

# WE ARE ENERGY

Affordable  
Reliable  
Eco-friendly

Sustainability Report 2020





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Reliable  
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## 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 operate 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.

# Content

## 6

### About Banpu Power

Operational Highlights	3
Messages from Chairman of the Board of Directors and Chief Executive Officer	4
About Banpu Power	6
Banpu Power Assets	7
Banpu Power Supply Chain	8
About This Report	9
Summary of Major Changes and Development	10
Challenges and Opportunities	11
Corporate Governance	13
Sustainability Governance	17
Stakeholder Engagement	21
Materiality Assessment	25
Banpu Power and Sustainable Development Goals	28

## 30

### Governance

Business Growth	31
Business Ethics	35
Anti- corruption	39
Compliance	41
Risk Management	45
Business Continuity Management	49
Availability and Reliability	52
Process Improvement and Innovation	55
Supplier Management	58
Contractor Management	61
Customer Management	63

## 66

### Environment

Greenhouse Gas (GHG) Emissions	67
Energy	72
Air Quality	75
Water Resources Utilization and Water Discharge	79
Waste	83
Biodiversity	86

## 88

### Social

Corporate Culture	89
Competency and Leadership Development	93
Employee Engagement	98
Occupational Health and Safety (OHS)	102
Community Engagement	106

## 112

### Additional Information

List of Business	113
Award & Membership	114
Data Boundary	115
Performance Data: Banpu Power	116
Performance Data: Banpu NEXT	125
Performance Data: BLCP	127
Performance Data: HPC	130
GRI Content Index	134
Assurance Statement	138

# Operational Highlights

EBITDA **5,230** million THB  
increasing **9%** from the previous year

Total Committed Capacity **2,856** MWe   increase of **427** MWe 

**25**  
Operating power plants  
Total operating capacity  
**2,750** MWe

Established  
**Banpu NEXT**  
to invest in renewable  
energy and energy  
technology

The greenhouse gas  
(GHG) emissions  
intensity  
**0.620**  
tonnes CO<sub>2</sub>e/ MWh

Water consumption  
intensity  
**0.901**  
cubic meters/ MWh

Utilize High Efficiency,  
Low Emissions (HELE) technology  
for excellent environmental performance

The sulfur dioxide (SO<sub>2</sub>)  
emissions intensity  
**0.0254**  
tonnes/ GWh

The oxides of nitrogen  
(NO<sub>x</sub>) emissions intensity  
**0.0420**  
tonnes/ GWh


The particular matters  
emissions intensity  
**0.0027**  
tonnes/ GWh

A total production  
capacity of  
renewable energy  
generation and  
solar rooftop  
(equity investment)

**347** MWe 

Availability Factor  
(AF) of power plants in  
China



 Business continuity during  
COVID-19 with zero infected  
employee

**No** work-related  
accident 

**No** incidents  
related to  
environment,  
social and  
governance

**BanpuHeart**  
A strong corporate culture helping  
combine the 'power' in driving  
businesses.

Establishing a financial support  
of THB **500** million with Banpu  
group and alliance to aid society  
on COVID-19





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

**Dr. Kirana Limpaphayom**  
Chief Executive Officer  
and Chairman of the Sustainable Development  
Committee

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

The year 2020 has been a challenging year for not only Banpu Power Group (BPP), but also other businesses due to a widespread impact of the COVID-19 epidemic crisis across the globe since early 2020 until 2021. Nonetheless, Banpu Power has overcome this challenge, owing to its flexible management system corresponding to the rapid changes. This has made the company still capable to conduct business and generate cash flows continuously. In 2020, Banpu Power Plc. recorded a net profit of THB 3,702 million, an increase of 25% from the previous year, thanks to sound operational results from the three combined heat and power (CHP) plants in China and BLCP Power Plant, which were able to maintain their availability and operating efficiency consistently

as planned. The operational performance of HPC Power Plant, however, was marginally lower than the plan set as a result of the maintenance outage of some production units affected by a lightning strike on the high-voltage power transmission line at the beginning of the 2<sup>nd</sup> quarter of the year. More importantly, BPP succeeded in commencing the commercial operations of solar power plants in Japan, namely Yamagata and Yabuki, respectively, as well as purchasing the EI Wind Mui Dinh Wind Power Plant in Vietnam. As a result, BPP has a current power operating capacity of 2,750 MW based on equity investments of the power plants already commencing commercial operations.

In addition to tirelessly generating good returns, BPP has also aimed at growing its power generation business, including the thermal power business in the base load power plants and the investment in the renewable power business in the Asia-Pacific region. In the past year, BPP underwent a significant change in the organizational structure – an amalgamation between Banpu Renewable Energy Company Limited (BRE), a subsidiary company, and Banpu Infinergy Company Limited (BPIN), a subsidiary of Banpu Public Company Limited, to set up Banpu NEXT Company Limited (Banpu NEXT) in February 2020 with a focus on investment and development of renewable energy and energy technology businesses. BPP and Banpu Plc. have equal shareholding of 50% each in Banpu NEXT. This amalgamation has enabled BPP to increase its investments in renewable energy and energy technology businesses, consisting of renewable energy plant, solar rooftop, energy storage system, electric vehicle, smart community and the energy management system.

To create a consistent and sustainable growth of the power generation business and to enhance an ability to deliver energy contributing values for economic development to all areas with affordable prices (Affordable), stable power delivery (Reliable) and environmentally friendly (Eco-friendly), BPP has planned to manage its businesses by using three significant strategies:

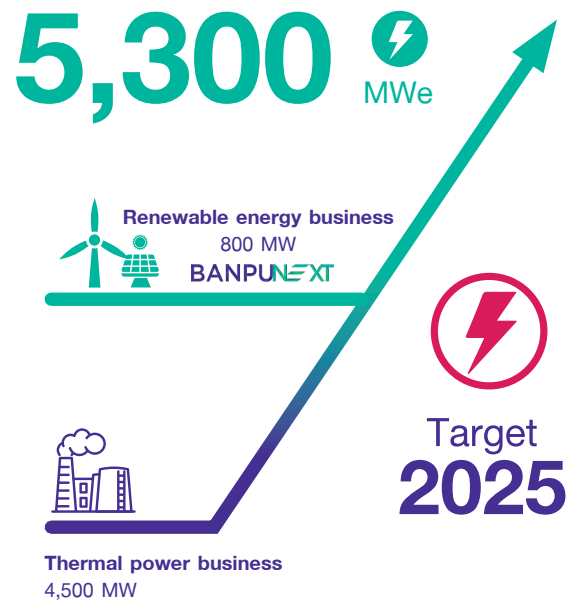
- Synergizing with Banpu Group to further develop and operate the power generation business in the countries where Banpu Group has operated.
- Seeking the investment opportunities in countries with economic growth and high demand for power in the Asia-Pacific region.
- Driving the growth of renewable energy and energy technology businesses through an investment in Banpu NEXT.

BPP has paid great attention to improve the power plants' operations and adopt High Efficiency, Low Emissions or HELE technologies in accordance with the Greener & Smarter strategy. The three CHP plants in China were granted financial support from the local governments as a consequence of their outstanding performances on controlling the air quality. BPP has set its power generation target of 5,300 MWe by the year 2025, consisting of 4,500 MW from the thermal power business and another 800 MW from the renewable energy business invested through Banpu NEXT. It has also determined a target for the greenhouse gas emissions intensity to no more than 0.676 tonnes CO<sub>2</sub>e/ MWh over the next five years in order to drive the organization to create innovations helping increase the efficiency of cost- effective use of resources and be a part in tackling the climate change problems.

Although the COVID- 19 outbreak is far more widespread than any crisis in the past, the ability to adapt ourselves to meet the organizational changes, including the efficient Business Continuity Management has helped the performance of Banpu Power Plc. in achieving the targets set. Furthermore, all of the power plants were able to constantly provide stability and reliability in generating power and steam for customers and communities with the utmost efficiency. In addition, with the safety operating standards and a focus on building a safety culture across the organization, all of the power plants that Banpu Power Plc. has management control had no working accidents while none of their employees was infected with the COVID- 19.

More importantly, Banpu Power has been selected as one of the sustainable stocks on the Stock Exchange of Thailand or 'Thailand Sustainable Investment' (THSI) for the third consecutive year. Additionally, it has been certified as a member of Thailand's Private Sector Collective Action Coalition Against Corruption (CAC) from the Thai Institute of Directors Association. These demonstrate the commitments of BPP to creating the sustainable growth, taking into account the Environmental, Social and Governance (ESG) along with adding values and keeping balances between cash flows and returns for all stakeholders.

On behalf of the Board of Directors, the executives and all employees of Banpu Power Group, we would like to thank all stakeholders for their trust and support in the company despite new changes and challenges. The spirit of 'Banpu Heart', a unique feature of our people, and the continued development of our human resources in accordance with the corporate strategic plans and future changes will allow us to be resilience and go through any challenges as well as continue committing to delivering the sustainably valuable energy to the society.





# About Banpu Power

Banpu Power Public Company Limited or Banpu Power (BPP) is a subsidiary of Banpu Public Company Limited. Established in 1996, BPP was listed on the Stock Exchange of Thailand in 2016. The Company has operated the power business and supplied electricity from thermal power generation and renewable power generation in the Asia-Pacific region.

consisting of 2,750 MWe from commercially operating power plants and 106 MW from power projects under construction and development. In the year 2020, the Company had total assets of THB 49,563 million, increasing THB 755 million from the year 2019.

Presently, BPP  
has total committed  
capacity **2,856**  MWe

In 2020, Banpu Renewable Company Limited (BRE), a subsidiary company of BPP, amalgamated with Banpu Infinergy Company Limited (BPIN) so as to form Banpu NEXT Company Limited (Banpu NEXT). Banpu NEXT is focusing on investing and developing both green power and energy related technologies in Thailand and Asia. BPP and Banpu each holds 50% stakes in Banpu NEXT.



# Banpu Power Assets

## China

### Luannan

Coal-fired CHP Plant  
**100%** Ownership  
 Gross: **227** MWe

### Zhengding

Coal-fired CHP Plant  
**100%** Ownership  
 Gross: **139** MWe

### Zouping

Coal-fired CHP Plant  
**70%** Ownership  
 Gross: **247** MWe

### Shanxi Lu Guang

Coal-fired Development Project  
**30%** Ownership  
 Gross: **1,320** MW

### China Solar

7 Solar Power Plants  
**50%** Ownership  
 Gross: **177.3** MW



## Laos PDR

### HPC

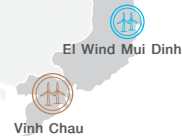
Coal-fired Mine-mount  
 Power Plant  
**40%** Ownership  
 Gross: **1,878** MW



## Thailand

### BLCP

Coal-fired Power Plant  
**50%** Ownership  
 Gross: **1,434** MW



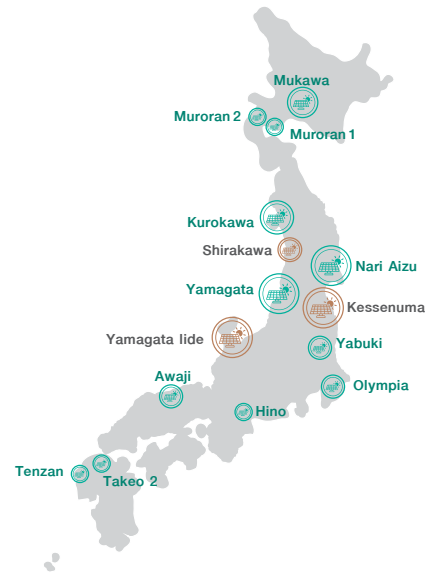
## Vietnam

### El Wind Mui Dinh

Wind Power Plant  
**50%** Ownership  
 Gross: **38** MW

### Vinh Chau

Wind Development Project  
**50%** Ownership  
 Gross: **80** MW



## Japan

### Japan Solar

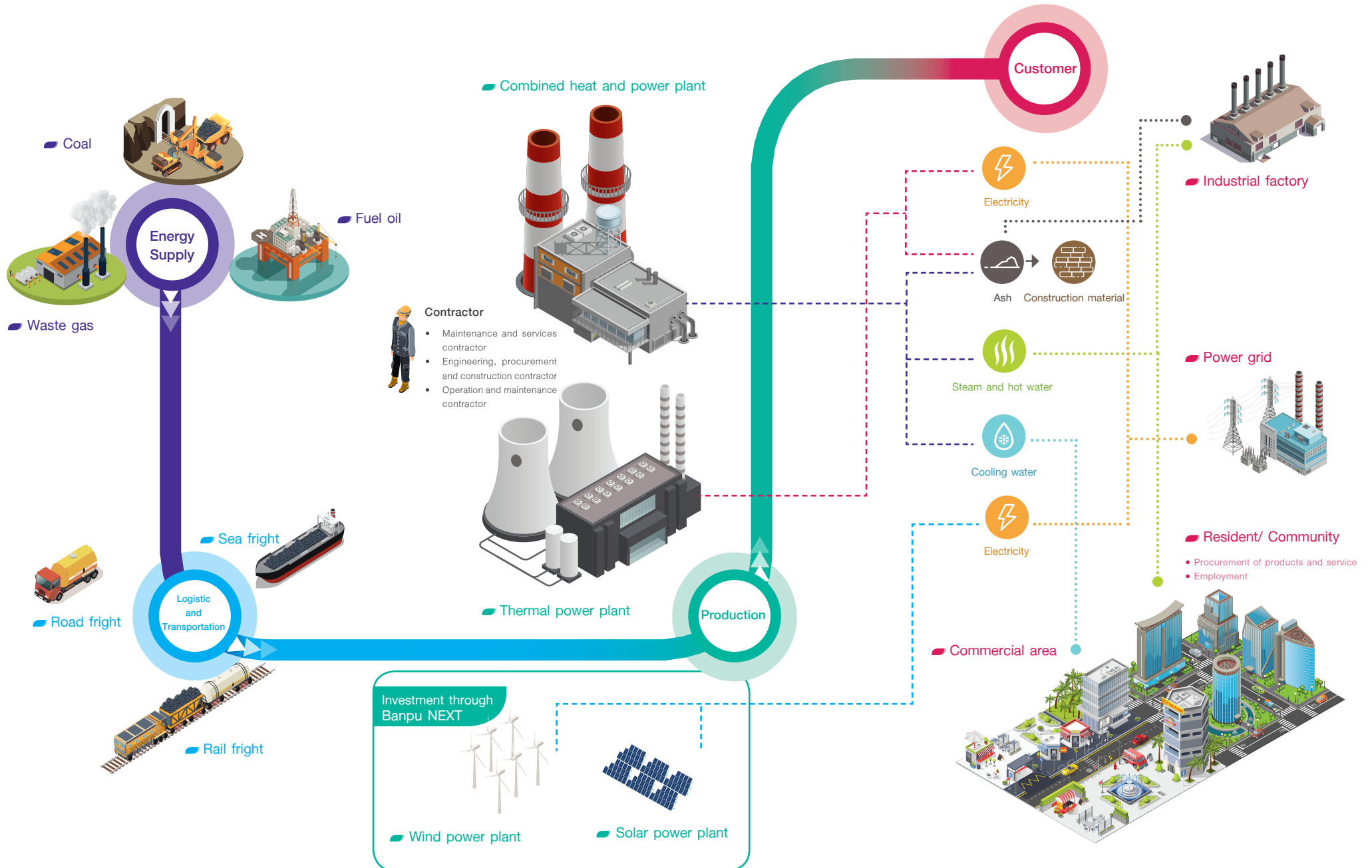
**12** Solar Power Plants  
**20-50%** Ownership  
 Gross: **88** MW

**3** Solar Development Projects  
**20-50%** Ownership  
 Gross: **132** MW

	Coal-fired Power Plant	Solar Power Plant	Wind Power Plant	
Operational control				} Operating asset
No management control				
Operational control				} Asset under development
No management control				

As of December 31, 2020

# Banpu Power Supply Chain



# About This Report

Banpu Power Public Company Limited (BPP) has developed the sustainable development report (Report) annually. This Report has been created for the third consecutive year with an aim to disclose management approach and operating results particular to the material topics relating to environment, social and governance (ESG) of BPP, previously disclosed in the sustainable development report of Banpu Group.

The Report has been initiated in accordance with the Global Reporting Initiatives Standards (GRI Standards): Core Options with additional indicators for electric utilities sector disclosures. Meanwhile the operational performance has been presented correspondingly to the Sustainable Development Goals (SDGs). Additionally, the financial information disclosed has complied with the Thai Financial Reporting Standards. More importantly, the contents published in this Report have been scrutinized by assessing 31 sustainability issues of the power business, 14 topics of which are related to the core sustainability materials.



## REPORTING PERIOD

This Report includes the operational performance during the 2020 fiscal year starting from 1<sup>st</sup> January - 31<sup>st</sup> December 2020. Ongoing activities within the first quarter of 2021 are also encompassed in order to keep the most updated information for readers,



## REPORTING BOUNDARY

BPP reports its sustainability performance, covering business entities in which it has greater than 50% of shares and direct management control. The contents in this Report therefore were enclosed with all material topics involved with the thermal power business of three combined heat and power (CHP) plants in China and Headquarters in Thailand. The businesses that have not yet commenced commercial operations, however, are not reported.

The renewable energy business in China, Japan and Vietnam, however, saw significant changes in the year 2020 - the business entity amalgamated with the energy technology business; the establishment of Banpu NEXT Company Limited in which Banpu Public Company Limited and Banpu Power Company Limited hold equal shares of 50% each. Therefore, the sustainability performance of the renewable energy business in the aforementioned countries was not reported in this Report.

Since BPP has less than 50% of investments and no direct management control in BLCP Power Plant in Thailand and HPC Power Plant in Lao PDR, the supervision is relying on the Board of Directors of each company. Hence, the sustainability performance of these power plants is not included in the operating results of BPP. As the two power plants have played significant roles in generating income, some of their sustainability performances are disclosed based upon stakeholders' interests.



## ASSURANCE

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

- GRI 302-1 Energy consumption within organization
- GRI 302-3 Energy intensity
- 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
- GRI 305-2 Energy indirect (Scope 2) GHG emissions
- GRI 305-4 GHG emissions intensity
- GRI 305-6 Emissions of ozone-depleting substances (ODS)
- GRI 305-7 Nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), and other significant air emissions (NO<sub>x</sub>, SO<sub>x</sub>, PM and Hg)
- GRI 306-2 Waste by type and disposal method
- GRI 306-4 Transport of hazardous waste
- GRI 403-1 Occupational health and safety management system (2018)
- GRI 403-2 Hazard identification, risk assessment, and incident investigation (2018)

- GRI 403-3 Occupational health services (2018)
- GRI 403-4 Worker participation, consultation, and communication on occupational health and safety (2018)
- GRI 403-5 Worker training on occupational health and safety (2018)
- GRI 403-6 Promotion of worker health (2018)
- GRI 403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships (2018)
- GRI 403-8 Workers covered by an occupational health and safety management system (2018)
- GRI 403-9 Work-related injuries (2018)
- Lost Time Injury Frequency Rate (LTIFR) and Injury Severity Rate (ISR)

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

# Summary of Major Changes and Development

## February

Banpu NEXT Co., Ltd. (Banpu NEXT) was established as the important business base for clean energy operations and energy technology development. BPP and Banpu each holds 50% of the issued shares. Banpu NEXT has a registered capital of THB 7,919 million.



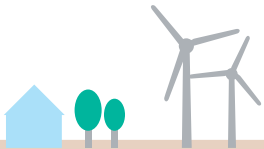
## June

Banpu NEXT established a new subsidiary, namely Banpu NEXT Green Leasing Co., Ltd. to provide energy services for rental and leasing as well as electric vehicles related businesses.



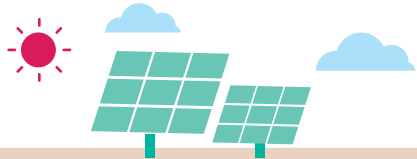
## July

Banpu NEXT signed an agreement to buy the 37.6 MW EI Wind Mui Dinh Wind Power Plant in Vietnam. With an investment value of USD 66 million, the plant commenced its commercial operation on 23 April 2019. This wind energy investment is in the process of complying with conditions involved with the contract and approvals from relevant government agencies.



## November

Banpu NEXT commenced the commercial operation of Yamagata Solar Power Plant in Japan. With a total production capacity of 20 MW, the power plant is located in Yamagata Prefecture. This solar power plant can generate power supplied to approximately 5,000 households in the community. The plant was later renamed as the 'Kawanishi Dahlia Solar Power Plant' so as to make it familiar to communities in the area.



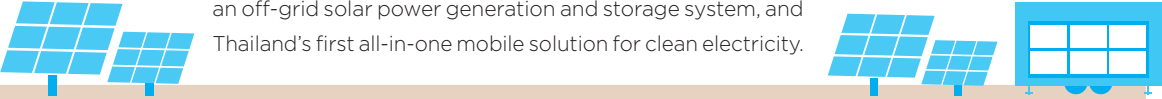
Banpu NEXT launched the 'Banpu NEXT e- Ferry', the first ever sea e- Ferry for tourism of Thailand.

## December

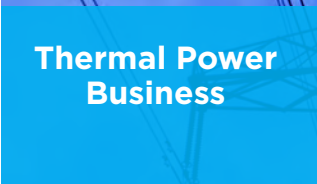



Banpu NEXT started the commercial operation of Yabuki Solar Power Plant in Japan, located in Fukushima Prefecture, with a total capacity of 7 MW.



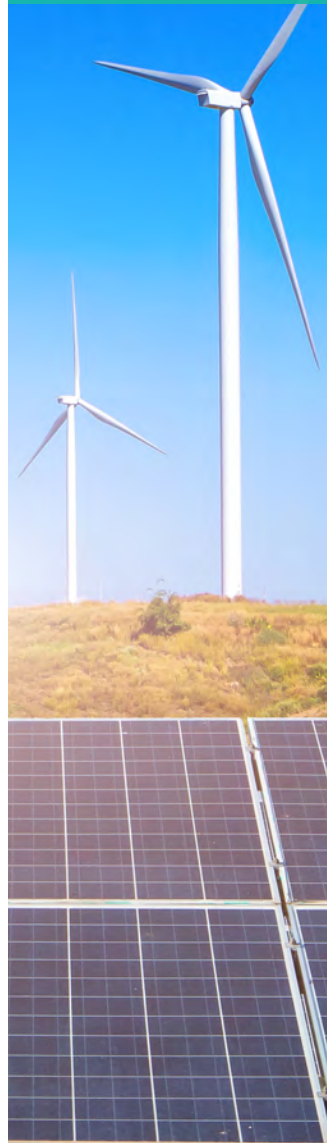
Banpu NEXT launched the 'Banpu NEXT e-Prompt Move', an off-grid solar power generation and storage system, and Thailand's first all-in-one mobile solution for clean electricity.







# Challenges and Opportunities

	Country	Challenges and Opportunities	Banpu Power's Strategies
 <p><b>Thermal Power Business</b></p>	 Thailand	<ul style="list-style-type: none"> <li>The improvement of Thailand's power development plan, which considered the targets to purchase renewable power on an annual basis, taking into account the fuel consumption potential as well as available infrastructure in each region, including risks possibly arisen from disruptive technology.</li> <li>Focusing on environmental impacts with stricter standards with a target to reduce the power generating emissions by 0.46 kgCO<sub>2</sub>e/ kWh in accordance with the COP21 agreement.</li> </ul>	<ul style="list-style-type: none"> <li>Conducting a study on details and impacts from changes of related policies, including looking for investment opportunities and assessing competitive advantages as well as preparing to participate in various projects open for development by the government sector.</li> <li>Operating businesses corresponding to the market conditions through managing costs and increasing production efficiency as well as maintaining equipment in accordance with the environmental standards, inclusion of monitoring and investigating the environmental impacts possibly arisen.</li> </ul>
	 Lao PDR	<ul style="list-style-type: none"> <li>The Lao government putting great emphasis on reforming the country into the ASEAN energy source (Battery of ASEAN) and being the major power exporter of the region.</li> <li>An urbanization development and a continuous infrastructure improvement in the country.</li> </ul>	<ul style="list-style-type: none"> <li>Managing the power transmission and generating systems to ensure that the power plants have the utmost availability and efficiency at all times, which is important for the electricity systems of both Thailand and Lao PDR.</li> <li>Promoting a community engagement in the area in tandem with an improvement of local people's living standards and a support for occupational development, inclusive of consistently managing relationships with local agencies and communities.</li> </ul>
	 China	<ul style="list-style-type: none"> <li>The national energy plan still maintaining proportion of the coal- fired power generation at 30% of the additional power generating capacity in order to meet the country's peak demand for electricity.</li> <li>The growing manufacturing and service sectors affecting economic growth and demand for electricity in each local area.</li> <li>Announcement of a climate change policy with a long- term target on becoming a carbon neutral country by the year 2060 and a set- up of formation and regulations on the Emission Trading Scheme (ETS) to be effective in 2021.</li> <li>Establishing measures to improve air quality by continuously reducing the number of pollutants released into the atmosphere.</li> </ul>	<ul style="list-style-type: none"> <li>A readiness to adjust sales of electricity, steam, hot water, and chilled water either in the summer season or according to market conditions, inclusion of a plan to expand the power generating capacity to increase the power plant's availability in producing and supplying both power and steam.</li> <li>Efficiency enhancement and strict cost control by having a strategy to purchase and reserve coal at the right time.</li> <li>Assessing the greenhouse gas (GHG) emissions from the three combined heat and power (CHP) plants and improving the energy efficiency in order to maintain the GHG emission level set by the government as well as seeking opportunities to participate in the ETS.</li> <li>Keeping ultra- low emissions of air quality released from stacks in order to be an example of power plant using advanced and environmentally friendly technology contributing the economic and environmental protection values to society.</li> </ul>

## Renewable Power Business



Country	Challenges and Opportunities	Banpu Power's Strategies
 Thailand	<ul style="list-style-type: none"> <li>Allocation of new renewable power plants according to the government's promotion policy, such as the community waste power plants, Pracharat biomass power plant projects, the public sector's solar energy projects, including the transmission system development plan to enhance the power system stability and efficiency, being the grid connection center and linking with the distribution system in order to be able to accommodate renewable energy in the future (Grid modernization)</li> <li>Promoting a tangible utilization of clean energy and creating the integrated clean energy consumption ecosystem.</li> </ul>	<ul style="list-style-type: none"> <li>Seeking investment opportunities and assessing competitive advantages, inclusion of preparation for participating in various projects open by the governmental sector.</li> <li>Signing the memorandum of understanding (MOU) with private and government agencies, such as the Office of Property Management, Chulalongkorn University. Phuket Smart City Development Project, for cooperation on the feasibility studies on creating the integrated clean energy consumption ecosystem, for example the installation of a solar power generation system and laying of the intelligent power transmission line system, conducting a study on energy storage systems to enhance the energy consumption capacity appropriately.</li> </ul>
 China	<ul style="list-style-type: none"> <li>A policy to reduce the subsidies for renewable energy to support the project development using advanced and high- quality technology as well as reducing dependency on governmental subsidies.</li> <li>Preparedness for formulating and regulating the GHG emission reduction credit (China Certified Emission Reduction or CCER).</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring policies of the government and other related agencies to assess the investment opportunities and the appropriateness of technologies used for the maximum efficiency of power generation.</li> <li>Conducting studies in order to look for opportunities to participate in the CCER projects from solar power plants.</li> </ul>
 Japan	<ul style="list-style-type: none"> <li>Japan's energy development plan is clear with a target to increase the proportion of electricity consumption from renewable energy by 22- 24% by the year 2030.</li> <li>Having lowered the feed- in tariff (FiT) scheme and adjusted the solar energy's purchase prices from the FiT scheme throughout the project life- cycle to the auction scheme since 2017.</li> <li>Regulatory changes for the solar power plants' development for example, a project with a production capacity of more than 40 MW is required for reporting the environmental impact assessment (EIA) results, effective April 2020.</li> </ul>	<ul style="list-style-type: none"> <li>Preparedness for assessing the investment opportunities and project development as well as conducting feasibility studies on investing in the solar rooftop installation business and the virtual power plants, including the energy trading platform via digital and internet networks in Japan.</li> <li>Conduction studies on details and impacts from policy and regulatory changes by relevant government agencies, inclusive of analyzing the impacts on projects under a continuous development in order to enable the power plant projects to commence their commercial operations as planned.</li> </ul>
 Vietnam	<ul style="list-style-type: none"> <li>Supporting an increase in renewable power production proportion, targeting the installed production capacity from solar and wind energy at 21% of the total installed capacity by year 2030.</li> <li>Presently, the Feed- in Tariff (FiT) scheme offers a fixed purchased price throughout the project's life cycle. However, such a FiT scheme will be binding on the projects operated within the specified period.</li> <li>Adjusting the solar power purchase from the FiT scheme to the auction scheme.</li> </ul>	<ul style="list-style-type: none"> <li>Studying primary data and thoroughly evaluating the possibility to seek additional investment opportunities as well as following up the project development progress able to commence commercial operations as planned by engaging consultants in various fields, such as engineering and environmental experts, legal counsels, financial advisors, and accounting and tax specialists, etc.</li> </ul>

# Corporate Governance

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

## Corporate Governance Structure

The Board of Directors structure of Banpu Power Company Limited is comprised of nine members, divided into three Independent Directors, three Non-executive Directors and three Executive Directors.



