human Rights Due Diligence process for the renewable energy business in Vietnam and the thermal power business in Thailand, which is a joint venture. BPP collects information through an interview with rights holders, including employees, contractors, sub-contractors, security guards, local communities and vulnerable groups consisting of women and pregnant women. According to the impact assessment results and the consideration of existing risks control measures, it was found that most of human rights issues were at a low to moderate level. BPP, therefore, has set up measures to alleviate and reduce impacts as follows:

Human rights	Human rights issues	Right holders	Impacts alleviation and mitigation measures
Labor rights	Working condition and equal remunerations  Labor recruitment  Forced Labor  Occupational health and	Contractors and sub-contractors	<ul> <li>Communicating on supplier code of conduct</li> <li>Training and dissemination of a manual on good corporate governance and business ethics, including various related policies, such as Human Rights Policy, Non-Discrimination and Anti-Harassment Policy, and Compensation Management Policy, etc.</li> <li>Using ESG as one of the criteria to select suppliers.</li> </ul>
Employee discrimination	safety in the workplace  Violence or harassment	Employees	<ul> <li>Communicating the Non-Discrimination and Anti-Harassment Policy to employees.</li> <li>Conveying messages regarding channels for receiving complaints to employees.</li> </ul>
Grievance mechanism & access to remedy	Internal grievance mechanisms	Employees	<ul> <li>Organizing a training on human rights for employees.</li> <li>Communicating about channels to receive grievance to employees.</li> <li>Conducting a training related to human rights to employees.</li> </ul>



Banpu Group's Human Resource Management Policy



The Guidelines for Human Rights Due Diligence of Banpu Group















# Talents Attraction and Retention



#### Stakeholders:

Employees

#### Strategy:

- Implementing a practical staff selection process, able to choose employees with work-based competency and values consistent with a corporate culture.
- Analyzing corporate performance data so as to develop a manpower strategic plan to effectively respond to corporate growth and to set up potential employees' database or Talent Pool.
- Preparing a High Potential Development Program (HiPo) and arranging trainings on emerging skills necessary for the power business transition.
- Arranging internal activities to promote organizational engagement and to enhance employee's well-being.

#### **Key Indicators:**

- The Banpu Heart corporate culture survey results
- The employee engagement survey results

#### **Target:**

- The Banpu Heart scores are no less than 70% for Thailand and 90% for China, respectively.
- The employee engagement scores of no less than 70% in Thailand and 85% in China, respectively.

#### **Performance:**

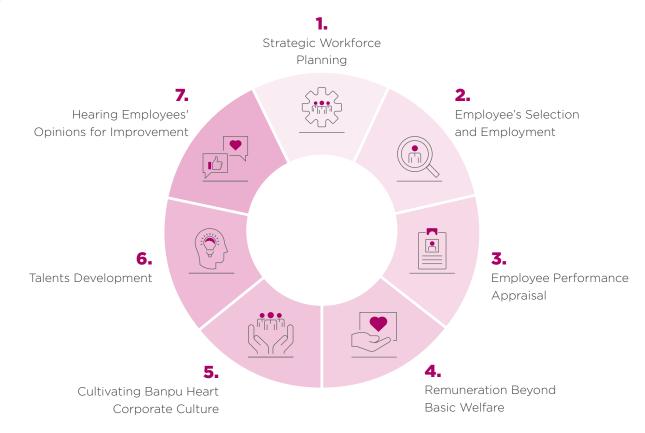
- The Banpu Heart scores of 87% in Thailand and 91% in China, respectively.
- The employee engagement scores of **57% in** Thailand and 91% in China, respectively.
- The high potential employee retention rate was 100%.

## Significance and Reporting Boundary

Attracting potential people to join the organization and retaining personnel with the company is a key factor supporting BPP to pursue its growth strategies and to achieve the targets set in the short- and long-terms. The power and energy businesses, in particular, are in needs of manpower with specific qualifications and experiences. Therefore, BPP has to have a process to attract and keep its employees continuously.

The boundary of this report covers the business entities in which BPP has direct control.

### **Management Approach**











Governance





#### 1. Strategic Workforce Planning

BPP has adopted its business strategies and personnel data analysis results in various areas to create strategic workforce planning in order to prepare manpower to support the operations in the future sufficiently and efficiently.

To develop key and critical position successors (Succession Planning and High Potential Management) continuously, the Succession Planning Committee will select, review and follow up competency development of senior management and key-position successors regularly, including recruiting new employees and executives to support the corporate growth in alignment with strategies set.

#### 2. Employee's Selection and Employment

The Human Resources (HR) Department has designed a recruitment process, starting from clear qualifications when announcing job vacancies, to assessing expertise and experiences by using the Culture-Fit Assessment and Behavioral-Based Interview during a recruitment process in order to know applicants' working attitudes in accordance with BPP's corporate shared values.

BPP's internal recruitment is carried out through an internal job posting process in order to give its employees opportunities to apply for the positions they are interested by contacting HR Department and going through a fair selection process. In addition, BPP has also provided its personnel the opportunities to learn and develop themselves via direct experiences, 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 BPP's affiliates oversea, etc.

#### 3. Employee Performance Appraisal

BPP has implemented the performance management system to create fairness and manage performance and compensation in line with the corporate goals. The employee's performance appraisal is carried out twice a year across the organization. The elements of employee performance assessment are divided into two key parts:

- -Part 1: An assessment conducted based on work-related KPIs, focusing on key operations, representing 70%.
- -Part 2: Behavior-based KPIs, which appraise employee's behaviors conducted according to a corporate culture, with a focus on cultivating behaviors supporting employees to work properly and efficiently. This part of the assessment represents 30%.

BPP has also established the leadership KPIs attached to the work-related ones for middle-level management and above. The leadership KPIs include an assessment of leadership skills and behaviors on taking care of subordinates in a responsible line of work. This KPI is assessed by subordinates one step down.

In addition, BPP has executed a 360-degree voluntary evaluation system, allowing employees to ask for opinions on their performances and behaviors from supervisors, colleagues from other functions and subordinates. The aim is to help employees in improving themselves. The information of employees and those providing comments or suggestions will be kept privately. -



















#### 4. Remuneration Beyond Basic Welfare

To take care of employees holistically, BPP has also provided other welfares in addition to managing wages and remuneration. Other welfares provided include the annual influenza vaccination, mental health counseling or Psychiatrist Service, online doctor consultation or Health at Work, exercises in the form of virtual one-on-one, massage therapy services for office syndrome and consideration of special welfare programs Flexible Benefits to be more diverse. Moreover, a physical therapy and dental care or On-site Physical Therapy & Dental Delivery has been conducted at the office, while a survey on employees' mental state (General Wellbeing & Psychosocial Assessment) was arranged so as to use the results gained to design activities for employees in 2024.

### 5. Cultivating Banpu **Heart Corporate Culture Through Banpu Change Leader (BCL)**

# Pas**sion**ate Innovative Committed

The Banpu Heart corporate culture has long been attached with BPP's employees, but how to cultivate and maintain this corporate culture is very significant. If the existing employees and newly-hired staff understand the culture well and behave in accordance to the three core shared-values. namely "Passionate." "Innovative" and "Committed." while those working oversea have knowledge and understanding of joint-working behaviors in alignment with Banpu Heart, they will finally work with each other happily and commit to the overall corporate performance. To promote the organizational culture, BPP has set up Banpu Change Leader (BCL), an employee representative from various departments who will be a Banpu Heart role model. These BCLs will be the change agents to encourage BPP people to behave in accordance with Banpu Heart corporate culture and encourage them to be a change leader helping BCLs to drive participation in Banpu Heart culture activities from various organizations. They will be representatives who will cultivate the organizational culture from the operational level to the managerial level.

#### 6. Talents Development

Every year, the Human Resources Department will consulate with heads of various departments in order to consider selecting employees who have outstanding performance with high potential and whose behavior is consistent with the organization's core shared values on an ongoing basis (Hi-Potential Employee Calibration). These employees are called HiPo, who have potential and are ready to be further developed and grow with the organization in the future. As a result. BPP has developed plans to provide knowledge and train these HiPos to prepare themselves for career growth, becoming an executive in the future.

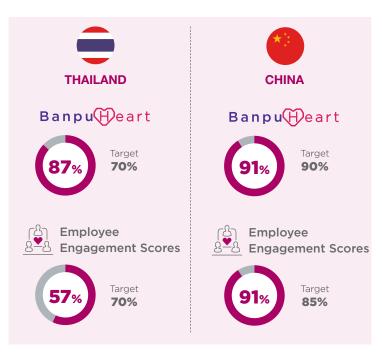
#### 7. Hearing Employees' Opinions for Improvement

BPP has regularly listened to its employee's opinions for continuous improvement in order to become the organization to which employees want to work in a long-term. It has provided various channels to receive employee's opinions, including conducting an organizational engagement survey, arranging a focus group meeting to get in-depth opinions.



#### **Performance**

BPP has conducted the Banpu Heart and employee engagement survey annually. The survey is conducted by external agencies. In 2023, the number of employees participating in the survey accounted for 98% of the total workforce. The survey results are as follows:



- High-potential employee's retention rate equaled to 100%.
- According to Banpu Group's employee engagement survey related to attracting other people to work with the organization, it was found that:
  - 78% of employees say positively about working in the organization when given the opportunity.
  - 71% of employees will recommend a friend who is looking for a job to join the organization. -

















# Banpu Career Day ····

BPP, together with Banpu Group, organized the career opportunity day 2023 for its employees with an aim to make them understand about planning their career path, consisting of three main elements: growth path or career path, career goals or career aspiration and career development. At the career opportunity day, a Design Your Own Career Workshop was arranged to educate participating employees about career planning so that they have sufficient knowledge and understanding. Moreover, the workshop gave participants a chance to plan their own career paths through designing a growth path suitable to their ambitions, as well as creating their own development plan according to the set targets. This led to another conversation with their supervisors to develop the first step plan so as to make his/her own career path designed to match the corporate vision and goals.





# Winnovation for Efficiency: A Study Tour at Asia **Aviation Academy**

On 14 December 2023, BPP supported 27 staff who are BPP's executives and employees in Thailand to attend a lecture on Innovation for Efficiency, conducted by AirAsia Aviation Academy. AirAsia is the most punctual low-cost airline in Asia Pacific. The aim was to enable BPP employees to learn how to create innovations for running business amid high challenges and competitions, especially during the COVID-19 outbreak, causing many businesses to cease operations. Opening the eyes to learning different businesses and seeing different perspectives can be applied to BPP's business development, including using oneself courages to learn and do new things.

In addition, participating employees were able to listen to and raise questions about flying from flight attendant trainers on a simulation aircraft so as to behave properly during traveling by plane. They also practiced sliding down the air staircase for evacuating passengers during the emergency.

#### Benefits

- 1. Employees exchanged knowledge and opinions and saw that B2C business is highly competitive. As a result, gaining a market share to generate income for the organization is not easy. The innovation and strategies, therefore, must be developed all the time due to tense competitiveness.
- 2. Gaining a perspective on B2C business, allowing employees to better understand competitions in the market. The knowledge received can be applied to operate business in the merchant market in which BPP is currently operating and has established a strategy for future growth.
- 3. The real experience gained from doing activities allows BPP employees to use their courage and take actions, dare to step out of their comfort zone and learn what they should know when wanting to travel by plane.
- 4. Exchanging ideas to build upon activities for social responsibility and sustainability activities.
- 5. Realizing the importance of working as a team and concerning the corporate overall benefits as well as doing projects or using innovations to increase work efficiency, reduce costs and increase business competitive advantages.





















# Boost Me Up, an Activity Promoting Mental •••• & Physical Health, As Well as Financial Planning

BPP has joined hands with Banpu Group to organize the "Boost Me Up" activity for the third consecutive year at the Head Office in Thailand. This year's activity focused on the topics of mental & physical health, nutrition and financial planning with an aim to have employees have good financial planning, while concerning more on sustainable heath care.

Through this activity, the experts in related fields were invited to give lectures and conduct activities with employees through both online and on-site. In the past year, there were five activities organized as follows:

#### 10 February 2023

Boost Me Up EP 7: Tax Planning: Planning to pay taxes and investing in funds

**Benefits gained from the activities:** Encouraging employees to be meticulous in planning their spending and tax planning.

#### 27 April 2023

Boost Me Up EP 8: Getting FIT the Series Workshop with the topic of "Sustainably losing weights for the last time together".

**Benefits gained from the activities:** Encouraging employees to take better care of their physical health by working with the lecturers who will provide advice on how to loose weights appropriately and how to manage good health. The lecturer will follow-up the results.

#### 12 July 2023

Boost Me Up EP 9: Listen to your heart

**Benefits gained from the activities:** Mainly promoting the mental health of employees so as to make them have happy lives.

#### 18 August 2023

Boost Me Up EP 10: Lose Fat to get Fit on the topic of "Sustainably losing weights for the last time together"

**Benefits gained from the activities:** Encouraging employees to have good health by exercising and eating nutritious foods.

#### 28 September 2023

Boost Me Up EP 11: Tax Tricks Workshop was arranged to help employees plan their taxes for the latter half of 2023

**Benefits gained from the activities:** Fostering employees to have knowledge on financial planning by putting the principles into real practices.















# **Employee Engagement**



Stakeholders:	• Employees
Strategy:	<ul> <li>Creating employee engagement through drawing participation from each unit's leader.</li> <li>Establishing communication channels and listening to employee's views for further development.</li> </ul>
Key Indicators:	<ul> <li>The employee engagement scores</li> <li>The Banpu Heart corporate culture scores</li> </ul>
Target:	<ul> <li>Employee engagement scores in Thailand and China are over 70% and 90%, respectively.</li> <li>The Banpu Heart scores exceed 70% for Thailand and over 85% for China.</li> </ul>
Performance:	<ul> <li>The employee engagement scores were 57% in Thailand and 91% in China.</li> <li>The Banpu Heart corporate culture scores were 87% in Thailand and 91% in China.</li> </ul>

# **Significance and Reporting Boundary**

BPP is confident that threating employees with good care, making them feel as part of the organization and be satisfied with their work, including providing them opportunities for fair career growth and welcoming their opinions for further improvement, will make the personnel work happily. This will also enable them to improve their work continuously, reduce turnover rate and retain talents with the organization. In addition, the employee engagement is significantly related

to competitive advantages, growth, stability, corporate sustainability and shareholder's values.

The boundary of this report covers the business entities, in which BPP has direct management control, including the offices in Thailand and China, the three combined heat and power (CHP) plants in China, but excluding the Temple I & II gas-fired power plants in the United States of America.

# **Management Approach**

BPP has established the Employee Relationship Policy as a practice guideline for creating good relationships with its employees. The employee engagement consists of three principles as following:







# **STRIVE**

Employees work Employees have happily and want deep connections positive attitude to to remain with the with the organization, organization in the striving to develop future. BPP better.

The key driver drawing employee engagement with the organization includes:





Employees say about BPP with both internal and external people.

**STAY** 

















In order to engage with employees continuously, and to report the engagement progress to executives quarterly, BPP, in collaboration with external consulting firms, has conducted the employee engagement survey annually. The analyzed survey results and recommendations from employees will be later used for designing the engagement action plans for organizational and departmental levels.

### **Performance**

BPP carried out the employee engagement and Banpu Heart corporate culture survey with results as following:

Country	Respondents (%)	Employee engagement scores (%)	Average employee engagement level in the labor market (%)	Banpu Heart corporate culture scores (%)
Thailand	100	57	70	87
China	100	91	77	91



BPP made use of the employee engagement survey 2022 results to analyze and seek ways to create the tangible employee engagement in 2023. BPP's management approach is as following:

#### 1. Talent and Staffing

### Developing a succession plan for key & critical positions continuously

One of the strategies for manpower planning and management, enabling the organization to move quickly and agilely, is a continuous development of successors for key & critical positions (Succession Planning and High Potential Management) to support BPP's rapid growth. In the year 2023, BPP, in collaboration with the Succession Plan Committee, selected, reviewed and monitored the high-ranking successors' development regularly, while preparing, following up and evaluating the Individual Development Plan (IDP) of selected candidates. This included recruitment of new executives and employees to strengthen key positions of all operating countries so as to keep the succession planning in alignment with BPP's strategies. To support the business growth and to scale-up operating bases abroad, BPP continued focusing on the Leadership Pipeline Development program in 2023.

This program was aimed at strengthening the middle-level management and above to be equipped with managing people and works, as well as being able to grow as a corporate future leader. Various initiatives have been cautiously implemented through following programs:

- Banpu International Business Leader Program (IBLP), a program to develop leaders in every country (the first generation), aims to develop and prepare leaders to be well equipped, with a focus on action learning. The program also provides a mentoring system for all participants whose mentors are senior executives within the organization in order to make this group of employees ready to grow in key positions in the future.
- Banpu Business Leaders Development Program aims to enhance the readiness of executives in every operating country, in terms of people & work management, in order to become BPP's future leaders. The employees participating in this program must go through a systematic selection process, including being assessed on leadership capability and leadership characteristics in order to have awareness of oneself strengths and areas to be developed. The Personalized Training Program will be, then, arranged for each participating employee so as to prepare them to be the future leaders.

In addition, BPP also increases the leaders' capabilities in the areas of business knowledge, analytical thinking and management skills for employees with high potential. This employee group is developed through various forms, such as cross functional working, enhancing experiences in working abroad or cross-country working and job rotations, etc. The progress of this development program is monitored every quarter. —













### 2. Career and Development

#### Human Resources Development Policy

BPP places great importance of personnel development, knowledge exchange, expertise and various innovations associated with the sustainable power generation and distribution business. BPP supports and promotes the employee's self-learning through online platforms in combination with action learning. It also raises the level of comprehensive human resource development in every operating country in order to support Banpu Group's long-term business growth. Thereby, BPP is focusing on improving every core process starting from: creating a group of employees with potential to support the organization's international growth (Banpu Global Talent Pool); systematically planning of workforce strategies for the entire company group; designing learning courses to suit each business and each job position by developing a holistic learning process (Learning Solution Design); creating an individual potential development plan (Personalized Learning Program) for key positions intensively; to accurately assessing learning results, in terms of changing behaviors and impacts on business through empirical measurements (Learning and Development Measurement).

BPP places great importance of personnel development, knowledge exchange, expertise and various innovations associated with the sustainable power generation and distribution business.



BPP continues to design and develop training courses for executives and employees at all levels to promote learning through the Learning Application Project (LAP), which encourages employees to apply lessons learned in the workplace into their daily work. This includes scaling up such learning through the design thinking process, emphasizing people as the center of development, training to think creatively and encouraging innovative thinking in order to create new necessary skills (Reskill). For example, joining hands with Banpu Academy to establish the energy trading learning community to share knowledge and experiences among employees across Banpu Group and to strengthen existing skills (Upskill), such as negotiation skills, effective project management and contractual parties skills so that employees have flexibility in making changes/adjusting oneself to suit with the sustainable business direction. BPP also promotes digital expertise (Digital Savvy), starting with enhancing knowledge and abilities from the "Data-Driven Citizen Program", which leverages insights depth data to lead the organization amid the technology era in order to create benefits for the organization and add values for customers. In particular, BPP gives its employees the opportunity to try out projects with support from the learning community to share experiences and endlessly transfer knowledge and data analysis techniques. As a result, employees become the center of learning and can choose their own learning style to access various skills efficiently. —















# A Solid Corporate Culture ..... **Driven by 3 Core Values:** "Committed, Innovative and Passionate"

That uniting all employees into "One Banpu, One Goal" which is the heart of Banpu Power's human resources management, is to create a consistently strong corporate culture in order to build on Banpu Group's power of diversity in initiating innovations and creating the sustainable business growth. Banpu Heart is a corporate culture in which all executives and employees of Banpu Group and Banpu Power adhere as a principle for operations. Banpu Heart consists of three core shared values: "Passionate". "Innovative" and "Committed". Last year, the score of Banpu Heart shared value survey was 87% and 91% for Thailand and China, respectively, which was higher than the target set. Bangkok Office in collaboration with BPP and Banpu Group, organized activities to promote the Banpu Heart corporate culture so as to make employees understand and apply the "10 Designed Behaviors of Banpu Heart" to their daily work, able to use such behaviors to drive towards the business goals.

In 2023, BPP changed the format to organize activities to support the expansion of BPP's diverse business portfolio. It focused on creating a sense of ownership and giving employees freedom to create various activities according to the differences of each country and each generation. The aim was to support the design and expression of corporate culture most appropriate to the context of each location. For example: learning, creating shared understanding and promoting corporate culture through the real lives of diverse employees participating in the project called "The Stories of Banpu People: Voice of Dedication". The project is a documentary film, telling stories about work, life and various experiences of employees in every operating country so that everyone gets to know each other better. This included being able to connect the "10 Key Behaviors of Banpu Heart" with personal and business goals of Banpu Group through expressing various viewpoints and opinions while it reflected the corporate culture heading in the same direction. In order to promote understanding and apply such values to their work agilely, creative activities were arranged for employees to take actions ready to apply the corporate shared values to personal values. The activities organized include:

• Strengthening Banpu Change Leaders (BCLs), a group of employees who volunteer to drive a corporate culture, by

elevating BCLs network to become a complete/concrete global ecosystem, such as organizing Banpu Heart and Local Community activities in China, arranging a new year activity called "Level Up 4 Decade" to strengthen the power of Banpu people in Thailand.

- The "Transcend Your Limit" activity, which believes that "every employee has unlimited abilities," therefore, BPP encourages employees to be ready to push past their own limits, learn the power of actions, dare to do new things and learn from failure.
- "Boost Me Up Series" activity is striving to caring for the employee's good quality life in every aspect and in a sustainable way, including Mindfulness Literacy, Health Literacy, Financial Literacy (mind, health and finance) to fulfill employees to be ready for creating good energy for the society.





















# The Power of Attitude ......and Team Building

BPP sees the importance of enhancing employee-toemployee relations, employees and executives, as well as employees and the organization, including promoting teamwork and creative working. BPP, therefore, organized the outing activity for the year 2023 on 23-24 March 2023 at Hard Rock Hotel Pattaya. There were 35 participants, including executives, employees and consultants of BPP in Thailand. At the outing, participants were divided into groups to carry out activities to promote teamwork, designed to give team members the opportunity to work together, develop strategic planning, find a team leader, plan and present their work, etc. In addition, employees were given the opportunity to practice expressing creative opinions (constructive and positive feedback), including summarizing all activities done by drawing a picture of the dream organization so as to let employees practice thinking, planning and working together creatively.

The activity organized received a satisfactory score of 4 out of 5 scores. All relevant departments will use this assessment result to design the action plans for developing relationships among employees and to make an understanding about business directions in the future.

#### Benefits

- Participating employees get to know their co-workers better, in terms of personal relationships, in addition to talking about work and duties.
- Creating trust between each other and drawing participation among employees, executives and the organization.
- Participating employees knew about BPP's direction since senior executives used this time to talk with staff about business matters and future direction where BPP will continue to grow. Additionally, participants were given the opportunity to raise questions and express their opinions on current and future business operations.

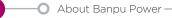


















# **Human Capital Development**



# Stakeholders: Strategy:

Employees

development plan (IDP).

supports.

