BANPU POWER

BRIGHTEN UP THE FUTURE

Sustainability Report
2022

BANPU
POWER

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

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

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

The year 2022, though, seeing the subsidence of COVID-19 epidemic, countries across the world still need time to recover the economy, especially China where the COVID-19 pandemic prevention measures have still been tightening. It was also a year in which the world was faced with challenges in managing energy security resulted from geopolitical conflicts and continued record high fuel prices, affecting the industrial sector, economic development and the well-being of society at large. Meanwhile, the climate change impact has still been an important issue affecting the sustainable development to which all sectors must cooperate in reducing greenhouse gas (GHG) emissions and adapting to changes.

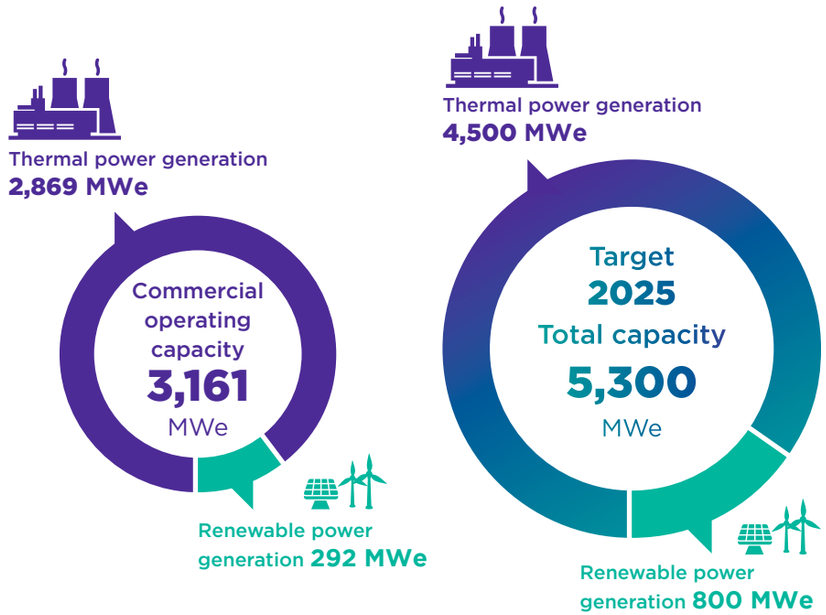
Therefore, maintaining a balance between the energy security and the environmental preservation was the significant challenge in the past year. Banpu Power Plc. (BPP), however, was able to run its business amid various challenges. Risks related to productions and investments were well-rounded mitigated so as to be flexible to change, especially the volatile fuel prices. In addition, innovations were used for continuous improvement, making BPP successful in operating business and maintaining its stability in power production and distribution. This included the ability to make profits in the free electricity market, resulting in earnings before interest, taxes, depreciation and amortization (EBITDA) in a total of THB 9,124 million, an increase of 261%, compared to the previous year.

In response to growing demands of customer groups in the future, BPP continues implementing the "Greener & Smarter" strategy to create a balance for sustainable growth by focusing on investing in the power plants employing clean and eco-friendly technologies, renewable energy business and clean energy technology solutions. Consequently, the Company has thoroughly considered all risks and opportunities so that every project can generate worthwhile returns in the long run. In addition, the synergies with the Banpu Group have also increased investment opportunities in countries where Banpu Group has operations such as United States of America, Japan and Australia.

"Banpu Power was able to run its business amid various challenges. Risks related to productions and investments were well-rounded mitigated so as to be flexible to change."

BPP is committed to continuously improving its environmental, social and governance (ESG) operations as promised to stakeholders since the Company has recognized that sound ESG practices are the key factor to sustainable growth. In the past year, BPP participated in the ESG assessments and was recognized internationally, namely:

- **Commended Sustainability Awards:** BPP was bestowed the "Commended Sustainability Awards" in the category of THB 30,000 - 100,000 million market capitalization and has been selected as Thailand Sustainability Investment (THSI) stock for the 5th consecutive year, evaluated by the Stock Exchange of Thailand.
- **Sustainability Yearbook 2022:** BPP was one of the companies recorded in the "Sustainability Yearbook 2022" based on its ESG performance assessment conducted by S&P Global.
- **TRIS Rating:** BPP was assigned a corporate credit rating of A+ with a stable outlook.
- **Corporate Governance Report of Thai Listed Companies (CGR):** BPP received the "Excellence CG Scoring" from the "Corporate Governance Survey of Listed Companies," organized by the Thai Institute of Directors Association (IOD)
- **ASEAN CG Scorecard:** BPP was awarded the "ASEAN CG Scorecard" for the year 2021 in the category of "ASEAN Asset Class PLCs," resulted from the assessment of good corporate governance of listed companies in the ASEAN region (ASEAN Corporate Governance Scorecard: ACGS).
- **Thailand's Private Sector Collective Action Coalition Against Corruption (CAC):** BPP has been a member of CAC.



In addition, BPP has also placed great emphasis on human capital management and development. As a result, the working environment attracting potential talents has been created, while the employee's competency development has been provided in various means, in line with the "Greener & Smarter" strategy. Furthermore, work rotations have been promoted across the organization so that employees can gain hands-on experiences to prepare themselves for changes in technologies and future business models. BPP has also developed the succession plan and regularly monitored its progress, including cultivating the "Banpu Heart" corporate culture in order to integrate differences into a synergized force within the organization.

On this occasion, we would like to thank all stakeholders for continuously trusting and supporting the Company. These included all BPP employees who have mutually faced the challenges and made this success happened, with a shared commitment to deliver the quality energy contributed to economic and social development with affordable prices and reliable & eco-friendly manner so as to achieve the sustainable development goals in the future in accordance with our determination set.

About This Report

Banpu Power Public Company Limited (BPP) has annually published the sustainability report (Report). Having been developed for the fifth consecutive year, this Report is aimed at disclosing BPP's management procedures and performances related to environmental, social and governance (ESG), and associated with BPP's materiality, previously unveiled in the sustainability report of Banpu Group.

The Report has been developed in alignment with the 2021 edition of Global Reporting Initiatives Standards 2021 (GRI Standards 2021) with additional indicators for electric utilities sector disclosures for the year 2010 (Electric Utilities Sector Disclosures 2010). Moreover, the operating results have been reported in accordance with the United Nations Sustainable Development Goals, while the financial information disclosed has complied with the Thai Financial Reporting Standards. In addition, the contents published in this Report have been analyzed through the assessment of 36 sustainability issues of power business for the year 2022, of which 14 topics are related to BPP's sustainability materiality.

Reporting Period

This Report covers the operating performance from January 1, 2022 to 31 December 2022, as well as subsequent activities carried out within the first quarter of 2023, to provide readers with the most up-to-date information.

Reporting Boundary

BPP reviewed and reported its sustainability performance of all key issues associated, covering businesses in which it has direct management control, namely:

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

The sustainability performance of Temple I Gas-fired Power Plant in USA, in which BPP has direct management control, is disclosed separately in the table annexed. The data reported, however, has not been assured by an external agency, and is not included in BPP's operating results in this Report since the power plant is in the process of improving its data to be the same standard.

The sustainability data of joint-venture companies, in which BPP has no direct management control, are not included in its operating results. Nevertheless, these business entities are playing key roles in generating revenue and creating growth. Therefore, some of their sustainability outcomes, which have not yet been assured by an 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

With a "moderate level of assurance", this Report has been assured at by an external agency that it has been developed under the same database as Banpu Group.

Details of environmental performance from thermal power business in China are as follows:

- GRI 302-1 Energy consumption within organization (2016)
- GRI 302-3 Energy intensity (2016)
- GRI 303-3 Water withdrawal (2018)
- GRI 303-4 Water discharge (2018)
- GRI 303-5 Water consumption (2018)
- GRI 305-1 Direct (Scope 1) GHG emissions (2016) (BPP has adjusted the Global Warming Potential (GWP) according to the IPCC Fifth Assessment Report, 2014 (AR5). As a result, all calculations have been adjusted 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_x), sulfur oxides (SO_2) and other significant air emissions (NO_x, SO_2, PM and Hg) (2016)
- GRI 306-3 Waste generated (2020)
- GRI 306-4 Waste diverted from disposal (2020)
- GRI 306-5 Waste directed to disposal (2020)

Meanwhile, data of social performance contributed by thermal power business in China and offices in Thailand and China are as following.

- GRI 403-8 Workers covered by an occupational health and safety management system (2018)
- GRI 403-9 Work-related injuries (2018)
- Lost Time Injury Frequency Rate (LTIFR) and Injury Severity Rate (ISR)
- Tier-1 Process safety event rate

To ensure that the data reported is accurate according to the reporting principles, BPP is committed to certifying the Report continually, including adding indicators on core sustainability issues in the future.

About Banpu Power

Banpu Power Public Company Limited or Banpu Power (BPP) is a subsidiary company of Banpu Public Company Limited. Established in 1996 and listed on the Stock Exchange of Thailand in 2016, BPP operates and distributes electricity from thermal power business and renewable power business, including energy technologies in the Asia-Pacific region, namely Thailand, Lao PDR, China, Japan, Vietnam, Australia, United States of America and Indonesia.

Over the past 20 years, BPP has been committed to creating sustainable business growth, both in investment and management of power business. Due to its expertise in the power business in combination with the strong synergies within Banpu Group relating to management and operations, BPP has been able to increase its full potential to operate its businesses continuously. With the company's determination to deliver quality energy to drive the economy, society and be friendly to the environment, BPP is ready to study and develop an array of innovations for efficient electricity generation by using advanced, safe and environmentally-friendly technologies in accordance with the "Greener & Smarter" strategy coupled with good corporate governance.

Currently BPP has a total of 42 power plants and projects with an equity-based power and steam production capacity of 3,161 MWe from the power plants already commencing commercial operations, and 176 MW from the projects under development, inclusive of the investments in energy technologies in the joint venture companies. By the year 2025, the company targets to achieve the equity-based power generation capacity of over 5,300 MWe, of which 800 MW are from renewable energy.

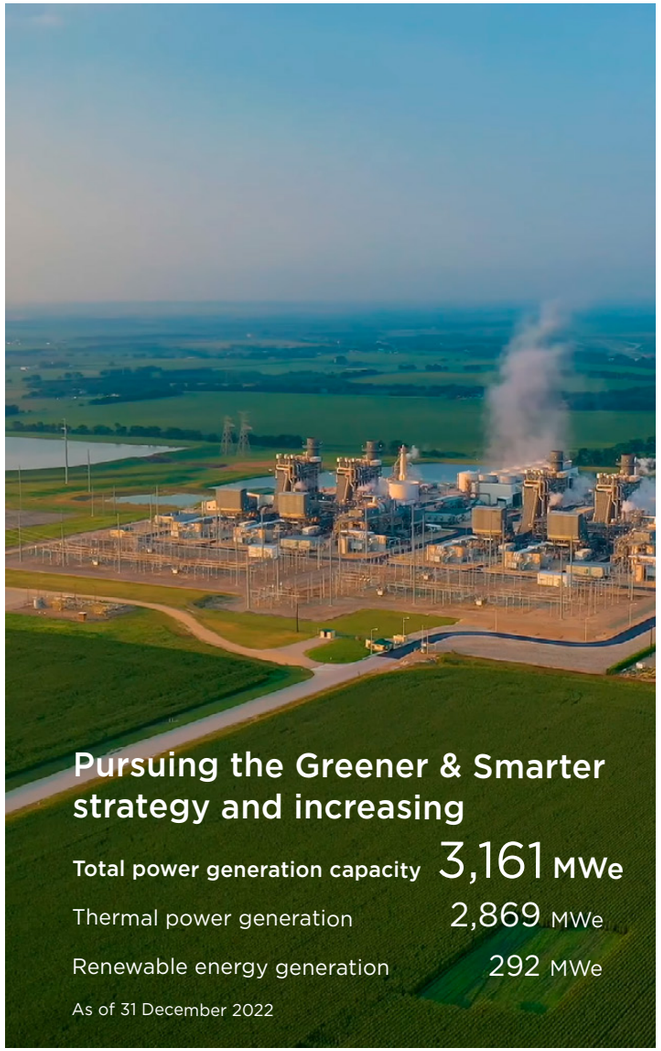
Banpu Power Group Structure

BPP has strengthened its full business potential while study and develop an array of innovations for efficient power generation.

42
power plants and projects

Commercial operating capacity
3,161 **MWe**
Under development production capacity of 176 MW.
(As of December 31, 2022)

Operational Highlights



Sustainability Yearbook
Member 2022

S&P Global

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

Banpu Power wins **SET Awards 2022's "Commended Sustainability Awards"** reflecting its **Sustainability Excellence** from the Stock Exchange of Thailand.

THSI
THAILAND SUSTAINABILITY INVESTMENT 2022

Having been listed as **Thailand Sustainability Investment (THSI)** for the 5th consecutive year.

TRIS RATING
A Strategic Partner of S&P Global

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

Governance

Ranked as 1 of companies bestowed the **Excellence CG Scoring** assessed by the Thai Institute of Directors (IOD).

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

Received an **ASEAN CG Scorecard** in the category of ASEAN Asset Class PLCs from 2021 from ASEAN Corporate Governance Scorecard (ACGS).

No Enviromental, Social and CG relating incidences.

Environment

Expanding the energy technology through an investment in Banpu NEXT Banpu Next partners "Cherdchai Motor Sales Co., Ltd"., **to build a lithium-ion battery assembly plant in Thailand** for e-Buses and all EV segments in Asia-Pacific.

The availability factor (AF) of power plants in which BPP has direct management control was in an average of **94%**.

The greenhouse gas (GHG) emissions intensity 0.609 tonnes CO2e/MWh decreasing 9.9% compared to target.

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

The sulfur dioxide (SO_2) emissions intensity

0.0218

tonnes/GWh

The oxides of nitrogen (NO_x) emissions intensity

0.0379

tonnes/GWh

The particulate matters (PM) emissions intensity

0.00256

tonnes/GWh

The water consumption intensity

0.818

cubic meters/MWh

Social

LTIFR was

Employee 1.49 persons/million working hours **supplier/contractor** 0 person/million working hours

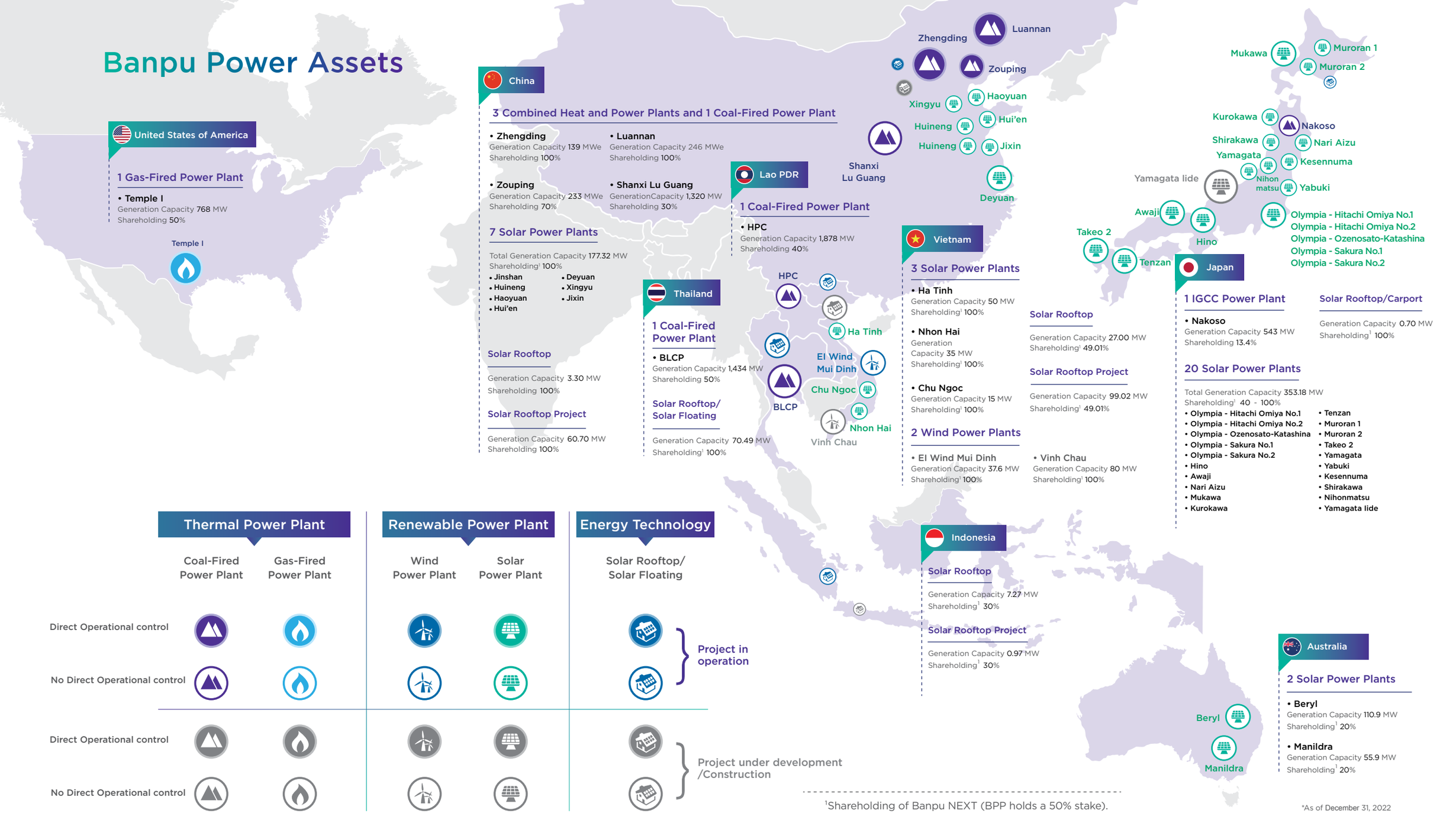
The employee engagement scores were

in Thailand 74

in China 96

Cultivating the **"Banpu Heart"**, a strong corporate culture helping unite the employees in driving businesses score at 84% in Thailand and 92% in China.

Banpu Power Assets



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

[1]Shareholding of Banpu NEXT (BPP holds a 50% stake).

*As of December 31, 2022

Banpu Power Supply Chain

1. Production Factor Management

Stakeholders: Suppliers

- Coal
- Natural gas
- Fuel oil
- Waste gas
- Water
- Other raw materials and chemicals

2. Transportation

Stakeholders: Contractors

- Road freight
- Rail freight
- Sea freight
- Gas pipeline
- Air freight

3. Production

Stakeholders: Contractors, Employees, Government Agencies, Communities, Business Partners

Thermal power plant

- Combined heat and power plant
- Coal-fired power plant
- Gas-fired power plant

Renewable power plant

- Solar power plant
- Wind power plant

- Energy trading

Energy technology and smart energy solutions

- Solar rooftop
- Batteries
- Electric vehicles
- Smart city
- Energy management system

4. Delivery of Products and Services

Stakeholders: Contractors, Employees

- Electricity
- Steam, heat and cooling water
- By-products (ash and gypsum)
- Electricity
- Renewable energy certificate
- Electricity
- Renewable energy certificate
- Solar rooftop solutions with digital platform
- Batteries
- Electric cars, Electric ferries, Travel solutions
- Smart city platform and microgrid system
- Energy management, smart energy generation, storage and utilization

5. Customer Management

Stakeholders: Customers, Employees

Summary of Major Changes and Development in 2022

01 January

Announced the commercial operation of the Shirakawa solar power plant in Japan. **The power plant has a total capacity of 10 MW**, generating and supplying to a community of approximately **2,000 households.**

Entered into a Sale and Purchase Agreement in LCE Ninh Thuan[1] who owns stake in the **35-MW Nhon Hai solar power plant** and LCE Gia Lai[2] who owns stake in the **15-MW Chu Ngoc solar power plant** in Vietnam.

03 March

Signed a Share Subscription Agreement (SSA) to purchase **49.04%** stake in **Solar Esco Joint Stock (Solar Esco)**, a market leader in the renewable energy sector in Vietnam, providing planning, development, engineering, procurement and construction for power generation from solar rooftop.

07 July

Signed a Memorandum of Understanding with two leading business partners – Cherdchai Motor Sales Co., Ltd., Thailand's largest bus operator, and Durapower Holdings Pte. Ltd., a world leading provider of lithium-ion battery storage systems, to build a lithium-ion battery assembly plant for e-Buses and address battery demands in all EV segments in Thailand. **Target in 2026 total production capacity 1 GWh**.

09 September

Invested in **Smart City Fund II** of Eurazeo, a global investment company for energy transition, smart vehicle and industrial technology.

11 November

Invested a **25%** stake in **AltoTech Global**, a developer of automatic IoT platforms to support energy management and optimization in office building, hotels and factories, strengthen energy technology business ecosystem.

[1] Licogi 16 Ninh Thuan Investment Renewable Energy Joint Stock Company

[2] Licogi 16 Gia Lai Investment Renewable Energy Joint Stock Company

Stakeholder Engagement

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

Stakeholder Analysis Process

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

Stakeholder Engagement Standard

In the past year, BPP reviewed stakeholder identification and found 6 groups of **key direct stakeholders** as follows:

Joint venture, Partners, Shareholders, Investors and Financial Institutions

Employees

Government Agencies

Customers

Suppliers/Contractors

Communities and Society

Stakeholders	Engagement Channels	Stakeholders' Issues of Interest	Key Activities
 1. Joint venture, Partners, Shareholders, Investors and Financial Institutions	• The Board of Directors meetings of subsidiaries and joint ventures • The Annual General Meeting of Shareholders • Presentation of investment information on various agendas such as the quarterly meetings and the roadshows, to present information and answer questions • Organizing the analyst meetings • Presentation of information at the Opportunity Day event organized by the Stock Exchange of Thailand • Providing channels for receiving complaints • Conducting a satisfaction survey • Preparation of the annual report and sustainability report • Dissemination of information via the website	• Performance, project development and business growth related to climate change • Financial and accounting policies • Cash flow management • Cost control • Provision of accurate and complete financial information within an appropriate time frame • Risk management • Business operation transparency • Developing and creating innovations to enhance competitive advantage • Qualifications and compensations of the Board of Directors and executives • Operation of socially responsible businesses with strong ESG principle	• Establishing the Greener & Smarter strategy; investing in high efficiency low emission power plant such as natural gas-fired power plant and investing in renewable energy. Formulating climate change policy and management approach; disclosing risks, impacts and climate-related activities that align with Task Force on Climate-related Financial Disclosures (TCFD) recommendation. • Implementing a risk management system in all business units • Conducting ESG data assurance by external parties • Participating in the annual CG assessment. In 2022, the Company received a five-star rating (Excellent) from the Corporate Governance Report of Thai Listed Companies (CGR) 2022, organized by the Thai Institute of Directors (IOD); being certified as a member of Thailand's Private Sector Collective Action Coalition Against Corruption (CAC) • Evaluating qualifications of the Board of Directors for the preparation of a board skills matrix and appointing an replacement director whose qualifications and experience align with BPP's performance targets • Participating in the ESG assessment. In 2022, BPP received the Commended Sustainability Awards from the Stock Exchange of Thailand • Being selected as a member of the S&P Global Sustainability Yearbook 2022 by participating in the ESG performance assessment of leading companies worldwide in the electric utilities industry

Stakeholders	Engagement Channels	Stakeholders' Issues of Interest	Key Activities
2. Employees	• Conducting an employee engagement survey • Conducting a Banpu Heart corporate culture survey • Setting up the Welfare Committee • Setting up the Occupational Health and Safety Committee • Setting up the Innovation Committee • Organizing CSR activities • Organizing activities to promote the corporate culture • Providing channels for receiving complaints • Developing a performance appraisal system • Dissemination of news release within the organization • Preparation of the annual report and sustainability report • Dissemination of information via the website	• Business directions and the organization's sustainable growth	• Establishing two-way communication with employees to regularly create understanding and employees' participation
		• Business ethics and responsibility for employees	• Communicating about corporate governance and integrating it with the corporate culture
		• Fair compensation • Performance appraisal • Career path • Capacity building • Participation in decision-making and allowing employees to voice their opinions • Work-life balance	• Ensuring that labor management complies with laws and international standards • Establishing clear, transparent and fair Key Performance Indicator (KPI) for employees • Allocating budget and providing capacity-building programs; preparing individual development plans • Cultivating Banpu Heart corporate culture
		• Working environment and occupational safety and health	• Regularly checking on working environment and safety • Determining appropriate preventive measures against the COVID-19 pandemic for each workplace, such as developing information systems and other systems to support remote working; providing health checks before starting work; facilitating vaccination for employees, etc.
3. Government Agencies	• Meetings and visits on various occasions • Site visits and operation inspections • Submission of reports and information as required by laws • Disclosure of information as requested • Participation in the projects organized by the government • Preparation of the annual report and sustainability report • Dissemination of information via the website	• Legal and regulatory compliance, and effective management to prevent non-compliance risks	• Compiling and regularly updating relevant laws • Implementing a compliance risk inspection and monitoring system, particularly monthly audits and reporting and independent auditing • Power plants under BPP's direct management are certified for quality, safety and environment management.
		• Corporate governance according to the Code of Conduct	• Announcing the Corporate Governance Policy and Code of Conduct and regularly reviewing and monitoring performance
		• Creating economic, social and environmental values	• Carrying out corporate social responsibility (CSR) projects; paying taxes as required by laws; promoting local procurement and employment • Collaborating and supporting sustainability related projects from government agency
		• Optimal utilization of natural resources	• Carrying out environmental projects to minimize resource utilization and waste generation
4. Customers	• Meeting with customers to devise the work plan, understand market situations, and set delivery targets according to the plan • Meeting for operators to share their experiences on power plants operations and contract management • Visiting customers to learn about their problems and find ways to improve • Disclosing information as requested • Conducting a customer satisfaction survey • Establishing a complaints mechanism via multiple chan nels such as by telephone and via website	• Availability Factor (AF) of electricity and other energy forms as specified in the agreements • Delivery of quality products and services as agreed at affordable prices • Business continuity management to deliver products and services without interruption in case of unexpected crises	• Implementing efficient production and maintaining the AF of electricity and other energy forms as specified to supply affordable and accessible energy according to customers' needs • Preparing the business continuity management plan to ensure continuous delivery of products and services without interruption even amid crises • Implementing the ISO 9001 quality management system

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

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

Stakeholder Satisfaction Survey

In 2022, BPP held a satisfaction survey with 5 stakeholder groups, i.e. joint venture partners, regulatory bodies, consultants, trading partners and financial institutions. The satisfaction survey questionnaire was sent to respondents via online channels to gather information and result was used for process improvement. The result revealed the stakeholders rated their satisfaction at high level.

Topics	Score (%)
Working with BPP people	95
Compliance with partnership terms and conditions	100
Transparent treatment and selection criteria	94
Communication channel effectiveness	93
Partnership contribution together	93
Cooperation in information provision and exchange	96
Overall satisfaction	100

Materiality Assessment

BPP has conducted a business sustainability materiality assessment to prioritize the short- and long-term key sustainability issues. The sustainability strategies and targets with action plan and appropriate indicators for the years 2021 - 2025 have been set in accordance with the **"Greener & Smarter"** strategy. Meanwhile the sustainability progress has been monitored and evaluated continuously, ranging from business units, the Sustainability Committee, the Risk Management Committee to the Board of Directors. In addition, the external assessment results from both national and international agencies are also taken into account to plan for improvements and heighten BPP's sustainability performance standards in order to cope with constant changes and meet the international standards as well as satisfy stakeholders' expectations.

BPP's key sustainability materiality is 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 environmental, social and governance (ESG) issues. The significant materiality has been annually reviewed by the Sustainability Committee. The sources of sustainability issues include:

- Trends or directions of changes in the energy business
- Applicable laws and trends in future changes
- Customer's current and future energy demand
- Best practices and operational standards in the power and other related businesses
- Risks associated with operations and growths, including ESG-related risks.

Materiality Assessment Process

1. Identifying relevant sustainability issues

BPP has identified the sustainability materiality by conducting a study from various sources and stakeholder's engagement. It has collected business-related issues and expectations, risks assessment and changes arisen thoroughly. In the year 2022, the opinions from stakeholders were used for reviewing and identifying the core materiality in this report, such as:

- International stakeholder expectations, such as the ESG performance questionnaires from assessment agencies and financial institutions.
- The results of meetings to clarify the project and gain suggestions from government agencies.
- The results from the meetings to clarify the projects and obtain opinions from joint venture partners, regulators, consultants, suppliers, customers and financial institutions.
- The satisfaction survey results of stakeholders working with BPP by sending the online questionnaires to joint-venture partners, regulators, consultants, suppliers and financial institutions.
- The power plants' customer satisfaction survey results conducted through a joint meeting.
- The results of meetings conducted to update BPP's progress and listen to opinions, such as the shareholders' meetings and security analyst meetings.
- The outcomes of monitoring local and global policy trends, legislation and ESG expectations.
- The results of employee engagement survey, and "Banpu Heart" corporate culture scores, including employee feedbacks derived from the online surveys carried out by external consultants and a focus group within the organization.

2. Significant Materiality Prioritization

2.1 Identifying each materiality significance on BPP's operations

The levels of impacts on BPP, which are consistent with the risk assessment criteria together with likelihood or probability, including risk forecasts, emerging risks or BPP status during the time when the sustainability assessment is conducted, are evaluated.

2.2 Identifying each materiality significance on stakeholders

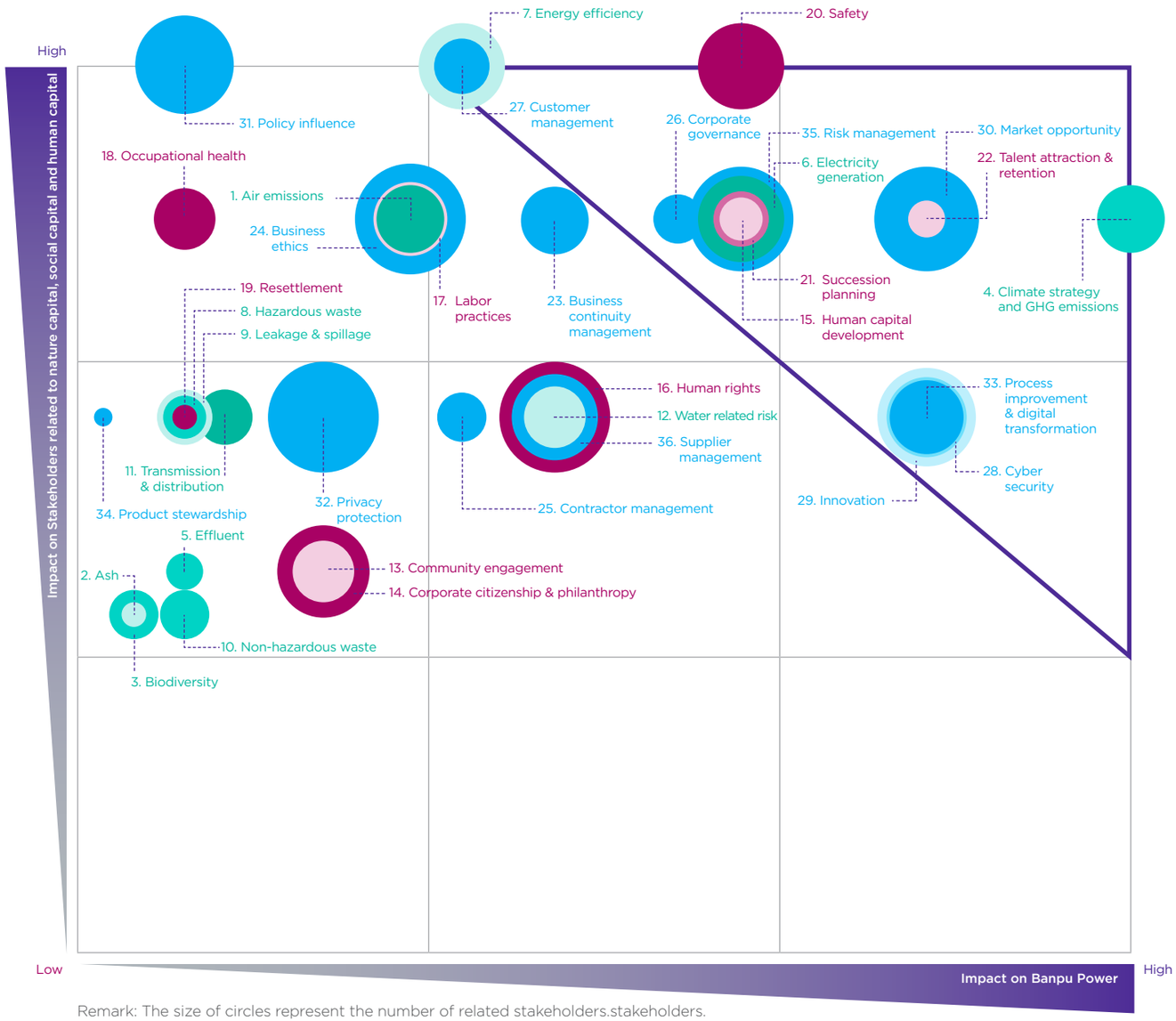
The impact levels on all stakeholders have been assessed by focusing on key stakeholders of each issue affected both positively and negatively from BPP's operations throughout the value chain. The impacts can be divided into 3 dimensions, including the effect on natural capital, social capital and human capital. The human right risk has been integrated into all areas of consideration.

3. Reviewing materiality issues by senior management

4. Considering and approving materiality issues by the Board of Directors

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

Materiality Matrix



Remark: The size of circles represent the number of related stakeholders.stakeholders.

Environment

1. Air emissions
2. Ash
3. Biodiversity
4. Climate strategy and GHG emissions
5. Effluent
6. Electricity generation
7. Energy efficiency
8. Hazardous waste
9. Leakage & spillage
10. Non-hazardous waste
11. Transmission & distribution
12. Water related risk

Social

13. Community engagement
14. Corporate citizenship & philanthropy
15. Human capital development
16. Human rights
17. Labor practices
18. Occupational health
19. Resettlement
20. Safety
21. Succession planning
22. Talent attraction & retention

Governance

23. 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

Materiality Topics 2022

BPP evaluated sustainability issues and prioritized 14 materiality topics which reviewed by top management and approved by the Board of Directors as follows:

Materiality Issues	Stakeholders		Topics in This Report
	Within BPP	Outside BPP	
4 Climate strategy and GHG emissions	• Banpu Group	• Joint venture companies/partners • Customers • Financial institutes • Government and regulatory agencies • Shareholders/investors	Climate Change and Greenhouse Gas Emissions
6 Electricity generation	• Banpu Group	• Joint venture companies/partners • Customers • Financial institutes • Government and regulatory agencies • Shareholders/investors	Electricity Generation
7 Energy efficiency	• Banpu Group	• Joint venture companies/partners • Customers • Financial institutes • Government and regulatory agencies • Shareholders/investors	Energy Efficiency
15 Human capital development	• Employee • Banpu Group	• Joint venture companies/partners	Human Capital Development
20 Safety	• Employee • Banpu Group	• Joint venture companies/partners • Contractors • Customers • Communities • Government and regulatory agencies	Occupational Health and Safety
21 Succession planning	• Employee • Banpu Group	• Joint venture companies/partners	Talent Attraction and Retention
22 Talent attraction & retention	• Employee • Banpu Group	• Joint venture companies/partners	

Materiality Issues	Stakeholders		Topics in This Report
	Within BPP	Outside BPP	
26 Corporate governance	• Employee • Banpu Group	• Joint venture companies/partners • Customers • Financial institutes • Government and regulatory agencies • Shareholders/investors	Corporate Governance
27 Customer management	• Employee • Banpu Group	• Customers	Customer Management
28 Cyber security	• Employee • Banpu Group	• Joint venture companies/partners • Suppliers/contractors • Customers	Process Improvement and Innovation
29 Innovation	• Employee • Banpu Group	• Joint venture companies/partners • Suppliers/contractors • Customers	
33 Process improvement & digital transformation	• Employee • Banpu Group	• Joint venture companies/partners • Suppliers/contractors • Customers	
30 Market opportunity	• Banpu Group	• Shareholders/investors • Joint venture companies/partners • Suppliers/contractors • Customers	Market Opportunity
35 Risk management	• Employee • Banpu Group	• Suppliers/contractors • Customers • Financial institutes • Government and regulatory agencies • Shareholders/investors	Risk Management

Banpu Power Sustainable Development

Banpu Power is committed to operating the energy business with appropriate use of innovations and technologies in order to deliver the energy creating values for economic and social development with affordable prices and reliable & eco-friendly manner. In addition to continuously improving operational efficiency and investing in clean energy, BPP has also increased its ability to adapt itself to today's rapid changes, in particular, the climate change, which poses 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. However, it is considered as significant trials and opportunities to formulate strategies and lay down a foundation for the Company's sustainable development, taking into account the long-term value creation for all groups of stakeholders in the long-run.

Sustainability Policy and Strategy

Affordable

- Investing in sound properties with effective cost management.
- Creating competitive advantages through utilizing innovations and developing employees' competencies.
- Establishing business partners throughout the supply chain.

Reliable

- Raising Corporate Governance (CG) standards.
- Employing a risk management system and looking for business opportunities, striving towards the integrated energy producer and supplier.
- Establishing a monitoring and evaluation system as well as communicating a transparent operating result to stakeholders.

Eco-friendly

- Using innovations and high efficiency, low emissions technologies.
- Engaging stakeholders and communities surrounding the project areas.
- Implementing the environmental, occupational health and safety management system standards.

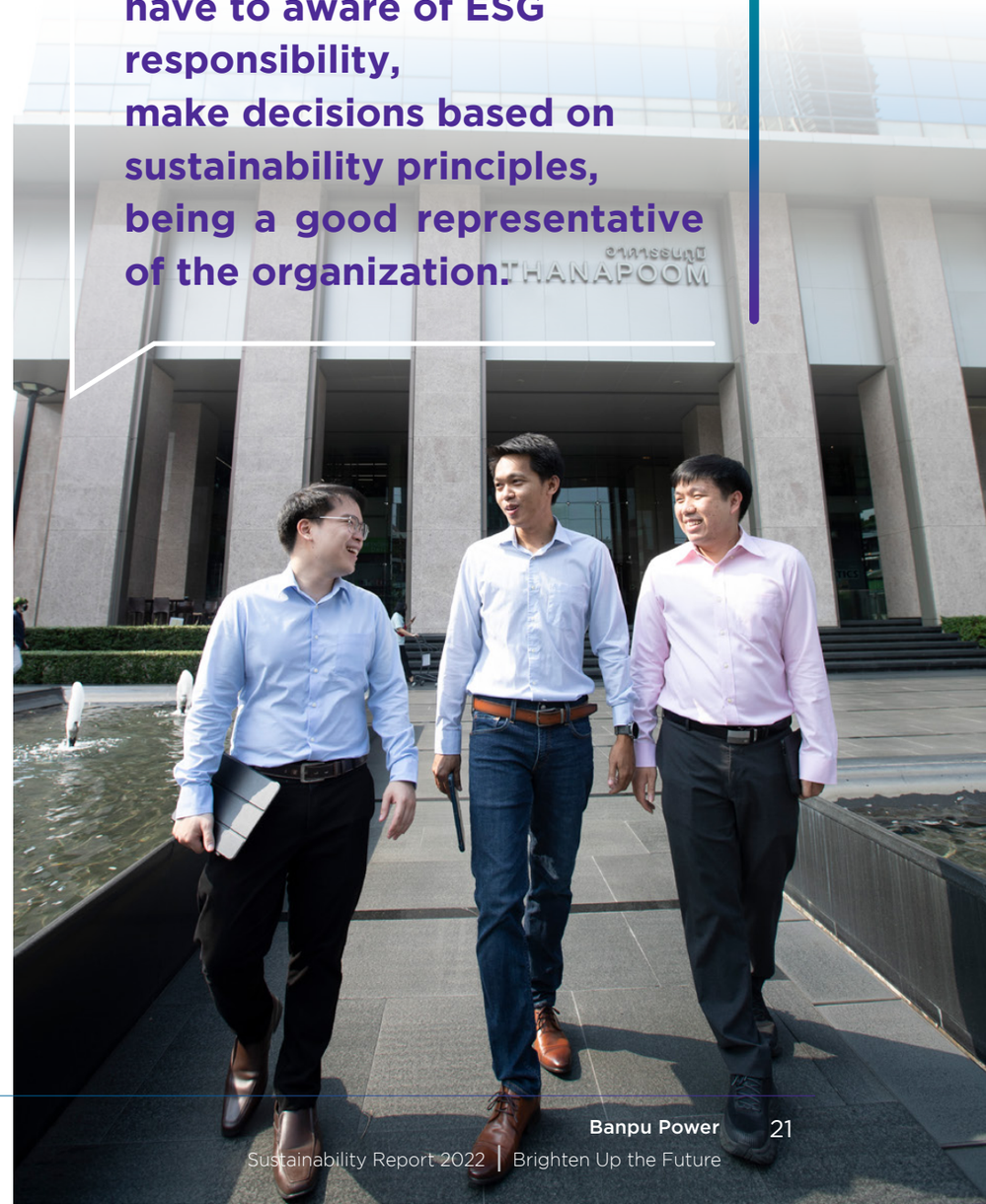
Sustainable Development Governance

The Board of Directors is responsible for governing, setting up strategies and monitoring progress, as well as assessing the sustainability performance. This is driven by the Banpu Power Sustainability Committee, consisting of business unit's top executives with following responsibilities:

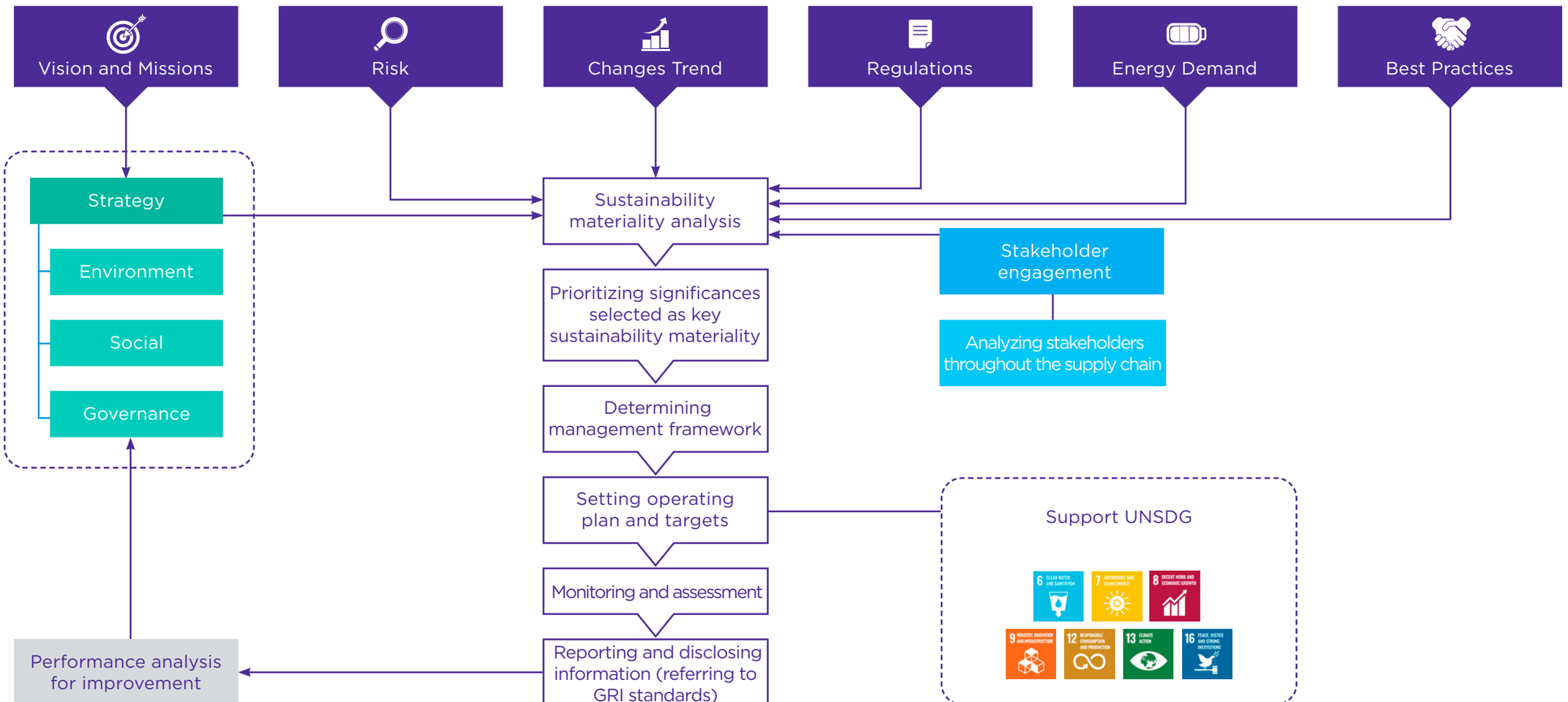
1. **Defining and reviewing the corporate sustainability policy**, the environmental, social and governance (ESG) strategies and other associated policies.
2. **Overseeing and implementing the sustainability policies, including the ESG strategies** for business operations.
3. **Reviewing the stakeholder engagement process** and the materiality assessment.
4. **Reviewing ESG targets** and performance.

The policies and operational directions already approved by the Board of Directors will be implemented in all business units. In addition, BPP has also driven the sustainability through "Banpu Heart" corporate culture, sharing common values of sustainable development that all employees and executives have to aware of social and environmental responsibility. Importantly, all BPP people make decisions based on sustainability principles, being a good representative of the organization to communicate accurate information to stakeholders, such as joint ventures, business partners, suppliers, contractors, sub-contractors, customers and communities.

All employees and executives have to aware of ESG responsibility, make decisions based on sustainability principles, being a good representative of the organization.



BPP has formulated a management framework to drive its operations by taking into account the external factors, inclusion of changes occurring all around. Moreover, strategies and indicators are set for both short- and long-terms, while executives and all employees are assigned with missions to mutually drive towards the successes.



Sustainable Development Performance Assessment

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

The Board of Directors Performance Assessment

The Company has set an agenda for the Board of Directors' appraisal once a year through self-assessment, which is divided into 3 levels as follows:

- 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

have been assessed twice a year, in comparison with Banpu Power's sustainable development goals, divided into annual and long-term ones, including:

- Creating growths in high-efficiency and low-emission power plants in accordance with the "Greener & Smarter" strategy.
- Managing productions to generate returns meeting the targets.
- Raising the ESG operational standards to be internationally recognized in order to build competitive advantages and respond to stakeholders' expectations.
- Fully complying with laws with no incidents related to violations of both local and international ESG laws.
- Building employee engagement, recruitment and competency development.
- Engaging stakeholders through a variety of channels.

Appraising executive and employee performances

twice a year, by using the key performance indicators (KPIs) in terms of operational performances and behaviors promoting the corporate shared values.

Analyzing the operational performance against the industry's best practices or standards (Gap analysis),

such as the analysis for better improvement through S&P Global Corporate Sustainability Assessment (CSA) and the sustainability assessment conducted by the Stock Exchange of Thailand, etc.

2022 Operational Results

March

The Banpu Power Sustainable Development Committee meeting for the year 2022 was organized in order to review the set goals and acknowledge ESG performance, as well as to formulate strategies for environmental, social, corporate governance and decarbonization operations.

June

The Board of Directors approved an improvement of the environmental policy, the water management policy, the biodiversity policy and the occupational health and safety policy.

October

The ESG Summit 2022 was held with an aim to formulate strategies and promote environmental, social and good corporate governance practices, as well as to deploy policies into practical practices throughout the organization according to the "Greener & Smarter strategy". This included the presentation of ESG strategic plans conducted by executives of each business unit.

Banpu Power and Sustainable Development Goals

BPP's ESG performance targets have been aligned and supported the United Nations Sustainable Development Goals (SDGs), this framework could reflect stakeholders' expectations and direction of sustainability policy in the future. BPP has established the ESG performance targets as follows:

The United Nations Sustainable Development Goals (SDGs)		BPP's 2025 Targets
7 AFFORDABLE AND CLEAN ENERGY	7.1 By 2030, ensure universal access to af fordable, 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 the renewable power generation. • Improve energy efficiency and Availability Payment (AP) with the Availability Factor (AF) **not less than 90%** and Forced Outage Factor (FOF) **not more than 5%.** • Key ESG issues are part of the CEO's performance appraisal and cascaded to senior managements.
8 DECENT WORK AND ECONOMIC GROWTH	8.8 Protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants and those in precarious employment.	• All working place environment comply to regulatory requirements and standards. • **No** major incident and occupational illness in employees and contractors - **Zero** Fatality - **Zero** Lost Time Injury Frequency Rate (LTIFR) - **Zero** Total Recordable Injury Frequency Rate (TRIFR) - **Zero** high-consequence injury rate - **Zero** fatality caused by occupational ill-health - **Zero** total recordable occupational ill-health frequency rate - **Zero** Tier-1 process safety event rate • Employee Engagement score of **no less than 80%** • Banpu Heart Score of **no less than 80%** • Proportion of employees having Individual Development Plan (IDP) equivalent to **100%** • All critical positions are identified for succession planning. • Proportion of business units conducing human rights risks assessment of **no less than 70%** in 2021 • **No** significant human rights complaints and **100%** of significant human rights complaints resolved by a dispute resolution mechanism • All business units have a risk management plan with ESG issues. • Customer and Product - **Zero** complaint about customer privacy - **Zero** complaint about safety and environment concerning product use - All customers' complaints are investigated and resolved within an appropriate timeframe.