In addition, there are three sub-committees namely, the Corporate Governance and Nomination Committee, the Audit Committee, and the Compensation Committee, respectively. The Independent Directors shall serve a term of office no more than nine years or three consecutive terms while those nominated as the company's Directors shall be directors of listed companies not exceeding five firms. Moreover, a resolution at a meeting of the Board of Directors must have a quorum of no less than two-thirds of the whole Board members.

BPP has set a meeting between the independent directors and non-executive directors without attendances of executive directors and its management once a year. In 2020, the aforementioned meeting was convened on 3 October 2020 to provide an opportunity for free discussions on various issues or expressing opinions regarding the effective business management. In addition, the Board of Directors stipulates that the Chairman of the Board and the CEO must not be the same person. Accordingly, BPP has clearly separated duties of the Board of Directors and management. The Board of Directors appoints and assigns the CEO to be responsible for business operations, development and implementation of strategies. Whereas, the CEO delegates his/her authority to the next level executives of both domestic and international business units to ensure a balance between the corporate governance and management.



	The Corporate Governance and Nomination Committee	The Audit Committee	The Compensation Committee
<b>Board of Directors</b>	3	3	3
• Executive Directors	-	-	1
• Non-executive Directors	2	-	1
• Independent Directors	1	3	1
<b>Related Charters</b>	The Charter of the Corporate Governance and Nomination Committee	The Charter of the Audit Committee	The Charter of the Compensation Committee
<b>Major Responsibilities</b>	<ul style="list-style-type: none"> <li>Determining the policy and practice guidelines regarding Corporate Governance and business ethics.</li> <li>Following up the implementation of policies and practice guidelines in the framework of Code of Conduct.</li> <li>Recruiting and nominating persons to be the Directors, Chief Executive Officers and Executive Officers.</li> <li>Monitoring a succession plan of senior executives.</li> </ul>	<ul style="list-style-type: none"> <li>Reviewing the financial statements, internal control and risk management systems as well as law and regulatory compliances.</li> <li>Examining action plans and performances of the Internal Audit Office.</li> <li>Considering the information disclosure of BPP in case of connected transactions or conflicts of interest.</li> <li>Governing BPP to duly comply with the anti-corruption policy.</li> <li>Selecting and appointing as well as terminating the auditor, including proposing for consideration of the Company's auditor remuneration.</li> <li>Considering the action plans, operating performances, budgets, and manpower of the Internal Audit Office.</li> <li>Continuously review and monitor significant risks management from the Risk Management Committee.</li> </ul>	<ul style="list-style-type: none"> <li>Providing suggestions on compensation management and other benefits for the Board of Directors, the sub-committees and the CEO.</li> <li>Reviewing the overall compensation and salary structure and annual bonus.</li> </ul>



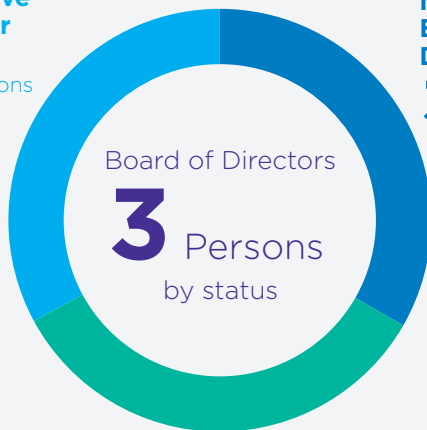
## Board of Directors Selection

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

### Composition of the Board of Directors

**Executive Director**  
**3** Persons

**Non Executive Director**  
**3** Persons



**Independent Directors** **3** Persons

Board of Directors  
9 persons  
by gender

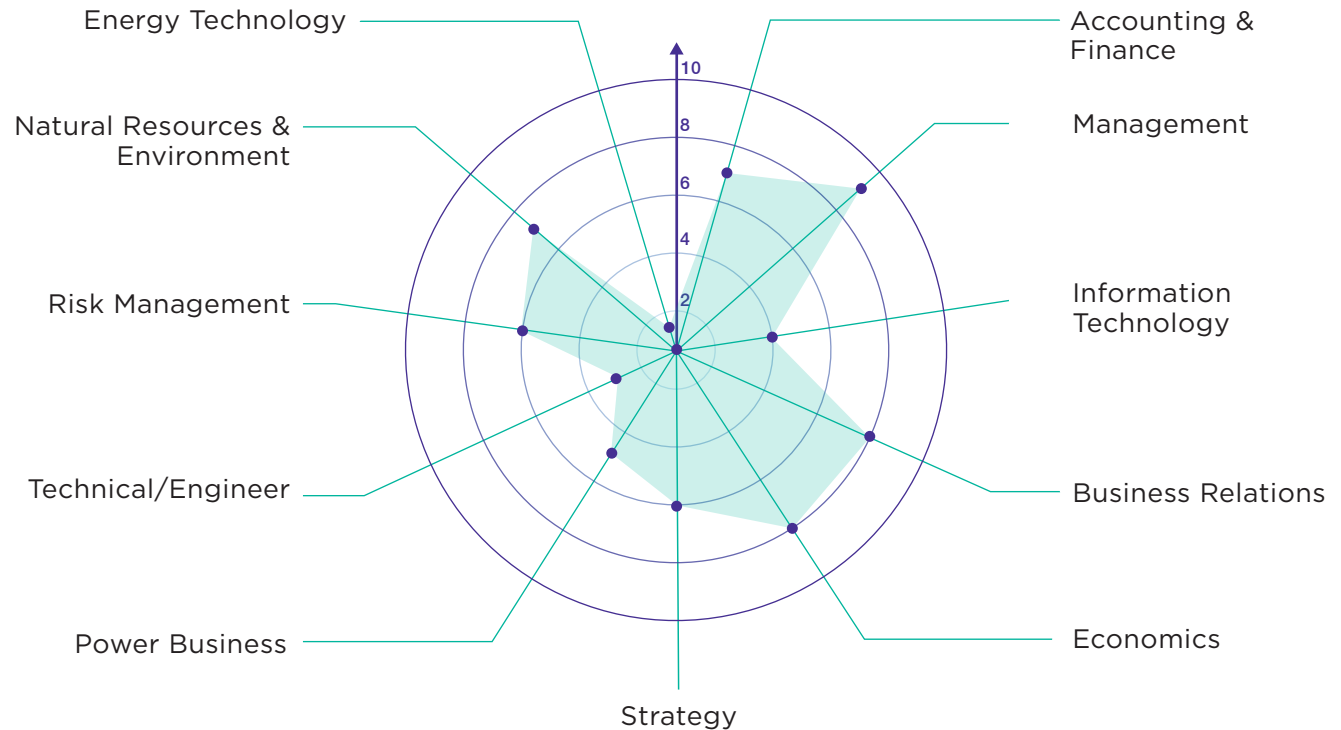


Male **8** persons



Female **1** person

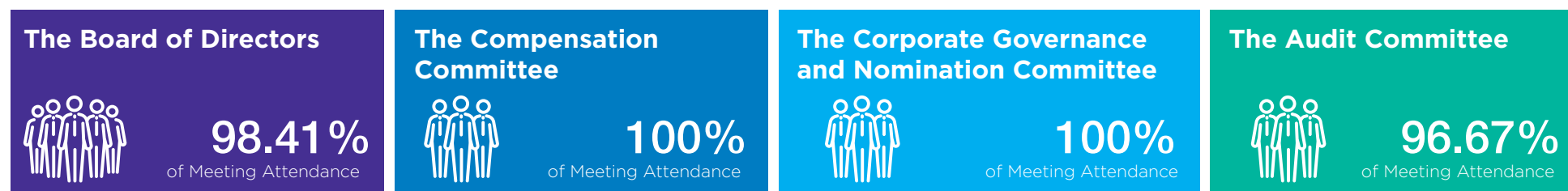
## Board Skill Matrix



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

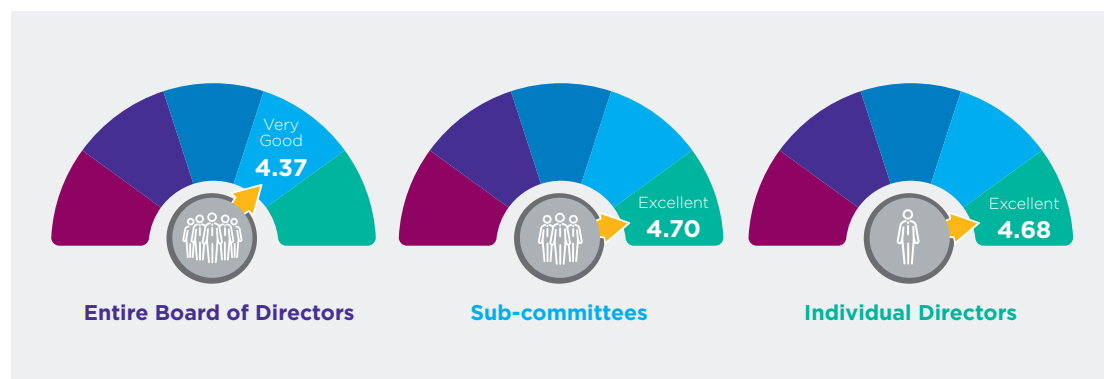
## Board Meeting Attendance

In 2020, Directors consistently attended the Board of Directors meetings and three sub-committee meetings as follows:



## Board of Directors Performance Evaluation

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



## Board of Directors Competency Development

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

Program	Organizer	Number of Attending Directors
The Training Course: Director Certificate Program (DCP): Class 294/2020	Thai Institute of Directors (IOD)	1
The Seminar titled 'Update the Trends for Energy Generation Markets and Investment Opportunity'	BPP	9
The Seminar on 'Board effectiveness in accordance with New CG Code'	BPP	8
The 'Global Megatrends' Seminar	BPP	9

# Sustainability Governance

BPP is committed to operating the energy business at the heart of right innovation and technology in order to deliver the affordable, reliable and eco- friendly energy, creating values for economic and social development. In addition to continuously operational efficiency improvement, BPP has increased its potential to adapt itself to the today's rapid changes, in particular the Coronavirus 2019 (COVID- 19) outbreak. The COVID- 19 epidemic is a significant test for the company to develop strategies and lay down a foundation for the sustainable development by taking into account the value creation for stakeholders in the long run. It is expected that the company's operations will be a part of supporting the sustainable development in all areas where BPP has operated.



## AFFORDABLE

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



## RELIABLE

- Business ethics
- Risk management
- Employee management and competency development

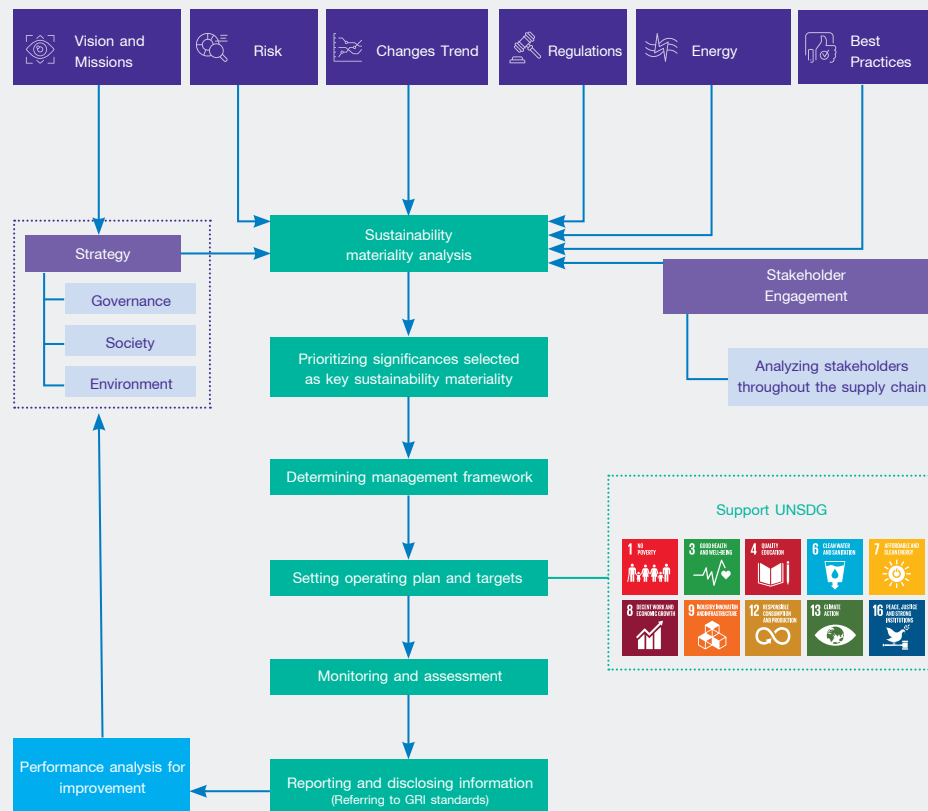


## ECO- FRIENDLY

- Employment of eco- friendly standards and technologies
- Stakeholder and surrounding community engagement
- Occupational health and safety

## Sustainability Policy and Strategy

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



### ■ Creating Competitive Advantages

- **Human Resources Development:** BPP has developed professionalism as well as enhanced competencies and leaderships of its employees so that they can adapt themselves to any changes, including promoting a cross-functional collaboration through a corporate culture. Thus, they have learnt to know each other.
- **Process Development:** Banpu Power has focused on operational excellence through innovation and continuous improvement since the effective procedure will help reducing natural resources consumption and waste generation as well as enhancing competitive advantages. Additionally, the efficient risk management will make the management and monitoring processes as well as a decision making better.
- **Products:** Delivering valuable products and services with stability, reliability, environmentally friendly and reasonable prices.

### ■ Creating Values for Stakeholders

- **Legal Compliance:** BPP has conducted its business with good corporate governance and code of conduct. It has also fully complied with various laws and regulations as well as applied to the international best practice standards.
- **Occupational Health and Safety:** A safe working environment has been created for employees and those involved.
- **Environment:** BPP has been looking for opportunities to develop renewable energy projects, use clean technology, and reduce negative environmental impacts through an effective environmental management system, while lowering resource consumptions and waste generations as well as promoting the efficient resource utilization with maximum benefits.
- **Society:** BPP has governed its business with transparency and social responsibility, respecting to stakeholders' human rights, strengthening relationships and acceptance from the communities through the effective stakeholder engagement process. Additionally, the sustainable values have been created via taxation for development, employment, and community development projects focusing on learning and self-reliance.

## Sustainable Development Committee Structure

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



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

## Sustainability Performance Assessment

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

- The Board of Directors Performance Appraisal  
BPP has determined to evaluate the Board of Directors performance once a year through self-assessments divided into 3 levels as follows:
  - The individual performance appraisal
  - The whole Board's performance review
  - The sub-committees' performance evaluation
- The performances of chief executive officer (CEO) and top management have been assessed against the annual and long- term targets twice a year, with contributions related to environmental, social and corporate governance (ESG), namely:
  - Carrying out operations by maintaining the availability factor (AF) of the power plants to meet the annual target set in order to manage the returns on projects and maintain the production efficiency. This in turn, will contribute to an increase of resource consumption efficiencies such as fuel, water, etc.
  - Keeping the ESG performance at the national level and being a member of Thailand's Private Sector Collective Action Coalition Against Corruption (CAC).
  - Fully complying with laws with no incidents involved with violations of both local and international ESG laws.
  - Implementing occupational health and safety operations without serious work-related accidents, no work -related fatalities of employees and contractors, and no lost time injury frequency rate (LTIFR).
  - Executing environmental operations, fully complying with environmental laws, maintaining environmental quality as required by laws, including managing the business units BPP has management control in order to emit a greenhouse gas (GHG) of no more than 0.676 tonnes CO<sub>2</sub>e/ MWh and consume water lower than 0.868 cubic meters/ MWh.
  - Establishing employee engagement, recruiting and developing employee competencies according to the 'Greener Smarter' strategy.
  - Creating stakeholder engagement across multiple channels.

- Conducting the employee and executive performance reviews twice a year via the key performance indicators (KPI) in two aspects – operating performance and behaviors relating to corporate culture promotions.
- Coordinating with Banpu Group to analyze the performance in comparison with the best practices or standards of the industry group (Gap Analysis) for example, the analysis for better improvement via various sustainability assessment tools including the Dow Jones Sustainability Index (DJSI), the Carbon Disclosure Project (CDP), the environmental, social and governance (ESG) assessment, and the annual sustainability assessment by the Stock Exchange of Thailand, etc.



### Sustainability Recognition

In 2020, Banpu Power has been listed on Thailand Sustainability Investment (THSI) for the third consecutive year from the Stock Exchange of Thailand. This has demonstrated our continued commitments to environmental, social responsibility and good corporate governance.



### September - October 2020

BPP conducted the ESG risk assessments, including climate change, water and human rights in all business units and the joint-venture HPC Power Plant.



### 7 October 2020

Due to the COVID-19 epidemic, BPP organized the online conference on occupational health, safety, environment and community development as well as sustainable development or the 'Banpu Group HSEC Summit 2020', where the sustainability strategies and targets for years 2021- 2025 were presented by management of each business unit.



### 27 October 2020

BPP held the sustainability workshop at Bangkok Office by inviting the leading sustainability consultants to share experiences relating to the 'Task Force on Climate-related Financial Disclosures' (TCFD) involved with climate change risks, inclusion of impacts on and opportunities for business operations.



### December 2020

BPP launched the BLiNK application, at the Digital Product Showcase. BLiNK is an application BPP developed to assist in collecting and analyzing its sustainability data. The data about human resource management and employee competency development were a pilot project using this application.



# Stakeholder Engagement

For considering on its sustainability materiality, BPP has focused on creating engagements with all sectors of stakeholders (Inclusiveness). This is to identify the materiality significantly to its operations and stakeholders, as well as key materiality management, inclusion of a transparent disclosure of operational information (Responsiveness) in accordance with the practice framework referring to the international AA 1000 Stakeholder Engagement Standard (AA1000SES).

On account of its operations investing/ having investments in various joint- venture companies, the stakeholder participation is collected from analytical results of various business units, such as discussions with stakeholders by involved employees. Then these data are analyzed at the organizational level again.



## Stakeholder Analysis Procedures



**1. Identifying stakeholders** involved with company's operations, both inside and outside the organization.



**2. Specifying the impact levels of BPP on stakeholders**, covering environmental, social and governance areas/ aspects.



**3. Determining the stakeholders' influencing degrees on BPP**, such as finance, operations, rules and regulations, reputation and strategies, etc.



**4. Grouping stakeholders** in order to classify them according to the impact level on BPP, and the degree of stakeholders' influences.



**5. Prioritizing stakeholders' significances** to determine the appropriate engagement channel for each stakeholder group.

## Engagement Channels and Materiality Interested by Stakeholders

Stakeholders	Engagement Channels	Issues of Attentions	Reporting Topics
Employees	<ul style="list-style-type: none"> <li>• A conduction of employee engagement survey</li> <li>• Banpu Heart corporate culture survey</li> <li>• Establishment of the Welfare Committee</li> <li>• A set up of the Occupational Health and Safety Committee</li> <li>• Instituting the Innovation Committee</li> <li>• Organizing CSR activities</li> <li>• Organizing Banpu Heart activities</li> <li>• Opening channels for receiving complaints</li> <li>• Employing a performance appraisal system</li> <li>• Dissemination of public relations (PR) news within the organization</li> <li>• Developing annual reports and sustainability reports</li> <li>• Publishing information on the website</li> </ul>	<ul style="list-style-type: none"> <li>• Business directions and the organization's sustainable growth</li> </ul>	<ul style="list-style-type: none"> <li>• Challenges and opportunities</li> </ul>
		<ul style="list-style-type: none"> <li>• Corporate business ethics and responsibilities on employees.</li> </ul>	<ul style="list-style-type: none"> <li>• Business ethics</li> </ul>
		<ul style="list-style-type: none"> <li>• Fair compensation</li> <li>• Performance appraisal</li> <li>• Career growth</li> <li>• Competency development</li> <li>• Participation in decision- making and giving opportunities for employees to express their opinions</li> <li>• Work-life balance</li> </ul>	<ul style="list-style-type: none"> <li>• Corporate culture</li> <li>• Employee engagement</li> <li>• Competency and leadership development</li> </ul>
		<ul style="list-style-type: none"> <li>• Working environment and work safety</li> </ul>	<ul style="list-style-type: none"> <li>• Occupational health and safety</li> </ul>
Government Sector	<ul style="list-style-type: none"> <li>• Conducting a satisfactory survey</li> <li>• Meetings and call on various occasions</li> <li>• Site visits and operation inspections</li> <li>• Submission of various reports and information as required by laws</li> <li>• Disclosure of information requested.</li> <li>• Participation in various projects organized by the government</li> <li>• Developing annual reports and sustainability reports</li> <li>• Dissemination of information on the website</li> </ul>	<ul style="list-style-type: none"> <li>• Creating environmental, social and governance (ESG) values</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainability governance</li> </ul>
		<ul style="list-style-type: none"> <li>• Corporate governance according to business ethics / code of conduct</li> </ul>	<ul style="list-style-type: none"> <li>• Corporate governance</li> <li>• Anti- corruption</li> </ul>
		<ul style="list-style-type: none"> <li>• Legal and regulatory compliance</li> </ul>	<ul style="list-style-type: none"> <li>• Compliance</li> </ul>
		<ul style="list-style-type: none"> <li>• Making the utmost benefit of natural resources</li> </ul>	<ul style="list-style-type: none"> <li>• Process improvement and innovation</li> </ul>
		<ul style="list-style-type: none"> <li>• Supply chain management</li> </ul>	<ul style="list-style-type: none"> <li>• Supplier management</li> <li>• Contractor management</li> <li>• Customer management</li> </ul>
		<ul style="list-style-type: none"> <li>• Managing the ESG impacts possibly arisen from operating business.</li> </ul>	<ul style="list-style-type: none"> <li>• Greenhouse gas (GHG) emissions</li> <li>• Air quality</li> <li>• Water resource utilization &amp; water discharged</li> <li>• Waste</li> </ul>



Stakeholders	Engagement Channels	Issues of Attentions	Reporting Topics
Customers	<ul style="list-style-type: none"> <li>• A joint meeting to determine the work plan and understand the market situation to determine the delivery as targeted</li> <li>• A meeting between operators to share their experiences on operating the power plants and managing contracts</li> <li>• Visiting customers to learn about their problems and find ways to improve them</li> <li>• Disclosing information as requested</li> <li>• Running a customer satisfaction survey</li> <li>• Establishing a mechanism for receiving complaints via multiple channels such as by telephone, website.</li> </ul>	<ul style="list-style-type: none"> <li>• Availability of power supply</li> <li>• Quality and prices</li> <li>• Business continuity management</li> <li>• Environmental impact management</li> </ul>	<ul style="list-style-type: none"> <li>• Customer management</li> <li>• Business ethics</li> <li>• Compliance</li> <li>• Risks management</li> <li>• Business continuity management</li> <li>• Availability and reliability</li> <li>• Process improvement and innovation</li> </ul>
Suppliers	<ul style="list-style-type: none"> <li>• Disclosure of procurement information via the website or applications</li> <li>• Organizing a meeting with suppliers</li> <li>• Conducting a satisfaction survey</li> </ul>	<ul style="list-style-type: none"> <li>• Procurement and returns</li> <li>• A fair selection process</li> <li>• Business opportunities for joint working</li> </ul>	<ul style="list-style-type: none"> <li>• Supplier management</li> <li>• Business ethics</li> </ul>
Contractors	<ul style="list-style-type: none"> <li>• A work plan meeting</li> <li>• Organizing a training for building contractors' capacity and working safety</li> <li>• Conducting a satisfactory survey</li> </ul>	<ul style="list-style-type: none"> <li>• An operation/ maintenance outage plan</li> <li>• Business opportunities for joint working</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor management</li> <li>• Business ethics</li> </ul>
		<ul style="list-style-type: none"> <li>• Working safety</li> </ul>	<ul style="list-style-type: none"> <li>• Occupational health &amp; safety</li> </ul>
Communities	<ul style="list-style-type: none"> <li>• Conducting a community opinion survey</li> <li>• Surveying primary information and community opinions before the project's commencement</li> <li>• Providing channels for receiving grievances over the phone and on the website</li> <li>• A meeting with the community</li> <li>• Establishing a joint development committee with the community.</li> <li>• Organizing community relation activities and conducting joint activities with communities.</li> <li>• Visiting the operations of BPP</li> <li>• Preparation of annual reports and sustainability reports</li> <li>• Dissemination of information on the website</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental management</li> </ul>	<ul style="list-style-type: none"> <li>• Air quality</li> <li>• Water resource utilization and water discharge</li> <li>• Waste</li> </ul>
		<ul style="list-style-type: none"> <li>• Community development programs</li> <li>• Corporate social responsibility</li> </ul>	<ul style="list-style-type: none"> <li>• Community engagement</li> </ul>

Stakeholders	Engagement Channels	Issues of Attentions	Reporting Topics
Joint- venture Partners Shareholders Investors and Financial Institutions	<ul style="list-style-type: none"> <li>The Annual General Meeting of Shareholders</li> <li>The Board of Directors meetings of subsidiaries and joint venture companies</li> <li>Presentation of investment information on various agendas such as the quarterly meetings, the roadshows to present information and answer questions, etc.</li> <li>Organizing the analyst meetings</li> <li>A presentation of information at the Opportunity Day event organized by the Stock Exchange of Thailand</li> <li>Opening channels for receiving complaints</li> <li>Organizing a satisfaction survey</li> <li>Preparation of the annual and sustainability reports</li> <li>Dissemination of information via the website</li> </ul>	<ul style="list-style-type: none"> <li>Operational performances, project development and business growths</li> <li>Financial and accounting policies</li> <li>Cash flow Management</li> <li>Cost control</li> <li>Accurate and complete financial information within a period of time</li> </ul>	<ul style="list-style-type: none"> <li>Business growth</li> </ul>
		<ul style="list-style-type: none"> <li>Risks management</li> </ul>	<ul style="list-style-type: none"> <li>Risks management</li> <li>Business continuity management</li> </ul>
		<ul style="list-style-type: none"> <li>Business operation transparency</li> </ul>	<ul style="list-style-type: none"> <li>Business ethics</li> <li>Anti-corruption</li> </ul>
		<ul style="list-style-type: none"> <li>Developing and innovating to enhance competitive advantages</li> </ul>	<ul style="list-style-type: none"> <li>Availability and reliability</li> <li>Process improvement and innovation</li> </ul>
		<ul style="list-style-type: none"> <li>Qualifications of the Board of Directors and executives as well as compensations</li> </ul>	<ul style="list-style-type: none"> <li>Corporate governance</li> </ul>
		<ul style="list-style-type: none"> <li>Operating businesses contributing values for the society and environment.</li> </ul>	<ul style="list-style-type: none"> <li>Sustainability governance</li> </ul>
Press/ Mass Media	<ul style="list-style-type: none"> <li>Disclosure of operational progress through circular letters.</li> <li>Organizing a press conference</li> <li>A media visit to the operations of BPP</li> <li>Developing the annual reports and sustainability reports</li> <li>Dissemination of information on the website</li> </ul>	<ul style="list-style-type: none"> <li>Business progress news, project development and operational performances</li> </ul>	<ul style="list-style-type: none"> <li>Business growth</li> <li>Challenges and Opportunities</li> </ul>
		<ul style="list-style-type: none"> <li>Transparency, timeliness and equality in information disclosure</li> </ul>	<ul style="list-style-type: none"> <li>Business ethics</li> </ul>
		<ul style="list-style-type: none"> <li>Legal and regulatory compliance</li> </ul>	<ul style="list-style-type: none"> <li>Compliance</li> </ul>
		<ul style="list-style-type: none"> <li>Social responsibility</li> </ul>	<ul style="list-style-type: none"> <li>Community engagement</li> </ul>
Public Sector	<ul style="list-style-type: none"> <li>Visiting the operations of BPP</li> <li>Developing the annual reports and the sustainability reports</li> <li>Dissemination of information on the website</li> </ul>	<ul style="list-style-type: none"> <li>Creating economic and social values</li> </ul>	<ul style="list-style-type: none"> <li>Sustainability governance</li> </ul>
		<ul style="list-style-type: none"> <li>Making the utmost utilization of natural resources</li> </ul>	<ul style="list-style-type: none"> <li>Process improvement and innovation</li> </ul>
		<ul style="list-style-type: none"> <li>Environmental quality management</li> </ul>	<ul style="list-style-type: none"> <li>Greenhouse gas emissions</li> <li>Compliance</li> <li>Community engagement</li> </ul>

# Materiality Assessment

BPP’s key materiality will be assessed by prioritizing its significances in accordance with the Global Reporting Initiative (GRI) and AA1000 AccountAbility Principles (AA1000AP). The materiality prioritization has been considered based on the importance on BPP, and stakeholders covering environmental, social, and corporate governance (ESG) issues. The significant materiality has been annually reviewed by the Sustainable Development Committee.