• Developing employee's competency

and leadership so as to respond to

direction by creating the individual

essential emerging skills and new

roles in alignment with business

Creating key & critical positions'

succession plan for continuous

# **Significance and Reporting Boundary**

Developing employees' competencies to be equipped with knowledge and occupational expertise, as well as management skills, inclusion of promoting their leaderships, is one of the key success factors for operating business to achieve its goals amid a rapid technology disruption era. It is also one of the human resources management strategies to accommodate business expansions and to increase competitive advantages. Hence, BPP has prepared comprehensive competency

development plans for its executives and employees so as to enhance their learning ability and working efficiency, in parallel with establishing leadership development plans in alignment with the organization's targets and missions.

The boundary of this report covers the business entities, in which BPP has direct control, namely the three combined heat and power (CHP) plants in China and offices in Thailand and China but excluding businesses in the United States of America.

#### **Key Indicators:**

- Proportion of employees with IDPs.
- Proportion of key & critical positions having succession plans.

management and business strategy

• The average training hours of each employee (hours/person).

#### **Target:**

- Proportion of employees having individual development plans (IDPs) accounts for 100% by the year 2025.
- Proportion of key & critical positions equipped with succession planning represents 100%.
- The employee average training hours equal to 30 hours/person in 2023

#### **Performance:**

- Proportion of employees having IDPs equaled to 69%.
- Proportion of key & critical positions with succession plans represented 100%
- The average training hours was 50 hours/person.

# **Management Approach**

BPP has created the individual development plans (IDP) and Training Roadmap, consisting of short-term (annual basis) and long-term employee development courses (according

to business strategic plans) with following management approaches:

#### Creating short-term training courses

Focusing on developing training courses suited with individual needs by taking the following criteria into consideration.

- 1. Assessing employee's competency compared to leadership and functional competencies.
- 2. Upskilling knowledge urgently required for development to be aligned with business operations, inclusion of reskilling necessary emerging skills and learning new technologies, or practicing essential skills and able to apply such skills to improve their current and future task more efficiently.
- 3. Learning methodologies according to the 70:20:10 learning and development model, inclusive of learning and development from attending trainings, various educational courses officially organized by BPP, learning from coaching, real practices and working, as well as through direct experiences.

Governance

#### Designing long-term training courses

Emphasizing on creating training courses aligned with BPP strategies and corresponding to trends of business needs, as well as demand for emerging skills in the global market. This is to prepare our employees to be ahead of the disruptive business trends and to connect diversities of each country where BPP has operated business.















In addition, BPP has established different forms of employee development in line with the position levels in order to be consistent with the most efficient learning process, as well as supporting employees' performances at each level as follows:

- Developing the Banpu Group Learning and Development **Roadmap** by focusing on knowledge essential for working. abilities to co-work with other people or "people system" and managerial skills. The roadmap concentrates on developing leadership and functional competencies, so that our personnel, ranging from the entry level to the managerial level, are able to enhance their working abilities along with leadership capabilities.
- Initiating the specific people capability development plan for power business.
- Arranging the High Potential Development Program for all levels of employees in order to train them to be equipped with knowledge and new skills essential for a power business transition.
- Assessing IDPs and taking the results to improve work continuously.

In addition, BPP encourages employees to learn in various ways, such as:

- Opening opportunities for employees to learn and develop oneself through direct working experiences, for example, transferring to other functions with work characteristics close to such an employee's line, participating in cross-functional projects and working in overseas affiliates, etc.
- Learning through online platforms on which employees can select the training courses they want to learn by themselves in order to enhance their potential.
- · Building awareness on the importance of continuous learning and development among employees by enhancing the "Growth Mindset."

BPP selects personnel with outstanding performances and sound attitudes aligned with the corporate shared values so as to create a plan to develop competency and working experiences of these talent groups, which will be beneficial to their future work. This includes putting the talents in the succession plan properly. Additionally, a succession plan for key positions has been laid down as following in order to continue conducting business and to support operational strategies:

- Establishing the succession plan committee to manage the succession plans of key and critical positions. The succession plan committee is responsible for determining the policy and specifying key and critical positions.
- Creating key and critical position profiles and setting up talents selection criteria.
- The succession plan committee coordinates with Human Resources (HR) Department to nominate and select talents to succeed such key and critical positions.
- Develop, follow-up, and examine IDPs of selected candidates by HR Department together with the succession plan committee.
- Evaluating key and critical position succession planning in accordance with corporate strategies and identifying critical roles for further developing a guideline to select persons to succeed these key and critical positions, including a development plan. In addition, the succession plan committee meeting has been convened quarterly so as to monitor progress of such a development plan.
- Initiating a review of employee's performance identified as high potential personnel in alignment with the international consulting standards. —













### **Performance**

- Employees developing their IDPs equaled to 69%.
- Employees were trained at an average of 50 hours/person/ year.
- · Key and critical positions having succession plans covered 100%.
- Implementing 80% of the total plan for specific people capability development for power business, such as project management training, negotiations, contract management, including regularly coaching staff in the assets management and engineering departments by executives and experts on a monthly basis.



Employees were trained at an average of 50 hours/person/year. In 2023, BPP arranged the leadership and competency development programs for its employees as follows:

Development gram	Target Groups	Objectives/Benefits Gained
npu Engaging ader Program Great Coach: elping Others Succeed	Vice President level /Managers and higher	Developing managements as the leaders to promote a creation of employee engagement and as the persons with whom subordinates are close and feel comfortable to learn at all times, while various managerial skills development programs were provided to these managements in the areas of coaching, motivation and inspiration, etc. The aim is to help management understand and know how to build a unified workforce, as well as to promote effective management. This is to encourage their subordinates to use their full potential to achieve their works successfully.
npu Engaging der Program on Hi-Coach	Manager-level employees who have passed the Great Coach training.	Developing and enhancing executives who have been coached according to his/her functional line to expand their abilities to conduct a cross-functional coaching for employees in order to develop employees' competencies regarding leadership and working for excellent results.
anpu Global Leadership gram for First Line Leader	Manager level	The leadership skills were developed to lead teams, including unleashing their own potential and building inner strength. Other skills were also enhanced to manage and develop teamwork, such as coaching, giving advice for subordinates' improvement and creating partnerships with stakeholders, including promoting and sharing real working experiences.
ou International siness Leader Program	Managerial level and above	Developing leadership skills to lead business, understanding business transition trends in the context of globalization, providing knowledge on financial instruments, business operations and leaning from case studies of leading global companies, with an aim to create a New S-Curve business for BPP.
pu Leadership ogram: Future Leader	Section manager	Enhancing leadership skills for self-improvement, self-understanding, flexible attitudes and concepts and growth mindset, efficient and effective joint working, as well as preparing for future growth, including preparing to become a future executive.
	npu Engaging ader Program Great Coach: elping Others Succeed  npu Engaging der Program on Hi-Coach  anpu Global Leadership gram for First Line Leader  ou International siness Leader Program  pu Leadership ogram: Future	npu Engaging Great Coach: Elping Others Succeed  Manager-level employees who have passed the Great Coach training.  Manager level employees who have passed the Great Coach training.  Manager level anpu Global Leadership gram for First Line Leader  Program  Managerial level and above  Program  Section manager ogram: Future













Moreover, BPP also organized a training course to develop employees' competency within the organization at Bangkok Office and allowed interested employees to apply for participating in the trainings equally, such as:

Courses	Objectives	Duration (Day)	Trainers	Target Groups
Basic Fire-Fighting and Evacuation     During Emergencies	To comply with labor laws and provide basic knowledge on fire-fighting.	1	External agencies	All levels of employees
2. Safety for New Employees	To comply with applicable laws and provide safety related knowledge for newcomers.	1	Certified safety and occupational officers	All levels of employees
3. Human Resources Management Tools for New Employees	The principles of HR management and tools used for functional development.	0.5	Human resources department	Supervisors/ Section managers
4. HR Management Tools for New Managers	The principles of HR management and tools used for functional development for managers.	0.5	Human resources department	Managers
5. The 7 Habits of Highly Effective People	The principle of self-development, interpersonal relationships, leaderships and efficiency enhancement.	3.5	External agencies	Managers/ Section managers
6. Hot Risk	Efficient risks management according to BPP's business directions, including understanding the real practices through business simulations.	2	Risks management department in collaboration with external agencies	Managers/ Section managers
7. Energy Titan	Learning about BPP's business operations throughout the supply chain through the business simulation games.	3	External agencies	Managers/ Section managers
8. "YourNextU" Online Course Platform	Promoting learning and developing emerging skills by self-learning.	365	External agencies	All levels of employees













Courses	Objectives	Duration (Day)	Trainers	Target Groups
9. "Coursera" Online Course Platform	Fostering learning and developing new skills through self-learning	365	External agencies	All levels of employees
10. Coaching Up	Promoting and building an understanding of basic coaching for employees at all levels in order to be consistent with other coaching courses within the organization until it can become a coaching culture in the future. This training unleashes the full potential of excellent employees, contributing to their career advancement at the team level and the organizational level.	0.5	Banpu Academy	All levels of employees
11. Data Series	The course started with inspiring Banpu executives to have technical knowledge and data to support personnel and decision-making and to comply with data technical operations in parallel with providing knowledge for employees at all levels through information techniques on a self-learning platform, including applying knowledge gained to develop their tasks, able to create new innovations in the digital field. Participating employees will be taught and coached along with actual operations by internal and external agencies.	365	Banpu Academy Digital & Innovation and external agencies	All levels of employees

### Banpu Group's employees participating in the leadership development program

Levels	Total number of participating employees (persons)	Total number of participating employees (%)	A number of hours (hours)	A number of training hours per person (hours)
Top executives (Vice president level and above)	15	100	547	36.5
Middle management (Managerial level and above)	68	75	3,015	44
Entry-level management (Section managers)	91	70	4,545	50

















# Banpu Global Leadership ••• **Program**

BPP has created a training course to enhance and develop new generation leaders continuously, regarded as another important success factor helping drive towards business growth. The program is aimed at creating effective leadership, starting from self-development to team development. BPP believes that these development programs will help its employees to manage tasks, practice leadership and to develop teamwork. This will, in turn, support the creation of innovations more efficient, as well as improve working processes and increase BPP's business values.

In addition, the program also promotes selected participants who are the unit's leaders from BPP's operating countries to exchange experiences and build a collaborative network among them.

Banpu Global Leadership Program is held annually, taking place around 8-10 months. It is divided into modules to develop leadership competency at each level, along with learning from leading consulting firms and exchanging experiences among participating leaders throughout the 8-10 months period. Additionally, participants will learn The working styles and various cultures

from employee representatives of various operating countries under Banpu Group, in which BPP has invested. This will also encourage collaborative working in the future.

#### Objectives

- 1. Promoting leadership characteristics, starting from building individual success to co-workers and the public, which will help manage work efficiently, leading and developing the team to unleash their highest potential.
- 2. Making understanding about businesses, able to develop oneself potential and enhance efficiency to create values for businesses and customers.
- 3. Fostering an agile working style and exchanging experiences among executives under Banpu Group.

#### Benefits

- 1. Key and critical positions have been succeeded by employees participating in the program, equivalent to 100%.
- 2. The employees chosen as high potential group participated in the program 100%.
- 3. The employees selected in the high potential pool remained with the organization 100%

In addition, in the year 2023, BPP joined hands with the leading international consultants to develop a new program called "Banpu International Business Leader Program", for executives who will hold a leadership position in business administration and looking for new business opportunities abroad. In addition to learning through lecturers and executives from international organizations, participating executives also learned through writing case studies on their own by analyzing BPP's previous investments as well as applied what they learned to improve the Board meetings to be more efficient.

Banpu Global Leadership Program consists of four levels as follows:

Banpu Global Leadership Program for Strategic Leader

conducted for senior vice presidents.

Banpu Global Leadership Program for Business Leader organized for vice presidents.

Banpu Global Leadership Program for First Line Leader arranged for middle management.

Banpu Global Leadership Program for Future Leader organized for junior management.



All **95** employees from the total number were trained.















# A Knowledge Training to Enhance Expertise of Employees in the Power Plants

BPP puts top priority to and focuses on increasing skills and training employees at the power plants to have professional expertise, as well as practicing new skills to prepare themselves for business transitions in the future. In 2023, BPP organized training in specific knowledge areas, such as:

- 1. Vocational Qualification Training for Production Department
- 2. Intermediate and Advanced Electrician Training
- 3. Whole Process Project Management
- 4. Power Trading Sharing
- 5. Agile Practice Guide
- The vocational knowledge training for employees at power plants covered more than 670 employees, representing more than 18,000 learning hours

This training program focuses on enhancing professional and technical skills of personnel working in the production department, including the operations and maintenance department. The training will last from 1-5 days, covering lectures on theories and hands-on activities.

#### Objectives

- 1. To enhance professional and technical expertise of production staff.
- 2. To share employee's professional knowledge.
- 3. To improve operational skills in the workplace so as to increase efficiency in the production process.





#### Benefits

- Being able to reduce operating costs related to errors as well as resource inadequate. Since this training is organized by employees, over USD 87,000 were saved.
- 2. Reducing the project operation time or solving problems, a professional knowledge exchange among employees enabling joint working and promoting to solve problems by using innovation. This was reflected from the engagement result regarding "Collaboration" gaining 87 scores, 11 scores higher than the average level of energy companies in China.
- 3. Lowering personnel recruitment costs because the employee development has a direct impact on their career advancement, reduces hiring from outsiders. This can be reflected from the corporate engagement level related to "Career & Development", equaling to 87 scores, 18 points higher than the average for the energy companies in China.

In 2023, the vocational knowledge training for employees at power plants covered more than 670 employees, representing more than 18,000 learning hours. The career training for staff from the production department is a clear example of BPP's dedication to upskilling and training its employees.

















# Knowledge Management (KM) .....

BPP realizes the importance of knowledge management within the organization to further build on business operations and employee potential development. As a result, activities are organized for its personnel to exchange their knowledge on a quarterly basis. The aim is to provide employees with the opportunity to exchange knowledge, news, experiences and technology useful for applying to improve their works, for example, news and technology in the energy business, organizational policies and practices, work instructions, international best practices and lessons learned, etc.

For the year 2023, BPP arranged the knowledge management activities for three times, covering seven topics, including:

- Hydrogen business in Japan.
- Challenges on power plant project management.
- Ammonia and value chain to support carbon neutrality.
- Human Rights Due Diligence.
- · Emergency management during traveling.
- Using hydrogen gas turbine to support carbon neutrality.
- Employing the accounting system program.

The number of participating employees (persons)

Levels	KM. No. 1	KM. No. 2	KM. No. 3
Supervisors	2	2	2
Section managers	8	5	11
Managers	5	8	13
VP up	5	2	2
Total	20	17	28

The aim is to provide employees with the opportunity to exchange knowledge, news, experiences and technology useful for applying to improve their works.















# UnBox iDeas .....

During September to October 2023, BPP designed the "UnBox iDeas" activity to promote agile working methods, providing a space for innovative thinkers to try out new ideas, dare to learn from failure and welcome suggestions & criticisms leading to further create ideas until they become innovations. This activity had as many as 23 participating employees, divided into seven thinkers & doers and 16 learning process leaders or facilitators. A budget was allocated to this group of employees for testing the proposed ideas. Over a two-months period, thinkers & doers received advice from the experts in various fields relating to creating ideas or innovation, enquiring about user needs, prioritizing their tasks so that their work can be developed to the stage of actual testing with users.

On 26 October 2023, the participants (thinkers & doers) presented their ideas and innovations to employees throughout the organization. The experts both from within and outside the organization attended the event to provide comprehensive views in order to develop the ideas presented to be more complete and lead to the development of innovation in the organization.





# Banpu Global Innovation •••• Awards 2023

Banpu has supported its employees to practice innovative thinking skills and make them materialized for more than 10 years. As a result, employees have been encouraged to present their creative ideas and innovative projects aligned with the "Greener & Smarter" strategy at the event called "Banpu Global Innovation Awards". This year, the event was held on 15-16 May 2023, when employees from all operating countries joined in and presented their creative works. The event is aimed at promoting collaboration and exchanging of knowledge throughout the

**Innovation Community** and be able to scaleup the results to further create innovations within the organization in both short- and long-terms.

organization. This will help

















# Occupational Health and Safety



#### Stakeholders:

• Employees, suppliers/contractors, communities, the government sector, investors, financial institutions, business partners

#### Strategy:

- Fostering a culture of work safety.
- Communicating about safety goals to create joint operations from executives, employees, contractors and every sector of stakeholders.
- Allocating appropriate and adequate resources for safety operations, such as conducting safety training for employees and contractors and arranging regular inspections of workplace environment and safety.
- Mitigating risks associated with occupational health and safety (OHS), including determining measures to control risks at the appetite level.
- Implementing ISO 45001 Occupational Health and Safety Management System.

#### **Key Indicators:**

- The number of critical working accidents causing fatalities.
- The Lost Time Injury Frequency Rate (LTIFR)

#### **Target:**

- None of serious accidents and illnesses causing fatalities of employees, contractors and others involved with BPP's operations.
- O fatalities
- O LTIFR

#### **Performance:**

- O fatalities
- O LTIFR

# **Significance and Reporting Boundary**

Workplace safety is the utmost target for operations since unsafe working may cause losses of lives and assets, as well as have an impact on the environment and employee's health. As a result, creating a safety culture to proactively prevent accidents must be carried out and improved regularly for example, arranging a safe working environment, setting up clear preventive measures, monitoring safety performances, fostering knowledge and raising awareness, as well as drawing participations from all employees and involved parties.

A safe workplace environment is counted as the human rights of which employees, contractors and those entering the areas should get sufficiently and equally. In addition, promoting employee participation in expressing their ideas to improve their workplace conditions 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 control, including the three combined heat and power (CHP) plants in China and the Temple I & II gas-fired power plants in the United States of America. The operating performance of Temple I & II was reported for the entire year because of the combined data collection system of both power plants.

# **Management Approach**

BPP concentrates on cultivating the culture of safety within the organization with the 3 ZEROs target, including:



#### Zero Incident:

Zero incident is driven by preventing and correcting unsafe behaviors and working conditions.



#### Zero Repeat:

None of recurrences can be achieved by inspecting the principle cause and rectifying a mistake at its root cause as well as communicating with employees to prevent a recurrence of such an incident.



About Banpu Power

#### **Zero Compromise:**

Strictly complying with safety rules, regulations and practices to prevent accidents or damage.

In order to meet the above targets, BPP has conducted its OHS operations in accordance with the following safety management approaches.

### Duty and Responsibility on Occupational Health and Safety (OHS)

Executives, ranging from the highest to operational levels, are committed and responsible for creating work safety. The process starts from construction designs and operations to prevention and collection of unsafe working conditions and behaviors. This includes determining short- and long-term safety goals and being a role model on safety. Moreover, all employees have duties to create a safe working environment for each other, which is defined as a performance indicator for both senior executives and operational-level employees.













### Compliance with Applicable Laws, Regulations and Safety **Operation Standard**

BPP is strictly complying with laws and safety best practices. Compliance with applicable laws and safety regulations is reviewed continuously, while the internationally recognized safety management standards have been employed at all BPP's production units.

#### Safety Risk Management

BPP assesses OHS risks in all areas where it has operated. Hence, all its business units have measures to prevent and mitigate risks related to safety properly. As a result, the operations having a high possibility of severe risks have to create a plan to mitigate risks to the appetite level.

#### · Cultivating a Safety Culture

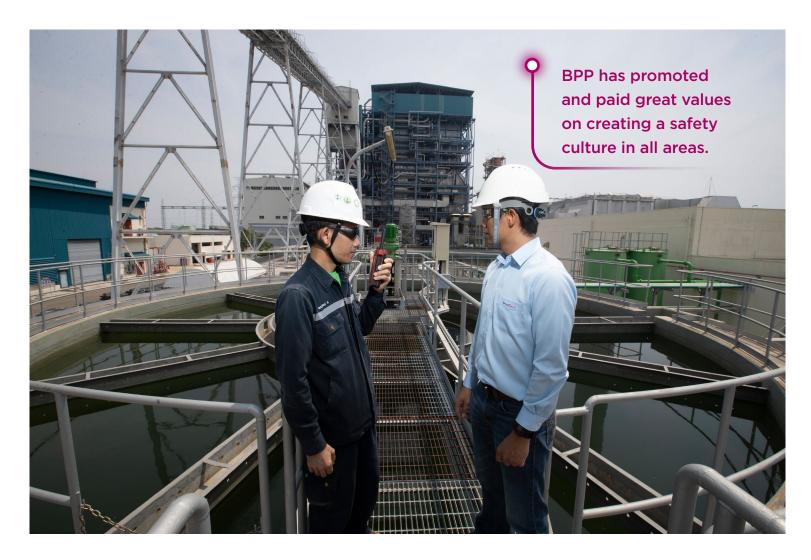
BPP has promoted and paid great values on creating a safety culture among its employees and contractors in all areas where it has operations. It recognizes the safety focused behavior by integrating such a behavior into a corporate culture. At BPP, employees and contractors care for each other and dare to warn each other if seeing unsafe working behaviors.

### Supporting Employees to Own Adequate Knowledge and **Expertise in OHS**

BPP encourages and educates its employees and contractors about OHS, so that they have adequate OHS related abilities for working safely. It also frequently inspects and reviews their OHS understandings.

#### Innovation and Safety Technology

BPP promotes an adoption of innovations and advanced technologies to further enhance its safety operation standards to be better, such as using the digital technology for safety monitoring.



BPP records its safety statistics, covering all workers who are in the scope of its control work and control workplace. These workers are employees, contractors and persons whom are allowed to enter the operational areas. For operators who are not in the scope of control work or workplace control, BPP will note the accidents, but will not include them in the accident statistics calculation. —















### **Performance**

In 2023, the power plants, in which BPP has direct control had no fatalities derived from working, with lost time injury frequency rate (LTIFR) equaling to zero.



BPP has put great emphasis on the work safety of its employees and contractors. It has employed the ISO 45001 Occupational Health and Safety Management System, by integrating with the ISO 9001 Quality Management System as well as the ISO 14001 Environmental Management System. Additionally, the three combined heat and power (CHP) plants in China have been certified to operate according to the three management system standards from external agencies.



#### **Activities to Promote Work Safety**

BPP has arranged activities to promote work safety. such as:

- Measuring working environment and make it safe.
- Conducting a training and a test related to safety and environment, safety rules and risks in the areas prior to starting working, including strictly reviewing such knowledge and rules at a defined time.
- Promoting workplace safety and inspecting operating areas by top management regularly.
- Arranging a safety inspection conducted by employees, supervisors and safety officers during operations.
- Establishing the safety improvement committees for offices and power plants.
- Communicating with involved parties to raise safety awareness via various activities, such as organizing a safety day activity, safety promotional emails, games, posters, etc.
- Conducting the emergency simulation exercises continuously.
- Giving incentive to motivate employees to work safely, such as special rewards for contractors who have outstanding safety operations and celebrations on common achievements, etc.