The United Nations Sustainable Development Goals (SDGs)		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_2 **< 0.0776 tonnes/GWh** - NO_X **< 1.184 tonnes/GWh** - PM **< 0.0230 tonnes/GWh** • Hazardous waste disposal to landfills **< 210 tonnes/year** • Non-hazardous waste disposal to landfills **< 793 tonnes/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^3/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
	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.	• GHG emissions intensity **< 0.676 tonnes CO_2e/MWh** in all operational control thermal power plants • Increase energy generation capacity from renewable energy to **800 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%**
	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 Collective Action Coalition Against Corruption (CAC)

Governance

Banpu Power has always attached to the corporate governance principles, which are the fundamental of sustainable business growth.

Corporate Governance

Stakeholders: • Business partners, shareholders, investors, employees, financial institutions, government sectors

The Board of Directors is committed to conducting business with transparency and efficiency by adhering to the principles of good corporate governance with appropriate risk management and internal control as well as strictly complying with applicable laws and regulations, which is the key element for sustainable business growth. The environmental, social and governance (ESG) strategies have been integrated into operational strategies. In addition, BPP has promoted good corporate governance (CG) through the "Banpu Heart" corporate culture regarding "Adhere to Integrity and Ethics" which the directors, executives and employees using as a code of conduct in operating business. In order to develop and upgrade the BPP's CG system as well as build confidence among shareholders, investors, customers, business partners, communities and all stakeholders both 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 implementation. Key ESG issues are included as part of the annual performance indicators for CEO and senior management of all business units.

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 all directors. There are 3 sub-committees, namely the Governance and Nomination Committee, the Audit Committee and the Remuneration Committee.

The Board of Directors' structure of BPP

5	2	3
Independent directors	Non-executive directors	Executive directors

Independent directors account for 50% of all directors.

BPP has determined that the term of office for an independent director shall not exceed 9 years or 3 consecutive terms. The nominee must not be a director of more than 5 listed companies on the Stock Exchange of Thailand, and a quorum must be at least two-thirds (2/3) of all directors to vote at a meeting of the entire Board of Directors.

BPP arranges a joint meeting between independent directors and non-executive directors without executive directors and management attending the meeting once a year. In 2022, the aforementioned meeting was held on 1 October 2022, with all 7 non-executive directors participating in this meeting. The aim was to provide the opportunity for all directors to present and discuss issues freely, as well as express their opinions and suggestions beneficial for the collaborative works between the Board of Directors and BPP management to mutually work, inclusion of laying out management guidelines for business administration in accordance with the Company's action plans and targets. In addition, the opinions and recommendations relating to the succession plan of BPP's top executives were also given at this meeting.

In addition, the Board of Directors prescribes that 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 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.

	The Corporate Governance and Nomination Committee	The Audit Committee	The Compensation Committee
Board of Directors • Executive Directors • Non-executive Directors • Independent Directore	3 - 1 2	4 - - 4	4 1 1 2
Related Charters	The Charter of the Corporate Governance and Nomination Committee	The Charter of the Audit Committee	The Charter of the Compensation Committee
Major Responsibilities	• Pondering the policy and practice guidelines associated with corporate governance and business ethics. • Following up the implementation of policies and practice guidelines in the Code of Conduct framework. • Recruiting and nominating persons to be the directors, CEO and executive officers. • Monitoring the senior executive succession plan.	• Auditing the financial statements, internal control and risk management systems as well as legal and regulatory compliances. • Examining action plans and performance of the Internal Audit Office. • Considering BPP's information disclosure in case of connected transactions or conflicts of interest. • Governing BPP to comply with the anti-corruption policy. • Selecting, proposing, appointing and terminating auditors, inclusive of purposing for consideration of BPP's auditor's remuneration. • Determining an 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. • 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. • Reviewing and supervising BPP to duly comply with its anti-corruption policy.	• Proposing opinions on remuneration and other benefits management for the Board of Directors, sub-committees and CEO. • Considering the overview and structure of salary and annual bonus.

In addition, the Board of Directors is responsible for setting up policies, governing and assessing the sustainability performance. In 2017, BPP established Banpu Power Sustainability Committee to drive sustainability operations. The CEO is appointed as Chairman of the sustainability committee, while top executives of all business units are appointed as the committee members responsible for creating policies, targets, strategic plans, indicators and performance monitoring. The aim was to ensure that all BPP's business units are able to create values for all stakeholders, have competitive advantages and properly manage risks, being able to adapt themselves to changes as well as grow sustainably. In addition, BPP's materiality assessment has been reviewed and examined to be in line with operational scope expansion, ESG risks and changing trends. The sustainability operation progress will be frequently reported to the Board of Directors.

Performance to Drive Sustainability Operations in 2022

- The policies related to sustainability management were improved to be consistent with the international standards and guidelines used in assessing the sustainability performance. Meantime, the environmental performance was also enhanced, responding to the sustainability assessments. Additionally, the Board of Directors meeting has resolved to approve the revised policies and practices related to environmental, social and governance (ESG), consisting of 4 policies as follows:
  - Environment Policy
  - Water Management Policy
  - Biodiversity Policy
  - Occupational Health and Safety Policy

- Regularly assessing, monitoring and auditing operational and ESG risks, including the emergence of climate change-related impacts.

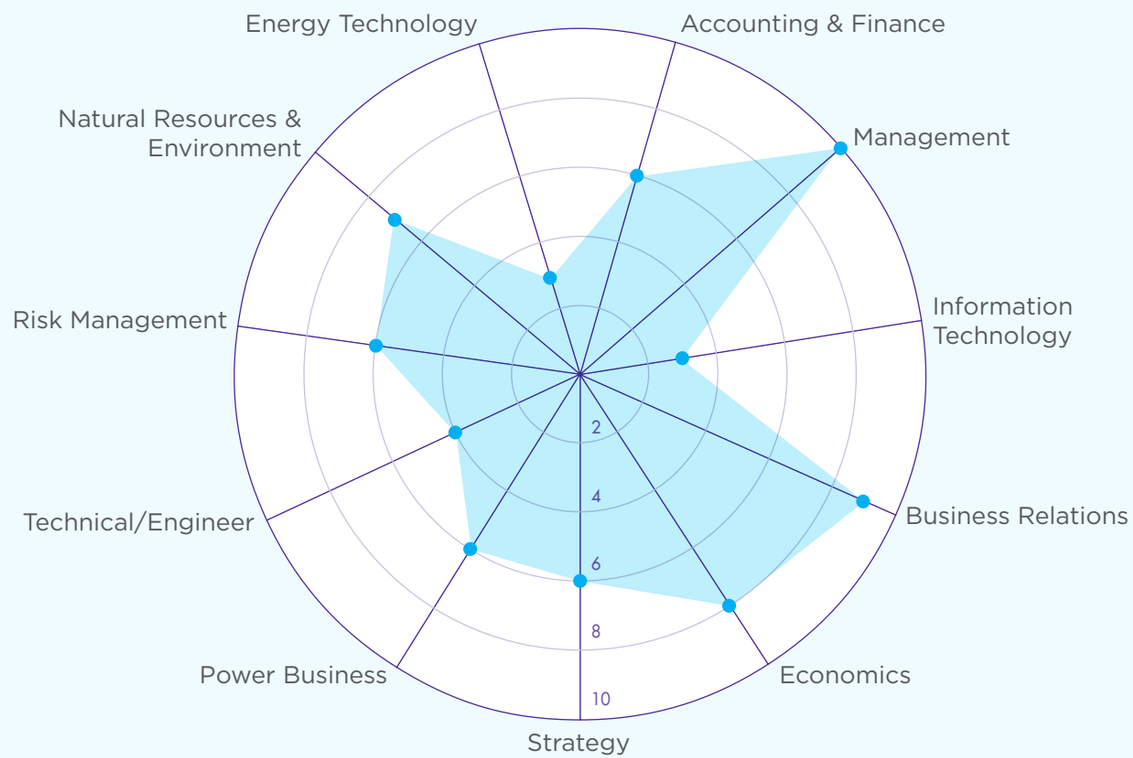
- Defining the sustainability performance indicators or ESG factors as part of CEO's key performance indicator (KPI) appraisal, being comprised of both financial and ESG measurements accountable for 35%. Examples of ESG indicators include the employee engagement levels, the number of significant CG related complaints, cybersecurity incidents, working related fatalities, etc. In addition, the KPIs of senior executives are in line with those of CEO. The Board of Directors evaluates the CEO's performance, while the performance of senior management is assessed by CEO.

Board of Directors Selection

The Governance and Nomination Committee has established the effective criteria and procedures for the Board's nomination, emphasizing the diversified qualifications regarding independence, knowledge, competency, skills, experiences, specific expertise, as well as genders, races and ages. A skill matrix for the Board of Directors has been designed 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.

Composition of the Board of Directors

Board Skill Matrix



Moreover, the Governance and Nomination Committee is responsible for nominating and appointing the CEO before proposing to the Board of Directors for further appointment approval. The CEO selection and nomination are based upon qualifications, knowledge, competencies, energy business operations, experiences in various fields, including managerial capabilities. Furthermore, the 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.

Board Meeting Attendance

In 2022, the directors regularly attended the meetings of the Board of Directors and all three sub-committees as follows:

- The Board of Directors 98.33%
- The Compensation Committee 100%
- The Corporate Governance and Nomination Committee 100%
- The Audit Committee 100%

Board of Directors Performance Appraisal

BPP requires that the performances of the entire Board of Directors, subcommittees, including individual directors be evaluated. The criteria and assessment process are in accordance to standards of the Stock Exchange of Thailand. The Board of Directors has been acknowledged the assessment results with recommendations, while their opinions have been exchanged at the Board of Directors meeting for further improvement and for the utmost benefits of BPP. The appraisal results for the year 2022 are as follows:

Board/Committee	Average Score (5 Scores)	Assessment Results
The entire Board of Directors	4.80	Excellent
Sub-Committees	4.83	Excellent
Individual Directors	4.76	Excellent

Board of Directors Competency Development

In the past year, the Board members participated in various training courses in order to develop their knowledge and skills as follows:

Program	Organizers	Number of Attending Directors
2022 Economic and Energy outlook	Banpu Group	4
Energy sector in U.S.A.	BPP	4
The global society's direction towards "Carbon Neutrality" and business opportunities in Thailand	Dr. Piroon Saiyasitpanich, Secretary-General, Office of Natural Resources and Environmental Policy and Planning	8
Commercial Risk Management for Power US	BPP	9
How AI and IT application to drive Banpu Business?	Banpu Group	2
Derivatives use by Temple I	BPP	8
Decarbonization	Banpu Group	8
Cybersecurity Update and Artificial Intelligence (AI)	Banpu Group	8
ESG Summit	Banpu Group	1
Introduction to carbon capture and storage	BKV Corporation	7

Business Ethics

Stakeholders:
- Shareholders, investors, business partners, financial institutions, suppliers, customers, employees, communities, business competitors, government sector, media

Strategy:
- Conducting business to develop, upgrade and promote good corporate governance (CG) system by adhering to honesty, justice, responsibility and transparency in business operations through cultivating the ethical operation culture. 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:
- BPP's CG assessment result is in the excellent level, while its membership in Thailand Private Sector Collective Action against Corruption (CAC) is renewed.
- Proportion of executives and employees accepting the CG policy and taking a knowledge test on CG and business ethics.
- Proportion of all significant CG complaints to be considered and resolved.
- The number of incidents associated with CG, code of conduct violation and corruption.

Target:
- Operating business on the basis of CG and being part of fighting against corruption.
- All BPP's executives and employees acknowledge the CG policy and code of conduct, using them as a working framework.
- All significant CG complaints are reviewed and resolved, including setting up measures to prevent recurrences.
- None of CG related incidents, business ethics violations and corruption.

Performance:
- The CG assessment result was in the excellent level, representing **94%** while BPP's CAC membership has been renewed.
- Conducting a CG & business ethics knowledge test, of which executives and employees at headquarters accepting the policy **100%**.
- **No** significant CG complaints.
- **None** of incidents related to CG, code of conduct violations and corruption.

Significance and Reporting Boundary

BPP aims to operate business in the best interest of shareholders, investors, customers, business partners, communities and all groups of stakeholders. It, therefore, has put utmost efforts to create business growth with good return in tandem with conducting business with honest, integrity, morality and ethics. A code of conduct manual composed with best practices has been arranged for its directors, executives and employees so that they acknowledge and adhere as the operational guideline. In addition, BPP is committed to respecting and complying with applicable laws, rules and regulations in all areas where it has operated businesses.

Management Approach

BPP has prepared a "Code of Conduct" handbook and communicated it to all directors, executives and employees so as to be used 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 putting top priority to customers and social responsibility, not being involved with politics and taking into account all group of stakeholders. These also include non-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 order to comply with the CG principles for listed companies for the year 2017 issued by the Securities and Exchange Commission, BPP revised its Corporate Governance policy and Code of Conduct handbook in 2021. Consequently, two aspects of contents were added, including a holding of directorship in other companies by a Chief Executive Officer (CEO) and a determination of blackout period for securities trading as well as a report on changes in holding BPP's securities by the Board of Directors and its executives. In addition, the anti-corruption policy was also improved so as to be in line with the guidelines of "Thailand Private Sector Collective Action against Corruption" (CAC) project.

Anti-corruption policy

BPP focuses on developing business ethics to meet the international standards and adheres to operating business in accordance with applicable laws, rules, regulations and criteria related to business operations both domestically and internationally, for example:
- The Good Corporate Governance principle for listed companies by the Stock Exchange of Thailand and the Securities and Exchange Commission
- Articles of Association of the Company according to the Securities and Exchange Act
- Policy Statement on Code of Best Practices of Directors of Listed Companies
- The CG ASEAN Scored Card by ASEAN Capital Market Forum
- Principles of Corporate Governance by the Organization for Economic Co-operation and Development (OECD)

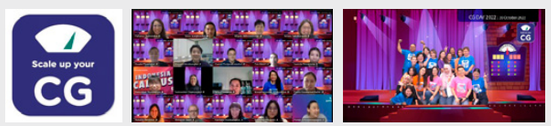
BPP has always fought against all forms of corruption whether directly, indirectly or through the third parties. Hence, the anti-corruption measures have been set up in the "Anti-Corruption Policy", while the guidelines for anti-corruption policy on accepting and offering of gifts, hospitality, or other similar forms have also been established. The aim is to be a clear practice guideline for operating business with honesty, transparency and verifiability in order to develop into a sustainable organization.

Performance

- A membership **in Thailand's Private Sector Collective Action Coalition Against Corruption (CAC)** was renewed in Q4/2022, marking the second term after being certified for the first time in 2019.
- **Having received the "Excellence CG Scoring"** rating or accountable for 94%. The rating received was based on the 2022 corporate governance survey of listed companies organized by the Thai Institute of Directors (IOD). BPP has received this "Excellence CG Scoring" rating for the third consecutive year, reinforcing its commitment and success in sustainability operations, which has taken into account the environmental, social and governance (ESG) issues.
- BPP was ranked as one of 234 listed companies from six ASEAN countries, namely Thailand, Malaysia, Singapore, Philippines, Indonesia and Vietnam. The Company was selected in the **"ASEAN Asset Class Publicly Listed Companies 2021"** group, receiving an ASEAN CG Scorecard of 97.50 points up.
- BPP was appraised by the Thai Investors Association on the topic of **"Tutoring Intensively, receiving 100% Scores"**, or "Tiwkhem Hai Temroi" in Thai. BPP received a full 100% score.

Moreover, 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 2022, BPP continued promoting various activities so as to ensure that all of its personnel know about business ethics and anti-corruption as follows:

- A training on organizational business ethics for newly hired employees with **100%** attendances.
- A knowledge test on corporate governance and business ethics was conducted with executives and employees accepting such policies **100%.**
- **No** significant complaints relating to corporate governance.
- **None** of incidents associated with corporate governance and corruption.
- The corporate shared values survey conducted with employees found that the value of **"Adhere to Integrity and Ethics"** was one of the behaviors BPP employees express the most.
- The corporate culture survey results for the year 2022 found that, overall, the **"Committed"** attribute was in a satisfactory level.
- Organizing activities to promote understanding of business ethics annually or the **"CG Day"** under the theme of **"Scale up your CG".**
- Conducting CG communications in the form of VDO podcast every Friday through the program called **"Friday Morning News Program"** so as to make executives and employees well aware of the CG principles seen up-close, inclusion of reviewing the correct understanding.
- Assessing the corruption risks and developing preventive measures for the year 2022 by conducting risk assessments covering every business in all countries where BPP has investments, both at the subsidiary and joint venture companies, and reporting the results to the Risk Management Committee.
- Continuously operating business in accordance with the guidelines on accepting and offering of gifts, hospitality, or other similar forms in accordance with the "No Gift Policy", and communicating the anti-corruption policy to directors, executives and employees throughout the organization, including stakeholders in order to make the policy into materialized practices.



Corporate Governance Communications

BPP organized an internal CG communication called **"Scale up your CG"** where various doubts related to CG were presented in the form of infographics displayed in a "VDO Clip" so as to make its employees have a clearer understanding about such issues. In addition, the case studies associated with violations of corporate governance and anti-corruption policies and their impacts, which were collected from the news disseminated were broadcast though the VDO Podcasts channel under the "Friday Morning News Program". A test to evaluate employees' understanding was later conducted through the "CG Quiz" so that they know and understand the CG principles, using them as a guideline to prevent them from violating CG policies and code of conduct.

On 22 October 2022, BPP together with Banpu Group organized the CG Day 2022, an annual event to promote and instill employees at all levels to realize the importance of ethical business practices, adhering and insisting on the truth. Approximately 180 employees of Banpu Group participated in the event both on-site and online. This year, BPP organized the ultimate quiz competition topic "Scale up Your CG", by giving opportunities for executives and employees to join in the quiz competition. The aim was to promote understanding and review knowledge about CG principles according to the CG policy and code of conducts, the anti-corruption policy and the whistleblower policy.

Additionally, BPP has set up a CG E-learning & E-testing system for its employees to review and test their understanding about the importance of BPP policies and practices on good corporate governance and business ethics. The CG E-learning is a system educating and creating awareness of employees at all levels about corporate governance policy and code of conduct so that they understand and are able to use such policies in their daily works. Meanwhile, the CG E-Testing will assess employee's understanding levels regarding corporate governance.

Grievances and Anti-corruption Handling Process

The complaints will be turned into the internal fraud management process whereby the Investigation Committee will inspect the grievances received in accordance with the Corporate Fraud Management guideline. The investigation results and recommendations will be compiled and presented to the CEO for making decisions and guiding appropriate corrective solutions. Such complaints will be reported to the Governance and Nomination Committee 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 damages caused by his/her actions to BPP. He/she will also be legally liable for those who have been damaged or effected by the said actions. In addition, BPP also reviews the procedures to find ways to prevent recurrences.

BPP continues focusing on a two-way communication with its employees. In addition to communicating about the best practices it upholds, the Company also encourages its employees at all operational levels to turn these best practices into the true actions in accordance with the organizational standards and business ethics. The best practice communication is run 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

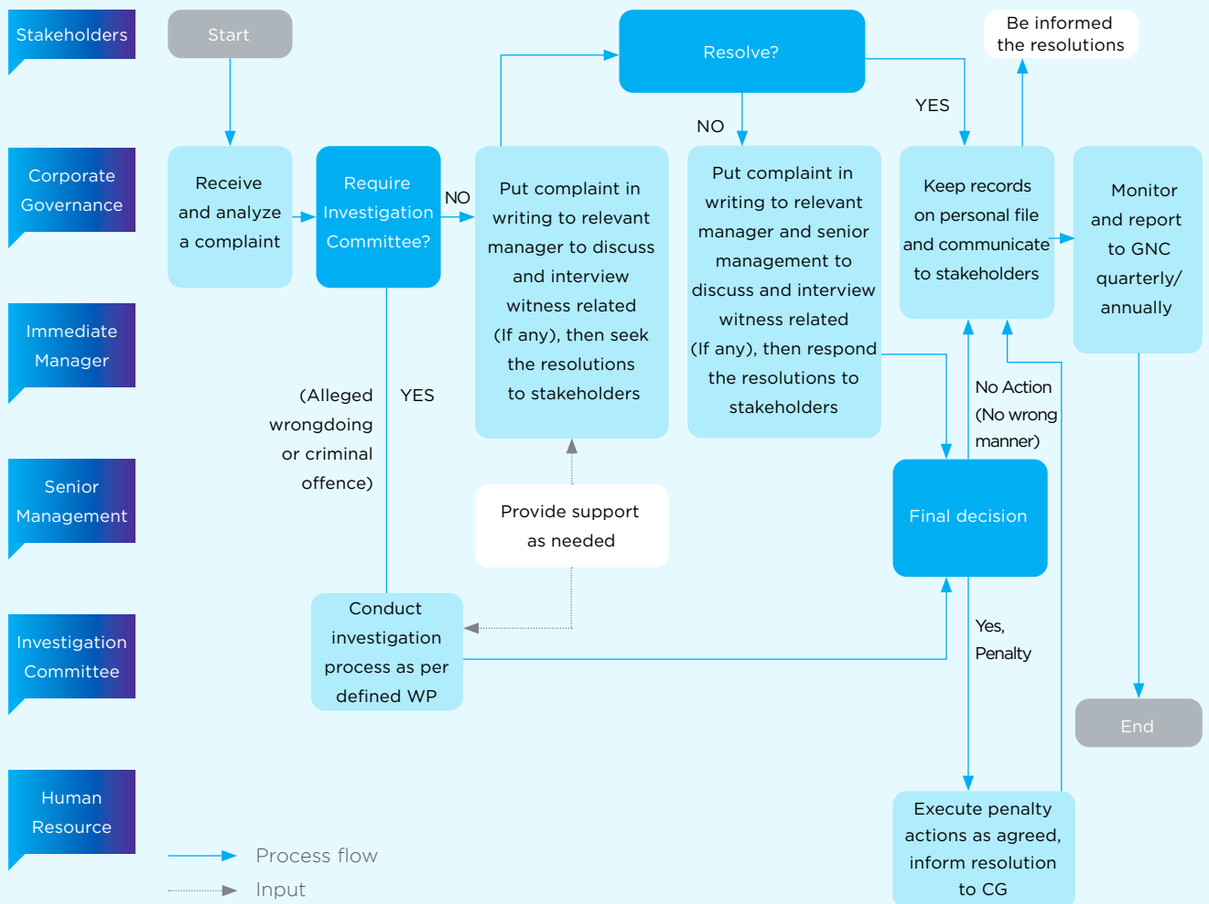
Filing Channels

- **Letter**: the Secretary of the Corporate Governance and Nomination Committee
  Banpu Power Public Company Limited
  26th Floor, Thanapoom Tower, 1550 Petchburi Road, Makkasan,
  Ratchathewi, Bangkok, 10400
- **E-mail**: GNCchairman@banpupower.co.th and/or:
  BPP_Comsec@banpupower.co.th

Company Website

Banpu Power Portal (internal)

Complaint Handling Process



GNC = Corporate Governance and Nomination Committee
CG = Corporate Governance Department
Senior Management = Senior Management related (GSVP level and higher)

Legal and Regulatory Compliance

Stakeholders:
- Government sector, shareholders, business partners, suppliers, customers, employees, communities, civil society

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

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

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

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

Significance and Reporting Boundary

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

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

The boundary of this report covers all business entities in which BPP has direct management control, namely the three combined heat and power (CHP) plants in China, including the offices in both Thailand and China. But, it is exclusion of Temple I Gas-fired Power Plant in which the company has just invested in late 2021.

Management Approach

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

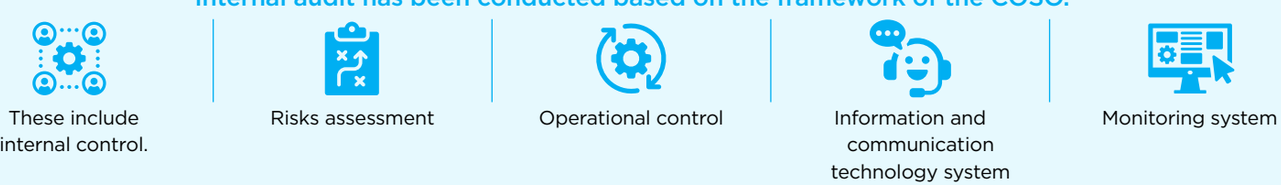
1. **The Corporate Compliance** is responsible for promoting, monitoring and auditing operational performances in accordance with laws and external regulations.
2. **The Internal Audit** is responsible for assessment of internal control systems including a compliance with policies, regulations and operational practice guidelines within the organization.

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

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

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

Internal audit has been conducted based on the framework of the COSO.



Monitoring of Environmental Quality, Safety and Labors Required by Laws

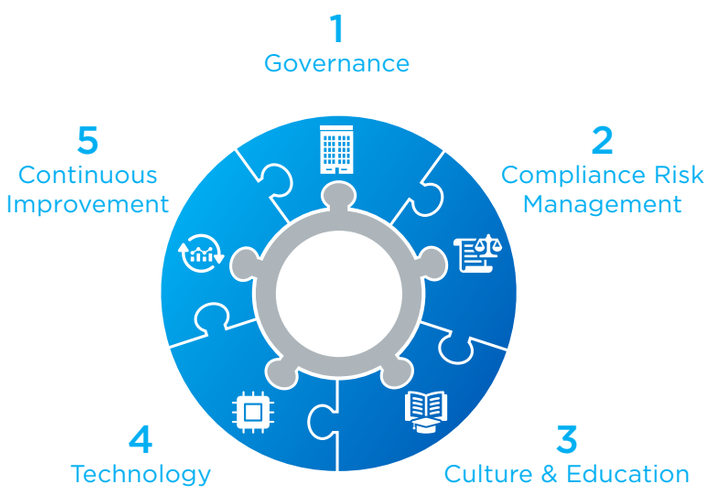
BPP has set up a system to monitor environmental qualities required by legislation and has monitored the possibility of changes related to laws in order to adjust itself promptly through a follow up of the central corporate compliance and internal departments among its business units. This is one of the requirements of the quality, safety and environmental management system.

Besides, the operating performances in the areas have also been regularly audited via following methodologies:

1. **Internal audits conducted through the company'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 the audits of environment and workplace safety, etc.

Quality Assurance Review (QAR)

BPP in collaboration with Banpu Group has assigned all supporting units under the supervision of Corporate Services Department, namely Health, Safety, Environment and Community Engagement (HSEC) Department, Information Technology Department, Legal Department, Procurement and General Administration Department as well as Business Process Management Department, to assess operational qualities and legal compliance. The QAR working group from Bangkok Office has been set up to inspect the operational performances of subsidiaries in each country. Meanwhile, the QAR working group of each subsidiary will conduct a regular review on all business units located in that country at least once a year. In the year 2020, the review benchmarks were revised to be in line with the international standards. In addition, remote audits in the form of self-examination and interviews, as well as remote evidence verification has been implemented since during the COVID-19 pandemic. BPP has deployed the standardized criteria for reviewing the legal compliance quality to suit its business operations, covering five dimensions.



Operational Audits by the International Certified Body

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

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

*Headquarters in Thailand incorporated with Banpu Group

Legal Compliance Audits at Joint Venture Companies

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

Compliance Audits in Key Suppliers

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

Performance

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

In order to operate our business in accordance with legislation and regulations of each country in which BPP has invested, the company proactively operated its businesses and regularly monitored the operational performance in 2022 as follows:

1. **Upgrading the operational standards** by adopting the 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 organization's compliance risks control be the most effective. This was done by using a model known as the "Three lines of defense" to create risk control mechanisms for operations across the organization. Whereas, a framework for implementation and regular follow-up was laid down, including the audits from an independent agency to guarantee the operations' achievements.
2. **Initiating and improving the compliance obligation list** (COL) by interviewing operating staff about working procedures so as to collect all activities and related laws with which the departments must comply. Subsequently, every department has to conduct the Quarterly Self-Assessment Report and submit it to the Corporate Compliance every quarter.
3. **Developing a compliance obligation list (COL) for new business entities** BPP just started developing projects, including the joint venture companies, such as the electronic vehiclebusiness, etc.
4. **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.
5. **Complying with the Personal Data Protection Act 2019** by setting up a working group and announcing policies and practice guidelines, as well as communicating with employees to make them understand about personal data, collecting personal details and establishing the system to prevent information leakage, inclusive of educating and raising awareness among employees.

6. **Adhering to the Royal Decree on Electronic Meetings**, such as the meeting attendees must present himself/herself; recording data transmission (log collection), voting either openly or confidentially, preparing meeting documents in both paper and electronic formats, recording video or audio throughout the meeting and arranging security measures as required by laws.

7. **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 pandemic.

8. **Arranging a meeting to assess legal violation risks** related to environment, social and corporate governance, including labor practice and human rights in all business units BPP has direct management control and joint venture companies such as Banpu NEXT and HPC Power Plant.

9. **Preparing internal media to raise awareness on legal compliance**, including providing knowledge about changing laws and regulations for all levels of employees on a regular basis.

10. **A Compliance in-Hand application** centralizing information and services related to legal compliance and risk management has been developed to facilitate the search for legal data and news related to the organization. Such a Compliance in-Hand application is an integration of the existing system, namely the "Compliance Risk Management Application" (C-RiM) and the "Laws in Hand" applications in order to reduce work redundancy.

For businesses in which BPP has less than 50% of investments with no direct management control, it has supervised the legal and regulatory compliance through the respective Board of Directors as following:

- Risks, including compliance risks, are reported quarterly in order to collect and submit to the Risk Management Committee and the Audit Committee.
- BPP by its Internal Audit Department/Assets Management Department has conducted the joint audits with its business partners at least once a year. In the previous year, there was none of significant incident involved with legal non-compliance.

Personal Data Protection

Currently, Thailand has announced the Personal Data Protection Act 2019 (PDPA), the legislation protecting personal data according to international standards and determining appropriate remedial measures for data subjects whose rights to the protection of personal data are violated.

During 2020 - 2022, Banpu Group took steps to protect personal data in accordance with the law and respect for human rights according to international principles, for example:

- Defining personal data protection policy (Privacy Policy).
- Appointing a Data Protection Officer (DPO).
- Appointing a personal data protection working group, responsible for preparing personal data protection standards in accordance with the Thai and international laws and communicating to create awareness and understanding of personal data protection laws properly in order to prevent risks arising in the organization. BPP is planning to escalate the results by setting up working groups in countries where personal data protection laws have been announced.
- Privacy notice, recording processing activities, stating the purpose of collection/use/disclosure of information and determining the period for using and destroying data so that the personal data will not collect beyond necessity.
- Developing personal data protection standard practice manual.
- Establishing a data breach management procedure.
- Preparation of procedures regarding the rights of the data subject (Data Subject Rights Management Procedure).
- Practicing a crisis communication plan in the event of a breach of personal data under the established internal standards and procedures.

Market Opportunity

Stakeholders:
- Shareholder, partners, suppliers, customers

Strategy:
- Seeking opportunities to expand a production capacity according to the Greener & Smarter strategy by investing in advanced, clean and eco-friendly technology.
- Integrating both conventional energy using high efficiency, low emissions (HELE) and other forms of renewable energy to balance business portfolio.
- Expanding the production capacity of renewable energy, energy technologyand smart energy utilization through an investment in Banpu NEXT.
- Collaborating with Banpu Group to create the business ecosystem contributing mutual benefits. Looking for opportunities for expanding the power plant business towards the integrated energy services provider.

Key Indicators:
- The production capacity growth.

Target:
- Having the power generation capacity of 5,300 MWe by the year 2025, consisting of:
  - Thermal capacity 4,500 MWe
  - Renewable capacity 800 MW

Performance:
- Commercial operating power generation capacity of **3,337 MWe** consisting of:
  - Thermal capacity **2,869 MWe**
  - Renewable capacity **468 MW**

Significance and Reporting Boundary

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

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

Affordable

Reliable

Eco-Friendly

Management Approach

BPP continues looking for business growth opportunities under its expansion plans for power generation and distribution business. BPP has currently operated more than **40 power plants** in strategic countries with economic growth and high electricity demand in the Asia-Pacific region. It has an equity-based capacity totaling **3,337 MWe.** BPP is focusing on expanding the quality megawatts according to the "Greener & Smarter" strategy, taking into account the balance of its business portfolios between thermal power business with high efficiency and low emissions (HELE) technology and renewable energy business as well as energy technology business. BPP is ready to continuously drive the growth of renewable energy and energy technology businesses in tandem with putting high emphasis on climate change impacts and supporting a low-carbon society. It is also seeking additional investment opportunities in the merchant market in potential countries. The aim is to increase the power generation capacity to reach the target of **5,300 MWe by 2025.**

Consequently, balancing the transition of current energy patterns to low-carbon energy in the future is a priority for BPP so as to ensure a smooth transition. Key operating principles leading to such a smooth transition include:

- Expanding production capacity by building upon the business ecosystem within Banpu Group (Banpu Ecosystem).
- Driving the energy technology business growth through an investment in Banpu NEXT and looking for opportunities to expand the business into an integrated energy services and provider in response to growing demand for clean energy.
- Making investment decisions by thoroughly considering both the return on investment and the risks associated with environmental, social and governance (ESG) issues, especially those related to climate change.
- Stabilizing and improving the power plants efficiency in order to deliver power to customers continuously as well as building competitive advantages for the energy trading business in the merchant power market, which is likely to increase in the future, replacing the power purchase agreement (PPA).
- Utilizing digital technology to build competitive advantages, such as using data for energy trading analysis on power plants in the merchant power market, providing power generation services in conjunction with applications for customers to use in energy management, after sales servicesand using applications together with vehicle services.

Looking for opportunities to expand the business into an integrated energy solution provider.

Performance

- **BPP has created continuous growth** with an investment committed capacity of **3,337 MWe**, consisting of 2,869 MWe from thermal power plants and **468 MW** from renewable power plants.
- **Zhengding Combined Heat and Power (CHP) Plant has been selected** as the operator of a solar rooftop installment project in Zhengding City. The goal is to install solar panels on the roofs of governmental buildings, factories and communities for a total of **62 MW**, having potential to increase to **167 MW** by 2023.
- **Successfully investing** in power generation projects according to the "Greener & Smarter" strategy through Banpu NEXT, for example:
  - Installing floating solar cells in Apex Green Industrial Estate with a total capacity of **32 MW**.
  - **Collaborating with two leading business partners**, namely Cherdchai Motors Sales Co., Ltd., the largest bus operator in Thailand, and Durapower Holdings Co., Ltd., a global leader in performance lithium 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 by 2026.
  - **Providing electric vehicles** such as "Ride Sharing"; MuvMi Electric Tuk Tuk service, which has expanded its service areas to12 locations in 2022; 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 **20 smart city projects** under development.

Expanding production capacity to renewable energy, power production technology and smart energy utilization at Banpu NEXT

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 operation. It also intends to support the sustainability operation without limitations, 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 five business groups, namely:

1. **Renewable Energy Generation Business:** Banpu NEXT has generated and distributed electricity from the large-scale renewable energy and expanded its business portfolio, inclusive of large-scale solar power generation, wind energy, rooftop solar power and buoyancy to strategic markets in Asia-Pacific, namely China, Japan, Vietnam, Indonesia, Australia and Thailand. In 2022, Banpu NEXT installed **floating solar panels in the industrial estates** to upgrade them to be the eco-industrial parks with an aim to be a low-carbon and sustainable industrial estate model creating all-round values for the industrial areas, entrepreneurs, communities and environment.

2. **Energy Storage System Business**: Banpu NEXT and its partner, Durapower Holdings Co., Ltd., an energy storage business in Singapore and a global leader in performance lithium-ion battery storage solutions, have developed energy storage systems for electric vehicles (EV) and stationary batteries such as solar systems. And most recently, Banpu NEXT in collaboration with Cherdchai Motors Sales, the largest bus operator in Thailand, and Durapower, have set up lithium-Ion battery plant in Thailand. Due to commencing operations in early 2023, the new battery assembly plant will produce battery systems for Cherdchai's e-Buses and the growing market for electric vehicles (EVs) across Asia-Pacific.

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

4. **E-Mobility Business**: It is Thailand's first integrated alternative transportation system in the form of "Mobility As a Service" (MaaS), including ride sharing, MuvMi electric Tuk Tuk, car sharing, vehicle rental through the HAUP application, 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 a real-time travel and transportation.

5. **Smart City & Energy Management Business**: 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 with an aim for energy consumption efficiency and energy saving. 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 the customers 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 an integrated digital platform and application allowing customers to easily manage energy consumption in real time on a single platform.

Risk Management

Stakeholders:
- Shareholders, business partners suppliers, customers, employee, community

Strategy:
- Employing risk management for decision making and operating aligned with the plans so as to mitigate risks associated with business.
- Using key risk indicators (KRI) to manage risks within the organization.
- Improving risk management system in accordance with the international standards.

Key Indicators:
- Coverage ratio of risk management system.
- Coverage ratio of risk management system associated with ESG issues.

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

Performance:
- All business units setting up risk management system equal to **100%**.
- Coverage ratio of risk management system involved with ESG issues was **97%**.

Significance and Reporting Boundary

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

Management Approach

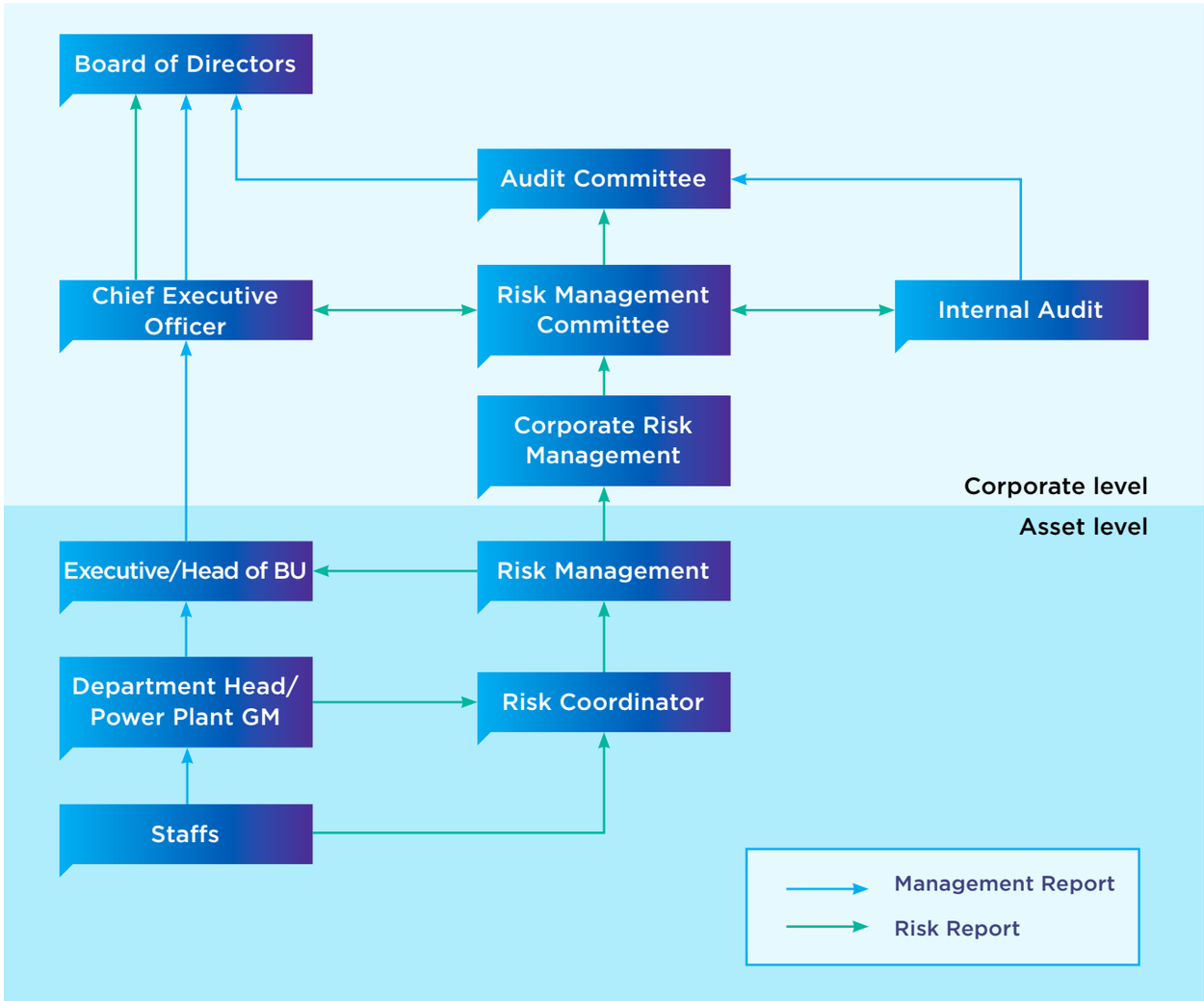
The risk management of BPP is under supervision of the Board of Directors through the Audit Committee. The Risk Management Committee (RMC) has been set up with the roles to manage stakeholders and improve the risk management responsibilities and risks relating to Environmental, Social and Governance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

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

BPP has declared its risk management policy with continued updates. A direct responsibility unit was established to coordinate with all departments to push effective risk management forward across the organization.

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

Risk Management Structure



Risk Categories	Risks
1. Strategic Risks	• Risks related to human resources management and competency development in order to facilitate future growths • Risks involved with investments and operating business to grow in line with the plan set • Risks associated with climate change
2. Financial Risks	• Exchange rate risks • Interest rate risks • Merchant power market risks
3. Operational Risks	• Power generation risks • Safety, occupational health, environmental and social related risks • Natural disaster risks • Risks associated with the COVID-19 outbreaks • Risks related to cyber security and personal data protection
4. Regulatory and Legal Compliances Related Risks	• Risks associated with changes and compliance of regulations and applicable laws
5. Emerging Risks	• Risks relating to emerging technology • Supply chain risks
6. Other Risks	• Human rights risks

Operational Mechanism

BPP has integrated risk management into its business operating plan, paying great importance on values creation for itself and its stakeholders in order to maximize risk management efficiencies. As a result, the risk correlation principle has been used for analyzing correlations of each risk in both positive and negative aspects. BPP's risk management process starts with defining objectives according to the business plan and allocating them into the business units, departments and sections. For identifying risks, the operational level employees who have knowledge and expertise in that operation will determine operational risks under his/her areas in details. The likelihood and impacts of such risks will be assessed along with developing practice guidelines to mitigate risks possibly arisen. The risk management process also includes reporting the results to commander-in-chief and supervisors as well as monitoring the progress regularly.

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

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

Performance

Presently, BPP is employing risks management systems covering all business units, while risk management is also expanded in accordance with BPP's rising investments. This includes a rise in risks management system's coverage ratio on ESG-related issues, accountable for **97%** and achieving the annual target set. It is expected to be entirely implemented in 2023.

Currently, the risk management system has covered all BPP's businesses, including the projects under development. Additionally, the business units have used key risk indicators (KRI) and incorporated risk appetize principles in assessing and mitigating their risks. Meanwhile, the results have been reported to the risk management committee quarterly. Last year, BPP paid great emphasis on raising awareness on the ESG risks. The workshops were organized in order to assess ESG related risks in all business entities in which BPP has management control.

100%

At present, BPP risk management system has covered all businesses and will be increased to cover new investment.

Emerging Risks

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

1. Emerging Technology Risks

A transition in energy technology such as "Carbon Capture, Utilization and Storage" (CCUS), hydrogen technology, micro grid system, renewable energy system, energy storage system and database system and big data analysis or big data system has resulted in the consumer's energy consumption behaviors, including associated regulations focusing more on clean energy technologies and a reduction of their reliance on the centralized transmission systems, causing changes in the nature of electricity demand in many countries, inclusive of Thailand. To respond to such risks, BPP joins hands with Banpu Group to increase business opportunities in renewable energy and energy technology, including the separation and grouping of businesses under Banpu Group to be clearer and agile. The aim is to research data for developing into future products in addition to building upon a development of existing projects. This also includes considering the possibility to restructure the organization to be aligned with the "Greener & Smarter" business strategy and to strengthen the future competitive advantages through an investment in Banpu NEXT Company Limited.

In response to the long-term social risks, specially a lack of skilled workers necessary for future jobs and a loss of careers effected by technology disruption, BPP has developed a learning and development framework in line with its growth strategy, while constantly identifying essential knowledge and skills in the future. The aim is to identify employees' competency gaps and individual development plans (IDP), such as developing digital and emerging technology competencies. In addition, a succession plan has been implemented to support the organizational growth through selecting and developing its personnel to succeed in the important positions in the future to ensure that BPP will have human resources able to effectively drive the corporate strategy, business and emerging technologies.

2. Value Chain Risks

In a state of geopolitical tensions, fuel price volatility, uncertain global economic outlook, inflations, exchange rates and interest rate fluctuations, BPP realizes the importance of value chain risks, starting from the factors used in production to the customer's demand for energy and electricity. BPP, therefore, prepares itself in terms of components used in production, such as having enough and appropriate critical spare parts for power plants, managing the long-term contracts to purchase sufficient coal to meet the operation demand as well as keeping adequate fuel reserves etc. In addition, BPP has managed its investment proportion to reduce fuel risks, for example, having a power plant with a power purchase agreement (PPA) able to accommodate fluctuations in fuel prices and changes caused by laws and government policies. This has enabled BPP to reduce the risks related to fuel price variations and applicable laws.

As for customer's demand for energy and electricity, BPP has adjusted the power plant's operating system to be more flexible and consistent as well as suitable to customers' needs. Moreover, it has tried to create good relationship with customers and also looked for opportunities to get more new customers and new business investments so as to increase the corporate sustainability and in line with the "Greener & Smarter" strategic plan.

Seeking for opportunities to get more new customers and new business investments so as to increase the corporate sustainability.

2022 ESG Summit (ESG Regulatory Risks: Pathway to Practice)

BPP has placed great importance on creating understanding and awareness of environmental, social and governance (ESG) risk management effectively and establishing a strategic direction for its sustainable growth. Thereby, the 2022 ESG Summit (ESG Regulatory Risks: Pathway to Practice) was organized in October. The guest speakers from the leading international consultant firms were invited to this summit attended by the Board of Directors and involved employees via on site and onlines.

Board of Directors Meeting (Board Retreat) and Others

In October, BPP organized the Board Retreat in order to develop a plan and determine its strategic direction, inclusion of assessing opportunities and risks from new technologies and the ESG risks. Throughout the year 2022, the lectures with topics related to risk management were arranged for the Board of Directors as following:

- A direction of global society towards “Carbon Neutrality” and business opportunities in Thailand
- Commercial risk management of the energy business in United States of America
- Cybersecurity Update and Artificial Intelligence (AI)
- Introduction to carbon capture and storage.

BPP has put great emphasis on respecting human rights.

Its Human Rights Policy was announced while risks associated with human rights have been integrated into the organization's core materiality assessments. Additionally, a human rights due diligence has been conducted in order to determine which human rights issues may pose risks to the organization. The due diligent covers the thermal power business in china and solar power business in China and Japan, covering 6 significant risks relating to human rights, namely employment, occupational health and safety, customers and products, communities, security contractors and the supply chain, focusing on both internal and external stakeholders such as employees, partners, customers, contractors and communities, as well as vulnerable groups have been focused. The assessment found that BPP has no risks associated with any of the six human rights issues.

Integrating human rights risk to the Company's Materiality Assessment Process

This is due to BPP's human rights prevention and avoidance in violating civil-liberties when operating businesses, by adhering to the principles of liberty and rights, equalities and human dignities without discriminations based on genders, races, religions or skin colors.