## Sources of Sustainability Topics

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

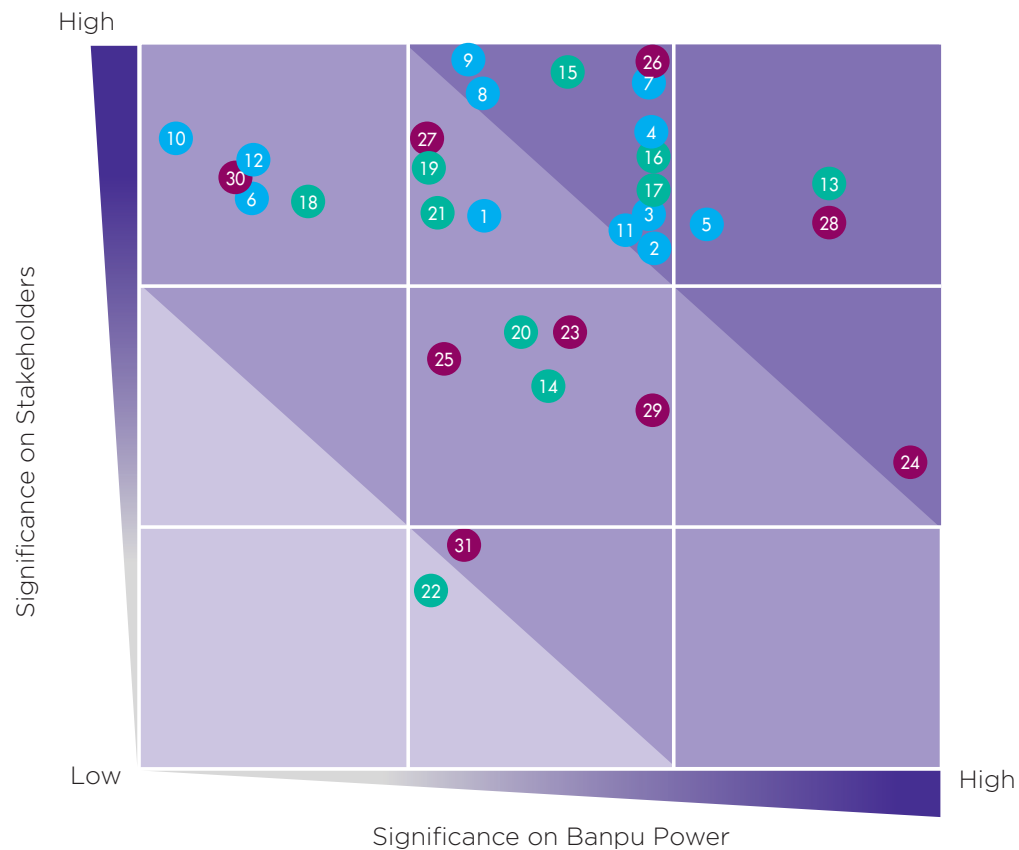
## Materiality Assessment Procedures



## Materiality Matrix

BPP used the 2019 material assessment results in determining the contents of this sustainable development report, while the 2020 sustainable materiality was reviewed. Additionally, the Sustainable Development Committee has raised the significances of two sustainability materiality topics, including;

- **Business continuity management (BCM):** Because BCM is a critical issue involved with the COVID-19 epidemic; and
- **Succession plan development:** Due to the limited numbers of human resources with extensive knowledge and expertise in the power generation business, it is an issue the firms are interested in defining and equipping their human resources with the organization's key positions.



### Governance Topics

1. Financial performance
2. Business ethics
3. Anti- corruption
4. Risk management
5. Business continuity management
6. Access and affordability
7. Process improvement and innovation
8. Supplier management
9. Contractor management
10. Product stewardship
11. Customer management
12. Plant decommissioning

### Environmental Topics

13. Greenhouse gas (GHG) emissions
14. Energy
15. Air quality
16. Water resources utilization
17. Water discharge
18. Non- hazardous waste
19. Hazardous waste
20. Ash
21. Biodiversity
22. Spill

### Social Topics

23. Employee development
24. Succession plan development\*
25. Employee engagement
26. Safety
27. Occupational health
28. Community engagement
29. Corporate social responsibility projects at corporate level
30. Community resettlement
31. Labor management

\* The materiality topics arisen in the year 2020

## Significant Materiality Topics

In 2020, 14 key materiality topics of Banpu Power were summarized and presented in this report as follows:

Significant Materiality Topics in This Report		Material Boundary on Stakeholders									
		Within the Organization		Outside the Organization							
		Employees	Banpu Group	Joint-venture Companies/ Partners	Suppliers	Contractors	Customers	Financial Institutions	Government and Regulatory Agencies	Shareholders/ Investors	Communities
Business Ethics	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Anti- corruption	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Risk Management	4		✓		✓		✓	✓	✓	✓	
Business Continuity Management*	5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Process Improvement and Innovation	7	✓	✓	✓	✓	✓					
Supplier Management	8		✓	✓	✓						
Contractor Management	9		✓	✓		✓			✓		
Customer Management	11		✓	✓			✓				
Greenhouse Gas (GHG) Emissions	13		✓	✓			✓	✓	✓		
Air Quality	15	✓	✓	✓					✓		✓
Water Resource Utilization and Water Discharged	16 17		✓	✓					✓		✓
Competency and Leadership Development*	24	✓	✓	✓							
Occupational Health and Safety	26 27		✓	✓		✓	✓		✓		
Community Engagement	28	✓	✓	✓					✓		✓

\* The materiality topics arisen in the year 2020



# Banpu Power and Sustainable Development Goals





United Nations Sustainable Development Goals (SDGs) is a framework that reflect stakeholders' expectation and directions of policy both internationally and locally in the future.

## SUSTAINABLE DEVELOPMENT GOALS



BPP has established the performance targets aligning with the SDGs as follows:

The United Nations Sustainable Development Goals (SDGs)		Banpu Power's Targets 2021-2025
AFFORDABLE	 <p>7.1 By 2030, ensure universal access to affordable, reliable and modern energy services. 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix. 7.3 By 2030, double the global rate of improvement in energy efficiency.</p>	<ul style="list-style-type: none"> <li>Achieve the power generating capacity target of 5,300 MW comprising of 4,500 MWe from the thermal power generation and 800 MW from the renewable power generation by the year 2025.</li> </ul>
	 <p>12.2 By 2030, achieve the sustainable management and efficient use of natural resources.</p>	

The United Nations Sustainable Development Goals (SDGs)		Banpu Power's Targets 2021-2025
RELIABLE	 <p>8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment.</p>	<ul style="list-style-type: none"> <li>All working place environment comply to regulatory requirements and standards</li> <li>No major incident and occupational illness in employees and contractors               <ul style="list-style-type: none"> <li>0 Fatality</li> <li>0 Lost Time Injury Frequency Rate: LTIFR</li> <li>0 Total recordable injury frequency rate</li> <li>0 High- consequence injury rate</li> <li>100% Working environment regulatory compliance</li> <li>0 fatality caused by occupational ill- health</li> <li>0 Total recordable occupational ill- health frequency rate</li> <li>0 Tier-1 process safety event rate</li> </ul> </li> </ul>
	 <p>16.5 Substantially reduce corruption and bribery in all their forms.</p>	<ul style="list-style-type: none"> <li>Achieve zero incident involving non-compliance, corporate governance and corruption. If there are significant complaints, they must be investigated and resolved with appropriate timeframe through dispute mechanism.</li> <li>Be certified as a member of the Collective Action Coalition Against Corruption (CAC)</li> </ul>
ECO-FRIENDLY	 <p>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.</p>	<ul style="list-style-type: none"> <li>Reduce air emissions intensity of the thermal power plants for ultra-low emissions               <ul style="list-style-type: none"> <li>SO<sub>2</sub> ≤ 0.0776 tonnes/ MWh</li> <li>NO<sub>x</sub> ≤ 1.184 tonnes/ MWh</li> <li>PM ≤ 0.0230 tonnes/ MWh</li> </ul> </li> <li>Water consumption intensity &lt; 0.868 cubic meter/ MWh</li> <li>No significant environmental incident, social incident and fines of non- compliance at all operation assets</li> <li>No significant ESG complaint from communities. All significant complaints must be resolve through dispute mechanism.</li> <li>All thermal power plants in China was certified ISO 14001 (Environmental management system standards)</li> </ul>
	 <p>13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries. 13.3 Improve education, awareness raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.</p>	<ul style="list-style-type: none"> <li>GHG emissions intensity &lt; 0.676 tonnes CO<sub>2</sub>e/ MWh</li> <li>Increase energy generation capacity from renewable energy to 800 MWh</li> <li>Disclose climate change information according to Task Force on Climate-related Financial Disclosures (TCFD)</li> <li>Establish business continuity management system and conduct drill at all operating assets</li> </ul>



Business continuity during  
**COVID-19** with zero infected  
employee



## Governance

Established  
**Banpu NEXT**  
to invest in renewable energy  
and energy technology

EBITDA **5,230** million THB  
increasing **9%** from the previous year

**Availability Factor (AF)**  
of power plants in China

**97.72%**

**25** Operating power plants  
Total operating capacity **2,750** MWe



# Business Growth



## Strategy

- Placing top priority to existing assets management in order to achieve the performance targets.
- Focusing on optimizing profitability and maintaining competitive advantages.
- Looking for major investment opportunities in power and related businesses, including supporting businesses with the acceptable risk appetite level for operating businesses.
- Creating growth for renewable energy and energy technology businesses under Banpu NEXT.

## Indicator

- The power production capacity.
- The project development plan and commercial operation commencement targets.

## Target

- Total production capacity of 5,300 MW by 2025, consisting of 4,500 MWe from thermal power plants and 800 MWe from renewable energy power plants and energy technology.

## Performance

- Total generation capacity of 2,750 MW (equity basis) comprised of 2,403 from thermal power generation, and 347 MW from renewable energy generation.
- Establishing Banpu NEXT Company Limited (Banpu NEXT), a business amalgamation company between Banpu Renewable Energy Company Limited (BRE) and Banpu Inifergy Co., Ltd. (BPIN), with an aim to serve as a major business base in operating clean energy and energy technology businesses.

## Significance and Reporting Boundary

The sustainable development framework is considered as a cornerstone for business operations of BPP in order to create growth and values for the organization and stakeholders in the supply chain as well as being responsible for the environment. The financial performance and growth of BPP has directly and indirectly yielded the fruitful results to our stakeholders, including:

Stakeholders	Economic Benefits	Stakeholders	Economic Benefits
<b>Suppliers and Contractors</b>	<ul style="list-style-type: none"> <li>• Operating expenses</li> <li>• Project development costs</li> </ul>	<b>Shareholders</b>	<ul style="list-style-type: none"> <li>• Dividends</li> </ul>
<b>Employees</b>	<ul style="list-style-type: none"> <li>• Salary, wages and welfares</li> <li>• Contributions for the provident fund</li> <li>• Employee development expenses</li> </ul>	<b>The Government Sector</b>	<ul style="list-style-type: none"> <li>• Taxes such as corporate income tax and local maintenance tax, house and building tax, specific business tax and others</li> </ul>
<b>Financial Institutions</b>	<ul style="list-style-type: none"> <li>• Interest paid and financial expenses</li> </ul>	<b>Communities</b>	<ul style="list-style-type: none"> <li>• Community development projects in the surrounding operational areas.</li> </ul>


BPP has established the practice guidelines for financial development and growth as follows:

- **Developing a business plan to create the organizational growth and maximize returns for shareholders** as well as creating good relations with both public and private sectors in the areas where BPP has operated its business in a long run.
- **Increasing capabilities to create maximum added values** by putting great importance on the power generation and distribution business having to have both stability and environmentally friendly manners as well as considering the appropriateness of using High Efficiency, Low Emissions (HELE) technology.

The management and operating performance data in this report cover the businesses of which BPP has operated as the end of 2020, with a total of 30 power plants and projects in Thailand, Lao PDR., China, Japan and Vietnam. Since BPP has received profit sharing from these joint venture companies including the joint investment enterprises, it has expenses from the projects under development and construction.

## Management Approach

BPP has a management approach to drive towards success according to the organizational key enables as follows.

 <p><b>Operational excellence</b></p>	<ul style="list-style-type: none"> <li>Improving equipment efficiency and maintenance outages as scheduled in the technical and engineering related plans.</li> <li>Paying great attention to increase the operational efficiency of all power plants in order to heighten competitive advantages.</li> <li>Managing project constructions in order to be able to commence the commercial operations as planned and to achieve a return on investment as targeted.</li> </ul>
 <p><b>Financing in accordance with the investment plan</b></p>	<ul style="list-style-type: none"> <li>Managing financing and investments to have the appropriate financial ratios.</li> <li>Taking measures for tight management of financial liquidity along with creating flexibility and a stable cash flow.</li> </ul>
 <p><b>Related legal and regulatory compliance</b></p>	<ul style="list-style-type: none"> <li>Conducting business in strict accordance with rules, regulations and related laws, inclusive of tracking changes in regulations and policies in every country in which BPP has invested.</li> </ul>
 <p><b>Corporate culture promotion and human resources development</b></p>	<ul style="list-style-type: none"> <li>Promoting the “Banpu Heart” corporate culture in order to foster good corporate values and culture together.</li> <li>Laying down the organizational structure appropriately, including developing employee’s leadership skills and encouraging them to play an important role.</li> </ul>

## Performance

In the year 2020, the Company’s business growth performances were as follows:

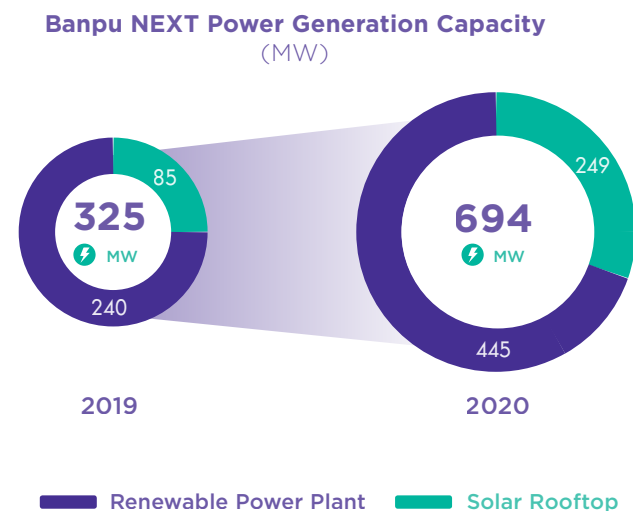
- Total production capacity of 2,750 MW (based on equity basis), including the projects commencing commercial operations (COD) during the year as following:
  - Commencing COD of Yamagata Solar Power Plant, located in Yamagata Prefecture, Japan, with a total production capacity of 20 MW.
  - Starting COD of Yabuki Solar Power Plant, located in Fukushima Prefecture, Japan, with a total power generation capacity of 7 MW.
  - Banpu Next Co., Ltd., an associated company BPP holds 50% of shares, signed a purchase agreement for the 37.6 MW El Wind Mui Dinh Wind Farm in Vietnam.
- Under a construction of Vinh Chau Wind Farm Project in Vietnam with a total production capacity of 30 MW, which will commence its COD by 2021.
- Looking for opportunities for investment expansion in both business conduction and potential countries, including joining forces with Banpu Group to strengthen plans and power business development especially the feasibility study on thermal power plants using advanced and environmentally friendly technologies in both the United States and Vietnam.



## Expansion of Production Capacity to Renewable Energy and Power Technology at Banpu NEXT

In response to adaptations to climate change, BPP has continuously invested and developed the renewable energy business and expanded its scope to develop energy technology and integrated energy related business through the investment of Banpu NEXT in which the Company holds 50% of stakes. Aside from creating a strong position in the renewable energy sector, Banpu NEXT will also help increase a diverse of our related businesses. In line with the Company's growth, the power generation capacity target has been adjusted to 5,300 MW, consisting of 4,500 MWe from the thermal power and 800 MW from the renewable energy by the year 2025.

Banpu NEXT has operated the renewable power and integrated energy technology businesses including:



### Renewable Power Plant

Banpu NEXT is operating the energy generation and distribution business from renewable power generation. It has grown and expanded its portfolio to the strategic markets for energy industries in the Asia-Pacific region, namely China, Japan and Vietnam. Currently, the company has a total power generation capacity of 445 MW from the investments in solar power plants in China, Japan, Taiwan, Vietnam and other countries in the Asia-Pacific region with a total capacity of 407 MW, and the investments in the wind power plants in Vietnam with a power generation capacity of 38 MW (as of 31 December 2020).



### Solar Rooftop

Banpu NEXT provides one-stop solar rooftop solutions and installation, with services ranging from site survey and system design and installation of solar system. All the services are provided with cutting-edge technologies by the specialized teams of engineers. To maximize customer service efficiency, advanced technologies are also introduced to the 24/7 after-sales service for industries and large businesses looking for reducing their electricity costs.



### Energy Storage System

Banpu NEXT is exploring development of solar power storage systems for numerous applications, such as uninterruptible power supply (UPS) and integration to smart grid and microgrid so as to help customers minimize their energy cost with efficient electricity management during on-peak times.

The company has acquired 47.68% stake in Durapower Holdings Pte Ltd, an energy storage system provider based in Singapore, to operate a lithium-ion battery factory in Suzhou, China, with annual output planned at 1 Gigawatt-hour. Meanwhile, the company is also studying development of solar power storage systems both for industrial and household applications.



### Smart Community

Banpu NEXT offers state-of-the-art energy technology solutions for a well-developed ecosystem of clean energy and optimum energy efficiency based on individual needs of each customer organization. These accessories include Smart Pole, Solar Kiosk and EV Charging Stations.



### Electric Vehicle

Banpu NEXT is the first in Thailand to provide integrated electric vehicle fleet management with the concept of 'Mobility as a Service', offering one-stop service solutions including consultancy, evaluation of mobility needs, provision of the right vehicles to meet specific needs of each company, and after-sales support combining advanced hardware and digital technologies for greater efficiency of its after-sales service to meet the accurate needs of customers.



### Energy Management System

Banpu NEXT offers consulting service in energy management to provide energy solutions that will optimize energy management system of each customer company. These include evaluation and analysis to provide guidelines for lower energy cost and better energy management system contributing to sustainable growth of customers businesses. Every step of the service is provided by a team of experts in energy technology.



## Strategy

- Operating businesses in order to enhance the Code of Conduct of BPP as well as build confidences among shareholders, investors, customers, business partners, communities and all stakeholders' groups.

## Indicator

- A proportion of all significant Corporate Governance (CG) complaints considered and resolved.
- A proportion of executives and employees accepting the policies and testing their knowledges about CG and business ethics.
- The CG assessment results from agencies relating to CG meeting the international standards.

## Target

- All significant CG grievances are examined and corrected, including a determination of measures to prevent recurrences.
- The CG assessment result is in a very good level, or equivalent to 90% of the total scores.

## Performance

- 100% of significant CG complaints for the year 2020 were considered and resolved through a dispute resolution process.
- 100% of executives and employees accepting policies and testing their knowledges about CG and Code of Conduct.
- Receiving the excellent rating (5 stars) of evaluation results from the 2020 Corporate Governance Report (CGR) program assessed by the Thai Institute of Directors (IOD).
- Receiving 100/100 scores from the quality assessment of the 2020 Annual General Meeting of Shareholders organized from the Thai Investors Association.

## Significance and Reporting Boundary

With an aim to conduct its business for the maximum benefit of shareholders, investors, customers, business partners, communities and stakeholders, Banpu Power therefore makes the utmost efforts to develop its businesses to prosper and yield good returns in parallel with operating business with honesty, integrity, and morals. BPP has developed the Code of Conduct booklet, compiling code of best practices for its Board of Directors, executives and, employees so that they acknowledge the standards expected by the company and use them as the operating guidelines. In addition, BPP is committed to respecting and complying with relevant laws, regulations, and rules wherever it operates businesses, with an aim to develop and enhance its business ethics and build confidences among shareholders, investors, customers, business partners, communities and all stakeholders' groups.

The boundary of the report covers all business entities BPP has more than 50% of investments and direct management control.

## Management Approach

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

BPP has focused on enhancing its business ethics to meet the international standards as well as adhered to conducting businesses in accordance with the laws, rules, regulations and guidelines relating to business operations both within the country and abroad, including:

- The Principle of Good Corporate Governance by the Stock Exchange of Thailand (SET) and the Securities and Exchange Commission (SEC)
- The Securities and Exchange Act
- Policy Statement on Code of Best Practices of Directors of Listed Companies
- CG ASEAN Scored Card, by ASEAN Capital Market Forum
- Principles of Corporate Governance, by The Organization for Economic Co-operation and Development (OECD)

## Performance

In 2020, BPP participated in the annual assessment from the Corporate Governance Report of Thai Listed Companies (CGR) project organized by the Thai Institute of Directors, receiving a 5 - star CG Rating (excellent). In addition, it received 100/100 scores from the assessment of the quality of organizing the 2020 Annual General Meeting of Shareholders (AGM Checklist) conducted by the Thai Investors Association. Since 2019, BPP has been certified to be a member of Thailand's Private Sector Collective Action Coalition Against Corruption (CAC) from the Thai Institute of Directors Association.

Furthermore, BPP has cultivated the ethical working culture and set the 'ethics' as one of its corporate shared values as well as the key performance indicators for all executives and employees. In 2020, the business ethics activities were continuously promoted throughout the organization so as to ensure that all employees know well about business ethics and anti-corruption. The activities organized were as follows:

- Arranging the Corporate Governance and Code of Conduct trainings for new staffs with 100% of attendances.
- Testing management and employee's knowledges on CG and business ethics and 100% of them accepting the policy.
- Receiving significant CG complaints and 100% of which were considered and resolved.
- Annually organizing activities to promote understanding on business ethics or the 'CG Day' under the theme of 'Awake Your CG'.
- Organizing an internal audio broadcast and a podcast within Banpu Group every Friday through the program called the 'Friday Morning Story', with an aim to make executives and employees aware of the CG principles seen around themselves and review their correct understandings.
- The 2020 BPP Crisis Communications training was organized in order to prepare employees to properly communicate and deal with any arising crises, by adopting the guidance of the internal data management and control of BPP to make both internal and external communication procedures more efficient.
- Organizing the 2020 Annual General Meeting of Shareholders under the Corona Virus Disease (COVID-19) pandemic control measure, taking into account the health safety of all attendees in order to reduce the potential impacts.



## Complaint and Anti-corruption Handling

### Filing Channels

- Submitting a letter:** to The Secretary of the Corporate Governance and Nomination Committee  
Banpu Power Public Company Limited  
26<sup>th</sup> Floor, Thanapoom Tower,  
1550 New Petchburi Road, Makkasan,  
Ratchathewi, Bangkok 10400
- Company website:** [https://www.banpupower.com/complaints\\_handling](https://www.banpupower.com/complaints_handling)
- Banpu Portal:** <http://portal.banpu.co.th>  
(BPP Whistleblower)
- E-mail:** [GNCchairman@banpupower.co.th](mailto:GNCchairman@banpupower.co.th) and/or  
[BPP\\_Comsec@banpupower.co.th](mailto:BPP_Comsec@banpupower.co.th)

### Complaint Receivers

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

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

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



**📢 The 2020 Annual General Meeting of Shareholders under the Corona Virus Disease (COVID- 19) Epidemic Situation**

The Coronavirus Disease 2019 (COVID- 19) Outbreak Situation in Thailand, which was widespread and escalated in violence in April 2020, had an effect on the direction of arranging the General Meeting of Shareholders (AGM) of Thai listed companies. Taking into account the overall health and safety of shareholders and keeping up with the ever-changing situation, the Board of Directors therefore resolved to postpone the 2020 AGM of BPP from the original date scheduled for 2 April 2020. In order to reduce the possible impacts resulted from the 2020 AGM postponement on shareholders, including the right to receive dividends, BPP considered by virtue of Section 115, Paragraph: 3 of the Public Limited Companies Act, B.E. 2535, which authorizes the Board of Directors to pay interim dividends. As a result, the Board of Directors' Meeting No. 5/ 2020 convened on 8 April 2020 approved the payment of interim dividends for the 2019 operating results according to the financial statements ended 31 December 2019 reviewed by the auditors of BPP in order to preserve the right and equality of all shareholders.

Later, when the situation of the COVID-19 outbreak in Thailand was improved and relevant government agencies announced the COVID-19 epidemic control measures, the Board of Directors resolved to hold a new date of the 2020 AGM on 19 June 2020. Measurements and guidelines for attending the 2020 AGM of BPP were established as follows:

1. Asking for cooperation from shareholders to grant a proxy to the Independent Directors of BPP to attend the Meeting on his/her behalf: In order to prevent and reduce any risks arisen from the COVID-19 epidemic and for the hygiene of shareholders, BPP asked the shareholders for their kind cooperation to grant proxies to its Independent Directors to attend the Meeting and vote on his/ her behalf by submitting a proxy form together with supporting documents via the envelope enclosed with an invitation letter (no postage stamp needed) to the Corporate Secretary Department, Banpu Power Public Company Limited, 26<sup>th</sup> Floor, Thanapoom Tower, 1550 New Petchburi Road, Makkasan, Ratchathewi, Bangkok 10400
2. BPP informed channels for submitting questions in advance; shareholders wishing to submit enquiries can send their questions in advance via the following channels:
  - Sending the acknowledgment envelop enclosed with the meeting invitation letter (No postage stamps required) and the proxy form to the Company Secretary Department, Banpu Power Public Company Limited, 26<sup>th</sup> Floor, Thanapoom Tower, 1550 New Petchburi Road, Makkasan, Ratchathew, Bangkok 10400
  - Email: [investor\\_relations@banpupower.co.th](mailto:investor_relations@banpupower.co.th)
3. BPP live broadcast the meeting atmosphere via [www.stationg.com/banpupower](http://www.stationg.com/banpupower)
4. Shareholders wishing to attend the Meeting in person, BPP would like to request for their cooperation to follow the following guidelines to prevent and reduce the risk of COVID-19 widespread:
  - 4.1 BPP has established the measures to hold the Meeting in order to reduce the congestion of shareholders in the Meeting area by arranging the seating with appropriate social distancing at a minimum of 1.5 meters placement from each other at the screening point, documents check point and registration. These also include limiting the number of elevator users to only four persons in each round, whereas the number of available seats for shareholders and/ or proxy holders (Attendee) in the meeting room is limited to 50 seats with specific seating number for each attendee. Therefore, each attendee is required to sit as specified for the benefits of the disease prevention or a follow-up in case of any unforeseen circumstances. Once the seats are fully occupied, shareholders, who attend the meeting in persons, are required to grant proxies to the Independent Directors of BPP to attend the Meeting instead of participating in persons.
  - 4.2 All attendees are required to fill in the COVID-19 Infection Risk Screening Form before entering the Meeting venue. For those attendees who have recently visited or returned from any disease infected zones as notified by the Ministry of Public Health, including those having had close contact with persons having

visited or returned from any disease infected zones, or being found of having risky symptoms such as fevers, coughs, sore throats, sneezing, runny noses, BPP shall reserve the right to not allow such persons to enter into the Meeting. BPP would also ask for your cooperation to strictly follow the recommendations from our staff at the health screening points. For those who cannot attend the meeting due to the reasons explained above are able to proxy the Independent Directors to attend and vote on their behalf at the Meeting. Please also note that concealment of health information or traveling records could be considered as violations of the Communicable Diseases Act B.E. 2558.

- 4.3. All attendees must check their temperatures at the screening points provided at both the main entrance and the registration before entering the Meeting's room.
  - 4.4 All attendees must wear a facemask at all times when attending the Meeting and clean their hands with alcohol gel, provided by BPP at several service points.
  - 4.5. Using the method of writing questions instead of speaking through the microphones for any inquiries during the Meeting
5. Neither food nor beverages will be served at the Meeting so as to reduce the risk of the virus widespread.

In addition, the Board of Directors has a policy to facilitate the shareholders equally by submitting complete, clear, sufficient and timely information through the channels of the Stock Exchange of Thailand and the Company's website: [www.banpupower.com](http://www.banpupower.com)





# Anti- corruption



## Strategy

- Instilling the ethical working culture by determining ethics as one of the Corporate Shared Values and a key performance indicator for management and employees.

## Indicator

- The number of incidents BPP involved with corruption actions.

## Target

- Zero tolerance against corruption.
- All executives and employees being well aware of, knowledgeable, having the anti- corruption measures, and ready to deal with incidents possibly exposed to corruption.