#### **Employee's Health Promotion**

BPP has carried out health promotion activities for its employees, such as:

- Arranging a health check-up for employees in accordance with the COVID-19 epidemic preventive measure strictly, providing health insurance for COVID-19 treatment and coordinating on the provision of vaccines for employees.
- Organizing an annual health check-up and a physical fitness measurement for employees based on risks arising from the nature of work.
- Inspecting working environment in both offices and production units, and improving, as well as standardizing working conditions continuously.
- Encouraging employees to exercise and maintain good health, such as establishing sports clubs, providing health related knowledge, including arranging an individual exercise trainer for interested personnel etc.
- Arranging a psychological consultation project called "iSTRONG" for employees, allowing them to consult with psychologists regarding mental matters to reduce stresses from personal life and work. All information consulted will be kept confidential by an external psychological service provider.
- Establishing an online doctor visit project for employees. The project has been executed since the COVID-19 pandemic up to present. Through the online doctor, employees can make an appointment and have a preliminary check with the doctor online. Then, the doctor will quickly prescribe the medication and deliver it to that staff.
- The Flexible Benefit project was created to support an annual budget of THB 12,000 for employees to use in various benefits inclusion of health, such as expenses for additional medical treatment, sports club membership fees and devices to facilitate ergonomic working from home, etc. -















# Assessment of the Safety Culture Excellence Level .....

Since 2018, BPP has continuously evaluated the excellence level of safety culture, by using a survey based on the United Kingdom Health and Safety Executive (UK HSE) Safety Culture Maturity model, which divides safety culture into five levels:

> Level 5: Continually Improving - Never become complacent and continuously improving.

Level 4: Co-operating - All employees are involved, committed and working together to improve safety.

Level 3: Involving - Employee participation is essential for improving safety.

Level 2: Managing - Management is dedicated and committed to preventing accidents.

Level 1: Emerging - Security interests are about technicality and legal compliance.

An action plan will be created after receiving the survey results so as to improve the safety culture, such as drawing more participation from executives, creating new work procedures, preparing appropriate personal protective equipment and training.

In 2023, Luannan and Zouping CHP plants reassessed the excellence level of their safety culture after the latest assessment in 2019. The two CHP plants' assessment results were at the "Co-operating" level. Meanwhile, Deyuan Solar Power Plant was assessed at its safety excellence level for the first time, with the "Involving" level. Moreover, five activities can be improved as follows:

1. Working according to risks, such as working in confined spaces. As a result, a training was arranged, including improving gas leak detection equipment, providing correct personal protective equipment and exercising emergency drills.

2. Working at height: Providing training according to applicable laws, preparing appropriate personal protective equipment, including organizing relevant training courses for employees and contractors. The power plants achieved the targets 100%, which were in accordance with the plan set as follows:

Places	Training Courses	The Number of Participants
Luannan CHP Plant	Training on working at heights, working with machinery, working with electricity and lifting work for contractors.	652 persons
	A theory training on working in confined spaces.	50 persons
Zouping CHP Plant	A safety training on working in confined spaces includes work procedures, emergency response plan and lessons learned from the accident arising.	126 persons
	A training on working at heights includes working procedures, emergency response plan and lessons learned from the accident arising.	131 persons
Deyuan Solar Power Plant	A training conducted for those qualified to work at heights according to applicable laws.	7 persons

- 3. Improving the working areas to be clean and safe, including creating measures to reduce danger risks, such as displaying appropriate warning signs, fixing and repairing damaged equipment.
- 4. Selecting appropriate personal protective equipment for working at heights and working with electricity.
- 5. Improving work procedures for contractor management, creating training plans according to job positions, upgrading procedures for specific tasks, such as heatrelated work at Luannan CHP Plant.

Assessing the excellence level of safety culture to identify opportunities for safety improvement has contributed to enhancing abilities and creating safety awareness among employees and contractors, as well as significantly reducing unsafe working behaviors.













# **Community Engagement**



#### Stakeholders:

• Communities, the government sector

#### Strategy:

- Creating participation and developing communities through a joint consultative committee between BPP, the community and the government sector.
- Communicating about BPP's operational performance and hearing community's opinions regularly.
- Establishing channels to receive complaints and suggestions so as to improve operations effectively.
- Carrying out the sustainable development projects with communities.

#### **Key Indicators:**

- Significant grievances from communities
- Incidents related to business disruptions/halts resulted by community's complaints.

#### **Target:**

- None of significant complaints from the community.
- All community's grievances were brought to the analysis and correction process in a timely manner.
- None of business disruptive events derived from community's grievances.

#### **Performance:**

- None of significant complaints from the community.
- None of business halts as a result of community's grievances.

# **Significance and Reporting Boundary**

The power plants' surrounding communities are valuable stakeholders for BPP's operations, since they have received both positive and negative impacts throughout the project's life cycle. Thereby, the community's affirmation is a significant factor in the project's sustainable development.

BPP has placed great emphasis on engaging with communities, while listening to their opinions since the project's feasibility study gets started. This is to collect comments and concerns from the communities so as to use them for engineering

designs and reducing any impacts likely arising. In addition, the monitoring and preventive measures are set up during the project's construction and operational stages, while the opinions gained from community engagement are used to improve BPP's operations, driving towards the sustainable development corresponding to local needs.

The boundary of this report covers the power plants, in which BPP has direct control, namely the three combined heat and power (CHP) plants in China and the Temple I & II gas-fired power plants in the United States of America.

## **Management Approach**

### BPP engages with communities



During the project's feasibility study stage, BPP determines to conduct a Social Baseline Study in the areas according to the international standards so as to understand economic and social conditions in the project's area. It also sets up practice guidelines for creating community engagements and applying them as seen appropriated for each area.

BPP engages with communities through stakeholder's analytical procedures, dividing involved parties into directly

and indirectly affected groups, as well as beneficiaries since a commencement of a feasibility study. The aim is to listen to opinions and concerns from the communities. Such opinions and concerns are used for designing the projects and establishing proper measures to mitigate social and environmental impacts for each area. Generally, the project's stakeholders are classified based on the impact levels resulting from project operations. -















A distinguishment, however, may be different from local conditions and applicable laws of each country, for example:

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



- 2. Communities living closest to the project are those residing adjacent to the project's areas or 5 km away from the project (radius may vary upon each area). These communities are directly affected and in proximity to the project. As a result, BPP has considered them as the most affected stakeholders during the 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 those living over 5 km from the project area, but not exceeding 10 km (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. Therefore, this community group is considered as the moderate affected stakeholders.
- **4. Indirectly effected communities** are those resided far away from the project's areas or supporting the relocation, which may be indirectly affected, for instance, increasing the population and transportation densities. BPP considered this group of communities as the least important stakeholders, when compared to the first three groups.

BPP has set up a unit with a direct responsibility on engaging with communities in order to develop an operational plan properly for each locality, 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, migrants and indigenous groups.



**Community Engagement Policy** 



Stakeholder Engagement Practice Guidelines

### **Performance**

In 2023, BPP received no significant complaints from communities surrounding its project areas. The power plants, in which BPP has direct management control, and the joint venture power plants, had neither incident related to production halts or disruptive operations due to community complaints, nor events involved with violations of economic social and environmental laws.

Since the CHP plants in China, namely Luannan, Zhengding and Zouping are located in the industrial and urban areas to generate power, steam and chilled water for industrial factories and communities, BPP collaborates with customers, business partners, the government sector and neighboring companies in engaging with the community. In addition, the community is one of the important customers purchasing heat from these power plants during the winter season. As a result, the power plants must operate according to the community's expectations, while their operations have been improved so as to be able to operate stably and supply quality heat consistently, being flexible to community needs.

Temple I & II gas-fired power plants located in Texas State in the U.S., are stationing far away from the community. The two power plants use treated water from the community for their operations in order to achieve maximum utilization of water resources and to reduce the natural water extraction used in the production process.

No significant complaints from communities surrounding its project areas and there were no incidents of business disruption resulting from community complaints.















# The Community Health and •••••• Safety Surveillance System at HPC Power Plant

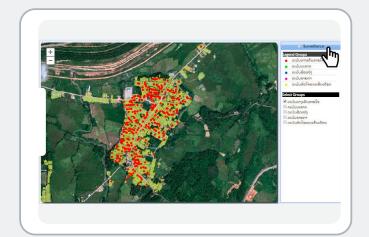
HPC Power Plant is located in a rural area of Xayaburi Province, Lao PDR, with a local population of approximately 27,000 people. Prior to commencing the project, the community had health concerns, especially in the area of environmental quality resulted from a construction of the power plant. Meanwhile, community members also needed to improve their health and basic public health in the area. HPC Power Plant, therefore, has joined hands with the government and communities to systematically develop a health surveillance system and promote the household and community health since it began operating in late 2012.

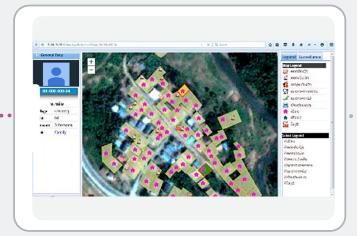
HPC Power Plant in collaboration with Public Health Department has established the community volunteers and provided training courses to promote understanding of household health, environmental health and basic public health. The household environmental health indicators have been created for volunteers to use during the monthly monitoring, such as behaviors regarding storing and using water for consumption, food preparation, waste management, cleanliness, household illnesses, etc. The household environmental health conditions are, then, classified into three levels, including a good level, a moderate level and a level needs to be improved. The volunteers will be the ones who give suggestions for improvement, such as cooking food to perfection, elimination of insects, which are disease carriers, wastewater management, hygienic management of pet corrals, etc. In addition, the health and

environmental surveillance system is also a way to receive suggestions or concerns from the community to improve and communicate information on HPC's environmental quality measurements to local communities on a regular basis

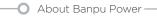
HPC Power Plant has created a health surveillance database converted into the "Geographic Information System" to enable spatial management, able to link environmental quality measurement results with the community's health status from the beginning of the project up to now. The system can also link the database to other management activities, such as career promotion activities efficiently.



















# **List of Business**

#### Thermal Power Business (committed capacity 3,247 MW, based on BPP equity)

Country		_	Share-	Generation Capacity			Direct
Country	Business Unit	Type	holding (%)	100%	Equity-Based	Status	Operational Control
China	Zhengding	Combined heat and power plant	100%	139 MWe	139 MWe	Operating	•
	Luannan	Combined heat and power plant	100%	246 MWe	246 MWe	Operating	•
	Zouping	Combined heat and power plant	70%	233 MWe	163 MWe	Operating	•
	Shanxi Lu Guang	Coal-fired power plant	30%	1,320 MW	396 MW	Operating	
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	13.4%	543 MW	73 MW	Operating	
The U.S.	Temple I	Gas-fired power plant	50%	768 MW	384 MW	Operating	•
	Temple II	Gas-fired power plant	50%	755 MW	378 MW	Operating (a)	•

#### Renewable Power Business (committed capacity 255.84 MW, based on BPP equity)

Cauatin			Share-	Generation Capacity			Direct
Country	Business Unit	Туре	holding (%)	100%	Equity-Based	Status	Operational Control
China	Huineng	Solar power plant	100% <sup>(b)</sup>	21.51 MW	21.51 MW	Operating	
	Jinshan	Solar power plant	100% <sup>(b)</sup>	28.95 MW	28.95 MW	Operating	
	Haoyuan	Solar power plant	100% <sup>(b)</sup>	20.00 MW	20.00 MW	Operating	
	Hui'en	Solar power plant	100% <sup>(b)</sup>	19.70 MW	19.70 MW	Operating	
	Deyuan	Solar power plant	100% <sup>(b)</sup>	51.64 MW	51.64 MW	Operating	
	Xingyu	Solar power plant	100% <sup>(b)</sup>	10.30 MW	10.30 MW	Operating	
	Jixin	Solar power plant	100% <sup>(b)</sup>	25.22 MW	25.22 MW	Operating	
Japan	Olympia - Hitashi Omiya No.1	Solar power plant	40% <sup>(b)</sup>	2.00 MW	0.80 MW	Operating	
	Olympia - Hitashi Omiya No.2	Solar power plant	40% <sup>(b)</sup>	2.00 MW	0.80 MW	Operating	
	Olympia - Ozenosato- Katashina	Solar power plant	40% <sup>(b)</sup>	2.00 MW	0.80 MW	Operating	
	Olympia - Sakura No.1	Solar power plant	40% <sup>(b)</sup>	2.00 MW	0.80 MW	Operating	
	Olympia - Sakura No.2	Solar power plant	40% <sup>(b)</sup>	2.00 MW	0.80 MW	Operating	
	Hino	Solar power plant	100% <sup>(b)(c)</sup>	3.50 MW	3.50 MW	Operating	
	Awaji	Solar power plant	100% <sup>(b)(c)</sup>	7.90 MW	7.90 MW	Operating	
	Nari Aizu	Solar power plant	100% <sup>(b)</sup>	20.46 MW	20.46 MW	Operating	
	Mukawa	Solar power plant	93% <sup>(b)</sup>	17.00 MW	15.81 MW	Operating	
	Kurokawa	Solar power plant	100% <sup>(b)</sup>	18.90 MW	18.90 MW	Operating	
	Tenzan	Solar power plant	100% <sup>(b)</sup>	1.96 MW	1.96 MW	Operating	
	Muroran 1	Solar power plant	100% <sup>(b)</sup>	1.73 MW	1.73 MW	Operating	
	Muroran 2	Solar power plant	100% <sup>(b)</sup>	1.63 MW	1.63 MW	Operating	

	Business Unit	_		Generation Capacity		a	Direct
Country	Business Unit	Туре	holding (%)	100%	Equity-Based	Status	Operational Control
Japan	Takeo 2	Solar power plant	100% <sup>(b)</sup>	1.00 MW	1.00 MW	Operating	
	Yamagata	Solar power plant	100% <sup>(b)</sup>	20.00 MW	20.00 MW	Operating	
	Yabuki	Solar power plant	100% <sup>(b)(c)</sup>	7.00 MW	7.00 MW	Operating	
	Kesennuma	Solar power plant	100% <sup>(b)</sup>	20.00 MW	20.00 MW	Operating	
	Nihonmatsu	Solar power plant	100% <sup>(b)</sup>	12.00 MW	12.00 MW	Operating	
	Shirakawa	Solar power plant	100% <sup>(b)</sup>	10.00 MW	10.00 MW	Operating	
Vietnam	El Wind Mui Dinh	Wind power plant	100% <sup>(b)</sup>	37.60 MW	37.60 MW	Operating	
	Vinh Chau -phase 1	Wind power plant project	100% <sup>(b)</sup>	30.00 MW	30.00 MW	During submission of document for COD approval	
	Vinh Chau -phase 2 and 3	Wind power plant project	100% <sup>(b)</sup>	50.00 MW	50.00 MW	Under development	
	Nhon Hai	Solar power plant	100% <sup>(b)</sup>	35.00 MW	35.00 MW	Operating	
Australia	Beryl	Solar power plant	20% <sup>(b)</sup>	110.90 MW	22.18 MW	Operating	
	Manildra	Solar power plant	20% <sup>(b)</sup>	55.90 MW	11.18 MW	Operating	
The U.S.	Sunshine	Solar power plant project	50%	2.5 MW	1.25 MW	Under development	•

### Energy Technology Business (committed capacity 139.36 MW, based on BPP equity)

Country	Туре	Shareholding	Generatio	n Capacity	Status	Direct
Country	туре	(%)	100%	Equity-Based	Status	Operational Control
Thailand	Solar rooftop/Solar floating	100% <sup>(b)</sup>	98.36 MW	98.36 MW	Operating	
China	Solar rooftop	100%	12.86 MW	12.86 MW	Operating	•
	Solar rooftop project	100%	53.24 MW	53.24 MW	Under development	•
Indonesia	Solar rooftop	19.5%-23.85% <sup>(b)</sup>	24.78 MW	5.20 MW	Operating	
Japan	Solar rooftop	100% <sup>(b)</sup>	2.51 MW	2.51 MW	Operating	
Vietnam	Solar rooftop	49.08% <sup>(b)</sup>	27.04 MW	13.27 MW	Operating	
	Solar rooftop project	49.08% <sup>(b)</sup>	55.36 MW	27.17 MW	Under development	

<sup>(</sup>a) Completed acquisition in July 2023.

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<sup>(</sup>b) Ownership reported for Banpu NEXT's (BPP holds a 50% stake).

<sup>(</sup>c) Increased ownership from 75% to 100% by Banpu NEXT in September 2023.

# **Awards & Recognitions**

Banpu Power

Awards/Recognitions	Host Institute
SET ESG Ratings at AAA Level for 2023	
Commended Sustainability Awards 2023	_
Outstanding Company Performance Awards 2023	The Stock Exchange of Thailand
Outstanding CEO Awards 2023	_
Corporate credit rating of "A+" with a "Stable" outlook	TRIS Rating
Corporate Governance Report of Thai Listed	Thai Institute of Directors Association
Companies (CGR) 2023 with Excellent CG	(IOD)
Scoring (5 Star)	
The company obtained a full 100 scores for	Thai Investors Association
the quality of the Annual General Meeting	
of Shareholders for the year 2023	
CAC Membership Certification	Thai Private Sector Collective Action
	Against Corruption (CAC)
Achieved 70% of scores and ranked at 89 <sup>th</sup>	S&P Global
percentile in the Corporate Sustainability	
Assessment (CSA) 2023 (Electric Utilities	
industry group)	
Ranked in C level for Climate Change and	Carbon Disclosure Project (CDP)
B level for Water Security for the assessment	
of management and disclosure 2023	













# **Reporting Boundary**

			Dii	rect Opera	tional Co	ntrol		No Direct Operational control					
Contain till to the contain		Office		Zhengding	Luannan	Zouping	Temple I & II	BLCP	HPC	Shanxi Lu Guang	Nakoso IGCC	Renewable Energy	Energy Technology
Sustainability Issues	Thailand	China	The U.S.	China	China	China	The U.S.	Thailand	Lao PDR	China	Japan	China, Japan, Vietnam, Australia	Thailand, China, Japan
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	_	-	-	•	•	•	•	+	+	-	-	+	-
13. Community engagement	-	-	-	•	•	•	•	+	+	-	-	-	-
14. Corporate citizenship & philanthropy	•	•	•	•	•	•	•	+	+	-	-	-	-
15. Human capital development		•	•	•	•	•	•	+	+	-	-	-	-
16. Human rights	•	•	•	•	•	•	•	+	+	-	-	-	-
17. Labor practices	•	•	•	•	•	•	•	+	+	-	-	-	-
18. Occupational health	•	•	•	•	•	•	•	+	+	-	-	-	-
19. Resettlement	-	-	-	-	-	-	-	-	-	-	-	-	-
20. Safety	•	•	•	•	•	•	•	+	+	-	-	<u>-</u>	-
21. Succession planning	•	•	•	•	•	•	0	-	-	-	-	<del>-</del>	-
22. Talent attraction & retention	•	•	0	•	•	•	0	+	+	-	-	-	-
23. Business continuity management	•	•	0	•	•	•	0	-	-	-	-	-	-
24. Business ethics	•	•	•	•	•	•	•	-	-	-	-	=	=
25. Contractor management	•	•	•	•	•	•	•	-	=	-	-	=	=
26. Corporate governance	•	•	•	•	•	•	•	-	-	-	-		-
27. Customer management	-	-	-	•	•	•	•	-	-	-	-		=
28. Cyber security	•	•	•	•	•	•	•	-	-	-	-		-
29. Innovation	•	•	•	•	•	•	•	-	-	-	-		<del>-</del>
30. Market opportunity	•	•	•	•	•	•	•	-	-	-	-	_	-
31. Policy influence	•	•	•	•	•	•	•	-	-	-	-		=
32. Privacy protection	•	•	•	•	•	•	•	-	-	=	-	=	=
33. Process improvement & digital transformation	•	•	•	•	•	•	•	=	=	=	=	=	<del>-</del>
34. Product stewardship	•	•	•	•	•	•	•	-	-	=	-	=	=
35. Risk management	•	•	•	•	•	•	•	-	-	-	-	=	=
36. Supplier management	•	•	0	•	•	•	0	-	-	-	-	=	=

- Reporting covers management approach and performance data.
- Reporting covers management approach but does not cover performance data.
- + Reporting does not cover management approach and performance data due to BPP has no direct operational control. However, there are some sustainability performances interested by stakeholders, the partial of sustainability performance are reported separately.
- Not included in the reporting boundary due to not being applicable to the business or having no direct operational control.



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# Performance Data 2023: Banpu Power

### Economic Performance

Data	Unit	2020	2021	2022	2023
Revenue	THB Million	5,506	6,784	24,501	30,443
EBITDA <sup>(a)</sup>	THB Million	5,230	3,407	9,124	12,262
Net profit	THB Million	3,702	3,127	5,739	5,319
Gross profit margin	%	20%	(1%)	10%	35%
Interest coverage ratio	-	4.55	(0.69)	1.90	2.88
Net debt to equity ratio	-	0.07	0.28	0.24	0.44

<sup>(</sup>a) Earning before interest, taxes, depreciation and amortization.

# Tax Payment

Data	Unit	2020	2021	2022	2023
Thailand (BPP Group) <sup>(b)</sup>					
Profit before tax	THB Thousand	4,083,515	3,231,538	6,194,452	6,840,183
Tax expense <sup>(a)</sup>	THB Thousand	(300,491)	(57,203)	(44,889)	(402,462)
Corporate income tax paid	THB Thousand	(274,644)	(88,751)	(94,781)	(114,162)
Income tax rate	%	20-25%	0-25%	0-25%	15-25%
China					
Profit before tax	RMB Thousand	267,417(c)	(133,736)(c)	(270,395)	(639)
• Tax expense <sup>(a)</sup>	RMB Thousand	(73,675)	(8,228)(c)	19,607	(22,022)
Corporate income tax paid	RMB Thousand	(59,790)	(32,256)(c)	(1,352)	(2,072)
Income tax rate	%	12.5-25%	0-25%	12.5-25% <sup>(c)</sup>	12.5-25%
The U.S. (BPP US)					
Profit before tax	USD Thousand	-	-	16,934	62,862
Tax expense <sup>(a)</sup>	USD Thousand	-	-	(1,696)	(6,569)
Corporate income tax paid	USD Thousand	-	-	(862) <sup>(c)</sup>	(2,986)
Income tax rate	%	-	-	21%	21%
Thailand (BLCP)					
Profit before tax	THB Thousand	554,908	(609,612)	224,619 <sup>(c)</sup>	1,241,435
Tax expense <sup>(a)</sup>	THB Thousand	(163,282)	(5,984)	_(c)	(261,730)
Corporate income tax paid	THB Thousand	(168,205)	(3,351)	_(c)	(173,750)
Income tax rate	%	20%	20%	20%	20%

	Data	Unit	2020	2021	2022	2023
Lá	ao PDR (HPC)					
•	Profit before tax	THB Thousand	7,602,786	9,192,934	9,431,320	8,120,245
•	Tax expense <sup>(a)</sup>	THB Thousand	-	(640,519)	(725,891)	(1,086,737)
•	Corporate income tax paid	THB Thousand	-	(323,365)	(779,378)	(1,017,280)
•	Income tax rate	%	0%	7.5-50%	7.5-50%	15-50%

<sup>&</sup>lt;sup>(a)</sup>Consisting of Corporate Income Tax, Withholding Tax and Deferred Tax.