In the past three years, BPP conducted human rights operations, such as:

- **Announcing the Human Rights Policy**
- **Establishing targets for human rights risks assessments by the year 2025**
  - Proportion of businesses assessing human rights equaling to 100%.
  - Proportion of businesses with high human rights risks must have a risk mitigation plan equivalent to 100%.
  - No significant complaints associated with human rights.
  - All complaints involved with human rights must be resolved through the dispute resolution mechanisms.
- **Reviewing the human resources management policy of Banpu Group** by integrating human rights issues according to the international principles, including:
  - Human Rights Policy
  - Non-Discrimination and Anti-Harassment Policy
  - Recruitment and Selection Policy
  - Remuneration Management Policy
  - Employee Relations Policy
  - Employee Training and Development Policy
- Collaborating with Banpu Group to **conduct the human rights risks due diligence all around** in the businesses where BPP has direct management control, accountable for 80%, including the three combined heat and power (CHP) plants in China, Bangkok Office and Beijing Office. It was found that there were no business units being exposed to the high human rights risk. Moreover, the assessment of human rights risks in US businesses is planned by 2025.
- **Assessing human rights risks covering some businesses in which BPP has jointly invested**, namely renewable energy production and energy technology businesses in Banpu NEXT and HPC Power Plant. Furthermore, BPP plans to conduct additional human rights risk assessments for the joint ventures in Vietnam and Thailand by 2023.

Business Continuity Management

Stakeholders:
- Shareholders, business partners, financial institutions, suppliers, customers, employees

Strategy:
- Developing a business continuity management (BCM) plan, covering key business entities.
- Arranging the business continuity plan (BCP) simulation exercise both at the corporate and country levels continuously.
- Communicating appropriate and adequate information to the public during a crisis.

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

Target:
- Proportion of business units organizing the annual BCP exercises at both corporate and country levels equal to 100% in 2025.
- Proportion of key business units conducting the annual BCM drills exceeding 25% in 2022.

Performance:
- Proportion of business units practicing the BCP simulation exercises at corporate and country levels equivalent to **100%**.
- Proportion of major business units conducting business continuity drills accountable for **33%**.
- BPP Crisis Communications Team (CCT) participated in CCT simulation exercise at its Bangkok headquarters.
- Bangkok Office collaborated with Banpu Group as well as Offices in China were certified with the ISO 22301 Business Continuity Management System from external agencies.

Significance and Reporting Boundary

Rapid and unpredictable changes from natural disasters, such as the COVID-19 outbreaks and human actions including terrorisms, cyberattacks, protests, fires and chemical spills and leakages, etc. are all risks affecting BPP's production operations. Therefore, preparedness for responding and resuming operations efficiently and quickly with proper and adequate communications amid emergencies, will help BPP reduce losses and build confidence among its stakeholders.

The boundary of this report covers all business entities where BPP has direct management control, exclusion of the power plant in United States of America, in which BPP has invested in late 2021.

Management Approach

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

Response
Responding to the incidents and preventing extended damage effectively with appropriate communications to internal and external stakeholders.

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

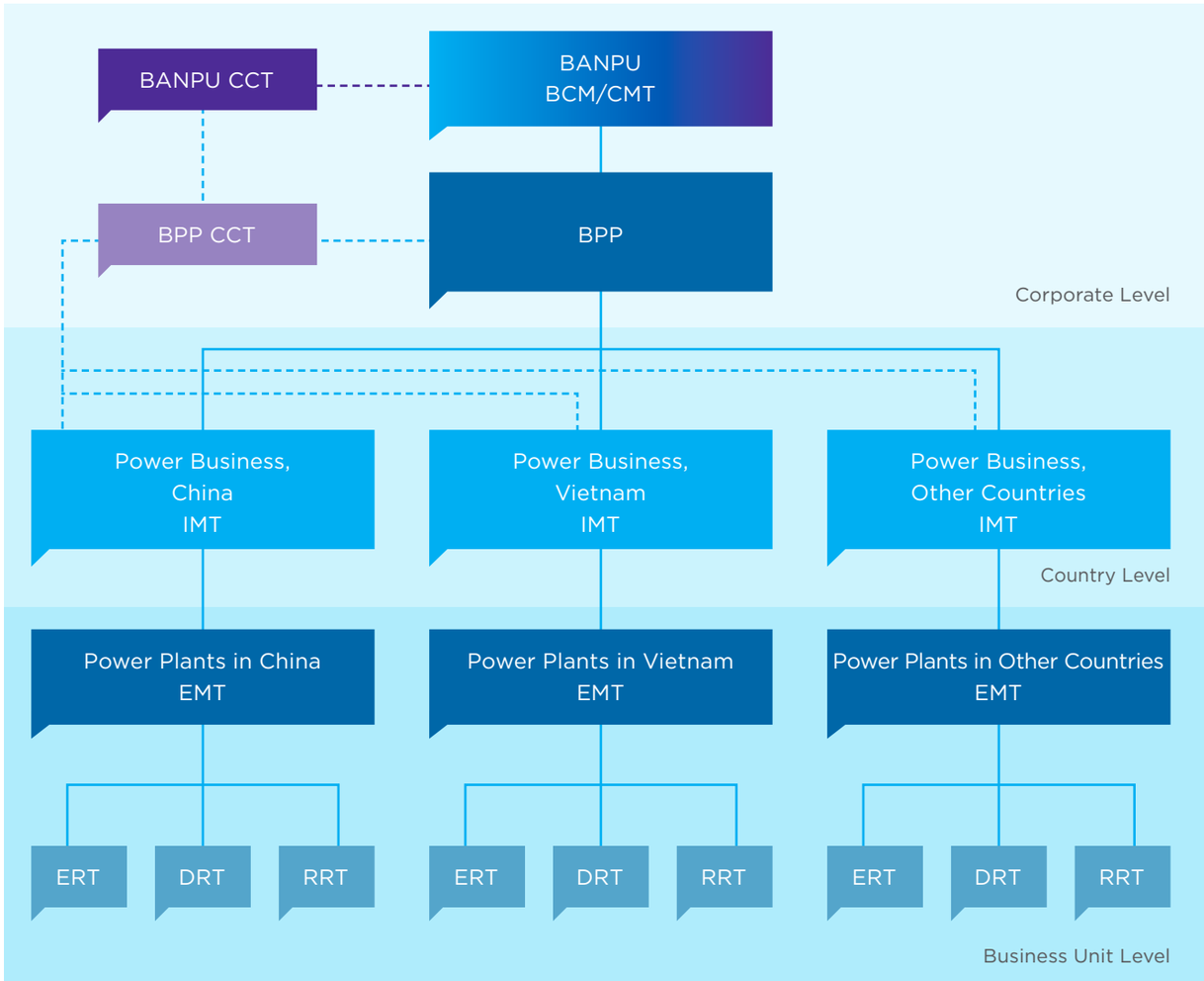
Restore
Rapidly restoring all BPP's activities in the time accepted by stakeholders.

A significant challenge for power business continuity is the damage of large power plants where activity recovery takes time. Consequently, BPP has paid top priority to risks management investments, including incident's severity impacts prevention and control as well as establishing proper and timely communication channels with general public.

BPP's business continuity has been combined, supervised and managed by Banpu Group where BPP's CEO is one of the Crisis Management Team (CMT) assigned to be the event commander 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.

The annual BCP drill has been exercised at both corporate and country levels continuously. The exercise will be arranged alternately, inclusion of monitoring and reviewing the system's operational efficiencies via internal audits and management reviews annually. Furthermore, each business unit is encouraged to share what they have learned in response to various threats so that they can apply the lessons learned to the context of each country.

Crisis Communication Management Structure



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

IMT: Incident Management Team
ERT: Emergency Response Team

CCT: Crisis Communication Team
DRT: Disaster Recovery Team

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

Performance

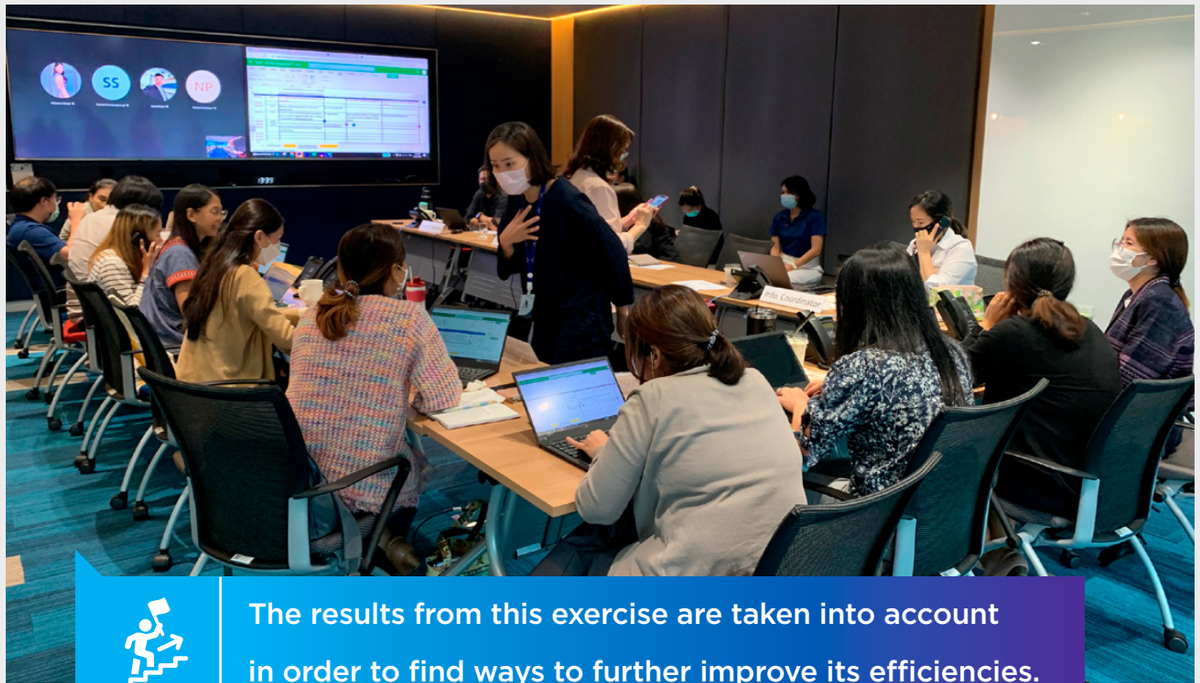
In 2022, BPP was able to operate unceasingly without any production unit's interruptions. This was due to a long-time implementation of BCM system and the company's well preparedness by exercising and improving its business continuity plan continuously. Key actions carried out included:

- Proportion of business units having practiced the BCP exercise at corporate and country levels was **100%**.
- Proportion of major business units conducting the BCP drills accounted to **33%**.
- On 30 June 2022, Banpu Power's CCT participated in the CCT simulation exercise at its Bangkok headquarters. The aim was to have BPP's executives and employees practice communicating to the public with appropriate and adequate information in the event of crises.
- On 13 September 2022, BPP, in collaboration with Banpu Group, **conducted the corporate-level business continuity drill**. Previously, the country-level BCP exercise was conducted at China Office on 28 June 2022 when this BCP drill was organized online in accordance with the business continuity management processes and ISO 22301 requirements. The exercise simulated an epidemic situation in which the office buildings were blocked. The business continuity at each business unit in China, however, has been closely managed in the real situation of COVID-19 outbreaks, which has been handled by the Emergency Response Team (EMT) as seen appropriate for each location. Then, the EMT will report the incident and its responsive actions to IMT and CMT, respectively, for the overall crisis management.

Business Continuity Plan Drill

BPP's Crisis Communication Team (CCT) Exercise

On 30 June 2022, Corporate Communications Department of Banpu Group organized a CCT simulation exercise for BPP at Bangkok Headquarters with an aim to prepare BPP's CCT both executives and employees for conveying information to stakeholders properly. Various scenarios affecting BPP's operations were simulated for this CCT exercise, including the cyberattacks demanding for ransom, the boiler explosion at a power station in China and the typhoon disaster in Vietnam. The results from this exercise are taken into account in order to find ways to further improve its efficiencies.



The results from this exercise are taken into account in order to find ways to further improve its efficiencies.

China Office Practices the Country-level Business Continuity Plan (BCP)

On 28 June 2022, China Office conducted a country-level BCP exercise by simulating a situation where people infected with COVID-19 were found at the office buildings. Then, such office buildings were blocked simultaneously. The exercise results were in accordance with the set objectives whereby the IMT was activated and immediately responded to the incident. Meanwhile, the business continuity plan was implemented with a recovery period targeted for key business units aligned with the objectives. At the same time, the incident was communicated to stakeholders properly. Moreover, this BCP drill has raised awareness when there is a disruption due to the disease epidemic.

Process Improvement and Innovation

Stakeholders:
- Employees, contractors, customers, business partners, shareholders, investors, the government sector

Strategy:
- Promoting production process development and innovation to increase competitive advantages and create production stability.
- Defining "Innovation" as one of the corporate values.
- Setting up an innovation working group to foster innovation throughout the organization.
- Fostering the work process transformation towards a complete digital era (Digital Transformation).

Key Indicators:
- Availability Factor (AF)
- Forced Outage Factor (FOF)
- Cybersecurity and privacy maturity score (Banpu Group's total score)

Target:
- AF is not less than 90%.
- FOF is not over 5%.
- Cybersecurity and privacy maturity score is at least 2.5 (A full score is 5).

Performance:
- Combined heat and power (CHP) plants recorded AF of **94.0%**, and FOF of **0.82%**.
- Gas-fired power plants had AF of **83.2%**, and FOF of **1.45%**.
- Overall cybersecurity and privacy maturity score was **3**.
- The assessment score of a business continuity plan (BCP) simulation exercise to test a responsive plan in case of business and personal data leakages, was **91.67%**. The assessment was rated in a **very good** level, conducted by an external agency.
- Bangkok Office and Beijing Office were certified ISO 27001:2013 Information Security Management Standard.

Significance and Reporting Boundary

"Innovation", in the context of BPP, is the design and selection of high-efficiency and eco-efficiency technologies suitable for each project, including initiatives to transform work processes to be more efficient in the long-term. This can be proceeded by conducting a study on how to improve the procedures. This may include applying emerging technologies to current tasks. Development of production processes and innovations are the key success factors to increase 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 power control.

Management Approach

With an aim to increase workforce efficiency and process reliability, as well as to reduce costs and losses in a production process, BPP has improved its production efficiency based on the principle of "Operational Excellence" together with innovations through participation of employees at all levels. By this means, all employees collaborate to identify problems possibly arising during work, find the root causes through a systematic process and make improvements continuously. This operating process starts with training employees to enable them to identify the problems possibly arising during working processes with supports from a corporate team. Moreover, a knowledge exchange between business units for mutual learning has been conducted, while employees have the opportunity to present the projects initiated and implemented with fruitful results.

BPP drives innovations through a creation of corporate culture—the "Innovative" value, which is one of the three corporate shared values. Innovation has been promoted through various activities to make all employees understand the importance of applying innovation to their works. BPP encourages its employees to present ideas and innovations in order to turn those initiatives into tangible practices. It also promotes learning within the organization in the form of a "Learning Application Project", encouraging employees from different departments to work on projects together, by using creativity and innovation. The project initiated, then, will be presented to the committee to approve on budgets for operation.

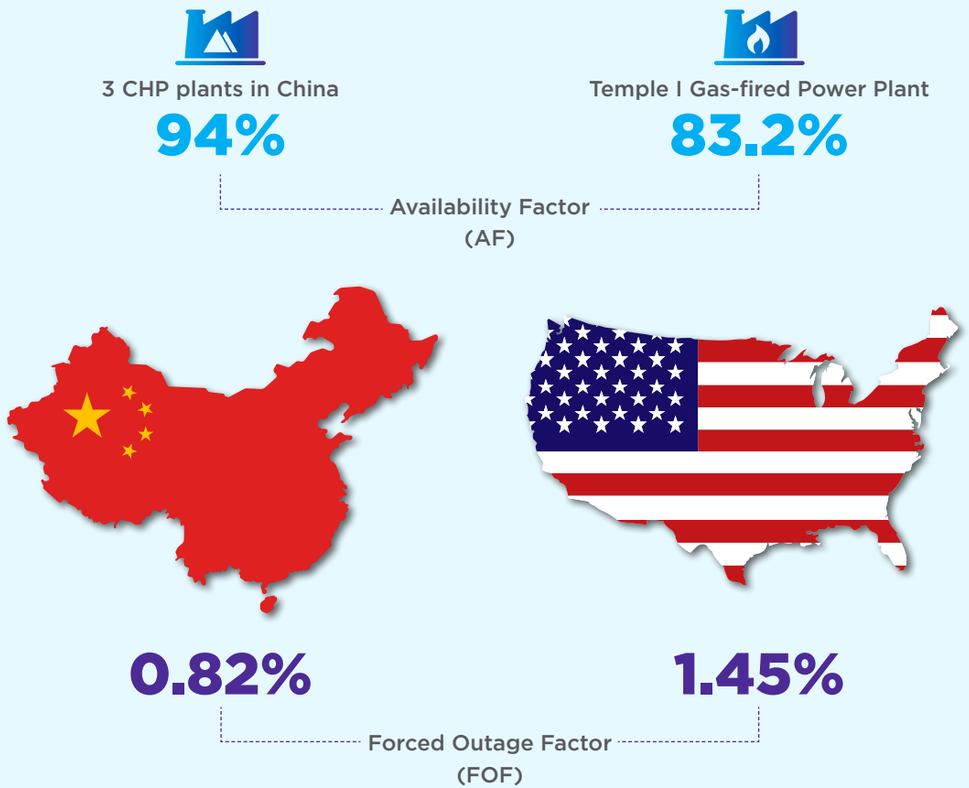
BPP has set up the "Innovation Committee", comprised of employee representatives, who are responsible for promoting innovation within the organization. In addition, knowledge management and an annual "Innovation Convention" have been conducted to transfer innovation knowledge within the organization. The annual "Innovation Convention" aims to exchange knowledge and experiences, as well as to demonstrate the outstanding performance of employees in implementing innovative projects.

BPP has employed a mechanism to screen production development projects, innovations and various digital projects thoroughly, by setting evaluation criteria covering the areas of investment values, risks, financial returns, and environmental, social and governance (ESG) factors, as well as sustainability. This includes expanding the projects for implementing in other production units.

Due to its awareness of future operations, in which digital technology will play an important role in creating competitive advantages, and in according with the "Greener & Smarter" strategy, Banpu Group places great emphasis 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 quickly. Meanwhile, the infrastructure laid down must be highly flexible to support business expansion. 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 required, while a safety must be tested. Furthermore, preventive measures have also been established to be always up-to-date, while a Global Information Security Officer (GISO) has been employed with duties on and responsibilities for supervising information security, digital technology risks and legal compliance across Banpu Group.

Certified ISO 27001:2013 Information Security Management Standard at Bangkok Office and Beijing Office.

Performance



BPP has implemented innovation projects with an aim to create competitive advantages, improve performance and stability in the long-term. Due to production process improvement and innovation implementation in the last year, the availability factor (AF) and the forced outage factor (FOF) of power plants, in which BPP has management control, met the target set. The power plants **were able to operate their production efficiently and stably according to the target**.

Process Improvement and Innovation Projects

1. **The "waste heat recovery from utilizing de-white facility" project** implemented at Luannan CHP Plant.

2. **The thermal energy conservation for maximum efficiency project,** conducted by Zhengding CHP Plant.

3. **The project to increase production availability** of Temple I Power Plant.

4. **The Advanced Leakage Monitoring** and Alerting Software (ALMA) project.

5. **The project to increase boiler's combustion efficiency** of HPC Power Plant.

Information Security Operations of Banpu Group

- Assessing information security systems and risks by external consulting firms to look for improvement opportunities. The overall assessment score was **3 (out of 5)**, of which results have been used for developing an improvement plan.
- Conducting a business continuity plan (BCP) exercise to test a responsive plan, in the event of business and personal information leakage. The BCP exercise conducted, was evaluated by an external consulting agency, and received a very good level score of **91.67%**. Objectives of BCP exercise were as following:

  1. To test 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 examine internal communication effectiveness.
  4. To measure, analyze and evaluate in accordance with the ISO 27001:2013 requirements.

Enhancing employee's digital skills in the organization, monitoring on production efficiency with real time and visualization data analytics

Digital technology is one of the key success factors in driving business transformation in accordance with "Greener & Smarter" strategy. Therefore, Banpu Group has embarked on Digital Transformation since 2018, by establishing a digital development department to drive the organization towards a digital era completely.

Currently, BPP has operated various power generation businesses in China, including combined heat and power (CHP) plants and solar power plants, which are joint-venture companies. Since each business unit was established at a different time, they are different in terms of technology used in production processes, machineries and equipment. These cause employees to spend much time collecting and analyzing data to be used in management and making decisions, both at the operational level and overall management. Moreover, the applications available in the market are not up to the mark and are expensive.

The employee's digital skills development program enables engineers and operational-level employees to build upon their existing knowledge with immense digital competency. At present, BPP's employees are able to develop, maintain and improve the information system used for monitoring production efficiency to meet users' needs by themselves. The system presented in the form of visualization helps employees in communicating information effectively, including making quick and accurate decisions. This can save time and costs of about CNY 50,000 per year. More importantly, employees can also quickly detect production abnormalities, helping limit damage. The information system developed is used as a tool for communicating accurate and precise information, which is conducive for collaboration.

Operating staff and engineers in business units enhanced their job expertise and competency with digital skills.

BPP is able to enhance digital competencies of operating staff and engineers in business units, who have expertise in various fields in the power business, including building upon more advanced digital skills, such as data science, data analysis and data-visualization. This will lead to development of BPP's digital projects according to the "Greener & Smarter" strategy.

Presently, 8 employees in China have been developed their capabilities and are equipped with digital skills necessary to help drive over 70 digital projects in the future. This drive stems from a continuous creation of the "Innovation" corporate culture for a long time. Until now, the "Innovation" corporate value is recognized by local stakeholders and the government sector.

Advanced Leakage Monitoring and Alerting Software (ALMA)

HPC Power Plant has developed a software to monitor and alert leakages in its boiler tubes in order to have enough time in preparing a repair work in advance and to reduce revenue loss from unplanned downtime.

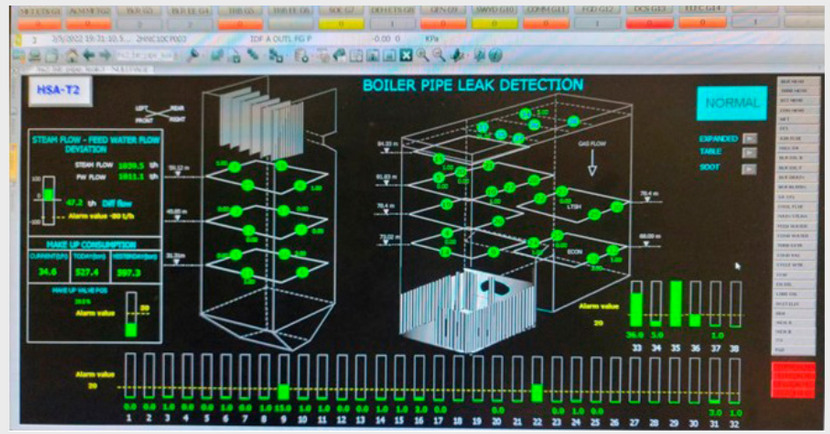
The ALMA software has adopted digital technology in the field of artificial intelligence (AI) to help detect leakage in boiler tubes. This makes it possible to recognize the leakage signal faster than usual. The software model was developed from statistical data of machineries and other related information, such as audio detection and a make-up water consumption. After that, the ALMA system will send an alarm signal to the production personnel, enabling the power plants to make decisions on maintenance plan in advance, including being able to reduce the loss and prevent it from spreading more.

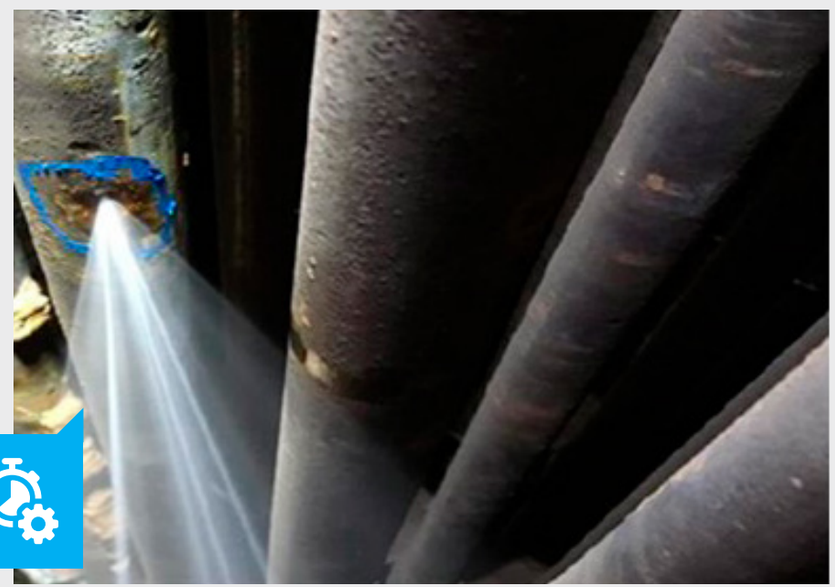
The software development has received collaboration from one employee of the Boiler Maintenance Department of HPC Power Plant, three production and maintenance contractors, four employees from BPP and Banpu Group, together with external consultants. From the operation, it was found that the **leakage in boiler tubes could be notified 3 - 5 days in advance, which gave the power plant plenty of time to prepare for a repair work and reduced a loss** from fines due to the power plant's notification on immediate and unplanned production halt. Such a production halt costs about THB 5 million per time or about THB 14.4 million per annum (This information is from statistical data during 2021 - 2022). Moreover, this software has a function to improve its model to be more accurate in the future.

Notified the leakage in boiler tube in advance
3 - 5 days

Cost saving from penalty fine around
14.4 million Baht/year
(2021 - 2022)

ALMA can early detect warning sign of leakage in boiler tube for notification.





Supplier Management

Stakeholders:
- Suppliers, contractors

Strategy:
- Setting up the "Supplier Code of Conduct", covering the areas of business ethics, environment and society.
- Managing suppliers in business units sustainably, by integrating the ISO 9001 Quality Management System Standard with the ISO 45001 Occupational Health and Safety Management System Standard and the ISO 14001 Environmental Management System Standard.
- Promoting and encouraging suppliers to participate in environmental, social and governance (ESG) operations.

Key Indicators:
- Proportion of new suppliers selected under the ESG criteria.
- The number of grievances on supplier management related to ESG.
- The number of incidents suppliers violating applicable laws, human rights, labors and environment.
- Proportion of local procurement values.
- A working safety of suppliers, such as fatalities, and lost time injury frequency rate (LTIFR).

Target:
- No complaints associated with supplier management related to ESG.
- None of incidents related to contractors violating applicable laws, human rights, labors and environment.
- Fatalities of suppliers = 0
- Lost time injury frequency rate (LTIFR) of suppliers = 0
- The proportion of critical tier-1 suppliers completely assessed on ESG risks by the year 2025.
- Proportion of contracts having specification on ESG requirements clause completely by 2025.

Performance:
- **No** grievances associated with supplier management related to ESG.
- **No** incidents involved with contractors violating applicable laws, human rights, labors, and environment.
- Fatalities of suppliers = **0**
- LTIFR of suppliers = **0**

Significance and Reporting Boundary

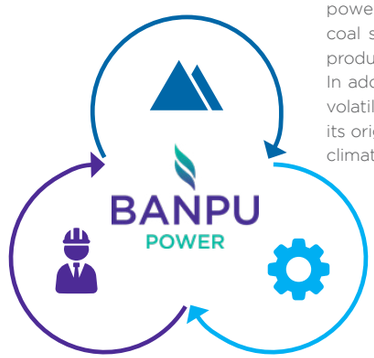
BPP has conducted its business by giving top concern on the sustainable supply chain management. It has realized that supplier's operation has an impact on a quality of products and services, and is also an important factor in building competitive advantages. This includes playing a key role in the ESG operations directly and indirectly. Consequently, BPP needs to draw participation and promote suppliers' ESG operations in order to create mutual benefits.

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, excluding the businesses in United States of America.

Management Approach

In order to achieve its goals to create a sustainable value throughout the supply chain, BPP has instituted operating guidelines for supplier management in compliance with the sustainable supply chain policy. It has established the "Supplier Code of Conduct" to clearly communicate its expectations on suppliers. Moreover, 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 an important role in ESG operations in BPP's operational areas.

BPP's main suppliers can be divided into three groups as following:



1. Fuel Suppliers Coal is a major raw material for power generation of BPP's thermal power plants. The supplier management to decrease risks related to quality coal supply with prices and quantity aligned with the production plan of each production period, is a key success factor for availability and reliability management. In addition, coal is categorized as a commodity product, the prices of which are volatile with 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: This type of suppliers is a manufacturer of machinery parts specific for the power plant's maintenances, which cannot be purchased in the general market.

3.Contractors: 1) operation & maintenance contractors, 2) maintenance and services contractor and 3) engineering, procurement and construction contractors.

The operating guidelines for supplier management of BPP are as follows:

- Selecting suppliers transparently and fairly in accordance with the code of conduct principle.
- Integrating safety, occupational health, environmental social and corporate governance targets into the supply chain management strategies and other associated policies.
- Driving towards the sustainable supplier management in all production units through the integration of ISO 9001 Quality Management System Standard, ISO 45001 Occupational Health and Safety Management Standard and ISO 14001 Environmental Management System Standard.
- Examining supplier's qualifications related to ESG in order to be able to identify and mitigate supply chain risks appropriately.
- Supporting to run business with suppliers attached to ethical principles and responsible for society and environment, as well as respecting to human rights according to the supplier code of conduct and any associated policies.
- Employing 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 in the procurement contracts and monitoring suppliers' operations related to environment, society and corporate governance, etc.
- Supporting local procurement to create economic benefits to the areas where BPP has operated.
- Establishing the supplier code of conduct and communicating with suppliers, emphasizing the critical tier-1 suppliers.
- Encouraging suppliers to expand the implementation of sustainable practice guidelines throughout the supply chain for continuous and efficient development.
- Setting up the key performance indicators and frequently monitoring operations to ensure that the suppliers operate in accordance with the standards and laws set, for example inspecting the operating sites of suppliers and contractors, etc.
- Providing a safe working environment for contractors, organizing trainings to educate them about safety and workplace environment, as well as conducting job safety analysis (JSA).
- Inspecting and assessing contractors while performing their duties in the area continuously to ensure safety and improve operational quality consistently.
- Regularly disclosing the supply chain's sustainable performance to stakeholders.

Performance

In the past year, BPP received no grievances associated with supplier management. There were no incidents, in which key suppliers were involved in violating the laws related to ESG. The contractors working in the operation areas performed operations safely, being able to achieve the safety targets as following:

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

BPP's key supplier management is following:

- **Identifying clear criteria and qualifications** for selecting suppliers in accordance with BPP's sustainability policy and a principle of business ethics, such as specifying transparent criteria and qualifications for selecting suppliers to construct a power generation unit to increase production capacities and to improve the power plants in China. This included supplier's operations on quality, environment, society and governance.
- **Procuring transparently through bidding processes**, clearly determining evaluation criteria in all steps by communicating information thoroughly and notifying suppliers via 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.
- **Verifying supplier's qualifications** in the areas of operational history, reputation and legal compliance to reduce operational risks before procurement, as well as visiting supplier's operations in the areas, such as key component manufactures for the power plants and coal mines, etc.

- **The three CHP plants in China drive contractors' operations through system implementation.** They have been certified for ISO 9001 Quality Management System Standard, ISO 45001 Occupational Health and Safety Management System Standard and ISO 14001 Environmental Management System Standard. In addition, BPP has engaged with contractors regularly. This is part to operate these management systems to achieve the goals set. Trainings and verification of contractor operations have also been conducted continually in order to develop the joint operational improvement plans.

- **Reviewing BPP's critical tier-1 supplier** and assessing operation risks in China.

  - Coal procurement: BPP uses the centralized coal procurement and bidding system to purchase coal in order to get coal procurement done quickly and transparently, as well as to reduce costs on coal procurement during high price periods. It also looks for opportunities to enter into some long-term coal contracts to mitigate risks related to coal price volatility.

  - Procurement of machinery and spare parts: There are a lot of machinery manufacturers specializing in maintenance and construction in China since the country is the industrial center with fast and convenient transportation system. Machinery and spare parts procurement, however, may be affected by the COVID-19 epidemic.

  - Hiring contractors: The COVID-19 pandemic has created risks on contractor procurement. This may result in inability to meet the targets and timelines, such as power plant operations and construction, which has an effect on BPP's business continuity. Therefore, it is important to control risks appropriately.

Implementation of "Smart Access Control System" to improve contractor's safety operations

The contractor's safety operation is one of the important factors for occupational health and safety management of the power plants. Power plant's operational risks arise from some contractors working at the plants without being trained and tested on safety prior to working. In 2022, the COVID-19 outbreak remained a challenge for the power plants in China to continuously generate power and steam for the industrial sector and local communities.

Zouping CHP Plant set up safety measures and prevention of COVID-19 pandemic, by conducting health checks and taking temperature of employees and contractors before entering into the operational area. The intelligent access control system was used to replace the traditional manual check, which requires a large number of employees to operate, takes a long time, and may not cover all contractors. This posed a safety risk. The intelligent area access control system consists of:

- **Occupational health & safety training and testing syste**m: Employees and contractors must pass the test on occupational health and safety before being approved to enter the area within the specified period. A database of people who have passed the test has been created, while these approved people have to be retested regularly according to safety rules.

- **Temperature monitoring system**: The system has been set up at the entrance and can automatically check the temperature of employees and contractors before entering the area.

- **A specific training system to match the nature of work and risks of each department.**

Benefits of using a smart access control system are as following:

- All employees and contractors have knowledge and are well aware of safety prior to working in the area. A specific training was conducted for 240 employees and 2,561 contractors.
- Zouping CHP Plant was able to deliver power and steam as the target set. The plant was able to carry out its production without any interruption caused by the COVID-19 epidemic.
- Completing safety trainings in accordance with legal requirements.
- Reducing risks related to accidents arisen from unsafe operations of employees and contractors.
- Decreasing the number of working hours, including manpower to organize trainings and health checks before entering the operational area.

Customer Management

Stakeholders:
- Customers

Strategy:
- Managing customers of production units sustainably through an integration 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 with business ethics, environmental and social policies.
- Regularly conducting a customer satisfaction and expectation survey for continuous improvement.

Key Indicators:
- Scores of customer's satisfactory survey.
- 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 involved with safety and environment of product usage.

Target:
- Customer' satisfactory scores are over 85%.
- Proportion of customer grievances corrected in a timely manner equals to 100%.
- No customer's complaints involved with customer's privacy data protection.
- None of customer's accusations associated with safety and environmental issues regarding product usage.

Performance:
- Customer's satisfactory scores equaled to **100%**.
- Proportion of customer's complaints settled in a timely manner was accountable for **100%**.
- **No** customer's grievances involved with customer's privacy data protection.
- **None** of customer's complaints related to safety and environment of product consumption.

Significance and Reporting Boundary

BPP is committed to generating and supplying power and other forms of energy to ensure quality and stability aligned with the international standards and customers' needs. Realizing that BPP's operations have contributed to stability of electricity's system and are the key factor for the industrial sector's production, as well as have an impact on community's well-being, it is, therefore, a responsibility of BPP to deliver products meeting customer's expectations. Consequently, BPP has to conduct its businesses with honesty and standards to protect customer's data. Additionally, the international operation standards have been integrated into its power generation system in order 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, in which BPP has direct management control, consisting of the three combined heat and power (CHP) plants in China, but excluding businesses in United States of America where BPP has just invested.

Management Approach

BPP has five key customer groups, consisting of:

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

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

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

1. **Identifying operational targets to be aligned** with customers' needs and expectations.
2. **Communicating about customers' needs** and expectations throughout the organization to build understanding among employees.
3. **Measuring customers' satisfactory level** in order to immediately response to customer's needs.
4. **Creating a systematic customer relationship.**
5. **Paying attention to a balance** corresponding to the needs of customers and other stakeholders.

Moreover, BPP has emphasized a creation of customer relationships, treating them as the partners of mutual achievements. This is done by putting top priority to deliver the sustainable values to all customers, taking into account four values as following:

1. **Product values**: Technology with "High Efficiency, Low Emission" (HELE) and ability to control air & water quality as well as environmental management to meet the international standards, has been employed to create product values.
2. **Service values**: To create service values, BPP has enhanced its production efficiency with availability and reliability according to customers' needs. Its operations are also flexible to reach customers' demand, including controlling product quality to meet standards and agreements made with customers.
3. **People values**: To build people 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 values**: To create good reputation, BPP operates its businesses professionally aligned with code of conduct and good corporate governance.

Performance

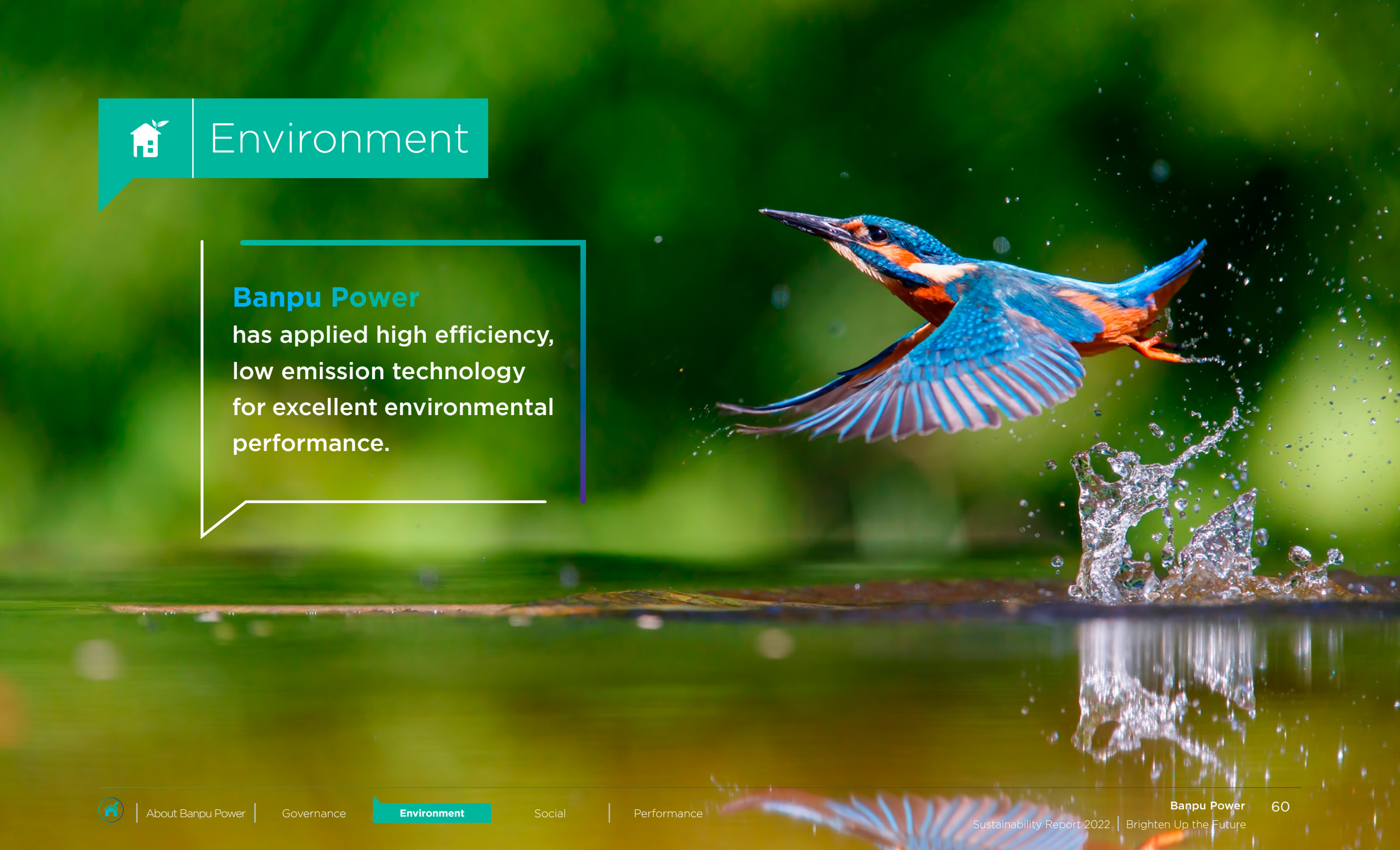
100%
The customer satisfaction scores

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 during the COVID-19 outbreak. Throughout the year 2022, they were still able to continue their production consistently by strictly complying with the government's epidemic preventive measures and the occupational health and safety standards in order to deliver power and other energy to customers continuously. In the previous year, key operations carried out by BPP were as follows:

- Carrying out 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 represented **100%** of the total 54 customers.
  - The response rate was **100%**.
  - The customer satisfaction scores were **100%**.
- Proportion of customers' grievances settled in a timely manner, equaled to **100%**.
- **None of customers' complaints** related to 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 certified as standard for the ISO 27001 Information Security Management System. This has strengthened the information security systems and reduced risks, as well as protected data from information theft.
- **None of complaints from customers regarding the safety and environment** of product's usage.
- Zouping CHP Plant used waste from its customer's production process, containing activated carbon, to reduce coal utilization and to create mutual benefits with customers in waste disposing of **26,250 tonnes/year**. This can reduce production costs by **RMB 6.4 million/year**.
- Zhengding CHP Plant has been selected by the government to operate a solar rooftop project in Zhengding City. The power plant targets to install **167 MW** of solar panels on the roofs of governmental buildings, factories and communities **by the year 2023**.

Environment

Banpu Power
has applied high efficiency, low emission technology for excellent environmental performance.



Electricity Generation

Stakeholders:
- Customers, employees, business partners, shareholders, financial institutions

Strategy:
- Raising power production capacity via investing in advanced, clean and eco-efficiency technology according to the "Greener & Smarter" strategy.
- Creating confidence in the power plants' availability to meet customer's needs efficiently and reliability through keeping power plants' machinery maintenance aligned with the international standards.
- Upgrading power plants' efficiencies by making use of innovations.

Key Indicators:
- A production capacity growth
- Availability Factor (AF) of power plants
- Forced Outage Factor (FOF)

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

Performance:
- Commercial operating power generation capacity of **3,161 MW**, consisting of:
  - **2,869 MWe** from thermal power.
  - **292 MWe** from renewable energy.
- The AF and FOF of combined heat and power (CHP) plants were **94.0%** and **0.82%**, respectively.
- The AF and FOF of gas-fired power plants were **83.2%** and **1.45%**, respectively.

Significance and Reporting Boundary

BPP has pursued the "Greener & Smarter" strategy corresponding to the transition towards more clean energy generation in the future. This includes a more efficient energy consumption model deprived from development of various energy technologies. Consequently, BPP focuses on investments creating growths from thermal power production, by using clean and high efficiency with eco-friendly technology, coupled with expanding electricity generation to renewable energy, energy technology and smart energy utilization. Furthermore, BPP has put top priority on continuous improvement to heighten its power plant's reliability and efficiency, with high availability and low forced outage factor. Besides, it also focuses on creating competitive advantages in response to an increase in the electricity free-trading market in the future. This is 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 moved 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 Gas-fired Power Plant in USA. In addition, 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 the key production forces of the company and are interested by stakeholders.

Management Approach

BPP focuses on creating stability and improving the power plants' efficiency.

BPP employs the quality, occupational health, safety and environment management standards in all of its CHP plants to operate their productions according to the entire operating processes.

This includes keeping maintenances with quality in line with specified standards.

Top priority to supply chain management so that fuels and raw materials can be supplied to the production line according to the action plan set.

It also promotes the application of innovation, particularly the digital technology.

BPP communicates its production and machinery maintenance plans with customers, partners and contractors in advance.

The standards include selecting skilled-maintenance contractors.

- **Production**

BPP focuses on creating stability and improving the power plants' efficiency to continually deliver energy to customers, by strictly operating productions according to operating processes. This includes keeping maintenances with quality in line with specified standards and defining criteria for supervisions, surveillances, audits, risk assessments, as well as regularly monitoring the power plants' operating performances. It also puts top priority to supply chain management so that fuels and raw materials can be supplied to the production line according to the action plan set.

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

BPP communicates its production and machinery maintenance plans with customers, partners and contractors in advance to create effective collaboration, which is important in maintaining the power plants' availability factor (AF) and stability. The annual machinery maintenance is the main activity, making the engine's conditions efficient with a long-service life. 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 performances 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 into the period of high energy demand. For example, in the winter and summer, all power plants avoid conducting maintenances 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 Investments**

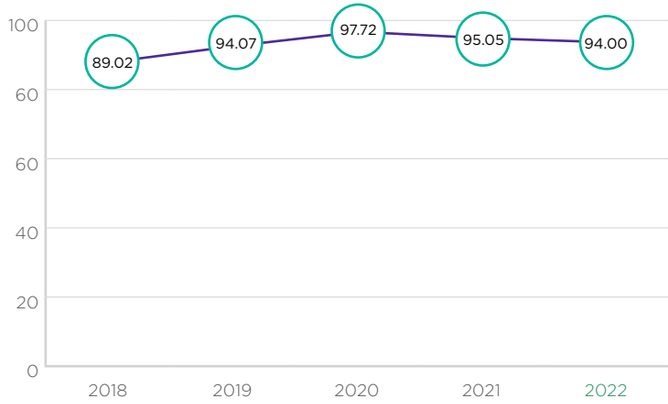
BPP puts great attention on investing in the power plants equipped with High Efficiency, Low Emission (HELE) technology according to the "Greener & Smarter" strategy, such as the gas-fired power plants, the renewable energy power plants, the energy technology and the smart energy solutions. These investments made are in the forms of both business operations with direct management control and joint-venture companies. Prior to investing, each project must be thoroughly considered on both risks and return on vestments, including examining the project's environmental, social and governance (ESG) factors. Additionally, the variants associated with ESG issues, such as carbon prices, greenhouse gas (GHG) emissions intensity and etc. are taken into consideration for each investment to ensure that BPP invests in the 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 the integrated energy services to meet the rising demand for clean energy.

Performance

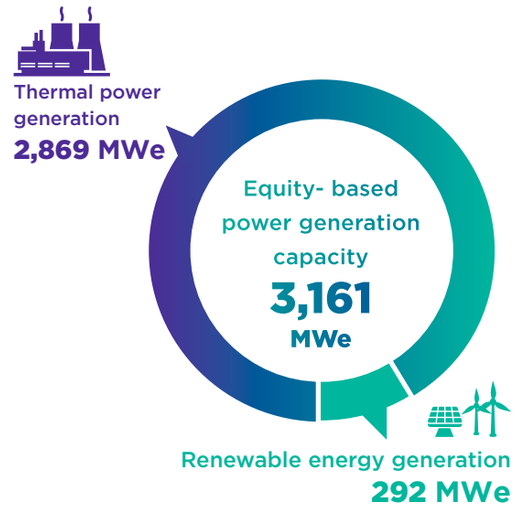
Indicators	3 CHP plants in China	Temple I Gas-fired Power Plant
Availability Factor (AF) (%)	94.0	83.2
Forced Outage Factor (FOF) (%)	0.82	1.45

- **BPP has improved its power plants to maintain their ability in generating electricity continuously**, keeping an availability factor in line with customer's demand, with efficient maintenance plan during the COVID-19 pandemic. It also heightened the efficiency of power plants to be more flexible in using various fuel types, such as industrial waste and low-caloric value coal, etc., to reduce production costs when the coal prices are high.
- **All three 3 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.

Availability Factor of three CHP plants in China (%)



40 power plants of Banpu Power under commercial operations

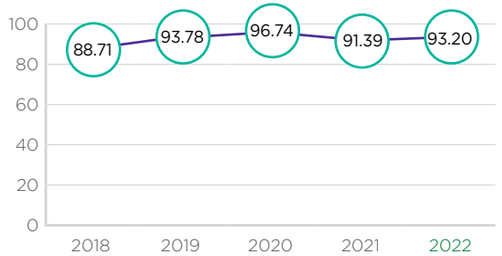


Operations of Joint-Venture Power Plants

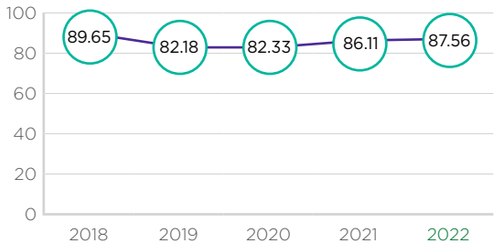
BPP has invested in thermal power plants in Thailand and Lao PDR, namely BLCP Power Plant and HPC Power Plant, respectively. The two power plants are the base load power plants under the power purchase agreements (PPA) to supply electricity to Electricity Generating Authority of Thailand (EGAT) in order to maintain stability of the power distribution system and the nation's overall electricity costs. Details of the number of availability hours and annual maintenance plans of BLCP Power Plant and HPC Power Pant are specified in the 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.