## Performance

- No significant incidents relating to corruption actions of BPP
- Organizing various activities to raise awareness on anti-corruption such as the CG Day under the theme of 'Awake Your CG', an internal audio broadcast called the 'Friday Morning Story' program, and etc.
- Taking actions in accordance with the guidelines for accepting and offering gifts, hospitality or other similar forms of rewards, complying with the 'No Gift Policy', while communicating such guidelines to all stakeholders through the website of BPP
- The internal Corporate Shared Values Survey results found that 'Adhere to Integrity and Ethics' value was classified as the behavior employees expressing the most.

## Significance and Reporting Boundary

Corruption is the exercise of power acquired by duties for unlawful benefits of oneself and/ or others involved. Such benefits may be in the form of money, objects or actions facilitating a decision making or changing some actions. Corruption is a problem having a negative impact on the organization management, corporate image, and confidence on the organization. In addition, it is an obstacle to economic, social and environmental development both in the country and abroad, affecting the overall picture of the sustainable development approach.

The boundary of this report covers all business entities BPP has invested more than 50% of shares and direct management control.

## Management Approach

BPP has realized the importance of fighting against all forms of corruption either directly or indirectly. To prevent corruption likely arising, the anti- corruption measures have been stipulated in writing on the Anti- Corruption Policy and the Anti- Corruption Guidelines regarding accepting and offering gifts, hospitality, or other similar forms of rewards. These include clarifying, understanding and communicating the best practices to the Board of Directors, executives and all employees so that they can use them as a clear guideline for conducting business with honesty and auditable. Furthermore, BPP has also participated in and has been certified as a member of the Collective Action Coalition Against Corruption Project (CAC), an independent entity. CAC has reviewed the anti- corruption system of BPP and also helped it improve the work procedures to be more efficient, leading to the development and strengthening of the integrity and transparency of the organization sustainably.

The Board of Directors, executives and all employees of BPP agreed to conduct business in accordance with jurisprudence in order to be a part of driving the

business mechanism in accordance with the principles of sustainable governance. As such, the Board of Directors has established the efficient corporate governance (CG) structure and system including supervision, monitoring and evaluation. So that all parties have the single direction guidelines in accordance with the principles of good corporate governance. In addition, the Board of Directors has assigned the Audit Committee to audit and monitor the internal control system, risk management in parallel with balances.

In addition, BPP has educated and communicated these measures to the Board of Directors, management, employees and stakeholders so as to create awareness and conduct concrete anti- corruption actions. Besides, it has communicated these measurements to its joint venture companies through various channels such as the company's representatives who are the executive committee, identifying the anti-corruption policy and practice guidelines on all contracts made with business partners, corporate visits, and organizing workshops, inclusion of auditing the internal control system with the Internal Audit Department of joint- venture companies, etc.

## Performance

The anti-corruption performance of BPP for the year 2020 is summarized as follows:

- No incidents relating to corruption of BPP
- Fostering an ethical conducts culture by determining 'Adhere to Integrity and Ethics' to be one of the Corporate Shared Values and one of the performance indicators for all executives and employees. The internal survey results on Corporate Shared Values found that the value of 'Adherence to Integrity and Ethics' was classified as the behavior expressed the most by employees.
- Communicating about anti- corruption within the organization through co-organizing various formats of activities with Banpu Group, such as organizing the 'CG Day' events, broadcasting the 'Friday Morning Story' audio program, and conducting the knowledge sharing sessions, etc.
- Planning to renew a membership of Thailand's Private Sector Collective Action Coalition Against Corruption (CAC).
- Requiring to have the anti- corruption measures identified in all contracts signed with every party in order to strengthen and develop the ethical business practices.
- Continuously proceeding in accordance with the practice guidelines for accepting and offering gifts, hospitality, and other similar forms of rewards, complying with the Anti- Corruption Policy (No Gift Policy) as well as communicating such a policy to all groups of stakeholders via the website of BPP.
- Disclosing the anti- corruption policy and practice guidelines in the annual report, the annual information disclosure report, the website of BPP, including communicating with all stakeholder groups.
- Establishing the communication channels, allowing stakeholders and involved parties, including management and employees, the opportunities to either file complaints or notify corruption clues, or if receiving any unfair practices. Details of the anti- corruption practice guidelines are disclosed on the website of BPP, focusing on keeping the corruption clues' notification confidentially.
- The procedures to protect the whistleblowers and prevent them from being physically hurt or threatened later have been established, inclusion of a measure to compensate the damages the complainers or the whistleblowers may receive.

### CG Day

On 13 November 2020, BPP joined hands with Banpu Group to organize the 2020 CG Day called 'Awake Your CG'. At the event, various activities such as the anti- corruption related games were organized so that employees could understand and review their knowledges about anti- corruption. In addition, the management representatives shared their opinions on the importance of working and conducting businesses under the good corporate governance policy, avoiding involvement in all forms of corruption. The aim was to reflect the commitment of BPP to operating businesses in accordance with the good governance principles, emphasizing on the anti- corruption policy and practice guidelines.



### The Internal Audio Broadcast Program - the 'Friday Morning Story'

BPP in collaboration with Banpu Group have organized the activity called the 'Friday Morning Story', an internal audio program broadcast within its office area where employee representatives jointly read the news about anti- corruption, business ethics and CG every Friday. In addition to conducting this activity as the internal audio program, the 'Friday Morning Story' has been also recorded in a format of podcast in order to make employees aware and able to review the importance of conducting businesses by adhering to the principles of good corporate governance and Code of Conduct, including the anti- corruption policy and guidelines.



### Knowledge Sharing

On July 10, 2020, BPP organized an exchange of knowledges between departments within the organization. At the session, the presentation on the topic of 'Anti-corruption' was conducted for employees with an aim to review their knowledges and understanding, including a preparation for renewing a membership of Thailand's Private Sector Collective Action Coalition Against Corruption.



## Strategy

- Establishing the effective internal control system in both preventing and monitoring the operational performance categorized into several levels including self-auditing and an evaluation by the independent unit reporting directly to the Audit Committee and the Board of Director; developing applications to integrate data gained from the monitoring system related to legal and regulatory compliance, risks management, and corporate governance.

## Indicator

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

## Target

- The internal audit and compliance systems covering all business entities in which BPP has over 50% of investments and management control.
- No significant incidents involved with non-compliance.

## Performance

- Operating in accordance with the internal audit and compliance systems covering all business units where BPP has greater than 50% of investments and management control.
- Conducting the internal audit and compliance assessment among the joint venture companies as well as coordinating with business partners to follow up deficiency resolutions to meet the common standards.
- No significant incidents relating to non-compliance.

## Significance and Reporting Boundary

Legal compliance is the basic principle to which BPP has adhered in conducting businesses. Meanwhile, it is a major challenge since the company has operated businesses in many countries with different regulations. Besides, the outcomes of climate change and a need to improve the air quality in large cities are the important driving force in rushing amendments on environmental laws in the power industry. Respectively, if BPP cannot adapt itself promptly, it would affect the company's business operations.

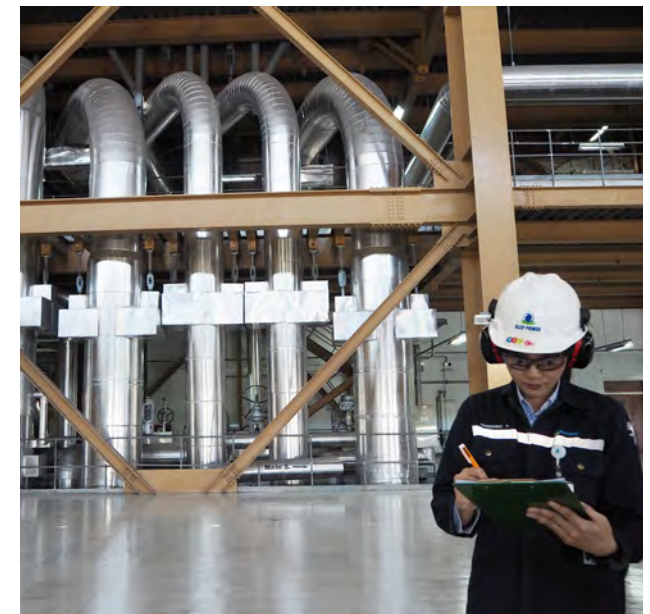
The business operations of BPP are related to various laws and regulations that must be fully complied, such as the environmental and safety laws, the labor laws, the trade and investment laws, the security and exchange regulations as well as various licenses. This also includes running businesses by adhering to business ethics, for example, anti-corruption, unfair competition and any actions against human rights, for instance, equality. Thus, a failure to comply with these laws will affect the sustainable business operations of BPP.

The boundary of this report covers all business entities in which BPP has more than 50% of investments and direct management control.

## Management Approach

In order 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 external regulations, the company has established the Internal Audit and Corporate Compliance as a major force to coordinate and monitor legal compliance with two main areas of responsibilities, including:

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



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

To ensure that all departments have operated in compliance with policies, laws, regulations and operational practice guidelines, BPP has regularly audited the operational performance and internal control systems covering major legal and regulatory compliance within the organization and its subsidiary companies. The 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, risk 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, reporting directly the Audit Committee and the Board of Directors in order to evaluate adequacy and efficiency of the internal control system as well as corporate compliance.

## **Monitoring of Environment Quality, Safety and Labor Required by Laws**

BPP has set up a system to monitor environmental qualities in accordance with laws and monitored the possibility of changes on laws in order to promptly adjust itself. It has also monitored environmental qualities required by laws as follows:

- Internal audits through the measurement systems of BPP, such as the continuous emission monitoring (CEM) and the water quality monitoring system, etc.
- Inspections by external agencies, such as measuring water and air quality by external agencies, auditing the implementation of environmental impact mitigation measures in accordance with the environmental impact assessment (EIA) reports, and the inspections of environment and workplace safety, etc.



## **Quality Assurance Review (QAR) by the Internal Unit**

BPP in cooperation with Banpu Group has assigned all supporting units under the supervision of Corporate Services Department, including Department of Occupational Health, Safety, Environment and Community Development, Information Technology Department, Legal Affairs, Procurement and General Administration as well as Business Process Management Department, to review operational qualities and legal compliance by establishing the QAR working group from Bangkok Office to assess the operational performance of subsidiaries in each country. Meanwhile, the QAR working group of each subsidiary will conduct a regular review in every business unit located in that country at least once a year. In 2020, the review benchmarks were revised to address the COVID-19 epidemic situation in a format of self-monitoring and an interview conducted through a teleconference system.

For legal compliance quality review of year 2020, BPP improved the benchmark to be more proper for business operations, covering five dimensions, namely corporate governance, compliance risk management, culture and education, technology and continuous improvement. The evaluation results will be used for further improving the efficiency of each department.

## Operational Audit by the International Certified Body

BPP has continuously applied the international standards to operational management in order to improve its operation standards and create confidence among all stakeholders. As a result, the company's business entities in each country have been certified by the international standards, 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. Meanwhile, the legal compliance is part of the requirements of these systems.

Business Unit	Management System Standard Certification				
	ISO 9001 Quality	ISO 14001 Environment	ISO 45001 Occupational Health and Safety	ISO 22301 Business Continuity Management	ISO 27001 Information Security
Zouping Power Plant	✓	✓	✓		
Zhengding Power Plant	✓	✓	✓		
Luannan Power Plant	✓	✓	✓		
Beijing Office				✓	
Bangkok Office*				✓	✓

\*Headquarters in Thailand incorporated with Banpu Group.

## Performance

BPP conducted the legal compliance audits completely, most of which were carried out online due to the COVID-19 outbreak. The audit results showed no significant non-compliance incidents relating to violations of environment, labor, social and human rights as well as unethical operations. Additionally, the environmental quality measurement results such as air quality, water quality, waste management and all environmental management of BPP were in the better levels than those required by laws.

To operate our business in accordance with laws and regulations of each country in which BPP has invested, the company proactively operated its businesses and regularly monitored the operational performance in 2020 as follows:

- Raising the operational standards by adopting the ISO 19600 Compliance Management Systems guidelines as a framework for legal operation and compliance together with risk governance so as 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 an audit from an independent agency to guarantee the operations' achievements.
- Establishing and improving the compliance obligation list (COL) by interviewing operating staff about working procedures so as to compile all activities and related laws to which the departments must comply. After that, every department needs to conduct the quarterly self-assessment report and submit it to the Corporate Compliance on a quarterly basis.
- Formulating a compliance obligation list (COL) for new business entities BPP just started developing projects, including the joint-venture companies such as the electronic vehicle business, etc.
- Appointing a 'Compliance Champion', a representative from each department to coordinate, support and operate legal compliance in order to make a risk management process the most efficient.
- Complying with the Personal Data Protection Act 2019 by setting up a working group and announcing policies & practice guidelines, communicating with employees to make them understand about personal information, collecting personal data and establishing the system to prevent information leakage, including educating and raising awareness among employees.

- Complying with the Royal Decree on Electronic Meetings, such as the meeting attendees must present himself/ herself; recording data transmission (log collection), voting either openly or secretly, preparing meeting documents in both paper and electronic formats, recording video or audio throughout the meeting, and preparing security measures as required by laws.
- Continuously conducting the annual monitoring on legal and regulatory compliance by the Corporate Compliance Department; In the past year, the monitoring was conducted through online due to the COVID- 19 epidemic.
- Arranging a meeting to assess legal violation risks related to environment, social and corporate governance, including labor and human rights in all business units BPP has direct management control and joint- venture companies such as Banpu NEXT and HPC Power Plant.
- Developing 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.
- Developing the Compliance Risk Management (C- RiM) application to monitor and prevent risks related to legal compliance from business operations and reporting the operational results to the management regularly. This application is an integration of the corporate compliance system into the corporate governance and risk management so as to reduce repetitive work.
- Originating the Laws in Hand application to keep up with current laws, announcements or news related to business operations and regularly show the results to executives and related employees.

For other businesses of which BPP has less than 50% of shares and no direct management control, the legal and regulatory compliance monitoring has been conducted through the Board of Directors of such companies and Banpu Power's Internal Audit Department incorporated with the business partners. Last year, both BLCP and HPC power plants had no significant incidents related to non- compliance.

## Risk Forum & Compliance Summit

On 22 - 24 July 2020, BPP together with Banpu Group, organized the Annual Risk Forum & Compliance Summit with an aim to present, exchange, and review corporate risk management and legal risk mitigation. As a result, the involved functions in every country have brought the summit's takeaways to develop their operational plans with appropriate operational risks control and ensure that they have fully complied with the laws.

## Laws in Hand Application

Laws in Hand application was developed with an aim to facilitate management and involved employees to track laws, announcements or current information relating to business operations continuously, keeping up with current situations as well as underpinning both computers and mobile devices.

## Personal Data Protection

The full implementation of information technology in the digital age has enabled operations more agile, faster and more efficient. On the other hand, an additional risk possibly arisen is a use and disclosure of personal data, which violates the privacy rights.

Banpu Group has, therefore, established the personal data protection policy and set up the personal data protection committee in order to identify criteria and supervise the collection, use and disclosure of personal data in accordance with the Personal Data Protection Act. This is to prevent the privacy rights violation of stakeholders' personal information. As a result, we have taken actions on personal data protection as follows:



1. Establishing strategies, goals/ targets and action plans related to the protection of personal information.
2. Developing the policy and/ or practice guidelines for the departments associated with personal data protection.
3. Providing measures and systems for personal information security in accordance with the international standards.
4. Preparing appropriate measurements and systems to prevent data infringements and leaks.
5. Raising awareness and/ or organizing trainings for employees and involved persons.
6. Arranging a meeting to monitor progress continuously.
7. Keeping personal data known or acquired by performing duties confidentially

# Risk Management



## Strategy

- Using risk management for decision making and operating in accordance with plans to mitigate business risks.
- Employing key risk indicators (KRI) to manage risks within the organization.
- Enhancing the risk management system to meet international standards.

## Indicator

- Coverage ratio of enterprise risk management system
- Coverage ratio of environmental, social and governance (ESG) issues in the enterprise risk management system

## Target

- 100% coverage of enterprise risk management system
- 100% coverage of ESG issues in the enterprise risk management system in 2023

## Performance

- 100% coverage of enterprise risk management system
- 92% coverage of ESG issues in the enterprise risk management system
- Launched a C- Rim application, an integration of risk management with legal operations audits.
- Conducted the ESG risk assessment at all business units BPP has direct management control.

## Significance and Reporting Boundary

Risk management is an important factor BPP has used for operating its businesses to grow stably and sustainably in both investments and project constructions as well as productions to meet the targets set. Currently, emerging risks relating to changes in business, environment, society, corporate governance, and stakeholder expectations are arising very quickly. Therefore, BPP needs to be vigilant in order to adapt itself to the risks arisen.

The boundary of this report covers all businesses in which BPP has greater than 50% of investments and 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 at operational levels. The RMC consists of the chief executive officer (CEO) and senior management whose duties are as follows:

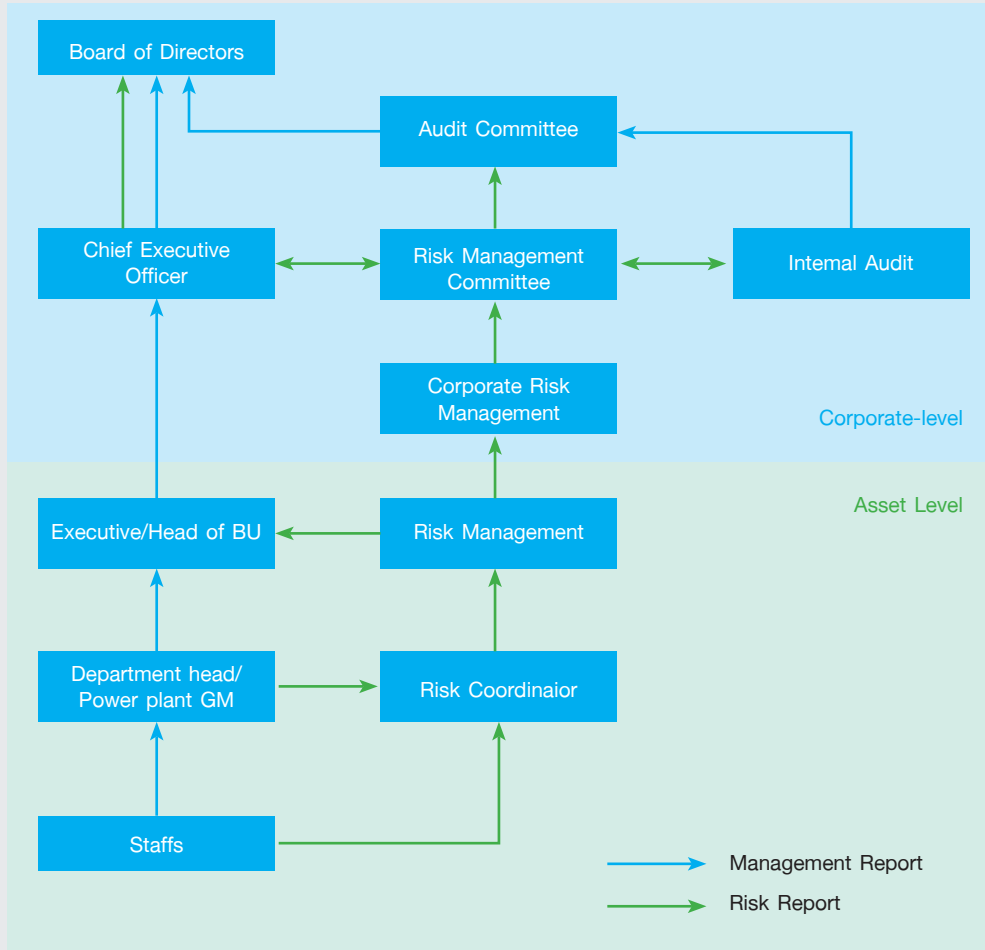
1. Assessing and managing risks to mitigate any risk effects on the operational performance of BPP
2. Lending supports relating to policies in order to help mitigate risks efficiently and to create awareness on any risks arisen from the activities implemented by BPP
3. Supporting internal and external resources necessary for managing risks efficiently.

BPP has declared the risk management policy with regular updates. A direct responsibility unit was established to coordinate with all departments to drive the effective risk management throughout the organization. A mechanism for finding and identifying key business risks covering the areas of environment, social, and corporate governance has been used in the annual

corporate strategy development procedure. This is in line with the strategic direction of BPP and related to the context of corporate sustainability management. The likelihoods and impacts on stakeholders have been assessed in order to consider priorities prior to defining them as a list of organizational risks and assigning the responsible persons to mitigate risks to be at the level accepted by the organization. Moreover, a progress of risks management has been regularly monitored while risk issues have been continuously reviewed. Additionally, BPP has integrated 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 the events arisen in the future.

As for managing risks relating to business interruptions, the RMC meetings have been convened to monitor such risks and risks management results according to the risk mitigation plan. The risk management system review has been reported to the Internal Audit Committee and the Board of Directors on a quarterly basis.

### Risk Management Structure



### Operating Mechanisms

To maximize the efficiency of risk management, BPP has integrated risk management into its business plan, giving high attention to value creation for the company and its stakeholders. Consequently, the risk correlation principle has been used to analyze correlations of each risk in both positive and negative aspects. The risk management process of BPP starts with defining objectives according to the business plan and allocating them into the business units, departments, and sections. The likelihood and impacts of such risks have been assessed along with preparing practice guidelines to mitigate risks possibly arisen. The risk management process also includes reporting the results to commander-in-chief and supervisors as well as monitoring the progress on an ongoing basis.



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



Risk Categories	Risks
1. Strategic risks	<ul style="list-style-type: none"> <li>Risks relating to strategic planning and implementation</li> <li>Risks on human resources (HR) management and competency development to facilitate future growth</li> <li>Risks related to corporate reputation</li> <li>Risks involved with new business investments</li> </ul>
2. Financial risks	<ul style="list-style-type: none"> <li>Currency exchange rate risks resulted from investments in many countries.</li> <li>Risks related to financial loan supports by financial institutions for the thermal power plants</li> </ul>
3. Operational risks	<ul style="list-style-type: none"> <li>Risks on changes in the power business</li> <li>Risks relating to occupation, health and environment</li> </ul>
4. Regulatory and legal compliances related risks	<ul style="list-style-type: none"> <li>Risks from regulatory, legal and policy changes especially changes in environmental laws and governmental subsidies in countries where BPP has operated.</li> </ul>
5. Emerging risks	<ul style="list-style-type: none"> <li>Disease epidemic risks</li> <li>Climate change risks</li> <li>Cyber security risks</li> <li>New technology risks</li> </ul>
6. Other risks	<ul style="list-style-type: none"> <li>Human rights risks</li> </ul>

## Performance

Presently, a risk management system has been employed in all businesses of BPP, including the projects under development. In addition, the business units have used the key risk indicators (KRI) and incorporated the risk appetite principles in risks assessment and management, while the results have been reported to the risk management committee every quarter.

In the previous year, BPP put top emphasis on raising awareness on risks related to the environment, social and governance (ESG). The workshop was organized to assess the ESG risks in all business units BPP has management control, including the three combined heat and power (CHP) plants in China, as well as the joint venture power plants under Banpu NEXT and HPC Power Plant.

### Emerging Risks

According to the risk assessment of Banpu Power Plc, four major emerging risks were found as follows.



#### Epidemics Risks

The first ever outbreak of a new strain of the corona virus (COVID-19) began in late 2019, affecting the whole world in terms of health and the supply chain of every business. As operating the energy business, it is necessary for BPP to continue operating during the epidemic period in order to generate electricity which is the main factor in carrying out people's activities in the society. It is, therefore, a major challenge for BPP to seriously take measures to prevent the pandemic affecting the health of employees and society as a whole. The business continuity system has been used with maximum capacity to enable the company to operate its business continuously such as the information system facilitating employees to work from their residences, etc.



#### Climate Change Risks

Climate change is a risk directly affecting BPP both as an energy producer and a power consumer. Correspondingly, it has managed the climate change risks by:

- Targeting to reduce the GHG emissions per power production unit of no more than 0.676 tonnes CO<sub>2</sub>e/ MWh.
- Investing in the renewable power plants and energy technology via an investment in Banpu NEXT.
- Investing in thermal power plants using clean and eco-friendly technology with minimal GHG emissions such as the power plants employing the ultra- supercritical and integrated gasification combined cycle (IGCC), etc.

## Cyber Security Risks

Cyber security risks are a major concern for power plants as they are related to the nation's security and the human's well-being. In the past year, BPP took measures to manage the cyber security risks such as:

- Announcement of information and cyber security policy.
- Raising employees' awareness on cyber threats, including practical and preventive measures such as communicating to employees at the meetings, and phishing emails to raise employee's awareness, etc.
- Conducting the exercise to practice dealing with the cyberattack threats and to recover the information system annually, responding to the event in a timely manner as well as reducing the impacts and damage possibly affecting the operations of BPP
- Organizing the crisis communications exercise simulating scenarios involved with the critical information leakage from cyber threats.
- Obtaining the ISO 27001 Information Security Management Systems (ISMS) certification, inclusion of countermeasures and action plans in the event of a cyberattack.

## New Technology Risks

Emerging energy technology trends have driven changes in consumer behaviors as well as relevant regulations to focus more on clean energy and reducing dependency on the central grid system. This has resulted in changes in power demand in various countries, including Thailand. In response to the aforementioned risks, BPP has collaborated with Banpu Group to increase the business opportunities in renewable energy and energy technologies, inclusion of the separation and grouping of Banpu Group to be clear and flexible. The objectives were to research data for developing the future products, which are beyond and extending to existing projects development. These included a consideration of possibilities to restructure the organization in accordance with its business strategies, and an enhancement of competitive advantages in the future through an investment in Banpu NEXT.

## C-RiM Application

BPP has applied the corporate risk management system to the legal operations supervision used as data sources across the organization, able to monitor the real-time risk assessment processes and present a wide variety of reports based on the needs of different users. For example, monitoring activities related to risks and natures of risks, executive summary reports, etc., so as to inform users about current risks and the state of the overall organizational legal practices.



## Human Rights Due Diligence Assessment

BPP conducted a human rights due diligence self-assessment to determine the human rights issues possibly posing the organizational risk. The assessment covered the thermal power business in China and the solar power operation in China and Japan. Six key human rights risks relating to employment, occupational health and safety, customers and products, communities, securities, contractors and supply chains, were assessed, taking into account both internal and external stakeholders such as employees, suppliers, customers, contractors and communities, as well as vulnerable groups. The assessment found that BPP had no risks involved with the six human rights issues. This was due to the Company's prevention and avoidance of human rights violations when operating businesses, adhering to the principles of liberty and rights, equality and human dignity without discrimination on genders, races, religions or colors.

# Business Continuity Management



## Strategy

- Developing a business continuity management (BCM) plan and arranging necessary resources, inclusive of sufficient and appropriate communication, covering possible crisis and in accordance with the organization's risk management.

## Indicator

- The number of ITM exercises conducted by the incident management team (IMT).
- Coverages of the BCM plan of the critical business functions.
- An ability to communicate appropriate and adequate information to the public during the crisis.

## Target

- The IMT is trained on simulation exercise once a year.
- Business continuity management covering all business units as well as new businesses in the future.

## Performance

- The IMT was trained on the BCM simulation exercise one time in China.
- Banpu Power's Crisis Communication Team (CCT) was trained at Bangkok Headquarters.
- Beijing Office was certified the ISO 22301:2012 Business Continuity Management System.

## Significance and Reporting Boundary

A business disruption from natural disasters, terrorists, cyber-attacks, protests, COVID-19 outbreaks, or any incidents (e.g., fires and chemical leakage, etc.) is a risk affecting lives and various industrial productions. Preparation for the rapidly operational rehabilitation during the crisis together with appropriate and adequate communication, will help minimize any impacts on BPP, as well as build confidences from power and steam buyers and other products' purchasers. As a result, BPP and stakeholders in the business supply chain, as well as investors and shareholders have paid top priority to the business continuity management.

This reporting boundary covers all business entities in which BPP has greater than 50% of shares and management control, including the three combined heat and power (CHP) plants in China.

## Management Approach

In 2018, BPP announced its business continuity policy with reference to the principles and requirements of the ISO 22301:2012 Business Continuity Management Standard, covering from the process of identifying key work procedures, business impact analysis and risk assessment, to creating business continuity plans and conducting BCP drills. The aim of BCM operations included:

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



### Response

Effectively responding to the incidents and preventing extended damage as well as appropriately communicating information to internal and external stakeholders.