### Economic Distributions

Data	Unit	2020	2021	2022	2023
Ratio of the dividend payout to net profit	-	0.46	0.63	0.37	0.46
Economic value generated					
• Sales	USD Thousand	195,577	239,388	727,479	891,788
Other revenues	USD Thousand	134,815	138,916	136,978	10,313
Economic value distributed					
• Shareholder <sup>(a)</sup>	USD Thousand	57,322	61,652	61,652	65,528
<ul> <li>Supplier and contractor<sup>(b)</sup></li> </ul>	USD Thousand	52,931	78,319	460,911	417,169
• Employee <sup>(c)</sup>	USD Thousand	21,591	30,517	52,039	64,239
<ul> <li>Financial institution<sup>(d)</sup></li> </ul>	USD Thousand	(3,757)	(4,127)	39,616	196,007
• Government <sup>(e)</sup>	USD Thousand	15,086	9,561	12,243	22,159
• Community <sup>(f)</sup>	USD Thousand	685	505	380	520
• Environment <sup>(g)</sup>	USD Thousand	2,042	1,906	1,953	1,820
Economic value retained	USD Thousand	184,491	199,970	235,663	134,660

<sup>&</sup>lt;sup>(a)</sup>Dividend



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Performance

<sup>(</sup>b) Consolidated.

<sup>(</sup>c) Updated from the previous report.

<sup>(</sup>b) Includes contractor cost, fuel cost, and other operating costs.

<sup>(</sup>c)Includes remuneration and benefits, provident fund contributions and employee development expenses.

<sup>&</sup>lt;sup>(d)</sup>Includes interest expense, financial expenses.

<sup>(</sup>e)Includes royalty fee, corporate income tax, local maintenance tax, property tax, specific business tax, and other additional taxes and payment to government.

<sup>&</sup>lt;sup>(f)</sup>Includes community development expenses, corporate social responsibility activities and land compensation.

<sup>&</sup>lt;sup>(g)</sup>Includes environmental treatment expenses and other environmental related activities.

# Corporate Citizenship and Philanthropy

Data	Unit	2020	2021	2022	2023
Philanthropic contributions - by category					
Charitable donation	% of Total costs	17%	46%	37%	33% <sup>(a)</sup>
Community investment	% of Total costs	11%	41%	56%	59% <sup>(a)</sup>
Commercial initiatives	% of Total costs	73%	13%	7%	8% <sup>(a)</sup>
Philanthropic contributions - by type					
<ul> <li>Cash contributions</li> </ul>	THB Thousand	4,972	7,665	1,313	1,632 <sup>(a)</sup>
• Time spent by volunteer employees	THB Thousand	33,995	806	6,011	5,002 <sup>(a)</sup>
during working hours					
<ul> <li>In-kind giving</li> </ul>	THB Thousand	298	610	959	2,725 <sup>(a)</sup>
<ul> <li>Management overhead</li> </ul>	THB Thousand	99,115	127,584	121,870	118,815 <sup>(a)</sup>

<sup>(</sup>a)Include BPPUS since 2023.

# Policy Influence

Data	Unit	2020	2021	2022	2023
Contributions and other spending					
<ul> <li>Lobbying, interest representation</li> </ul>	THB	0	0	0	0
<ul> <li>Political party or political interest</li> </ul>	THB	0	0	0	0
Trade association or tax-exempt groups	THB	251,450	347,750	500,118	382,418
Other contributions	THB	0	0	0	0

# Corporate Governance

Data	Unit	2020	2021	2022	2023
Coverage of significant ESG aspects set as corporate ESG targets	%	100%	100%	100%	100%
Coverage of corporate ESG targets deployed to senior executives	%	100%	100%	100%	100%
Board type					
Executive directors	Person	3	3	3	3
Independent directors	Person	3	4	5	5
Other non-executive directors	Person	3	3	2	2

Data	Unit	2020	2021	2022	2023
Number of meeting					
Board of directors	Time/Year	14	12	12	12
Corporate governance and nomination committee	Time/Year	3	5	4	3
Audit committee	Time/Year	10	9	8	10
Compensation committee	Time/Year	4	4	4	4
Board meeting attendance					
Board of directors	%	98.41%	98.33%	98.33%	100%
Corporate governance and nomination committee	%	100%	100%	100%	88.89%
Audit committee	%	100%	91.67%	100%	97.50%
Compensation committee	%	96.67%	100%	100%	100%
• ESG committee(b)	%	-	-	-	100%
Performance evaluation(a)					
Board of directors	-	4.37	4.75	4.80	4.94
Sub-committees	-	4.70	4.85	4.83	4.89 <sup>(c)</sup>
Individual directors	-	4.68	4.69	4.76	4.83

<sup>(</sup>a) Average score in the range of 0 to 5.

### Business Ethics

Data	Unit	2020	2021	2022	2023
Number of significant corporate	Case	0	0	0	0
governance complaints					
<ul> <li>Corruption &amp; bribery</li> </ul>	Case	0	0	0	0
<ul> <li>Fraud, embezzlement, theft</li> </ul>	Case	0	0	0	0
Dishonesty for own and other benefit	Case	0	0	0	0
<ul> <li>Dangers to health and safety or</li> </ul>	Case	0	0	0	0
environment					
<ul> <li>Intentional act causing harm or</li> </ul>	Case	0	0	0	0
loss to the Company					

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→ Social —

Performance

<sup>(</sup>b)Established in March 2023.

<sup>(</sup>c)Include ESG committee.

Data	Unit	2020	2021	2022	2023
Significant breaches of the Code of Conduct <sup>(a)</sup>	Case	0	0	0	0
Assistance in wrongdoing <sup>(b)</sup>	Case	0	0	0	0
• Other <sup>(c)</sup>	Case	0	0	0	0
Proportion of significant corporate governance complaints resolved through a dispute mechanism	%	NA <sup>(d)</sup>	NA <sup>(d)</sup>	NA <sup>(d)</sup>	NA <sup>(d)</sup>

<sup>(</sup>a) Includes antitrust/anti-competitive practices.

## Risk Management

Data	Unit	2020	2021	2022	2023
Proportion of business units with key risk indicators	%	100%	100%	100%	100%
Coverage of ESG issues in the enterprise risk management <sup>(a)</sup>	%	92%	94%	97%	98%
Proportion of business units with ESG risk management plan <sup>(b)</sup>	%	NA <sup>(c)</sup>	NA <sup>(c)</sup>	NA <sup>(c)</sup>	NA <sup>(c)</sup>

<sup>(</sup>a)Based on COSO.

# Business Continuity Management

Data	Unit	2020	2021	2022	2023
Coverage of BCP exercise for critical	%	-	-	33%	66.7%
business functions					
Coverage of CMT/IMT exercise <sup>(a)</sup>	%	100%	100%	100%	100%

<sup>&</sup>lt;sup>(a)</sup>The real activation of CMT/IMT considered as a BCP exercise at Bangkok and Beijing offices.

## Customer & Product Stewardship

Data	Unit	2020	2021	2022	2023
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 <sup>(a)</sup>	NA <sup>(a)</sup>	NA <sup>(a)</sup>	NA <sup>(a)</sup>
Customer satisfaction <sup>(b)</sup>					
Satisfied respondents	%	-	100%	100%	100%
Coverage of customer surveyed	%	-	89%	100%	100%

<sup>&</sup>lt;sup>(a)</sup>No significant complaints.

## Data Privacy & Cyber Security<sup>(a)</sup>

Data	Unit	2020	2021	2022	2023
Number of cybersecurity breaches	Case	1	0	1	0
Number of IT infrastructure incidents	Case	1	1	1	0
% of IT and IoT assets securely managed by security operation center (SOC)	%	-	30%	60%	70%
Cybersecurity & privacy maturity score (b)	%	-	2.0	3.0	3.5

<sup>&</sup>lt;sup>(a)</sup>Data reported for Banpu Group due to management service agreement.

## Availability & Reliability

Data	Unit	2020	2021	2022	2023
Combined Heat and Power (CHP)					
Installed capacity					
<ul> <li>Current capacity</li> </ul>	MW	348	348	348	348
Capacity under construction	MW	0	0	0	0
System efficiency					
Efficiency rate for electricity generation	g/KWh	246.63	202.51	183.68	167.56
Efficiency rate for steam production	kg/GJ	37.75	37.96	37.23	37.31
Availability factor	%	97.72%	95.05%	94.00%	95.98%
Overall efficiency	%	74.70%	77.47%	79.78%	84.06%

<sup>(</sup>b) Against the law, rules and regulations, corporate governance policy and code of conduct including concealing or assisting in concealing once they have occurred.

<sup>(</sup>c)Includes discrimination and unfair treatment.

<sup>&</sup>lt;sup>(d)</sup>No significant complaints.

<sup>(</sup>b) For business unit(s) with high priority ESG risks.

<sup>(</sup>c) No business unit identified as high ESG risks.

<sup>(</sup>b) Cover all industrial steam customers of 3 CHPs.

<sup>(</sup>b)In the range of 1 to 5.

Data	Unit	2020	2021	2022	2023
Total outage					
Total outage frequency	Case/Year	15	24	15	17
Total outage hour	Hours	2,621	5,002	6,054	5,026
Average total outage duration	Hours/Case	175	208	404	296
Planned outage					
Planned outage frequency	Case/Year	15	20	14	17
Planned outage hours	Hours	2,621	4,575	5,982	5,026
Average planned outage duration	Hours/Case	175	229	427	296
Unplanned outage					
Unplanned outage frequency	Case/Year	0	4	1	0
Unplanned outage hours	Hours	0	427	72	C
Average unplanned outage duration	Hours/Case	0	107	72	C
Unplanned forced outage factor	%	0%	0.05%	0.82%	0%
Combined Cycle Gas Turbine (CCGT)					
Installed capacity					
Current capacity	MW	-	-	-	1,523 <sup>(a</sup>
Capacity under construction	MW	-	-	-	O <sup>(a</sup>
System efficiency					
Efficiency rate for electricity generation	btu/KWh	-	-	-	7,120.60 <sup>(a)</sup>
Availability factor	%	-	-	-	82.68% <sup>(a</sup>
Overall efficiency	%	-	-	-	47.92% <sup>(a</sup>
Total outage					
Total outage frequency	Case/Year	-	-	-	10 <sup>(a)</sup>
Total outage hour	Hours	-	-	-	2,224 <sup>(a</sup>
Average total outage duration	Hours/Case	-	-	-	225 <sup>(a</sup>
Planned outage					
Planned outage frequency	Case/Year	-	-	-	5 <sup>(a</sup>
Planned outage hours	Hours	-	-	-	2,178 <sup>(a</sup>
Average planned outage duration	Hours/Case	-	-	-	436 <sup>(a</sup>
Unplanned outage					
Unplanned outage frequency	Case/Year	-	-	-	5 <sup>(a</sup>
Unplanned outage hours	Hours	-	-	-	67 <sup>(a)</sup>
Average unplanned outage duration	Hours/Case	-	-	-	13 <sup>(a)</sup>
Unplanned forced outage factor	%	-	_	-	0.51% <sup>(a)</sup>

<sup>&</sup>lt;sup>(a)</sup>Consolidation of data from Temple I and Temple II Power Plants for the first year 2023, which Temple II Power Plant was completely acquired on July 10, 2023.

# Supplier Management

Data	Unit	2020	2021	2022	2023
China					
Number of suppliers					
All suppliers	Number	910	910 <sup>(c)</sup>	910 <sup>(c)</sup>	910 <sup>(c)</sup>
Critical suppliers <sup>(a)</sup>	Number	171	171 <sup>(c)</sup>	171 <sup>(c)</sup>	171 <sup>(c)</sup>
Proportion of suppliers assessed for ESG risks					
All critical tier-1 suppliers	%	11%	11% <sup>(c)</sup>	11% <sup>(c)</sup>	11% <sup>(c)</sup>
New critical tier-1 suppliers	%	-	_(c)	_(c)	_(c)
Proportion of critical tier-1 suppliers classified as high-risk	%	0%	0% <sup>(c)</sup>	0% <sup>(c)</sup>	0% <sup>(c)</sup>
Proportion of spending on local suppliers <sup>(b)</sup>	%	30%	30% <sup>(c)</sup>	30% <sup>(c)</sup>	30% <sup>(c)</sup>
Proportion of contracts that include ESG clauses	%	42%	42% <sup>(c)</sup>	42% <sup>(c)</sup>	42% <sup>(c)</sup>
The U.S.					
Number of suppliers					
All suppliers	Number	-	-	-	225
<ul> <li>Critical suppliers<sup>(a)</sup></li> </ul>	Number	-	-	-	68
Proportion of suppliers assessed for ESG risks					
All critical tier-1 suppliers	%	-	-	-	_(d)
New critical tier-1 suppliers	%	-	-	-	_(d)
Proportion of critical tier-1 suppliers classified as high-risk	%	-	-	-	_(d)
Proportion of spending on local suppliers <sup>(b)</sup>	%	-	-	-	24%
Proportion of contracts that include ESG clauses	%	-	-	-	_(d)

<sup>&</sup>lt;sup>(a)</sup>Defined as high-volume suppliers, critical component suppliers, or non-substitutable suppliers.

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<sup>(</sup>b)Supplier that operates in the same region.

<sup>&</sup>lt;sup>(c)</sup>Consolidated data from 2020. Data collection system is under standardization.

<sup>&</sup>lt;sup>(d)</sup>Data collection system is under standardization.

### Socioeconomic Compliance

Data	Unit	2020	2021	2022	2023
Significant socioeconomic non-compliance  Number of non-monetary sanctions	Case	0	0	0	0
<ul> <li>Number of cases brought through dispute mechanisms</li> </ul>	Case	0	0	0	0
Significant fines from socioeconomic non-compliance					
<ul> <li>Number of significant fines</li> </ul>	Case	0	0	0	0
<ul> <li>Total amount of significant fines</li> </ul>	USD	0	0	0	0

#### Product

Data	Unit	2020	2021	2022	2023
Total energy sold	MWh	6,474,833	6,033,955	5,862,102	11,543,365
Energy sold					
<ul> <li>Electricity (renewable fuel) sold</li> </ul>	MWh	107	98	109	110
<ul> <li>Electricity (non-renewable fuel) sold</li> </ul>	MWh	1,563,091	1,178,967	1,089,332	6,540,164
Steam sold	MWh	3,564,832	3,529,044	3,406,515	3,708,691
Heat sold	MWh	1,346,803	1,325,845	1,366,146	1,294,400

#### Greenhouse Gas Emissions\*

GRI 305-1, 305-2, 305-4

Data	Unit	2020	2021	2022	2023
GHG emissions					
<ul><li>Total (Scope 1 &amp; 2)</li></ul>	tonnes CO2e	4,017,800	3,642,241	3,570,856	5,413,943
• Direct (Scope 1)	tonnes CO2e	4,011,281	3,634,731	3,567,119	5,406,989
• Direct (Scope 1) - Biogenic CO <sub>2</sub>	tonnes CO2e	-	-	-	0
<ul> <li>Indirect (Scope 2)<sup>(a)</sup></li> </ul>	tonnes CO2e	6,519	7,510	3,737	6,954
<ul> <li>Other indirect (Scope 3)<sup>(b)</sup></li> </ul>	tonnes CO <sub>2</sub> e	-	-	-	-
GHG emissions intensity					
<ul><li>Total (Scope 1 &amp; 2)</li></ul>	tonnes CO <sub>2</sub> e/MWh	0.621	0.604	0.609	0.469
<ul> <li>Electricity generation</li> </ul>	tonnes CO2e/MWh	0.655	0.733	0.900	0.293
<ul> <li>Steam &amp; heat generation</li> </ul>	tonnes CO <sub>2</sub> e/MWh	0.694	0.652	0.629	0.176
SF <sub>6</sub> emissions	tonnes CO₂e	515	241	679	402

<sup>\*</sup>BPP has consolidated GHG emissions based on operational control approach. The GHG emissions were calculated from emissions of various gases including  $CO_2$ ,  $CH_4$ ,  $N_2O$ , HFC and  $SF_6$ .

#### Energy

GRI 302-1, 302-3

Data	Unit	2020	2021	2022	2023
Total energy consumption	TJ	9,953	7,209	5,477	26,599
Renewable energy consumption					
Renewable fuel	TJ	0	0	0	0
<ul> <li>Electricity purchased<sup>(a)</sup></li> </ul>	TJ	0	0	0	0
Electricity self-generated	TJ	0.39	0.35	1.03	8.48
Non-renewable energy consumption					
Non-renewable fuel	TJ	33,235	28,900	26,648	68,090
- Coal	TJ	30,749	26,832	24,233	26,349
- Diesel	TJ	29	36	30	22
- Gasoline	TJ	1	1	1	3
- Waste gas	TJ	2,455	2,030	2,291	0
- Natural gas	TJ	-	-	-	41,707
- Activated carbon	TJ	-	-	93	10
- LPG	TJ	-	-	0.2	0.2
- Solar	TJ	-	-	-	8
- Wind	TJ	-	-	-	-
Electricity purchased	TJ	27	31	23	56
Steam, heating & cooling	TJ	0	0	0	0
Renewable energy sold					
• Electricity	TJ	0.39	0.35	0.39	0.40
Non-renewable energy sold					
• Electricity	TJ	5,627	4,244	3,922	23,545
• Steam	TJ	12,832	12,704	12,262	13,351
Heating	TJ	4,848	4,773	4,918	4,660
Energy consumption intensity <sup>(b)</sup>	GJ/MWh	1.537	1.195	0.934	2.30

<sup>&</sup>lt;sup>(a)</sup>Negligible purchased electricity for solar power plant during nighttime.



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<sup>&</sup>lt;sup>(a)</sup>Gross location based scope 2 GHG emissions.

<sup>(</sup>b) Data collection system under standardization.

<sup>(</sup>b)Includes coal, diesel, gasoline, waste gas, activated carbon, LPG, electricity, steam, heating and cooling within organization only.

### Air Emissions

GRI 305-6, 305-7, G4-EU-EN21

Data	Unit	2020	2021	2022	2023
Air emissions load <sup>(a)</sup>					
• NO <sub>x</sub>	tonnes	272	268	222	373
• SO <sub>2</sub> (b)	tonnes	164	154	128	137
Particular matters	tonnes	17	19	15	143
• Mercury	tonnes	0.0085	0.0091	0.0079	0.0082
Air emissions intensity					
• NO <sub>x</sub>	tonnes/GWh	0.0420	0.0445	0.0379	0.0323
• SO <sub>2</sub> (b)	tonnes/GWh	0.0254	0.0254	0.0218	0.0119
Particular matters	tonnes/GWh	0.0027	0.0031	0.00256	0.0124
• Mercury	tonnes/GWh	1.3e-6	1.5e-6	1.4e-6	7.0e-7
Ozone-depleting substances (ODS)					
ODS consumption	Kg CFC-11e	1	1	2	9
ODS imported	Kg CFC-11e	0	0	0	0
ODS exported	Kg CFC-11e	0	0	0	0

<sup>&</sup>lt;sup>(a)</sup>Direct measurement from Continuous Emissions Monitoring (CEM).

### Water\*

GRI 303-3, 303-4, 303-5

Data	Unit	2020	2021	2022	2023
Water withdrawal - from all areas	megaliter	7,611	6,897	6,306	12,510
<ul> <li>Surface water (total)</li> </ul>	megaliter	0	10	31	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	10	31	0
- Other water (>1,000 mg/L TDS)	megaliter	_(a)	0	0	0
Groundwater (total)	megaliter	2,231	2,710	2,038	1,655
- Freshwater (≤1,000 mg/L TDS)	megaliter	2,231	2,710	2,038	1,655
- Other water (>1,000 mg/L TDS)	megaliter	_(a)	0	0	0
Seawater (total)	megaliter	0	0	0	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	_(a)	0	0	0

Data	Unit	2020	2021	2022	2023
Produced water (total)	megaliter	0	0	0	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	_(a)	0	0	0
<ul> <li>Third-party water (total)</li> </ul>	megaliter	5,380	4,178	4,236	10,854
- Freshwater (≤1,000 mg/L TDS)	megaliter	5,380	4,178	2,380	1,491
- Other water (>1,000 mg/L TDS)	megaliter	_(a)	0	1,856	9,363
Water withdrawal - from water stress areas	megaliter	7,611	6,897	6,306	5,759
Surface water (total)	megaliter	0	10	31	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	10	31	0
- Other water (>1,000 mg/L TDS)	megaliter	_(a)	0	0	0
<ul> <li>Groundwater (total)</li> </ul>	megaliter	2,231	2,710	2,038	1,655
- Freshwater (≤1,000 mg/L TDS)	megaliter	2,231	2,710	2,308	1,655
- Other water (>1,000 mg/L TDS)	megaliter	_(a)	0	0	0
<ul> <li>Seawater (total)</li> </ul>	megaliter	0	0	0	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	_(a)	0	0	0
<ul> <li>Produced water (total)</li> </ul>	megaliter	0	0	0	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	_(a)	0	0	0
<ul> <li>Third-party water (total)</li> </ul>	megaliter	5,380	4,178	4,236	4,104
- Freshwater (≤1,000 mg/L TDS)	megaliter	5,380	4,178	2,380	1,129
- Surface water	megaliter	4,117	3,181	2,380	758
- Groundwater	megaliter	0	0	0	0
- Seawater	megaliter	0	0	0	0
- Reclaimed water <sup>(b)</sup>	megaliter	0	0	0	371
- Produced water	megaliter	1,263	997	0	0
- Other water (>1,000 mg/L TDS)	megaliter	_(a)	0	1,856	2,975
- Surface water	megaliter	_(a)	0	1,598	2,975
- Groundwater	megaliter	_(a)	0	0	0
- Seawater	megaliter	_(a)	0	0	0
- Reclaimed water <sup>(b)</sup>	megaliter	_(a)	0	258	0
- Produced water	megaliter	_(a)	0	0	0

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<sup>(</sup>b) Data only emissions from point source.