It also heightened the efficiency of power plants to be more flexible in using various fuel types.

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



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



Energy technology business under BANPUNEXT in which BPP has jointly invested 50%.

Solar Rooftop and Floating Business
Having an equity-based production capacity of 205 MW*

Electricity Trading Business
Having a power purchase capacity of 1,719 GWh*

Smart Cities & Energy Management Business
This business has operated 20 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 establishing a battery assembly plant in Thailand. The equity-based production capacity of this business is 1.0 GWh*

Maintenance Business and Customer Services
An electric train maintenance and after-sales services.

Remarks *Such figures represent 100% of production capacity.

Increasing Stability and Capacity of Temple I Gas-fired Power Plant.

Temple I Gas-fired Power Plant, located in Temple, Texas, USA, is a 768 MW combined cycle gas turbines (CCGT) power plant, using US-produced natural gas as a fuel for generating electricity. The power generated is sold through a 345-kV transmission line to the wholesale power market, overseen by Electric Reliability Council of Texas (ERCOT). In November 2021, BPP invested in Temple I Gas-fired Power Plant with 50% of shares, having an equity-based capacity of 384 MW in alignment with the "Greener & Smarter" strategy.

Temple I Gas-fired Power Plant has undergone the following improvements to increase its production stability and capacity.

iMonnit – an application to monitor key machinery operations in the power plant.

When the weather is cold in winter and extremely hot in summer, the state of Texas is faced with high demand for electricity. As a result, the power plant must be prepared for production in order to generate power to meet higher demand. Temple I Gas-fired Power Plant, therefore, developed the "iMonnit" application, which can monitor operations of key machines in real-time as a web-based model. The application sends various parameters to the control room for making decisions on production operations. As the application allows to control operations from a remote area, it is safe for employees to control production outside the area where core machines are located. With the development and implementation of iMonnit application, Temple I Gas-fired Power Plant can increase its power generation stability and has been recognized as a role model by ERCOT. This application has also been widely applied in the field.

Investments	Benefits
• Investing in project's preparation and development totaling USD 93,960. • The number of employees and persons involved in the project development is 7 people, with estimated expenses of approximately USD 21,600.	• Reducing forced outage factor (FOF) by 0.42%. • The number of warnings when something going wrong in the production process, increased 6 times in summer and 15 times in winter, respectively. The warnings allow the power plant to take quick corrective actions before damage occurs. • Lowering manpower cost of USD 241,920.

Improving for Higher Production Capacity during Summer by Using the "Wet Compression" System.

Due to high temperatures in summer, fuel combustion efficiency decreases as the air volume increases from rising temperatures. Meanwhile, the air density reduces when being carried into the combustion system. As a result, it cannot generate electricity at a full capacity equally to winter.

Consequently, Temple I Power Plant conducted a study and has installed a demineralized water spray system to reduce air temperatures from Siemens' SGT6-5000F Wet Compression system prior to production. A decrease in air temperatures has made the air volume down, while the air density entering to the combustion system increases. As a result, the power plant can increase the overall production capacity to a maximum level in the summer.

Investments	Benefits
• Investing in improvement and development in an amount USD 4,919,414. • 42 employees and persons are involved in the project development, with estimated costs of approximately USD 1,910,251.	• Increasing production capacity by 45 MW in the summer. • An increase of USD 2,805,231 in revenue.

Temple I Gas-fired Power Plant is also ranked in a good merit order, suitable for the competitive environment of ERCOT power merchant market. It is also ready for natural gas transportation and storage, which contributes to efficient cost management and increases flexibility in operating power production in line with local electricity demand patterns.

In 2022, Temple I Gas-fired Power Plant was able to maintain its availability factor (AF) at a high level of 83.2%, while its forced outage factor (FOF) was kept at a low level at 1.45%. This has enabled the power plant to create its competitive advantages in the power merchant market.

Climate Change and Greenhouse Gas (GHG) Emissions

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

Strategy:
- Lessening GHG emissions intensity per unit of products by increasing power plant efficiency through promoting innovations and using high efficiency & environmentally-friendly technologies.
- Investing in renewable energy in order to be part of a low-carbon society in the future.
- Heightening an ability to adapt itself to risks associated with climate change.
- Disclosing climate change related data in accordance with "Task Force on Climate-related Financial Disclosure (TCFD)."

Key Indicators:
- GHG emissions intensity.
- An investment in renewable energy generation project.

Target:
- GHG emissions intensity is not exceeding 0.676 tonnes CO_2e/MWh during the year 2021 - 2025.
- The renewable energy generation capacity of at least 800 MWe by 2025.

Performance:
- GHG emissions intensity was **0.609 tonnes CO_2e/MWh**, decreasing **9.9%** when compared with the target set.
- The renewable energy generation capacity of **288.1 MWe**, representing **36%** progress of the year 2025 target.

Significance and Reporting Boundary

Climate change is a significant issue affecting the sustainable development and human well-being. Consequently, it has become the global issue pulling collaborations across the world to decrease GHG emissions and alleviate its impacts. In addition, many countries have jointly set the common goals to reduce GHG emissions to control an increase of the earth's average temperature to well below two degrees Celsius. As a result, policies and laws have been issued to promote GHG emission reductions in many countries, including the People's Republic of China, such as the Emission Trading Scheme (ETS) and the fuel consumption restrictions for energy production, the promoting more renewable energy investments, etc. These are both challenges and important opportunities for BPP.

BPP's major activities causing GHG emissions are summarized as following:

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

The boundary of this report covers all business entities, in which BPP has direct management control in alignment with the principle of "The GHG Protocol Corporate Accounting and Reporting Standard" (Revised Edition). It is also in accordance with that of Banpu Group, including the three combined heat and power (CHP) plants in China, but exclusion of Temple I Gas-fired Power Plant as the power plant is under data standardization.

The operating results of renewable power plants and joint-venture thermal power plants, in which BPP doesn't have direct management control, but are interested by stakeholders, are reported in the table annexed. However, they are not integrated into GHG emissions database of BPP.

Management Approach

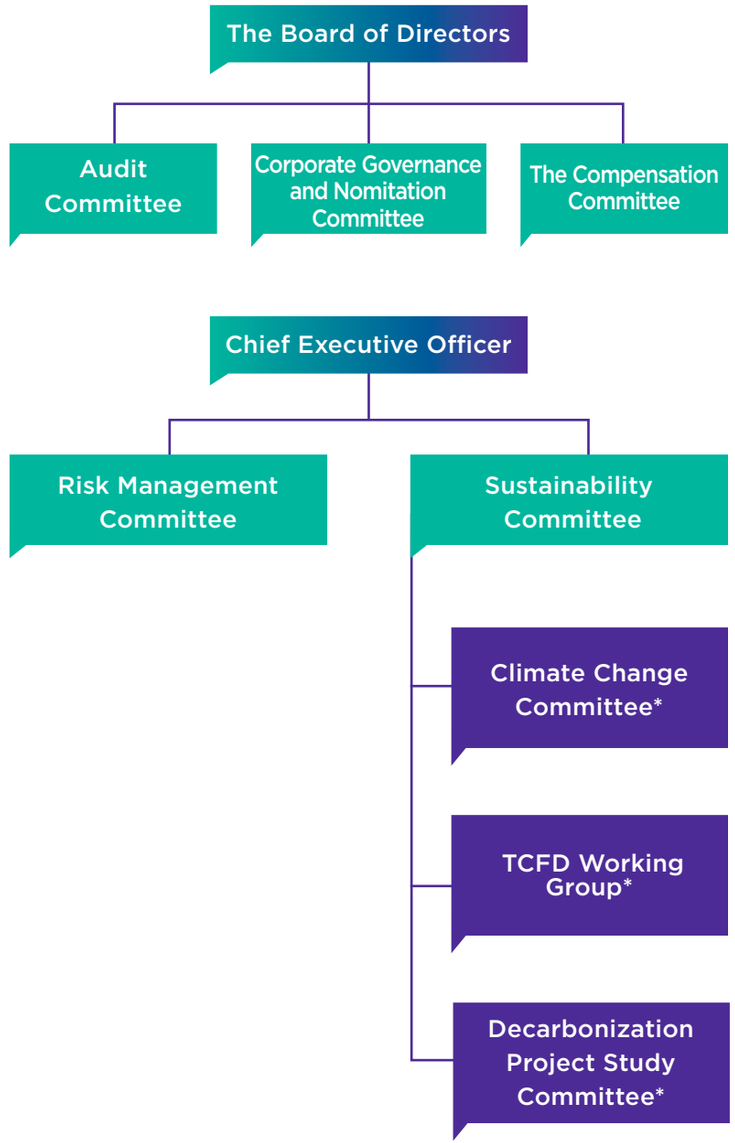
Due to a nature of its business – a power and energy generation, BPP directly consumes fuels for energy productions. Consequently, it mainly focuses on reducing a direct GHG emissions (Scope 1), resulted from various fuel consumptions. BPP's direct GHG emissions is accountable for 99% of its total GHG emissions since its operations are the upstream business to generate power and other energy supplied for industrial and residential consumptions.

BPP sees the opportunities and capabilities to decrease GHG emissions through improving energy utilization efficiency, reducing losses in the production process and conducting a study on alternative fuels to achieve its GHG reduction target. It is also looking for chances to invest in the renewable energy & technology businesses and the smart power utilization in accordance with the "Greener & Smarter" strategy.

BPP closely monitors policy changes and assesses risks related to climate change in preparation for adapting itself to a transition of structures, policies and laws in several countries. For example, BPP employs a business continuity management system to assess risks, impacts and opportunities associated with 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 supervise climate change operations as following:

Working Group and Supervision	Responsibility	Frequency
The Board of Directors	• Supervising and making strategic decisions for BPP's long-term growth, by taking into account the environmental, social and governance (ESG), including climate change. • Overseeing the operational direction and growth in accordance with the vision and missions. • Considering returns related to performances in accordance with ESG targets.	On a monthly basis.
Risk Management Committee	• The Chief Executive Officer (CEO) is the chairman of the committee, while high-ranking executives are the committee members. • Auditing, assessing and managing risks and opportunities, including issues related to climate change. • Reporting risk management to the Audit Committee.	On a quarterly basis.
Sustainability Committee	• CEO is the chairman of the committee, while high-ranking management are members. • Setting up and reviewing corporate policies and strategies, taking into account the ESG operations to be presented to the Board of Directors for approval. • Communicating on policies and assigning responsibilities to involved parties to lead them to make these policies into tangible practices throughout the organization. • Examining and overseeing ESG operations, including issues related to climate change to be in line with to the targets set.	On an annual basis or more than a year as seen necessarily.
Climate Change Committee	The committee is accountable for 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, or more than a quarter as 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, or over a quarter as seen necessarily.
Decarbonization Project Study Committee	• Conducting a feasibility study to determine operating targets and a plan driving towards a "Net Zero". • Conducting a feasibility study to jointly implement the decarbonization project with Banpu Group.	On a quarterly basis, or over a quarter as seen necessarily.



Note: *Operating in collaboration with Banpu Group

BPP sees the opportunities and capabilities to decrease GHGs through improving energy utilization efficiency, reducing losses in the production process.

BPP's management approaches to decrease GHG emissions in various businesses include:

Existing Thermal Power Plants

- Combined Heat and Power (CHP) Plants, in which BPP has direct management control include the CHP plants in China. These CHP plants have high energy consumption efficiencies, with 25% energy loss during a maximum production capacity of power and steam. Meanwhile, the thermal power plants solely generating electricity lose energy around 65% when generating power. This leads the CHP plants to have low energy consumption rate and marginal GHG emissions intensity. Nonetheless, customer's demand to purchase steam in certain periods directly affects the efficiencies of energy consumptions and GHG emissions. Consequently, BPP focuses on using innovations to improve its power plant efficiency and production processes, as well as operating the power plants to be flexible in response to the volatile steam demand. As a result, BPP in collaboration with Banpu Group, have always monitored and inspected the accuracy of GHG emissions database. The three CHP plants have been examined and certified for the GHG emissions data since 2018 up to present.

  Moreover, BPP is looking for opportunities to reduce GHG emissions in its CHP plants, such as using technology to capture carbons, utilizing and storing carbons (carbon capture, utilization and storage or CCUS), as well as transforming the business operations towards the integrated energy producer and provider, such as being an operator of renewable energy projects, etc.

- Joint-venture thermal power plants, namely BLCP Power Plant and HPC Power Plant focus on quality management and efficient annual maintenances, including using the information system to predict a machinery maintenance before it is broken down (Predictive Maintenance), etc. This has an effect on the power plants' efficiency, reducing the fuel consumption intensity per unit of products and having the availability factor (AF) as designed. These factors are significant performance indicators reflecting the power plants' availability and efficiency, which directly affect a reduction of CHG emissions. Consequently, BPP has assigned the Asset Management Unit in collaboration with its business partners who jointly invest in the power plants, to monitor the power plants' performance.

Thermal power plant projects under development and production capacity expansions

For development of thermal power plant projects or the upcoming CHP plants, BPP uses clean and highly efficient technology with environmentally-friendly. BPP also focuses on investing in the gas-fired power plants as gases are the stable fuel and flexible for production adjustment in response to an increase of merchant markets.

BPP is also looking for opportunities in the environmentally-friendly energy industry, such as the hydrogen industry. This is one of the patterns of clean energy growing rapidly. Thus, using hydrogen as a fuel source can play a significant role in reducing GHG emissions.

Renewable Power Plant and Energy Technology

BPP aims at investing in renewable power plant projects of no less than 800 MWe by the year 2025 through Banpu NEXT, in which the company holds 50% of shares. 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 in order to reduce 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.

BPP collects data on consumption volumes of diesel, biodiesel and benzene through accumulating data from receipts, while the coal quantity consumed is obtained from a scale attached to a conveyor belt. Meanwhile, the amount of flue 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 flue gas is gathered from the monthly measurements. 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 on "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_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs) and sulfur hexafluoride (SF_6).

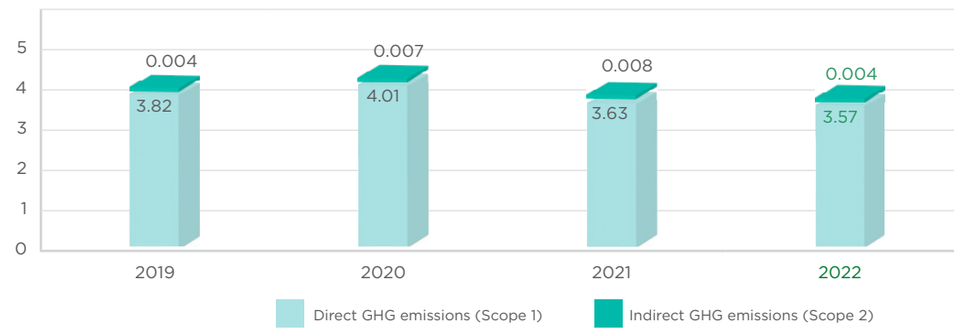
Climate Change Policy

Performance

- BPP's GHG emission intensity was **0.609 tonnes CO_2e/MWh**, decreasing **9.9%** in comparison with the target set. This was due to improvements of power plants' efficiencies over the years. The improvements included the project to reduce energy and water losses in the systems and the enhancement of steam boilers to burn fuels with various heat values. 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 started implementing in China. In the previous year, BPP's CHP plants in China were able to control the amount of GHG emissions according to standards set by the government and have the opportunities to either sell or retain the remaining GHG emission rights for future use.

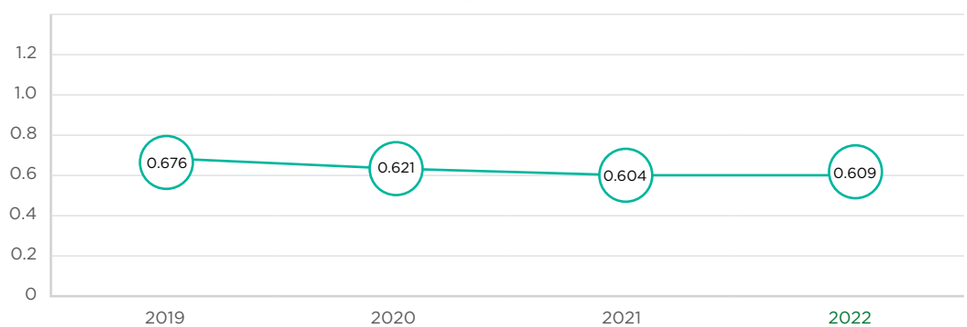
The amount of direct and indirect GHG emissions

(million tonnes of CO_2e)



GHG emissions intensity from the CHP plants in China

(tonnes of CO_2e / MWh)



- 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 shares. The company has an equity-based power generation capacity of **288.1 MW** from renewable energy, equivalent to **36%** progress of its target of at least **800 MW** from renewable energy by the year 2025.
- **Arranging a workshop to assess risks associated with climate change**, including physical risks affecting operations and risks related to a transition to a low-carbon society (Transition risk) both in the short- and long-term periods. This is part of disclosing the climate change operation's performance. BPP also conducted a study to align with the "Task Force on Climate-related Financial Disclosures" (TCFD), commencing 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 related 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.
- **Enhancing capabilities for adaptation 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 and able to deliver products and services meeting stakeholders' expectations. The business continuity management exercises have been regularly organized, while the company has been certified by the ISO 22301 Business Continuity Management System.
  - **Changes in policies and regulations related to energy, environment and GHG emissions**: BPP has 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 be able to adapt itself to the changing environmental quality standards, which are more intensively. BPP is also looking for more investment opportunities in renewable energy business receiving supports from the government.
- **BPP discloses its climate change operation 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 organized trainings to create understanding and awareness of climate change** – a challenge and opportunity for BPP, to the Board of Directors, executives and employees, such as setting up a "Net Zero Emissions" target, disclosing data according the TCFD guidelines and providing knowledge about various forms of technologies to reduce GHG emissions and energy storage technology, etc.
- **The innovation projects** to improve energy consumption efficiency and to reduce GHG emissions were implemented, such as:

Zouping CHP Plant

The "Multisource Solid Waste compound fuels" project.

Zhengding CHP Plant

- The power plant improvement project to blend low-calorific coal used as the fuel.
- The project to upgrade the intelligent monitoring and control system in heat exchanger stations for safety and heightening efficiency.
- The project to reduce heat loss from the white smoke reduction process.
- Zhengding CHP Plant was selected as the developer of the Zhengding Rooftop Solar PV project to install solar panels on the roofs of government buildings, factories and communities, totaling 167 MW by 2023.

Luannan CHP Plant

The project to utilize digital systems in energy management.

Other indirect GHG emissions (Scope 3)

BPP conducted a preliminary assessment of other indirect GHG emissions (Scope 3), of which activities are as follows:

Activities	Association	Explanation
1. A purchase of goods and services	✓	Production and transportation, coal, (exclusion of HPC Power Plant, which is a mine-mouth power plant) oils, electricity, several chemical substances, constructional materials and contractors' services, etc.
2. Capital goods	✓	A production of major capital assets includes machineries, spare parts, vehicles, project's constructional materials.
3. Fuel consumption activities, which are not included in direct GHG emissions (Scope 1) and indirect GHG emissions (Scope 2)	o	The office's electricity consumption without production activities.
4. Seller's transportation	✓	Using oils to delivery materials by sellers or sub-contractors via key transportation channels, including ships, trains and roads.
5. Waste generated from production	✓	Treatments or disposal of waste by third parties, such as hazardous waste treatment & disposal, water treatment and utilization of fly ash and bottom-ash, etc.
6. Business trips	o	BPP's business trips are conducted via airplanes, trains and cars, etc. The amount of GHG released from traveling is minimal in comparison with that generated by other activities.
7. Employee travels	o	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, when compared with other GHG emissions.
8. Leasing assets	×	BPP does not lease assets for production, but it only leases office spaces.
9. Product transportation and distribution	o	Losses incurred in the power transmission lines and the steam, hot & cold-water pipelines, which are not owned by BPP.
10. Product transformation	o	Electricity, steam, hot and cold water can be consumed immediately, without being processed. The voltages, however, may be slightly adjusted before being used or sold to customers.
11. Usage of products	✓	Consumption of electricity, steam, hot and cold water by customers.
12. Expired product treatments	×	BPP's consumption on electricity and other products doesn't require any treatment.
13. Leasing of assets	×	BPP doesn't lease any asset for production.
14. Franchises	×	BPP doesn't operate businesses related to franchises.
15. Investments	✓	An investment in joint-venture companies, including the conventional power plants and renewable power plants.

Notes:

✓ Associated with BPP's operations o Associated with BPP's operations, but insignificant. × Not associated with BPP's operations.

Assessments of risks, impacts, and opportunities associated with 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	• The unusual winter birth time affects a production plan of CHP plants, which have to generate heat for communities in winter. • Significantly higher than normal temperatures result in a decrease of thermal energy volumes sold to residential units and an increase of costs from controlling discharged water temperatures. • Significantly higher/lower than normal temperatures cause machines unable to run operations since it exceeds the design value. • The amount of light and wind intensity deviating from estimation, causes the renewable energy power plants to generate less electricity than the target set.	↓	• 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. • 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. • Assessing the project's worthiness before making an investment, by allowing for higher light and wind discrepancies.	0 - 5 years
1.2 Severe natural disasters, such as storms and floods	• Production halts due to natural disasters have resulted in expenses on investing in natural disaster prevention and damage repairs, as well as creating opportunity loss in production.	↓	• 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. • Designing and constructing the projects by putting top priority to natural disaster factors. • Procuring property damage insurance and business interruption insurance suitable for various events.	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.	→	• 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. • Other power plants are not affected because they are not located in the coastal area.	10 years up
1.4 A decrease of rainfall and a fresh water shortage	• Less rainfall has resulted in a shortage of fresh water in the area. The three CHP plants in China are located in the high-risk areas.	↓	• 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 it does not discharge water anymore (zero discharge). • Temple I Gas-fired Power Plant was designed to have a water reservoir for supplying water within the system without discharging. • 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 near by industrial factories. • HPC Power Plant manages its water sources by constructing two wellsprings and monitoring water levels regularly.	1 - 5 years

→ No impacts or minimal impacts ↓ Having negative impacts ↑ Having positive impacts

Risks	Impacts/Opportunities	Financial Impact Estimation	Strategies and Operations	Lengths of Time Expected to Happen
2. Transition Risk				
2.1 Policy and legal changes	• 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. • Expenses incurred from carbon tax/opportunities to sell power generated from clean energy. • Higher financial cost, or receiving no supports for fossil fuel projects/lower financial cost for clean energy projects.	↓	• Improving the power plant efficiency to maximize energy consumption capabilities and reducing 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. • 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. • Looking for opportunities to convert the use of fossil fuels such as biomass, biodiesel, etc. • Adjusting a business plan to be an integrated electricity supplier and provider, such as providing solar rooftop installation services in China. • Conducting a feasibility study to invest in Carbon Capture, Utilization and Storage (CCUS) technology. • Using expenses incurred from carbon taxes to calculate investment worthiness of each project. • Looking for opportunities to sell carbon credits from clean energy production. • Enhancing environmental, social and governance (ESG) operation to a decent level, with international recognition to build confidence among stakeholders and financial institutions.	0 - 5 years
2.2 Demand for clean energy is increasing, while technology and infrastructure to deliver electricity in the area are still immature.	• Fluctuations in light intensity and wind speeds have created inconsistency of renewable power generation. • Lacking stability of the power transmission and distribution system in some areas. • The concentration of renewable energy power plants in some areas results in more power generation volumes than the demand in the area.	↓	• Investing in energy technologies, such as energy storage systems to create stability in renewable energy transition. • 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. • Investing in energy with high-technology and low-emissions, such as natural gas power plants to help create stability in power production in the area. • Investing in demand-side management technology.	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 supported by the government sector	→	• Investing in power plants using different fuels with appropriate proportion to manage fuel risks. • 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. • The government controls coal prices in China, making coal prices less volatile than those of the world market. • Managing coal purchases by using applications to compare prices and making purchasing decisions at the right time, procuring coal with a long-term contract, expanding storage areas to stock more coal. • Looking for opportunities to use other fuels, such as biomass, natural gas, waste, etc.	0 - 5 years
2.4 Restriction of water consumption and rising water prices	• The governmental restriction on using fresh water in the production process, has resulted in improvements to reduce the amount of water consumption as specified by the government. • A shortage of fresh water in the area increases water prices.	↓	• 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 waste water is not discharged from the power plants. • BLCP Power Plant produces fresh water from seawater through the reverse osmosis methodology, making it unnecessary to draw fresh water in the area. • HPC Power Plant manages its water sources by constructing two wellheads and monitoring water level management continuously. • Temple I Gas-fired Power Plant was designed to have reservoirs to supply water within the system without discharges.	1 - 5 years
2.5 Higher insurance costs	• Insurance companies increase their insurance premiums due to natural disasters, which are more severe with higher frequency.	↓	• Investing in equipment installation to prevent and reduce damage severity from natural disasters.	0 - 5 years
3. Business Opportunity				
Business development associated with renewable energy, energy technology and CCUS	• Solar Power Plants • Wind Power Plants • Energy technologies, such as batteries, energy solutions and smart cities • Biomass • CCUS	↑	• Investing in renewable energy and energy technology through an investment in Banpu NEXT, in which BPP holds a 50% stake. • Seeking opportunities in GHG emission reduction technologies, such as CCUS and Hydrogen.	1 - 10 years

→ No impacts or minimal impacts ↓ Having negative impacts ↑ Having positive impacts

Energy Efficiency

Stakeholders:
- Customers, contractors, investors

Strategy:
- Controlling fuel consumption with maximum efficiency.
- Using high efficiency and environmental-friendly technology.
- Supporting projects and innovations related to energy saving.

Key Indicators:
- Energy consumption intensity per unit of products.

Target:
- Energy consumption intensity doesn't exceed 1.55 GJ/MWh.

Performance:
- Energy consumption intensity was **0.934 GJ/MWh, 39.7%** better than the target set and **21.8%** decrease from 2021.

Significance and Reporting Boundary

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

Activities associated with energy consumption in power and steam generation include:

Using coal as a fuel for production.	Using diesels to ignite boilers and as a fuel for operating heavy equipment and transportations.	Using benzenes and diesels for transportation.	Using other fuels for production, such as blast furnace gases.	Purchasing electricity from external agencies.

The boundary of this energy consumption report is in accordance with the greenhouse gas (GHG) statement, covering all business entities, in which BPP has direct management control, including the three CHP plants in China.

Temple I Gase-fired Power Plant, renewable power plants and major joint-venture power plants, only their operating results are reported on the table annexed.

Management Approach

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

Thermal Power Plant Solely Generating Electricity

Energy from fuel — Energy loss **65%** — Electricity **35%**

Combined Heat and Power Plant

Energy from fuel — Energy loss **25%** — Electricity and Steam **75%**

Consequently, BPP focuses on efficient energy management through utilizing various means, as follows:

- **Selecting high-efficiency technology** with minimal fuel consumption and environmentally-friendly.
- **Enhancing boiler efficiency to** combust concretely.
- **Making an efficient maintenance plan** to increase the power plants' availability factor (AF), reduce the planned outage factor and the unplanned outage factor, as well as to lessen energy losses from operation stoppages and commencements.
- **Seeking opportunities to lower heat and power losses** in the system and reuse it.
- **Improving 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 to utilize more energy sources in the area**, such as waste gases from the blast furnace gas industry, natural gases, biomass fuels, etc.
- **Planning to purchase multiple fuels from various sources** to manage fuel supply with high quality and reasonable prices, and to mitigate any risks associated with fuel shortages.
- **Developing applications for the integrated energy management of power plants**, starting from purchasing, storage and blending, to production's combustion process.

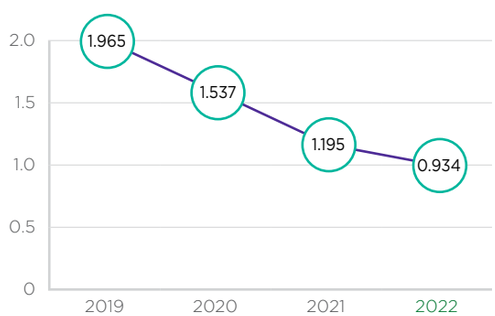
BPP has collected its energy consumption data, including the amount of diesel, biodiesel and benzene contents by gathering information from the receipts, while the coal quantities have been obtained from a scale attached to a conveyor belt. Moreover, the amount of flue gas has been taken from the gas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

The energy consumption intensity of **0.934** GJ/MWh, decreasing **21.8%**, and 39.7% better than the target set.

Performance

In the previous year, BPP posted the energy consumption intensity of **0.934 GJ/MWh**, decreasing **21.8%**, in comparison with the year 2022, and **39.7%** better than the target set. This was due to continuous improvement of production processes, such as a reduction of heat loss in a production process, low-calorific coal blending at Zhengding CHP Plant and using activated carbons – waste from the customers' industrial factories, to replace coal at Zouping CHP Plant. Through experiments, power plants' equipment improvement and energy efficiency and safety inspections, BPP was able to improve its energy consumption efficiency, reduce coal utilization and use waste from the industrial sector for commercials. Moreover, it was able to decrease fuel costs. Though the coal prices hit the record-high in the history, BPP was able to adapt itself properly. Besides, it was able to control coal consumption volumes as specified by the government, while the energy consumption intensity per unit of products was significantly improved.

Energy Consumption Intensity (GJ/MWh)



BPP has frequently monitored and compared imported energy with the one it has generated, as well as has examined the energy consumption of each production unit since it is the main cost of power generation for thermal power plants and CHP plants. It has also sought opportunities to decrease fossil energy consumption as it is a fuel cost and generates GHGs. In the past year, various projects to increase the energy consumption efficiency were implemented as following:

- Improving power plants' energy efficiency, such as:

Improving techniques
to spray fuels.

Reducing power loss in the system
such as a loss in the pipe system, an energy consumption of supportive machineries, etc.

Utilizing digital technology to develop applications
and install devices for holistic energy management.

Enhancing power plants' capabilities to use other fuels
such as coal with lower calorific values and waste from customer's factories.

- Producing and using more clean energy to replace fossil fuels, such as installing solar cells on coal storage plants, streets and parking lots, etc.
- Selling by-products produced from power generations, in alignment with the market demand, such as steam and cold water, which can decrease energy losses and energy consumption intensity per unit of products.
- Conducting a study on fuels modification available in each area, such as industrial waste gases, industrial waste, natural gases, biomasses, etc.

Enhancement of boiler combustion efficiency at HPC Power Plant

HPC Power Plant – a joint-venture power plant, in which BPP holds 40% of stakes, is located in Lao PDR. The power plant has increased its boilers' efficiency at the Power Unit 2 after completing the annual maintenance. Consequently, a study on a project to increase boilers' combustion efficiency has been started. This project is conducted by two employees from the Efficiency Department, one machinery operating and maintenance contractor from the Electricity Generating Authority of Thailand (EGAT) and one officer from the Thermal Power Research Institute (TPRI), People's Republic of China. They are responsible for collecting data for experiment and improving various parameters of the boiler, making them in the most suitable condition, such as:

- A size of coal used before being delivered to the boiler.
- The distribution of coal in each layer when spraying into the boiler.
- Optimizing the amount of air used for combustion.

The experimental study has yielded a fruitful result, allowing the power plant to determine the proper values for boiler combustion more precisely. It can increase the boiler efficiency by **0.52%, reduce coal consumption by 26,000 tonnes/year,** or decrease emissions by approximately **27,610 tonnes CO_2e/year.**

Thermal energy conservation for optimization and improvement of heating services at Zhengding CHP Plant

Zhengding CHP Plant produces steam for users in Zhengding City during winter to warm up their homes. The steam supplied is converted into hot water at the heat exchanging station prior to being delivering to customers. Since the efficiency of equipment installed in approximately 177 stations began decreasing, more thermal energy from steam is required. The factors causing higher demand for thermal energy are deterioration of equipment serving a long service-life for 15 years, a dirty heat exchanger with scale deposits and increasing demand for hot water from customers. As a result, Zhengding Power Plant has improved its equipment efficiency at heat exchanger stations as follows: 1. **Removing scale deposits** on tube surfaces of heat exchangers. 2. **Installing a frequency converter** to make a system adjusted the amount of steam and hot water appropriately for customer's needs. 3. **Improving thermal insulation** of hot water pipes to reduce heat loss.

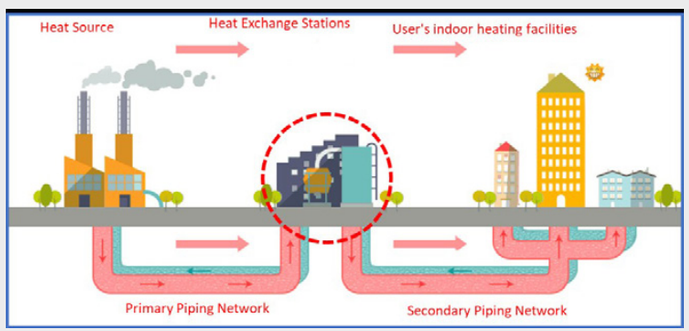
The energy management of Zhengding CHP Plant is divided into 4 main areas, enabling it to manage its energy efficiently and properly meeting the needs of each area. The power plant can also make a maintenance plan in advance and monitor, as well as analyze the status and conditions of heat exchanger equipment so as not to affect customer's consumption. **With an investment of about CNY 1 million, the optimization and improvement of heating services conducted by Zhengding Power Plant can reduce steam consumption by 10%, able to pay back the investment cost within a year**.

The afore mentioned project has been implemented together with an improvement of energy efficiency carried out for many years. The power plant's improvement includes a project to reduce energy loss together with air quality control, a continuous reduction of losses in the pipe system and energy consumption of supportive equipment, as well as development of energy management control applications. These enabled Zhengding Power Plant to increase its energy efficiency and reduce GHG emissions significantly in the year 2022.

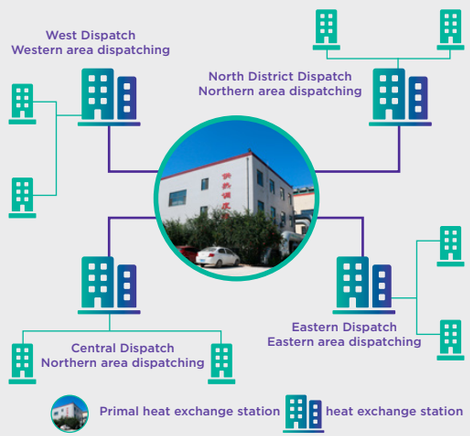
Energy consumption of Zhengding Power Plant	2021	2022	Change
Total energy consumption (GJ)	2,566,770.86	1,796,463.52	Decreasing 30.0%
Power consumption (GJ/MWh)	1.736	1.176	Decreasing 32.3%
The amount of GHG emissions (Scope 1&2) (tonnes CO_2e)	1,041,811	1,020,622	Decreasing 2.0%
GHG emission Intensity (Scope 1&2) (tonnes CO_2e/MWh)	0.705	0.668	Decreasing 5.2%

In addition, Zhengding Power Plant is looking for an opportunity to expand its business into the "Integrated Energy Services" in response to the government policy, promoting more clean energy projects in the locality to reduce GHG emissions. Hence, Zhengding Power Plant has conducted a feasibility study on installing solar rooftops as a source of clean energy for Zhengding City. In the past year, it has been selected as the operator of a solar rooftop installation project in Zhengding. The power plant targets to increase solar panels installation on the roofs of all government buildings, factories and communities totaling to 167 MW by the year 2023.

Thermal Energy Distribution Diagram



Thermal energy managed by area zones



Air Quality

Stakeholders:
- Communities, employees, contractors, the government sector

Strategy:
- Enhancing a pollutant capture system to be more efficient.
- Opting to use appropriate fuels.
- Upgrading combustion system's efficiency.

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

Target:
- The air quality emitted from stacks is complied with applicable laws.
- SO_2 emission intensity < 0.0766 tonnes/GWh.
- NO_x emission intensity < 1.184 tonnes/GWh.
- PM emission intensity < 0.0230 tonnes/GWh.

Performance:
- The air quality released from stacks was in accordance with applicable laws.
- The pollution emission intensity was **better than the target set.**
- SO_2emission intensity was at **0.022 tonnes/GWh.**
- NO_x emission intensity was at **0.038 tonnes/GWh.**
- PM emission intensity was at **0.003 tonnes/GWh.**

Significance and Reporting Boundary

Volumes of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x), as well as particulate matters (PM) are the key indicators of air quality emitted from stacks of thermal power plants since they may have impacts on human health in the area. Consequently, the government sector 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 treatment efficiency and to control the quality of air released to comply with applicable laws.

The boundary of this report covers three combined heat and power (CHP) plants, in which BPP holds more than 50% of stakes and has direct management control.

Enhancing a pollutant capture system before being emitted from stacks

Opting to use coal with low sulfur contents

Management Approach

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

- **Employing appropriate innovation** to enhance a pollutant capture system before being emitted from stacks, such as a SO_2 precipitator called the "Flue Gas Desulfurization" (FGD), a particulate matter (PM) treatment system, namely the Electrostatic Precipitator and a dust filter – the Bagfilter, etc.
- **Opting to use coal with low sulfur contents** to decrease the amount of SO_2 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.
- **Implementing a clean technology to help boilers in igniting concretely**, 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_2 and NO_x as well as PMs during the boiler's combustion stage, etc.
- **Creating a continuous monitoring system for air quality discharges** throughout the production process, and determining preventive measures, as well as being regularly audited by external agencies.

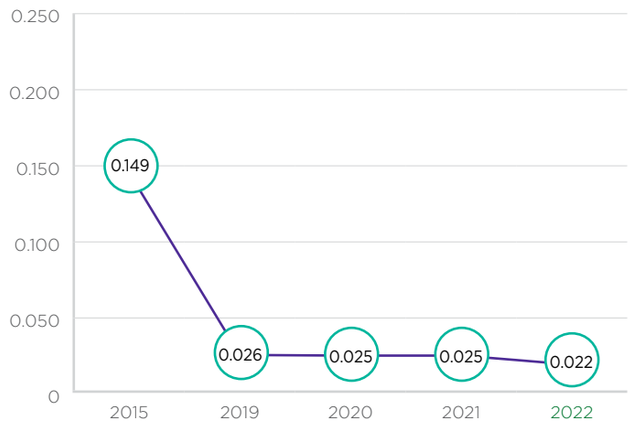
Performance

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

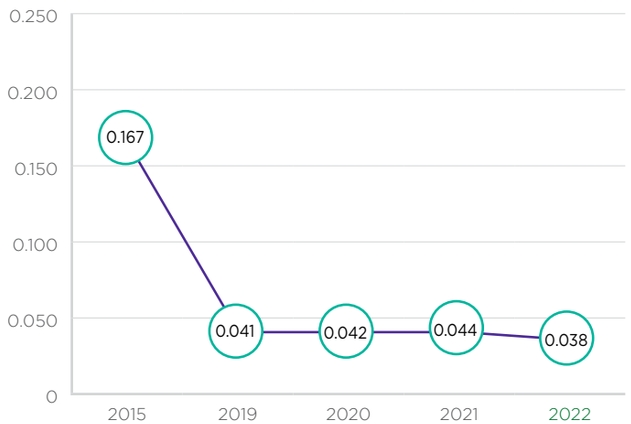
Although, the three CHP plants in China adjusted their fuel consumptions to reduce costs resulted from using high-priced coal last year, such as using coal with lower calorific values and activated carbons – waste from customers' industrial plants, etc., **it was found that these three CHP plants still had their abilities to control pollutions at a minimal level. The air quality released from stacks was better than the standards set by laws**, and met the targets set. Consequently, the three CHP plants received high recognitions and special subsidies from the government as the power plants with excellent air quality control. Besides, mercury contents in these three CHP plants were also measured, with a total emission of 0.008 tonnes.

The air quality emitted from these CHP plants is better than the standards required by laws.

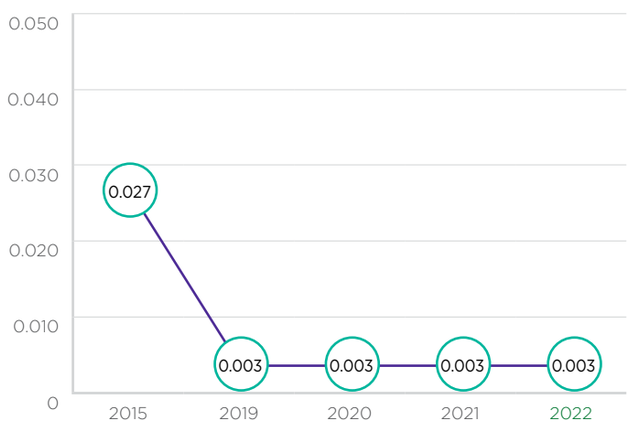
SO_2 Emissions Intensity (tonnes/GWh)



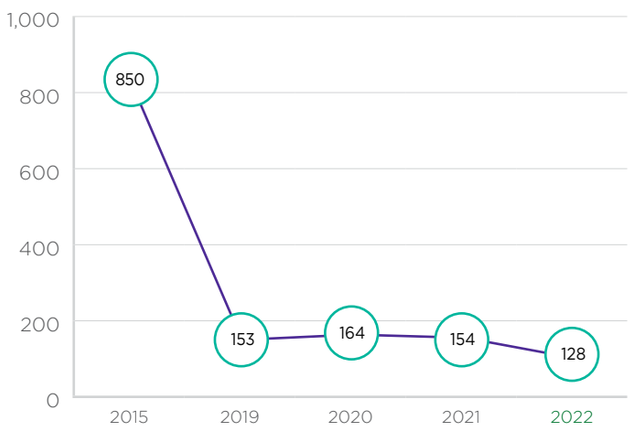
NO_X Emissions Intensity (tonnes/GWh)



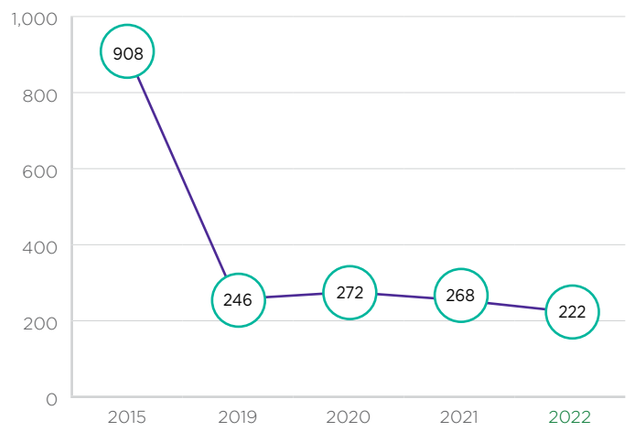
PM Emissions Intensity (tonnes/GWh)



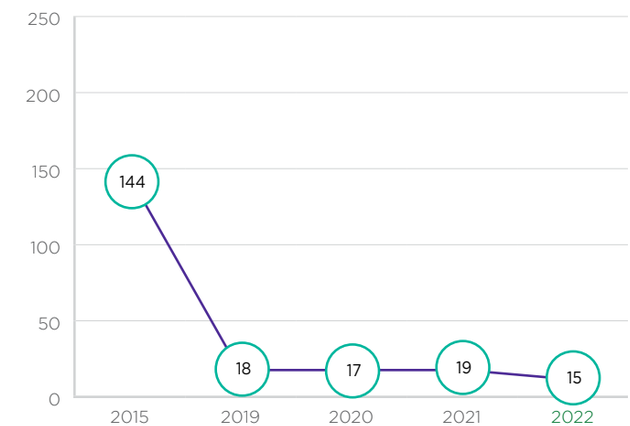
SO_2 Emissions (tonnes)



NO_X Emissions (tonnes)



PM Emissions (tonnes)



A reduction of heat loss from a de-white facility project at Luannan Power Plant

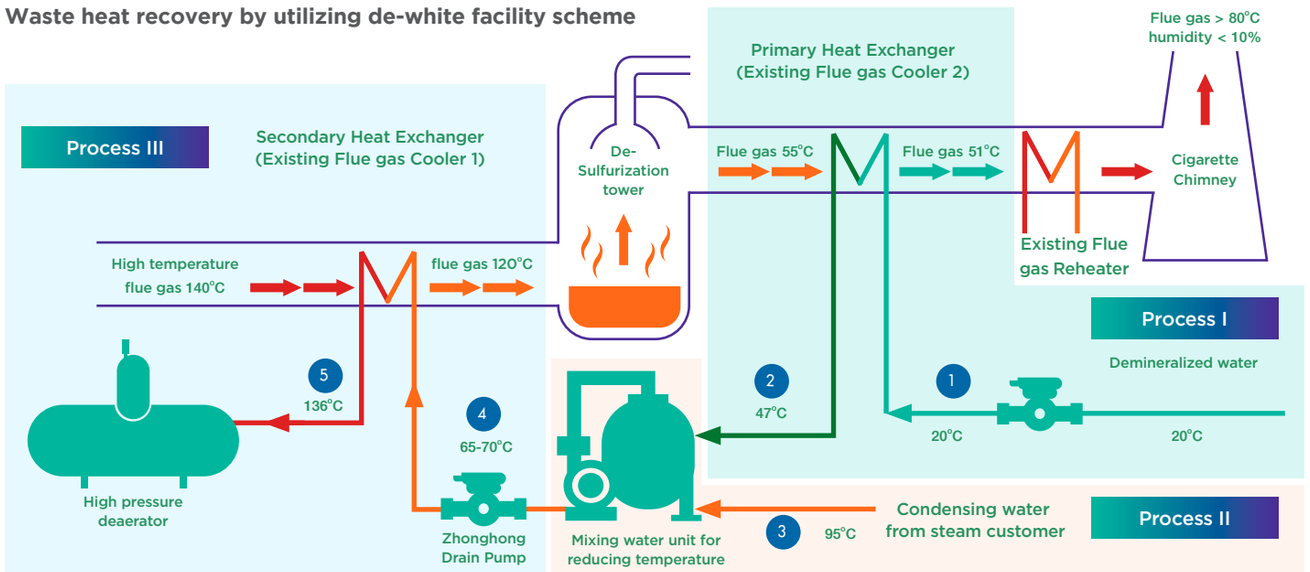
The pollution control policy of China has provisions for a reduction of white smoke derived from exhaust emissions, which is released into the atmosphere. The white smoke occurs during low temperature weather. This causes exhaust gas released from stacks, which has higher humidity and heat than the outside weather, to condense to form water vapor visible as a cloud of white smoke.

Luannan combined heat and power plant's employees studied and designed the De-white Facility for reducing humidity that caused white smoke from flue gas before releasing to environment to comply with the new registration in 2021.

Later, Luannan Power Plant found that such a white smoke reduction process also generates thermal energy able to be recycled back into the production process. The power plant, therefore, took additional steps to reduce energy loss by installing a heat exchanger system, which has three operating processes to produce thermal energy as following:

A white smoke reduction process also generates thermal energy able to be recycled back into the production process.

Waste heat recovery by utilizing de-white facility scheme



1. **The process of entering cold water into the primary heat exchanger** (1) The temperature of water flowing from this primary heat exchanger increases approximately 27 degrees Celsius (2) (Exiting temperature of 47 degrees Celsius).
2. **The process of mixing water before entering into the secondary heat exchanger** to prevent corrosions in the pipe surface of heat exchangers. In this process, the water condensed from steam sold to customers is returned to the power plant with a temperature of about 95 degrees Celsius (3) and mixed with water from the first process. After mixing, the water generated from this process will have a temperature of about 65 degrees Celsius (4).
3. **The process of supplying water for further utilization in the power generation process** The water from the second process will carry thermal energy from the secondary heat exchanger, after which the water temperature will increase approximately 65 - 70 degrees Celsius (5) (Exiting temperature of 136 degrees Celsius).

After exhaust gas goes through a white smoke reduction process and a heat exchanging procedure, the exhaust gas released from stacks will have a temperature of about 80 degrees Celsius and a humidity of about 10%. As a result, there is no white smoke during low temperature conditions. In addition, thermal energy derived from this project can also be utilized in the power generation process at about 15 GJ/h. **This project costs approximately CNY 223,700 and can pay back the investment cost within 18 days**.

Water Resources

Stakeholders:
- Communities, customers, employees, shareholders, business partners, suppliers, the government sector

Strategy:
- Enhancing a production process, decreasing water loss and consuming water with maximum benefits.
- Implementing the 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.
- Promoting stakeholder's participation in water management in the area.

Key Indicators:
- Water consumption intensity.
- The quality of discharged water in comparison with standards prescribed by laws.

Target:
- Water consumption intensity doesn't exceed 0.868 cubic meters/MWh.
- The quality of discharged water is complied with legal standards set.