### Recover

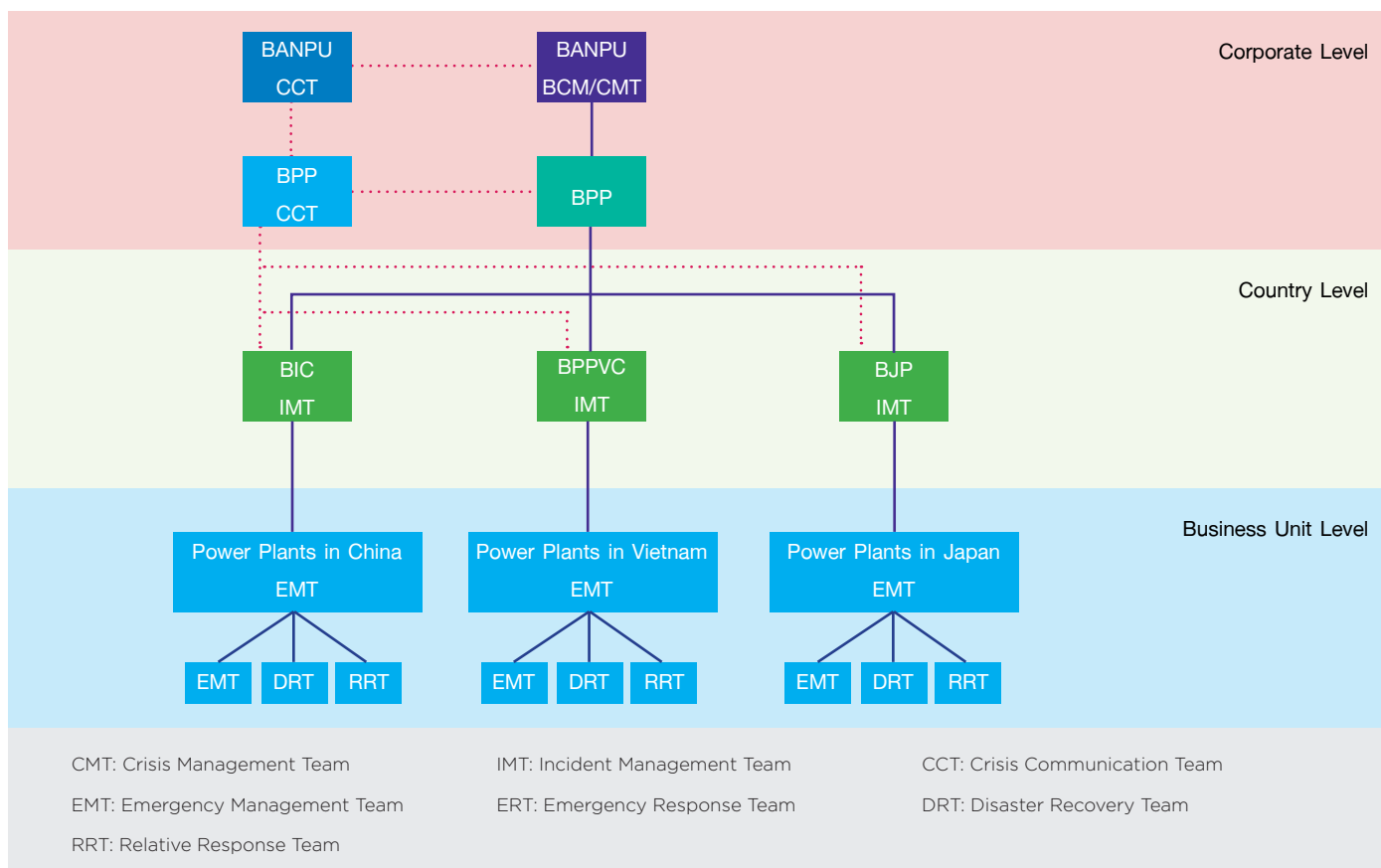
Able to restore key necessary activities to rapidly deliver products and services in the time acceptable by stakeholders.



### Restore

Quickly restoring all activities of BPP in the time accepted by stakeholders.

## Crisis Communication Management Structure



As BLCP Power Plant and HPC Power Plant are the joint-venture power plants, BPP has not had direct management control, but relying on supervision through the Board of Directors of such companies. As a result, the BCM of these power plants is not included in this structure. BPP, therefore, has assigned a liaison officer for BLCP Power Plant and HPC Power Plant to report information and current situations in preparation for communications involved with BPP as a joint-venture company.

A significant challenge for the continuity of power business is the damage of large power plants where activity recovery takes time. Hence, Banpu Power has given top priority to invest in preventing, controlling and reducing the incident severity, inclusive of appropriate and timely communications to external parties.

## Performance

In the previous year, BPP managed its business continuity to ensure that its BCM system was operated effectively as follows:

- During the COVID-19 widespread, Banpu Group managed this crisis through the actions of the Crisis Management Team (CMT), enabling it to operate continuously without any interruptions or production shutdowns of its business units. More importantly, all of our employees are safe from infections.
- In cooperation with Banpu Group to conduct the BCP Drill at headquarters and passing the ISO 22301:2012 certification audit for five consecutive years from the external agencies.
- The IMT of Banpu Power Group conducted one simulation exercise at Beijing Headquarters on 25 September, 2020, completing the annual BCM plan.
- Beijing Office was awarded the ISO 22301:2012 Business Continuity Management System Certification from an outside agency for the first year.
- Improving the Crisis Communication Team (CCT) manual and communication procedures including a conduction of the CCT drill simulating the incident of data breaches and cybersecurity.

## Business Continuity Management during the COVID- 19 Epidemic

During the COVID- 19 epidemic, BPP was able to operate continuously while its business units did not have either disruptions or operational stoppages. More importantly, all employees were safe from the infections because they have been preparing themselves to cope with the situation for a long time. The implementation of a business continuity management system has made BPP possible to flexibly respond and adapt to a pre-crisis situation. It was also able to resume operations quickly, helping reduce losses and build confidence among stakeholders. Measures and operations to handle the COVID- 19 epidemic included:

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



## Banpu Power's CCT Simulation Exercise

On December 1, 2020, the Corporate Communications Department of Banpu Group organized a simulation exercise for Banpu Power's Crisis Communication Team (CCT) at Bangkok Headquarters. The aim was to equip CCT both management and employees of Banpu Power to appropriately communicate information to stakeholders. The simulation exercise with a scenario possibly affecting the organization from a cyber- attack, a risk that may arise at the power plants, was conducted. The results of this exercise were taken into account in order to find ways for further improvement.

## Beijing Office Received Business Continuity Management System Certification (ISO 22301:2012)

On December 18, 2020, Banpu Investment China Co., Ltd. was awarded the Certificate of ISO 22301:2012 Business Continuity Management System from China Quality Certification Center in the scope of activities implanted at Beijing Office, relating to the power generation business, the solar power business, the coal operation business, and various supporting activities. This has ensured that BPP can operate its business continuously with high flexibility to any situations, even in a crisis situation. It has also been in accordance with our missions to create sustainable value and reliability among stakeholders with responsibility towards the global society and to enhance the trade opportunities of BPP.



# Availability and Reliability



## Strategy

- Ensuring confidences on availability of the combined heat and power (CHP) plants in order to stably and efficiently correspond to customers' needs.
- Creating fuel stability through quality management.
- Effectively maintaining machines according to the plans.

## Indicator

- Availability Factor (AF) of the power plants.

## Target

- The power plants' AF rate is 94.34%

## Performance

- AF rate of the three CHP plants in China was 97.72%, able to maintain their availability and reliability in accordance with customers' demand.

## Significance and Reporting Boundary

The power plants' availability and reliability have arisen from managing productions in strict compliance with operating procedures, inclusion of the quality maintenance according to the specified standards and the supply chain management to consistently provide good quality fuel for raw materials in the production line.

BPP has operated its business with a power generation base from the CHP plants in China. The power generated is supplied to the public through the government transmission system. Meanwhile, the steam and hot water as well as cooling water are sold to the industrial sector and commercial as well as residential areas. The peak demand for steam and hot water is in the winter during November to March every year, while the highest demand for cooling water is in the summer during May to September each year. Although China was severely affected by the COVID-19 epidemic in early 2020, the outbreak was quickly controlled. This has led to a positive impact on the industrial sector, especially medical device products and hospitals due to the increasing demand for consumer products. Moreover, China's economy has recovered quickly after the lockdown measures were lifted in early April.

As a result, demand for electricity, steam and hot water has rapidly increased as a result of normal production recommencement of large factories, which are the customers of BPP.

Therefore, the availability and reliability of the power plant as well as the efficiency of planned maintenance outages are the core indicators to which BPP has adhered in order to build confidences and create the most sustainable benefits for customers. The criteria used for supervision, surveillance, inspection and monitoring as well as power plants' performance analysis include the availability factor, the heat rate, the planned outage factor (POF), the unplanned outage factor (UOF), for example.

The boundary of this report covers the businesses of which BPP has greater than 50% of investments and management control, including the three CHP plants in China. Moreover, the performances of the thermal power plants, which are the joint-venture companies, namely HPC Power Plant and BLCP Power Plant are separately reported since they are the main production bases of BPP.

## Management Approach

Availability and reliability of the power plants have arisen from managing productions in strict compliance with the operating procedures, inclusive of the quality maintenance according to the specified standards and the supply chain management to consistently provide sound quality fuel for raw materials in the production line.

In order to manage the power plants' productions to fully comply with the operating procedures, BPP has applied the quality, occupational health, safety and environmental management system standards to all of its CHP plants. It has also promoted the innovation adoption, in particular the digital technology which can be widely applied to various parameters' measurements in the production process. Then, the information gained will be applied for creating benefits of production availability and stability.

BPP has communicated its production and machinery maintenance plans to customers in advance in order to create effective mutual working. The annual maintenance outage is one of the key activities to efficiently keep the machines in good conditions and last long. As a result, the power plants are able to operate continuously, meeting the customers' needs as the plan set.

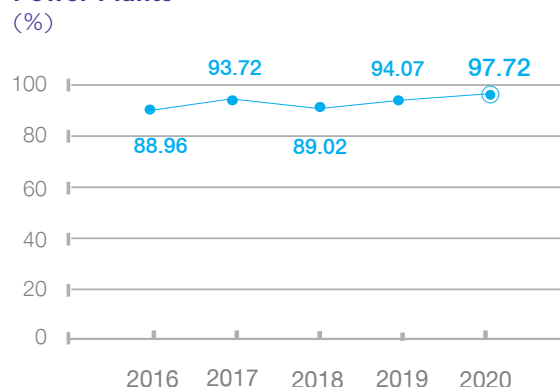
The CHP plants in China will have a maintenance outage during summer so that they can run continuously until winter as customers have maximum demand for energy. As a result, the maintenance outages for CHP plants will be based on a 3- years medium- term plan and an annual operational plan in order to prepare the machineries requiring maintenances and efficiency improvement in advance. More importantly, the maintenance for each power plant will not be operated at the same time since these power plants have to distribute steam to the industrial customers even during the maintenance period carried out during the summer season.

The CHP plants in China are scheduled for minor maintenances every year, taking 10- 20 days per time, while the major maintenances are operated every two years with 30- 45 days each time. The power plants' maintenance period is varied depending on the items determined by manufacturers and is also based on the inspections of machinery working-conditions which have been deteriorated as well. Each maintenance must be completed before entering to the winter season to ensure that the power plants continuously have the maximum availability potential.

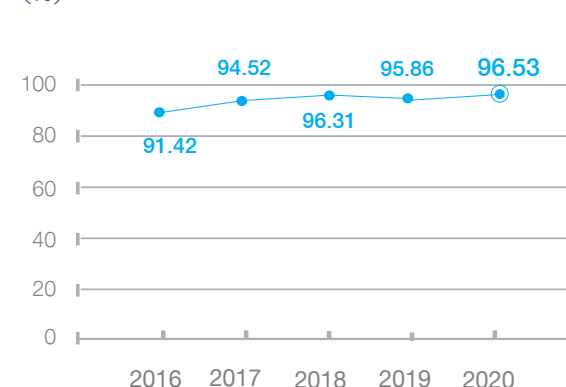
## Performance

In 2020, BPP was able to maintain its availability and reliability according to the customers' needs. The three CHP plants in China had the AF rate of 97.72% or 3.38% higher than the target set. Additionally, the planned outage factor (POF) and the unplanned outage factor (UOF) were on the targets set, able to distribute power, steam and hot water continuously.

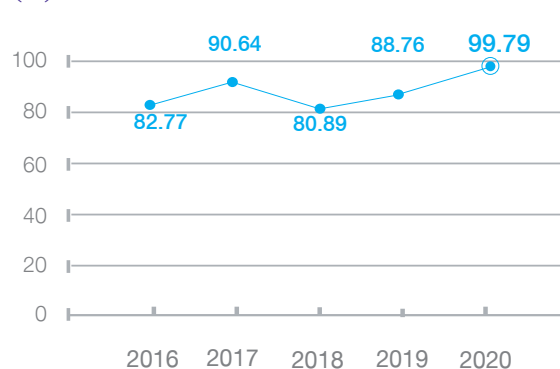
**Average Availability Factor of the three CHP Power Plants**



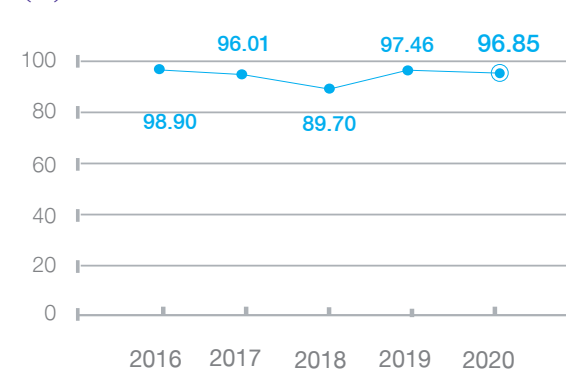
**Availability Factor - Zhengding Power Plant**



**Availability Factor - Launnan Power Plant**



**Availability Factor - Zouping Power Plant**



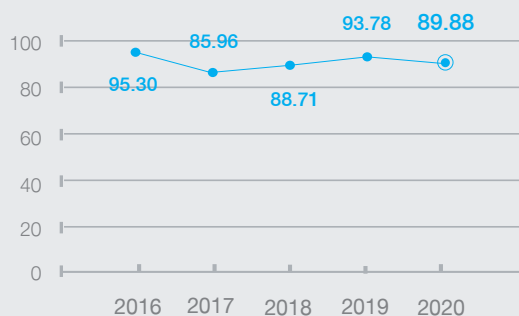
## Operations of Joint-Venture Power Plants

BPP has jointly invested in the thermal power plants in Thailand and Laos PDR, namely BLCP Power Plant and HPC Power Plant, respectively. BLCP and HPC are the base load power plants under the power purchase agreements (PPA) with the Electricity Generating Authority of Thailand (EGAT) in order to maintain stabilities of the power transmission system and the nation's electricity costs. Details of the number of availability hours and the annual maintenance outages of HPC Power Plant and BLCP Power Plant are specified in the PPA throughout the 25- year contracts. Generally, the practice guidelines have specified that the power plants must submit their maintenance outages to EGAT and have to completely achieve their operational targets within the specified period as stated to EGAT.

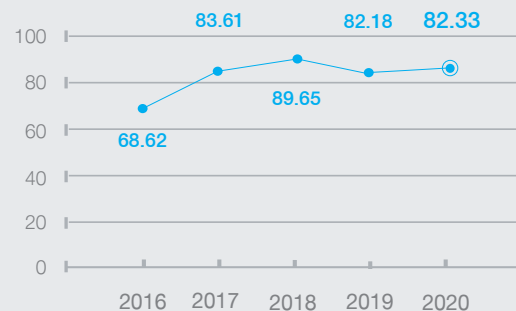
In the previous year, BLCP Power Plant was able to generate power higher than the plan set due to the nation's higher demand for electricity, which made EGAT to have high dispatch factor. Additionally, the power plant was also able to keep its equivalent availability factor (EAF) as planned, completing the contracted availability hours earlier than the deadline. Moreover, it completed the maintenance earlier than the plan set, making the plant be able to support the transmission system by generating additional electricity from the power trading hours specified in the PPA.

Whereas, the 2020 availability factor of the HPC Power Plant was slightly lower than planned due to the power plants' maintenance outage effects. These include the ongoing maintenance of the power plant's first unit in January 2020 as a result of the earthquake impact in late November 2019; the maintenance outages of the three power generation units effected by the forest fires and the strike (of lightning) on the 500 kV transmission line; the annual maintenance outage of the third unit from May 2020 to August 2020.

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



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



## Predictive Maintenance Software

HPC Power Plant, a joint- venture power plant, has developed a predictive maintenance program to tackle the unplanned maintenance outage caused by the power plant's machinery and equipment failures. This has resulted in production stoppages for maintenance, leading to a loss of incomes and a waste of resources.

The predictive maintenance has used a digital technology in the part of artificial intelligence (AI) to help predict machinery and equipment deteriorations before they actually fail. Various measurement data from machinery sensors such as heats, noises, vibrations, etc. have been used and brought into a model for predicting the deterioration of machinery parts ahead of engine's worn out. When the system detects an abnormal signal, it will notify automatically. This allows the power plant to plan for maintenances in advance before its machines actually fail, making the plant have more availability and stability. Additionally, this software has also helped increase the power plant's production continuously as well as reduce the opportunity loss of power generation driven from the unplanned maintenance outages.

The HPC Power Plant started operating the first phase project in April - December 2020. According to the whole plan, when the first phase is completed, the plant will consider expanding its scope to cover all of the power plant's major equipment in 2021.

### Benefits:

1. The power plant can prevent and plan in advance for maintaining equipment prone to failure. This makes it possible to reduce costs and maintenance time.
2. The power plant can continue its production, generate power according to the PPA, and create an opportunity to earn more income generated from additional electricity sales from the agreement.
3. The power plant can use statistical data to analyze damage causes and apply knowledges to rapidly prevent its machineries and other equipment from impairment.



# Process Improvement and Innovation



## Strategy

- Promoting the creation and utilization of innovations, being one of the corporate core values.
- Setting up an innovation working group to promote the creation of innovations throughout the organization.
- Bolstering the transformation of work process towards the digital era completely (Digital Transformation)

## Indicator

- The number of 'Wow Idea' and innovations presented and applied to operations with tangible results
- The progress of 'Digital Transformation' projects aligned with the roadmap.

## Target

- Employee participation from all departments in presenting the 'Wow Idea' and innovations.
- Assessing the current status of power plants in China to develop a Digital Transformation Roadmap.

## Performance

- Staff at Bangkok Office presenting 260 Wow Ideas.
- The implementation of a digital transformation project at Luannan Power Plant's Phase 1 meeting the target.
- Establishing Banpu NEXT Company Limited to expand the growth of BPP towards the energy technology.
- A project to improve air quality released at stacks and to reduce heat loss at Zhengding Power Plant was selected as one of the Top 100 Eco- environmental Innovation Projects in 2020 in China.

## Significance and Reporting Boundary

'Innovation', in the context of BPP, is the design and selection of high- efficiency and clean technologies suitable for each project , and the initiation to change the working process to be more efficient. This can be proceeded through studying how to improve the procedures, probably including applying advanced technologies to current tasks such as digital technologies, electricity trading technologies, and a virtual power plant etc. The development of production processes and innovations will be a significant platform to increase competitive advantages and create stable and sustainable growth amid the fast- changing industry during the disruptive technology era.

## Management Approach

BPP has improved its production efficiency based on the principles of 'Operational Excellence' together with innovations. Employees at all levels collaborate to identify problems possibly arisen during working including finding their root causes through a systematic process and continuous improvement in order to increase working efficiency and process reliability as well as to reduce costs and losses in a production procedure. The process starts with training employees to enable them to identify the problems that may arise during their working processes with the support from a corporate team. In addition, a knowledge exchange between business units for mutual learning has been conducted, while employees have the opportunity to present a project initiated and implemented with fruitful results.

BPP has driven innovation through the creation of corporate culture - the 'Innovative' value, one of the three corporate shared values. Innovation has been

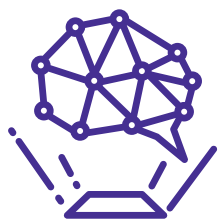
promoted through various activities in order to help all employees understand the importance of applying innovation to their works. The 'Wow Idea' system has been created for employees to propose their initiatives so that they can present the ideas and innovations leading to the concretely tangible practices.

With a realization of future operations in which digital technology will play an important role in creating competitive advantages, BPP has paid great attention to the transformation of work processes to the digital age (Digital transformation). As a result, not only devices have been modified, but also applications have been developed. Moreover, employee's digital skills have been enhanced, while their working concepts have been adjusted so that they have flexibilities, skills and expertise, being able to quickly respond to any new changes or demands. This includes the effective cooperation with experts in various fields (Agility).

## Performance

BPP together with Banpu Group have managed and promoted innovations as well as motivated its employees to present ideas for improvement, turning them into tangible actions via the online 'Wow Idea' presentation system. Prior to implementation, the 'WoW Idea' concepts will be considered on their appropriateness by the 'WoW' committee consisting of employee representatives. The 'WoW' ideas can be level - up by further presented to the Innovation Committee. In 2020, there were 260 WoW idea presented by staffs at Bangkok Office.

BPP has established Digital Capability Center at Beijing office and Luannan Power Plant since 2020. Over 150 employees participated in digital workshop in order to enhance their digital skill for applying fundamental and digital technology in their work.



In 2020, BPP has developed **7 digital technology projects,**

which created value around **1.15 million USD** including:

1. Digital Patrol Inspection
2. Digital Work Permit
3. Coal Blending
4. Safety Double Control
5. Work Order Management
6. Solar Inventory Management
7. Energy Management

### Examples of innovation projects in 2020

- A project to improve air quality released from stacks and reduce heat losses at Zhengding Power Plant was selected as one of the Top 100 Eco- environmental Innovation Projects in 2020, in China.
- A project to improve the power plant's boilers to support the waste gas combustions from the customer's production process.
- Loss on Ignition (LOI) Project - A project to reduce losses from the boiler's fuel combustion by using a forecast of unburned carbon of fly ashes.
- Smart Operation and Maintenance: An application developed by BPP for in-house use in the power plant operations and maintenances.
- Coal Blending Optimization System: An application BPP developed for in-house use to maximize efficiencies of coal blending and utilization.
- Predictive Maintenance: A predictive maintenance application used in the power plants by measuring critical parameters able to indicate possible malfunctions right from the start.
- ENIGMA: An application developed by BPP in order to manage operations in its business units and to present data in a format easy for management and related parties to make decisions (asset and monitoring management).
- B-Link: An application BPP developed for in-house use to collect HR information in accordance with the GRI standard. It is a pilot application to support development of a sustainable development report of BPP.

Additionally, BPP has also expanded the scope of its operations to the energy technology through the establishment of Banpu NEXT, such as the energy storage system business, the electric vehicles business, the intelligent community business, and the energy management system, etc.



## Transformation into the Digital Era

Realizing the opportunity to drive the organization towards excellence, Banpu Group is currently proceeding for transforming itself into a true digital organization through modifying the organizational ideas and working procedures to be more flexible and adaptive to change. This will help increase the organization's competitiveness.

BPP has applied new working concepts and digital technology to manage information, current and future work procedures. Additionally, the Digital Center of Excellence (DCOE), a department specializing in digital technology, has been established so as to closely work with various departments by assisting them in preparing personnel readiness. DCOE provides supports on analyzing work processes and identifying areas for improvement through the use of technology or application development in order to quickly resolve the problems.

## Over 120 employees in Banpu Group passed digital workshop.

In 2020, the Digital Capability Centers were officially opened at Beijing Office and Luannan Power Plant by using strengths of each area for maximum benefits of the centers. The Beijing-based Center is focusing on building the startups eco-system, helping accelerate the products creation more quickly. Since Beijing is one of the places having the largest number of startups in China, it can also help other learning centers of Banpu networks. Meanwhile, the Luannan Power Plant Digital Capability Center will be an area open for the power plant's employees and visitors from external parties such as the government agencies, the educational institutions, etc. The center also organizes various activities such as conducting the design thinking workshop, experimenting the work pieces taken place at the power plant, and etc.

Additionally, Banpu Group has developed its internal personnel to understand and learn about digital technology through online courses and workshops. Up to now, 32 employees already attended the online courses while over 120 staff participated in the workshops.

## Digital Development at Luannan Power Plant

Traditionally, employees would inspect the power plant's on-site work daily by using vibration and temperature measuring instruments. The measurement results, however, could not be immediately reported, causing the inflexible coordination within the power plant. The Luannan Power Plant has adopted digital technology such as Smart Operation and Maintenance Application (Smart O&M). Traditionally, employees would inspect the power plant's on-site work daily by using vibration and temperature measuring instruments. The measurement results, however, could not be immediately reported, causing the inflexible coordination within the power plant. The Luannan Power Plant has adopted digital technology to help solve such a problem.

'Smart O&M' is an application developed by a collaboration of two departments namely, the Operation department and the Maintenance department. In the first phase, the application has been developed, consisting of two modules: the 'Operation Patrol Inspection' and the 'Digital Work Permit' for maintenance work in the area. All related work systems have been transformed into the digital system equipped with wireless measuring instruments, helping provide real-time numerical and graph indicators for immediate analysis. It can also display the results on both computers and mobile phones, making the collaboration between the production and maintenance departments more flexible and efficient.

More importantly, the 'Smart O&M' also consists of various sub-modules such as equipment patrol inspection system, equipment defect system, multi-function hand-held inspection device, voice approval, record face-to-face security disclosure, etc. These modules have significantly helped reduce various repetitions down to 10-20%. They have also assisted in creating safety in the workplace where operating officers can examine the vulnerable areas digitally without entering such areas. Additionally, the warning system has been provided so that they will be more careful when being in the vulnerable areas.

# Supplier Management



## Strategy

- Driving and integrating the sustainable supplier management under the corporate governance (CG), ISO 9001 Quality Management System Standard, ISO 45001 Occupational Health and Safety Management System Standard, and ISO 14001 Environmental Management System Standard.
- Establishing the supplier code of conduct and supplier management in accordance with the principles of business ethics, environment and society with efficiency, leading to the sustainable development.
- Supporting and participating in the sustainable development with suppliers in order to mitigate the environmental, social and governance risks.

## Indicator

- Proportion of new suppliers selected under the environmental and social criteria.
- Number of complaints related to supplier management on environment, society and corporate governance.
- Number of incidents involved with contractors violating laws, regulations, human rights and labors.

## Target

- No complaints related to supplier management on environment, society and corporate governance.
- No incidents involved with contractors violating laws, regulations, human rights and labors.
- Local procurements equivalent to no less than 50%.

## Performance

- No grievances relating to contractor's management on environment, society, and corporate governance.
- No incidents associated with contractors violating laws, regulations, human rights and labors.
- Local procurement's values representing 30%.
- The satisfactory survey found that 100% of contractors were satisfied with the operations of BPP

## Significance and Reporting Boundary

BPP has operated its business, putting top priority on the sustainable supply chain management in order to build confidences among its stakeholders and to create values as well as competitive advantages effectively so as to reduce costs and risks possibly arising in the supply chain, such as a lack of production's raw materials, a delay from products awaiting for being manufactured, inclusive of environmental, social and governance (ESG) risks in the supply chain, which may affect the operation, confidence and reputation of BPP

The supply chain of BPP is classified into two main groups as follows:



**Fuel Supply Chain:** Coal is the major raw material for power generation in the thermal power plants of BPP. The supplier management for reducing the risk of supplying coal with quality, price and quantity according to the production plan in each production period is an important factor for the management of production availability and reliability. Additionally, coal is categorized as a commodity product volatile with the world market price, while coal productions and transportations from its original production sites may be affected by the severe natural disasters caused by climate change, etc.



**Machinery Supply Chain:** Manufacturers of machinery parts specific for the power plant's maintenances, which cannot be purchased in the general market, are considered the important suppliers to business operations. Hence, having suppliers with good production, environmental and social management would make BPP to assure of smooth production.

BPP recognizes that supplier operations are directly and indirectly affect its performances. It is, therefore, strongly intends to supporting suppliers to conduct their sustainable operations in accordance with the corporate governance principle. That is to expand the sustainable management framework of BPP to surrounding societies, creating sustainable values throughout the supplier chain. The boundary of this report covers every business entity BPP has greater than 50% of investments and direct management control.

## Management Approach

BPP has established the operating guidelines for supplier management according to the sustainable supply chain policy in order to achieve its goals to create sustainable values throughout the supply chain as follows:

- Procuring with transparency and fairness in accordance with the code of conduct principle of BPP.
- Integrating the targets on safety, occupational health, environment, social and governance (ESG) with the supply chain management strategies and other associated policies as well as searching for opportunities to improve and mitigate risks likely to arise in the supply chain.
- Driving the sustainable supplier management in production units through the integration of ISO 9001 Management System Standard, ISO 45001 Occupational Health and Safety Management System Standard and ISO 14001 Environmental Management System Standard.
- Verifying supplier's qualifications relating to ESG in order to be able to properly identify and manage supply chain risks.
- Promoting business operations with suppliers adhering to ethical principles with social and environmental responsibility, respecting to human rights, and complying with the supplier code of conduct and any associated policies.
- Implementing any procedures to ensure that suppliers comply with laws and local regulations as well as international labor standards, such as setting up selection criteria, stipulating in the procurement contracts, and monitoring suppliers' operations associated with environment, society and corporate governance, etc.
- Supporting local procurements in order to create economic returns in areas where BPP has operated.
- Developing the supplier code of conduct and applying it to supplier management by starting with the critical supplier.
- Encouraging suppliers to expand the use of sustainable practice guidelines throughout the supply chain for the continuous development and efficiency.
- Establishing the key performance indicators and regularly monitoring operations to ensure that the suppliers operate in accordance with the standards and laws set, for example inspecting the supplier's operating sites, etc.
- Establishing the environmental, social, and corporate governance assessment forms in reference to the supplier code of conduct of BPP
- Regularly disclosing the supply chain's sustainable performance to stakeholders.