Data	Unit	2020	2021	2022	2023
Water discharge - by destination	megaliter	1,779	1,604	1,513	1,453
Surface water	megaliter	0	464	796	705
Groundwater	megaliter	0	0	0	0
Seawater	megaliter	0	0	0	0
Third-party water	megaliter	1,779	1,139	717	747
Water discharge - to all areas	megaliter	1,779	1,604	1,513	1,453
• Freshwater (<1,000 mg/L TDS)	megaliter	_(a)	_(a)	285	69
• Other water (>1,000 mg/L TDS)	megaliter	_(a)	_(a)	1,229	1,383
Water discharge - to water stress areas	megaliter	1,779	1,604	1,513	1,453
• Freshwater (<1,000 mg/L TDS)	megaliter	_(a)	_(a)	285	69
- Surwface water	megaliter	_(a)	_(a)	144	0
- Groundwater	megaliter	_(a)	_(a)	0	0
- Seawater	megaliter	_(a)	_(a)	0	0
- Third-party water (sewer)	megaliter	_(a)	_(a)	141	69
• Other water (>1,000 mg/L TDS)	megaliter	_(a)	_(a)	1,229	1,383
- Surface water	megaliter	_(a)	_(a)	652	705
- Groundwater	megaliter	_(a)	_(a)	0	0
- Seawater	megaliter	_(a)	_(a)	0	0
- Third-party water	megaliter	_(a)	_(a)	567	678
Pollutant load to surface water <sup>(e)</sup>					
Chemical oxygen demand (COD)	tonnes	-	11.18 <sup>(c)</sup>	18.95	15
Total dissolved solids (TDS)	tonnes	-	O <sub>(c)</sub>	930.43	954
Total suspended solid (TSS)	tonnes	-	12.65 <sup>(c)</sup>	21.87	17
Oil & Grease	tonnes	-	0.31 <sup>(c)</sup>	0.76	1
Pollutant load to third-party water <sup>(e)</sup>					
Chemical oxygen demand (COD)	tonnes	-	54.34	37.16	30
Total dissolved solids (TDS)	tonnes	-	1,556	1,487	1,741
Total suspended solid (TSS)	tonnes	-	33.36	20.17	29
Oil & Grease	tonnes	-	0.39	0.41	0
Water consumption					
All areas	megaliter	5,832	5,293	4,792	11,057
Water stress areas	megaliter	5,832	5,293	4,792	4,306
Water consumption intensity	m³/MWh	0.901	0.877	0.818	0.958
Change in water storage	megaliter	_(d)	_(d)	_(d)	_(d)

<sup>\*</sup>BPP has measured the volume of water withdrawal and discharged by using water meter.

#### Waste\*

GRI 306-3, 306-4, 306-5

Data	Unit	2020	2021	2022	2023
Waste generated	tonnes	763,357	777,757	792,583	744,208
<ul> <li>Hazardous waste</li> </ul>	tonnes	103	176	116	163
Non-hazardous waste <sup>(a)</sup>	tonnes	763,254	777,581	792,467	744,044
Waste diverted from disposal(b)	tonnes	762,684	776,807	792,001	743,902
<ul> <li>Hazardous waste</li> </ul>	tonnes	84	175	90	161
- Preparation for reuse	tonnes	0	4	86	16
- Recycling	tonnes	84	59	4	145
- Other recovery operations	tonnes	0	113	0	0
<ul> <li>Non-hazardous waste<sup>(a)</sup></li> </ul>	tonnes	762,600	776,631	791,911	743,741
- Preparation for reuse	tonnes	334815	418,328	0	0
- Recycling	tonnes	427,785	358,103	791,911	743,741
- Other recovery operations	tonnes	0	201	0	0
Waste directed to disposal <sup>(b)</sup>	tonnes	675	794	729	303
<ul> <li>Hazardous waste</li> </ul>	tonnes	20	1	26	3
- Incineration with energy recovery	tonnes	16	1	2	3
- Incineration without energy recovery	tonnes	4	0	0	0
- Landfilling	tonnes	0	0	24	0
- Other disposals	tonnes	0	0	0	0
<ul> <li>Non-hazardous waste<sup>(a)</sup></li> </ul>	tonnes	655	793	703	300
- Incineration with energy recovery	tonnes	0	72	228	186
- Incineration without energy recovery	tonnes	0	0	0	0
- Landfilling	tonnes	583	721	475	115
- Other disposal	tonnes	72	0	0	0

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<sup>(</sup>a) Data collection system under standardization.

<sup>(</sup>b) From wastewater treatment plant of the third party.

<sup>&</sup>lt;sup>(c)</sup>Data of June to December 2021 only, no data collection from January to April 2021.

<sup>&</sup>lt;sup>(d)</sup>All CHP plants have no water storage tanks which impact water related issues.

<sup>(</sup>e) Water quality monitoring conducted following the national laws and regulations such as the monitoring frequency, analytical method, monitoring parameter/substances and also threshold limit.

### Biodiversity

GRI 304-1

Data	Unit	2020	2021	2022	2023
Number of operation	number	3	4	4	4
Area of operation	hectare	101	182	182	182
Business unit(s) in relation to protected area					
• In the area	number	0	0	0	0
Adjacent to	number	0	0	0	0
Containing portions	number	0	0	0	0
Business unit(s) in relation to high					
biodiversity wilderness area outside					
protected					
In the area	number	0	0	0	0
Adjacent to	number	0	0	0	0
Containing portions	number	0	0	0	0
Number of business units					
Assessed for potential biodiversity impact	number	3	4	4	4
<ul> <li>Identified as high potential of biodiversity impact</li> </ul>	number	0	0	0	0
Assessed for biodiversity value	number	0	0	0	0
Required biodiversity management plan <sup>(a)</sup>	number	0	0	0	0
Implemented biodiversity     management plan <sup>(a)</sup>	number	0	0	0	0
Proportion of business units					
Assessed for biodiversity impact	%	100%	100%	100%	100%
Assessed for biodiversity value	%	NA <sup>(b)</sup>	$NA^{(b)}$	$NA^{(b)}$	NA <sup>(b)</sup>
• With biodiversity management plan <sup>(a)</sup>	%	NA <sup>(b)</sup>	NA <sup>(b)</sup>	NA <sup>(b)</sup>	NA <sup>(b)</sup>

<sup>&</sup>lt;sup>(a)</sup>For business unit(s) identified as high potential of biodiversity impact only.

<sup>(</sup>b) No business unit(s) identified as high potential of biodiversity impact.

Data	Unit	2020	2021	2022	2023
Vaste direct disposal intensity					
Hazardous waste	kg/MWh	0.0031	0.0002	0.0044	0.0003
Non-hazardous waste <sup>(a)</sup>	kg/MWh	0.101	0.131	0.120	0.026
Ash generated	tonnes	677,396	688,623	701,580	648,830
ash diverted from disposal <sup>(b)</sup>	tonnes	677,396	688,466	701,737	648,830
Preparation for reuse	tonnes	296,118	369,587	0	0
Recycling	tonnes	381,278	318,879	701,737	648,830
Other recovery operations	tonnes	0	0	0	0
ash directed to disposal <sup>(b)</sup>	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 disposal	tonnes	0	0	0	C
Sypsum generated	tonnes	85,187	87,964	90,001	94,103
Sypsum diverted from disposal <sup>(b)</sup>	tonnes	85,187	87,964	90,001	94,103
Preparation for reuse	tonnes	38,697	48,741	0	C
Recycling	tonnes	46,490	39,223	90,001	94,103
Other recovery operations	tonnes	0	0	0	0
Gypsum directed to disposal <sup>(b)</sup>	tonnes	0	0	0	0
Incineration with energy recovery	tonnes	0	0	0	0
Incineration without energy recovery	tonnes	0	0	0	C
Landfilling	tonnes	0	0	0	C
Other disposal	tonnes	0	0	0	C
Proportion of hazardous waste reused	%	81.6%	35.6%	77.3%	98.21%
k recycled					
Proportion of non-hazardous waste eused & recycled <sup>(a)</sup>	%	99.9%	99.9%	99.9%	99.96%
Proportion of ash reused & recycled	%	100%	100%	100%	100%

<sup>\*</sup>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, which authorized by each local government to transport and dispose waste, has been recorded from the receipts.

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<sup>(</sup>a)Includes ash & gypsum from power plants.

<sup>(</sup>b) BPP has managed waste disposal only offsite, and there is no onsite management.

### Environmental Compliance

GRI 303-4, 306-3

Data	Unit	2020	2021	2022	2023
Number of environmental non-compliance					
Effluent discharge limits	case	0	0	0	0
<ul> <li>Air emissions standards</li> </ul>	case	0	0	0	0
• Others	case	0	0	0	0
Significant spills <sup>(a)</sup>					
<ul> <li>Number of significant spills</li> </ul>	case	0	0	0	0
<ul> <li>Total amount of significant spills</li> </ul>	liter	0	0	0	0
Number of significant environmental incident	case	0	0	0	0
Fines from environmental non-compliance <sup>(b)</sup>					
Number of significant fines	case	0	0	0	0
<ul> <li>Total amount of significant fines</li> </ul>	USD	0	0	0	0
Environmental liability accrued at year end	USD	0	0	0	0

<sup>&</sup>lt;sup>(a)</sup>Referred to internal definition with criteria such as any damage to widespread area or potential fines that is greater than USD 10,000.

### Occupational Health and Safety

GRI 403-8. 403-9

Data	Unit	2020	2021	2022	2023
Workers covered by OHS management					
system					
Number of workers	person	1,415	1,456	1,648	1,527
Percentage of total workers	%	100%	100%	100%	100%
Workers covered by OHS management					
system that has been internally audited					
Number of workers	person	1,310	1,353	1,537	1,376
Percentage of total workers	%	92.6%	92.9%	93.3%	90%

Data	Unit	2020	2021	2022	2023
Worker covered by OHS manageme system that has been audited or	nt				
certified by third party					
Number of workers	person	1,310	1,353	1,537	1,376
Percentage of total workers	%	92.6%	92.9%	93.3%	90%
Number of occupational fatalities	person	0	0	1	0
• Employee	person	0	0	1	0
• Contractor	person	0	0	0	0
Fatality rate	person/	0	0	0.41	0
	million man-hour				
• Employee	person/	0	0	0.50	0
	million man-hour				
Contractor	person/	0	0	0	0
	million man-hour				
Number of recordable injuries	case	0	0	4	3
• Employee	case	0	0	4	0
- Abrasion (or scrape)	case	0	0	1	0
- Amputation	case	0	0	0	0
- Broken bone (or fracture)	case	0	0	0	0
- Bruise	case	0	0	0	0
- Burn (heat)	case	0	0	2	0
- Burn (chemical)	case	0	0	0	0
- Concussion (to the head)	case	0	0	0	0
- Crushing	case	0	0	0	0
- Cut	case	0	0	0	0
- Death	case	0	0	1	0
- Laceration	case	0	0	0	0
- Loss of consciousness	case	0	0	0	0
- Paralysis	case	0	0	0	0
- Puncture	case	0	0	0	0
- Sprain	case	0	0	0	0
- Strain	case	0	0	0	0
- Other	case	0	0	0	0

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<sup>&</sup>lt;sup>(b)</sup>Fines or potential fines that is greater than USD 10,000.

Data	Unit	2020	2021	2022	2023
• Contractor	case	0	0	0	3
- Abrasion (or scrape)	case	0	0	0	0
- Amputation	case	0	0	0	0
- Broken bone (or fracture)	case	0	0	0	0
- Bruise	case	0	0	0	0
- Burn (heat)	case	0	0	0	0
- Burn (chemical)	case	0	0	0	0
- Concussion (to the head)	case	0	0	0	0
- Crushing	case	0	0	0	0
- Cut	case	0	0	0	2
- Death	case	0	0	0	0
- Laceration	case	0	0	0	0
- Loss of consciousness	case	0	0	0	0
- Paralysis	case	0	0	0	0
- Puncture	case	0	0	0	0
- Sprain	case	0	0	0	1
- Strain	case	0	0	0	0
- Other	case	0	0	0	0
Number of incidents	case	0	0	4	3
• Employee	case	0	0	4	0
- Chemical	case	0	0	0	0
- Flammable	case	0	0	0	0
- Toxic	case	0	0	0	0
- Reactive	case	0	0	0	0
- Corrosive	case	0	0	0	0
- Physical	case	0	0	4	0
- Electricity	case	0	0	0	0
- Noise	case	0	0	0	0
- Radiation	case	0	0	0	0
- Temperature extremes	case	0	0	2	0
- Struck/hit by objects	case	0	0	1	0
- Slip, trip, fall	case	0	0	1	0
- Biological	case	0	0	0	0
- Insect/animal bite	case	0	0	0	0
- Disease	case	0	0	0	0

Data	Unit	2020	2021	2022	2023
- Ergonomic	case	0	0	0	0
- Muscle stress	case	0	0	0	0
- Physiological	case	0	0	0	0
- Mental health	case	0	0	0	0
- Other	case	0	0	0	0
Contractor	case	0	0	0	3
- Chemical	case	0	0	0	0
- Flammable	case	0	0	0	0
- Toxic	case	0	0	0	0
- Reactive	case	0	0	0	0
- Corrosive	case	0	0	0	0
- Physical	case	0	0	0	0
- Electricity	case	0	0	0	0
- Noise	case	0	0	0	0
- Radiation	case	0	0	0	0
- Temperature extremes	case	0	0	0	0
- Struck/hit by objects	case	0	0	0	0
- Slip, trip, fall	case	0	0	0	0
- Biological	case	0	0	0	0
- Insect/animal bite	case	0	0	0	0
- Disease	case	0	0	0	0
- Ergonomic	case	0	0	0	0
- Muscle stress	case	0	0	0	0
- Physiological	case	0	0	0	0
- Mental health	case	0	0	0	0
- Other	case	0	0	0	3
Total recordable injury frequency rate	person/	0	0	1.64	1.17
(TRIFR)	million man-hour				
• Employee	person/	0	0	1.99	0
	million man-hour				
Contractor	person/	0	0	0	6.09
	million man-hour				





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Data	Unit	2020	2021	2022	2023
Lost time injury frequency rate (LTIFR)	person/ million man-hour	0	0	1.23	0
• Employee	person/ million man-hour	0	0	1.49	0
Contractor	person/ million man-hour	0	0	0	0
Injury severity rate (ISR) <sup>(a)</sup>	day/ million man-hour	0	0	2,540.20	0
• Employee	day/ million man-hour	0	0	3,087.56	0
Contractor	day/ million man-hour	0	0	0	0
Number of high-consequence work- related injuries (excluding fatalities)	case	0	0	0	0
• Employee	case	0	0	0	0
Contractor	case	0	0	0	0
High-consequence work-related injuries frequency rate (excluding fatalities)	person/ million man-hour	0	0	0	0
• Employee	person/ million man-hour	0	0	0	0
Contractor	person/ million man-hour	0	0	0	0
Number of hours worked	hour	2,497,876	2,424,300	2,443,900	2,562,348
• Employee	hour	1,899,082	1,921,094	2,010,647	2,069,622
Contractor	hour	598,794	503,206	433,253	492,726
Tier-1 process safety event <sup>(b)</sup>	case	0	0	1	0
Tier-1 process safety event rate	case/ million man-hour	0	0	0.41	0
Number of fatalities as a result of work-related ill health	person	0	0	0	0
• Employee	person	0	0	0	0
Contractor	person	0	0	0	0
Number of total recordable work-related ill health	case	0	0	0	0
• Employee	case	0	0	0	0
Contractor	case	0	0	0	0

<sup>(</sup>a) Refers to American National Standards Institute (ANSI) standard.

### Employee

Data	Unit	2020	2021	2022	2023
Total employee	Person	786	745	952	938
Employee - by country					
• Thai	%	4.30%	3.36%	3.26%	3.62%
• China	%	95.70%	96.64%	93.17%	95.63%
• The U.S.	%	-	-	0.32%	0.75%
• Others	%	-	-	3.25%	0%
Employee - by nationality					
• Thai	%	4.80%	3.49%	4.52%	4.37%
• Chinese	%	95.00%	96.38%	92.75%	95.10%
American	%	0%	0%	0.32%	0.53%
Others	%	0.10%	0.13%	2.41%	0%
Employee - by age					
• Under 30	%	18.20%	16.38%	14.60%	13.75%
• 30-39	%	43.80%	41.74%	34.98%	37.21%
40-49	%	31.60%	32.48%	33.93%	33.16%
• 50 and over	%	6.50%	9.40%	16.49%	15.88%
Employee - by type					
<ul> <li>Permanent</li> </ul>	%	96.40%	99.60%	99.79%	55.44%
<ul> <li>Temporary/contract</li> </ul>	%	3.60%	0.40%	0.21%	44.56%
Employee - by level					
Senior management	%	0.60%	0.67%	1.79%	3.20%
Middle management	%	5%	4.56%	7.67%	6.82%
Junior management	%	5%	6.17%	21.85%	20.26%
Supervisor & staff	%	89.40%	88.59%	68.70%	69.72%
Employee - by STEM-related position <sup>(a)</sup>					
STEM-related position	%	-	-	-	71.64%
Others	%	_	-	-	28.36%

<sup>(a)</sup>Positions pursue in the Science, Technology, Engineering and Maths sectors, including but not limited to Engineer, Geologist, Economist, and Software developer.



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<sup>(</sup>b) Refers to internal definition with criteria such as fatality and catastrophic damage to ecosystem, or property damage >100,000USD.

### Gender Diversity

Data	Unit	2020	2021	2022	2023
Employee - by gender					
• Male	%	82.80%	84.97%	78.47%	78.68%
• Female	%	17.20%	15.03%	21.53%	21.32%
All management - by gender <sup>(a)</sup>					
• Male	%	-	-	-	73.59%
• Female	%	-	-	-	26.41%
Top management - by gender <sup>(b)</sup>					
• Male	%	81.80%	94.87%	67.78%	68.09%
• Female	%	18.20%	5.13%	32.22%	31.91%
Junior management - by gender					
• Male	%	-	-	-	76.32%
• Female	%	-	-	-	23.68%
STEM-related position - by gender(c)					
• Male	%	-	-	-	86.90%
• Female	%	-	-	-	13.10%

<sup>&</sup>lt;sup>(a)</sup>Included junior, middle and senior management.

### New Employee

Data	Unit	2020	2021	2022	2023
Total new employee	Person	40	36	61	55
New employee - by gender					
• Male	Person	37	31	50	43
• Female	Person	3	5	11	12
New employee - by type					
<ul> <li>Permanent</li> </ul>	Person	-	-	-	55
• Temporary	Person	-	-	-	0
New employee - by nationality					
• Thai	Person	0	0	5	6
• Chinese	Person	40	36	41	47
American <sup>(a)</sup>	Person	-	-	2	2

Data	Unit	2020	2021	2022	2023
New employee - by age					
• Under 30	Person	-	-	-	26
• 30-39	Person	-	-	-	24
• 40-49	Person	-	-	-	3
• Over 50	Person	-	-	-	2
New employee - by level					
Senior management	Person	-	-	-	1
Middle management	Person	-	-	-	3
Junior management	Person	-	-	-	5
Staff and supervisor	Person	-	-	-	46
New employee - by STEM-related position <sup>(b)</sup>					
STEM-related position	Person	-	-	-	40
• Others	Person	-	-	-	15

<sup>(</sup>a)Include migrants who live in that particular country

### Corporate Culture and Employee Engagement

Data	Unit	2020	2021	2022	2023
Level of alignment between employee					
behavior and the corporate culture -					
by country					
Thailand	%	69%	79%	84%	87%
• China	%	94%	95%	92%	91%
Employee engagement level - by country					
Thailand	%	48%	69%	74%	51%
• China	%	92%	93%	96%	91%

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<sup>(</sup>b) Included middle and senior management.

<sup>&</sup>lt;sup>(c)</sup>Positions pursue in the Science, Technology, Engineering and Maths sectors, including but not limited to Engineer, Geologist, Economist, and Software developer.

<sup>(</sup>b) Positions pursue in the Science, Technology, Engineering and Maths sectors, including but not limited to Engineer, Geologist, Economist, and Software developer.

### Employee Turnover Rate

Data	Unit	2020	2021	2022	2023
Total employee turnover rate	%	4.30%	5.20%	5.99%	11.41%
Voluntary employee turnover rate	%	4.30%	5.20%	1.58%	11.19%
Turnover rate - by country					
Thailand	%	2.90%	0%	6.44%	0.64%
• China	%	4.40%	5.20%	2.71%	10.77%
The U.S.	%	-	-	0%	0%
Turnover rate - by age					
• Under 30	%	-	-	-	2.67%
• 30-39	%	-	-	-	5.54%
• 40-49	%	-	-	-	2.45%
• Over 50	%	-	-	-	0.75%
Turnover rate - by gender					
• Male	%	-	-	-	9.59%
Female	%	-	-	-	1.81%
Turnover rate - by level					
<ul> <li>Senior management</li> </ul>	%	-	-	-	0%
Middle management	%	-	-	-	0.32%
<ul> <li>Junior management</li> </ul>	%	-	-	-	1.81%
<ul> <li>Staff and supervisor</li> </ul>	%	-	-	-	9.28%

### Parental Leave<sup>(a)</sup>

Data	Unit	2020	2021	2022	2023
Employee taking parental leave -					
by country					
• Thailand	Person	0	0	1	0
• China	Person	1	1	6	15
• The U.S.	Person	-	-	0	0
Employee returning to work after					
parental leave ended - by country					
Thailand	%	NA <sup>(b)</sup>	$NA^{(b)}$	100%	NA <sup>(b)</sup>
• China	%	100%	100%	67%	100%
• The U.S.	%	-	-	NA <sup>(b)</sup>	NA <sup>(b)</sup>

<sup>(</sup>a)Included male and female employees.

### Human Capital Development

Data	Unit	2020	2021	2022	2023
Proportion of open positions filled by internal candidates <sup>(a)</sup>	%	-	-	50%	33%
Proportion of high critical positions with successor identified	%	100%	100%	100%	100%
Proportion of employee with individual development plan	%	-	-	-	69%
Thailand	%	100%	85%	85%	31%
• China <sup>(d)</sup>	%	55%	60%	88%	77%
Employee attending leadership development programs (cumulative)	Number	56	61	67	75
Employee attending leadership development programs (annual)					
Business Leader	Number	0	0	1	0
First Line Leader	Number	0	0	1	4
• Future Leader <sup>(a)</sup>	Number	2	3	3	1
Engaging Leader <sup>(a)</sup>	Number	1	2	1	3
Success of leadership development programs <sup>(b)(c)</sup>					
Business Leader	%	82%	82%	85%	64%
First Line Leader	%	75%	78%	75%	58%
• Future Leader <sup>(a)</sup>	%	60%	70%	80%	95%
Engaging Leader <sup>(a)</sup>	%	94%	94%	94%	84%

<sup>&</sup>lt;sup>(a)</sup>Data covers only employee in Thailand.

### Training

Data	Unit	2020	2021	2022	2023
Average cost of training - by nationality	USD/person	-	-	-	580
• Thai	USD/person	1,110	985	1,220	9,983
• Chinese	USD/person	271	251	210	231
Average cost of training - by level					
Senior management	USD/person	3,127	2,352	1,385	2,494
Middle management	USD/person	1,058	1,280	880	4,868
Junior management	USD/person	793	1,590	410	946
Staff and supervisor	USD/person	193	161	145	182

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<sup>&</sup>lt;sup>(b)</sup>No parental leave.

<sup>(</sup>b)% completion of development programs.

<sup>(</sup>c)Increasing target of 2023 training was applied.

<sup>&</sup>lt;sup>(d)</sup>Cover only employee in target group.