Performance:
- Water consumption intensity was **0.818 cubic meters/MWh.**
- The quality of released water was in accordance with standards required by laws.

Significance and Reporting Boundary

Climate change impact is an important factor, making the situation of water-related risks become more severe in the future. It also poses a risk in power generation as water is an important factor for thermal power plants, where water is used in the power production process, such as generating steam in a boiler, controlling temperatures in a cooling system and air quality. The efficient management of water resources used in the production process and discharged water qualitatively and quantitatively, will help reduce the impacts on communities and the environment from water scarcity and quality. It also mitigates BPP's risks related to production costs, compliance with applicable laws and community relations.

The target on water consumption intensity per unit of products has been set not over

0.868

cubic meters/MWh/year

Enhancing the discharged water quality in alignment with the standards specified by laws

Management Approach

As the sources of water for steam production of CHP plants in China are from groundwater and water purchased from external manufacturers, the water management is focused on recycling water as much as possible in order to decrease the amount of water discharges and released water quality to comply with applicable laws. The target on water consumption intensity per unit of products has been set not over 0.868 cubic meters/MWh/year between 2021 to 2025. Meanwhile, the quality of discharged water in all operating areas must meet the standards set by laws. Activities carried out under BPP's water management policy include:

- **Managing water consumption with maximum benefits** and seeking opportunities to decrease water consumption and reuse or recycle the water.
- **Enhancing the discharged water quality in alignment with the standards specified by laws** and setting up measures to prevent chemical leakages and contaminations at its original sources.
- **Managing water holistically** to ensure that water consumption for operations in line with the righteousness and effectiveness with no effects to stakeholders in the area.
- **Conducting assessments on risks related to water resources and setting up measures and operational practices in the event of any emergency**, in order to reduce the impacts likely to happen from disruptions associated with water resources and to rehabilitate the incident efficiently and in a timely-manner.
- **Establishing a surveillance system for both quality and quantity of water** to ensure that water be well managed, while the discharged water is managed in accordance with the standards required by laws.
- **Encouraging stakeholder's participation**, especially local communities and a research sector in order to conserve water resources and to improve water quality and management in the area.

BPP has collected water consumption data of its businesses in order to use them for water management. The water withdrawn from a water source is consisted 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 doesn't use such precipitation. The data collected are based on the assumption that local water reservoirs have a minimal capacity, when compared with the water amount drawn from all water sources.

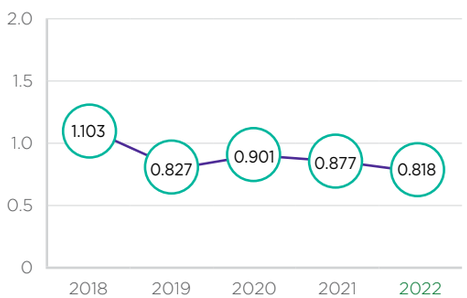
More importantly, BPP has determined measures to examine water quality before discharging it to outside, which is measured by BPP and external agencies. The measured pollution types, its frequency and the measurement methodologies of each business unit, however, may vary according to project requirements and as required by laws.

Performance

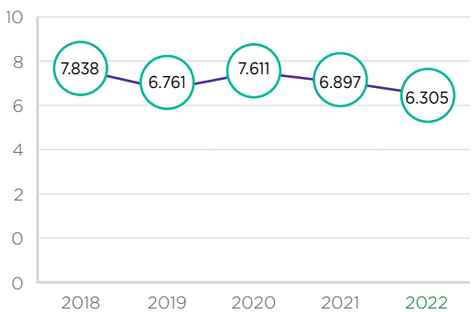
In 2022, the three CHP plants in China had a total water consumption of 4.792 million cubic meters, with a water consumption intensity equivalent to 0.818 cubic meters/MWh, **decreasing 6.78%** when compared to the previous year. The three plants were able to successfully achieve the target for water consumption intensity per unit of products of not exceeding 0.868 cubic meters/MWh, or better than the target set by **5.81%**. Moreover, they were able to control their water consumptions and discharged water to meet the standards required by the government.

BPP was also able to control the amount of water withdrawals totaling 6.305 million cubic meters, decreasing **0.59 million cubic meters**, or a decrease of 8.6% when compared with the previous year. This was due to the water treatment system project to recycle water from the production process with "Zero Discharge" at the power plant's extension unit in order to comply with the Chinese government's regulations. Meanwhile, all discharged water from these power plants was sent for treatments by the authorized external water treatment provider. In addition, the water quality discharged from all power plants was complied with the standards prescribed by laws, while no incidents associated with chemical contaminants leaking into the water sources.

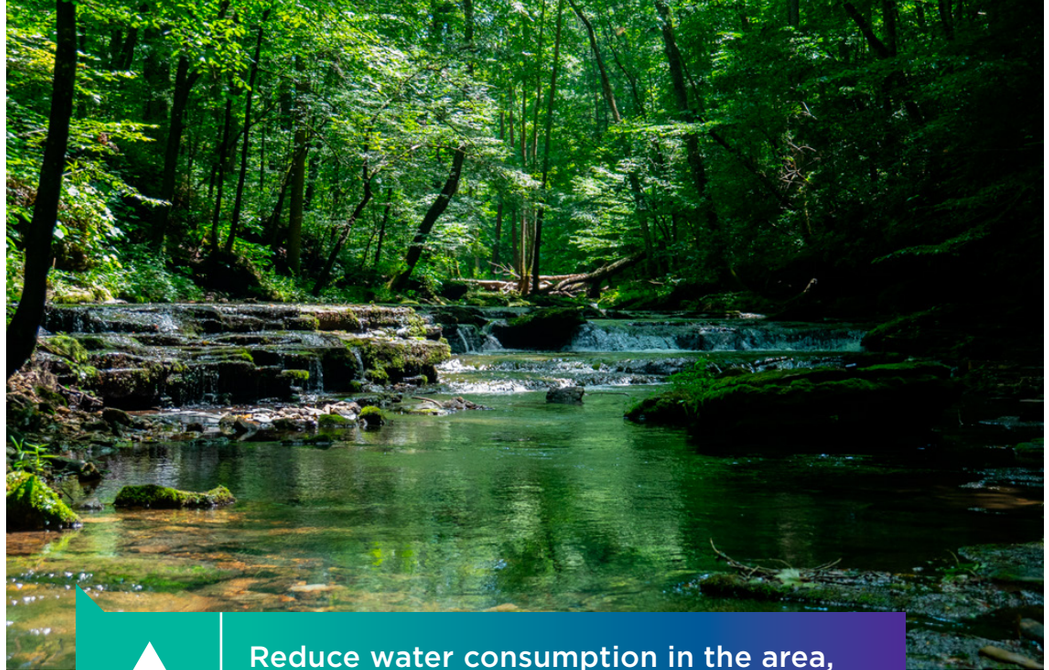
Water Consumption Intensity (cubic meters/MWh)



Water Withdrawals (million cubic meters)



Additionally, BPP in coloration with Banpu Group, reviewed the water footprint assessments of the three CHP plants and seven solar power plants in China to further improve their performances in the future.



Reduce water consumption in the area, with no water discharged to outside.

Assessments of Risks Related to Water Resources

BPP assesses risks related to water scarcity from its business unit's locations, with a reference to the WRI Aqueduct Water Risk Atlas (2019) – a program for categorizing areas with water resource risks, in terms of physical quantity and quality, regulatory & reputational risks, as well as anticipating future risks.

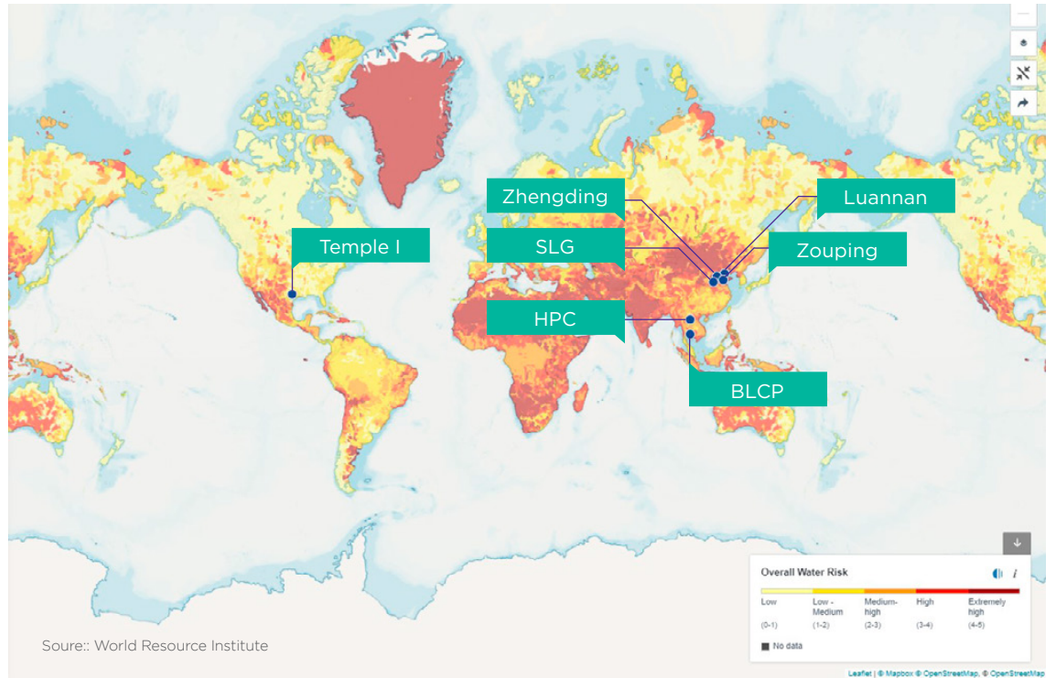
The 2022 assessment using data on areas facing the water shortage risk in the next 20 years, found that all three CHP plants in China, in which BPP has direct management control, are located in the areas with extremely-high risks associated with water resources. As a result, the three CHP plants, have made improvements to reduce the amount of water consumption and water discharges in compliance with the government's regulations. The power plant's extensions have also installed a recycling system, making them able to reuse all of their released water. Temple I Gas-fired Power Plant in USA, which assessed its risks associated with water resources for the first year, revealed that the power plant is not exposed to risks related to water scarcity significantly. Temple I, however, has installed the water recycle system at its power production towers. This has enabled the power plant to reduce water consumption in the area, with no water discharged to outside.

Installed a recycling system making them able to reuse all of their released water

Invested in a construction of the desalination plant

Use models to forecast water balances in the areas

As for the joint-venture thermal power plants, namely BLCP Power Plant in Thailand and HPC Power Plant in Lao PDR, it was found BLCP Power Plant has medium-high level risks as the plant is located on the sea. Consequently, BLCP Power Plant has invested in a construction of the desalination plant, producing fresh water and tap water from seawater through the "Reverse Osmosis Seawater Desalination Plant" (ROSDP), with a capacity of 1,000 cubic meters/day. The aim is to alleviate the water shortage crisis in the eastern region, producing sufficient water for the people and farmers. Since 2020, the desalination plant has reduced its fresh water consumption by 100%. HPC Power Plant, though having low level risks associated with water resources, the power plant has managed water sources in the area, namely Nam Leuk and Nam Kaen water sources. HPC Power Plant, in collaboration with the experts conducted a study to use models to forecast water balances in the areas, determine 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.



Power Plants	Overall Water Risk	Physical Risks Quantity		Physical Risk Quality	Regulatory and Reputational Risk	2040 Forecast	
		Water Stress Risk	Drought Risk			Water Stress	Water Demand
Luannnan	Extremely high	Extremely high	Medium-High	High	Medium-High	Near normal	Increasing around 1.4 times
Zhengding	Extremely high	Extremely high	Medium-High	Medium-High	Medium-High	Increasing around 1.4 times	Increasing around 1.2 times
Zouping	Extremely high	High	Medium-High	High	Medium-High	Near normal	Increasing around 1.2 times
Shanxi Lu Guang*	Extremely high	High	Medium-High	Medium-High	High	Near normal	Increasing around 1.4 times
HPC*	Medium-High	Low	Low-Medium	High	Extremely high	Near normal	Increasing around 1.2 times
BLCP*	Medium-High	Medium-High	Medium-High	Medium-High	Low-Medium	Increasing around 1.4 times	Increasing 1.7 times or greater
Temple I	Low-Medium	Low-Medium	Medium	Low	Low-Medium	Increasing around 1.4 times	Increasing around 1.2 times

* BPP have no direct management control.

A Water Management System at Temple I Gas-fired Power Plant

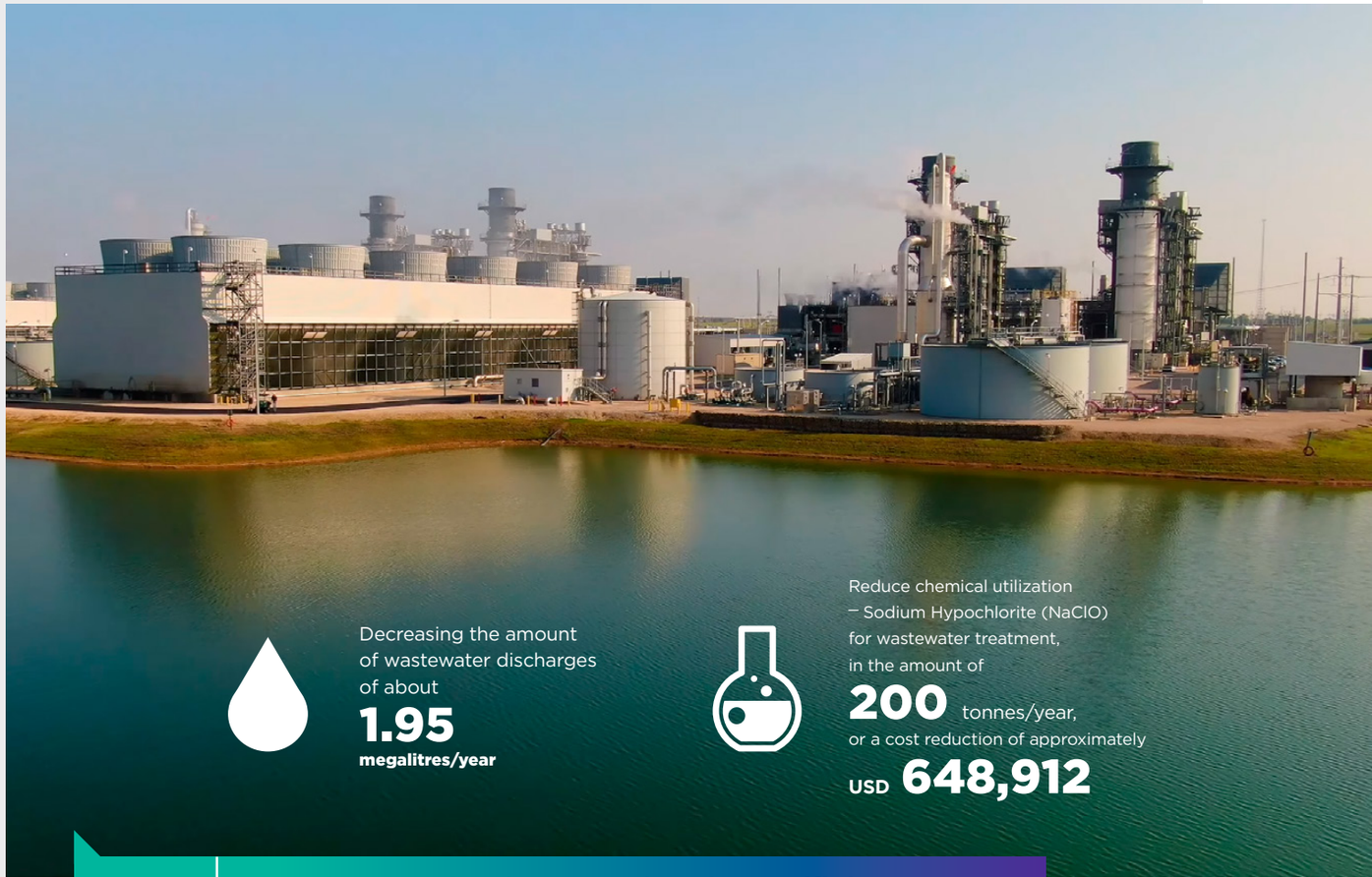
Temple I Gas-fired Power Plant has a 10-acre (approximately 40,000 square meters) water reservoir within the power plant's area to obtain water recycled from the wastewater treatment plant, serving surrounding communities. This recycled water is the main source of water, reducing wastewater discharges to nearby natural water bodies. It enables the power plant to have enough water for consumption. The cost of recycled water produced is lower than that of groundwater or other water sources.

Temple I Gas-fired Power Plant initially treats the water with a biological methodology through raising fish eating plants and algae as food. Thus, these fish raised help to control the number of algae and the acidity and alkalinity of the water. As a result, it can significantly reduce the amount of chemicals used in water treatment. After that, the water treated is fed into the power plant's Zero-Liquid Discharge (ZLD) treatment system to meet quality standards. It can be used in the production process of Temple I Power Plant as well.

Through this holistic water management, Temple I Gas-fired Power Plant has sufficient water reserves, and does not discharge its production's wastewater into the Texas basin.

Benefits gained from the project

- As using biological methods to treat water, Temple I Power Plant can reduce chemical utilization – Sodium Hypochlorite (NaClO) for wastewater treatment, in the amount of 200 tonnes/year, or a cost reduction of approximately USD 648,912
- Decreasing the amount of wastewater discharges of about 1.95 megalitres/year.
- Reducing the impacts from withdrawing natural water resources in the area.
- Creating a good attitude towards the community.



Waste

Stakeholders:
- Communities, customers, employees, shareholders, business partners, suppliers, the government sector

Strategy:
- Decreasing the amount of waste used at its original sources.
- Promoting a reuse and recycle of waste.
- Determining measurements to prevent and solve hazardous waste leakages.

Key Indicators:
- Proportion of hazardous waste to landfill.
- Proportion of reused and recycled fly-ashes.
- Proportion of reused and recycled synthetic gypsums.

Target:
- Zero hazardous waste to landfill.
- The intensity of direct disposal of hazardous waste is not over 6 tonnes/year, and doesn't exceed 210 tonnes/year during the years 2023 - 2025.
- Direct disposal for non-hazardous waste is not more than 0.130 kg/MWh in 2021 - 2022 and doesn't exceed 793 tonnes/year in 2023 - 2025.
- Proportion of fly ashes disposed by reusing and recycling is no less than 100% per year.
- Proportion of synthetic gypsums disposed by reusing and recycling is at no less than 100% per year

Performance:
- **23.5** tonnes of hazardous waste to landfill.
- A direct disposal of hazardous waste was **26.05 tonnes/year**.
- Non-hazardous waste directly disposed was **0.12 kg/MWh**.
- Proportion of fly ashes disposed by reusing and recycling equaled to **100%.**
- Proportion of synthetic gypsums treated through reusing or recycling represented **100%.**

Significance and Reporting Boundary

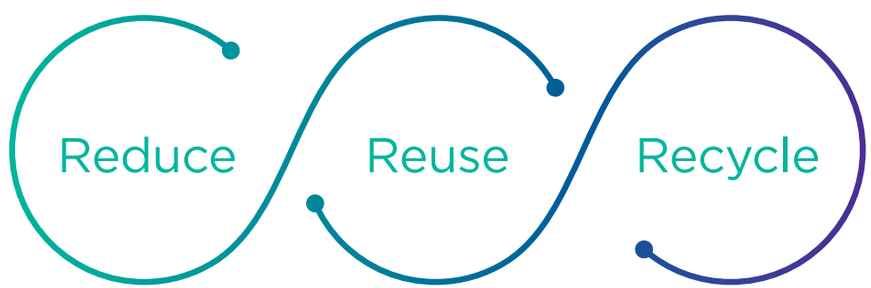
A conservation and valuable utilization of resources is the best practice to minimize waste generated from operations. The appropriate and efficient waste management can also reduce costs for waste disposals. This includes reducing the impacts on environment and surrounding communities caused by hazardous waste leakages and unproper disposal.

As for conventional power business, aside from non-hazardous and hazardous waste generated, there are also by-products created from fuel combustions and air quality treatment processes, namely ashes and gypsums. Both ashes and gypsums can be utilized and added values by selling them as mixtures of construction materials.

The boundary of this report covers business entities, in which BPP has direct management control, excluding the business in USA where BPP have invested since late 2021.

Management Approach

BPP has managed its waste with the 3Rs principles, as following:



The key target of BPP's waste management is to have no hazardous waste to landfill and to monitor waste disposal operation by comparing with the annual target. This is to ensure that the power plants' waste management is conducted in accordance with best practices and legal compliances of each country.

Waste Management Policy

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

Types of waste	Examples	Management Approach
Non-hazardous Waste	• Papers and office equipment • Metal scraps, materials and equipment, as well as packaging • Household waste • Organic waste generated from tree trimmings and mowing in the area	• Consumption reduction. • Storage and classification for reusing and recycling.
Hazardous Waste	• Used oils and lubricants • Used batteries • Chemicals used to improve water quality and other chemicals, including packaging	• Reducing consumption. • Seeking opportunities to transforming hazardous waste into those able to be better treated and reused. • Decreasing the use of packages by transporting and installing hazardous waste in chemical storage tanks. • Storing and classifying waste for reusing and recycling. • Setting up measurements to prevent and handle waste leakages, in the event of emergency. • Transportation, disposals and sales for recycling must comply with the standards required by laws. • Delivering waste for disposal by certified external parties.
Ashes and Gypsums	• Fly ashes • Bottom ashes • Synthetic gypsums	• Separating fly ash sizes to meet customers' needs and market demand. • Exploring the market to sell fly ashes, bottom ashes and gypsums for utilization such as construction materials. • Arranging the adequate areas for storing ashes and gypsums appropriately. • Delivering ashes and gypsums to the certified external parties for disposals.

Waste Management System

Procurement
- **Selecting suppliers/ contractors with good operating standards.**
- **Decreasing package usages.**

Storage
- **Storing waste in accordance with best practice 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.**

Elimination
- **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 collects the amount of waste generated and delivered for disposal by weighing and recording it prior to either management or disposals. The amount of waste carried for disposal by outside agencies has been recorded from the receipts.

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

Since 2021, BPP has collected waste data according to the GRI 306 Waste (2020). The three combined heat and power (CHP) plants in China generated waste in a total of **792,583 tonnes**, consisting of **116 tonnes** of hazardous waste and **792,467 tonnes** of non-hazardous waste (including ashes and gypsums). All waste were disposed by external parties, without on-site disposal. Most of waste were disposed through reusing and recycling. The 2022 performance of waste management is following:

- Recording **23.5 tonnes** of hazardous waste to landfill, which was higher than the target set. This was resulted by changing chemicals used in air quality treatment according to the maintenance planning cycle, while there wasn't any party providing waste disposal service through reusing and recycling in the area.
- Non-hazardous waste with direct disposal was **0.12 kg/MWh**.

Waste Disposal	Hazardous Waste (tonnes)		Non-hazardous waste (tonnes)	
	2021	2022	2021	2022
Waste diverted from disposal	175	90	776,631	791,911
Waste direct to disposal	1	26	793	703
Total disposal waste	176	116	777,424	792,614

Remark: 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 procedures.

In 2022, BPP's non-hazardous waste included 710,580 tonnes of ash, resulted from fuel combustion and 90,001 tonnes of synthetic gypsums. The synthetic gypsums were reused and recycled **100%**, while fly-ashes were sorted out to its sizes before being sold as a component used for the construction materials. Separating the fly-ash size helped add values to the products, so that fly ashes can be sold at a higher price because it meets customer's needs.

In addition, BPP created a project to use the industrial waste, the activated carbon from its customers' factories to blend with coal, which was faced with high prices in the previous year. This made it possible to reduce the amount of waste generated in the area.

Biodiversity

Stakeholders:
- Communities, government agencies

Strategy:
- Avoid operating in areas with high biodiversity value.
- Conducting a study and assessing risks associated with biodiversity in operating areas to avoid such areas and to develop preventive and corrective measures.

Key Indicators:
- Proportion of business units assessed 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 assessed on potential biodiversity impact equals to 100%.
- Proportion of business units evaluated on biodiversity value, represents 100%.

Performance:
- Assessing biodiversity **in all areas of the business units**.
- **No** production units are located in areas with high biodiversity value.
- **No** complaints or non-compliance with laws related to biodiversity.
- Carrying out biodiversity conservation and restoration projects in collaboration with local communities, such as reforestation projects and natural resources & environment conservation projects.

Significance and Reporting Boundary

Nowadays, 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, etc. BPP is well aware of areas with high biodiversity so that it strives to conduct business with caution and take into account the potential impact from 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 more than 50% of shares with direct management control.

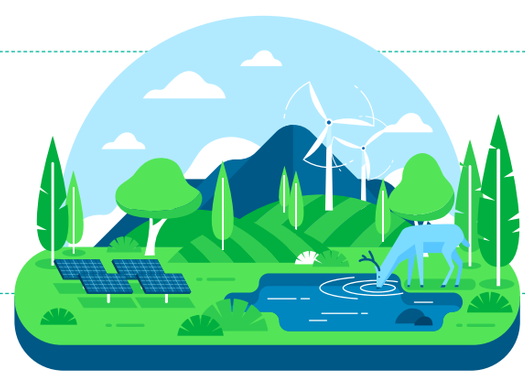
Management Approach

BPP has established guidelines for biodiversity management by avoiding the impact on biodiversity in the first place. The process begins with selecting operational zones not affecting areas with high biodiversity. We are committed to conducting biodiversity operations as following:

- BPP is committed to implementing projects creating positive impacts on biodiversity (Net Positive Impact) by using the following management approaches:

Avoidance
Avoiding conducting activities causing negative impacts on biodiversity.

Offset
Implementing projects to offset the biodiversity impact.



Reduce
Reducing the unenviable impact by setting a clear action plan and measures.

Rehabilitation
Rehabilitating the affected areas.

- Avoid implementing projects in areas with high biodiversity.
- Assessing potential biodiversity impacts in all business units.
- Conducting studies and assessing the biodiversity value in order to collect data and prepare an action plan to reduce the impact before commencing the project.
- Taking into account the biodiversity impacts in every phase of the project, starting from survey, construction, during operation, to project's expiration period.
- There are no 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.
- Engaging with stakeholders, especially local communities and educational institutions to implement the biodiversity conservation projects.
- Supporting research projects on biodiversity.

Performance

In the year 2022, BPP revised its biodiversity policy to be clearer, especially the intention to avoid and minimize the impact on biodiversity. 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.

Currently, BPP operates neither power plants nor 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.

Biodiversity Policy

No BPP's power plants or business units are located in high biodiversity value area.

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

- The three combined heat and power (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 images, 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, covering an area of approximately 80 square kilometers. The study found that the areas used around the three CHP plants are still the urban space where most of the activities conducted are the industrial undertakings, while some are agricultural and residential areas. The study results revealed that there are **no incidences related to biodiversity impacts derived from the air quality and power plants' operations**. In addition, there haven't been any conservation areas announcement near the three CHP plants.
- Temple I Gas-fired Power Plant, located in Texas, USA, stations on empty land and farmland. Therefore, its biodiversity risk is low.

BLCP Power Plant Organized a "Community Forest Plantation" Activity

On 6 August 2022, BLCP Power Plant arranged a community forest plantation activity at Ban Nong Lalok, Nata-khwan Sub-district, Mueang Rayong District, Rayong Province. The objective of this activity is to restore forest areas and increase the potential of community forests to become a carbon storage, restore ecosystems to increase biodiversity and to be the natural resources and food sources for surrounding communities. The project focuses on sustainability through creating participation from local communities with collaboration from a government sector, such as the Royal Forest Department, Thailand Greenhouse Gas Management Organization (Public Organization) and Local Administrative Organization.

BLCP Power Plant has been continually supporting the community forest project since 2016 through various environmental conservation programs, such as Khao Chom Hae Reforestation Project, Ban Khao Phudon Huay Mahad Community Forest Plantation Project, Ban Maduea Community Reforestation Project, Khamaeng Khong Man Community Forest Plantation Project, Phrachedi Klangnam Mangrove Reforestation Project, etc. These projects are nature-based solutions (NbS) to mitigate climate change problems along with restoring degraded forest areas to turn back with abundance.

Project	Areas (sq. m.)	Processing Time	Carbon Sequestration (tonnes CO_2e)	Remark
Phrachedi Klangnam Mangrove Reforestation Project	200,192	2008 - 18 February 2016	2,847	LESS*
Khamaeng Khong Man Community Forest, Klaeng District	56,000	30 August 2017 - 27 September 2021	914.55	LESS*
Ban Maduea Community Forest, Khao Chamao Sub-district	40,000	1 October 2019 - 14 August 2020	2,488.614	LESS*
Ban Nong Krab Community Forest, Ban Khai District	24,000	Years 2021 - 2023 (Current and future operational plans)	Approximately 300	Estimation data, waiting for LESS Scheme submission
Ban Nong Lalok Community Forest, Mueang Rayong District	35,200	Years 2022 - 2024 (Current and future operational plans)	Approximately 500	Estimation data, waiting for LESS Scheme submission

Remark: * LESS: Low Emission Support Scheme is prepared for developing the greenhouse gas reduction projects, but unable to buy-sell credits.

Participants

Participants
121 employees

Community members, officers from the Sub-district Administrative Organization and the Royal Forest Department
105 persons

Social

Banpu Power
has created sustainable value
for stakeholders and society.

Labor Practice

Stakeholders:
- Employees

Strategy:
- Operating labor practices in accordance with the international best practices.
- Fostering equality and non-discrimination, as well as fighting against harassment or infringement of rights in the workplace.
- Defining communication channels with employees, receiving complaints and taking them into a remedial process.

Key Indicators:
- The number of incidents associated with violations of labor laws and practices.
- Safe working-environment.
- Employee engagement scores.

Target:
- No incidents relating to violations of labor laws and practices.
- The working-environment examination results are in accordance with legal standards.
- The employee engagement scores are over 70% and 75% in Thailand and China, respectively.

Performance:
- None of incidents involved with violations of labor laws and practices.
- The working-environment examination results were in line with the standards set by laws.
- Employee engagement scores were **74%** and **96%** in Thailand and China, respectively.

Significance and Reporting Boundary

With our belief that employees are the heart of building a business ecosystem to grow steadily, leading to the creation of emerging and diverse business opportunities, BPP aims at sustainably creating a decent quality of life for its employees in all aspects and building their competencies, as well as a sound working environment accommodating them to create positive changes to deliver good energy to society. As a result, BPP has designed every process of human resource management and employee welfare. Realizing that employees are the center, BPP's human resources management and welfare are conducted under the three principles, namely equitability, performance base and competency base, together with employee diversity management, in terms of races, religions, languages, cultures, ages, knowledge, perspectives and working experiences in all nine countries, where BPP has operated its businesses. So that employees utilize their diversity strengths to add value and competitive advantages. This will enable them to work together happily, flexibly and agilely, as well as properly in their job positions and lifestyles, daring to change and create innovation in every aspect, with readiness to drive new businesses. The goal is to create the business sustainability, making BPP grow from its strong foundation in the long term.

BPP's human are conducted under the three principles

BPP is well aware of the strong foundation of "Banpu Heart" corporate culture, helping unite all differences into one. In order to be the driving force for the organization and ready for any changes in accordance with business vision and strategy, BPP's executives and employees in every country have been striving for cultivating a corporate culture continuously and earnestly for almost 40 years so as to make them work in the same direction.

The boundary of this report covers the companies, in which BPP has direct management control.

Management Approach

To manage its human resources in all operating countries to be suitable for the new context efficiently, and to support the "One Banpu, One Goal" concept, turning it into tangible actions, BPP has taken the following actions:

- Employee recruitment process: BPP emphasizes qualifications and knowledge, as well as competences of all applicants equally, mainly to fit with the needs of each job.
- Promoting collaboration under diversity: As mentioned above, BPP has long been supporting its human resources in all countries where it has operated businesses, to work collaboratively under diversities in order to strengthen teamwork and drive the company's innovation in making a business grown sustainably.
- BPP aims to develop its personnel to be 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 and adhering to the Banpu Heart corporate culture.
- Performance Management: BPP has established a fair key performance indicator (KPI) system in order to manage its performance to be consistent with the goals set. In addition, it has also improved a KPI scoring criteria, divided into two parts: Work-related KPIs, accountable for 70%, and behavior - based KPIs, equivalent to 30%, The behavior base KPI is scored based on behaviors expressed by employees in accordance with corporate culture.

- **Defining other KPIs beyond individual responsibilities**: Other KPIs related to subordinate management skills, such as leadership KPIs, have been set up for department managers and above to make them realize that other than department's managerial work, supervising and taking care of subordinates is also helping operate the department better.
- **Setting up a complaint channel**: Employees can submit various complaints through the compensation committee, established as a means for them to submit their matters for consideration and further present to executives. In addition, employees can consult or submit their complaints on various affairs via supervisors directly or through the Human Resource Management Department. 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 employed a process to investigate such complaints and disciplinary punishments as specified in working regulations.
- **Announcing the "Human Rights Policy"** by adhering to the principles of liberty, equality and human dignity, regardless of genders, races, religions or skin colors. BPP has put great importance on labor laws and has respected human rights aligned with the "Universal Declaration of Human Rights" (UDHR), the "International Labor Organization" (ILO), the "United Nations Global Compact" (UNGC), the "UN Guiding Principles on Business and Human Rights" (UNGPs), and the labor laws of all countries, in which it has operated business to ensure equality of its employees and stakeholder, such as business partners, suppliers, communities, joint ventures and external contractors.
- **Prevention of child and forced labors employment**: To prevent risks of child labor employment, BPP has a policy not to use child and forced labors by clearly specifying the minimum age of hiring employees in accordance with the labor laws of each country, including establishing a transparent recruitment and selection process, requiring a labor contract be made every time when employing the new staff.

Operating labor practices in accordance with the international best practices

Performance

- **No incidents related to violations of labor laws and practices**, discriminations, infringements and sexual harassments, and other persecutions in the workplace.
- **The corporate engagement survey results were higher than the set targets**, consisting of 74% in Thailand and 96% in China.
- **Measuring the workplace environment and taking corrective actions** to meet the standards required by laws in all operational areas, including the contractors' operational areas.
- **Improving the "Human Resource Management Policy"** by combining the "Human Rights Policy", the "Non-Discrimination and Anti-Harassment Policy" into this policy and communicating it to all employees, including information disclosure through BPP's website.
- **Arranging communications on good labor 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 employees by attending the welfare committee meeting with Banpu Group on a quarterly basis. In the past year, BPP made many improvements regarding welfare and regulations affecting employees, such as:

- **Providing welfare beyond the basic one** to take care of employees in a holistic manner, such as annual influenza vaccination, providing mental health counseling (Relationflip Program), online doctor consultation (Health at Work), virtual one-on-one exercise, massage therapy for office syndrome symptoms or consideration of special welfare program (Flexible Benefits) to be more diverse.
- **Organizing workshops to improve working styles (Work Anywhere)** by brainstorming opinions from all department's executives and to promote teamwork for maximum efficiency.
- **Managing communications on best labor practices**, such as indicators for labor practices, human rights, human capital development and talent attraction & retention.

Performance Management

Connecting the Company goals to individual employees' target

BPP adheres to three human resources development principles, including the principles of equitability, performance base management and competency base management. Thereby, it has long supported mutual working under diversities of races, languages, cultures, ages and countries where BPP has operated, with an aim to strengthen collaboration and drive the company's innovation towards sustainable business growth.

The performance management is an important process driving an organization to achieve its business goals. It is bridging the organizational needs and employees' individual working targets. It is also an administrative tool for making supervisors know the team members' performances and competencies, as well as promoting the participation of supervisors and subordinates in setting targets and KPIs together. This has resulted in collaboration and good relationships between supervisors and subordinates, eventually leading to the organizational success.

Establishing a clear and materialized performance appraisal system capable to measure individual achievement is, therefore, essential. Moreover, such an appraisal system should be communicated to all employees for acknowledgment and apply it as a principle for working, for example,

- **Setting up a fair KPI system** to manage performances in the same direction as the company's goals.
- **Improving KPIs** scoring criteria by dividing into two parts: Work-related KPIs, accountable for 70%, and behavior-based KPIs assessed from behavioral actions in line with a corporate culture, which is equivalent to 30%.
- **Upgrading the performance appraisal standards** as a single practice across the organization. Each indicator must have at least one out of four performance indicators, namely quantity, progress and time, cost, and accuracy & quality. The improved performance appraisal standards have been clearly communicated to employees for their acknowledgment and understanding.
- **Setting up leadership KPIs** for middle management and above to assess their subordinate management and caring skills. These Leadership KPIs will be evaluated by subordinates and taken as part of work-related KPIs.

Legal Compliance and International Concepts

BPP has announced the Human Rights Policy since 2018, complying with the principles of liberty, equality and human dignity without discrimination on genders, races, religions or skin colors. It has paid great importance to labor laws and has respected to human rights according to the Universal Declaration of Human Rights (UDHR), the International Labor Organization (ILO), the United Nations Global Compact (UNGC), the UN Guiding Principles on Business and Human Rights (UNGPs) and labor laws of all countries in which BPP has operated its businesses. This is to ensure equal treatment of its employees and stakeholders from BPP's operations.

Additionally, BPP has employed a "Quality Assurance Review" (QAR) management system by setting up indicators, monitoring and reviewing its operational performances regularly to promote labor and human rights policies. It has also employed the visually impaired people from the Department of Empowerment of Persons with Disabilities to provide massaging services for BPP employees under the "Healing Hands" project. The project is open every Tuesday and Thursday, with an aim to reduce office syndrome symptoms and working stresses, making employees relax.

Paying great importance to labor laws and respecting human rights according to the Universal Declaration of Human Rights

“Boost Me Up” Mental and Physical Health Promotion Activity

BPP, in collaboration with Banpu Group, has organized the “Boost Me Up” activity, an activity to promote mental and physical health for employees, at Bangkok Office, Thailand. The “Boost Me Up” activity has been consecutively arranged every quarter since 2021, focusing on mental and physical health, including financial planning. In the past year, four activities were organized, consisting of financial planning topics two times, physical health one time and mental health one time as follows:

20 January 2022

Boost Me Up EP 3:
(Not) Secret Tips for Bonus and Tax Management

7 April 2022

Boost Me Up EP 4:
BE FIT AND EAT WELL.

27July 2022

Boost Me Up EP 5:
TRAVEL - Are you going to the mountain or the sea during this long-awaited holiday

10 - 11 November 2022

Boost Me Up EP 6:
Financial Workshop.

Talent Attraction and Retention

Stakeholders:
- Employees

Strategy:
- Employing a practical staff selection procedure, able to choose employees with work-based competency, and values aligned with corporate culture.
- Conducting a data analysis on employees' performances to be used for developing a manpower strategic plan to effectively respond to corporate growth strategies and to set up potential employees' database (Talent Pool).
- Developing a development program for high potential employees (HiPO) and arranging training courses on new skills necessary for the power business transition.
- Promoting corporate reputation to attract potential candidates to join the company through cultivating "Banpu Heart" corporate culture.

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

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

Performance:
- The "Banpu Heart" scores were **84%** in Thailand and **92%** in China.
- The employee engagement scores of **74%** in Thailand and **96%** in China, respectively.
- HiPO' retention rate equivalent to **100%.**

Significance and Reporting Boundary

Attracting potential people to join the company, and keeping employees with the organization is an important factor supporting BPP to pursue its growth strategies and achieve targets set in the short- and long- terms. The power and energy businesses, in particular, require manpower with specific qualifications and experiences, while these people are highly needed in the labor market. Hence, BPP has to have a process to attract and retain its employees continuously.

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

Management Approach

Enhance successors' competency for key positions continuously.

Provide opportunities to learn and develop employees' competency via direct experiences.

1. Strategic Workforce Planning

BPP has adopted its business strategies and personnel data analysis results in various fields to create strategic workforce planning in order to prepare manpower to support the operations in the future sufficiently and efficiently. One of the manpower strategic planning, enabling personnel to work quickly and agilely, is the continuous development of successors for key positions (Succession Planning and High Potential Management). The succession plan committee will select, review and follow up competency development of senior management successors continually, including recruiting new employees and executives to support corporate growth according to strategies set.

2. Employee's Selection and Employment

The Human Resources (HR) Department has designed a recruitment process, starting from specifying clear qualifications once 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 operated through an "internal job posting" process in order to give its employees opportunities to apply for the positions they are interested in, by contacting the HR Department and going through a fair selection process. In addition, BPP has also provided its employees 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. In order to draw high potential people to work with the organization, while retaining existing employees, BPP has deployed a fair compensation management system able to compete in the power industry's labor market.

3. Employee's Performance Appraisal

BPP has employed the performance management system to create fairness and manage performance and compensation aligned with corporate goals. The employee's performance appraisal is carried out twice a year throughout the organization. The elements of employee performance evaluation 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 corporate culture, focusing on cultivating behaviors supporting employees to work properly and efficiently. This part is accountable for 30%.

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

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

360-degree assessment system

In addition to identifying the annual KPIs, BPP has set up long-term KPIs, which are applied to middle-level management and above to measure achievements of a 5-year strategic plan, consisting of indicators for achieving corporate strategies.

Creating competitive advantages and retaining existing employees to continuously work with the company

4. Remuneration, welfare and benefits management

Improve compensation, welfare, and benefits

BPP has a policy on remuneration, welfare and benefit management, which is based on its HR philosophy, focusing on using operating performance as a performance-based pay. BPP has also strictly complied with labor laws in countries where it has invested in managing its employees' welfare and benefits. In addition, some welfare and benefits are provided higher than those required by laws in order to create competitive advantages and retain existing employees to continuously work with the company. To create competitive advantages with external markets, BPP has conducted a survey to compare its compensation and benefits with external companies in the same industry and leading companies in each country regularly. The survey results are used to improve compensation, welfare and benefits for maximum benefit to employees and the company.

BPP's compensation, welfare and benefits are available on cash- and non-cash bases, which are appropriately provided based on employees' job levels, performance appraisal results, etc.

5. Cultivating "Banpu Heart" Corporate Culture

Passionate
Innovative
Committed

BPP focuses on creating a corporate culture in order to help executives and employees in all areas in working together seamlessly with the same common values and combining employee differences into strengths, as well as working together efficiently and happily. This will finally increase employee engagement levels. The "Banpu Heart" corporate culture consists of three core values: Passionate, Innovative and Committed. Moreover, the creation of corporate culture also reflects corporate reputation through corporate shared values and employees' expressions to the public to attract potential people to join the organization.

6. Talents Development

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

7. People Analytic System

Talent Pool database development

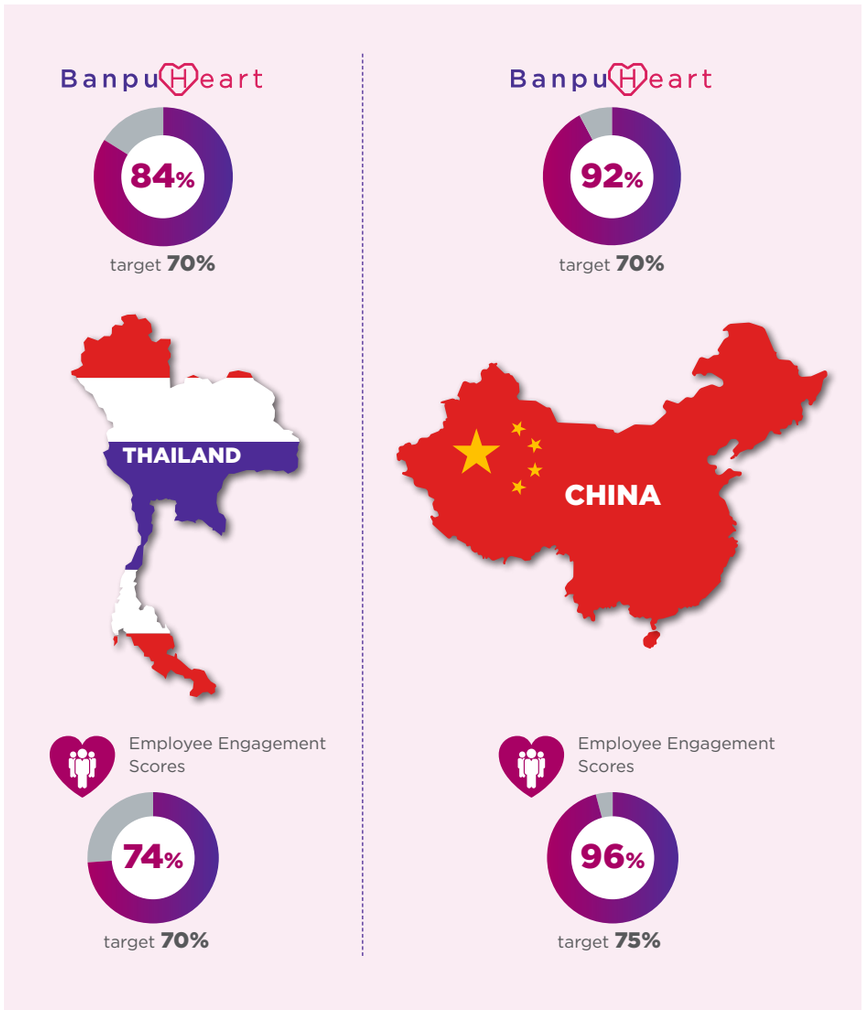
BPP has collected employee's data for analyzing in many dimensions, such as employee performance measurement, employee competency assessment and development to create a database system for potential employees or "Talent Pool", including organizational engagement scores of employees in each area and issues to be improved to retain employees. This information can be used to plan manpower to meet future needs.

8. Hearing for Employees' Opinions for Improvement

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

Performance

BPP has conducted the "Banpu Heart" and employee engagement survey annually, which is operated by external agencies. In 2022, the number of employees participating in the survey accounted for **98%** of the total workforce. The survey results are as follows:



- **100%** high potential employee retention rate.
- The Banpu Group's corporate engagement survey regarding attracting personnel to work with the organization found that:
  - **93%** of employees say positively about working for the organization when given the opportunity.
  - **70%** of employees will recommend a friend who is looking for a job to join the organization.

BPP has attracted and retained employees in various means, for example:

- **Promoting a corporate reputation** through a presentation of Banpu Heart's corporate culture on various channels, such as Facebook fanpage, so that stakeholders understand BPP's working principles. It also attracts potential candidates to work with the company.
- **Developing and implementing a "High Potential Development Program"** (HiPo), for example, organizing training sessions on skills needed in the power business. The progress of organizing training for key positions is accontable for 70%.
- **Continuously implementing the employee potential development project**: To prepare employees for more challenging jobs in the future, the "Leadership Pipeline Development" program was initiated last year, with an aim to enhance capabilities of middle-level management and higher in working and managing people, as well as being able to grow as the corporate future leaders. These talents were chosen through a systematic selection process and assessed leadership capability and characteristics to gain awareness of their strengths and points to be developed, as well as to create individual development programs (IDP) to prepare the future leaders both in Thailand and abroad. Moreover, BPP has strengthened and developed these talents to increase their leadership capabilities in businesses, critical thinking and management through various development processes, such as cross-functional working, cross-country working, job rotation, etc. The progress of their development plans is monitored on a quarterly basis.

Employee Engagement

Stakeholders:
- Employees

Strategy:
- Engaging with employees by drawing participation from department leaders.
- Developing communication channels and hearing employees' opinions for further improvement.

Key Indicators:
- Employee engagement scores
- Banpu Heart corporate culture scores

Target:
- Employee engagement scores in Thailand and China are at least 70%, and 75%, respectively.
- Banpu Heart score is not less than 70%.

Performance:
- Employee engagement scores in Thailand and China were **74%** and **96%**, respectively.
- Banpu Heart corporate culture score in Thailand and China were **84%** and **92%**, respectively.

Significance and Reporting Boundary

BPP believes that taking good care of employees and making them feel as part of the organization, as well as encouraging them to be satisfied with their work, inclusive of providing opportunities for fair career growth and accepting their opinions for further improvement, will make them work happily. This will also enable employees to improve their work continuously and reduce the turnover rate, as well as retain talents within the organization. Furthermore, the employee engagement is significantly associated with competitive advantages, growth, stability, corporate sustainability and shareholders' returns.