## Performance

In the past year, BPP had no complaints involved with supplier management. It announced the sustainable supply chain policy implemented across the organization, including its subsidiary companies so as to use it as the principle of supply chain management covering the areas of business ethics, environmental and social management. In addition, the supplier code of conduct was developed in Thai, English, Chinese, Japanese, and Vietnamese languages for communicating with suppliers who use these languages clearly.

In the past year, BPP managed key suppliers as follows:

- Defining clear criteria and qualifications for supplier's selection consistent with the sustainability policy and business ethics of BPP, for example, specifying clear criteria and qualifications for choosing suppliers for the power plants' construction to expand their production capacities and improve the power plants in China, covering supplier's operations on quality, environment, society and governance.
- Procuring transparently through bidding processes, clearly determining the evaluation criteria at all steps by communicating information thoroughly, notifying suppliers via online systems, such as the coal procurement system of the three CHP plants in China through the centralized coal procurement system in order to select suppliers who meet the requirements of BPP.
- Verifying supplier's qualifications in the areas of operational histories, reputations, and legal compliance to reduce operational risks before procurements as well as visiting supplier's operations in the areas, such as key component manufactures for the power plants, etc.
- Planning to coordinate with suppliers appropriately and managing product delivery periods as planned and in accordance with the procurement criteria, such as shipping of coal and machinery parts for maintenances to reduce supply chain's risks possibly affecting the operations of BPP.
- Conducting the business partner's satisfactory survey, including suppliers. The survey found that 100% of suppliers were satisfied with the operations of BPP.

BPP has promoted mutual operations with suppliers by adhering to the ethics principle with social and environmental responsibility, respecting to human rights, and in line with the ethical principles to conduct business with suppliers at the joint venture power plants, for example compliance with the policies of the International Maritime Organization (IMO) for coal partners of BLCP power plant; IMO adjusting the standards for large cargo ships to use fuels with sulfur contents of less than 0.5% from 3.5% in order to reduce sulfur emissions from coal transportations.

### Centralized Coal Procurement

The three CHP plants in China are offering centralized coal biddings through the Centralized Coal Procurement system, in which the bidding prices are submitted. In order to select the proper suppliers according to the needs of BPP, the clear bidding criteria have been set up while details (of bidding criteria) are communicated and clarified transparently and can be examined. This system has been developed from a traditional procurement system which separated procurements based on the need of each power plant.

Additionally, the IRIS application, an application using a digital technology procedure to create the Digitalization of Market Intelligence system, was developed so as to analyze and purchase coal for feeding the power plants in China. IRIS will collect coal market information in China, including prices, land and water transportations' costs, coal volumes in the stockyard at each distribution point, coal industry information, and macro-economic news. Users can check the aforementioned information at any time (real time). This application allows BPP to make right decisions on coal purchase and keep up as well as quickly respond to the market news. By this way, employees do not have to waste times searching and collecting data, allowing them to spend more times to meticulously analyze and review the information received.



# Contractor Management



## Strategy

- Driving the contractor sustainable management at operational units 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 as the management tools for managing contractors with utmost quality and efficiency.
- Managing contractors or suppliers in accordance with the code of conduct, social, and environmental policies.
- Determining the supplier code of conduct, covering business ethics, environment, and society.
- Supporting and participating in the sustainable development with suppliers in order to mitigate risks related to environment, society, and corporate governance.

## Indicator

- The number of contractor's accidents resulted from working or activities of BPP, leading to fatalities.
- No incidents involved with violations of laws and regulations as well as human rights and labors.

## Target

- No contractor fatalities associated with operational accidents
- No ESG complaints relating to contractor management.
- No incidents involved with contractors violating laws, regulations, human rights and labors.

## Performance

- No contractor fatalities involved with operational accidents.
- The contractors fully and strictly complying with laws and regulations and no incidents related to human rights and labor violations.

## Significance and Reporting Boundary

BPP has paid serious attention to contractor management since the contractor is one of its trade partners in the supply chain. Additionally, contractors are the major force in creating stability for and building confidence on the power generation process, providing quality and safety operations, including constructing the projects in accordance with the standards set. This in turn, helps the organization in achieving the targets set for economics, society, and environment.

Major contractors of BPP are as follows:

- 1) Operation & Maintenance Contractors
- 2) Maintenance and Service Contractors
- 3) Engineering and Procurement and Construction Contractor

These contractors are the key drivers for BPP to achieve its operational goals. As contractors must have extensive knowledge and expertise, the contractor selection criteria should assure that those selected have potential to operate.

Since most contractors of BPP are working at the operational sites, risks associated with contractor's operations have been assessed and managed properly, equally to its operational employees in the areas. Having a sound contractor management system has helped increase the operational efficiency, create safety workplace, and promote the corporate social responsibility image of BPP among involved parties. Besides, it has also helped reduce risks as well as prevent any dangers from accidents possibly arising from the production processes within the organization. The boundary of this report covers all business units BPP has investments greater than 50% and direct management control.



## Management Approach

The contractor management practice guideline of BPP is similar to that of the trade partner management following the sustainable supply chain policy, of which details are as following:

- Selecting contractors with a transparent manner in accordance to the code of conduct principle.
- Identifying clear contractor selection criteria; In addition to having professionalism and expertise, key contractors must have the operation management system equivalent to the international principles and laws, for example, safety and environmental management, labors and human rights standards, and passing the environmental, social and good governance assessment, etc.
- Enhancing contractors' efficiency and operational performance through an integration of ISO 9001 Quality Management System Standard, ISO 45001 Safety and Occupational Management System Standard, and ISO 14001 Environmental Management System Standard at the operation sites having significant risks.
- Arranging appropriate working environment, organizing trainings to provide knowledges on safety and working environment, and assessing risks associated with contractors' operational activities before starting working.
- Regularly monitoring contractors while operating in the areas for continuously improving operational quality.
- Promoting local contractors having sound capacities to run business with BPP.
- Seeking opportunities to conduct the sustainable operations with contractors in order to create the sustainable growth with contractors and communities in the areas, such as building working capacity and jointly running CSR projects, etc.



## Performance

In the past year, the operating power plants had no contractor fatalities resulted from operations. The three combined heat and power (CHP) plants in China handled the contractor's quality, safety, occupational, and environmental operations through the ISO 9001 Quality Management System Standard, the ISO 45001 Safety and Occupational Management System Standard, and the ISO 14001 Environmental Management System Standard. By this way, contractors were part of operating these management systems to achieve the targets set.

In 2020, BPP recorded no incidents or complaints related to environment, social and governance (ESG). Furthermore, it had fair and transparent procurement process, providing appropriate working environment for contractors, inclusive of arranging the rest area during free time, organizing recreation activities, so as to make contractors relax when out of work. In addition, other activities to create good relationships were also arranged such as doing the exercise prior to starting working, communicating about cases of accidents and unsafe operating in various areas or the 'Daily Safety Talk' so as to be beneficial for working together with safety caring mind to each other.

BPP announced the sustainable supply chain policy, which was completed in 2020. The contractor prioritization criteria were also developed for the critical tier-1 suppliers, the new vendors and the existing ones to comply with the trade partner practices guidelines of BPP. In addition, they must fully pass the ESG risks assessment by the year 2025.



# Customer Management



## Strategy

- Managing customers sustainably in production units through the integration of ISO 9001 Quality Management System Standard, ISO 45001 Occupational Health and Safety Management System Standard, and ISO 14001 Environmental Management System Standard.
- Integrating customer management into the business ethics, environmental and social policies.
- Regularly surveying customers' satisfactions and expectations for continuous improvement.

## Indicator

- Proportion of customer complaints resolved in a timely manner.
- The number of customer grievances associated with customers' privacy data protection.
- The number of customers' complaints involved with safety and environment regarding product usage.

## Target

- Proportion of customer complaints corrected in a timely manner equivalent to 100%.
- No customers' complaints related to keeping customer privacy information.
- No customers' grievances associated with safety and environment regarding product usage.

## Performance

- The three combined heat and power (CHP) plants in China were able to maintain their availability and reliability according to the customers' needs and correct the complaints in a timely manner.
- No customer grievances relating to keeping customers' privacy data.
- No customer complaints involved with safety and environment, and product usage.

## Significance and Reporting Boundary

BPP has five main categories of customers, namely:



The primary customers mainly generating revenues are the government agencies and state enterprises under the long-term power purchase agreement, as well as the industrial sectors buying steam. Realizing that the operations of BPP have contributed to the stability of China's electricity system and is the significant part in the industrial sector's production process affecting the well-being of the communities, it is, therefore, a responsibility of BPP in delivering products to meet customers' expectations with flexibility and readiness in adaptation to the needs of customers. Conducting business in good faith and keeping customers' privacy data, as well as maintaining the best practice standards for safety and environmental operations will be an important foundation in building business success together in the long run.

The boundary of this report covers all business entities in which BPP has investments more than 50% and direct management control.

## Management Approach

BPP has applied the ISO 9001 Quality Management System Standard to its production units requiring contacts with variety of customers. One of the quality management approaches is 'Customer Focus' of which processes are able to help in the following areas:

- 1) Creating understanding of needs and expectations between producers and customers
- 2) Setting the operational goals in accordance with customers' needs and expectations.
- 3) Communicating about customers' needs and expectations throughout the organization to create understanding among employees
- 4) Measuring customers' satisfactions.
- 5) Establishing a systematic customer relationship.
- 6) Taking into account the balances in responding to the needs of customers and other stakeholders.

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



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



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



**3) People values** by developing knowledgeable employees and build the sound corporate culture with qualified human resources ready to accurately solve the customers' problems in a timely manner.



**4) Reputation values** by operating businesses professionally based on the code of conduct and good corporate governance.

## Performance

In the past year, the three CHP plants in China were able to maintain their availability and reliability according to customer demand from both public and private sectors during the outbreak of a new strain of corona virus (COVID- 19). Throughout the year 2020, all three CHP plants were still able to continue their production continuously by strictly complying with the government's epidemics preventive measures and the occupational health and safety standards in order to deliver power and other energies to surrounding communities.

The customer satisfactory survey found that customers' satisfaction was in the sound level. There were no complaints related to keeping customer's privacy data, safety, and environment associated with product usage. Additionally, the power plants also had flexibilities in preparation for supplying steam before the deadline in order to accommodate the customers' needs during the winter that came earlier than usual. Moreover, BPP has expanded the production capacities of Zhengding Power Plant since 2019 and Luannan Power Plant in 2020, respectively, in response to higher demand of steam.

### Joint- Venture Power Plants

- Electricity generated by solar power plants in both China and Japan was sold to the government sector under the power purchase agreement without indicating the quantity of power supply because it is the renewable energy, of which the production volume varies upon the intensity of natural lights. Only the electricity quality would be determined, such as the characteristics of voltages, frequencies, etc. Consequently, BPP was able to generate power according to the international quality standards and the power purchase agreements.
- BLCP Power Plant, a joint- venture company in Thailand, was able to maintain its availability factor, meeting the availability hours as stated in the power purchase agreement. Moreover, the power plant could complete a maintenance faster than the target set, enabling it to generate additional electricity from the power trading hours specified in the power purchase agreement smoothly.
- HPC Power Plant, a joint- venture company in Lao PDR, was affected by a strike (of lightning) on the transmission line, making one of its three production units damaged and ceased operations for of planned maintenance. As a result, two out of three production units were able to generate power. Until the middle of the year, a maintenance of a production unit affected by the strike was completed and the three production units could generate power safely, making the power plant's availability and confidence rates were marginally lower than the plan set.

## ¥ Investment Budget

**CNY 5 million**, receiving a discount on waste gas prices from Xiwang Steel Mill to compensate for Zouping Power Plant's efficiency loss.

## 📈 Benefits

- Increasing a revenue of Xiwang Group by **CNY 10 million**.
- Reducing fuel costs, GHG emissions, and energy consumption volume within Zouping Power Plant totaling **CNY 1.84 million**.
- Lessening the amount of coal consumption by **31,000 tonnes**.
- **Lowering overall GHG emissions** by using waste gases released to replace coal used in the power plant.
- Zouping Power Plant can **respond to customer needs able to build good relationship with Xiwang Group**. This is helpful for the long-term collaboration.

## 🔊 Improving the boilers to Support the Burning of Waste Gases from the Customer's Manufacturing Process at Zouping Power Plant

In 2015, Zouping Power Plant modified its 2<sup>nd</sup> Boiler Unit in order to accommodate changes on power sources, replacing the coal-fired fuel to waste gases generated from the blast furnace gas (BFG) process of Xiwang Special Steel Company Limited in which the blast furnace gas volume of 90,000 cubic meters was released per hour. The 2<sup>nd</sup> Boiler Unit, however, was still unable to handle the total exhaust gas from the Xiwang Steel Plant. There were another 30,000 cubic meters per hour left and released into the atmosphere, directly affecting the environment.

Xiwang Group Company Limited started developing the 'Blast Furnace Gas Mix-burning Retrofit Project' to utilize waste gases from the iron smelting process and to increase the power generation capacity of Zouping Power Plant by installing more equipment at the 1<sup>st</sup> Boiler Unit of Zouping Power Plant. Through this technique, the plants were able to utilize waste gases rather than release to the environment. It also helped reduce emissions of GHG and other waste gases, increasing revenues of both Zouping Power Plant and Xiwang Group. All in all, this technology is reliable and has been used extensively in China for over 20 years.


The working group of Zouping Power Plant studied and assessed safety related risks. Moreover, the additional safety equipment has been installed while operational procedures for extra safety has been put in place, such as the gas leak detection systems in the forms of both equipment at the power plants and employee tracking systems, etc. In addition, the air quality emitted from the stacks has ultra-low emissions, meeting China's environmental standards. The project was implemented on 11 October 2020.



No significant environmental incident

# Environment

A total production capacity of renewable **energy generation** and **solar rooftop** (equity investment)

**347**  
 MWe

The sulfur dioxide (SO<sub>2</sub>) emissions intensity

**0.0254**  
tonnes/ GWh

The oxides of nitrogen (NO<sub>x</sub>) emissions intensity

**0.0420**  
tonnes/ GWh

The particular matters emissions intensity

**0.0027**  
tonnes/ GWh

The greenhouse gas (GHG) emissions intensity

**0.620**  
tonnes CO<sub>2</sub>e/ MWh

Water consumption intensity

**0.901**  
cubic meters/ MWh

# Greenhouse Gas (GHG) Emissions



## Strategy

- Decreasing greenhouse gas (GHG) emissions intensity per unit of product by heightening the power plant efficiency by using innovations and high efficiency and environmentally friendly technologies.
- Investing in renewable energy in order to be part of a low-carbon society in the future
- Enhancing an ability to adapt itself to risks associated with climate change.

## Indicator

- GHG emissions intensity.
- Investing in renewable power generation projects.

## Target

- GHG emissions intensity reducing by 15% against the 2012 baseline by 2020.
- The renewable energy production capacity of no less than 800 MWe by 2025 through the investment in Banpu NEXT.
- GHG emissions intensity not exceeding 0.676 tonnes CO<sub>2</sub>e / MWh during the year 2021- 2025.

## Performance

- GHG emissions intensity was 0.620 tonnes CO<sub>2</sub>e/ MWh, reducing 8% compared to 2019 and a decrease of 1.7% in comparison with the year 2012.
- The renewable energy production capacity of 347 MWe, equivalent to 12.6% of the total power generation capacity.

## Significance and Reporting Boundary

Climate change is an issue affecting the sustainability and the human's well- beings. Hence, it has become the global concern pulling collaborations across the world to reduce the GHG emissions and alleviate its impacts. In order to control an increase of the average temperature of the earth to well below two degrees Celsius, the international countries have set up the common goals to reduce GHG emissions. Policies and laws have been put in place to promote the GHG emission reductions in many countries, such as the Emission Trading Scheme (ETS), limiting fuel consumptions in energy productions, and promoting more investments in the renewable energy, etc.

**Activities causing the GHG emissions conducted by BPP** are summarized as following:

Direct GHG Emissions (Scope 1)	Indirect GHG Emissions (Scope 2)
<ul style="list-style-type: none"> <li>• Utilizing coal and waste gases from the industrial factories as fuel to generate power, steam and heats.</li> <li>• Using diesels for igniting the boiler's combustions, heavy equipment, substitute power generators, internal transport vehicles, etc.</li> <li>• Consuming minimum gasoline for vehicles.</li> <li>• Making use of calcium carbonate (CaCO<sub>3</sub>) for the air quality control system.</li> <li>• Using SF<sub>6</sub> and HFCs gases.</li> </ul>	<ul style="list-style-type: none"> <li>• A purchase of electricity from external sources.</li> </ul>

The boundary of this report covers all business entities in which BPP has invested greater than 50% and management control in accordance with the principle of The GHG Protocol Corporate Accounting and Reporting Standard (Revise Edition), which is in line with that of Banpu Group, including the three CHP plants in China.

The operating results of the joint- venture power plants including the investment in solar power plants through Banpu NEXT (50%) and the two thermal power plants in Thailand and Lao PDR, namely BLCP Power Plant (50%) and HPC Power Plant (40%), respectively, however, are reported in the table annexed. They are not integrated with the GHG emissions database of BPP, according to the GHG emissions reporting standard of Banpu Group as mentioned above.

## Management Approach

Since BPP has operated the power generation and energy businesses, it has directly consumed energy from the production fuel. As a result, BPP has mainly focused on operations to reduce the direct GHG emissions (Scope 1) from various fuel consumptions. As its business operations are the upstream business to generate power and other energy for industrial and residential consumptions, BPP sees the opportunities and potentials to reduce the GHG by improving the energy efficiency, reducing the production process loss, conducting a study on alternative fuel, and looking for opportunities to invest in the low-carbon businesses in order to achieve the GHG reduction targets.

In addition, BPP has closely monitored the policy changes and assessed risks associated with climate change in preparation for adaptations to such changes, such as determining the internal carbon pricing as part of investment considerations on various projects.

BPP has a management approach to reduce the GHG as follows:

### Existing Thermal Power Plants

- **Thermal power plants in China where BPP has direct management control** include the CHP plants in China which are able to consume energy efficiently, having 25% energy loss during a full production capacity of power and steam. Meanwhile the thermal power plants solely generating electricity will lose about 65% of production energy. This has led the CHP plants to have low energy consumption rate and GHG emissions intensity. The customer's demand to purchase steam at different times, however, has directly affected the efficiency of energy consumptions and GHG emissions. BPP, therefore, has placed great emphasis on using innovations to improve the power plant productivity. Additionally, BPP together with Banpu Group have monitored and checked the accuracy of GHG emissions database. The three CHP plants' GHG emissions data have been verified and assured since 2018.
- **Thermal power plants which are the joint venture companies**, namely BLC Power Plant and HPC Power Plant, have focused on the quality management and annual maintenances, inclusive of implementation of the information system to predict a machinery maintenance before it is

broke down (Predictive Maintenance). This will have an effect on the power plants' efficiency, lowering the fuel consumption rate per unit of product and having the equivalent availability factor (EAF) as designed. These factors are the key performance indicators reflecting the readiness and efficiency of the power plants, and directly affecting the GHG emissions' reduction. Consequently, BPP has assigned the Asset Management Unit in collaboration with its business partners who jointly invest in the power plants, to monitor the GHG emissions of its power plants.

Furthermore, BPP is also looking for opportunities to use a variety of fuel in response to the stakeholders and be able to procure fuel supply in the areas such as natural gases, biomass and industrial waste gases, etc. This includes the investment in the hydrogen industry, expected to grow rapidly in the future and will finally help reduce the overall GHG emissions.

### Thermal power plant projects under development and production capacity expansions

BPP has chosen the clean and high efficiency technology to develop the thermal and combined heat and power plant projects in the future. For example, using the Ultra-Supercritical technology, the latest technology for thermal power plants, to design and construct the Shanxi Luguang (SLG) Power Project, a construction of which was completed in the beginning of 2021.

Additionally, BPP is looking for the future investment opportunities related to power generations from natural gas, renewable energy, and environmentally friendly energy industries such as the hydrogen industry. This is a form of clean energy that is growing rapidly. Using hydrogen as a power fuel source can play a significant role in reducing the GHG emissions.

### Renewable Power Plant and Energy Technology Projects

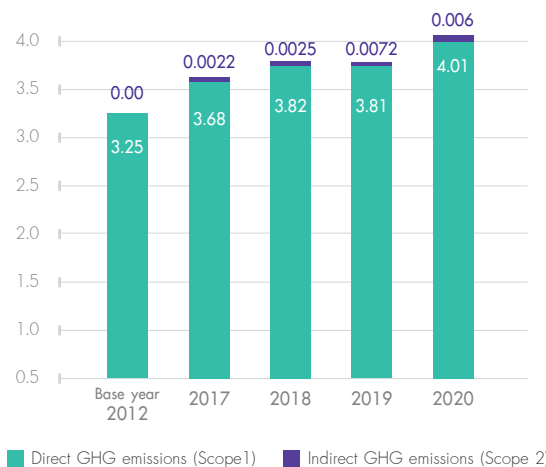
BPP has set its targets to invest in the renewable power plant projects of no less than 800 MWe by 2025 through Banpu NEXT in which Banpu Power has invested 50% of shares. It has also expanded its businesses to the energy technology, such as the solar rooftop, the energy storage & system, the electric vehicle, the smart community development and the energy management system, etc.

## Performance

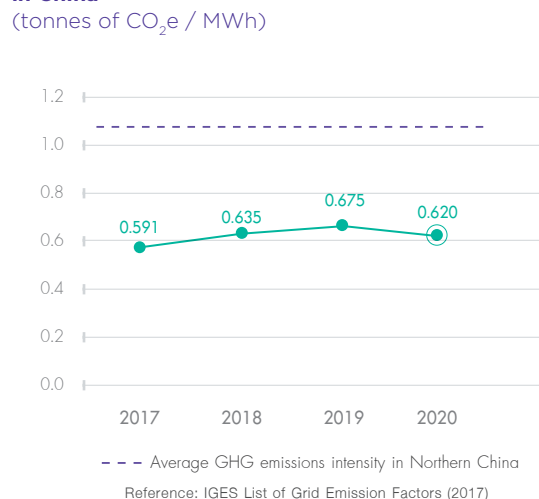
- GHG Emissions Intensity, BPP has changed its GHG emissions database due to the organizational structure amendment when its subsidiary, Banpu Renewable Energy Company Limited (BRE), had merged with Banpu Infinite Company Limited (BPIN) to form Banpu NEXT Company Limited (Banpu NEXT) in February 2020. Banpu NEXT is focusing on the investment and development of renewable energy and energy technology businesses. As BPP holds 50% of shares in Banpu NEXT, it needs to modify its GHG emissions database in accordance with the principles of reporting the GHG emissions database, which is in line with that of Banpu Group. As a consequence of such a change, the operating performance of the renewable energy business is no longer included in the operating performance of BPP.

In 2020, the GHG emissions intensity of BPP was 0.620 tonnes CO<sub>2</sub>e/ MWh, decreasing 8% when compared with 2019 and 1.7% lower than the year 2012 baseline, owing to higher steam demand in China for the previous year. resulted by the industrial sector recovery during the COVID-19 outbreak. BPP was able to generate power consistently with full efficiencies. As a result, its GHG emissions intensity per unit of product was lower. Meanwhile, the three CHP plants in China were still keeping their abilities to manage energy with GHG emissions intensity better than the average of similar power plants in the northern areas of China.

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



**The GHG emissions intensity from the CHP plants in China**  
(tonnes of CO<sub>2</sub>e / MWh)



- BPP together with Banpu Group has established the Climate Change Committee to be responsible for managing the climate change risk holistically as well as mitigating associated risks, leading to a reduction of GHG emissions in the future.
- Setting a target for the year 2021- 2025 to control the GHG emissions intensity of no more than 0.676 tonnes of CO<sub>2</sub>e/ MWh.
- Organizing the workshops to assess risks associated with climate change, inclusive of physical risks affecting production operations, and risks relating to a transition risk to a low-carbon society including changes on policies, laws, technologies, marketing, corporate reputations, etc., as well as a forecast on climate change trends in the future.
- Looking for opportunities to invest in energy, renewable energy as part of a low-carbon society in the future through the investment in Banpu NEXT. In the past year, Banpu NEXT increased expanded its renewable energy production capacity to 694 MWh. BPP holds a 50% stake in Banpu NEXT.
- Increasing the potentials for adaptations to risks associated with climate change.
  - Operation Risk Management: BPP has adopted the Business Continuity Management System (BCMS) in preparation for events interrupting business operations such as natural disasters, disease epidemics. Consequently, the company will be able to deliver products and services to customers and various stakeholders immediately.

- Changes in policies and regulations regarding energy and GHG emissions: BPP has a responsible unit to monitor and anticipate changes in regulations in all areas open for operations at the local level and the central government in order to be able to adapt itself to the changing environmental quality standards that are more extreme. At the same time, it is looking for opportunities to invest in the renewable energy business receiving more supports from the government.

- Disclosing the actions on climate change and conducting a study aligned with the Task Force on Climate-related Financial Disclosures (TCFD), assessing risks and opportunities arising from climate change, including the impact on the current businesses and in the future.
- An innovative projects to improve air quality released from the stack and reduce the flue gas treatment and waste heat recovery at Zhengding Power Plant: The project was selected as China's 100 Eco-environmental Innovation Projects in 2020.

## A Project to Control Exhausts Released from the Stack and Reduce Heat Loss at Zhengding Power Plant

During the year 2016 - 2017, several cities in China, including Zhengding City, had gradually announced policies to control fumes released from the power plant's exhaust stacks. The fumes released from Zhengding Power Plant's stack have ultra- low emission and are derived from steam evaporations in the sulfur dioxide precipitator system. And when the exhaust temperatures and those of outside atmosphere are different, the fumes are released. As a result of an enforcement of the fume control policy, Zhengding Power Plant has to construct a condensing unit, which is a technology commonly used to lower the exhaust temperatures to control fumes released from stacks as required by laws. It is expected that around CNY 20 million investment is needed and an annual operating budget of CNY 1.6 million will be spent. This will result in higher production costs for the power plant in the long run.

On the other hand, Zhengding Power Plant had conducted alternative studies to minimize the impact on electricity costs. It was found that the engineering design by using a heat pump instead of a steam distiller construction to exchange heats can separate the steam mixed with the exhaust gas and control the fume generation.

It is also possible to reuse the heats generated from exhausts, requiring an investment of around CNY 35.5 million and an operating cost of about CNY 2.4 million per annum. The replacement of heat pump does not only control fumes in accordance with the legal requirements, but there are also other benefits as following:



It is an innovation resulted from the commitments to continued development of the Zhengding Power Plant. As a result, this project was selected as one of **China's Top 100 Eco- environmental Innovation Projects in 2020**.



## Other Indirect GHG Emissions (Scope 3)

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

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

Notes:

● Associated with the Company's operations    ○ Associated with the Company's operations but without significance    — Not associated with the Company's operations



## Strategy

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

## Indicator

- The energy consumption intensity.

## Target

- The energy consumption intensity not exceeding 1.72 GJ/ MWh.

## Performance

- The energy consumption intensity was 1.535 GJ/ MWh, better than the set target of 14% and decreasing 20% compared to 2019.

## Significance and Reporting Boundary

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

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



Using coal as a fuel for productions.



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



Using gasolines and diesels for transportations.



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

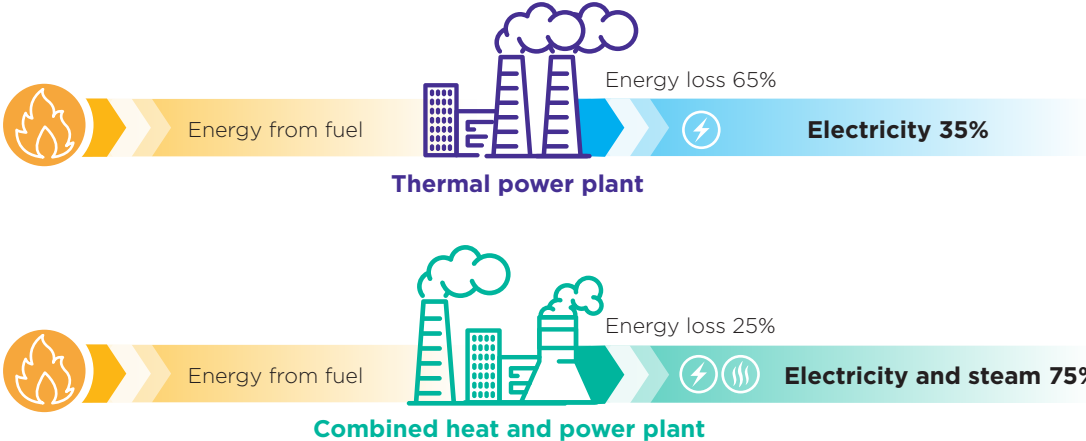


Purchasing electricity from external sources.