Data	Unit	2020	2021	2022	2023
Average cost of training - by program			·		
Technical/functional	USD/person	-	-	-	236
• Leadership	USD/person	-	-	-	344
Average hours of training - by nationality	hour/person	-	-	-	49.9
• Thai	hour/person	30	31	23	49.5
• Chinese	hour/person	35	37	37	49.9
Average hours of training - by level					
<ul> <li>Senior management</li> </ul>	hour/person	27	17.3	30	45.6
Middle management	hour/person	30	31.5	37	48.6
<ul> <li>Junior management</li> </ul>	hour/person	35	40.1	38	48.9
Staff and supervisor	hour/person	30	31.1	36	50.2
Average hours of training - by program					
Technical/functional	hour/person	-	-	-	39.6
<ul> <li>Leadership</li> </ul>	hour/person	-	-	-	10.3

#### Remuneration

Data	Unit	2020	2021	2022	2023
Male to female remuneration ratio	-	-	1.06	0.86	0.27
Male to female remuneration ratio - by level					
Senior management	-	-	0.88	1.40	0.39
<ul> <li>Junior management</li> </ul>	-	-	1.08	0.83	0.28
Staff and supervisor	-	-	1.17	0.99	0.21
Male to female remuneration ratio - by country					
Thailand	-	-	-	-	0.39
• China	-	-	-	-	0.28
The U.S.	-	-	-	-	0.15

#### Freedom of Association

Data	Unit	2020	2021	2022	2023
Employee who are members of labor unions	%	-	-	-	86.4%
Employee covered by collective bargaining	%	-	-	-	95.6%
agreement					

### Community Engagement

Data	Unit	2020	2021	2022	2023
Number of significant community complaint issues	Case	0	0	0	0
Proportion of significant complaint issues from communities resolved through a dispute mechanism	%	NA <sup>(a)</sup>	NA <sup>(a)</sup>	NA <sup>(a)</sup>	NA <sup>(a)</sup>

<sup>(</sup>a)No significant complaint.

### Community Resettlement

Data	Unit	2020	2021	2022	2023
Significant community resettlement complaints	Case	0	0	0	0
Proportion of significant resettlement complaints resolved through a dispute mechanism	%	NA <sup>(a)</sup>	NA <sup>(a)</sup>	NA <sup>(a)</sup>	NA <sup>(a)</sup>

<sup>&</sup>lt;sup>(a)</sup>No significant complaint.

### Human Rights

Data	Unit	2020	2021	2022	2023
Coverage of business units assessed for human right risks	%	100%	100%	75% <sup>(d)</sup>	60% <sup>(e)</sup>
Proportion of business units with risk management plan <sup>(a)</sup>	%	NA <sup>(b)</sup>	NA <sup>(b)</sup>	NA <sup>(b)</sup>	NA <sup>(b)</sup>
Number of significant human rights issues	Case	0	0	0	0
Proportion of significant human rights issues resolved through a dispute mechanism	%	NA <sup>(c)</sup>	NA <sup>(c)</sup>	NA <sup>(c)</sup>	NA <sup>(c)</sup>

<sup>(</sup>a) For business unit(s) identified as high human rights risks.

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<sup>(</sup>b) No business units identified as high human rights risks.

<sup>(</sup>c)No significant issues.

<sup>&</sup>lt;sup>(d)</sup>Change of data boundary which excludes Temple I because the asset has successfully invested in November 2021 and under standardization process.

<sup>(</sup>e) Change the data coverage to include 3 CHPs in China and the additional Temple I & II in the U.S.

# Performance Data 2023: Banpu Next

#### Product

Data	Unit	2020	2021	2022	2023
Electricity sold	MWh	338,763	531,193	539,843	824,800

### Greenhouse Gas (GHG) Emissions

Data	Unit	2020	2021	2022	2023
GHG emissions					
• Total (Scope 1 & 2)	tonnes CO2e	3,256	3,538	3,126	4,129
• Direct (Scope 1)	tonnes CO2e	55	47	56	91
<ul> <li>Direct (Scope 1) – Biogenic CO<sub>2</sub></li> </ul>	tonnes CO2e	-	-	-	0
<ul> <li>Indirect (Scope 2)<sup>(a)</sup></li> </ul>	tonnes CO2e	3,201	3,490	3,070	4,038
Other indirect (Scope 3) <sup>(b)</sup>	tonnes CO2e	-	-	-	-
GHG emissions intensity					
Total (Scope 1 & 2)	tonnes CO <sub>2</sub> e/ MWh	0.010	0.007	0.006	0.005
Electricity generation	tonnes CO <sub>2</sub> e/ MWh	0.010	0.007	0.006	0.005
SF <sub>6</sub> emissions	tonnes CO2e	0	0	0	0

<sup>(</sup>a) Gross location-based scope 2 GHG emissions.

### Energy

Data	Unit	2020	2021	2022	2023
Total energy consumption	TJ	24	37	31	100
Renewable energy consumption					
Renewable fuel	TJ	0	0	0	0
Electricity purchased <sup>(a)</sup>	TJ	0	0	0	0
Electricity self-generated	TJ	1,229	1,931	1,955	3,044
- Solar	TJ	-	1,775	1,673	2,683
- Wind	TJ	-	155	282	361

Data	Unit	2020	2021	2022	2023
Non-renewable energy consumption					
Non-renewable fuel	TJ	1	1	0.64	1.18
- Diesel	TJ	-	0.11	0.11	0.29
- Gasoline	TJ	-	0.57	0.53	0.89
Electricity purchased	TJ	14	17	19	24
Steam, heating & cooling	TJ	0	0	0	0
Renewable energy sold					
Electricity	TJ	1,220	1,912	1,943	2,969
Non-renewable energy sold					
• Electricity	TJ	0	0	0	0
• Steam	TJ	0	0	0	0
Heating	TJ	0	0	0	0
Energy consumption intensity <sup>(b)</sup>	GJ/MWh	0.07	0.07	0.06	0.12

<sup>(</sup>a) Negligible purchased electricity for solar power plant during nighttime.

#### Water

Data	Unit	2020	2021	2022	2023
Water withdrawal - from all areas	megaliter	4	2	2.48	2,818
Surface water (total)	megaliter	0	0	0	0
- Freshwater (≤ 1,000 mg/L TDS)	megaliter	0	0	0	0
- Other water (> 1,000 mg/L TDS)	megaliter	- <sup>(a)</sup>	0	0	0
Groundwater (total)	megaliter	3	1	1.07	1
- Freshwater (≤ 1,000 mg/L TDS)	megaliter	3	1	1.07	1
- Other water (> 1,000 mg/L TDS)	megaliter	- <sup>(a)</sup>	0	0	0
Seawater (total)	megaliter	0	0	0	0
- Freshwater (≤ 1,000 mg/L TDS)	megaliter	0	0	0	0
- Other water (> 1,000 mg/L TDS)	megaliter	- <sup>(a)</sup>	0	0	0









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<sup>(</sup>a) Data collection system under standardization.

<sup>(</sup>b)Includes diesel, gasoline, electricity self-generated and electricity purchased both within and outside organization.

Data	Unit	2020	2021	2022	2023
Produced water (total)	megaliter	0	0	0	2,815
- Freshwater (≤ 1,000 mg/L TDS)	megaliter	0	0	0	0
- Other water (> 1,000 mg/L TDS)	megaliter	- <sup>(a)</sup>	0	0	2,815
<ul> <li>Third-party water (total)</li> </ul>	megaliter	1	1	1.41	0
- Freshwater (≤ 1,000 mg/L TDS)	megaliter	1	1	1.41	2
- Other water (> 1,000 mg/L TDS)	megaliter	- <sup>(a)</sup>	0	0	0
Water withdrawal - from water stress areas	megaliter	4	2	1.87	2,798
Surface water (total)	megaliter	0	0	0	0
- Freshwater (≤ 1,000 mg/L TDS)	megaliter	0	0	0	0
- Other water (> 1,000 mg/L TDS)	megaliter	- <sup>(a)</sup>	0	0	0
<ul> <li>Groundwater (total)</li> </ul>	megaliter	3	1	1.07	1
- Freshwater (≤ 1,000 mg/L TDS)	megaliter	3	1	1.07	1
- Other water (> 1,000 mg/L TDS)	megaliter	- <sup>(a)</sup>	0	0	0
<ul> <li>Seawater (total)</li> </ul>	megaliter	0	0	0	0
- Freshwater (≤ 1,000 mg/L TDS)	megaliter	0	0	0	0
- Other water (> 1,000 mg/L TDS)	megaliter	_ (a)	0	0	0
<ul> <li>Produced water (total)</li> </ul>	megaliter	0	0	0	2,796
- Freshwater (≤ 1,000 mg/L TDS)	megaliter	0	0	0	0
- Other water (> 1,000 mg/L TDS)	megaliter	- <sup>(a)</sup>	0	0	2,796
<ul> <li>Third-party water (total)</li> </ul>	megaliter	1	1	0.81	1
- Freshwater (≤ 1,000 mg/L TDS)	megaliter	1	1	0.81	1
- Surface water	megaliter	1	1	0.54	1
- Groundwater	megaliter	0	0	0.27	0
- Seawater	megaliter	0	0	0	0
<ul> <li>Reclaimed water<sup>(b)</sup></li> </ul>	megaliter	0	0	0	0
- Produced water	megaliter	0	0	0	0
- Other water (> 1,000 mg/L TDS)	megaliter	- <sup>(a)</sup>	0	0	0
- Surface water	megaliter	- <sup>(a)</sup>	0	0	0
- Groundwater	megaliter	- <sup>(a)</sup>	0	0	0
- Seawater	megaliter	- <sup>(a)</sup>	0	0	0
- Reclaimed water <sup>(b)</sup>	megaliter	- <sup>(a)</sup>	0	0	0
- Produced water	megaliter	- <sup>(a)</sup>	0	0	0

Data	Unit	2020	2021	2022	2023
Water discharge - by destination	megaliter	0	2	1.78	24
Surface water	megaliter	0	0	0	0
Groundwater	megaliter	0	0	0	0
Seawater	megaliter	0	0	0	0
Third-party water	megaliter	0	2	1.78	24
Water discharge - to all areas	megaliter	0	2	1.78	24
• Freshwater (≤ 1,000 mg/L TDS)	megaliter	0	0	0	0
• Other water (> 1,000 mg/L TDS)	megaliter	0	2	1.78	24
Water consumption					
All areas	megaliter	4	23	0.70	2,794
Water stress areas	megaliter	4	1	0.30	2,798
Water consumption intensity	m³/MWh	0.013	0.044	0.001	3.388
Change in water storage					
All areas	megaliter	- <sup>(a)</sup>	- <sup>(a)</sup>	_ (a)	0
Area with significant water impact	megaliter	- <sup>(a)</sup>	_ (a)	- <sup>(a)</sup>	0

<sup>&</sup>lt;sup>(a)</sup>Data collection system under standardization.

### Waste

Data	Unit	2020	2021	2022	2023
Waste generated	tonnes	8	22	3.40	54
<ul> <li>Hazardous waste</li> </ul>	tonnes	0	0	0.53	36
<ul> <li>Non-hazardous waste</li> </ul>	tonnes	8	21	2.87	19
Waste diverted from disposal(a)	tonnes	0	10	0.47	19
Hazardous waste	tonnes	0	0	0.11	17
- Preparation for reuse	tonnes	0	0	0	0
- Recycling	tonnes	0	0	0.11	17
- Other recovery operations	tonnes	0	0	0	0
<ul> <li>Non-hazardous waste</li> </ul>	tonnes	0	10	0.36	2
- Preparation for reuse	tonnes	0	0	0	0
- Recycling	tonnes	0	10	0.36	2
- Other recovery operations	tonnes	0	0	0	0













Data	Unit	2020	2021	2022	2023
Waste directed to disposal <sup>(a)</sup>	tonnes	8	12	7.06	34
Hazardous waste	tonnes	0	0	0.42	18
- Incineration with energy recovery	tonnes	0	0	0	0
- Incineration without energy recovery	tonnes	0	0	0.42	0
- Landfilling	tonnes	0	0	0	18
- Other disposals	tonnes	0	0	0	0
Non-hazardous waste	tonnes	8	12	6.64	16
- Incineration with energy recovery	tonnes	0	0	0	1
- Incineration without energy recovery	tonnes	0	0	0	0
- Landfilling	tonnes	0	12	6.64	15
- Other disposal	tonnes	8	0	0	0
Waste direct disposal intensity					
Hazardous waste	kg/MWh	-	0	0.001	0.022
Non-hazardous waste	kg/MWh	-	0.022	0.012	0.019
Proportion of hazardous waste reused & recycled	%	-	33.18%	20.75%	47.59%
Proportion of non-hazardous waste reused & recycled	%	-	47.49%	12.56%	13.48%

<sup>&</sup>lt;sup>(a)</sup>Banpu NEXT has managed waste disposal only offsite and there is no onsite management.

### Biodiversity

Data	Linit	0000	20	21	20	22	20:	23
Data	Unit	2020	Operating	Project	Operating	Project	Operating	Project
Number of operations	number	33	24	2	24	2	27	1
Business unit(s) in relation to protected area								
In the area	number	0	0	0	0	0	0	0
<ul> <li>Adjacent to</li> </ul>	number	0	0	0	0	0	0	0
Containing portions	number	0	0	1	0	1	1	0

Data	Unit	2020	20.	21	20:	22	20:	23
Data	Unit	2020	Operating	Project	Operating	Project	Operating	Project
Business unit(s) in relation to high biodiversity wilderness area outside protected								
In the area	number	0	0	0	0	0	0	(
<ul> <li>Adjacent to</li> </ul>	number	0	0	0	0	0	0	(
<ul> <li>Containing portions</li> </ul>	number	0	0	0	0	0	0	(
Number of business units								
<ul> <li>Assessed for potential biodiversity impact</li> </ul>	number	0	24	2	24	2	27	
<ul> <li>Identified as high potential of biodiversity impact</li> </ul>	number	0	0	1	0	1	1	(
<ul> <li>Assessed for biodiversity value</li> </ul>	number	0	0	0	0	0	1	
<ul> <li>Required biodiversity management plan<sup>(a)</sup></li> </ul>	number	0	0	0	0	0	1	
<ul> <li>Implemented biodiversity management plan<sup>(a)</sup></li> </ul>	number	0	0	-	0	-	1	
Area	hectare	-	0	620	0	620	2,152	348
<ul> <li>Assessed for potential biodiversity impact</li> </ul>	hectare	-	0	620	0	620	0	(
<ul> <li>Assessed for biodiversity value<sup>(a)</sup></li> </ul>	hectare	-	0	0	0	0	0	(
<ul> <li>With biodiversity management plan<sup>(a)</sup></li> </ul>	hectare	-	0	-	0	-	0	
Biodiversity offset area	hectare	-	-	-	-	-	0	
Proportion of business units								
<ul> <li>Assessed for biodiversity impact</li> </ul>	%	100%	100%	100%	100%	100%	100%	1009
<ul> <li>Assessed for biodiversity value</li> </ul>	%	NA <sup>(b)</sup>	100%	NA <sup>(</sup>				
With biodiversity management plan <sup>(a)</sup>	%	NA <sup>(b)</sup>	NA <sup>(b)</sup>	-	NA <sup>(b)</sup>	-	100%	

<sup>&</sup>lt;sup>(a)</sup>For business unit(s) identified as high potential of biodiversity impact only.

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<sup>(</sup>b) No business unit(s) identified as high potential of biodiversity impact.

### Environmental Compliance

Data	Unit	2020	2021	2022	2023
Number of environmental non-compliance					
Effluent discharge limits	case	0	0	0	0
Air emissions standards	case	0	0	0	0
• Others	case	0	0	0	0
Significant spills <sup>(a)</sup>					
<ul> <li>Number of significant spills</li> </ul>	case	0	0	0	0
Total amount of significant spills	liter	0	0	0	0
Number of significant environmental incident	case	0	0	0	0
Fines from environmental non-compliance <sup>(b)</sup>					
Number of significant fines	case	0	0	0	0
Total amount of significant fines	USD	0	0	0	0
Environmental liability accrued at year end	USD	0	0	0	0

<sup>&</sup>lt;sup>(a)</sup>Referred to internal definition with criteria such as any damage to widespread area or potential fines that are greater than USD 10,000.

### Occupational Health and Safety

Data	Unit	2020	2021	2022	2023
Workers covered by OHS management system					
Number of workers	person	236	151	397	568
Percentage of total workers	%	85.8%	100%	100%	100%
Workers covered by OHS management system that has been internally audited					
Number of workers	person	40	48	158	108
Percentage of total workers	%	14.5%	32%	39.8%	19%
Worker covered by OHS management system that has been audited or certified by third party					
Number of workers	person	0	0	0	0
Percentage of total workers	%	0%	0%	0%	0%

Data	Unit	2020	2021	2022	2023
Number of occupational fatalities	person	0	0	0	0
• Employee	person	0	0	0	0
<ul> <li>Contractor</li> </ul>	person	0	0	0	0
Fatality rate	person/ million man-hour	0	0	0	0
Employee	person/ million man-hour	0	0	0	0
Contractor	person/ million man-hour	0	0	0	0
Number of recordable injuries	case	0	0	0	0
• Employee	case	0	0	0	0
<ul> <li>Contractor</li> </ul>	case	0	0	0	0
Total Recordable Injury Frequency Rate (TRIFR)	person/ million man-hour	0	0	0	0
• Employee	person/ million man-hour	0	0	0	0
Contractor	person/ million man-hour	0	0	0	0
Lost Time Injury Frequency Rate (LTIFR)	person/ million man-hour	0	0	0	0
Employee	person/ million man-hour	0	0	0	0
Contractor	person/ million man-hour	0	0	0	0
Injury Severity Rate (ISR) <sup>(a)</sup>	day/million man-hour	0	0	0	0
Employee	day/million man-hour	0	0	0	0
Contractor	day/million man-hour	0	0	0	0

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<sup>(</sup>b) Fines or potential fines that are greater than USD 10,000.

Data	Unit	2020	2021	2022	2023
Number of high-consequence work-related injuries	case	0	0	0	0
• Employee	case	0	0	0	0
Contractor	case	0	0	0	0
High-consequence work-related injuries frequency rate	person/ million man-hour	0	0	0	0
• Employee	person/ million man-hour	0	0	0	0
• Contractor	person/ million man-hour	0	0	0	0
Number of hours worked	hour	401,454	281,028	508,197	578,898
• Employee	hour	256,712	231,904	334,644	368,702
Contractor	hour	144,742	49,124	173,553	210,197

Data	Unit	2020	2021	2022	2023
Tier-1 process safety event <sup>(b)</sup>	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	person	0	0	0	0
• Employee	person	0	0	0	0
<ul> <li>Contractor</li> </ul>	person	0	0	0	0
Number of total recordable work-related ill health	case	0	0	0	0
• Employee	case	0	0	0	0
• Contractor	case	0	0	0	0

<sup>(</sup>a) Refers to American National Standards Institute (ANSI) standard.

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<sup>(</sup>b) Refers to internal definition with criteria, such as fatality and catastrophic damage to ecosystem or property damage > USD 100,000.

# Performance Data 2023: BLCP

### Installation Capacity

Data	Unit	2020	2021	2022	2023
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

Data	Unit	2020	2021	2022	2023
Electricity sold	MWh	11,284,046	10,718,875	10,260,160	10,901,258
	GJ	40,622,565	38,587,951	36,936,576	39,244,529
Electricity generated	MWh	11,823,652	11,235,025	10,746,124	11,410,542

# System Efficiency

Data	Unit	2020	2021	2022	2023
Production efficiency					
Efficiency rate	g/KWh	355.78	356.65	356.75	350.24
Availability factor	%	96.74%	91.39%	93.20%	96.40%
Overall efficiency	%	38.76%	38.60%	38.71%	38.47%
Planned outage					
Planned outage frequency	case/year	2	0	2	1
Planned outage hours	hour	532	0	1,366	620
Average planned outage duration	hour/case	266	0	683	620
Unplanned outage					
<ul> <li>Unplanned outage frequency</li> </ul>	case/year	1	9	1	C
<ul> <li>Unplanned outage hours</li> </ul>	hour	10.8	1,464.5	228.5	C
Average unplanned outage duration	hour/case	10.8	162.7	228.5	C
Total outage					
Total outage frequency	case/year	3	9	3	1
Total outage hours	hour	542.8	1,464.5	1,595	620
Average total outage duration	hour/case	181	162.7	531.5	620
Transmission					
Length of transmission line	Km	47	47	47	47
Transmission loss	%	-	-	-	
Length of distribution line	Km	-	-	-	

### Energy

Data	Unit	2020	2021	2022	2023
Direct energy consumption	GJ	108,553,084	103,281,316	93,075,856	98,704,920
Fuel consumption within organization from non-renewable sources	GJ	108,553,084	103,281,316	93,075,856	98,704,920
• Coal	GJ	108,529,744	103,233,875	93,039,780	98,655,031
<ul> <li>Diesel (stationary combustion)</li> </ul>	GJ	23,341	47,441	21,467	28,712
<ul> <li>Diesel (mobile combustion)</li> </ul>	GJ	0	0	14,609	11,010
Gasoline (mobile combustion)	GJ	0	0	0	9,908
• LPG	GJ	0	0	0	256
Acetylene Gas	GJ	0	0	0	3.49
Fuel consumption within organization from renewable sources	GJ	0	0	0	0
• Biomass	GJ	0	0	0	0
Indirect energy consumption					
Electricity purchased	GJ	0	14,713	8,046	6,039
Energy intensity	GJ/MWh	6.02	5.77	5.22	5.21

### **Greenhouse Gas (GHG)**

Data	Unit	2020	2021	2022	2023
GHG emissions					
• Total GHG (Scope 1 & 2)	ton CO <sub>g</sub> e	9,902,083	9,411,226	8,806,480	11,138,659
• Direct GHG (Scope 1)	ton CO e	9,900,455	9,408,633	8,805,295	9,340,645
• Indirect GHG (Scope 2)	ton CO e	1,628	2,043	1,117	839
Other indirect (Scope 3)	ton CO <sub>2</sub> e	0	550	68	1,797,175
SF <sub>6</sub> emissions	ton CO2e	0	0	987	3,525
Chemical refrigerants					
• R-22	ton CO¸e	62.75	62.75	62.75	672.32
• R134a	ton CO e	0.44	0.44	0.60	0
• R-410A	ton CO e	6.41	6.41	5.91	21.16
• R-32	ton CO e	2.38	2.38	2.38	14.22
HFC227ea (SBPL)	ton CO e	0	0	0	0
Acetylene gas	ton CO <sub>2</sub> e	-	-	0	0.24
GHG intensity					
• GHG emissions intensity (Scope 1 & 2)	kgCO <sub>2</sub> /kWh	0.878	0.839	0.819	0.819
Total GHG emissions intensity	kgCO <sub>2</sub> /kWh	0.878	0.839	0.820	0.976















### Air

Data	Unit	2020	2021	2022	2023
Nitrogen oxide (NOx)					
Average concentration	ppm	144.6	125.5	98.25	128.8
Emissions load	ton	13,327	13,541	12,813	12,916
Degree of compliance	%	100%	100%	100%	100%
Sulfur dioxide (SO <sub>2</sub> )					
Average concentration	mg/m³	140.0	119.3	90.18	129.6
Emissions load	ton	14,981	15,038	14,819	18,156
Degree of compliance	%	100%	100%	100%	100%
Total suspended particles (TSP)					
Average concentration	mg/m³	16.3	19.3	29.0	24.94
Emissions load	ton	671	612	1,132	886
Degree of compliance	%	100%	100%	100%	100%