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

Management Approach

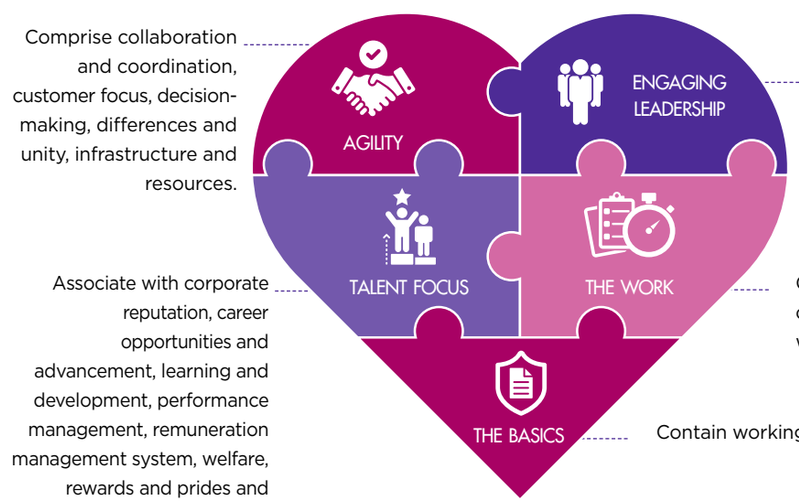
BPP has employed the employee relationship policy as a practice guideline for creating good relationships with its employees. The employee engagement comprises three principles as follows:

SAY
Employees say about BPP with positive attitude to internal and external people.

STAY
Employees work happily and want to stay with the organization in the future.

STRIVE
Employees have deep bond, striving to make the company better.

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 engagement action plans for organizational and departmental levels in order to continuously engage with employees and report a progress to executives quarterly.



Performance

BPP organized the employee engagement and Banpu Heart corporate culture survey with the following results.

Country	Respondents (%)	BPP employee engagement scores (%)	Average employee engagement level in the labor market (%)	Banpu Heart scores (%)
Thailand	100	74	71	84
China	99	96	75	92

In 2022, BPP used the results of employee engagement survey to analyze and find ways to create tangible employee engagement. Employee management is divided into three dimensions, the scores of which have notably increased as follows:

1. Talent and Staffing

Continually developing a succession plan for key positions

One of the strategies for manpower planning and management, enabling them to work quickly and agilely, is a continued development of successors for key positions (Succession Planning and High Potential Management) to support BPP's rapid growth. In 2022, BPP, in conjunction with the "Succession Plan Committee", considered, selected, reviewed and followed up on high-ranking successors' development regularly, while preparing, monitoring and assessing the individual development plan (IDP) of selected candidates on a monthly basis. This included the recruitment of new employees and executives to strengthen key positions in every operating country in order to keep the succession development plans in line with BPP's strategies. In 2022, BPP continued focusing on the "Leadership Pipeline Development" program to support business growth and expansion abroad through various initiatives. The aim was to enhance the preparedness of middle-level management and above in managing people, work and being able to grow as a corporate future leader.

Additionally, BPP also empowered leaders' capabilities in business knowledge, analytical thinking and management skills for people with high potential. This was done through various development processes, such as cross-function working, enhancing overseas working experiences, job rotation, etc. The progress of such development plans was monitored quarterly.

2. Career Development and Growth

In 2022, BPP focused on promoting employee competency development in order to make its personnel ready to cope with challenges and unceasing business transitions. As a result, the "Banpu Academy" was established at Bangkok Office, with a vision and goal to drive Banpu towards a lifelong learning organization. The aim was to prepare all employees with capabilities to learn and develop themselves in a comprehensive way, enabling BPP business to adapt and grow steadily amid any opportunity and business challenges, as well as changing trends related to sustainability. The main missions of Banpu Academy are as follows:

2.1 **Developing modern and standardized training courses** for employees at Banpu Group level, including special courses according to the specific expertise and context of each Business Flagship, and in each country where Banpu has operated business currently and in the future.

2.2 **Creating a network and ecosystem to develop employees** together with capacity-building institutions and organizations from the private and international public sectors.

2.3 **Applying data analytics principles to plan the annual development program** for employees, as well as designing learning experiences, responding to dynamic needs of personnel development in the entire business sector and in each diverse workforce efficiently.

2.4 **Developing employees' potential and capabilities ready to adapt themselves to the digital age** and various transitions arising rapidly in the new normal era, including applying digital tools to work more efficiently. The development was focused on skills related to data analytics, human centric and Banpu's way of working, which was adopted from "Agile Methodology", using the "Scrum" framework as a key driver. Meanwhile, the "Design Thinking" process was used for cross-working within functional lines, departments and countries.

Providing a proper platform responding to self-development needed by diversified employees

2.5 Fostering an organizational culture of innovation and unceasing creativity & development. An innovation community was established within the organization through various activities, such as “Banpu Hackathon”, “Unbox”, “Unleash Your Creativity” and “Banpu Innovation Convention”. Moreover, Banpu Academy at Bangkok Office has joined hands with human capacity-building agencies in each country to set up Banpu Academy – Country Campus, to link Banpu employees’ development in each country systematically. In 2012, Banpu Academy – Indonesia Campus, and Banpu Academy – Australia Campus have been established with a plan to expand to Vietnam, China, Japan and the United States, expected to be completed in 2023.

2.6 BPP continues preparing its middle-level management and higher to be capable and ready for managing people and work, able to grow as a future corporate leader. In 2022, various projects were initiated, including:

- Banpu International Business Leader Program (IBLP), an all-country leadership development program (the first generation), aims to develop and prepare readiness for leaders, focusing on action learning. A “Mentor System” from senior executives has been set up for all participants within the organization to encourage them to be ready to grow in key positions.

- Banpu Business Leaders Development Program aims to enhance executives’ readiness in every country, in terms of people & work management, being a corporate future leader. Participating employees must go through a systematic selection process, including an assessment of leadership capability and characteristics in order to gain awareness of their strengths and areas to be developed, as well as to arrange a personalized training program in preparation for being a leader in the future.

In addition to general basic development courses, BPP, in collaboration with consulting firms and leading domestic and international executive development institutes, continues designing and developing training programs in a format of blended learning for management and employees at all levels. Besides, personnel development programs have been adjusted, more in line with the “Flexible Workplace” policy, in which participating employees can reskill and upskill through online self-learning. Meanwhile, Banpu Academy together with HR Digital Team, will provide a proper platform responding to self-development needed by diversified employees, so that they have impressive learning and working experiences. This will lead to further development, passing on skills, knowledge and experiences from brothers to sisters, which will help BPP implement its strategies in a smart, sustainable and stable way.

Self-Learning Program

Other than in-house and outside training courses, a selective learning program has been arranged in accordance with the international lifelong learning model. Personnel development budgets in every country are allocated at least 5% of the total salary per year. In 2022, the main skills were developed as follows:

Leadership Development	Specific Functional Competency	Banpu Global Leadership Program
Such as enhancing business concept, for example, "Energy Titan", "Negotiation Skill", "Coaching and Mentoring Skills", to help employees unleash their potential. Digital savvy has been enhanced, starting with complementing knowledge through the "Data-Driven Citizen Program", which leverages insights to drive the organization amid a tech-rich environment to create benefits for the organization and to add value for customers. In particular, we provided opportunities for employees to initiate and try out projects with support from a learning community sharing experiences and endlessly transferring knowledge and techniques of data analytics. By this means, employees are a learning centric and choose their own learning style to access and develop knowledge and skills effectively.	such as strategic thinking and strategic planning, project management, business model canvas workshop, sustainable development principles of Banpu Group, etc. For developing technical/functional competencies, BPP not only continues organizing necessary competency development training courses to prepare employees when on-site, but also arranges training to develop emerging skills for employees to accommodate its business expansion and advancement, such as holding internal seminars on ESG. In addition, employees have been developed through a learning community, focusing on sharing experiences in solving problems from real case studies both inside and outside the organization, such as "Energy Trading Learning Community", "Renewable Energy Asset Management Learning Community", etc. The aim is to allow employees in the same functional group from various operating countries to exchange knowledge, best practice and experiences, as well as create guidelines for working process development, including exchanging information and expanding networks.	It is a joint training program attended by executives from all BPP operating countries to promote cross-cultural working (Diversity and Inclusion) networking between functions to create collaboration between countries (Collaboration). Courses provided in this training include self-development to build leadership skills, team's leadership skills and business leadership development.

3. Work-Life Balance

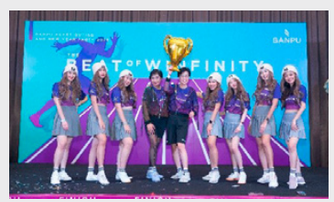
BPP has put top priority on and encouraged its employees to achieve work-life balance or a balanced life in both work and healthy living. Various methodologies continued promoting from 2021 are as follows:

- **Improving "Work Anywhere and Flexi time" policy.**
- **Initiating "Work Anywhere" workshop** for senior vice president level and above.
- **Providing consultations related to work and personal matters for employees through a "RelationFlip"** project, served by external psychologists who keep employees' personal information confidential.
- **Arranging "Boost Me Up series"**, an activity continuously caring for employees' quality of life in all aspects, including mindfulness literacy, health literacy and financial literacy to encourage employees to create positive power in surrounding society.

A strong corporate culture contributed from three main powers: "Determination, Creativity and Love"

Banpu Heart is a corporate culture uniting employees to be “One Banpu, One Goal”. The principle of BPP's human resource management is to continually cultivate a strong corporate culture to build upon the diversified power of Banpu Group in creating innovations and sustainable business growth. All executives and employees of Banpu Group, including BPP, have adhered to Banpu Heart corporate culture as the operating principles, consisting of three shared values: “Passionate”, “Innovative” and “Committed”. In the previous year, the Banpu Heart Corporate Shared Values (CSV) survey result was **84%** in Thailand and **92%** in China, higher than the target set. Besides, BPP and Banpu Group’s Bangkok Office, Thailand, organized various activities to promote “Banpu Heart” corporate culture, such as

- **“Banpu Heart” workshops conducted in each country**, namely Japan, to educate employees about 10 key behaviors of “Banpu Heart” despite language and cultural differences.
- **Setting up a Banpu Change Leader (BCL) Community** in each country to become a role model and instill Banpu Heart corporate culture in all employees across the organization sustainably. Most recently, the BJP BCL was established in Japan in addition to Thailand and China.
- An activity to introduce 10 “Banpu Heart” ambassadors at the event called **“Banpu Transformation: The future we make”** was organized to emphasize that “Banpu Heart” corporate culture is the heart of organizational transformation process, starting from people.
- The **“Beat of Winfinity” Sports Day** was arranged to connect employees in Thailand and Thai staff working abroad to run activities together. More than 384 employees attended this event both on-site and online. The Sports Day was aimed to support corporate core values and connect employees based in different locations via a hybrid system, a new way of working in the future where employees do not have to go to the office every day.
- **“Banpu People Garden”** activity was arranged to reflect that Banpu Power respects differences and diversity and is ready to encourage employees to have their own career growth, which was expressed through the distribution of **various plants** to participating employees.
- An activity called **"Trying the Best, Trying the Taste"** was organized to reflect that BPP supports its employees to overcome their fears, dare to try and error through the learning process and grow from mistakes to move towards success.



Human Capital Development

Stakeholders:
- Employees

Strategy:
- Developing employees' competencies and leadership, responding to newly necessary skills and roles in line with business directions by establishing an individual development plan (IDP).
- Planning key positions' successors for consistent management and business strategy supports.

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

Target:
- Proportion of employees completing setting up IDPs equal to 100% by 2025.
- Proportion of succession plans for key positions, accountable for 100%.

Performance:
- Proportion of employees having IDPs was **83%** in Thailand and **88%** in China.
- Proportion of key positions having IDPs representing **100%.**

Significance and Reporting Boundary

Developing employees' competencies to be equipped with knowledge and occupational expertise, as well as management skills, including promoting their leadership, 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 human resources management strategies to accommodate business expansions and increase competitive advantages. As a result BPP has prepared comprehensive competency development plans for its executives and employees to enhance their learning ability and working efficiency, in tandem with setting up leadership development plans in accordance with organizational targets and missions.

The boundary of this report covers business entities, in which BPP has direct management control, including the three combined heat and power (CHP) plants in China and the offices in Thailand and China, excluding a business in the United States of America, where BPP just started investing.

Management Approach

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

Designing short-term training courses

Concentrating on developing training courses properly with individual needs by taking the following criteria into consideration.

1. **Assessing employees' competency** in comparison with leadership and functional competencies.
2. **Explicating knowledge urgently required for development** aligned with business operations the inclusion of building upon upskills and reskills, and learning emerging technologies, or practicing essential skills able to apply these skills to improve their current and future work more efficiently.
3. **Learning methodologies consistent with the 70:20:10 learning and development model**, including learning and development from attending training courses, various educational courses officially organized by BPP, learning from coaching, real practices and working, as well as through direct experiences.

Developing long-term training courses

Focusing on designing training courses in line with BPP strategies and corresponding to trends of business needs, as well as demand for new skills in the global market. This is to prepare our employees to be ahead of the changing business trends and to link diversities of each country, where BPP has operated business.

Moreover, BPP has set up different forms of employee development according to position levels, and to be in line with the most efficient learning process, as well as supporting employees' performances in each level as follows:

- **Designing the Banpu Group Learning and Development Road Map** by taking into consideration the knowledge essential for working, people system and managerial skills. BPP's employee development focuses on leadership and functional competencies, so that our personnel, ranging from the employee level to the managerial level, can enhance their working skills in parallel with leadership capabilities.
- **Developing specific people capacity development plan for power business.**
- **Arranging a high potential development program** for all levels of employees to train them to be equipped with knowledge and new skills essential for a power business transition.
- **Assessing IDPs** and using results gained for improving operations continuously.

Additionally, BPP also encourages its employees to learn from various means, such as:

- Giving employees opportunities to learn and develop themselves through direct working experiences, e.g. transferring to other functions with work characteristics close to such an employee's function, participating in cross-functional projects, working in overseas affiliates, etc.
- Learning through online course platforms on which employees can choose the training topics they want to learn by themselves to enhance their potential.
- Creating awareness on the importance of continuous learning and development among employees through enhancing the "Growth Mindset."

Creating awareness on the importance of continuous learning and development among employees through enhancing the Growth Mindset

BPP selects employees with outstanding performances and sound attitudes in accordance with the corporate shared values in order to formulate a plan to develop competency and working experiences of these talent groups, which will be beneficial to their future work. This includes putting these talents in the succession plan appropriately. To continue conducting business and to support operational strategies, BPP has laid down a succession plan for key positions as follows:

- **Setting up the succession plan committee** to oversee a succession plan for key positions. The succession plan committee is responsible for prescribing policies and considering as well as determining key and critical positions.
- **Designing key and critical position profiles** and setting talents selection criteria.
- **Jointly working with Human Resources (HR) Department** to nominate and select talents to succeed such key positions.
- **Designing, monitoring and assessing IDPs of selected candidates** by working together with HR Department.
- **Reviewing key position succession plans to be in line with corporate strategies** and identifying critical roles for further developing a guideline to select the persons to succeed these key positions, including a development plan for critical positions. In addition, the succession plan committee meeting has been convened quarterly so as to monitor the progress of such a development plan.
- **Initiating assessing the performance of employees identified as high potential employees** according to the international consulting standards.

Performance

- Employees completely set up IDPs, accountable for **83%** in Thailand and **88%** in China.
- Employees received an average of **21.5 training hours/person/year.**
- Key positions having a succession plan covered **100%.**
- Implementing specific people capability development for power business, such as project management training, negotiation, contract management, accounted for **70%** of the total plan, including regular coaching staff in the property management and engineering department by executives and experts on a monthly basis.

In the previous year, BPP organized leadership and competency development trainings as following:

Banpu Engaging Leader Program on Great Coach: Helping Others Succeed

Target Groups: Vice-President Level & Manager Level and higher

To develop and train the management as the leaders helping to create employee engagement, and as the persons with whom subordinates are close and feel comfortable to learn at all times, various managerial skills development programs were provided to the management in the areas of coaching, motivation, inspiration, etc. The aim is to help the management understand and know how to build a unified workforce, as well as to promote effective management and also encourage their subordinates to achieve working successfully.

Banpu Engaging Leader Program on Hi-Coach

Target Groups: Manager-level employees who have attended the "Great Coach" training.

The program aims to develop and strengthen executives who have been coached according to his/her functional line to expand their abilities to conduct a cross-functional coaching for employees so as to develop the potential of employees in terms of leadership and working for excellent results.

Banpu Global Leadership Program for First Line Leader

Target Groups: Department Managers

The program is aimed at developing leadership skills to lead teams, unleash their own potential and build inner strength. Other skills were also built to manage and develop teamwork, such as coaching, giving suggestions for improvement to subordinates and creating partnerships with stakeholders, including promoting and sharing real working experiences.

Banpu Global Leadership Program for Business Leader

Target Groups: Department Managers and above

Developing leadership skills for leading business, understanding business trends and changes in the context of globalization, providing knowledge on financial instruments, and business operations and learning from case studies from leading global companies, with an aim to create a New S-Curve for the company.

Banpu Leadership Program: Future Leader

Target Groups: Section Managers

Developing leadership skills for self-improvement, self-understanding, flexible attitudes and concepts, and Growth Mindset working with others efficiently and effectively, as well as preparing for future growth, including developing and preparing to become a future executive.

Learning through online course platforms on which employees can choose the training topics they want to learn by themselves to enhance their potential.

Courses	Objectives	Duration (Day)	Trainers	Target Groups
1. Basic firefighting and evacuation during emergencies	Complying with labor laws and providing basic knowledge on firefighting.	1	External agencies	• Employees at all levels
2. Safety for new employees	Complying with laws and providing safety knowledge to new employees.	1	Certified safety and occupational officers	• Employees at all levels
3. HR Management tools for new employees	Principles of human resource management and tools used for functional development.	0.5	Human Resource Development Department	• Supervisors • Section Managers
4. HR Management tools for new managers	The human resources management principles and tools for managers to develop functional work.	0.5	Human Resource Development Department	• Department Managers
5. The 7 Habits of Highly Effective People	The self-development principle, interpersonal relationships, leadership and efficiency increment.	3.5	External agencies	• Section Managers • Department Managers
6. Hot Risk	Effective risk management according to the company's business operations and understanding the real practices through business simulations.	2	Risks Management Unit in collaboration with external agencies	• Section Managers • Department Managers
7. Energy Titan	Learning about BPP's business operations throughout the supply chain and via the business simulation games.	3	External agencies	• Section Managers • Department Managers
8. YourNextU online course platform	Encouraging employees to learn and develop new skills through self-learning.	365	External agencies	• Employees at all levels
9. Coaching Up	Promoting and creating an understanding of basic coaching for employees at all levels. In order to be consistent with other coaching courses in the organization until it can become a coaching culture in the future, this training unleashes the full potential of excellent employees, contributing to career advancement of employees at the team level and at the organizational level.	0.5	Banpu Academy	• All level
10. Data Series	It started with inspiring Banpu executives to have technical knowledge and information to support personnel and decision-making and to comply with data technical operations in parallel with creating knowledge for employees at all levels through information techniques on a self-learning platform, including bringing knowledge to develop their tasks, able to build on 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

Employees attending leadership development programs of Banpu Group

Levels	Total Number (Persons)	Total Number of Participants (%)	Training Hours (Hours)	The Number of Training Hours per Person (Hours)
Executives (Vice-President level and up	14	90	432	30
Middle-level management (Department Managers and up)	69	75	2,565	37
Junior management (Section Managers)	91	70	3,500	38

Banpu Global Leadership Program

BPP has designed a curriculum to upgrade and develop new generation leaders, regarded as another important success factor helping drive business growth. The program aims to create 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 develop teamwork. This will support the creation of more efficient, innovations as well as improve working processes and increase the company's business values.

The program also promotes participants selected from unit's leaders from BPP's operating countries to exchange experiences and create a collaboration network among them.

Banpu Global Leadership Program is divided into four levels as follows:

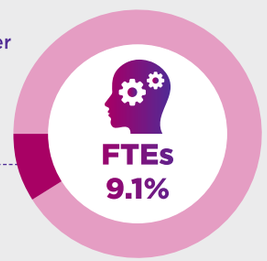
Banpu Global Leadership Program for Strategic Leader
organized for senior vice presidents.

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.

88 people from the total number of employees were trained.



100% **Employees selected in the high potential pool remain in the organization 100%.**

Banpu Global Leadership Program is held annually, taking about 8 - 10 months. It is divided into modules to develop leadership competencies at each level, along with learning from leading consulting firms and exchanging experiences among participating leaders throughout the training period. Additionally, participants will learn working styles and cultures from representative employees in various operating countries under Banpu Group, in which BPP has invested. This will also encourage collaborative working in the future.

Objectives

1. Fostering leadership characteristics, starting from building individual success to co-workers and the public, which will help in managing the work efficiently, leading and developing the team to unleash their highest potential.
2. Building business understanding, able to develop one's own potential and improve efficiency to create values for businesses and customers.
3. Promoting agile working style and exchanging experiences among executives under Banpu Group.

Benefits/Results

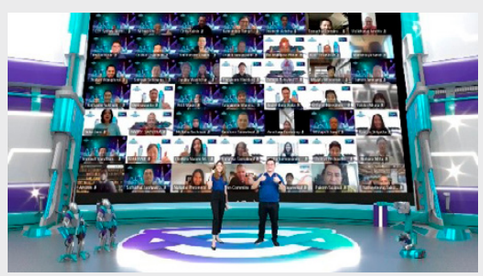
1. 100% of critical positions are succeeded by participating employees.
2. Employees selected in the high potential group participated in this program 80%
3. Employees selected in the high potential pool remain in the organization 100%.

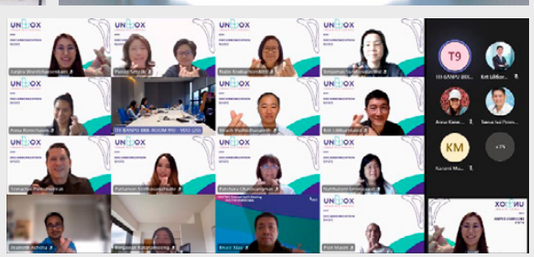
Streamline Innovation Process

BPP drives innovation through cultivating a corporate culture wherein “Innovative” is one of the three core values. At Banpu Power, innovation is promoted through various activities so that all of its employees realize the importance of bringing innovation to develop the organization sustainably.

To cultivate the “Innovative Culture”, BPP has opened a space for employees to present their ideas and innovations, leading to materialized implementation through the “Streamline Innovation Process” program. Through this platform, employees can submit their innovations to join the project to receive advice from experts to further improve his/her own innovative projects. Each year, employees of Banpu Group and BPP also take part in the annual “Banpu Innovation Convention” in order to exchange their knowledge and experiences, as well as to present their outstanding performances of innovative projects operated.

In addition, BPP has encouraged its employees to participate in “Banpu Hackathon”, a forum for employees of Banpu Group and BPP to express their ideas on new business opportunities or build upon their original work process. Moreover, the “UnBoX, Unleash Your Creativity” activity has been organized as a platform for employees to share experiences related to innovation and changing trends with internal and external experts. It aims at creating awareness among employees at both Banpu Group and BPP on creative thinking, using innovation to further his/her own work.





Coaching Up

With an aim to create a basic understanding of coaching for employees at all levels, Banpu Academy has developed and organized the CoachingUp training course, a 3-hour training focusing on experiential learning, making employees truly understand the meaning, importance, process and necessity of coaching. It is expected that this basic knowledge will be a significant foundation for employees to be developed through coaching methodologies more efficiently, as well as to attract supervisors to use this means in developing his/her coaching skills, including developing a team through coaching methods on a regular basis. This is the cornerstone of coaching culture within the organization.

Energy Titan

To upskill business acumen for Banpu Power employees, Banpu Academy organized a training course on “Energy Titan”. The aim is to make employees understand the end-to-end approach to energy business management, the linkage between a day-to-day operation and profit and loss, financial statement analysis, asset management, as well as fundamental risk management in the energy business. This “Energy Titan” course is divided into four categories: Mining Business, Power Business, Renewable Business and Oil and Gas Business. It takes two days to learn each category in the form of a business simulation game competition, organized for employees at the division manager level and above.

Negotiation Skill Development

Negotiation is one of the success factors for operating a business, BPP, therefore, has organized a training session on negotiation skill development for employees involved with making contacts, coordinating and operating the business. The guest speakers specializing in negotiations were invited to provide knowledge and organize workshops for participating employees in a hybrid format, both online and at sites. A total of 18 people participated in this two-day training. All participating employees were trained from business problems assignments. A follow-up from trainers was made a month later in order to know whether participating employees has applied the knowledge or skills gained from this workshop to their daily work or not. Besides, BPP also monitored the training results and listened to suggestions from participating employees. Most of them commented that the negotiation skill development workshop is useful. They can apply negotiation methods to their daily work and with business partners to achieve decent results for both parties.

Project Management Skills Development

BPP promotes the development of knowledge and skills to support future business expansions. BPP employees, therefore, must be equipped with knowledge and capability in project management as a basis for handling projects in the future. As a result, a training on developing project management skills was organized for BPP employees. The training was conducted by trainers from Banpu Group, who have expertise and specialize in project management. This project management course comprised theories, project analysis, writing project proposals and project management. A total of 25 employees attended this hybrid training, both online and at the office. The training took six hours in total, divided into three hours for theoretical learning and another three hours for practicing.

This training has enabled employees to write the project proposal, see an overview of managing various projects and suggest methodologies to monitor the project progress in order to achieve such a project as planned.

Knowledge Sharing

BPP has provided opportunities for all employees to exchange knowledge in various fields with their colleagues online quarterly. This knowledge - sharing session takes about 4.5 hours per time. The topics arranged for the knowledge sharing program in the year 2022 are as follows:

1. Techniques for internal facilitator
2. Hydrogen value chain
3. Civil law and criminal law in labor law
4. Contract Management
5. Bidding game for merchant power market

Occupational Health and Safety

Stakeholders:
- Employees, suppliers/contractors, communities, government sector, shareholders, financial institutes, business partners

Strategy:
- Promoting a culture of safety in all operational areas.
- Assessing risks related to Occupational Health and Safety (OHS) for all operational activities and setting up measures to control OHS risks within the acceptable level.
- Employing ISO 45001 Occupational Health and Safety Management System.

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

Target:
- The LTIFR of employees and contractors is equal to zero.
- No critical accidents and illnesses causing fatalities of employees, contractors and others associated with BPP's operations.

Performance:
- LTIFR was 1.23 person/million working hours.
- One fatality case

Significance and Reporting Boundary

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

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

The boundary of this report covers all business entities, where BPP has direct management control, exclusion of the businesses in the USA and the joint-venture power plants, of which data are separately reported in a reference table of this report.

Management Approach

BPP focuses on creating a safe workplace culture with the "3 ZEROs" targets as follows:

Zero Incident

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

Zero Repeat

There is no recurrence 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.

Zero Compromise

Complying with safety rules, regulations and practices. To achieve the above targets, BPP has conducted its OHS operations in accordance with the following safety management approaches.

To achieve the above targets, BPP has conducted its OHS operations in accordance with 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 with construction designs to operations, as well as the prevention and collection of unsafe working conditions and behaviors. This includes setting up short- and long-term safety goals and being a role model in safety. In addition, 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 and Regulations as well as Safety Standards**
  BPP is rigorous in complying with laws and safety best practices. Compliance with applicable laws and safety regulations is regularly inspected, while the internationally accepted safety management standards have been implemented in all BPP's production units.

- **Safety Risks Management**
  BPP assesses OHS risks in all areas where it has operated. Therefore, all of its business units have measures to prevent and reduce risks associated with safety properly. As a result, operations with high possibility of severe risks have to set up a plan to mitigate risks to the acceptable level.

- **Cultivating a Culture of Safety**
  BPP has promoted and paid great value on cultivating a culture of safety among its employees and contractors in all areas where it has operations. It realizes the safety concerned behavior by integrating it into a corporate culture. At BPP, employees and contractors care for each other and dare to warn each other if they see unsafe working behaviors.

- **Encouraging Employees to Own Adequate Knowledge and Expertise in OHS.**
  BPP supports and educates its employees and contractors about OHS, so that they have adequate OHS-related abilities to work safely. It also frequently examines and reviews their OHS understandings.

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

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

BPP has put a top priority on the work safety of its employees and contractors.

Performance

In 2022, the lost time injury rate (LTIFR) of power plants, in which BPP has direct management control, was 1.23 person/million working hours. Meanwhile, there was an accident causing one fatality of employee in China. In response to such an accident, BPP urgently treated the family of the deceased and investigated the accident's actual cause in order to take corrective and preventive actions immediately, for example, improving the area for clearer visibility, reviewing operational procedures, assessing risks, setting up rules for working in the area and communicating with employees for acknowledging and strictly practicing to prevent recurrences.

BPP has put a top priority on the work safety of its employees and contractors. It has employed the ISO 45001 Occupational Health and Safety Management System and integrated it with the ISO 9001 Quality Management System as well as the ISO 14001 Environmental Management System. Moreover, the three combined heat and power (CHP) plants in China have been certified to operate according to the three management system standards from outside agencies.

Activities to Promote Work Safety

BPP has organized activities to promote work safety, such as:

- **Measuring the workplace environment** and making it safe.
- **Conducting training and testing employees' knowledge on safety and environment**, safety rules and risks in the areas prior to working, as well as strictly reviewing such knowledge and rules at a defined time.
- **Promoting a work safety**, and regularly inspecting a workplace by top management.
- **Conducting safety checks** carried out by employees, supervisors, and safety officers during operations.
- **Setting up safety improvement committees** for offices and power plants.
- **Communicating with involved parties to raise safety awareness** through various activities, such as organizing a safety day activity, promotional emails, games, posters, etc.
- **Regularly exercising the emergency plans** by simulating various scenarios.
- **Providing incentives for safe working**, such as special rewards for contractors who have outstanding safety operations, celebrations on common achievements, etc.

Employee's Health Promotion

BPP has arranged health promotions for its employees, such as:

- **Conducting 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 the provision of vaccines for employees.
- **Arranging an annual health check-up** and a physical fitness measurement for employees based on risks arising from the nature of work.
- **Inspecting working conditions** in both offices and production units and improving as well as standardizing the working environment 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 staff, etc.
- **Organizing a psychological consultation project called "Relation-flip"** for employees so that they can consult psychological matters to reduce stresses from personal life and work. All information consulted will be kept confidential by an external psychological service provider.
- **Creating an online doctor visit project for employees**. The project has been implemented since the COVID-19 pandemic up to present. 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 initiated by supporting an annual budget of THB 12,000 for employees to use in various benefits including health, such as expenses for additional medical treatment, sports club membership fees, devices to facilitate ergonomic working from home, etc.

Using the "Safety Double Control" Application to Manage Safety Operation at Luannan CHP Plant

Luannan CHP Plant has four main production units, consisting of high-temperature and pressure boilers and steam turbines to supply power to the main grid in the north of Hebei Province. It is the only power plant in the area generating heat into a centralized heating system for local use. Therefore, the operational safety and production stability of the power plant are essential for local energy consumption.

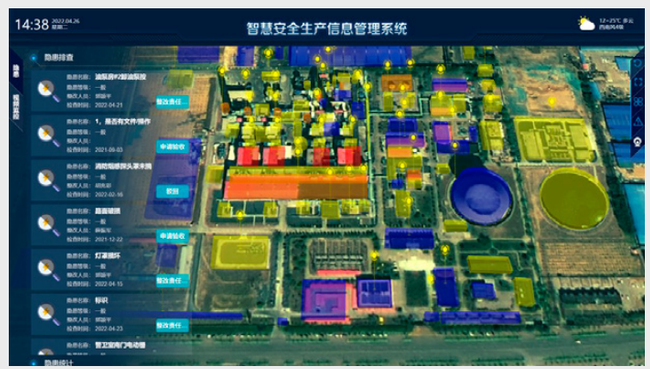
In late last year, Luannan Power Plant developed a "Safety Double Control" application to manage its safety. The application is an employee-led development initiated by the "Digital Transformation Master Plan" in China, which has been recognized by the Luannan County Safety Supervision Administration Bureau. The "Safety Double Control" application can be used from both computers and mobile phones to store and analyze data displayed in the form of images, so that users can use the data efficiently. This platform was developed based on the integration of several parts of data, including security risk management, an investigation of dangers hidden in working conditions, operating procedures, emergency management and safety training.

This application uses statistical analysis data to assess risks in various equipment and power plant's activities. Then, the risk assessment results are presented on the map using colors to show different risk levels in each area, so that users are aware of risks' details and know accurate operating procedures in each area.

The application also helps operating employees, safety officers and executives perform their duties safely. In addition, the system can generate reports according to the needs of various users and is able to check the historical data of every activity. As a result, it is beneficial for reducing time in preparing reports submitted to the government sector.

The "Safety Double Control" application helps in streamlining safety inspections and corrections. While finding any risk in the operational area, users can report and create workflows to send results to those responsible for corrective actions. When corrective actions are complete, progress can be reported from this application, allowing employees and executives to access such information immediately. As a result, they can take corrective actions quickly and save time on paperwork previously used, as well as trace the data back easily.

After the implementation of "Safety Double Control" application, it was found that more than 2,000 risks found were analyzed for improvements. As a result, the application can save about CNY 20,000 in labor costs each year. The power plant has no major working accidents and can maintain its availability index according to the target set, being able to deliver power and steam in the area continuously.



The application can save about **CNY 20,000** in labor costs each year

The "Safety Double Control" application helps in streamlining safety inspections and corrections.

Enhancement of Safety Culture for 7 Solar Power Plants

The Occupational Health and Safety Department has initiated and driven the concept of creating a safety culture. This has resulted in a positive impact on employees' safety. A higher level of safety culture reduces unsafe actions-the main cause of accidents. More importantly, a strong safety culture helps keep employees safer, have a good level of safety performance, reduce accidents and mitigate risks appropriately.

BPP has applied this safety culture at its solar power plants, namely Haoyuan, Xingyu and Jixin, totaling 7 locations. The safety culture cultivation of these power plants started with the top executive of solar power plants transferring knowledge and promoting a culture of safety by himself. This has been run through participating in site visits, conducting safety inspections, communicating safety information and showing commitment to safety operations. In addition, the safety meetings coupled with safety trainings are organized on a monthly basis. Meanwhile, safety documentation is provided and communicated to employees. As a result, the safety performance of these solar power plants has been improved, while the number of incidents related to chemicals has decreased significantly.

Financial Investment	2021 - 2022 budget for building safety culture	USD 4,857
Human Resources Investment	Employees of OHS Department	5 Persons
Positive impacts on BPP	Reducing accident risks	
Positive impacts on natural costs	Minimizing and mitigating safety-related risks. (Reducing fines)	USD 1,786
Positive impacts on human costs	Saving employees' training costs	USD 2,743
Positive impacts on social costs	Complying with the requirements of relevant agencies (Reducing fines)	USD 12,143
Social Return on Investment (SROI)		**1 : 3.43**

Community Engagement

Stakeholders:
- Communities, the government sector

Strategy:
- Creating community engagement and development through a joint consultative committee between the Company, the communities and the government sector.
- A continuous two-way communication.
- Grievance channels and effective corrections.

Key Indicators:
- Significant complaints from communities.
- Business disruptive incidents resulted from community grievances.

Target:
- None of significant complaints from the community.
- All grievances are carried to analysis process and corrections made in a timely manner.
- No business disruptive incidents caused by community complaints.

Performance:
- **No** significant community complaints.
- **None** of incidents related to business disruption caused by community complaints.

Significance and Reporting Boundary

Communities surrounding the power plants are valuable stakeholders for operations of BPP since they have received both positive and negative impacts throughout the project's life cycle. Therefore, the community's acceptance is a significant factor for the project's sustainability. BPP has placed great importance on engaging with communities and listening to their opinions since the project's feasibility study gets started in order to collect comments and concerns from the communities, using them for engineering designs and reducing any impacts likely arising. This includes determining the monitoring and preventive measures during the project's construction and operational stages. Moreover, BPP has used opinions gained from community engagement to improve its operations and to support the sustainable development corresponding to local needs.

The boundary of this report covers the power plants, in which BPP has direct management control.

Management Approach

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

Mitigate social and environmental impacts for each area.

BPP has engaged with communities through stakeholder analytical procedures, dividing into directly and indirectly affected groups, as well as beneficiaries since a feasibility study commencement in order to listen to opinions and concerns from the communities. These opinions and concerns are used for designing the projects and establishing suitable measures to mitigate social and environmental impacts for each area. Generally, the project's stakeholders are classified based on the impact levels, resulted from project operations. A distinguishment may be different from local conditions and laws of each country, for example,

1. **Communities living in the project area** are those staying in the project's zones and necessarily being relocated. They are the most affected people at the project's 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 communities for their best benefits with minimal effects, is a must. The unwilling relocation is avoidable and challenging for the project accomplishment.
2. **Communities located closest to the project** are those living adjacent to the project's areas or 5 kms away from the project (radius may vary upon each area). These communities are directly affected and in proximity to the project. BPP has considered them as the most affected stakeholders during its operational stage. Consequently, the communities residing closest to the project together with those staying in the project's areas will be provided 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 kms from the project, but not exceeding 10 kms (radius may vary upon each area), or the communities BPP purchased lands for operating, but do not have to relocate. These communities are directly affected by the project, but less than the first two groups. Hence, this community group is considered as the moderate affected stakeholders.
4. **Indirectly effected communities** are those located 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 these community group as the most indirectly affected stakeholders, compared to the first three groups.

BPP has established a unit directly responsible for creating community participation in order to develop an operational plan appropriate for each community, covering a vulnerable group, such as persons unable to protect their rights, or have no freedom to make decisions on effects they may receive, such as children, the elderly, migrants and indigenous groups.

The combined heat and power (CHP) plants in China, namely Luannan Power Plant, Zhengding Power Plant and Zouping Power Plant, are located in the industrial and city areas for generating power, steam and cold water to factories and local communities. BPP, therefore, has collaborated with customers, business partners, government agencies and nearby companies to engage with communities. As communities are also one of the key customers purchasing heats from the power plants during winter, the power plants have to operate in accordance with community's expectations. The power plants have been developed with stable operations, able to supply quality heat consistently and being flexible to community's needs.

Community Development Policy

Stakeholder Engagement Standard

No significant complaints from communities surrounding the project area and no business disruption due to community complaints.

Performance

In 2022, BPP received **no significant complaints** from communities surrounding the project area. There were neither incidents related to production halts or disruptive operations due to community complaints, nor events involved with violations of economic, social and environmental laws at the power plants BPP has direct management control and the joint-venture power plants.

“Light & Learn” Lighting Up Learning Opportunity

Banpu NEXT has implemented the “Light & Learn” social responsibility project by bringing solar power system to electricity-deprived schools in remote areas to help light up learning opportunity and benefit the children.

In the previous year, the employees joined forces with highland teaching volunteers, arranged nature and solar energy learning activities for children of Ban Po Pho Khi in Tak province, a community learning center located in a backcountry area. The kids who come to class at this learning center are from a Thai highlander community. They normally use their own dialect and cannot speak Thai, making difficulty both in general communication and education. Banpu NEXT, therefore, installed solar power system and storage batteries, including provision of TV sets and learning media, with an aim to help manage learning through quality media, enabling children to practice speaking Thai with faster results. In addition, community members can come to the center and use these devices, believed to give them a better quality of life.

Moreover, the working group also organized recreational activities and fostered imagination through arts, including learning the value of nature and clean energy, such as a natural tie-dye fabric and paper mask making workshop letting them use natural materials to make a mask in their individual styles. Other activities organized include home-grown vegetable planting, educational solar power storytelling, charity lunch and gift giveaway to the children.

Over the past 5 years, Banpu NEXT has promoted employees' participation in volunteer activities. It has established collaborative network from external agencies in local areas to bring solar power system to create changes and help light up learning opportunity and benefit to children in remote and electricity-deprived areas. The solar power system has already been introduced to 73 electricity-deprived schools in remote areas, with more than 73,000 watts of installed capacity all combined, which benefit over 2,400 children altogether. Moreover, satellite dishes and TV sets to enable their access to distance learning media plus many other learning materials and necessities were also provided.

Banpu NEXT is a joint-venture company BPP has invested with 50% of stakes in order to create growth in renewable energy and energy technolog businesses

Install **73,000** watts

Support **2,400** children

2017 - 2018
Tak Province
School in Mae Fa Luang Highlander Community

2019
Mae Hong Son Province
Schools in Armed Forces Development Command Area

2021
Kanchanaburi Province
Schools in Si Sawat District and Thong Pha Phum District

2022
Tak Province
Schools in Tha Song Yang District

Performance

List of Business

Thermal Power Business

Country	Power Plant/ Project	Type	Shareholding (%)	Generation Capacity 100%	Generation Capacity Equity-Based	Status	Direct Operational Control
China	Zhengding	Combined heat and power (CHP) plant	100%	139 MWe	139 MWe	Operating	✓
	Luannan	Combined heat and power (CHP) plant	100%	246 MWe	246 MWe	Operating	✓
	Zouping	Combined heat and power (CHP) 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	✓

Renewable Power Business

Country	Power Plant/ Project	Type	Shareholding (%)	Generation Capacity 100%	Generation Capacity Equity-Based	Status	Direct Operational Control
China	Huineng	Solar power plant	100%[a]	21.51 MW	21.51 MW	Operating	×
	Jinshan	Solar power plant	100%[a]	28.95 MW	28.95 MW	Operating	×
	Haoyuan	Solar power plant	100%[a]	20.00 MW	20.00 MW	Operating	×
	Hui'en	Solar power plant	100%[a]	19.70 MW	19.70 MW	Operating	×
	Deyuan	Solar power plant	100%[a]	51.64 MW	51.64 MW	Operating	×
	Xingyu	Solar power plant	100%[a]	10.30 MW	10.30 MW	Operating	×
	Jixin	Solar power plant	100%[a]	25.22 MW	25.22 MW	Operating	×
Japan	Olympia - Hitashi Omiya No.1	Solar power plant	40%[a]	2.00 MW	0.80 MW	Operating	×
	Olympia - Hitashi Omiya No.2	Solar power plant	40%[a]	2.00 MW	0.80 MW	Operating	×
	Olympia - Ozenosato-Katashina	Solar power plant	40%[a]	2.00 MW	0.80 MW	Operating	×
	Olympia - Sakura No.1	Solar power plant	40%[a]	2.00 MW	0.80 MW	Operating	×
	Olympia - Sakura No.2	Solar power plant	40%[a]	2.00 MW	0.80 MW	Operating	×
	Hino	Solar power plant	75%[a]	3.50 MW	2.63 MW	Operating	×
	Awaji	Solar power plant	75%[a]	8.00 MW	6.00 MW	Operating	×
	Nari Aizu	Solar power plant	100%[a]	20.46 MW	20.46 MW	Operating	×
	Mukawa	Solar power plant	93%[a][b]	17.00 MW	15.81 MW	Operating	×
	Kurokawa	Solar power plant	100%[a]	18.90 MW	18.90 MW	Operating	×
	Tenzan	Solar power plant	100%[a]	1.96 MW	1.96 MW	Operating	×

Renewable Power Business

Country	Power Plant/ Project	Type	Shareholding (%)	Generation Capacity 100%	Generation Capacity Equity-Based	Status	Direct Operational Control
	Muroran 1	Solar power plant	100%[a]	1.73 MW	1.73 MW	Operating	×
	Muroran 2	Solar power plant	100%[a]	1.63 MW	1.63 MW	Operating	×
	Takeo 2	Solar power plant	100%[a]	1.00 MW	1.00 MW	Operating	×
	Yamagata	Solar power plant	100%[a]	20.00 MW	20.00 MW	Operating	×
	Yabuki	Solar power plant	75%[a]	7.00 MW	5.25 MW	Operating	×
	Kesennuma	Solar power plant	100%[a]	20.00 MW	20.00 MW	Operating	×
	Nihonmatsu	Solar power plant	100%[a]	12.00 MW	12.00 MW	Operating	×
	Shirakawa	Solar power plant	100%[a]	10.00 MW	10.00 MW	Operating[c]	×
	Yamagata Iide	Solar power plant	51%[a]	200.00 MW	102.00 MW	Under development	×
Vietnam	El Wind Mui Dinh	Wind power plant	100%[a]	37.60 MW	37.60 MW	Operating	×
	Vinh Chau - phase 1	Wind power plant	100%[a]	30.00 MW	30.00 MW	During submission of document for COD approval	×
	Vinh Chau - phase 2 and 3	Wind power plant	100%[a]	50.00 MW	50.00 MW	Under development	×
	Ha Tinh	Solar power plant	100%[a]	50.00 MW.	50.00 MW	Operating	×
	Chu Ngoc	Solar power plant	100%[a]	15.00 MW	15.00 MW	Operating[d]	×
	Nhon Hai	Solar power plant	100%[a]	35.00 MW	35.00 MW	Operating[e]	×
Australia	Beryl	Solar power plant	20%[a]	110.90 MW	22.18 MW	Operating	×
	Manildra	Solar power plant	20%[a]	55.90 MW	11.18 MW	Operating	×

Energy Technology Business

Country	Type	Shareholding (%)	Generation Capacity 100%	Generation Capacity Equity-Based	Status	Direct Operational Control
Thailand	Solar Rooftop/Solar Floating	100%[a]	70.49 MW	70.49 MW	Operating	×
China	Solar Rooftop	100%	3.30 MW	3.30 MW	Operating	✓
	Solar Rooftop Project	100%	60.70 MW	60.70 MW	Under development	✓
Indonesia	Solar Rooftop	30%[a]	7.27 MW	2.18 MW	Operating	×
	Solar Rooftop Project	30%[a]	0.97 MW	0.29 MW	Under development	×
Japan	Solar Rooftop/Carport	100%[a]	0.70 MW	0.70 MW	Operating	×
Vietnam	Solar Rooftop	49.01%[a]	27.00 MW	13.24 MW	Operating	×
	Solar Rooftop Project	49.01%[a]	99.02 MW	48.56 MW	Under development	×

[a] Ownership reported for Banpu NEXT's (BPP holds a 50% stake).
[b] Adjusted to 93% ownership by Banpu NEXT
[c] Commercial Operation Date (COD) in January 2022.
[d] Entered into sale and purchase agreement in January 2022.
[e] Completed acquisition in June 2022.

Awards and Recognitions

Banpu Power

Awards/Recognitions	Host Institute
Sustainability Yearbook Member 2022	S&P Global
Thailand Sustainability Investment 2022	The Stock Exchange of Thailand
Commended Sustainability Excellence Awards 2022	The Stock Exchange of Thailand
Corporate credit rating of "A+" with a "Stable" outlook	TRIS Rating
Corporate Governance Report of Thai Listed Companies (CGR) 2022 with Excellent CG Scoring (5 Star)	Thai Institute of Directors Association (IOD)
The company obtained a full 100 scores for the quality of the Annual General Meeting of Shareholders for the year 2022	Thai Investors Association
ASEAN Asset Class Publicly Listed Companies	ASEAN Corporate Governance Scorecard (ACGS)
Renewal of CAC Membership Certification	Thai Private Sector Collective Action Against Corruption (CAC)

Banpu Power's Subsidiaries

Business Unit	Awards/Recognitions	Host Institute
Luannan CHP Plant	Hebei technology-based SMEs	Department of Science and Technology of Hebei Province
	"Advanced unit" of work safety publicity in Luannan county in 2021 (Awarded in 2022)	Work safety committee office of Luannan county
	May 4th Red Flag Youth League Branch in 2021 (Awarded in 2022)	Communist Youth League of Luannan County Committee
	The Model Home of Employees	Labour Union of Tangshan City
	Occupational health enterprises in Hebei Province (2022 - 2024)	Hebei Provincial Health Commission
	The third prize of "Excellent Organization" in Luannan County of the "Cloud" Sports Meeting for Hebei workers	Labour Union of Luannan County
	The first prize of the 2022 comprehensive emergency skills competition in Luannan County	Work safety committee office of Luannan county
Zhengding CHP Plant	6 national patents, the total number of patents reached 12	China National Intellectual Property Administration
	Model Unit for Integrity in 2021 (Awarded in 2022)	Leading Team Office of Shijiazhuang Social Credit System Construction; Shijiazhuang Credit Union
	Advanced Unit of Heating Industry in Hebei Province	Hebei Urban Heating Association
	Hebei smart heating enterprise Chamber of Commerce	Hebei Chamber of Commerce Smart Heating Enterprise
	Vice-chairman Unit of Hebei Chamber of Commerce Smart Heating Enterprise	Hebei Chamber of Commerce Smart Heating Enterprise
	Mechanical maintenance shift was rated as Pioneer Worker Team in Shijiazhuang.	Shijiazhuang City Labour Union
	The Winner Unit in Shijiazhuang Competition area of Hebei Workers' Cloud Games	Zhengding County Labour Union
	Two employees won the 10th place in the tool fitter and electric welder section of Shijiazhuang Vocational Skills Competition	Zhengding County Labour Union
	Silver Award for Top 20 Tax Payers of Private Enterprises in 2021 (Awarded in 2022)	Zhengding County Party Committee;
	People's Government of Zhengding County	People's Government of Zhengding County
	Zhengding County Star Enterprise	People's Government of Zhengding County
	A worker won May 1 Labor Medal.	Zhengding County Labour Union
	An employee was awarded Zhengding Grand Craftsman.	Zhengding County Labour Union
	Two employees obtained the certificate of "Professional Technical Expert of Zhengding County".	Zhengding County Labour Union
Zouping CHP Plant	Tax Paying Enterprise with A Credit Rating for Year 2021 (Awarded in 2022)	Zouping County-level City Taxation Bureau of the State Taxation Bureau

Participation & Memberships

Banpu Power

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

Banpu Power's Subsidiaries

Business Unit	Organization	Status
Banpu Investment (China) Ltd.	China Association of Enterprises with Foreign Investment	Corporate member
	Thai Chamber of Commerce in China	Corporate member
	Henan Association of Enterprises with Foreign Investment	Council member
	Shanxi Association of Foreign Trade Development	Member
Zhengding CHP Plant	Hebei Chamber of Commerce Smart Heating Enterprise	Vice chairman
Zouping CHP Plant	Shandong Overseas Chinese Entrepreneurs Association	Member
	Binzhou Overseas Chinese Entrepreneurs Association	Member
	Shandong Electric Power Enterprises Association	Member
	Shandong Energy Conservation Association	Member

Reporting Boundary

Sustainability Issues	Direct Operational Control							No Direct Operational Control				
	Office		Zhengding	Luannan	Zouping	Temple I[a]	BLCP	HPC	Shanxi Lu Guang	Nakoso IGCC	Renewable Power Business (Banpu NEXT)	Energy Technology Business (Banpu NEXT)
	Thailand	China	China	China	China	The U.S.	Thailand	Lao PDR	China	Japan	China, Japan, Vietnam, Australia	Thailand, China, Japan
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	●	●	●	●	●	◐	+	+	-	-	-	-
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	●	●	●	●	●	◐	-	-	-	-	-	-

● Reporting covers management approach and performance data.
◐ Reporting covers management approach, but does not cover performance data.
\+ Management approach and performance data do not cover such business due to the company has no direct operational control. However, there are some sustainability performances interested by stakeholders, the partial of sustainability performance are reported separately.
\- Not included in the reporting boundary.