The boundary of this energy consumption report is in accordance with the greenhouse gas emissions statement covering all business entities where BPP has invested greater than 50% and direct management control, which are the three CHP plants in China. For renewable power plants and joint-venture thermal power plants, only their operating performances are reported in the table annexed.

# Management Approach

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



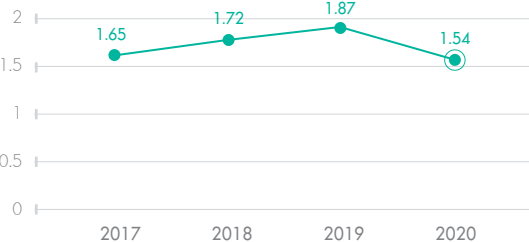
BPP has focused on providing energy management services for the maximum efficiency, namely:

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

# Performance

In 2020, BPP recorded the energy consumption intensity of 1.54 GJ/ MWh, decreasing 17.9% compared to 2019, and 10.8% better than the target set due a significant increase of steam sales volumes and a recovery of the industrial and households consumptions resulting from the COVID- 19 outbreak in China. As a result, BPP was able to operate all of its production units with full efficiency. Moreover, using digital innovations to help in managing coal consumptions with utmost efficiency and maintenances with the quality meeting standards enabled the company to continue its productions at the full efficiency. This made the energy consumption intensity per unit of product of BPP lower.

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







BPP has regularly monitored and compared the imported energy to the energy produced as well as the energy consumption of each production segment since it is the power generation's main cost for thermal power plants and CHP plants. BPP has also looked for opportunities to reduce fossil energy consumptions as it is a cost and generates the greenhouse gases, such as:

- Conducting a study on fuels modification available in each area, such as natural gases, biomasses, etc.
- Improving the techniques to spray fuels into the boilers to increase energy efficiency.
- Seeking production opportunities and using more clean energy to replace fossil energy, such as installing solar panel on coal storage plants, streets, and parking lots, etc.
- Selling by-products generated from power productions according to market demand such as steam and cold water, which can reduce energy losses and energy consumption intensity per unit of product.
- Applying the digital technology to the development of applications for energy management in the power plants.

### Coal Blending Optimization System Application at Luannan Power Plant

BPP purchases coal from various sources, resulted in a vary of coal qualities based upon each shipment. The power plants therefore must blend coal to meet the desired quality. This has led to risks arising from mixing coal that does not meet the quality needed as well as an increase in production costs. It also affects the power plant's efficiency. Hence, the Luannan Power Plant's Engineering Department has developed an application for the efficient coal blending as following:

-  Calculation model management module
-  Blending scheme calculation management module
-  Coal yard information system module
-  Performance tracking module

The afore- mentioned development has helped the Luannan Power Plant be able to efficiently control its energy consumptions and production costs relating to coal blending. The power plant has been able to examine the coal quantity and quality in the stockyard quickly, able to analyze and plan to purchase coal in advance effectively.





## Strategy

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

## Indicator

- The air quality released at stacks
- Sulfur dioxide (SO<sub>2</sub>) emission intensity
- Oxide of nitrogen (NO<sub>x</sub>) emission intensity
- Particulate matters (PM) emission intensity

## Target

- The air quality released at stacks in compliance with the laws set.
- SO<sub>2</sub> emission intensity ≤ 0.0766 tonnes/ GWh.
- NO<sub>x</sub> emission intensity ≤ 1.184 tonnes/ GWh
- PM emission intensity ≤ 0.0230 tonnes/ GWh

## Performance

- The air quality released at stacks was in accordance with the laws set.
- The emissions intensity was lower than the target.
  - SO<sub>2</sub> emission intensity was at 0.0254 tonnes/ GWh.
  - NO<sub>x</sub> emission intensity was at 0.0420 tonnes/ GWh.
  - PM emission intensity was at 0.0027 tonnes/ GWh.

## Significance and Reporting Boundary

Sulfur dioxide (SO<sub>2</sub>) and oxides of Nitrogen (NO<sub>x</sub>) as well as a quantity of dusts are the indicators of air quality released at stacks from thermal power plants since they may have the impacts on human health in the area. As a result, the government sector needs to improve the air quality in large cities determining more stringent preventive measures and standards for many consecutive years. It is also a challenge for BPP to improve its pollutant treatment efficiency and control the released air quality to comply with the laws.

The boundary of this report covers the three combined heat and power (CHP) plants in which BPP holds greater than 50% of investments and management control. The joint-venture thermal power plants, namely BLCP Power Plant and HPC Power Plant, however, only report their operating results on the table annexed.

## Management Approach

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

- Continuously using proper technologies to improve a pollutant treatment system before releasing any contaminations from stacks, for example a SO<sub>2</sub> precipitator called the 'Flue Gas Desulfurization (FDG)', a particular matter treatment system, namely the Electrostatic Precipitator, and a dust filter - the 'Bagfilter', etc.
- Opting to use coal with low sulfur contents to lower the SO<sub>2</sub> amount generated at its original point; BPP has developed a long-term purchase agreement for the quality coal resources as specified. The online trading system has also been open for coal traders to offer the coal quality meeting the requirements of BPP.
- The clean technology has been employed to help boilers igniting completely, such as using the effective production and environmentally friendly technology called the 'High Efficiency, Low Emissions (HELE)', the clean technology for boiler's combustions namely, the 'Pulverized Fuel Combustion' and the 'Fluidized Bed Combustion' to reduce SO<sub>2</sub> and NO<sub>x</sub> as well as particular matters during the boiler's combustion.
- Implementing the continuous monitoring system for air quality discharges throughout the production process and defining preventive measures as well as being regularly audited from the outside agencies.

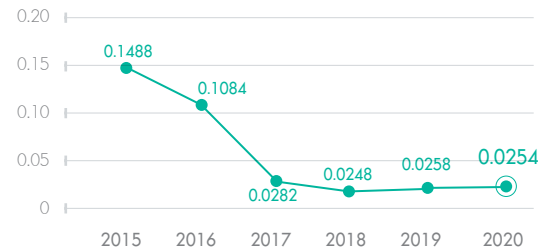
## Performance

A quantity of pollutant emissions through stacks depends on the coal quality used for combustions, the combustions efficiency and the pollutant treatment before being released. The three CHP plants in China have continually improved their air quality emitted via stacks since 2013, resulting in a significantly higher quality of air emissions. In the past year, the three CHP plants in China experienced better air quality than the legal standards, meeting the targets set. They also received recognitions and special financial grants from the government for being a power plant with excellent air quality control.

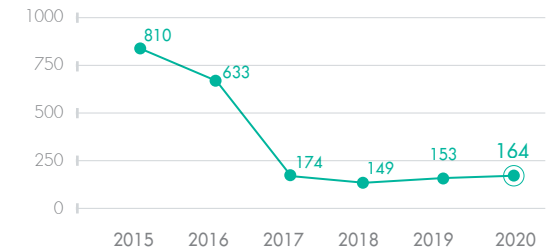
Three combined heat and power plants in China have better **air quality than the legal standard**



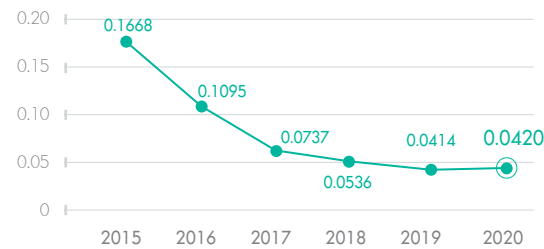
**SO<sub>2</sub> Emission Intensity**  
(tonnes/ GWh)



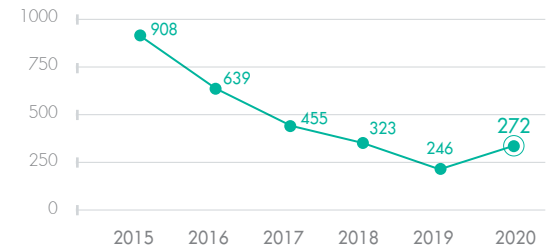
**SO<sub>2</sub> Emission**  
(tonnes)



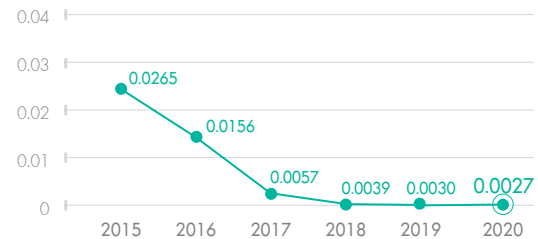
**NO<sub>x</sub> Emission Intensity**  
(tonnes/ GWh)



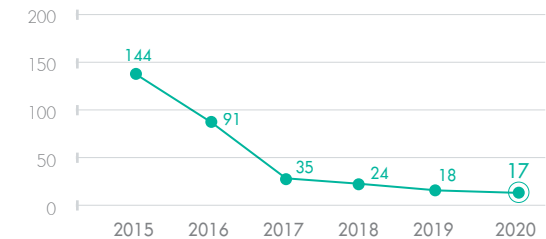
**NO<sub>x</sub> Emission**  
(tonnes)



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



**PM Emission**  
(tonnes)



## Sustainable Development at Zhengding Power Plant

Although the winter season is considered having the coldest weather and the lowest temperature of the year, it is, on the other hand, the happiest and warmest moments for the communities. Since the special festivals with long holidays have always been organized during winter, it allows family members working in different cities to return to their hometowns where they join together to celebrate and do activities on the festive period. Therefore, it is a time of warmth and happiness for the family.

The outbreak of coronavirus 2019 (COVID-19) in 2020, however, has inevitably affected habitants on this earth. People had to quarantine themselves by staying at homes during the cold period to protect themselves from the COVID-19 epidemic. As a result, utilities such as the city's centralized electricity and heating systems were necessary to keep indoors to cope with this difficult time.

Amid such a difficult condition, the employees of Zhengding Power Plant had tried hard running the plant together. As a result, the power plant has been able to generate power and heat supplied for the communities stably throughout the year. It is, therefore, the pride of Zhengding Power Plant's employees for their dedications and hard works that can help the community members get through this difficult period.

Shijiazhuang City is located in Zhengding County, Hebei Province in northern China, where the weather is cold and dry during winter with an average outdoor temperature of 0.3 degrees Celsius. Prior to the operational commencement of Shijiazhuang Chengfeng Cogen Co., Ltd. (Zhengding Power Plant), bulk coal fired boilers had been widely used by industrial enterprises and residents for winter heating. This had caused the severe air pollution. When Zhengding Power Plant started its operation in 2000, however, the centralized heat supply was implemented in Zhengding County. At present, the Power Plant, with a total installed capacity of 73 MW and annual heating capacity of 10 million GJ, undertakes the task of supplying heats to 58,000 residential users and over 180 industrial and institutional utilizers in Zhengding County.

In recent years, China has been facing increasingly the serious environmental problems. To cope with this situation, Zhengding Plant has been committing to exploring a sustainable development way of clean heating supply and creating a **'green and warm winter'** for the people. Not only does the plant meet the requirements of environmental protection, low costs, and low subsidies, but it is also well received by users for its stable supply, reliable quality and perfect services.

### Promoting a project development via innovations and improvement of heating capacity:

Through a series of technical innovations such as recycled water heating and wasted heat recovery, Zhengding Power Plant has continuously improved its heating capacity and expanded the heating supply area. At present, 96% of urban residents in Zhengding County are supplied by the centralized heating system of Zhengding Power Plant.

RELIABLE



### Achieving clean and efficient heating production:

To achieve ultra-low emissions, Zhengding Power Plant has invested nearly CNY 200 million in recent years for the construction and upgrade of environmental protection facilities such as desulfurization and denitrification.

ECO-FRIENDLY

### Affordable heat supply for the benefit of the public:

Technological innovations have brought down heating costs and prices as well as benefited residential users. The power plant has also extended its heating period for five consecutive years and taken the initiative to bear part of the increased costs, in an amount of as much as CNY 17 million during the heating period of 2019- 2020.

AFFORDABLE

In addition, the power plant has been keeping good maintenance and upgrading its heating facilities, strengthening a dynamic monitoring of heating operations, as well as improving the emergency plans to ensure a stable operation of heating supply. Furthermore, the plant has also taken various measures to improve its heating services, such as implementing the grid management and clearly identifying responsibilities of involved parties; providing a 24- hours service to solve unexpected problems in heat supply; focusing on the stable heat supply for key user groups, namely nursing homes, hospitals and schools; launching the new payment system by scanning the QR Code so as for user's conveniences, especially during the COVID-19 outbreak at the beginning of 2020 when the whole populations were quarantined at home.

The Zhengding Power Plant's employees, however, were able to overcome numerous difficulties by providing stable heating and extending the heating period. This is to ensure the normal life of people during the quarantine period and stabilize the community members.

The heating model of Zhengding Plant does not only meet the demands for environmental protection, but also utilize coal resources in an efficient way. The plant is able to provide high- quality heating services with affordable prices for residents. It is also acceptable by the government. In addition to ensure that the project will be developed in a sustainable way in the long- term, the Zhengding's heating model has helped improving the quality of life and sense of well- being of local people. As a result, Zhengding Power Plant has won praise from the local government and communities, creating significant social benefits mainly in:



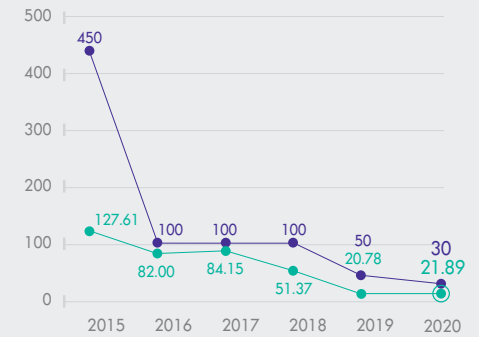
**Customers' satisfaction:** With the high- quality heating with affordable price and good services, the centralized heating of Zhengding Power Plant has become the first choice of the users. Many residents who used other heating methods have switched to the plant's centralized heating system. This has raised customer satisfaction continuously, enabling the plant to achieve the 'zero complaints' from users.



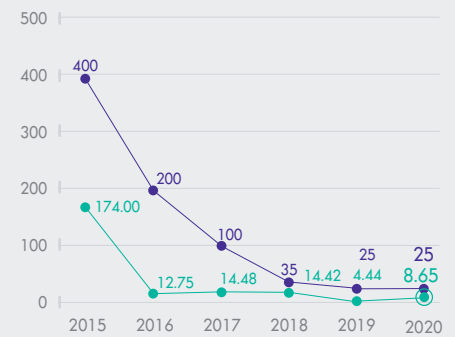
**Government's satisfaction:** The heating model of Zhengding Power Plant is highly recognized by the Chinese government at all levels. The leader of the inspection team from Ministry of Environmental Protection said that **"Zhengding Plant is the most eco-friendly power plant of its size I have ever seen in China. The power plant's experience in environmental protection and management is worth spreading."** After researching, the Shijiazhuang municipal government organized several heating companies to visit the power plant and recommended the heating model of Zhengding Power Plant to the National Energy Administration as a typical example of clean heating.

At the same time, Zhengding Power Plant is achieving its own sustainable development. Over the years, the power plant has been maintaining the largest centralized heating area, the fewest heating issues, the lowest heating subsidy, and the best heating quality in the surrounding counties of Shijiazhuang City with affordable cost and environmental friendly. This has greatly enhanced the reputation of Zhengding Power Plant and BPP as the sustainable energy provider in the area.

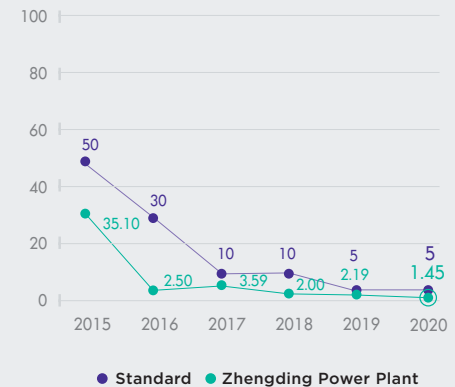
**Oxide of Nitrogen (NO<sub>x</sub>) Concentration**  
(mg/ m<sup>3</sup>)



**Sulfur Dioxide (SO<sub>2</sub>) Concentration**  
(mg/ m<sup>3</sup>)



**Particulate Matters Concentration**  
(mg/ m<sup>3</sup>)





# Water Resources Utilization and Water Discharge



## Strategy

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

## Indicator

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

## Target

- Water consumption intensity < 1.103 cubic meters / MWh
- Discharged- water quality complied with the legal standards set.

## Performance

- Water consumption intensity was 0.901 cubic meters/ MWh
- A released water quality was in accordance with the standards required by laws

## Significance and Reporting Boundary

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

The framework of this report covers all business entities in which BPP has greater than 50% of shares and management control, inclusion of the three combined heat and power (CHP) plants in China. For the renewable power plants and the thermal power plants which are the joint-venture companies, only their operating performances are reported in the table annexed.

## Management Approach

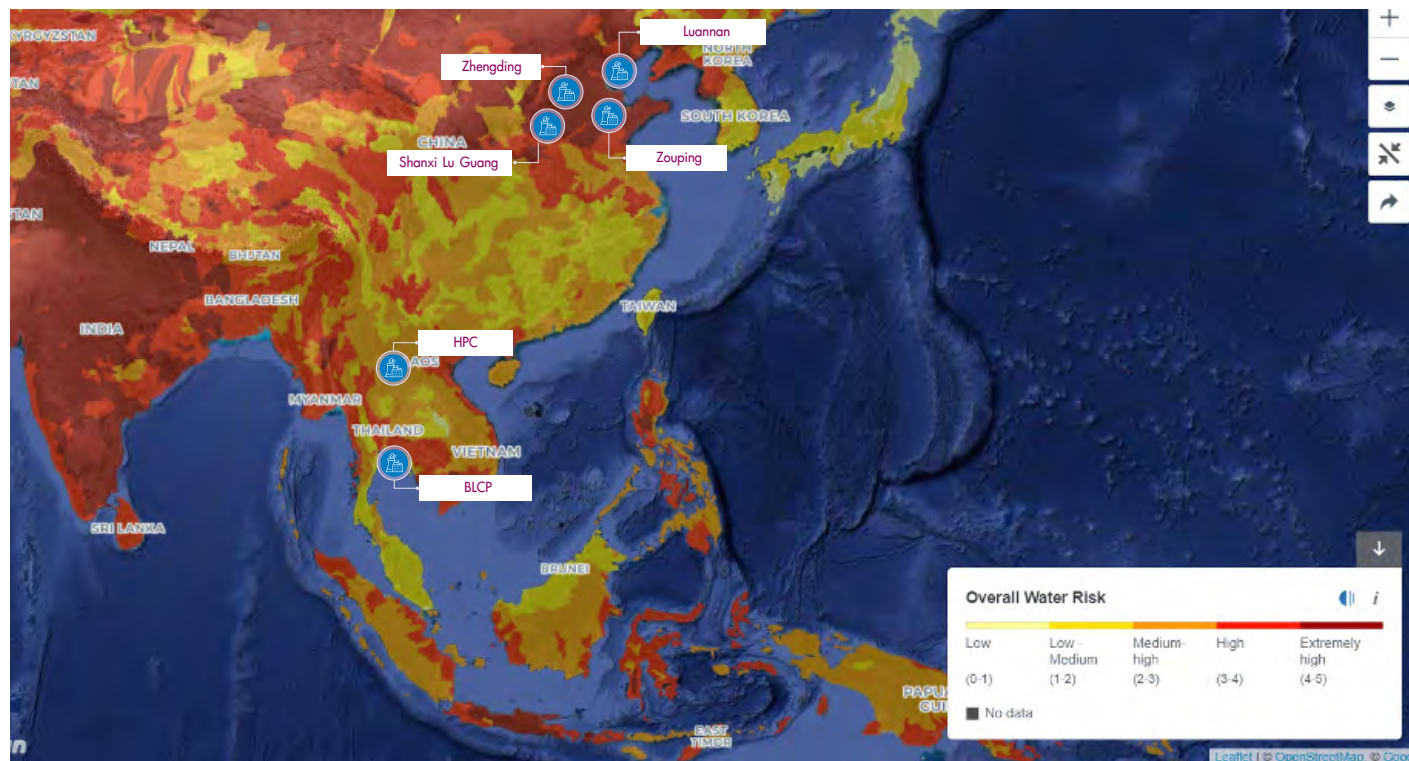
Since the sources of water for steam production of the CHP plants in China are from groundwater and water purchased from external manufacturers. the water management has been emphasized on recycling water as much as possible in order to reduce the amount of water discharge and release water quality in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

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

## Water Resources Risks Assessment

BPP has assessed the water shortage risks from its business unit's locations, referring to the WRI Aqueduct Water Risk Atlas (2019), a program for classifying the areas having water resources risks associated with physical, economic, legal and anticipated future risks.

The 2020 assessment using data of areas having water shortage risks over the next 20 years, found that all thermal power plants in China are located in the areas with extremely high water risks. Meanwhile, the joint-venture thermal power plants, namely BLCP in Thailand and HPC Power Plant in Lao PDR have the medium-high water risks. Consequently, BPP has regularly reviewed the water management plans of all business units in order to mitigate such risks.



Sources: World Resource Institute

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

Remark: Shanxi Lu Guang Power Plant, HPC Power Plant, and BLCP Power Plant are the joint venture companies where BPP has no direct management control, but relied on the supervision of the Board of Directors of such a company. The management therefore focuses on coordination to report information and monitor the current situation.

## Performance

In 2020, the three CHP plants in China had a water consumption intensity 0.901 cubic meters/ MWh and was able to achieve a water consumption intensity of no more than 1.103 cubic meters/ MWh, better than the set target by 18%.

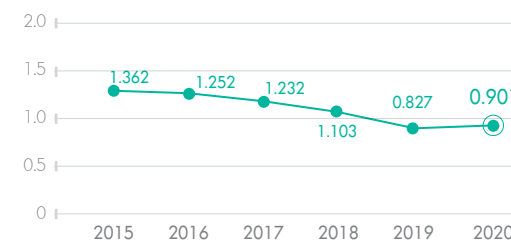
The production commencement of Luannan Power Plant 's Extension Phase 3 and a significant increase of steam sold in the past year directly affected a water consumption intensity and the amount of water drawn from the water sources, causing water consumption intensity and water withdraw, to be slightly higher.

In addition, the organizational structure change in 2020 has made BPP disclose only the performance data of the business entities it has more than 50% of investments and management control, including the three CHP plants in China. The previous year data, including data from renewable energy plants were therefore not used in this year's calculations, resulted in higher water consumption rate per unit of product.

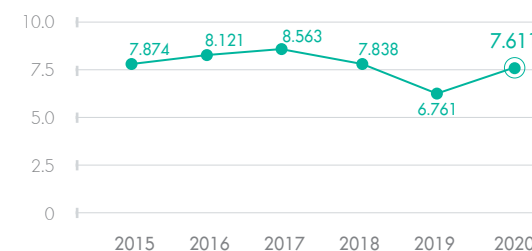
However, BPP was still able to control the amount of water discharge by 3% from the previous year, owing to the Zero Discharge Water Treatment Project in the power plant's extension unit in order to comply with the Chinese government regulations. All discharged water from the power plants was sent to an authorized external collector for treatment. Moreover, the discharged water quality of all power plants was in line with the standards required by laws, while there were no incidents associated with chemical leakages contaminating the water sources.

BPP has continuously collected water data in order to analyze it for designing projects efficiently, reducing water consumptions for the power plants. The process has been done through improving a collection of water and discharged water data to comply with the GRI 303 (2018) standard since 2019. Such data was certified by the third-party in 2020 for the first year while the water balance at the three CHP plants in China was successfully completed for further water management planning.

**Water Consumption Intensity**  
(Cubic meter/ MWh)



**Water Withdrawal**  
(Million cubic meter)



### Water Balance of the Combined Heat and Power (CHP) Business in China

Water withdrawal  
**7,610,699 cubic meter**



- Underground water 2,230,712 cubic meter
- Third-party Water Withdrawal 5,379,986 cubic meter
- Surface water 4,116,807 cubic meter
- Recycled water (from water treatment system) 1,263,180 cubic meter

Water consumption for operation  
**5,831,522 cubic meter**



Water discharge  
**1,779,177 cubic meter**



- Treatment water (at centralize water treatment system) 1,779,177 cubic meter



### Water Treatment in Combine Heat and Power Plant in China

Since China is located in an area where there is a high risk of water scarcity, the government has set measures to control water consumption and wastewater discharges for the industrial sector. It began to be applied to the emerging industrial plants as well as in the additional capacity expansion ones.

The government's control measures on water consumption have made the three CHP plants in China to improve their production processes for the utmost efficient water consumption. The Luannan Power Plant has improved its water treatment system in the production process in terms of capacity expansion to be able to reuse the whole released water (Zero Discharge) by reverse Osmosis, Multiphase Evaporation (MPC) and dry by waste gas from combustion. Generally, the wastewater in the power plants consists of two main parts: production effluents and general wastewater. The Luannan Power Plant has been able to operate its wastewater treatment system since October 1, 2020 and can **reuse all effluents at 98%** of water consumptions in operating process with zero water discharge to the environment.

### Fresh Water Production from Seawater to Reduce the Total Raw Water Consumption of BLCP Power Plant

As the drought had been intensifying and affecting the Eastern Economic Corridor (EEC) in the past year, the Industrial Estate Authority of Thailand (IEAT) requested for cooperation from the Map Ta Phut Industrial Estate Group to reduce water consumption by 10%.

Consequently, the BLCP Power Plant responded to the governmental policy and the IEAT by **reducing its total fresh water consumption by 100%** from 15 February 2020. The water filtration system using a membrane or the Reverse Osmosis Seawater Desalination Plant (ROSDP), has been used for producing fresh and tap water from the seawater, with a production capacity of 1,000 cubic meters/ day. The aim is to alleviate the water shortage crisis in the Eastern region, leaving enough water for the public and farmers.

This project is a result of the future water shortage risks assessment. Therefore, BLCP Power Plant has planned and prepared for this situation in advance with the hope that its operations will not adversely affect the fresh water resource consumption in the area, enabling the power plant to be ready to respond to government policies quickly.

# Waste



## Strategy

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

## Indicator

- Proportion of hazardous wastes to landfill.
- Proportion of reused and recycled fly-ashes.
- Proportion of synthetic gypsums eliminated by reuse or recycling.

## Target

- Zero hazardous wastes to landfill.
- Proportion of fly ashes eliminated by reusing and recycling is no less than 100% per annum.
- Proportion of reused and recycled synthetic gypsums is no less than 100% per year.

## Performance

- A zero hazardous waste to landfill.
- Proportion of fly ashes eliminated by reuse or recycling equivalent to 100%.
- Proportion of synthetic gypsums reused or recycled equally to 100%.



## Significance and Reporting Boundary

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

The boundary of this report covers the businesses of which BPP has more than 50% of shares and management control including the three combined heat and power (CHP) plants in China. However, only the operating results of thermal and renewable power plants, which are the joint-venture companies are reported in the table annexed.

## Management Approach

BPP has managed its wastes under the environmental policy, using the 3Rs principles, including Reduce, Reuse, and Recycle. The aim is to achieve a target of zero hazardous waste to landfill and operating in accordance with best the practice standards and legal compliance of each country.