### Water

Data	Unit	2020	2021	2022	2023
Water withdrawal - by source	m <sup>3</sup>	406,162	509,891	377,382	155,441,249
<ul> <li>Surface water (including water from rivers, lakes and oceans)</li> </ul>	m³ d	406,162	509,891	377,382	4,682
<ul> <li>Groundwater</li> </ul>	m <sup>3</sup>	0	0	0	0
Seawater	m <sup>3</sup>	-	-	-	155,436,567
<ul> <li>Municipal water supplies or other water utilities</li> </ul>	m <sup>3</sup>	0	0	0	0
Recycled water	m³	547,185	474,135	498,998	556,834
Water discharge - by destination	m³	149,076	226,690	216,551	155,089,972
Surface water	m³	149,076	226,690	216,551	77,071
<ul> <li>Groundwater</li> </ul>	m <sup>3</sup>	-	-	-	-
<ul> <li>Seawater</li> </ul>	m <sup>3</sup>	-	-	-	155,012,901
On-site storage	m <sup>3</sup>	-	-	-	-
Water consumption	m <sup>3</sup>	257,086	283,201	160,831	351,277
Water quality					
Biochemical oxygen demand (BOD)	mg/l	< 2.0-4.9	< 2.0-2.7	< 2.0-3.8	< 2.0
Chemical oxygen demand (COD)	mg/l	< 25.0	< 25.0-25.7	< 25.0	< 25.0
• pH (0-14)	-	7.84	7.73	7.90	8.03
Maximum temperature	degree Celcius	35.47	34.88	33.77	35

### Waste

Data	Unit	2020	2021	2022	2023
Hazardous waste generated	ton	-	111.70	245.44	91.60
Hazardous waste - onsite disposal	ton	-	0	0	0
Waste diverted from disposal	ton	-	0	0	0
- Preparation for reuse	ton	-	0	0	0
- Recycling	ton	-	0	0	0
- Other recovery operations	ton	-	0	0	0
- Unknown disposal method	ton	-	0	0	0
Waste directed to disposal	ton	-	0	0	0
- Incineration (with energy recovery)	ton	-	0	0	0
<ul> <li>Incineration (without energy recovery)</li> </ul>	ton	-	0	0	0
- Landfilling	ton	-	0	0	0
- Other disposal operations	ton	-	0	0	0
- Unknown disposal method	ton	-	0	0	0
Hazardous waste - offsite disposal	ton	-	111.70	245.44	91.60
<ul> <li>Waste diverted from disposal</li> </ul>	ton	-	82.38	211.41	90.00
- Preparation for reuse	ton	-	0	0	0
- Recycling	ton	-	44.29	62.30	48.73
- Other recovery operations	ton	-	38.09	149.11	41.27
- Unknown disposal method	ton	-	0	0	0
Waste directed to disposal	ton	-	29.31	34.03	1.60
- Incineration (with energy recovery)	ton	-	0	0	0
- Incineration (without energy recovery)	ton	-	0	0	1.42
- Landfilling	ton	-	29.31	34.03	0.18
- Other disposal operations	ton	-	0	0	0
- Unknown disposal method	ton	-	0	0	0
Non-hazardous waste generated	ton	-	529,832.50	1,344.30	1,160.01













Data	Unit	2020	2021	2022	2023
Non-hazardous waste - onsite disposal	ton	-	46,438.07	0	0
Waste diverted from disposal	ton	-	5,600.00	0	0
- Preparation for reuse	ton	-	0	0	0
- Recycling	ton	-	0	0	0
- Other recovery operations	ton	-	5,600.00	0	0
- Unknown disposal method	ton	-	0	0	0
Waste directed to disposal	ton	-	40,838.07	0	0
- Incineration (with energy recovery)	ton	-	0	0	0
- Incineration (without energy recovery)	ton	-	0	0	0
- Landfilling	ton	-	40,838.07	0	0
- Other disposal operations	ton	-	0	0	0
- Unknown disposal method	ton	-	0	0	0
Non-hazardous waste - offsite disposal	ton	-	483,394.43	1,344.30	1,160.01
Waste diverted from disposal	ton	-	483,394.43	366.51	253.49
- Preparation for reuse	ton	-	2.34	4.77	0
- Recycling	ton	-	233.56	361.74	253.49
- Other recovery operations	ton	-	483,158.53	0	0
- Unknown disposal method	ton	-	0	0	0
Waste directed to disposal	ton	-	0	977.79	906.52
- Incineration (with energy recovery)	ton	-	0	0	0
- Incineration (without energy recovery)	ton	-	0	0	0
- Landfilling	ton	-	0	977.79	906.52
- Other disposal operations	ton	-	0	0	0
- Unknown disposal method	ton	-	0	0	0

### Ash & Gypsum

Data	Unit	2020	2021	2022	2023
Ash and gypsum waste generated	ton	-	528,440	648,239	638,611
Ash and gypsum waste composted, reused, recycled or recovered	ton	-	488,754	597,237	637,743
Ash and gypsum waste composted, reused, recycled or recovered	%	-	92.5%	92.1%	99.9%
• Reused	ton	-	488,754	0	0
<ul> <li>Donated</li> </ul>	ton	-	5	95	55
<ul> <li>Other recovery operations (sold)</li> </ul>	ton	-	0	597,237	637,689
Ash and gypsum waste landfilled	ton	-	39,682	50,908	867.45

### Spill

Data	Unit	2020	2021	2022	2023
Significant oil and chemical spill	case	0	0	0	0

### Environmental Compliance

Data	Unit	2020	2021	2022	2023
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

Data	Unit	2020	2021	2022	2023
Number of IUCN red list species and	species	0	0	0	0
national conservation list species					

## Occupational Health and Safety

Data	Unit	2020	2021	2022	2023
Manhours worked	hour	1,418,753	1,347,563	1,793,146	1,838,322
• Employee	hour	391,015	476,848	413,892	663,028
• Contractor	hour	1,027,738	870,715	1,379,254	1,175,294
Safety manhours	hour	1,418,753	1,347,563	1,793,146	1,838,322
• Employee	hour	391,015	476,848	413,892	663,028
• Contractor	hour	1,027,738	870,715	1,379,254	1,175,294
Accumulated safety hours	hour	7,529,414	8,876,977	10,670,123	12,508,445
• Employee	hour	2,637,237	3,114,085	3,527,977	4,191,005
<ul> <li>Contractor</li> </ul>	hour	4,892,177	5,762,892	7,142,146	8,317,440
Fatality	case	0	0	0	0
• Employee	case	0	0	0	0
• Contractor	case	0	0	0	0
Total number of injuries	case	1	0	0	0
• Employee	case	0	0	0	0
• Contractor	case	1	0	0	0
High-consequence work-related injury	case	0	0	0	0
• Employee	case	0	0	0	0
<ul> <li>Contractor</li> </ul>	case	0	0	0	0
Total number of lost time injuries	case	0	0	0	0
• Employee	case	0	0	0	0
• Contractor	case	0	0	0	0















Data	Unit	2020	2021	2022	2023
First aid case	case	1	4	3	3
• Employee	case	1	2	0	1
• Contractor	case	0	2	3	2
Number of injured days off work	day	0	0	0	0
• Employee	day	0	0	0	0
• Contractor	day	0	0	0	0
Number of lost work days	day	0	0	0	0
• Employee	day	0	0	0	0
Contractor	day	0	0	0	0
Injury Frequency Rate (IFR)	case/million man-hour	0.70	0	0	0
• Employee	case/million man-hour	0	0	0	0
• Contractor	case/million man-hour	0.97	0	0	0
Lost Time Injury Frequency Rate (LTIFR)	case/million man-hour	0	0	0	0
• Employee	case/million man-hour	0	0	0	0
• Contractor	case/million man-hour	0	0	0	0
Injury Severity Rate (ISR)	day/million man-hour	0	0	0	0
• Employee	day/million man-hour	0	0	0	0
• Contractor	day/million man-hour	0	0	0	0
High consequence work related injury rate	day/million man-hour	0	0	0	0
• Employee	day/million man-hour	0	0	0	0
• Contractor	day/million man-hour	0	0	0	0

## OHS Training/Communication

Data	Unit	2020	2021	2022	2023
OHS training hour					
• Employee	hour	18,176	1,680	971	4,536
Contractor	hour	9,216	15,765	19,176	13,188

## Expense and Investment for Safety

Data	Unit	2020	2021	2022	2023
Expense for safety operation					
Operation expense	THB	25,431,249	23,908,000	30,682,500	32,753,000
• Capex	THB	0	0	7,300,000	7,500,000
Expense for safety improvement project					
Operation expense	THB	0	0	0	0
• Capex	THB	15,860,000	23,020,000	0	0

### Employee

Data	Unit	2020	2021	2022	2023
Total employee	person	297	273	262	260
Number of employee by gender					
• Male	person	247	229	218	218
• Female	person	50	44	44	42
Number of employee by type					
• Permanent	person	267	260	251	246
Temporary/contract	person	30	13	11	14
Number of employee by level					
Senior management	person	5	5	5	5
Middle management	person	41	42	40	38
<ul> <li>Junior management</li> </ul>	person	41	46	43	44
Supervisor & staff	person	180	167	163	159

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### Gender Diversity

Data	Unit	2020	2021	2022	2023
Senior management					
• Male	person	5	5	5	5
• Female	person	0	0	0	0
Middle management					
• Male	person	31	31	29	28
• Female	person	10	11	11	10
Junior management					
• Male	person	33	35	33	36
• Female	person	8	11	10	8
Supervisor & staff					
• Male	person	161	152	147	142
• Female	person	19	15	16	17

#### Turnover

Data	Unit	2020	2021	2022	2023
Turnover of permanent employee by age group					
Below 30 years old	person	1	9	6	3
• 30-50 years old	person	3	9	9	5
Over 50 years old	person	2	4	3	3
Turnover rate					
• Male	% of total employee	1.21%	5.68%	5.96%	3.21%
• Female	% of total employee	8.11%	24.32%	13.51%	11.43%

### New Employee

Data	Unit	2020	2021	2022	2023
New employees hired by age group					
Below 30 years old	person	7	6	3	2
• 30-50 years old	person	1	5	2	4
Over 50 years old	person	0	1	0	0
Total new hired rate					
• Male	% of total employee	3.48%	2.69%	0.93%	1.42%
Female	% of total employee	0.00%	16.22%	8.11%	8.57%

### Parental Leave

Data	Unit	2020	2021	2022	2023
Employee take parental leave	person	0	3	2	1
Number of employee return to work after parental leave	person	0	3	2	1

### Employee Development

Data	Unit	2020	2021	2022	2023
Total training hour by level					
Senior management	hour/year	291	197	246	497
Middle management	hour/year	4,615	1,292	1,143	5,574
Junior management	hour/year	1,628	2,010	2,035	3,986
Supervisor & staff	hour/year	6,811	5,844	6,418	8,394
Total training hours by type					
<ul> <li>Environment, health, safety</li> </ul>	hour/year	3,137	1,680	4,651	3,647
Others	hour/year	10,208	7,662	5,191	14,804
Average training hours by level					
Senior management	hour/person/ year	58	39	49	99
Middle management	hour/person/ year	121	34	30	147
Junior management	hour/person/ year	37	46	46	91
Supervisor & staff	hour/person/ year	43	37	40	53

### Grievances about Human Resources

Data	Unit	2020	2021	2022	2023
Number of grievance about human resource	case	0	0	0	0
Number of grievance addressed	case	0	0	0	0
Number of grievance resolved	case	0	0	0	0





# Performance Data 2023: HPC

### Installation Capacity

Data	Unit	2020	2021	2022	2023
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

Data	Unit	2020	2021	2022	2023
Electricity sold	MWh	11,355,053	11,881,482	12,179,559	12,077,298
	GJ	40,878,189	42,773,334	43,846,413	43,478,274
Electricity generated	MWh	12,979,918	13,600,863	13,916,543	13,823,460

### System Efficiency

Data	Unit	2020	2021	2022	2023
Production efficiency					
Efficiency rate	g/KWh	1,087	1,091	1,099	1,073
Availability factor	%	82.33%	86.11%	87.56%	86.55%
Overall efficiency	%	32.57%	32.65%	32.57%	32.64%
Planned outage					
Planned outage frequency	case/year	2	3	3	3
Planned outage hours	hour	2,367	2,489	2,224	1,940
Average planned outage duration	hour/case	1,183.50	829.67	741.33	646.67
Unplanned outage					
Unplanned outage frequency	case/year	17	17	14	13
Unplanned outage hours	hour	2,273	1,152	1,010	1,573
Average unplanned outage duration	hour/case	133.71	67.76	72.14	121.00
Total outage					
Total outage frequency	case/year	19	20	17	16
Total outage hours	hour	4,640	3,641	3,234	3,513
Average total outage duration	hour/case	244.21	182.05	190.24	219.56
Transmission					
Length of transmission line	Km	167	167	167	167
Transmission loss	%	0.20%	0.21%	0.22%	0.21%
Length of distribution line	Km	6	6	6	6

### Energy

Data	Unit	2020	2021	2022	2023
Direct energy consumption	GJ	143,611,047	150,087,092	153,934,759	152,535,294
Fuel consumption within organization from non-renewable sources	GJ	143,611,047	150,087,092	153,934,759	152,535,294
• Coal	GJ	143,353,524	149,877,480	153,727,901	152,345,158
• Diesel	GJ	257,523	209,612	206,858	190,136
Indirect energy consumption					
Electricity purchased	GJ	18,694	3,000	595	677
	MWh	5.193	833	165	188

### Greenhouse Gas (GHG)

	/				
Data	Unit	2020	2021	2022	2023
Power Plant GHG emissions					
• Total GHG (Scope 1 & 2)	ton CO2e	15,539,513	16,150,764	16,509,996	15,758,979
• Direct GHG (Scope 1)	ton CO2e	15,539,471	16,150,714	16,509,953	15,758,931
• Indirect GHG (Scope 2)	ton CO <sub>2</sub> e	42	50	43	48
Other indirect GHG (Scope 3)	ton CO <sub>2</sub> e	1,939	1,793	1,358	1,995
• GHG intensity (Scope 1 & 2)	ton CO <sub>2</sub> e/MWh	1.299	1.359	1.400	1.170
Mine GHG emissions					
• Total GHG (Scope 1 & 2)	ton CO <sub>2</sub> e	625,349	698,235	535,077	316,937
• Direct GHG (Scope 1)	ton CO <sub>2</sub> e	422,693	458,231	534,737	316,937
• Indirect GHG (Scope 2)	ton CO <sub>2</sub> e	202,657	240,004	340	0
SF <sub>6</sub> recharge	Kg	0	0	0	0

### Air

Data	Unit	2020	2021	2022	2023
NO <sub>x</sub>					
Average concentration	mg/Nm³	200.55- 222.87	193.88- 205.64	189.50- 207.83	151.89- 219.94
Standard	mg/Nm³	510	510	510	510
Emission load	ton	7,818	8,387	7,713	5,884
Degree of compliance	%	100%	100%	100%	100%













Data	Unit	2020	2021	2022	2023
SO <sub>x</sub>			·	·	
Average concentration	mg/Nm³	131.90- 135.59	150.80- 154.87	148.73- 159.39	150.03- 187.48
Standard	mg/Nm³	230	230	230	230
Emission load	ton	4,890	6,243	6,121	4,412
Degree of compliance	%	100%	100%	100%	100%
Particulate matter (PM)					
Average concentration	mg/Nm³	4.33-12.36	4.05-9.62	2.52-4.97	2.28-4.45
Standard	mg/Nm³	50	50	50	50
Emission load	ton	303	254	151	100
Degree of compliance	%	100%	100%	100%	100%

### Biodiversity

Data	Unit	2020	2021	2022	2023
Total operation area (Concession area of mining, power plant, dams and transmission line)	KM <sup>2</sup>	76.20	76.20	76.20	76.20
Total operation area: dumping area (Concession area of mining concession area expansion)	KM <sup>2</sup>	-	-	41.45	41.45
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				0
Endangered	number		Survey has	s been	2
• Vulnerable	number	conducted in			3
Near threatened	number		4		
Least concern	number				102

### Water

Vvater					
Data	Unit	2020	2021	2022	2023
Water discharged - by destination					
Total water discharged	megaliter	16,947	50,859	48,538	29,752
Surface water	megaliter	16,947	50,859	48,538	29,752
Groundwater	megaliter	-	-	-	-
Seawater	megaliter	-	-	-	-
Third-party water	megaliter	-	-	-	-
Power plant effluent quality					
• TSS	mg/L	5-82	5-23	5.5-29	5-41
- Standard	mg/L	≤ 50	≤ 50	≤ 50	≤ 50
- Amount	ton	524.90	196.78	193.95	128.28
- Degree of compliance	%	100%	100%	100%	100%
• BOD	mg/L	0.3-4.5	0.3-7	0.5-2.3	0.1-1.7
- Standard	mg/L	≤ 40	≤ 40	≤ 40	≤ 40
- Amount	ton	18.44	25.70	14.54	7.80
- Degree of compliance	%	100%	100%	100%	100%
• COD	mg/L	< 40	< 40	< 40	< 40
- Standard	mg/L	≤ 120	≤ 120	≤ 120	≤ 120
- Amount	ton	-	-	-	-
- Degree of compliance	%	100%	100%	100%	100%
• pH	-	8.6-8.9	8.4-8.9	8.7-9	8-9
- Standard	-	6-9	6-9	6-9	6-9
- Degree of compliance	%	100%	100%	100%	100%
Temperature	°C differential	0-2	0-0.2	0.2	< 3
- Standard	°C differential	< 3	< 3	< 3	< 3
- Degree of compliance	%	100%	100%	100%	100%
Mine effluent quality					
• TSS	mg/L	10.1-49.2	8-50	5-93	5-125
- Standard	mg/L	≤ 50	≤ 50	≤ 50	≤ 50
- Amount	ton	138.95	94.13	249.64	1,482.39
- Degree of compliance	%	100%	100%	100%	100%
• BOD	mg/L	0.1-2.7	0.3-12.9	0.4-9.2	0.1-2
- Standard	mg/L	≤ 50	≤ 50	≤ 50	≤ 50
- Amount	ton	14.28	13.47	10.99	3.26
- Degree of compliance	%	100%	100%	100%	100%













Data	Unit	2020	2021	2022	2023
• COD	mg/L	43.2-78.4	< 40	40-74	25-40
- Standard	mg/L	≤ 150	≤ 150	≤ 150	≤ 150
- Amount	ton	369.55	205.40	282.76	138.27
- Degree of compliance	%	100%	100%	100%	100%
• pH	-	6.0-8.2	6.9-8.8	6.2-8.3	6.7-8.5
- Standard	-	6-9	6-9	6-9	6-9
- Degree of compliance	%	100%	100%	100%	100%
<ul> <li>Temperature</li> </ul>	°C differential	0-2	0-0.2	0.2	< 3
- Standard	°C differential	< 3	< 3	< 3	< 3
- Degree of compliance	%	100%	100%	100%	100%

#### Waste

Data	Unit	2020	2021	2022	2023
Hazardous waste disposed					
<ul> <li>Total hazardous waste</li> </ul>	ton	368,543	64,497	394,116	874
• Reuse	ton	14	5	11.23	6.87
Recycle (liquid)	liter	368,108	63,910	393,730	814,070
Recycle (solid)	ton	7.30	2.25	19.84	2.38
<ul> <li>Recovery (including energy recovery)</li> </ul>	ton	-	30.14	38.40	27.06
<ul><li>Incineration</li></ul>	ton	-	-	-	
Deep well injection	ton	-	-	-	
• Landfill	ton	-	-	-	
On-site storage	ton	414	550	316	550
Other disposal	ton	-	-	-	
Non-hazardous waste disposed					
<ul> <li>Total non-hazardous waste</li> </ul>	ton	5,683	2,675	20,156	1,259
• Reuse	ton	-	-	-	
Recycle (solid)	ton	317	836	18,394	669
<ul> <li>Compositing</li> </ul>	ton	1	0.07	3.47	4.62
<ul> <li>Recovery (including energy recovery)</li> </ul>	ton	-	-	-	
<ul> <li>Incineration</li> </ul>	ton	-	-	-	
Deep well injection	ton	-	-	-	
• Landfill	ton	5,365	1,835	1,758	586
On-site storage	ton	-	4	0	(
Other disposal	ton	-	-	-	
Total waste disposed (hazardous & non-hazardous)	ton	374,226	67,172	414,271	2,133

### Ash & Gypsum

Data	Unit	2020	2021	2022	2023
Production of ash & gypsum					
<ul> <li>Total production of ash</li> </ul>	ton	3,413,872	3,503,887	3,624,740	3,990,755
Fly ash	ton	3,413,872	3,503,887	3,624,740	3,990,755
Bottom ash	ton	-	-	-	-
• Gypsum	ton	706,477	762,372	788,668	502,669
Recycled ash & gypsum					
Fly ash recycled	ton	174,556	61,167	7,151	44,302
Bottom ash recycled	ton	-	-	-	-
Gypsum recycled	ton	2,736	1,021	2,897	20,707

### Spill

Data	Unit	2020	2021	2022	2023
Number of significant oil and chemical spills	case	5	1	1	1
Volume of significant oil and chemical spills	liter	1,500	200	300	30

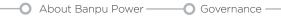
## Environmental Compliance

Data	Unit	2020	2021	2022	2023
Total monetary value of significant fines	case	0	0	0	0
	THB	0	0	0	0
Total non-monetary sanctions	case	0	0	0	0
Case brought through dispute resolution mechanism	case	0	0	0	0

## **Supplier Environmental Assessment**

Data	Unit	2020	2021	2022	2023
New suppliers screened using environ- mental criteria					
<ul> <li>New suppliers registered</li> </ul>	number	162	105	188	187
<ul> <li>New suppliers screened by environ- mental criteria</li> </ul>	number	162	105	188	187
Percentage new suppliers that were screened using environmental criteria	%	100%	100%	100%	100%















#### Return on Environmental Investment

Data	Unit	2020	2021	2022	2023
Environmental expenditure and cost					
Capital investment expense	THB	571,849	417,547	-	-
Operating expense	THB	25,270,414	18,070,946	36,600,600	17,767,586
Environmental improvement project					
Operating expense	THB	604,351	-	2,240,839	1,426,003
• Capex	THB	-	500,000	3,053,805	288,465

### Environmental Grievance Mechanism

Data	Unit	2020	2021	2022	2023
Complaints from related stakeholders on environment					
Significant environmental complaint	number	1	0	0	0
Significant complaint resolved	number	1	0	0	0

### Safety Performance

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Data	Unit	2020	2021	2022	2023
Employee					
Man-hour	hour	1,798,075	1,812,908	1,765,909	2,233,200
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	1	0
• Female	person	0	0	0	0
Number of recordable work-related injuries					
• Male	person	3	0	3	1
• Female	person	0	0	0	0
Number of day lost (excluding fatality and permanent disability)					
• Male	day	0	0	17	0
• Female	day	0	0	0	0