Remark [a] The sustainability performance of Temple I Gas-fired Power Plant in the United States, where BPP has direct management control, however, is not included in BPP performance data in this Report since the company is under the process of consolidating the information to be the BPP standard.

Performance Data 2022: Banpu Power

Economic Performance

Data	Unit	2019	2020	2021	2022
Revenue	THB Million	5,687	5,506	6,784	24,501
EBITDA[a]	THB Million	4,802	5,230	3,407	9,124
Net profit	THB Million	2,969	3,702	3,127	5,739
Gross profit margin	%	19%	20%	(1%)	10%
Interest coverage ratio	-	(0.56)	4.55	(0.69)	1.90
Net debt to equity ratio	-	0.08	0.07	0.28	0.24

[a] Earning before interest, taxes, depreciation and amortization.

Tax Payment

Data	Unit	2019	2020	2021	2022
Thailand (BPP Group)[b]					
• Profit before tax	THB Thousand	3,206,924	4,083,515	3,231,538	6,194,452
• Tax expense[a]	THB Thousand	(204,083)	(300,491)	(57,203)	(44,889)
• Corporate income tax paid	THB Thousand	(192,913)	(274,644)	(88,751)	(94,781)
• Income tax rate	%	20 - 25%	20 - 25%	0 - 25%	0 - 25%
China					
• Profit before tax	RMB Thousand	161,788	267,417[c]	(133,736)[c]	(270,395)
• Tax expense[a]	RMB Thousand	(45,821)	(73,675)	(8,228)[c]	19,607
• Corporate income tax paid	RMB Thousand	(41,322)	(59,790)	(32,256)[c]	(1,352)
• Income tax rate	%	25%	12.5 - 25%	0 - 25%	0 - 25%
The U.S. (BPP US)					
• Profit before tax	USD Thousand	-	-	-	16,934
• Tax expense[a]	USD Thousand	-	-	-	(1,696)
• Corporate income tax paid	USD Thousand	-	-	-	0
• Income tax rate	%	-	-	-	21%
Thailand (BLCP)					
• Profit before tax	THB Thousand	2,299,190	554,908	(609,612)	1,480,978
• Tax expense[a]	THB Thousand	(430,461)	(163,282)	(5,984)	(343,840)
• Corporate income tax paid	THB Thousand	(417,960)	(168,205)	(3,351)	0[d]
• Income tax rate	%	20%	20%	20%	20%
Lao PDR (HPC)					
• Profit before tax	THB Thousand	6,573,695	7,602,786	9,192,934	9,431,320
• Tax expense[a]	THB Thousand	-	-	(640,519)	(725,891)
• Corporate income tax paid	THB Thousand	-	-	(323,365)	(779,378)
• Income tax rate	%	0%	0%	7.5 - 50%	7.5 - 50%

[a] Consisting of Corporate Income Tax, Withholding Tax and Deferred Tax.
[b] Consolidated.
[c] Updated from the previous report
[d] No tax paid because the losses were carried forward.

Economic Distributions

Data	Unit	2019	2020	2021	2022
Ratio of the dividend payout to net profit	-	0.64	0.46	0.63	0.37
Economic value generated					
• Sales	USD Thousand	178,015	195,577	239,388[h]	727,479
• Other revenues	USD Thousand	135,921	134,815	138,916	136,978
Economic value distributed					
• Shareholder[a]	USD Thousand	63,444	57,322	61,652	61,652
• Supplier and contractor[b]	USD Thousand	56,450	52,931	78,319[h]	460,911
• Employee[c]	USD Thousand	21,333	21,591	30,517	52,039
• Financial institution[d]	USD Thousand	6,855	(3,757)	(4,127)	39,616
• Government[e]	USD Thousand	9,032	15,086	9,561[h]	12,243
• Community[f]	USD Thousand	680	685	505	380
• Environment[g]	USD Thousand	1,828	2,042	1,906	1,953
Economic value retained	USD Thousand	154,314	184,491	199,970[h]	235,663

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

Corporate Citizenship and Philanthropy

Data	Unit	2019	2020	2021	2022
Philanthropic contributions – by category					
• Charitable donation	% of Total costs	-	17%[a]	46%	37%
• Community investment	% of Total costs	-	11%[a]	41%	56%
• Commercial initiatives	% of Total costs	-	73%[a]	13%	7%

Data	Unit	2019	2020	2021	2022
Philanthropic contributions – by type					
• Cash contributions	CNY Thousand	-	1,084	1,460	252
• Time spent by volunteer employees during working hours	CNY Thousand		7,412	153	1,153
• In-kind giving	CNY Thousand	-	65	116	184
• Management overhead	CNY Thousand	-	21,611	24,299	23,388

Policy Influence

Data	Unit	2019	2020	2021	2022
Contributions and other spending					
• Lobbying, interest representation	THB	0	0	0	0
• Political party or political interest	THB	0	0	0	0
• Trade association or tax-exempt groups	THB	305,378	251,450	347,750	500,118
• Other contributions	THB	0	0	0	0

Corporate Governance

Data	Unit	2019	2020	2021	2022
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	3	4	5
• Other non-executive directors	person	3	3	3	2
Number of meetings					
• Board of directors	time/year	12	14	12	12
• Corporate governance and nomination committee	time/year	4	3	5	4
• Audit committee	time/year	11	10	9	8
• Compensation committee	time/year	4	4	4	4
Board meeting attendance					
• Board of directors	%	97.22%	98.41%	98.33%	98.33%
• Corporate governance and nomination committee	%	100%	100%	100%	100%
• Audit committee	%	100%	100%	91.67%	100%
• Compensation committee	%	93.94%	96.67%	100%	100%
Performance evaluation[a]					
• Board of directors	-	4.86	4.37	4.75	4.80
• Sub-committees	-	4.92	4.70	4.85	4.83
• Individual directors	-	4.91	4.68	4.69	4.76

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

Business Ethics

Data	Unit	2019	2020	2021	2022
Number of significant corporate governance complaints	case	0	0	0	0
• Corruption & bribery	case	0	0	0	0
• Fraud, embezzlement, theft	case	0	0	0	0
• Dishonesty for own and other benefit	case	0	0	0	0
• Dangers to health and safety or environment	case	0	0	0	0
• Intentional act causing harm or loss to the company	case	0	0	0	0
• Significant breaches of the Code of Conduct[a]	case	0	0	0	0
• Assistance in wrongdoing[b]	case	0	0	0	0
• Other[c]	case	0	0	0	0
Proportion of significant corporate governance complaints resolved through a dispute mechanism	%	NA[d]	NA[d]	NA[d]	NA[d]

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

Risk Management

Data	Unit	2019	2020	2021	2022
Proportion of business units with key risk indicators	%	100%	100%	100%	100%
Coverage of ESG issues in the enterprise risk management[a]	%	-	92%	94%	97%
Proportion of business units with ESG risk management plan[b]	%	-	NA[c]	NA[c]	NA[c]

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

Business Continuity Management

Data	Unit	2019	2020	2021	2022
Coverage of CMT/IMT exercise[a]	%	50%	100%	100%	100%

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

Customer & Product Stewardship

Data	Unit	2019	2020	2021	2022
Number of complaints	case	0	0	0	0
• Customer privacy	case	0	0	0	0
• Safety and environmental issues from the use of products	case	0	0	0	0
Proportion of customer complaints resolved in a timely manner	%	NA[a]	NA[a]	NA[a]	NA[a]
Customer satisfaction[b]					
• Satisfied respondents	%	-	-	100%	100%
• Coverage of customer surveyed	%	-	-	89%	100%

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

Data Privacy & Cyber Security[a]

Data	Unit	2019	2020	2021	2022
Number of cybersecurity breaches	case	-	1	0	1
Number of IT infrastructure incidents	case	-	1	1	1
% of IT and IoT assets securely managed by Security Operation Center (SOC)	%	-	-	30%	60%
Cybersecurity & privacy maturity score[b]	%	-	-	2.0	3.0

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

Availability & Reliability

Data	Unit	2019	2020	2021	2022
Installed capacity					
• Current capacity	MW	348	348	348	348
• Capacity under construction	MW	0	0	0	0
System efficiency					
• Efficiency rate for electricity generation	g/KWh	279.00	246.63	202.51	183.68
• Efficiency rate for steam production	kg/GJ	37.94	37.75	37.96	37.23
• Availability factor	%	94.07%	97.72%	95.05%	94.00%
• Overall efficiency	%	65.07%	74.70%	77.47%	79.78%
Total outage					
• Total outage frequency	case/year	26	15	24	15
• Total outage hour	hours	6,480	2,621	5,002	6,054
• Average total outage duration	hours/case	249	175	208	404
Planned outage					
• Planned outage frequency	case/year	25	15	20	14
• Planned outage hours	hours	6,023	2,621	4,575	5,982
• Average planned outage duration	hours/case	241	175	229	427
Unplanned outage					
• Unplanned outage frequency	case/year	1	0	4	1
• Unplanned outage hours	hours	457	0	427	72
• Average unplanned outage duration	hours/case	457	0	107	72
• Unplanned forced outage factor	%	5.2%	0%	0.05%	0.82%

Supplier Management

Data	Unit	2019	2020	2021	2022
Number of suppliers					
• All suppliers	number	509	910	910[c]	910[c]
• Critical suppliers[a]	number	147	171	171[c]	171[c]
Proportion of suppliers assessed for ESG risks					
• All critical tier-1 suppliers	%	-	11%	11%[c]	11%[c]
• New critical tier-1 suppliers	%	23%	-	-[c]	-[c]
Proportion of critical tier-1 suppliers classified as high-risk	%	0%	0%	0%[c]	0%[c]
Proportion of spending on local suppliers[b]	%	87%	30%	30%[c]	30%[c]
Proportion of contracts that include ESG clauses	%	28%	42%	42%[c]	42%[c]

[a] Defined as high-volume suppliers, critical component suppliers or non-substitutable suppliers.
[b] Supplier that operates in the same region.
[c] Consolidated data from 2020. Data collection system is under standardization.

Socioeconomic Compliance

Data	Unit	2019	2020	2021	2022
Significant socioeconomic non-compliance					
• Number of non-monetary sanctions	case	0	0	0	0
• Number of cases brought through dispute mechanisms	case	0	0	0	0
Significant fines from socioeconomic non-compliance					
• Number of significant fines	case	0	0	0	0
• Total amount of significant fines	USD	0	0	0	0

Product

Data	Unit	2019	2020	2021	2022
Total energy sold	MWh	5,648,619	6,474,833	6,033,955	5,862,102
Energy sold					
• Electricity (renewable fuel) sold	MWh	112	107	98	109
• Electricity (non-renewable fuel) sold	MWh	1,495,640	1,563,091	1,178,967	1,089,332
• Steam sold	MWh	3,328,603	3,564,832	3,529,044	3,406,515
• Heat sold	MWh	824,264	1,346,803	1,325,845	1,366,146

Greenhouse Gas Emissions

Data	Unit	2019	2020	2021	2022
GHG emissions					
• Total (Scope 1 & 2)	tonnes CO_2e	3,820,298	4,017,800	3,642,241	3,570,856
• Direct (Scope 1)	tonnes CO_2e	3,815,933	4,011,281	3,634,731	3,567,119
• Indirect (Scope 2)[a]	tonnes CO_2e	4,365	6,519	7,510	3,737
• Other indirect (Scope 3)[b]	tonnes CO_2e	-	-	-	-
GHG emissions intensity					
• Total (Scope 1 & 2)	tonnes CO_2e/MWh	0.676	0.621	0.604	0.609
• Electricity generation	tonnes CO_2e/MWh	0.684	0.655	0.733	0.900
• Steam & heat generation	tonnes CO_2e/MWh	0.710	0.694	0.652	0.629
SF_6 emissions	tonnes CO_2e	1,086	515	241	679

[a] Gross location based scope 2 GHG emissions.
[b] Data collection system under standardization.

Energy

Data	Unit	2019	2020	2021	2022
Total energy consumption	TJ	11,102	9,953	7,209	5,477
Renewable energy consumption					
• Renewable fuel	TJ	0	0	0	0
• Electricity purchased[a]	TJ	0	0	0	0
• Electricity self-generated	TJ	0.40	0.39	0.35	1.03
Non-renewable energy consumption					
• Non-renewable fuel	TJ	31,418	33,235	28,900	26,648
- Coal	TJ	29,381	30,749	26,832	24,233
- Diesel	TJ	21	29	36	30
- Gasoline	TJ	2	1	1	1
- Waste gas	TJ	2,015	2,455	2,030	2,291
- Activated carbon	TJ	-	-	-	93
- LPG	TJ	-	-	-	0.2
• Electricity purchased	TJ	18	27	31	23
• Steam, heating & cooling	TJ	0	0	0	0
Renewable energy sold					
• Electricity	TJ	0.40	0.39	0.35	0.39
Non-renewable energy sold					
• Electricity	TJ	5,384	5,627	4,244	3,922
• Steam	TJ	11,982	12,832	12,704	12,262
• Heating	TJ	2,967	4,848	4,773	4,918
Energy consumption intensity[b]	GJ/MWh	1.965	1.537	1.195	0.934

[a] Negligible purchased electricity for solar power plant during nighttime.
[b] Includes coal, diesel, gasoline, waste gas, activated carbon, LPG, electricity, steam, heating and cooling within organization only.

Air Emissions

Data	Unit	2019	2020	2021	2022
Air emissions load[a]					
• NO_x[b]	tonnes	246	272	268	222
• SO_2[b]	tonnes	153	164	154	128
• Particular matters[b]	tonnes	18	17	19	15
• Mercury	tonnes	0.0034	0.0085	0.0091	0.0079
Air emissions intensity					
• NO_x	tonnes/GWh	0.0414	0.0420	0.0445	0.0379
• SO_2	tonnes/GWh	0.0258	0.0254	0.0254	0.0218
• Particular matters	tonnes/GWh	0.0030	0.0027	0.0031	0.00256
• Mercury	tonnes/GWh	0.6e-6	1.3e-6	1.5e-6	1.4e-6
Ozone-depleting substances (ODS)					
• ODS consumption	Kg CFC-11e	1	1	1	2
• ODS imported	Kg CFC-11e	0	0	0	0
• ODS exported	Kg CFC-11e	0	0	0	0

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

Water*

Data	Unit	2019	2020	2021	2022
Water withdrawal – from all areas	megaliter	6,761	7,611	6,897	6,306
• Surface water (total)	megaliter	0	0	10	31
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	10	31
- Other water (>1,000 mg/L TDS)	megaliter	-[a]	-[a]	0	0

Data	Unit	2019	2020	2021	2022
• Groundwater (total)	megaliter	2,497	2,231	2,710	2,038
- Freshwater (≤1,000 mg/L TDS)	megaliter	2,497	2,231	2,710	2,038
- Other water (>1,000 mg/L TDS)	megaliter	- [a]	- [a]	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]	- [a]	0	0
• 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]	- [a]	0	0
• Third-party water (total)	megaliter	4,265	5,380	4,178	4,236
- Freshwater (≤1,000 mg/L TDS)	megaliter	4,265	5,380	4,178	2,380
- Other water (>1,000 mg/L TDS)	megaliter	- [a]	- [a]	0	1,856
Water withdrawal – from water stress areas	megaliter	6,761	7,611	6,897	6,306
• Surface water (total)	megaliter	0	0	10	31
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	10	31
- Other water (>1,000 mg/L TDS)	megaliter	- [a]	- [a]	0	0
• Groundwater (total)	megaliter	2,497	2,231	2,710	2,038
- Freshwater (≤1,000 mg/L TDS)	megaliter	2,497	2,231	2,710	2,308
- Other water (>1,000 mg/L TDS)	megaliter	- [a]	- [a]	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]	- [a]	0	0
• 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]	- [a]	0	0
• Third-party water (total)	megaliter	4,265	5,380	4,178	4,236
- Freshwater (≤1,000 mg/L TDS)	megaliter	4,265	5,380	4,178	2,380
- Surface water	megaliter	2,897	4,117	3,181	2,380
- Groundwater	megaliter	0	0	0	0
- Seawater	megaliter	0	0	0	0
- Reclaimed water [b]	megaliter	0	0	0	0
- Produced water	megaliter	368	1,263	997	0
- Other water (>1,000 mg/L TDS)	megaliter	- [a]	- [a]	0	1,856
- Surface water	megaliter	- [a]	- [a]	0	1,598
- Groundwater	megaliter	- [a]	- [a]	0	0
- Seawater	megaliter	- [a]	- [a]	0	0
- Reclaimed water [b]	megaliter	- [a]	- [a]	0	258
- Produced water	megaliter	- [a]	- [a]	0	0

Data	Unit	2019	2020	2021	2022
Water discharge – by destination	megaliter	1,855	1,779	1,604	1,513
• Surface water	megaliter	0	0	464	796
• Groundwater	megaliter	0	0	0	0
• Seawater	megaliter	0	0	0	0
• Third-party water	megaliter	1,855	1,779	1,139	717
Water discharge – to all areas	megaliter	1,855	1,779	1,604	1,513
• Freshwater (≤1,000 mg/L TDS)	megaliter	- [a]	- [a]	- [a]	285
• Other water (>1,000 mg/L TDS)	megaliter	- [a]	- [a]	- [a]	1,229
Water discharge – to water stress areas	megaliter	1,855	1,779	1,604	1,513
• Freshwater (≤1,000 mg/L TDS)	megaliter	- [a]	- [a]	- [a]	285
- Surface water	megaliter	- [a]	- [a]	- [a]	144
- Groundwater	megaliter	- [a]	- [a]	- [a]	0
- Seawater	megaliter	- [a]	- [a]	- [a]	0
- Third-party water (sewer)	megaliter	- [a]	- [a]	- [a]	141
• Other water (>1,000 mg/L TDS)	megaliter	- [a]	- [a]	- [a]	1,229
- Surface water	megaliter	- [a]	- [a]	- [a]	652
- Groundwater	megaliter	- [a]	- [a]	- [a]	0
- Seawater	megaliter	- [a]	- [a]	- [a]	0
- Third-party water	megaliter	- [a]	- [a]	- [a]	567
Pollutant load to surface water [e]					
• Chemical oxygen demand (COD)	tonnes	-	-	11.18 [c]	18.95
• Total dissolved solids (TDS)	tonnes	-	-	0 [c]	930.43
• Total suspended solid (TSS)	tonnes	-	-	12.65 [c]	21.87
• Oil & Grease	tonnes	-	-	0.31 [c]	0.76
Pollutant load to third-party water [e]					
• Chemical oxygen demand (COD)	tonnes	-	-	54.34	37.16
• Total dissolved solids (TDS)	tonnes	-	-	1,556	1,487
• Total suspended solid (TSS)	tonnes	-	-	33.36	20.17
• Oil & Grease	tonnes	-	-	0.39	0.41
Water consumption					
• All areas	megaliter	4,906	5,832	5,293	4,792
• Water stress areas	megaliter	4,906	5,832	5,293	4,792
Water consumption intensity	m^3/MWh	0.827	0.901	0.877	0.818
Change in water storage	megaliter	- [d]	- [d]	- [d]	- [d]

* BPP has measured the volume of water withdrawal and discharged at CHP plants by using water meter.
[a] Data collection system under standardization.
[b] From wastewater treatment plant of the third party.
[c] Data of June to December 2021 only, no data collection from January to April 2021.
[d] All CHP plants have no water storage tanks which impact water related issues.
[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.

Waste*

Data	Unit	2019	2020	2021	2022
Waste generated	tonnes	750,234	763,357	777,757	792,583
• Hazardous waste	tonnes	22	103	176	116
• Non-hazardous waste[a]	tonnes	750,212	763,254	777,581	792,467
Waste diverted from disposal[b]	tonnes	749,309	762,684	776,807	792,001
• Hazardous waste	tonnes	13	84	175	90
- Preparation for reuse	tonnes	0	0	4	86
- Recycling	tonnes	13	84	59	4
- Other recovery operations	tonnes	0	0	113	0
• Non-hazardous waste[a]	tonnes	749,296	762,600	776,631	791,911
- Preparation for reuse	tonnes	0	334,815	418,328	0
- Recycling	tonnes	749,296	427,785	358,103	791,911
- Other recovery operations	tonnes	0	0	201	0
Waste directed to disposal[b]	tonnes	925	675	794	729
• Hazardous waste	tonnes	9	20	1	26
- Incineration (with energy recovery)	tonnes	3	16	1	2
- Incineration (without energy recovery)	tonnes	6	4	0	0
- Landfilling	tonnes	0	0	0	24
- Other disposals	tonnes	0	0	0	0
• Non-hazardous waste[a]	tonnes	916	655	793	703
- Incineration (with energy recovery)	tonnes	0	0	72	228
- Incineration (without energy recovery)	tonnes	0	0	0	0
- Landfilling	tonnes	844	583	721	475
- Other disposal	tonnes	72	72	0	0
Waste direct disposal intensity					
• Hazardous waste	kg/MWh	0.0016	0.0031	0.0002	0.0044
• Non-hazardous waste[a]	kg/MWh	0.162	0.101	0.131	0.120
Ash generated	tonnes	664,199	677,396	688,623	701,580
Ash diverted from disposal[b]	tonnes	664,199	677,396	688,466	701,737
• Preparation for reuse	tonnes	0	296,118	369,587	0
• Recycling	tonnes	664,199	381,278	318,879	701,737
• Other recovery operations	tonnes	0	0	0	0
Ash directed to disposal[b]	tonnes	0	0	0	0
• Incineration (with energy recovery)	tonnes	0	0	0	0
• Incineration (without energy recovery)	tonnes	0	0	0	0
• Landfilling	tonnes	0	0	0	0
• Other disposal	tonnes	0	0	0	0
Gypsum generated	tonnes	85,097	85,187	87,964	90,001
Gypsum diverted from disposal[b]	tonnes	85,097	85,187	87,964	90,001
• Preparation for reuse	tonnes	0	38,697	48,741	0
• Recycling	tonnes	85,097	46,490	39,223	90,001
• Other recovery operations	tonnes	0	0	0	0
Gypsum directed to disposal[b]	tonnes	0	0	0	0
• Incineration (with energy recovery)	tonnes	0	0	0	0
• Incineration (without energy recovery)	tonnes	0	0	0	0
• Landfilling	tonnes	0	0	0	0
• Other disposal	tonnes	0	0	0	0
Proportion of hazardous waste reused & recycled	%	59.1%	81.6%	35.6%	77.3%
Proportion of non-hazardous waste reused & recycled[a]	%	99.9%	99.9%	99.9%	99.9%
Proportion of ash reused & recycled	%	100%	100%	100%	100%
Proportion of gypsum reused & recycled	%	100%	100%	100%	100%

*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.

[a] Includes ash & gypsum from power plants.

[b] BPP has managed waste disposal only offsite and there is no onsite management.

Biodiversity

Data	Unit	2019	2020	2021	2022
Number of operations	number	3	3	4	4
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	3	4	4
• Identified as high potential of biodiversity impact	number	0	0	0	0
• Assessed for biodiversity value	number	0	0	0	0
• Required biodiversity management plan[a]	number	0	0	0	0
• Implemented biodiversity management plan[a]	number	0	0	0	0
Proportion of business units					
• Assessed for biodiversity impact	%	100%	100%	100%	100%
• Assessed for biodiversity value	%	NA[b]	NA[b]	NA[b]	NA[b]
• With biodiversity management plan[a]	%	NA[b]	NA[b]	NA[b]	NA[b]

[a] For business unit(s) identified as high potential of biodiversity impact only.

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

Environmental Compliance

Data	Unit	2019	2020	2021	2022
Number of significant environmental incidents[a]					
• Effluent discharge limits	case	0	0	0	0
• Air emissions standards	case	0	0	0	0
• Other	case	0	0	0	0
Fines from environmental non-compliance[b]					
• Number of significant fines	case	0	0	0	0
• Total amount of significant fines	USD	0	0	0	0
Non-monetary sanctions	case	0	0	0	0
Cases brought through dispute mechanisms	case	0	0	0	0
Spills[a]					
• Number of significant spills	case	0	0	0	0
• Total amount of significant spills	liter	0	0	0	0

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

Occupational Health and Safety

Data	Unit	2019	2020	2021	2022
Workers covered by OHS management system					
• Number of workers	person	-	1,415	1,456	1,648
• Percentage of total workers	%	-	100%	100%	100%
Workers covered by OHS management system that has been internally audited					
• Number of workers	person	-	1,310	1,353	1,537
• Percentage of total workers	%	-	92.6%	92.9%	93.3%
Worker covered by OHS management system that has been audited or certified by third party					
• Number of workers	person	-	1,310	1,353	1,537
• Percentage of total workers	%	-	92.6%	92.9%	93.3%
Number of occupational fatalities	person	0	0	0	1
• Employee	person	0	0	0	1
• Contractor	person	0	0	0	0
Fatality rate	person/million man-hour	0	0	0	0.41
• Employee	person/million man-hour	0	0	0	0.50
• Contractor	person/million man-hour	0	0	0	0
Number of recordable injury	case	0	0	0	4
• Employee	case	0	0	0	4
- Abrasion (or scrape)	case	0	0	0	1
- 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	2
- 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	0	1
- 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
• Contractor	case	-	0	0	0
- Abrasion (or scrape)	case	-	0	0	0
- Amputation	case	-	0	0	0
- Broken bone (or fracture)	case	-	0	0	0
- Bruise	case	-	0	0	0
- Burn (heat)	case	-	0	0	0
- Burn (chemical)	case	-	0	0	0
- Concussion (to the head)	case	-	0	0	0
- Crushing	case	-	0	0	0
- Cut	case	-	0	0	0
- Death	case	-	0	0	0
- Laceration	case	-	0	0	0
- Loss of consciousness	case	-	0	0	0
- Paralysis	case	-	0	0	0
- Puncture	case	-	0	0	0
- Sprain	case	-	0	0	0
- Strain	case	-	0	0	0
- Other	case	-	0	0	0
Number of incident	case	0	0	0	4
• Employee	case	0	0	0	4
- 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	4
- Electricity	case	0	0	0	0
- Noise	case	0	0	0	0
- Radiation	case	0	0	0	0
- Temperature extremes	case	0	0	0	2
- Struck/hit by objects	case	0	0	0	1
- Slip, trip, fall	case	0	0	0	1

Data	Unit	2019	2020	2021	2022
- 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	0
• Contractor	case	-	0	0	0
- Chemical	case	-	0	0	0
- Flammable	case	-	0	0	0
- Toxic	case	-	0	0	0
- Reactive	case	-	0	0	0
- Corrosive	case	-	0	0	0
- Physical	case	-	0	0	0
- Electricity	case	-	0	0	0
- Noise	case	-	0	0	0
- Radiation	case	-	0	0	0
- Temperature extremes	case	-	0	0	0
- Struck/hit by objects	case	-	0	0	0
- Slip, trip, fall	case	-	0	0	0
- Biological	case	-	0	0	0
- Insect/animal bite	case	-	0	0	0
- Disease	case	-	0	0	0
- Ergonomic	case	-	0	0	0
- Muscle stress	case	-	0	0	0
- Physiological	case	-	0	0	0
- Mental health	case	-	0	0	0
- Other	case	-	0	0	0
Total recordable injury frequency rate (TRIFR)	person/million man-hour	0	0	0	1.64
• Employee	person/million man-hour	0	0	0	1.99
• Contractor	person/million man-hour	-	0	0	0
Lost time injury frequency rate (LTIFR)	person/million man-hour	0	0	0	1.23
• Employee	person/million man-hour	0	0	0	1.49
• Contractor	person/million man-hour	-	0	0	0
Injury severity rate (ISR)[a]	day/million man-hour	0	0	0	2,540.20
• Employee	day/million man-hour	0	0	0	3,087.56
• Contractor	day/million man-hour	-	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

Data	Unit	2019	2020	2021	2022
Number of hours worked	hour	-	2,497,876	2,424,300	2,443,900
• Employee	hour	-	1,899,082	1,921,094	2,010,647
• Contractor	hour	-	598,794	503,206	433,253
Tier-1 process safety event[b]	case	0	0	0	1
Tier-1 process safety event rate	case/million man-hour	0	0	0	0.41
Number of fatalities as a result of work-related ill health	person	-	0	0	0
• Employee	person	-	0	0	0
• Contractor	person	-	0	0	0
Number of total recordable work-related ill health	case	-	0	0	0
• Employee	case	-	0	0	0
• Contractor	case	-	0	0	0
Average OHS training per employee					
• China	hour/person	-	25.42	45.35	31.51

[a]Refers to American National Standards Institute (ANSI) standard.
[b]Refers to internal definition with criteria such as fatality and catastrophic damage to ecosystem or property damage >100,000 USD.

Employee

Data	Unit	2019	2020	2021	2022
Total employees	person	966	786	745	952
Employees – by gender					
• Male	%	77.43%	82.80%	84.97%	78.47%
• Female	%	22.57%	17.20%	15.03%	21.53%
Employees – by country					
• Thailand	%	4.35%	4.30%	3.36%	3.26%
• China	%	93.58%	95.70%	96.64%	93.17%
• Japan	%	1.76%	0%	0%	1.79%
• Vietnam	%	0.31%	0%	0%	1.47%
• USA	%	-	-	-	0.32%
• Other	%	0%	0%	0%	0%
Employees – by nationality					
• Thai	%	5.38%	4.80%	3.49%	4.52%
• Chinese	%	92.55%	95%	96.38%	92.75%
• Japanese	%	1.04%	0%	0%	1.16%
• Vietnamese	%	0.31%	0%	0%	1.16%
• American	%	0.21%	0%	0%	0.32%
• Other	%	0.52%	0.10%	0.13%	0.11%
Employees – by age					
• Under 30	%	20.70%	18.20%	16.38%	14.60%
• 30 - 39	%	37.68%	43.80%	41.74%	34.98%
• 40 - 49	%	32.40%	31.60%	32.48%	33.93%
• 50 and over	%	9.21%	6.50%	9.40%	16.49%

Data	Unit	2019	2020	2021	2022
Employee – by type					
• Permanent	%	74.02%	96.40%	99.60%	99.79%
• Temporary/contract	%	25.98%	3.60%	0.40%	0.21%
Employee – by level					
• Senior management	%	0.31%	0.60%	0.67%	1.79%
• Middle management	%	7.04%	5%	4.56%	7.67%
• Junior management	%	6.94%	5%	6.17%	21.85%
• Supervisor & staff	%	85.71%	89.40%	88.59%	68.70%
Management – by gender[a]					
• Male	%	71.74%	81.80%	94.87%	67.78%
• Female	%	28.26%	18.20%	5.13%	32.22%

[a]Included middle and senior management.

New Employee

Data	Unit	2019	2020	2021	2022
Total new employees	person	56	40	36	61
New employees – by gender					
• Male	person	41	37	31	50
• Female	person	15	3	5	11
New employees – by country					
• Thailand	person	5	0	0	5
• China	person	50	40	36	41
• Japan	person	1	0	0	6
• Vietnam	person	0	0	0	7
• USA	person	-	-	-	2
• Other	person	0	0	0	0
Open positions filled by internal candidates[a]	%	-	-	-	50%

[a]Only Bangkok office

Corporate Culture

Data	Unit	2019	2020	2021	2022
Level of alignment between employee behavior and the corporate culture – by country					
• Thailand	%	65%	69%	79%	84%
• China	%	95%	94%	95%	92%
• Japan	%	79%	56%	57%	72%

Employee Engagement

Data	Unit	2019	2020	2021	2022
Employee engagement level – by country					
• Thailand	%	68%	48%	69%	74%
• China	%	94%	92%	93%	96%
• Japan	%	50%	38%	31%	47%
Total turnover rate	%	5.69%	4.30%	5.20%	5.99%
Voluntary turnover rate	%	4.87%	4.30%	5.20%	1.58%
Turnover rate – by country					
• Thailand	%	2.38%	2.90%	0%	6.44%
• China	%	5.97%	4.40%	5.20%	2.71%
• Japan	%	0%	0%	0%	11.74%
• USA	%	-	-	-	0%
• Other	%	0%	0%	0%	28.58%
Employees taking parental leave – by country					
• Thailand	person	0	0	0	1
• China	person	7	1	1	6
• Japan	person	0	0	0	1
• USA	person	-	-	-	0
• Other	person	0	0	0	0
Employees returning to work after parental leave – by country					
• Thailand	%	NA[a]	NA[a]	NA[a]	100%
• China	%	100%	100%	100%	67%
• Japan	%	NA[a]	NA[a]	NA[a]	100%
• USA	%	-	-	-	NA[a]
• Other	%	NA[a]	NA[a]	NA[a]	NA[a]

[a]No parental leave.

Human Capital Development

Data	Unit	2019	2020	2021	2022
Average training cost per employee – by country					
• Thailand	USD/person	2,320	1,110	985	1,220
• China	USD/person	275	271	251	210
• Japan	USD/person	1,730	370	-	-
• Other	USD/person	7,140	125	-	-
Average training cost per employee – by level					
• Senior management	USD/person	5,100	3,127	2,352	1,385
• Middle management	USD/person	1,230	1,058	1,280	880
• Junior management	USD/person	775	793	1,590	410
• Supervisor & staff	USD/person	195	193	161	145

Data	Unit	2019	2020	2021	2022
Average training hours per employee – by country					
• Thailand	hour/person	35.2	30	31	23
• China	hour/person	29	35	37	37
• Japan	hour/person	27	20	-	-
• Other	hour/person	27	9	-	-
Average training hours per employee – by level					
• Senior management	hour/person	37	27	17.3	30
• Middle management	hour/person	62	30	31.5	37
• Junior management	hour/person	53	35	40.1	38
• Supervisor & staff	hour/person	25	30	31.1	36

Succession Plan & Leadership Development

Data	Unit	2019	2020	2021	2022
Proportion of critical positions having a succession plan	%	100%	100%	100%	100%
Critical positions having a succession plan – by level					
• Senior management	%	100%	100%	100%	100%
• Middle management	%	100%	100%	100%	100%
Proportion of employees having individual development plan – by country					
• Thailand	%	-	100%	85%	85%
• China	%	-	55%	60%	88%
Succession of leadership development program	%	80%	100%	100%	100%
Succession of leadership development program (by course)					
• Strategic Leader	%	100%	100%	100%	100%
• Business Leader	%	82%	82%	82%	85%
• First Line Leader	%	66%	75%	78%	75%
• Future Leader	%	56%	60%	70%	80%
• Engaging Leader	%	94%	94%	94%	94%

Remuneration[a]

Data	Unit	2019	2020	2021	2022
Male to female remuneration ratio	-	-	-	1.06	0.86
Male to female remuneration ratio - by level					
• Senior management	-	-	-	0.88	1.40
• Middle management	-	-	-	1.07	1.18
• Junior management	-	-	-	1.08	0.83
• Staff and supervisor	-	-	-	1.17	0.99

[a]Excluding Vietnam

Collection Bargaining Agreement

Data	Unit	2019	2020	2021	2022
Employees covered by collective bargaining agreement					
• Thailand	%	0%	0%	0%	0%
• China	%	0%	0%	0%	0%
• Japan	%	0%	0%	0%	0%
• USA	%	-	-	-	0%
• Other	%	0%	0%	0%	0%

Community Engagement

Data	Unit	2019	2020	2021	2022
Significant community complaints	case	0	0	0	0
Proportion of significant complaints from communities resolved through a dispute mechanism	%	NA[a]	NA[a]	NA[a]	NA[a]

[a]No significant complaint.

Community Resettlement

Data	Unit	2019	2020	2021	2022
Significant community resettlement complaints	case	0	0	0	0
Proportion of significant resettlement complaints resolved through a dispute mechanism	%	NA[a]	NA[a]	NA[a]	NA[a]

[a]No significant complaint.

Human Rights

Data	Unit	2019	2020	2021	2022
Coverage of business units assessed for human right risks	%	100%	100%	100%	75%[d]
Proportion of business units with risk management plan[a]	%	NA[b]	NA[b]	NA[b]	NA[b]
Number of significant human rights issues	case	0	0	0	0
Proportion of significant human rights issues resolved through a dispute mechanism	%	NA[c]	NA[c]	NA[c]	NA[c]

[a]For business unit(s) identified as high human rights risks.
[b]No business units identified as high human rights risks.
[c]No significant issues.
[d]Change of data boundary which excludes Temple I because the asset has successfully invested in November 2021 and under standardization process.

Performance Data 2022: Banpu NEXT

Product

Data	Unit	2020	2021	2022
Electricity sold	MWh	338,763	531,193	539,843

Greenhouse Gas Emissions

Data	Unit	2020	2021	2022
GHG emissions				
• Total (Scope 1 & 2)	tonnes CO_2e	3,256	3,538	3,126
• Direct (Scope 1)	tonnes CO_2e	55	47	56
• Indirect (Scope 2)[a]	tonnes CO_2e	3,201	3,490	3,070
• Other indirect (Scope 3)[b]	tonnes CO_2e	-	-	
GHG emissions intensity				
• Total (Scope 1 & 2)	tonnes CO_2e/MWh	0.010	0.007	0.006
• Electricity generation	tonnes CO_2e/MWh	0.010	0.007	0.006
SF_6 emissions	tonnes CO_2e	0	0	0

[a] Gross location based scope 2 GHG emissions.
[b] Data collection system under standardization.

Energy

Data	Unit	2020	2021	2022
Total energy consumption	TJ	24	37	31
Renewable energy consumption				
• Renewable fuel	TJ	0	0	0
• Electricity purchased[a]	TJ	0	0	0
• Electricity self-generated	TJ	1,229	1,931	1,955
- Solar	TJ	-	1,775	1,673
- Wind	TJ	-	155	282
Non-renewable energy consumption				
• Non-renewable fuel	TJ	1	1	0.64
- Diesel	TJ	-	0.11	0.11
- Gasoline	TJ	-	0.57	0.53
• Electricity purchased	TJ	14	17	19
• Steam, heating & cooling	TJ	0	0	0
Renewable energy sold				
• Electricity	TJ	1,220	1,912	1,943
Non-renewable energy sold				
• Electricity	TJ	0	0	0
• Steam	TJ	0	0	0
• Heating	TJ	0	0	0
Energy consumption intensity[b]	GJ/MWh	0.07	0.07	0.06

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

Water

Data	Unit	2020	2021	2022
Water withdrawal – from all areas	megaliter	4	2	2.48
• Surface water (total)	megaliter	0	0	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	-[a]	0	0
• Groundwater (total)	megaliter	3	1	1.07
- Freshwater (≤1,000 mg/L TDS)	megaliter	3	1	1.07
- Other water (>1,000 mg/L TDS)	megaliter	-[a]	0	0
• Seawater (total)	megaliter	0	0	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	-[a]	0	0
• Produced water (total)	megaliter	0	0	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	-[a]	0	0
• Third-party water (total)	megaliter	1	1	1.41
- Freshwater (≤1,000 mg/L TDS)	megaliter	1	1	1.41
- Other water (>1,000 mg/L TDS)	megaliter	-[a]	0	0

Data	Unit	2020	2021	2022
Water withdrawal – from water stress areas	megaliter	4	2	1.87
• Surface water (total)	megaliter	0	0	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	- [a]	0	0
• Groundwater (total)	megaliter	3	1	1.07
- Freshwater (≤1,000 mg/L TDS)	megaliter	3	1	1.07
- Other water (>1,000 mg/L TDS)	megaliter	- [a]	0	0
• Seawater (total)	megaliter	0	0	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	- [a]	0	0
• Produced water (total)	megaliter	0	0	0
- Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	- [a]	0	0
• Third-party water (total)	megaliter	1	1	0.81
- Freshwater (≤1,000 mg/L TDS)	megaliter	1	1	0.81
- Surface water	megaliter	1	1	0.54
- Groundwater	megaliter	0	0	0.27
- Seawater	megaliter	0	0	0
- Reclaimed water	megaliter	0	0	0
- Produced water	megaliter	0	0	0
- Other water (>1,000 mg/L TDS)	megaliter	- [a]	0	0
- Surface water	megaliter	- [a]	0	0
- Groundwater	megaliter	- [a]	0	0
- Seawater	megaliter	- [a]	0	0
- Reclaimed water	megaliter	- [a]	0	0
- Produced water	megaliter	- [a]	0	0
Water discharge – by destination	megaliter	0	2	1.78
• Surface water	megaliter	0	0	0
• Groundwater	megaliter	0	0	0
• Seawater	megaliter	0	0	0
• Third-party water	megaliter	0	2	1.78
Water discharge – to all areas	megaliter	0	2	1.78
• Freshwater (≤1,000 mg/L TDS)	megaliter	0	0	0
• Other water (>1,000 mg/L TDS)	megaliter	0	2	1.78

Data	Unit	2020	2021	2022
Water discharge – to water stress areas	megaliter	- [a]	- [a]	1.57
• Freshwater (≤1,000 mg/L TDS)	megaliter	- [a]	- [a]	0
- Surface water	megaliter	- [a]	- [a]	0
- Groundwater	megaliter	- [a]	- [a]	0
- Seawater	megaliter	- [a]	- [a]	0
- Third-party water (sewer)	megaliter	- [a]	- [a]	0
• Other water (>1,000 mg/L TDS)	megaliter	- [a]	- [a]	1.57
- Surface water	megaliter	- [a]	- [a]	0
- Groundwater	megaliter	- [a]	- [a]	0
- Seawater	megaliter	- [a]	- [a]	0
- Third-party water	megaliter	- [a]	- [a]	1.57
Water consumption				
• All areas	megaliter	4	23	0.70
• Water stress areas	megaliter	4	1	0.30
Water consumption intensity	m^3/MWh	0.013	0.044	0.001
Change in water storage	megaliter	- [a]	- [a]	- [a]

[a] Data collection system under standardization.

Waste

Data	Unit	2020	2021	2022
Waste generated	tonnes	8	22	3.40
• Hazardous waste	tonnes	0	0	0.53
• Non-hazardous waste	tonnes	8	21	2.87
Waste diverted from disposal[a]	tonnes	0	10	0.47
• Hazardous waste	tonnes	0	0	0.11
- Preparation for reuse	tonnes	0	0	0
- Recycling	tonnes	0	0	0.11
- Other recovery operations	tonnes	0	0	0
• Non-hazardous waste	tonnes	0	10	0.36
- Preparation for reuse	tonnes	0	0	0
- Recycling	tonnes	0	10	0.36
- Other recovery operations	tonnes	0	0	0

Data	Unit	2020	2021	2022
Waste directed to disposal[a]	tonnes	8	12	7.06
• Hazardous waste	tonnes	0	0	0.42
- Incineration (with energy recovery)	tonnes	0	0	0
- Incineration (without energy recovery)	tonnes	0	0	0.42
- Landfilling	tonnes	0	0	0
- Other disposals	tonnes	0	0	0
• Non-hazardous waste	tonnes	8	12	6.64
- Incineration (with energy recovery)	tonnes	0	0	0
- Incineration (without energy recovery)	tonnes	0	0	0
- Landfilling	tonnes	0	12	6.64
- Other disposal	tonnes	8	0	0
Waste direct disposal intensity				
• Hazardous waste	kg/MWh	-	0	0.001
• Non-hazardous waste	kg/MWh	-	0.022	0.012
Proportion of hazardous waste reused & recycled	%	-	33.18%	20.75%
Proportion of non-hazardous waste reused & recycled	%	-	47.49%	12.56%

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

Biodiversity

Data	Unit	2020	2021		2022	
			Operating	Project	Operating	Project
Number of operations	number	33	24	2	24	2
Business unit(s) in relation to protected area						
• In the area	number	0	0	0	0	0
• Adjacent to	number	0	0	0	0	0
• Containing portions	number	0	0	1	0	1
Business unit(s) in relation to high biodiversity wilderness area outside protected						
• In the area	number	0	0	0	0	0
• Adjacent to	number	0	0	0	0	0
• Containing portions	number	0	0	0	0	0

Data	Unit	2020	2021		2022	
			Operating	Project	Operating	Project
Number of business units						
• Assessed for potential biodiversity impact	number	0	24	2	24	2
• Identified as high potential of biodiversity impact	number	0	0	1	0	1
• Assessed for biodiversity value	number	0	0	0	0	0
• Required biodiversity management plan[a]	number	0	0	0	0	0
• Implemented biodiversity management plan[a]	number	0	0	-	0	-
Area						
• Assessed for potential biodiversity impact	hectare	-	0	620	0	620
• Assessed for biodiversity value[a]	hectare	-	0	0	0	0
• With biodiversity management plan[a]	hectare	-	0	-	0	-
• Biodiversity offset area	hectare	-	-	-	-	-
Proportion of business units						
• Assessed for biodiversity impact	%	100%	100%	100%	100%	100%
• Assessed for biodiversity value	%	NA[b]	NA[b]	NA[b]	NA[b]	NA[b]
• With biodiversity management plan[a]	%	NA[b]	NA[b]	-	NA[b]	-

[a] For business unit(s) identified as high potential of biodiversity impact only.

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

Environmental Compliance

Data	Unit	2020	2021	2022
Number of significant environmental incidents[a]				
• Effluent discharge limits	case	0	0	0
• Air emissions standards	case	0	0	0
• Other	case	0	0	0
Fines from environmental non-compliance[b]				
• Number of significant fines	case	0	0	0
• Total amount of significant fines	USD	0	0	0
Non-monetary sanctions	case	0	0	0
Cases brought through dispute mechanisms	case	0	0	0

Data	Unit	2020	2021	2022
Spills[a]				
• Number of significant spills	case	0	0	0
• Total amount of significant spills	liter	0	0	0

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

[b] Fines or potential fines that are greater than USD 10,000.

Occupational Health and Safety

Data	Unit	2020	2021	2022
Workers covered by OHS management system				
• Number of workers	person	236	151	397
• Percentage of total workers	%	85.8%	100%	100%
Workers covered by OHS management system that has been internally audited				
• Number of workers	person	40	48	158
• Percentage of total workers	%	14.5%	32%	39.8%
Worker covered by OHS management system that has been audited or certified by third party				
• Number of workers	person	0	0	0
• Percentage of total workers	%	0%	0%	0%
Number of occupational fatalities	person	0	0	0
• Employee	person	0	0	0
• Contractor	person	0	0	0
Fatality rate	person/million man-hour	0	0	0
• Employee	person/million man-hour	0	0	0
• Contractor	person/million man-hour	0	0	0
Number of recordable injuries	case	0	0	0
• Employee	case	0	0	0
• Contractor	case	0	0	0
Total recordable injury frequency rate (TRIFR)	person/million man-hour	0	0	0
• Employee	person/million man-hour	0	0	0
• Contractor	person/million man-hour	0	0	0
Lost time injury frequency rate (LTIFR)	person/million man-hour	0	0	0
• Employee	person/million man-hour	0	0	0
• Contractor	person/million man-hour	0	0	0
Injury severity rate (ISR)[a]	day/million man-hour	0	0	0
• Employee	day/million man-hour	0	0	0
• Contractor	day/million man-hour	0	0	0
Number of high-consequence work-related injuries	case	0	0	0
• Employee	case	0	0	0
• Contractor	case	0	0	0
High-consequence work-related injuries frequency rate	person/million man-hour	0	0	0
• Employee	person/million man-hour	0	0	0
• Contractor	person/million man-hour	0	0	0
Number of hours worked	hour	401,454	281,028	508,197
• Employee	hour	256,712	231,904	334,644
• Contractor	hour	144,742	49,124	173,553
Tier-1 process safety event[b]	case	0	0	0
Tier-1 process safety event rate	case/million man-hour	0	0	0
Number of fatalities as a result of work-related ill health	person	0	0	0
• Employee	person	0	0	0
• Contractor	person	0	0	0
Number of total recordable work-related ill health	case	0	0	0
• Employee	case	0	0	0
• Contractor	case	0	0	0

[a] Refers to American National Standards Institute (ANSI) standard.

[b] Refers to internal definition with criteria such as fatality and catastrophic damage to ecosystem or property damage 100,000 USD.

Performance Data 2022: Temple I

Data	Unit	2022
Production		
Electricity sold	MWh	3,810,295
	TJ	13,717.1
Electricity generated	MWh	3,912,461
	TJ	14,084.9
System Efficiency		
Equivalent Availability Factor (EAF)	%	83.2
Capacity Factor (CF)	%	58.53
Forced Outage Factor (FOF)	%	1.45
Scheduled Outage Factor (SOF)	%	15.35
Energy		
Energy consumption	TJ	28,509.6
Energy consumption intensity	GJ/MWh	7.482
Greenhouse Gas Emissions		
GHG emissions (Scope 1 & 2)	ton CO_2e	1,743,504.2
GHG emissions intensity	ton CO_2e/MWh	0.458
Air Emissions		
NO_x emissions	ton	103.8
NO_x emissions intensity	ton/GWh	0.0272
SO_2 emissions	ton	8.8
SO_2 emissions intensity	ton/GWh	0.0023
Water		
Water consumption	megaliter	3,618.8
Water discharge	megaliter	0
Water consumption intensity	m^3/MWh	0.950
Waste		
Waste disposal	liter	0

Data	Unit	2022
Spill		
Significant spill/leak	case	0
Occupational Health and Safety		
Fatality	case	0
Lost time injury frequency rate (LTIFR)	case/million man-hour	0
Complaint from Company Operation		
Significant complaint from customer	case	0
Significant complaint from community	case	0
Significant complaint from regulator	case	0

Performance Data 2022: BLCP

Data	Unit	2019	2020	2021	2022
Installation Capacity					
Electricity	MW	1,434	1,434	1,434	1,434
Capacity under construction	MW	0	0	0	0
Planned future investment	THB	0	0	0	0
Production					
Electricity sold	MWh	10,912,012	11,284,046	10,718,875	10,260,160
	GJ	39,283,243	40,622,565	38,587,951	36,936,576
Electricity generated	MWh	11,436,600	11,823,652	11,235,025	10,746,124
System Efficiency					
Production efficiency					
• Efficiency rate (power production)	g/KWh	357.45	355.78	356.65	356.75
• Efficiency rate (steam production)	Kg/GJ	0	0	0	0
• Availability factor	%	93.78%	96.74%	91.39%	93.20%
• Overall efficiency	%	38.75%	38.76%	38.60%	38.71%
Planned outage					
• Planned outage frequency	case/year	2	2	0	2
• Total outage hours	hour	1,054	532	0	1,366
• Average power outage duration	hour/case	527	266	0	683
Unplanned outage					
• Planned outage frequency	case/year	1	1	9	1
• Total outage hours	hour	7	10.8	1,464.5	228.5
• Average power outage duration	hour/case	7.00	10.8	162.7	228.5
Total outage					
• Planned outage frequency	case/year	3	3	9	3
• Total outage hours	hour	1,061	542.8	1,464.5	1,595
• Average power outage duration	hour/case	353.67	181	162.7	531.5
Transmission					
• Length of transmission line	Km	47	47	47	47

Data	Unit	2019	2020	2021	2022
Energy					
Direct fuel consumption					
• Total	GJ	104,652,927	108,553,084	103,281,316	97,459,523
• Coal	GJ	104,633,968	108,529,744	103,233,875	97,439,118
• Diesel	GJ	18,959	23,341	47,441	20,406
Indirect energy consumption					
• Electricity purchased	GJ	0	0	14,713	8,046
Energy intensity	MJ/MWh	9,591	9,620	9,635	9,499
Greenhouse Gas (GHG)					
GHG emissions					
• Total GHG (Scope 1 & 2)	ton CO_2e	9,589,975	9,902,083	9,736,742	9,174,003
• Direct GHG (Scope 1)	ton CO_2e	9,588,300	9,900,455	9,408,633	8,861,377
• Indirect GHG (Scope 2)	ton CO_2e	1,675	1,628	2,069	1,117
• Other indirect (Scope 3)	ton CO_2e	-	-	326,040	311,509
SF_6 emissions	ton CO_2e	0	0	0	987
Chemical refrigerants					
• R-22	ton CO_2e	113.58	62.75	62.75	62.75
• R134a	ton CO_2e	0.38	0.44	0.44	0.60
• R-140A	ton CO_2e	5.77	6.41	6.41	5.91
• R32	ton CO_2e	0.35	2.38	2.38	2.38
GHG intensity (Scope 1 & 2)	Kg CO_2/KWh	0.839	0.837	0.838	0.825
Air					
Nitrogen oxide (NO_x)					
• Average concentration	mg/m^3	228.1	272.1	236.1	169.7
	ppm	121.2	144.6	125.5	90.2
• Emissions load	ton	13,263	13,327	13,541	12,813
• Degree of compliance	%	100%	100%	100%	100%
Sulfur dioxide (SO_2)					
• Average concentration	mg/m^3	360.6	366.4	312.1	257.2
	ppm	137.8	140.0	119.3	98.3
• Emissions load	ton	14,894	14,981	15,038	14,819
• Degree of compliance	%	100%	100%	100%	100%

Data	Unit	2019	2020	2021	2022
Total suspended particles (TSP)					
• Average concentration	mg/m^3	10.6	16.3	19.3	29.0
• Emissions load	ton	799	671	612	1,132
• Degree of compliance	%	100%	100%	100%	100%
Water					
Total water consumption by source	m^3	491,867	406,162	509,891	377,382
• Surface water (including water from rivers, lakes and oceans)	m^3	491,867	406,162	509,891	377,382
• Ground water	m^3	-	-	-	-
• Municipal water supplies or other water utilities	m^3	-	-	-	-
Recycled water	m^3	354,164	547,185	474,135	498,998
Wastewater released to environment	m^3	159,411	149,076	226,690	216,551
Water quality					
• Biochemical oxygen demand (BOD)	mg/l	< 2.0 - 2.6	< 2.0 - 4.9	< 2.0 - 2.7	< 2.0 - 3.8
• Chemical oxygen demand (COD)	mg/l	< 25.0	< 25.0	< 25.0 - 25.7	< 25.0
• pH (0 - 14)	-	7.66	7.84	7.73	7.90
• Average temperature	degree Celcius	35.30	35.47	34.88	33.77
Waste					
Total non-hazardous waste generated including ash	ton	-	-	529,832	649,584
Total hazardous waste generated	ton	-	-	112	245
Non-hazardous waste – onsite disposal	ton	-	-	5,600	0
• Reuse	ton	-	-	0	0
• Recycling	ton	-	-	0	0
• Other recovery operations (sold)	ton	-	-	5,600	0
Non-hazardous waste – offsite disposal	ton	-	-	483,394	597,698
• Reuse	ton	-	-	2	5
• Recycling	ton	-	-	234	362
• Other recovery operations (sold)	ton	-	-	483,159	597,332
Hazardous waste – onsite disposal	ton	-	-	0	0
• Reuse	ton	-	-	0	0
• Recycling	ton	-	-	0	0
• Other recovery operations (sold)	ton	-	-	0	0

Data	Unit	2019	2020	2021	2022
Hazardous waste – offsite disposal	ton	-	-	82	211
• Reuse	ton	-	-	0	0
• Recycling	ton	-	-	44	62
• Other recovery operations (sold)	ton	-	-	38	149
Total non-hazardous waste directed to disposal (landfill/incineration without heat recovery) – onsite disposal	ton	-	-	0	0
Total non-hazardous waste directed to disposal (landfill/incineration without heat recovery) – offsite disposal	ton	-	-	40,838	51,885
Total hazardous waste directed to disposal (landfill/incineration without heat recovery) – onsite disposal	ton	-	-	0	0
Total hazardous waste directed to disposal (landfill/incineration without heat recovery) – offsite disposal	ton	-	-	29	34
Ash					
Total ash and gypsum waste generated	ton	-	-	528,440	648,239
Total ash and gypsum waste composted, reused, recycled or recovered	ton	-	-	488,754	597,237
Total ash and gypsum waste composted, reused, recycled or recovered	%	-	-	92	92
• Donated	ton	-	-	5	95
• Other recovery operations (sold)	ton	-	-	0	0
Total ash and gypsum waste landfilled	ton	-	-	39,682	50,908
Spill					
Significant oil and chemical spill	case	0	0	0	0
Environmental Compliance					
Fines for non-compliance with environmental laws	million THB	0	0	0	0
Number of non-compliance with environmental law	case	0	0	0	0
Biodiversity					
Total number of IUCN red list species and national conservation list species	species	0	0	0	0

Data	Unit	2019	2020	2021	2022
Occupational Health and Safety					
Man-hour worked	hour	1,918,003	1,418,753	1,347,563	1,793,146
• Employee	hour	622,640	391,015	476,848	413,892
• Contractor	hour	1,295,363	1,027,738	870,715	1,379,254
Safety man-hours	hour	1,918,003	1,418,753	1,347,563	1,793,146
• Employee	hour	622,640	391,015	476,848	413,892
• Contractor	hour	1,295,363	1,027,738	870,715	1,379,254
Accumulated safety hours	hour	6,110,661	7,529,414	8,876,977	10,670,123
• Employee	hour	1,668,484	2,637,237	3,114,085	3,527,977
• Contractor	hour	4,442,177	4,892,177	5,762,892	7,142,146
Fatality	case	0	0	0	0
• Employee – male	case	0	0	0	0
• Employee – female	case	0	0	0	0
• Contractor – male	case	0	0	0	0
• Contractor – female	case	0	0	0	0
Total number of injuries	case	5	2	4	3
• Employee – male	case	0	1	2	0
• Employee – female	case	0	0	0	0
• Contractor – male	case	4	1	1	3
• Contractor – female	case	1	0	1	0
Total number of lost time injuries	case	0	0	0	0
• Employee – male	case	0	0	0	0
• Employee – female	case	0	0	0	0
• Contractor – male	case	0	0	0	0
• Contractor – female	case	0	0	0	0
Number of injured days off work	day	0	0	0	0
• Employee – male	day	0	0	0	0
• Employee – female	day	0	0	0	0
• Contractor – male	day	0	0	0	0
• Contractor – female	day	0	0	0	0
Injury frequency rate (IFR)	case/million man-hour	2.61	1.41	0	0
• Employee	case/million man-hour	1.61	2.56	0	0
• Contractor	case/million man-hour	0.77	0.97	0	0

Data	Unit	2019	2020	2021	2022
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	0.77	0.97	0	0
Total recordable injury rate (TRIR)	day/million man-hour	0	0	0	0
• Employee	day/million man-hour	0	0	0	0
• Contractor	day/million man-hour	0.77	0.97	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					
OHS training hour					
• Employee	hour	18,189	18,176	1,680	971
• Contractor	hour	18,984	9,216	15,765	19,176
Expense and Investment for Safety					
Expense for safety operation					
• Operation expense	THB	24,063,000	25,431,249	23,908,000	30,682,500
• Capex	THB	0	0	0	0
Expense for safety improvement project					
• Operation expense	THB	0	0	0	0
• Capex	THB	6,020,000	15,860,000	23,020,000	7,300,000
Employee					
Total employees	person	280	297	273	262
Number of employees by gender	person				
• Male	person	234	247	229	218
• Female	person	46	50	44	44
Number of employees by type					
• Permanent	person	263	267	260	251
• Temporary/contract	person	17	30	13	11

Data	Unit	2019	2020	2021	2022
Number of employees by level					
• Senior management	person	6	5	5	5
• Middle management	person	33	41	42	40
• Junior management	person	47	41	46	43
• Supervisor & staff	person	180	180	167	163
Gender Diversity					
Senior management					
• Male	person	5	5	5	5
• Female	person	1	0	0	0
Middle management					
• Male	person	25	31	31	29
• Female	person	8	10	11	11
Junior management					
• Male	person	41	33	35	33
• Female	person	6	8	11	10
Supervisor & staff					
• Male	person	156	161	152	147
• Female	person	24	19	15	16
Turnover					
Turnover of permanent employees by age group					
• Under 30 years old	person	3	1	9	6
• 30 - 50 years old	person	4	3	9	9
• Over 50 years old	person	1	2	4	3
Turnover rate					
• Male	% of total employees	2.99%	1.21%	5.68%	5.96%
• Female	% of total employees	2.86%	8.11%	24.32%	13.51%
New Employee					
New employees hired by age group					
• Under 30 years old	person	9	7	6	3
• 30 - 50 years old	person	0	1	5	2
• Over 50 years old	person	0	0	1	0
Total new hired rate					
• Male	% of total employees	3.51%	3.48%	2.69%	0.93%
• Female	% of total employees	2.86%	0.00%	16.22%	8.11%

Data	Unit	2019	2020	2021	2022
Parental Leave					
Employees taking parental leave	person	2	0	3	2
Number of employees returning to work after parental leave	person	2	0	3	2
Employee Development					
Total training hour by level					
• Senior management	hour/year	648	291	197	246
• Middle management	hour/year	3,393	4,615	1,292	1,143
• Junior management	hour/year	3,780	1,628	2,010	2,035
• Supervisor & staff	hour/year	10,368	6,811	5,844	6,418
Total training hours by type					
• Environment, health, safety	hour/year	3,165	3,137	1,680	4,651
• Others	hour/year	15,024	10,208	7,662	5,191
Average training hours by level					
• Senior management	hour/person/year	216	58	39	49
• Middle management	hour/person/year	215	217	62	53
• Junior management	hour/person/year	162	82	87	84
• Supervisor & staff	hour/person/year	129	73	95	136
Grievances about Human Resources					
Number of grievance about human resources	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 2022: HPC

Data	Unit	2019	2020	2021	2022
Installation Capacity					
Electricity	MW	1,878	1,878	1,878	1,878
Capacity under construction	MW	0	0	0	0
Planned future investment	THB	0	0	0	0
Production					
Electricity sold	GWh	11,406	11,355	11,881	12,180
	GJ	41,062,469	40,878,189	42,773,334	43,846,413
Electricity generated	GWh	13,087	12,980	13,601	13,917
System Efficiency					
Production efficiency					
• Efficiency rate (power production)	g/KWh	1,099	1,087	1,091	1,099
• Efficiency rate (steam production)	Kg/GJ	0	0	0	0
• Availability factor	%	82.18%	82.33%	86.11%	87.56%
• Overall efficiency	%	32.49%	32.57%	32.65%	32.57%
Planned outage					
• Planned outage frequency	case/year	3	2	3	3
• Total outage hours	hour	1,143	2,367	2,489	2,224
• Average power outage duration	hour/case	381.00	1,183.50	829.67	741.33
Unplanned outage (Forced outage)					
• Planned outage frequency	case/year	17	17	17	14
• Total outage hours	hour	3,530	2,273	1,152	1,010
• Average power outage duration	hour/case	207.65	133.71	67.76	72.14
Total outage					
• Planned outage frequency	case/year	20	19	20	17
• Total outage hours	hour	3,911	3,457	1,982	1,751
• Average power outage duration	hour/case	195.55	181.92	99.08	103.02
Transmission					
• Length of transmission line	Km	167	167	167	167
• Transmission loss	%	0.20%	0.20%	0.21%	0.22%
• Length of distribution line	Km	6	6	6	6

Data	Unit	2019	2020	2021	2022
Energy					
Direct fuel consumption					
• Total	GJ	145,217,278	143,611,047	150,087,092	153,934,759
• Coal	GJ	144,917,349	143,353,524	149,877,480	153,727,901
• Diesel	GJ	299,930	257,523	209,612	206,858
Indirect energy consumption					
• Electricity purchased	GJ	0	0	0	0
	MWh	8,590	5,193	833	165
Greenhouse Gas (GHG)					
Power Plant GHG emissions					
• Total GHG (Scope 1 & 2)	ton CO_2e	15,539,000	15,539,513	16,150,764	16,509,996
• Direct GHG (Scope 1)	ton CO_2e	15,538,951	15,539,471	16,150,714	16,509,953
• Indirect GHG (Scope 2)	ton CO_2e	48	42	50	43
• Other indirect GHG (Scope 3)	ton CO_2e	1,461	1,939	1,793	1,358
• GHG intensity (Scope 1 & 2)	ton CO_2e/MWh	1.362	1.299	1.359	1.400
SF_6 recharge	Kg	0	0	0	0
Mine GHG emissions					
• Total GHG (Scope 1 & 2)	ton CO_2e	459,669	625,349	698,235	535,077
• Direct GHG (Scope 1)	ton CO_2e	459,005	422,693	458,231	534,737
• Indirect GHG (Scope 2)	ton CO_2e	665	202,657	240,004	340
Air					
NO_x					
• Average concentration	mg/Nm^3	162.74 - 198.10	200.55 - 222.87	193.88 - 205.64	189.50 - 207.83
• Standard	mg/Nm^3	510	510	510	510
• Emissions load	ton	8,249	7,818	8,387	7,713
• Degree of compliance	%	100%	100%	100%	100%
SO_x					
• Average concentration	mg/Nm^3	128.35 - 129.61	131.90 - 135.59	150.80 - 154.87	148.73 - 159.39
• Standard	mg/Nm^3	230	230	230	230
• Emissions load	ton	5,099	4,890	6,243	6,121
• Degree of compliance	%	100%	100%	100%	100%

Data	Unit	2019	2020	2021	2022
Particulate matter (PM)					
• Average concentration	mg/Nm^3	4.92 - 7.99	4.33 - 12.36	4.05 - 9.62	2.52 - 4.97
• Standard	mg/Nm^3	50	50	50	50
• Emissions load	ton	270	303	254	151
• Degree of compliance	%	100%	100%	100%	100%
Biodiversity					
Total operation area (Concession area of mining, power plant, dams and transmission line)	KM^2	76.20	76.20	76.20	76.20
Total operation area: dumping area (Concession area of mining concession area expansion)	KM^2	-	-	-	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	Latest result was in 2017 (survey has been conducted every 5 years)			Survey has been conducted in Oct 2022 - Apr 2023
• Endangered	number				
• Vulnerable	number				
• Near threatened	number				
• Least concern	number				
Effluent					
Water discharged by destination					
• Total water discharged	megaliter	8,278	16,947	50,859	48,538
• Surface water	megaliter	8,278	16,947	50,859	48,538
• Groundwater	megaliter	-	-	-	-
• Seawater	megaliter	-	-	-	-
• Third-party water (total)	megaliter	-	-	-	-
• Third-party water sent for use to other organization	megaliter	-	-	-	-
Water discharged by freshwater and other water					
• Fresh water (<1000 mg/L Total Dissolved Solids)	megaliter	-	-	-	-
• Other water (>1000 mg/L Total Dissolved Solids)	megaliter	-	-	-	-

Data	Unit	2019	2020	2021	2022
Power Plant effluent quality					
• TSS	mg/L	<5.0 - 36	5 - 82	5 - 23	5.5 - 29
Standard	mg/L	≤50	≤50	≤50	≤50
Amount	ton	47.89	524.90	196.78	193.95
Degree of compliance	%	100%	100%	100%	100%
• BOD	mg/L	0.1 - 2.4	0.3 - 4.5	0.3 - 7	0.5 - 2.3
Standard	mg/L	≤40	≤40	≤40	≤40
Amount	ton	6.06	18.44	25.70	14.54
Degree of compliance	%	100%	100%	100%	100%
• COD	mg/L	<40 - 51	<40	<40	<40
Standard	mg/L	≤120	≤120	≤120	≤120
Amount	ton	0	-	-	-
Degree of compliance	%	100%	100%	100%	100%
• pH	-	8.5 - 9.2	8.6 - 8.9	8.4 - 8.9	8.7 - 9
Standard	-	6-9	6-9	6-9	6-9
Degree of compliance	%	91.7%	100%	100%	100%
• Temperature	°C differential	0-1	0-2	0-0.2	0.2
Standard	°C differential	<3	<3	<3	<3
Degree of compliance	%	100%	100%	100%	100%
Mine effluent quality					
• TSS	mg/L	<5.0 - 66	10.1 - 49.2	8 - 50	5 - 93
Standard	mg/L	≤50	≤50	≤50	≤50
Amount	ton	20.84 - 2,032.89	138.95	94.13	249.64
Degree of compliance	%	100%	100%	100%	100%
• BOD	mg/L	0.0 - 2.5	0.1 - 2.7	0.3 - 12.9	0.4 - 9.2
Standard	mg/L	≤50	≤50	≤50	≤50
Amount	ton	1.88 - 21.74	14.28	13.47	10.99
Degree of compliance	%	100%	100%	100%	100%
• COD	mg/L	<40 - 47	43.2 - 78.4	<40	40 - 74
Standard	mg/L	≤150	≤150	≤150	≤150
Amount	ton	83.36 - 1,763.77	369.55	205.40	282.76
Degree of compliance	%	100%	100%	100%	100%
• pH	-	6.1 - 8.3	6.0 - 8.2	6.9 - 8.8	6.2 - 8.3
Standard	-	6-9	6-9	6-9	6-9
Degree of compliance	%	100%	100%	100%	100%

Data	Unit	2019	2020	2021	2022
• Temperature	°C differential	0 - 1	0 - 2	0 - 0.2	0.2
Standard	°C differential	<3	<3	<3	<3
Degree of compliance	%	100%	100%	100%	100%
Oil and chemical spills					
• Total number of significant spills	case	0	5	1	1
• Total volume of significant spills	liter	0	1,500	200	300
Waste					
Hazardous waste disposed					
• Total hazardous waste	ton	261,622	368,543	64,497	394,116
• Reuse	ton	122	14	5	11.23
• Recycle (liquid)	liter	259,237	368,108	63,910	393,730
• Recycle (solid)	ton	2,045	7.30	2.25	19.84
• Recovery (including energy recovery)	ton	-	-	30.14	38.40
• Incineration	ton	5	-	-	-
• Deep well injection	ton	-	-	-	-
• Landfill	ton	-	-	-	-
• On-site storage	ton	213	414	550	316
• Other disposal	ton	-	-	-	-
Non-hazardous waste disposed					
• Total non-hazardous waste	ton	5,754	5,683	2,675	20,156
• Reuse	ton	-	-	-	-
• Recycle (solid)	liter	5.15	317	836	18,394
• Compositing	ton	-	1	0.07	3.47
• Recovery (including energy recovery)	ton	-	-	-	-
• Incineration	ton	-	-	-	-
• Deep well injection	ton	-	-	-	-
• Landfill	ton	5,749	5,365	1,835	1,758
• On-site storage	ton	-	-	4	0
• Other disposal	ton	-	-	-	-
Total waste disposed (hazardous & non-hazardous)	ton	267,376	374,226	67,172	414,271
Production of ash & gypsum					
• Total production of ash	ton	3,402,781	3,413,872	3,503,887	3,624,740
• Fly ash	ton	3,402,781	3,413,872	3,503,887	3,624,740
• Bottom ash	ton	-	-	-	-
• Gypsum	ton	740,373	706,477	762,372	788,668

Data	Unit	2019	2020	2021	2022
Recycled ash & gypsum					
• Fly ash recycled	ton	355,795	174,556	61,167	7,151
• Bottom ash recycled	ton	-	-	-	-
• Gypsum recycled	ton	0	2,736	1,021	2,897
Environmental Compliance					
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					
New suppliers screened using environmental criteria					
• New suppliers registered	number	278	162	105	188
• New suppliers screened by environmental criteria	number	238	162	105	188
Percentage new suppliers that were screened using environmental criteria	%	85.61%	100.0%	100.0%	100.0%
Return on Environmental Investment					
Environmental expenditure and cost					
• Capital investment expense	THB	146,100	571,849	417,547	-
• Operating expense	THB	22,397,424	25,270,414	18,070,946	36,600,600
Environmental improvement project					
• Operating expense	THB	-	604,351	-	2,240,839
• Capex	THB	-	-	500,000	3,053,805
Environmental Grievance Mechanism					
Complaints from related stakeholders on environment					
• Significant environmental complaint	number	1	1	0	0
• Significant complaint resolved	number	1	1	0	0
Safety Performance					
Employee					
Man-hour	hour	1,757,550	1,798,075	1,812,908	1,765,909
Number of fatality					
• Male	person	0	0	0	0
• Female	person	0	0	0	0

Data	Unit	2019	2020	2021	2022
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 injuries					
• Male	person	0	0	0	1
• Female	person	0	0	0	0
Number of recordable work-related injuries					
• Male	person	4	3	0	3
• Female	person	0	0	0	0
Number of day lost (excluding fatality and permanent disability)					
• Male	day	0	0	0	17
• Female	day	0	0	0	0
Fatality rate	person/million man-hour	0	0	0	0
Lost time injury frequency rate (LTIFR)	person/million man-hour	0	0	0	0.57
High consequence work related injury rate	person/million man-hour	0	0	0	0
Total recordable injury rate (TRIR)	day/million man-hour	2.28	1.67	0	1.70
Main type of work-related injuries					
• 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	1	3	3	1
• Dry heat friction	person	0	0	0	0
• Fracture	person	0	0	0	1
• Hernia	person	0	0	0	0
• Irritation	person	0	0	0	0
• Laceration	person	2	0	0	0
• Puncture	person	1	0	0	0
• Rash	person	0	0	0	1
• Strain & Sprain	person	0	0	0	0
• Other	person	0	0	0	0

Data	Unit	2019	2020	2021	2022
Number of occupational disease					
• Male	person	0	0	0	0
• Female	person	0	0	0	0
Contractor					
Man-hour	hour	15,393,461	13,871,450	14,685,149	14,710,407
Number of fatality					
• Male	person	1	0	1	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 injuries					
• Male	person	5	4	0	3
• Female	person	0	0	0	1
Number of recordable work-related injuries					
• Male	person	25	15	9	9
• Female	person	0	0	0	1
Number of day lost (excluding fatality and permanent disability)					
• Male	day	1,865	56	0	70
• Female	day	0	0	0	14
Fatality rate	person/million man-hour	0.06	0	0.07	0
Lost time injury frequency rate (LTIFR)	person/million man-hour	0.39	0.29	0	0.27
High consequence work related injury rate	person/million man-hour	0	0	0	0
Total recordable injury rate (TRIR)	day/million man-hour	1.62	1.08	0.61	0.68
Main type of work-related injuries					
• Amputation	person	1	0	0	0
• Burn	person	1	0	0	1
• Chemical	person	1	0	0	0
• Contamination	person	0	0	0	0
• Contusion	person	11	8	5	3
• Dry heat friction	person	0	0	0	0
• Fracture	person	2	4	0	4

Data	Unit	2019	2020	2021	2022
• Hernia	person	0	0	0	0
• Irritation	person	0	0	3	2
• Laceration	person	8	3	1	0
• Puncture	person	0	0	0	0
• Rash	person	0	0	0	0
• Strain & Sprain	person	1	0	0	0
• Other	person	0	0	0	0
Number of occupational diseases					
• Male	person	0	0	0	0
• Female	person	0	0	0	0
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					
Employee					
• OHS training program	number	42	30	25	33
• OHS training hour	hour	5,571	2,153	3,936	5,020
Contractor					
• OHS training program	number	802	423	385	257
• OHS training hour	hour	29,989	15,817	23,071	17,796
Expense and Investment for Safety					
Expense for safety operation					
• Operation expense	THB	27,232,209	33,446,374	27,935,055	34,457,355
• Capex	THB	1,200,000	328,800	0	869,000
Expense for safety improvement project					
• Operation expense	THB	0	0	0	0
• Capex	THB	18,120,000	0	0	0
Impacted Community					
Plant area					
• Impacted household	household	2,588	2,588	2,588	2,588
• Impacted people	person	12,335	12,335	12,335	12,335
• Compensated household	household	975	975	975	975
• Compensated people	person	5,265	5,265	5,265	5,265

Data	Unit	2019	2020	2021	2022
Transmission line					
• Impacted household	household	249	249	249	249
• Impacted people	person	1,345	1,345	1,345	1,345
• Compensated household	household	249	249	249	249
• Compensated people	person	1,345	1,345	1,345	1,345
Employee					
Total employees	person	732	720	726	743
Number of employees by gender					
• Male	person	564	560	561	576
• Female	person	168	160	165	167
Number of employees by nationality					
• Thai	person	268	262	260	264
• Laos PDR	person	463	457	465	478
• China	person	0	0	0	0
• Japan	person	0	0	0	0
• Others	person	1	1	1	1
Number of employees by age					
• Under 30 years old	person	292	232	221	169
• 30 - 39 years old	person	279	313	325	382
• 40 - 49 years old	person	101	108	112	118
• Over 50 years old	person	60	67	68	74
Number of employees by type					
• Permanent	person	685	676	673	682
• Temporary/contract	person	47	44	53	61
Number of employees by level					
• Senior management	person	19	18	15	16
• Middle management	person	94	93	90	99
• Junior management	person	179	177	183	181
• Supervisor & staff	person	406	401	410	420
• Other (worker)	person	34	31	28	27
Total new employees	person	29	43	53	84
• Male	person	17	21	33	62
• Female	person	12	22	20	22
Retainment of employees					
• Average length of service years	year	5.17	5.98	6.54	7.06

Data	Unit	2019	2020	2021	2022
Estimated total employees eligible to retire in the next 5 years	person	27	29	29	33
• Senior Management (DD and up)	person	7	7	6	6
• Middle Management (section and manager)	person	4	5	5	8
• Junior Management (senior officer)	person	9	11	12	11
• Supervisor and staff	person	6	5	5	7
• Other (worker)	person	1	1	1	1
Estimated total employees eligible to retire in the next 10 years	person	60	66	67	74
• Senior Management (DD and up)	person	12	13	12	11
• Middle Management (section and manager)	person	14	15	16	22
• Junior Management (senior officer)	person	18	20	22	21
• Supervisor and staff	person	12	12	12	15
• Other (worker)	person	4	6	5	5
Turnover	person	33	53	48	43
• Resignment	person	22	35	31	38
• Retirement	person	2	3	7	3
• Other termination	person	9	15	10	2
Total turnover rate	%	4.51%	7.36%	6.61%	5.79%
Volunteer turnover rate	%	3.01%	4.86%	4.27%	5.11%
Gender Diversity					
Senior management	person	19	18	15	16
• Male	person	15	14	11	13
• Female	person	4	4	4	3
Middle management	person	94	93	90	99
• Male	person	68	69	66	72
• Female	person	26	24	24	27
Junior management	person	179	177	183	181
• Male	person	119	117	122	122
• Female	person	60	60	61	59
Supervisor and staff	person	406	401	410	420
• Male	person	334	333	336	344
• Female	person	72	68	74	76
Professional and advisor	person	6	5	28	27
• Male	person	6	5	26	25
• Female	person	0	0	2	2

Data	Unit	2019	2020	2021	2022
Employee Development					
Skill/competency needed assessment in the workforce					
• Employees who was assessed skill/ training needs	person	-	-	669	658
	%	-	-	80.00	92.54
Total training hours	hour	20,397	16,805	19,241	16,315
• Senior Management	hour	637	141	123	381
• Middle Management	hour	5,523	1,794	2,824	3,406
• Junior Management	hour	9,828	5,571	5,742	6,572
• Supervisor and staff	hour	4,409	9,299	10,552	5,956
Average training hours/person	hour/person	29.39	24.39	27.92	27.33
Total training expense	THB/person	24,528,028	2,654,937	3,530,304	8,490,018
• Senior Management	THB/person	37,055	35,724	296,957	199,096
• Middle Management	THB/person	32,522	127,892	88,666	1,365,229
• Junior Management	THB/person	22,030	53,385	78,150	2,531,362
• Supervisor and staff	THB/person	36,488	71,307	38,852	4,394,331
Average training expense/employee	THB/person	29,984	3,734	4,965	14,221
Parental Leave					
Employees taking parental leave	person	8	13	10	7
	%	5%	8%	6%	4%
Number of employees returning to work after parental leave	person	8	13	10	7
	%	5%	8%	6%	4%
Freedom of Association and Collective Bargaining					
Number of employees covered by collective bargaining agreements	person	0	0	0	0
	%	0	0	0	0
Absenteeism Rate (due to illness)					
Absenteeism rate due to common illness	%	0.65	0.53	0.44	1.03
Absenteeism rate due to occupational illness	%	-	-	-	-
Complaint from Company Operation					
Total formal/significant complaint case by communities	case	1	1	0	0
Solved complaint	case	1	1	0	0

GRI Content Index

Statement of use	Banpu Power has reported in accordance with the GRI Standards for the period 1 January - 31 December 2022.
GRI 1 used	GRI 1: Foundation 2021
Applicable GRI Sector Standard(s)	Utilties

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
General disclosures					
GRI 2: General Disclosures 2021	2-1	Organizational details	Back cover, 10	A gray cell indicates that reasons for omission are not permitted for the disclosure or that a GRI Sector Standard reference number is not available.	
	2-2	Entities included in the organization's sustainability reporting	121, 123		
	2-3	Reporting period, frequency and contact point	6, Back cover		
	2-4	Restatements of information	6		
	2-5	External assurance	153		
	2-6	Activities, value chain and other business relationships	11		
	2-7	Employees	131-132		
	2-8	Workers who are not employees	130-131		
	2-9	Governance structure and composition	27-30		
	2-10	Nomination and selection of the highest governance body	27-30		
	2-11	Chair of the highest governance body	27-30		
	2-12	Role of the highest governance body in overseeing the management of impacts	20-23		
	2-13	Delegation of responsibility for managing impacts	20-23		
	2-14	Role of the highest governance body in sustainability reporting	17-23, 27-30		
	2-15	Conflicts of interest	27-30		
	2-16	Communication of critical concerns	20-23		
	2-17	Collective knowledge of the highest governance body	27-30		
	2-18	Evaluation of the performance of the highest governance body	20-23		
	2-19	Remuneration policies	23, 30		
	2-20	Process to determine remuneration	23, 30		
	2-21	Annual total compensation ratio	133		
	2-22	Statement on sustainable development strategy	4-5		
	2-23	Policy commitments	31-33	Human Rights Policy	
	2-24	Embedding policy commitments	20-23, 27-30		
	2-25	Processes to remediate negative impacts	33		
	2-26	Mechanisms for seeking advice and raising concerns	33-37		
	2-27	Compliance with laws and regulations	34-37, 126, 130		
	2-28	Membership associations	122		
	2-29	Approach to stakeholder engagement	13-16		
	2-30	Collective bargaining agreements	133		
GRI G4 Electric Utilities Sector Disclosures 2010	EU1	Installed capacity, broken down by primary energy source and by regulatory regime	126		
	EU2	Net energy output, broken down by primary energy source and by regulatory regime	126		
Material topics					
GRI 3: Material Topics 2021	3-1	Process to determine material topics	17-18	A gray cell indicates that reasons for omission are not permitted for the disclosure or that a GRI Sector Standard reference number is not available.	
	3-2	List of material topics	19		
Economic performance					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		-
GRI 201: Economic Performance 2016	201-1	Direct economic value generated and distributed	124		-
	201-2	Financial implications and other risks and opportunities due to climate change	71-72		-
	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 Presence 2016	202-1	Ratios of standard entry level wage by gender compared to local minimum wage	-		-
	202-2	Proportion of senior management hired from the local community	-		-
Indirect economic impacts					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		-
GRI 203: Indirect Economic Impacts 2016	203-1	Infrastructure investments and services supported	124		-
	203-2	Significant indirect economic impacts	124		-

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Procurement practices					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		-
GRI 204: Procurement Practices 2016	204-1	Proportion of spending on local suppliers	-		-
Anti-corruption					
GRI 3: Material Topics 2021	3-3	Management of material topics	31		-
GRI 205: Anti-corruption 2016	205-1	Operations assessed for risks related to corruption	32		-
	205-2	Communication and training about anti-corruption policies and procedures	32		-
	205-3	Confirmed incidents of corruption and actions taken	125		-
Anti-competitive behavior					
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	124		-
Materials					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		-
GRI 301: Materials 2016	301-1	Materials used by weight or volume	-		-
	301-2	Recycled input materials used	-		-
	301-3	Reclaimed products and their packaging materials	-		-
Energy					
GRI 3: Material Topics 2021	3-3	Management of material topics	73-74		-
GRI 302: Energy 2016	302-1	Energy consumption within the organization	127		Yes
	302-2	Energy consumption outside of the organization	-		-
	302-3	Energy intensity	127		Yes
	302-4	Reduction of energy consumption	76		-
	302-5	Reductions in energy requirements of products and services	74-75		-

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Water and effluents					
GRI 3: Material Topics 2021	3-3	Management of material topics	81		-
GRI 303: Water and Effluents 2018	303-1	Interactions with water as a shared resource	82-83		-
	303-2	Management of water discharge-related impacts	82-83		-
	303-3	Water withdrawal	127-128		Yes
	303-4	Water discharge	127-128		Yes
	303-5	Water consumption	127-128	The change of water storage is insignificant because neligible evaporation rate at all CHPs' storage tanks.	Yes
Biodiversity					
GRI 3: Material Topics 2021	3-3	Management of material topics	88-89		-
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	129		-
	304-2	Significant impacts of activities, products, and services on biodiversity	129		-
	304-3	Habitats protected or restored	129		-
	304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	89		-
Emissions					
GRI 3: Material Topics 2021	3-3	Management of material topics	65-68, 77		-
GRI 305: Emissions 2016	305-1	Direct (Scope 1) GHG emissions	127		Yes
	305-2	Energy indirect (Scope 2) GHG emissions	127		Yes
	305-3	Other indirect (Scope 3) GHG emissions	-		-
	305-4	GHG emissions intensity	127		Yes
	305-5	Reduction of GHG emissions	76		-
	305-6	Emissions of ozone-depleting substances (ODS)	127		-
	305-7	Nitrogen oxides (NO_x), sulfur oxides (SO_x), and other significant air emissions	127	The NO_x and PM emitted from non-point sources are excluded and will be disclosed in SD Report 2023.	Yes
Waste					
GRI 3: Material Topics 2021	3-3	Management of material topics	85-86		-
GRI 306: Waste 2020	306-1	Waste generation and significant waste-related impacts	85-86		-
	306-2	Management of significant waste-related impacts	85-86		-
	306-3	Waste generated	129		Yes
	306-4	Waste diverted from disposal	129		Yes
	306-5	Waste directed to disposal	129		Yes

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Supplier environmental assessment					
GRI 3: Material Topics 2021	3-3	Management of material topics	55-56		-
GRI 308: Supplier Environmental Assessment 2016	308-1	New suppliers that were screened using environmental criteria	126		-
	308-2	Negative environmental impacts in the supply chain and actions taken	-		-
Employment					
GRI 3: Material Topics 2021	3-3	Management of material topics	92-93		-
GRI 401: Employment 2016	401-1	New employee hires and employee turnover	132		-
	401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	93		-
	401-3	Parental leave	132		-
Labor/management relations					
GRI 3: Material Topics 2021	3-3	Management of material topics	100		-
GRI 402: Labor/ Management Relations 2016	402-1	Minimum notice periods regarding operational changes	-		-
Occupational health and safety					
GRI 3: Material Topics 2021	3-3	Management of material topics	112-113		-
GRI 403: Occupational Health and Safety 2018	403-1	Occupational health and safety management system	112-114		-
	403-2	Hazard identification, risk assessment, and incident investigation	112-114		-
	403-3	Occupational health services	112-114		-
	403-4	Worker participation, consultation, and communication on occupational health and safety	112-114		-
	403-5	Worker training on occupational health and safety	112-114		-
	403-6	Promotion of worker health	112-114		-
	403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	112-114		-
	403-8	Workers covered by an occupational health and safety management system	130-131		Yes
	403-9	Work-related injuries	130-131	The working hours of contractors with less than five consecutive working days are excluded and will be disclosed in SD Report 2023. Moreover, the working hours of employees remaining on site after working hours are not recorded; however, the incident is recorded, if any case occur.	Yes
	403-10	Work-related ill health	130-131		-

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Training and education					
GRI 3: Material Topics 2021	3-3	Management of material topics	105-106		-
GRI 404: Training and Education 2016	404-1	Average hours of training per year per employee	132-133		-
	404-2	Programs for upgrading employee skills and transition assistance programs	105-111		-
	404-3	Percentage of employees receiving regular performance and career development reviews	133		-
Diversity and equal opportunity					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		-
GRI 405: Diversity and Equal Opportunity 2016	405-1	Diversity of governance bodies and employees	29		-
	405-2	Ratio of basic salary and remuneration of women to men	133		-
Non-discrimination					
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	125		-
Freedom of association 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	133		-
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 compulsory labor					
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	-		-
Security practices					
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	-		-

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Rights of indigenous peoples					
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 communities					
GRI 3: Material Topics 2021	3-3	Management of material topics	117-118		-
GRI 413: Local Communities 2016	413-1	Operations with local community engagement, impact assessments, and development programs	119		-
	413-2	Operations with significant actual and potential negative impacts on local communities	119		-
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 assessment					
GRI 3: Material Topics 2021	3-3	Management of material topics	55-56		-
GRI 414: Supplier Social Assessment 2016	414-1	New suppliers that were screened using social criteria	126		-
	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	125		-
Customer health and safety					
GRI 3: Material Topics 2021	3-3	Management of material topics	58-59		-
GRI 416: Customer Health and Safety 2016	416-1	Assessment of the health and safety impacts of product and service categories	126		-
	416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	126		-

GRI STANDARD/ OTHER SOURCE		DISCLOSURE	PAGE	DETAIL/OMISSION	EXTERNAL ASSURANCE
Marketing and labeling					
GRI 3: Material Topics 2021	3-3	Management of material topics	-		-
GRI 417: Marketing and Labeling 2016	417-1	Requirements for product and service information and labeling	-		-
	417-2	Incidents of non-compliance concerning product and service information and labeling	-		-
	417-3	Incidents of non-compliance concerning marketing communications	-		-
Customer privacy					
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	126		-
System Efficiency					
GRI 3: Material Topics 2021	3-3	Management of material topics	61-62		-
GRI G4 Electric Utilities Sector Disclosures 2010	EU11	Average generation efficiency of thermal plants by energy source and by regulatory regime	126		-
Access					
GRI 3: Material Topics 2021	3-3	Management of material topics	61-62		-
GRI G4 Electric Utilities Sector Disclosures 2010	EU28	Power outage frequency	126		-
	EU29	Average power outage duration	126		
	EU30	Average plant availability factor by energy source and by regulatory regime	126		-

LRQA Independent Assurance Statement

Relating to Banpu Power Public Company Limited's Sustainability Report for the calendar year 2022.

This Assurance Statement has been prepared for Banpu Power Public Company Limited in accordance with our contract but is intended for the readers of this Report.

Terms of engagement

LRQA was commissioned by Banpu Public Company Limited (Banpu) to provide independent assurance on Banpu Power Public Company Limited (BPP)'s Sustainability Report 2022 ("the report") against the assurance criteria below to a limited level of assurance and materiality of the professional judgement of the verifier using LRQA's verification procedure. LRQA's verification procedure is based on current best practice, is in accordance with ISAE 3000 and uses the following principles of - inclusivity, materiality, responsiveness and reliability of performance data.

Our assurance engagement covered BPP's thermal power business consisting of three combined heat and power (CHP) plants in China, Headquarters in Thailand and office in China and specifically the following requirements:

- Confirming that the performance indicators conform with GRI's specific standard disclosures defined in:
  - Sustainability Reporting Standard
  - GRI Electric Utilities sector disclosures.
- Evaluating the reliability of data and information for only the selected performance indicators listed below:[a, b]
  - GRI 302-1 Energy consumption within the organization (2016)[1]
  - GRI 302-3 Energy intensity (2016) [1]
  - 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 emissions (2016) [1]
  - GRI 305-2 Energy indirect (Scope 2) GHG emissions (2016) [1]
  - GRI 305-4 GHG emissions intensity (2016) [1]
  - GRI 305-7 Nitrogen Oxides (NOx), Sulfur Oxides (SOx) and other significant air emissions (2016) [2]
  - GRI 306-3 Waste generated (2020) [2]
  - GRI 306-4 Waste diverted from disposal (2020) [2]
  - GRI 306-5 Waste directed to disposal (2020) [2]
  - GRI 403-8 Workers covered by an occupational health and safety management system (2018) [3]
  - GRI 403-9 Work-related injuries (2018) [3]
  - Lost time injury frequency rate (LTIFR) and injury severity rate (ISR) [3]
  - Tier-1 Process safety event rate[3]

Note:

1) Reporting boundary of these performances data include BPP's thermal power business of three combined heat and power (CHP) plants' operations and activities in China (Luannan Coal-fired CHP Plant, Zhengding Coal-fired CHP Plant and Zouping Coal-Fired CHP Plant) and BIC office in China.
2) Reporting boundary of these performances data include BPP's thermal power business of three combined heat and power (CHP) plants' operations and activities in China (Luannan Coal-fired CHP Plant, Zhengding Coal-fired CHP Plant and Zouping Coal-Fired CHP Plant) only.
3) Reporting boundary of these performances data include BPP's thermal power business of three combined heat and power (CHP) plants' operations and activities in China (Luannan Coal-fired CHP Plant, Zhengding Coal-fired CHP Plant and Zouping Coal-Fired CHP Plant), BIC office in China and Headquarter office 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 LRQA's approach nothing has come to our attention that would cause us to believe that BPP has not, in all material respects:

- Met the requirements above, 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 water storage has not been identified as having significant water-related impact.
  - NOx and PM emitted from non-point sources are excluded due to unavailable data.
  - Working hours of contractors with less than 5 consecutive working days and the working hours of employees remaining on site after working hours are not recorded, so these are excluded from GRI 403-9.
- Disclosed reliable performance data and information for the selected performance indicators above.

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 been performed.

LRQA's Approach

LRQA's assurance engagements are carried out in accordance with our verification procedure. The following tasks though were undertaken as part of the evidence gathering process for this assurance engagement:

- Auditing BPP's data management systems to confirm that there were no significant errors, omissions, or misstatements in the report. We did this by reviewing the effectiveness of data handling procedures, and systems. We also spoke with those key people responsible for compiling the data and drafting the report.
- Verifying data and information remotely, via ICT application, for a selection of BPP's CHP Coal-fired plant in China, i.e. Zhengding Combined Heat & Power plant, and verifying aggregated data, via desktop review, for all selected performance indicators at a corporate level.

Note: LRQA did not verify the data back to its original sources, nor did it assess the accuracy and completeness of the data reported by individual locations.

Observations

Further observations and findings, made during the assurance engagement, are:

- Responsiveness:
  The reporting scope of significant air emissions should be extended to include all applicable sources not only major emission sources but also all minor sources i.e., NOx and Particulate Matter (PM) emitted from non-point sources and PM emitted from dust abatement equipment. This can enhance responsiveness for addressing air emission related issue.
- Reliability:
  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:
  - Uncertainty of reported GHG data can be improved by applying recommended quantification methods "GHG Emissions Accounting Method and Reporting Guide for Enterprises - Power Generation Facilities' published by Ministry of Ecology and Environment of the PR China (MEE)" i.e., considering quality data of coal and ash into account, etc.
  - More rigorous internal verification will improve the reliability of reported data and information and prevent future errors.

LRQA's standards, competence and independence

LRQA ensures the selection of appropriately qualified individuals based on their qualifications, training and experience. The outcome of all verification and certification assessments is then internally reviewed by senior management to ensure that the approach applied is rigorous and transparent.

The report verification is the only work undertaken by LRQA for BPP and as such does not compromise our independence or impartiality.

Paveena Hengsritawat
LRQA Lead Verifier

24 March 2023

On behalf of LRQA (Thailand) Limited
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TALK TO US

Banpu Power welcomes your suggestions and additional information provided for our sustainability policies and operations.

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