Data	Unit	2020	2021	2022	2023
Fatality rate	person/	0	0	0	0
	million man-hour				
Lost Time Injury Frequency Rate (LTIFR)	person/ million man-hour	0	0	0.57	0
High consequence work related injury rate	person/ million man-hour	0	0	0	0
Total Recordable Injury Rate (TRIR)	day/ million man-hour	1.67	0	1.70	0.45
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	3	3	1	0
Dry heat friction	person	0	0	0	0
Fracture	person	0	0	1	0
Hernia	person	0	0	0	0
• Irritation	person	0	0	0	0
Laceration	person	0	0	0	1
• Puncture	person	0	0	0	0
Rash	person	0	0	1	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	13,871,450	14,685,149	14,710,407	18,909,064
Number of fatality					
• Male	person	0	1	0	0
• Female	person	0	0	0	1
Number of high consequence work related Injuries (excluding fatality)					
• Male	person	0	0	0	0
• Female	person	0	0	0	0



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Data	Unit	2020	2021	2022	2023
Number of lost time injury		·	·		
Male	person	4	0	3	1
• Female	person	0	0	1	0
Number of recordable work-related injuries	3				
Male	person	15	9	9	8
• Female	person	0	0	1	4
Number of day lost (excluding fatality and permanent disability)					
• Male	day	56	0	70	60
• Female	day	0	0	14	0
Fatality rate	person/ million man-hour	0	0.07	0	0.05
Lost Time Injury Frequency Rate (LTIFR)	person/ million man-hour	0.29	0	0.27	0.05
High consequence work related injury rate	person/ million man-hour	0	0	0	0
Total Recordable Injury Rate (TRIR)	day/ million man-hour	1.08	0.61	0.68	0.63
Main type of work-related injury					
Amputation	person	0	0	0	0
• Burn	person	0	0	1	0
Chemical	person	0	0	0	0
Contamination	person	0	0	0	0
• Contusion	person	8	5	3	1
Dry heat friction	person	0	0	0	0
Fracture	person	4	0	4	0
Hernia	person	0	0	0	0
• Irritation	person	0	3	2	0
• Laceration	person	3	1	0	8
• Puncture	person	0	0	0	0
• Rash	person	0	0	0	0
Strain & Sprain	person	0	0	0	0
• Other	person	0	0	0	1
Number of occupational disease					
• Male	person	0	0	0	0
• Female	person	0	0	0	0

Data	Unit	2020	2021	2022	2023
Public					
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

## OHS Training/Communication

Data	Unit	2020	2021	2022	2023
Employee					
OHS training program	number	30	25	33	49
OHS training hour	hour	2,153	3,936	5,020	4,060
Contractor					
OHS training program	number	423	385	257	366
OHS training hour	hour	15,817	23,071	17,796	15,062

### **Expense and Investment for Safety**

Data	Unit	2020	2021	2022	2023
Expense for safety operation					
Operation expense	THB	33,446,374	27,935,055	34,457,355	36,740,000
• Capex	THB	328,800	0	869,000	680,000
Expense for safety improvement project					
Operation expense	THB	0	0	0	0
• Capex	THB	0	0	0	0

### Impacted Community

	•				
Data	Unit	2020	2021	2022	2023
Plant area					
<ul> <li>Impacted household</li> </ul>	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









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Data	Unit	2020	2021	2022	2023
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

Data	Unit	2020	2021	2022	2023
Total employee	person	720	726	743	729
Number of employee by gender					
• Male	person	560	561	576	558
• Female	person	160	165	167	171
Number of employee by nationality					
• Thai	person	262	260	264	262
• Lao PDR	person	457	465	478	466
• China	person	0	0	0	0
• Japan	person	0	0	0	0
• Others	person	1	1	1	1
Number of employee by age					
• Under 30 years old	person	232	221	169	152
• 30-39 years old	person	313	325	382	388
• 40-49 years old	person	108	112	118	121
• 50 years old+	person	67	68	74	68
Number of employee by type					
• Permanent	person	676	673	682	673
Temporary/contract	person	44	53	61	56
Number of employee by level					
Senior management	person	18	15	16	14
Middle management	person	93	90	99	101
Junior management	person	177	183	181	184
Supervisor & staff	person	401	410	420	417
Other (worker)	person	31	28	27	13
Total new employee	person	43	53	84	51
• Male	person	21	33	62	25
• Female	person	22	20	22	26

Data	Unit	2020	2021	2022	2023
Retainment of employee					
Average length of service years	year	5.98	6.54	7.06	7.60
Estimated total employee eligible to retired in the next 5 years	person	29	29	33	33
<ul> <li>Senior Management (DD and up)</li> </ul>	person	7	6	6	4
<ul> <li>Middle Management (section and manager)</li> </ul>	person	5	5	8	8
<ul> <li>Junior Management (senior officer)</li> </ul>	person	11	12	11	12
<ul> <li>Supervisor and staff</li> </ul>	person	5	5	7	9
Other (worker)	person	1	1	1	0
Estimated total employee eligible to retired in the next 10 years	person	66	67	74	67
<ul> <li>Senior Management (DD and up)</li> </ul>	person	13	12	11	8
<ul> <li>Middle Management (section and manager)</li> </ul>	person	15	16	22	22
<ul> <li>Junior Management (senior officer)</li> </ul>	person	20	22	21	18
Supervisor and staff	person	12	12	15	17
Other (worker)	person	6	5	5	2
Turnover	person	53	48	43	64
Resignment	person	35	31	38	32
Retirement	person	3	7	3	5
Other termination	person	15	10	2	27
Total turnover rate	%	7.36%	6.61%	5.79%	8.78%
Volunteer turnover rate	%	4.86%	4.27%	5.11%	4.39%

## Gender Diversity

Data	Unit	2020	2021	2022	2023
Senior management	person	18	15	16	14
• Male	person	14	11	13	13
• Female	person	4	4	3	1
Middle management	person	93	90	99	101
• Male	person	69	66	72	72
• Female	person	24	24	27	29
Junior management	person	177	183	181	184
• Male	person	117	122	122	121
• Female	person	60	61	59	63

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Data	Unit	2020	2021	2022	2023
Supervisor and staff	person	401	410	420	417
• Male	person	333	336	344	340
• Female	person	68	74	76	77
Professional and advisor	person	5	28	27	13
• Male	person	5	26	25	12
• Female	person	0	2	2	1

### Salary/Expense

Data	Unit	2020	2021	2022	2023
Remuneration cost	THB	-	-	-	644,806,480
Retirement benefit cost	THB	-	-	-	9,713,894
Employee development cost	THB	-	-	-	14,394,892

### Employee Development

Data	Unit	2020	2021	2022	2023
Skill/competency needed assessment in the workforce					
Employee who was assessed skill/	person	-	669	658	516
training needs	%	-	80.00	92.54	75.18
Total training hours	hour	16,805	19,241	16,315	11,031
Senior Management	hour	141	123	381	126
Middle Management	hour	1,794	2,824	3,406	1,700
Junior Management	hour	5,571	5,742	6,572	4,209
Supervisor and staff	hour	9,299	10,552	5,956	4,996
Average training hours/person	hour/person	24.39	27.92	27.33	18.82
Total training expense	THB/person	2,654,937	3,530,304	8,490,018	5,519,819
Senior Management	THB/person	35,724	296,957	199,096	84,775
Middle Management	THB/person	127,892	88,666	1,365,229	876,012
Junior Management	THB/person	53,385	78,150	2,531,362	1,488,279
Supervisor and staff	THB/person	71,307	38,852	4,394,331	3,070,752
Average training expense/employee	THB/person	3,734	4,965	14,221	9,419

### Parental Leave

Data	Unit	2020	2021	2022	2023
Employee take parental leave	person	13	10	7	3
	%	8%	6%	4%	2%
Number of employee return to work	person	13	10	7	3
after parental leave	%	8%	6%	4%	2%

### Freedom of Association and Collective Bargaining

Data	Unit	2020	2021	2022	2023
Number of employees covered	person	0	0	0	0
by collective bargaining agreements	%	0	0	0	0

### Absenteeism Rate (Due to Illness)

Data	Unit	2020	2021	2022	2023
Absenteeism rate due to common illness	%	0.53	0.44	1.03	0.70
Absenteeism rate due to occupational illness	%	-	-	-	-

## Complaint from Company Operation

Data	Unit 2020 2021		2022	2023	
Total formal/significant complaint case by communities	case	1	0	0	0
Solved complaint	case	1	0	0	0











# **GRI Content Index**

Banpu Power has reported the information cited in this GRI content index for the January 1 - December 31, 2023 with reference to the GRI Standards. GRI 1: Foundation 2021 Utilties

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNA ASSURAN
General disclosu	ires				
GRI 2: General Disclosures 2021	2-1	Organizational details	Back cover, 9		
	2-2	2-2 Entities included in the organization's sustainability reporting		A gray cell indicates for omission are not	permitted
	2-3	Reporting period, frequency and contact point	6, Back cover	for the disclosur a GRI Sector Standa number is not a	rd reference
	2-4	Restatements of information	6	- number is not a	valiable.
	2-5	External assurance	176		
	2-6	Activities, value chain and other business relationships	10		
	2-7	Employees	151		
	2-8	Workers who are not employees	151		
	2-9	Governance structure and composition	29-34		
	2-10	Nomination and selection of the highest governance body	29-34		
	2-11	Chair of the highest governance body	29-34		
	2-12	Role of the highest governance body in overseeing the management of impacts	21-25		
	2-13	Delegation of responsibility for managing impacts	21-25		
	2-14	Role of the highest governance body in sustainability reporting	17-25, 29-34		
	2-15	Conflicts of interest	29-34		
	2-16	Communication of critical concerns	21-25		
	2-17	Collective knowledge of the highest governance body	29-34		
	2-18	Evaluation of the performance of the highest governance body	21-25		
	2-19	Remuneration policies	24, 34		
	2-20	Process to determine remuneration	24, 34		
	2-21	Annual total compensation ratio	154		
	2-22	Statement on sustainable development strategy	4-5		
	2-23	Policy commitments	35-38	Human Rights Policy	
	2-24	Embedding policy commitments	21-25, 29-34		
	2-25	Processes to remediate negative impacts	38		
	2-26	Mechanisms for seeking advice and raising concerns	38		
	2-27	Compliance with laws and regulations	39-43		

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
	2-28	Membership associations	5, 139		
	2-29	Approach to stakeholder engagement	12-16		
	2-30	Collective bargaining agreements	154		
GRI G4 Electric Utilities Sector	EU1	Installed capacity, broken down by primary energy source and by regulatory regime	143-144		
Disclosures 2010	EU2	Net energy output, broken down by primary energy source and by regulatory regime	143-144		
Material topics					
GRI 3: Material	3-1	Process to determine material topics	17-19	A gray cell indicates	that reasons
Topics 2021	3-2	List of material topics	20	for omission are not permit for the disclosure or that a GRI Sector Standard refer number is not available.	
Economic perfor	mance				
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 201:	201-1	Direct economic value generated and distributed	141		
Economic Performance 2016	201-2	Financial implications and other risks and opportunities due to climate change	85-86		
2010	201-3	Defined benefit plan obligations and other retirement plans	-		
	201-4	Financial assistance received from government	-		
Market presence					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 202: Market	202-1	Ratios of standard entry level wage by gender compared to local minimum wage	-		
Presence 2016	202-2	Proportion of senior management hired from the local community	-		
Indirect economi	c impa	cts			
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 203: Indirect	203-1	Infrastructure investments and services supported	141		
Economic Impacts 2016	203-2	Significant indirect economic impacts	141		



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GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Procurement pra	actices				
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 204: Procurement Practices 2016	204-1	Proportion of spending on local suppliers	144		
Anti-corruption					
GRI 3: Material Topics 2021	3-3	Management of material topics	35-38		
GRI 205:	205-1	Operations assessed for risks related to corruption	35-38		
Anti-corruption 2016	205-2	Communication and training about anti-corruption policies and procedures	35-38		
	205-3	Confirmed incidents of corruption and actions taken	142-143		
Anti-competitive	behavi				
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 206: Anti-competitive Behavior 2016	206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	-		
Tax					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 207: Tax 2019	207-1	Approach to tax	-	Tax Management Standard Practice Manual	
	207-2	Tax governance, control, and risk management	-		
	207-3	Stakeholder engagement and management of concerns related to tax	-		
	207-4	Country-by-country reporting	141		
Materials					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 301:	301-1	Materials used by weight or volume	-		
Materials 2016	301-2	Recycled input materials used	-		
	301-3	Reclaimed products and their packaging materials	-		

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Energy					
GRI 3: Material Topics 2021	3-3	Management of material topics	87-90		
GRI 302:	302-1	Energy consumption within the organization	145		•
Energy 2016	302-2	Energy consumption outside of the organization	-		
	302-3	Energy intensity	145		•
	302-4	Reduction of energy consumption	88		
	302-5	Reductions in energy requirements of products and services	89-90		
Water and efflue	nts				
GRI 3: Material Fopics 2021	3-3	Management of material topics	94-98		
GRI 303: Water	303-1	Interactions with water as a shared resource	94-98		•
and Effluents	303-2	Management of water discharge-related impacts	94-98		•
2018	303-3	Water withdrawal	146-147		•
	303-4	Water discharge	146-147		•
	303-5	Water consumption	146-147		•
Biodiversity					
GRI 3: Material Topics 2021	3-3	Management of material topics	102-104		
GRI 304: Biodiversity 2016	304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	148		
	304-2	Significant impacts of activities, products and services on biodiversity	148		
	304-3	Habitats protected or restored	148		
	304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	103		
Emissions					
GRI 3: Material Fopics 2021	3-3	Management of material topics	78-86, 91-93		
GRI 305:	305-1	Direct (Scope 1) GHG emissions	145		•
missions 2016	305-2	Energy indirect (Scope 2) GHG emissions	145		•
	305-3	Other indirect (Scope 3) GHG emissions	-		
	305-4	GHG emissions intensity	145		•
	305-5	Reduction of GHG emissions	81-83		
	305-6	Emissions of ozone-depleting substances (ODS)	146		
	305-7	Nitrogen oxides (NO,), sulfur oxides (SO,), and other significant air emissions	146	The SO <sub>2</sub> , NO <sub>x</sub> and PM emitted from non-point source are excluded due to neligible amount in power plant's operation.	•















GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Waste		<u> </u>			
GRI 3: Material Topics 2021	3-3	Management of material topics	99-101		
GRI 306:	306-1	Waste generation and significant waste-related impacts	99-101		•
Waste 2020	306-2	Management of significant waste-related impacts	99-101		•
	306-3	Waste generated	147-148		•
	306-4	Waste diverted from disposal	147-148		•
	306-5	Waste directed to disposal	147-148		•
Supplier environ	mental	assessment			
GRI 3: Material Topics 2021	3-3	Management of material topics	65-68		
Environmental	308-1	New suppliers that were screened using environmental criteria	144		
Assessment 2016	308-2	Negative environmental impacts in the supply chain and actions taken	-		
Employment					
GRI 3: Material Topics 2021	3-3	Management of material topics	106-110		
GRI 401:	401-1	New employee hires and employee turnover	152-153		
Employment 2016	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	113		
	401-3	Parental leave	153		
Labor/managem	ent rela	itions			
GRI 3: Material Topics 2021	3-3	Management of material topics	116-120		
GRI 402: Labor/ Management Relations 2016	402-1	Minimum notice periods regarding operational changes	-		
Occupational he	alth and	d safety			
GRI 3: Material Topics 2021	3-3	Management of material topics	130-133		
GRI 403:	403-1	Occupational health and safety management system	130-133		•
Occupational Health and	403-2	Hazard identification, risk assessment, and incident investigation	130-133		•
Safety 2018	403-3	Occupational health services	130-133		•
	403-4	Worker participation, consultation, and communication on occupational health and safety	130-133		•
	403-5	Worker training on occupational health and safety	130-133		•
	403-6	Promotion of worker health	130-133		•
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	130-133		•
	403-8	Workers covered by an occupational health and safety management system	149-151		•
	403-9	Work-related injuries	149-151		•

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Training and edu	cation				
GRI 3: Material Topics 2021	3-3	Management of material topics	121-129		
GRI 404:	404-1	Average hours of training per year per employee	153-154		
Training and Education 2016	404-2	Programs for upgrading employee skills and transition assistance programs	123-128		
	404-3	Percentage of employees receiving regular performance and career development reviews	154		
Diversity and eq	ual opp	ortunity			
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 405:	405-1	Diversity of governance bodies and employees	29, 152		
Diversity and Equal Opportunity 2016	405-2	Ratio of basic salary and remuneration of women to men	154		
Non-discriminati	on				
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 406: Non- discrimination 2016	406-1	Incidents of discrimination and corrective actions taken	142-143		
Freedom of asso	ciation	and collective bargaining			
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 407: Freedom of Association and Collective Bargaining 2016	407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	154		
Child labor					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 408: Child Labor 2016	408-1	Operations and suppliers at significant risk for incidents of child labor	-		
Forced or compo	ulsory I	abor			
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 409: Forced or Compulsory Labor 2016	409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	-		



403-10 Work-related ill health

149-151

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GRI STANDARD/		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL
OTHER SOURCE					ASSURANCE
Security practice					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 410: Security Practices 2016	410-1	Security personnel trained in human rights policies or procedures	-		
Rights of indiger	nous pe	eoples			
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 411: Rights of Indigenous Peoples 2016	411-1	Incidents of violations involving rights of indigenous peoples	-		
Local communiti					
GRI 3: Material Topics 2021	3-3	Management of material topics	134-136		
GRI 413: Local Communities	413-1	Operations with local community engagement, impact assessments, and development programs	136		
2016	413-2	Operations with significant actual and potential negative impacts on local communities	154		
GRI G4 Electric Utilities Sector Disclosures 2010	EU22	Number of people physically or economically displaced and compensation, broken down by type of project	-		
Supplier social a	assessn	nent			
GRI 3: Material Topics 2021	3-3	Management of material topics	65-68		
GRI 414:	414-1	New suppliers that were screened using social criteria	144		
Supplier Social Assessment 2016	414-2	Negative social impacts in the supply chain and actions taken	-		
Public policy					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 415: Public Policy 2016	415-1	Political contributions	142		

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Customer health	and sa	afety			
GRI 3: Material Topics 2021	3-3	Management of material topics	69-72		
GRI 416: Customer	416-1	Assessment of the health and safety impacts of product and service categories	143		
Health and Safety 2016	416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	143		
Marketing and la	abeling				
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 417: Marketing and	417-1	Requirements for product and service information and labeling	-		
Labeling 2016	417-2	Incidents of non-compliance concerning product and service information and labeling	-		
	417-3	Incidents of non-compliance concerning marketing communications	-		
Customer privac					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		
GRI 418: Customer Privacy 2016	418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	143		
System Efficience	у				
GRI 3: Material Topics 2021	3-3	Management of material topics	74-77		
GRI G4 Electric Utilities Sector Disclosures 2010	EU11	Average generation efficiency of thermal plants by energy source and by regulatory regime	143-144		
Access					
GRI 3: Material Topics 2021	3-3	Management of material topics	74-77		
GRI G4 Electric	EU28	Power outage frequency	143-144		
Utilities Sector Disclosures	EU29	Average power outage duration	143-144		
2010	EU30	Average plant availability factor by energy source and by regulatory regime	143-144		















# **LRQA Independent Assurance Statement**

### Relating to Banpu Power Public Company Limited's Sustainability Report for the calendar year 2023.

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

LROA was commissioned by Banpu Public Company Limited (Banpu) to provide independent assurance on Banpu Power Public Company Limited (BPP)'s Sustainability Report 2023 ("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 under its operational control consisting of three combined heat and power (CHP) plants in China, two natural gas-based power plants in USA, an office in China and the headquarters in Thailand 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: a, b
- GRI 302-1 Energy consumption within the organization (2016)(1
- GRI 302-3 Energy intensity (2016)(1
- GRI 303-1 Interactions with water as share resource (2018)(2)
- GRI 303-2 Management of water discharge-related impact (2018)(2)
- GRI 303-3 Water withdrawal (2018)(2)
- GRI 303-4 Water discharge (2018)(2)
- GRI 303-5 Water consumption (2018)(2
- GRI 305-1 Direct (Scope 1) GHG emission (2016)(1
- GRI 305-2 Energy indirect (Scope 2) GHG emission (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)(2)
- GRI 306-1 Waste generation and significant waste-related impact (2020)(2)
- GRI 306-2 Management of significant waste-related impact (2020)(2)
- GRI 306-3 Waste generated (2020)(2)
- GRI 306-4 Waste diverted from disposal (2020)
- GRI 306-5 Waste directed to disposal (2020)(2
- 403-1 Occupational health and safety management system (2018)(3)
- 403-2 Hazard identification, risk assessment, and incident investigation (2018)(3)
- 403-3 Occupational health services (2018)(3)
- 403-4 Worker participation, consultation, and communication on occupational health and safety (2018)(3
- 403-5 Worker training on occupational health and safety (2018)(3)
- 403-6 Promotion of worker health (2018)(3)
- 403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships (2018)(3)
- GRI 403-8 Workers covered by an occupational health and safety management system (2018)<sup>[3]</sup>
- Lost time injury frequency rate (LTIFR)(3) and injury severity rate (ISR)(3)
- Tier-1 Process safety event rate(3)

- Reporting boundary of these performances data include BPP's thermal power business of three coal fired 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), BIC office in China and two natural gas-based power plants in USA (Temple I and Temple II power plant. It's also worth noting that data of Temple II power plant which includes in this reporting is data during July - December 2023, because BPP just acquired Temple II in Jul 2023.)
- Reporting boundary of these performances data include BPP's thermal power business of three coal fired 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 two natural gas-based power plants in USA (Temple I and Templer II power plant) only.
- Reporting boundary of these performances data include BPP's thermal power business of three coal fired 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), two natural gas-based power plants in USA (Temple I and Temple II power plant), BIC office in China and the headquarters in Thailand.

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 LROA's approach nothing has come to our attention that would cause us to believe that BPP has not, in all material

- · Met the requirements above, except for some omissions in the reported data. However, these omissions, and the reason for omission, are clearly stated in the GRI content index and within the report i.e.
- Change in water storage is not applicable because all CHP plants have no water storage which significantly impacts water related issues.
- Air Emission from non-point sources are excluded due to unavailable data.
- Disclosed reliable performance data and information for the selected performance indicators above

Note: The extent of evidence gathering for a limited assurance engagement is less than for a reasonable assurance engagement. Limited assurance engagements focus on aggregated data rather than physically checking source data at sites. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement

#### 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 via:
  - onsite visit to CHP coal-fired power plant in China, i.e. Luannan Combined Heat & Power plant,
  - remote verification of the natural gas-based power plants in the USA (Temple I and Temple II), and
  - desktop review of aggregated data, at the headquarters in Thailand, for all the selected performance indicators,

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

Further observations and findings, made during the assurance engagement, are:

- - Data management systems are established and centralised for the collection and calculation of data associated with the selected specific standard disclosures listed above. However, we believe that
  - More rigorous internal verification will improve the reliability of reported data and information and prevent future
  - The reporting scope of significant air emissions should be extended to include not only major emission sources but also all other applicable sources, i.e. non-point sources. This will enhance BPP's response to addressing air

#### 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

LRQA Lead Verifier

On behalf of LRQA (Thailand) Limited

No.252/123, Muang Thai - Phatra Complex Tower B, 26th Floor, Unit 252/123 (C),

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LRQA reference: BGK00001007











21 March 2024