As a result, wastes from the CHP plants have been classified into three types: hazardous wastes, non-hazardous wastes, ashes and gypsums. The waste management guidelines can be summarized as follows:

Waste Types	Example	Management Approach
<b>Non-hazardous wastes</b>	<ul style="list-style-type: none"> <li>Papers and office equipment</li> <li>Metal scraps materials and equipment as well as packaging.</li> <li>Household wastes</li> <li>Organic wastes generated from tree trimmings and mowing in the area</li> </ul>	<ul style="list-style-type: none"> <li>Consumption reduction</li> <li>Storage and classification for reuse and recycling.</li> </ul>
<b>Hazardous wastes</b>	<ul style="list-style-type: none"> <li>Used oils, lubricants</li> <li>Used batteries</li> <li>Chemicals used to improve water quality and other chemicals including packaging</li> </ul>	<ul style="list-style-type: none"> <li>Decreasing consumption</li> <li>Looking for opportunities to transforming hazardous waste to those able to be treated and reused better.</li> <li>A reduction of packaging usages by transporting and installing hazardous wastes in the chemical storage tanks.</li> <li>Storing and classifying wastes for reuse and recycling.</li> <li>Defining measures to prevent and handle waste leakages in the event of emergency.</li> <li>Transportation, disposals and sales for recycling must comply with the standards required by laws.</li> <li>Delivering wastes for disposal by the certified external parties.</li> </ul>
<b>Ashes and gypsums</b>	<ul style="list-style-type: none"> <li>Fly ashes</li> <li>Bottom ashes</li> <li>Synthetic gypsums</li> </ul>	<ul style="list-style-type: none"> <li>Separating fly ash sizes corresponding to the customers' needs and the market demand.</li> <li>Exploring the market to sell fly ashes, bottom ashes and gypsums for utilization such as construction materials.</li> <li>Arranging the areas for ashes and gypsums storages appropriately and adequately.</li> <li>Transporting ashes and gypsums for disposals by the certified external parties</li> </ul>

## Waste Management System



### Procurement

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



### Storage

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



### Transportation

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



### Elimination

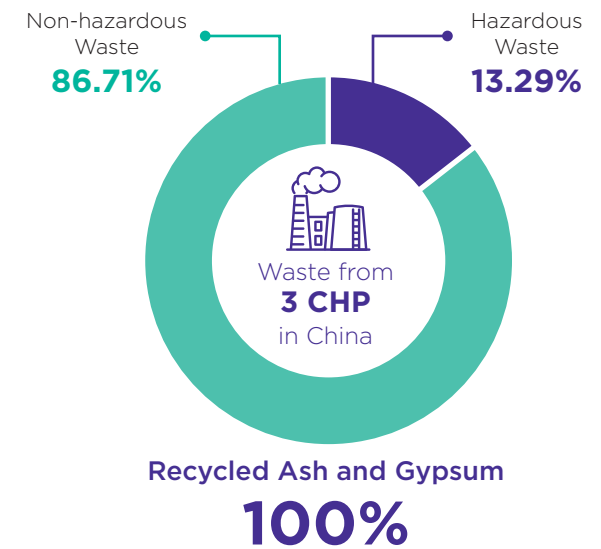
- Classifying wastes for reusing or recycling.
- Distributing or eliminating wastes by means of proper operations in accordance with the good operating standards and legal compliances.
- Recording waste management data on a regular basis.

## Performance

In the year 2020, hazardous wastes generated by the three CHP plants in China amounted to 755 tonnes, consisting of 103 tonnes of hazardous wastes and 672 tonnes of non-hazardous wastes. All of these wastes were eliminated by proper methods, achieving the target set as a **zero hazardous waste to landfill**.

Meanwhile, by-products generated by the air treatment process included ashes and synthetic gypsums from the CHP plants in China. In the previous year, the number of ashes and gypsums generated from fuel combustions was 677,395 tonnes, consisting of 540,024 tonnes from fly ashes and 137,372 tonnes from bottom ashes, respectively. The size of fly ashes was classified prior to selling as construction materials. Classifying fly ash sizes to meet customer's needs is a method to add values to fly ashes generated from the Chinese power plants since the price is higher due to their qualifications meeting the market's demand. In the past year, 85,187 tonnes of synthetic gypsums were produced. All ashes and gypsums were disposed of through reuse or recycling, accountable for 100%.

In addition, BPP together with Banpu Group announced the **waste management policy** and continuously collected waste data so as for further analysis in 2020. The waste data collection was improved to comply with the GRI 306-2 (2016) standard and was the first-ever verified by the third party.





## Strategy

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

## Indicator

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

## Target

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

## Performance

- A complete biodiversity assessment in all areas of business units
- No business units located in the areas of high biodiversity.
- Conducting a biodiversity study in the areas of Vinh Chau Wind Power Plant in Vietnam.

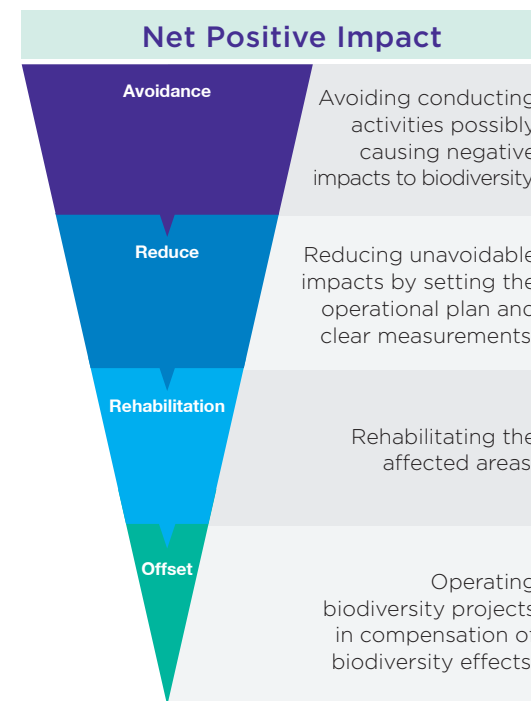
## Significance and Reporting Boundary

Presently, biodiversity is threatened for many reasons, such as habitat loss, a beyond balance utilization of the biological ecology resources, climate change, threats from invasive alien species and pollutions from human activities, etc., especially those in the areas where high biodiversity is existing. BPP is well aware of the importance of biodiversity and has commitment to conducting the power business with cautions, taking into account the project's potential impacts in order to prevent and reduce the effects to a minimum. The boundary of this report covers the power plants BPP has invested greater than 50% and management control, including the three combined heat and power (CHP) plants in China.

## Management Approach

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

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





## Performance

BPP has operated neither power plants nor business units located in areas having high potentials of biodiversity, such as the World Heritage Area, the protected areas by the International Union for Conservation of Nature (IUCN) Category 1-4. This means our operations are not located in the strictly natural reservation areas, national parks, natural monument and habitat/ species management areas or wildlife sanctuary areas. However, BPP has conducted the **preliminary biodiversity risks assessment in all areas** where it operates to ensure that its operations do not have any effects on the biodiversity of the area.



### Biodiversity Conservation Activities at BLCP Power Plant

BLCP Power Plant is a joint venture power plant BPP has hold 50% of investments. It is located in Map Ta Phut Industrial Estate, Rayong Province. In the past year, BLCP Power Plant handed over 'Prachedi Klangnam Mangrove Forest Learning Center' to the Rayong Municipality. The plant also organized the natural resources conservation activities under the theme of 'BLCP Creating, Releasing and Planting Mangrove Forests', with an aim to raise awareness and create participations from all sectors.

BLCP Power Plant initially constructed 'Prachedi Klangnam Mangrove Forest Learning Center' in April 2011 and handed over it to the Rayong Municipality in November 2012 with a construction and interior design budget in the total amount of THB 3,000,000. Later, in the year 2019, BLCP renovated and repaired the Learning Center as well as furnished of its architectural interiors again in order to make the center look modern and interesting. The center will be the educational sources for Rayong people and interested persons, providing information about the history and mangrove forest ecosystem.

In addition to organizing the opening ceremony and officially handing over the Learning Center, three activities to conserve natural resources were also conducted as follows:



- Aquatic animal releasing activities, including three million of black tiger prawns, blue crab squares and baby crab cubs purchased from the Ban Phayun Aquaculture Farm under the local small boat fishing community enterprise, Muang District and Ban Chang District. The activity has generated the continuous incomes and occupations for the fishing group.



- A visit to 'Prachedi Klangnam Mangrove Forest Learning Center', Rayong Province



- The activity to collect garbage from the river in the Prachedi Klangnam's mangrove forest areas.

**No** work-related  
accident



## Social

**Banpu**  **Heart**

A strong corporate culture helping combine the 'power' in driving businesses.

**No incidents** related to environment, social and governance.

Establishing a financial support of **THB 500 million** with Banpu group and alliance to aid society on COVID-19.



## Significance and Reporting Boundary

BPP has operated its businesses in various areas in the Asia- Pacific region. It believes that a strong corporate culture will help drive executives and employees in all areas not only in working harmoniously, but also performing their responsible duties as well as consolidating differences into the organizational strengths to achieve its goals without differences on genders, ethnicities and religions, languages, ages, affiliations, etc.

The boundary of this report covers the business entities in which BPP has greater than 50% of investments and management control namely, the three combined heat and power (CHP) plants in China and the offices in both Thailand and China.

## Management Approach

BPP is focusing on continuously strengthening the ‘Banpu Heart’ corporate culture, consisting of three core values: Passionate, Innovative, and Committed. Ten key behaviors have been defined as following so that employees can practice tangibly.

### Strategy

- Driving businesses under the ‘Banpu Heart’ corporate culture by planning the systematic operations, starting from the new employee’s recruitment process to the performance appraisal procedure.
- Strengthening corporate culture through a variety of activities organized by the Banpu Heart Change Leaders (BCLs) working group.

### Indicator

- The survey results (Banpu Heart Score) on the consistency level of behaviors expressed by employees in comparison with corporate core values.

### Target

- Banpu Heart Score in Thailand to be higher than 70% in 2020.

### Performance

- The Banpu Heart Score results in year 2020 were as following:
  - Thailand: 69%
  - China: 94%

## Passionate

Passionate value consists of:

- 1) Pursue for success:** Leveraging full potential and professionalism for continuous growth and success.
- 2) Can do more:** Valuing different ideas and supporting each other to make things beyond expectation without hesitation.
- 3) Be agile and change:** Strengthening teamwork to enhance positive changes in responsive and effective ways.
- 4) Express care and share:** Embracing differences and sincerely valuing one another.

## Innovative

Innovative value consists of:

- 1) Transcend the trend:** Maximizing contributions to the organization by thinking ahead of the game and working smarter.
- 2) Ideate and get real:** Making a difference, experimenting prototype, and making it happen for continuous improvement of process, products, and services.
- 3) Learn fast, do first:** Daring to take risks, doing, learning, and growing together.

## Committed

Committed value consists of:

- 1) Adhere to Integrity and Ethics:** Doing the right things, always.
- 2) Synergize and network:** Building strong connections to all stakeholders for win-win outcomes.
- 3) Engage to sustainability:** Responsible for the well-being of society and environment.

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

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



## Performance

In the year 2020, Thailand's Office recorded the Banpu Heart Score of 69%. Though slightly lower than the target, the score was significantly higher than the previous year. Meanwhile, the Banpu Heart Score of the office and power plants in China was equivalent to 94%, meeting the targets set.

In the past year, BPP continuously designed and organized activities to promote a corporate culture under the concept of **'Speed Up Your Agility x2... Accelerating faster than before'** in order to create collaborations for working smarter and faster (Smarter and Faster), responding to business changes. The activities organized were as follows:



- Organizing the **'Accelerating Transformation Series Workshop'** for executive management in order to make them be the role models of changes and business leaders during the uncertainty period as well as to foster leaderships focusing on creating common goals throughout the organization. Furthermore, the workshop was also aimed at encouraging participants to share commitments to moving forwards and accelerating the changes in driving the 'New S-Curve' future industry corresponding to the sustainable growth. This workshop will be arranged in a total of four series and the first series of this year called 'Power of Clarity and Alignment' was held on 20 October 2020.
- Arranging a workshop on **'Banpu Heart Experience # 2: How to be innovative'** for executives and employees from all countries. The aim was to use the 'Banpu Heart' behaviors for creating new ideas and designing working models to be smarter and faster (Smarter and Faster) ready to respond and adjust to any changes with forward thinking.
- Holding activities to promote corporate culture; In the past year, the BCLs working group committed to conducting various activities to create strengths during the COVID- 19 epidemic, for example:
  - The **'Banpu Heart Super Fun Day 9.9'** activity was organized by having executives from three core business under Banpu Group, share their work experiences and business achievements using the Banpu Heart corporate culture as a key working driver.
  - The **'Innovation Culture'** activity was conducted to allow employees to propose new ideas with true actions through cross- functional works in order to improve the work processes more efficiently. In the past year, Banpu Power staff submitted the 'Wow Idea' in a total of 24 topics.
  - The activity named **'Banpu Heart Virtual: Work From Home...Smooth and Uninterrupted'** was organized to provide employees the opportunities to share their experiences and exchange how to work from home efficiently.
  - The COVID- 19 experience sharing activity titled **'Stick to the Edge'** was held by allowing employees to talk with their fellows who have experienced with the COVID-19 so that employees are well aware and prepare to protect themselves regularly.
  - The **'Express care & share'** activity was conducted by BCLs working group who represented management in passing concerns to all employees by providing them cloth masks and cleaning gels.
  - The **'Sharing of Happiness via Voices'** activity and the **'Read for the Blind: Storytelling through Live'** activity were organized for employees, aimed at making them enjoy running the fun-filled social responsibility activities as well as sending happiness to the visually impaired persons.
  - The **'Banpu Value U: Best Friends Tell More'** project was arranged by providing employees the opportunity to tell good stories demonstrating 10 key behaviors in order to be a role model for each other.
  - The **'HEART AM (BASSADORS)'** activity under the campaign 'I can see your heart', was conducted with an aim to encourage employees to express 10 key behaviors by submitting the names of their peers who exemplify those behaviors' expressions.



### A 'Banpu Heart Experience' Workshop

BPP has realized the importance of continually cultivating a strong corporate culture. As a result, the 'Banpu Heart' corporate culture has been communicated through various activities with an aim to create understanding among employees and truly apply the 10 key behaviors into their daily lives. The **'Banpu Heart Experience Project # 2: How to be innovative'** project was organized for all levels of employees so as to make them understand and adapt the 'Banpu Heart' corporate culture to practice innovative thinking skills, turning them into tangible actions. The aim was to create business values and to show that 'innovative' is close to every job position while everyone can innovate.

### Promoting Creative Values with Banpu WoW Ideas

The 'Banpu WoW Ideas' is an ongoing project to encourage employees to propose new ideas which are the foundation leading to innovation creation and relentlessly driving the organization forward. The criteria used for evaluating the 'WOW' ideas consist of three areas as follows:



- ① The proposed ideas must be 'new to Banpu.'
- ② The proposed ideas must create values for Banpu e.g., cost reduction, increasing productivity, etc.
- ③ The proposed ideas must be feasible and practical.



In 2020, a total of 260 WoW Ideas were submitted within Banpu Group, 24 of which were the ideas from Banpu Power's employees.

# Competency and Leadership Development



## Strategy

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

## Indicator

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

## Target

- Proportion of key positions with succession plans accountable for 100%.
- Proportion of employees having IDPs equivalent to 100%.

## Performance

- 100% of key positions with succession plans
- Proportion of employees having IDPs were as follows:
  - Thailand: 100%
  - China: 55%

## Significance and Reporting Boundary

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

The boundary of this report covers the business entities of which BPP has greater than 50% of shares and management control, including the three combined heat and power (CHP) plants in China and the offices in both Thailand and China.

## Management Approach

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



### Development of short- term training courses

Focusing on designing the training courses appropriated with each employee' needs by taking following criteria into consideration.

- 1) Employee's competency assessment in comparison with both leadership and functional competencies.
- 2) The knowledge urgently needed for development in order to be aligned with business operations, inclusion of adding newly necessary skills (upskills/ reskills) and learning new technologies or practicing essential skills being able to apply these knowledge areas to improve their current and future works more efficiently.
- 3) Learning methodologies consistent with the 70:20:10 learning and development model, i.e. learning and developing from attending the trainings as well as various educational courses officially organized by the company, learning from coaching, real practices, and real work as well as through direct experiences.



### Development of long- term training courses

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

BPP has designed the employee development model differently based on levels of positions in order to be in line with the most efficient learning process. The company has supported the employee performances in each level as following:

- 1) Developing the Banpu Group Learning and Development Road Map by taking into account the knowledges necessary for the working system, the people system and the managerial skills. The Banpu Power employee development is focusing on leadership and functional competencies so that our personnel, ranging from the employee level to the managerial level, can increase their working skills in parallel with leadership capabilities.
- 2) Improving the leadership competency in accordance with the business strategies for year 2016- 2020.
- 3) Assessing the competency development plan and using its results for regularly improving employee's development plans.



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

- Providing opportunities for employees to gain direct working experiences, e.g., transferring to work in other functions that have work characteristics close to such employee's functions, attending the cross- function projects, and working in overseas affiliates, etc.
- Learning through online course platforms that employees can choose the topics they want to learn by themselves. The online learning courses can be used to help develop the potentials of employees and the organization through expanding body of knowledge either from developing original literacies to have more capabilities or learning new things to develop more new skills.
- Instilling all employees to realize the importance of continuous learning and development through enhancing the 'Growth Mindset'.
- Arranging the 'Knowledge Sharing for Power Business' session by allowing employees to present the topics they want to know so that they understand the ongoing business management.

BPP has selected employees with outstanding performances and attitudes consistent with the corporate shared values in order to formulate a development plan for these employee groups. The aim is to develop the competencies and work experiences beneficial to their future works, inclusion of putting these talents in the succession plan appropriately.

For a continuity of business management and strategic support, the succession plan for key positions has been laid down as follows:

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



## Performance

In 2020, the proportion of key positions with succession plans of BPP was accountable for 100%. Meanwhile, the employees in Thailand and China who developed IDPs were equivalent to 100% and 55%, respectively. Additionally, employees were trained in an average of 30 and 35 hours / person / year in Thailand and China, respectively.

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

Leadership Development Programs	Main Objectives/ Benefits Gained	Target Groups
1. Banpu Engaging Leader & Great Coach: Helping Others Succeed	To develop and train managements as the leaders who encourage employee engagement, and as the persons with whom employees are close and feel comfortable to learn at all times, various managerial skills development programs were provided to these management in the areas of coaching, motivations, and inspirations etc. The purpose is to help management understand and know how to build a unified teamwork as well as promote effective management. In addition, the continuing course called 'Great Coach' was provided for them to learn about coaching skills, and how to apply this skill to coach his/her team members properly, as well as to encourage their subordinates to achieve their works.	<ul style="list-style-type: none"> <li>Vice Presidents</li> <li>Managers and higher</li> </ul>
2. BGLP: First Line Leader	Developing a wide range of competencies for managing working teams in order to drive the plans into actions, including promoting the sharing of real work experiences.	<ul style="list-style-type: none"> <li>Managers</li> </ul>
3. BLP: Future Leader	Preparing the employee's readiness for taking executive positions in the future.	<ul style="list-style-type: none"> <li>Supervisors</li> </ul>

Remarks:

BGLP: BANPU Global Leadership Program

BLP: BANPU Leadership Program

In addition, BPP also organized the in- house employee development course at Bangkok Office and provided equal opportunities for interested employees to apply for these trainings such as:

Courses	Objectives	Duration (Days)	Trainers	Target Groups	Maximum Number of Attendees
1. Basic fire- fighting and evacuation during emergencies.	Complying with labor laws and providing basic knowledge on fire fighting	1	External Agencies	<ul style="list-style-type: none"> <li>All levels of employees</li> </ul>	40
2. Safety for new employees	Complying with laws and providing safety knowledge to new employees	1	Occupational Health, Safety, Environment, and Community Development Department	<ul style="list-style-type: none"> <li>All levels of employees</li> </ul>	25

Courses	Objectives	Duration (Days)	Trainers	Target Groups	Maximum Number of Attendees
3. Basic Contract Knowledge	Basic law knowledge for contract execution	2	Legal Department	<ul style="list-style-type: none"> <li>Supervisors</li> <li>Section Manager</li> </ul>	24
4. HR Management tools for new employees	HR tools for functional development	0.5	Human Resources Department	<ul style="list-style-type: none"> <li>Supervisors</li> <li>Section Manager</li> </ul>	25
5. HR Management tools for new managers	The human resources management principles and tools for managers to develop the functional works.	0.5	Human Resources Department	<ul style="list-style-type: none"> <li>Managers</li> </ul>	30
6. The 7 Habits of Highly Effective People	The self- development principle, interpersonal relationships, leaderships, and increasing efficiencies.	3.5	External Agencies	<ul style="list-style-type: none"> <li>Section Managers</li> <li>Managers</li> </ul>	24
7. Taking the Risk and Moving Forward	Efficient risks management in accordance with business operations of BPP	2	External Agencies	<ul style="list-style-type: none"> <li>Section Managers</li> <li>Managers</li> </ul>	30
8. Energy Titan	Learning about business operations of BPP throughout the supply chain and via the business simulation games.	3	External Agencies	<ul style="list-style-type: none"> <li>Section Managers</li> <li>Managers</li> </ul>	75
9. Getting Things Done	The art of increasing productivity without stress.	2.5	External Agencies	<ul style="list-style-type: none"> <li>All levels of employees</li> </ul>	24
10. Power Apps	Designing and using applications to increase work efficiency.	2	External Agencies	<ul style="list-style-type: none"> <li>All levels of employees</li> </ul>	30
11. Virtual Professional Personality	Developing a good visual personality for presentations and how to build credibility.	2	External Agencies	<ul style="list-style-type: none"> <li>Managers</li> <li>Section Managers</li> </ul>	30
12. Design Thinking	Learning working perspectives in different cultures for creating successes.	2.5	External Agencies	<ul style="list-style-type: none"> <li>All levels of employees</li> </ul>	28
13. YourNextU online course platform	Encouraging employees to learn and develop new skills through self-learning.	365	External Agencies	<ul style="list-style-type: none"> <li>All levels of employees</li> </ul>	50

### Employees attending the leadership development trainings of Banpu Group

Levels	Total Numbers of participant (Persons)	Number of participants against long term plan (%)	Training Hours (Hours)	The Number of Training Hours per Person (Hours)
Vice Presidents and higher	30	80	458	15.26
Managers and higher	46	75	1,272	27.65
Section Managers	78	55	1,985	25.44



## Future Leader Training Course

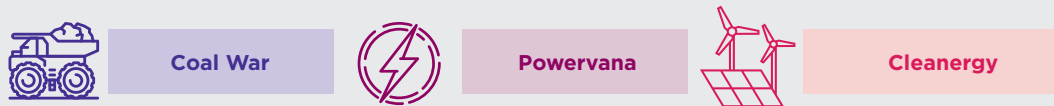
The 'Future Leader' is Banpu Group's new leadership development course, providing opportunities for employees to learn and practice solving problems in the form of a hands-on learning application called the 'Learning Application Project' (LAP). Participating employees will be grouped and assigned to work across functional areas to initiate the organizational improvement projects. Meanwhile, senior management are assigned to coach and give advices closely when participants are working on their initiated projects.

In the previous year, seven projects initiated by 29 participating employees were presented at the **'Future Leader Project Showcase'**. The benefits gained from this program can be used for creating true values for the organization.

## Energy Titan: Employee Competency Development Course

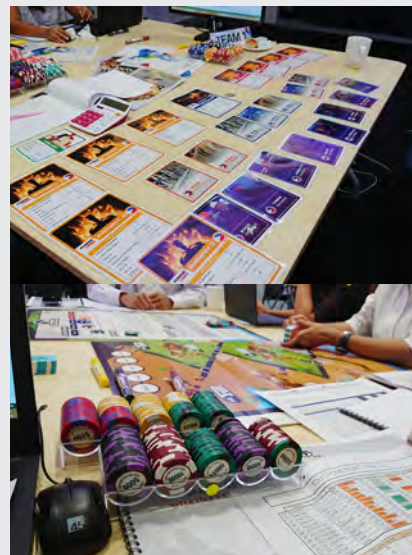
In today's business world, new challenges have been arisen at all times. As a result, adaptation to surrounding situations is much necessary. For this reason, BPP has paid great importance to develop business related skills (Commercial mindset), aiming to make its employees know and understand more about the businesses of Banpu Power Group.

In 2020, BPP designed a course/ program with specific contents through a three- day simulated business game for its employees. Throughout this program, employees will have opportunities to practice various skills on managing energy business through the roles of investors, power plant executives, business developers or strategic planners, etc. Three business models provided in the course are:



### Benefits

1. Thoroughly understanding how to manage the energy business in a broader picture, from the beginning through the end.
2. Being able to analyze the market and understand the energy business supply chain.
3. Understanding the linkages between on- site working and the overall company's performance.
4. Analyzing financial statements, asset management, and investment plan for the maximum profit.
5. Knowing the principles of efficient production and maintenance management.
6. Realizing energy business related risks and risks mitigation.



## Knowledge Management for Power Business 2020

Banpu Power has also encouraged its employees from different departments to share knowledge, experiences and expertise in various fields. The aim is to enable all levels of employees to practice their presentation skills and create continuous learning annually. The topics presented and shared in the year 2020 were as follows:

1. Environmental, Health and Safety guidelines for Wind Energy
2. Biodiversity Policy
3. Supplier Code of Conduct
4. Basic Fuel Gas System
5. Document Management
6. New CG guidelines
7. SD Information System Project
8. BLCP Power Business
9. Basic OM Agreement
10. MSCI ESG Rating
11. Fuel Gas Pipe Cleaning
12. Wind Turbine Technology
13. GHG Calculation Concept
14. Digital Disruption
15. Electricity Overview
16. What is RPT (Related Party Transaction)?
17. Monthly reporting Guidelines



# Employee Engagement



## Strategy

- Building organization engagement via drawing participation from leaders of each department.
- Establishing a communication channel and hearing employee's opinions for further improvement.

## Indicator

- A level of employee engagement

## Target

- Over 65% of employee engagement scores in the year 2020.

## Performance

- The employee engagement survey results for year 2020 were as following:
  - Thailand: 48% (92% response rate)
  - China: 92% (98% response rate)

## Significance and Reporting Boundary

BPP believes that taking good care of employees by making them feel as part of the organization and satisfied with their works, inclusive of providing a fair opportunity for their career opportunities and listening to their opinions for further improvement, will finally make employees work happily. This will also drive them to continuously improve their works and help reduce the turnover rate as well as keep potential employees with the organization. In addition, the level of employee engagement is significantly related to the competitive advantage, growth, stability, and sustainability, as well as shareholders' returns.

The boundary of this report covers the business entities of which BPP has greater than 50% of shares and direct management control, including the three combined heat and power (CHP) plants in China as well as the offices in both Thailand and China.

## Management Approach

BPP has formulated the employee relation policy as a practice guideline for strengthening good relationships with its employees. The employee engagement is fostered with 'Say Stay Strive' concept.

- **Say:** Employees say about BPP with other people positively, both inside and outside the company.
- **Stay:** Employees work happily and are willing to stay with the organization in the future.
- **Strive:** Employees have deep bond and strive to improve BPP to be better.

The key drivers in persuading employees to engage with the organization are as following:

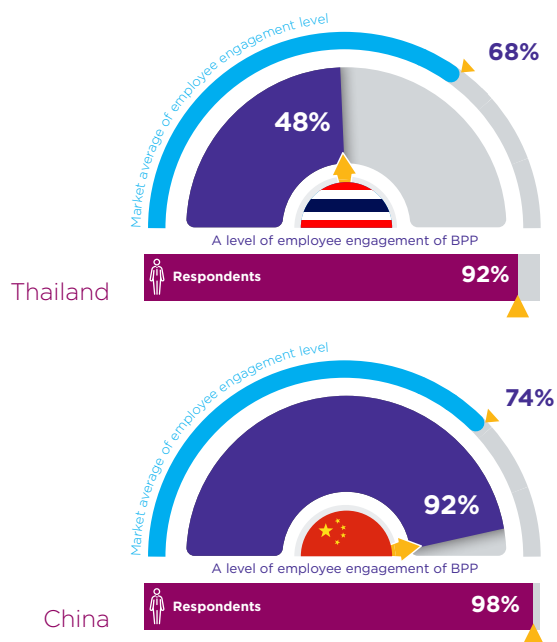


BPP in cooperation with external consulting firms have conducted the employee engagement survey annually. The analyzed survey results and suggestions from employees will be later used for developing the engagement action plan for both organizational and departmental levels. In addition, the reporting system to quarterly update management the progress of employee engagement has been created so as to continually strengthen the employee engagement.

## Performance

In the past year, the employee engagement survey results found that the level of employee engagement was higher than average compared to that of the labor market in China. In Thailand, the organizational engagement scores were significantly reduced due to a major organizational restructure in 2020. Consequently, BPP conducted a focus group among its employees to listen to their opinions for analysis and further improvement in the year 2021.

### Employee Engagement Survey Result 2020



In 2020, BPP used the results of employee engagement survey for analyzing and finding ways to create the tangible employee engagement. Management of employee engagement is divided into three dimensions, the scores of which have notably increased as following:

### 1. Work-Life Balance

BPP has placed great importance on and encouraged employees to achieve work-life balance or a balanced life in both work and healthy living. Various methods were promoted as follows:

- Increasing the number of days for employees in Bangkok Office to **work anywhere** to two days a week in order to provide them with flexible working hours and more in line with the current situation. Through this system, employees can be contacted at any time and have to report their work performances to supervisors, including having sound safety awareness on using the public internet.
- The **flexible benefits** were improved to be more diverse corresponding to the needs of employees at all levels. To make it easy and convenient as well as faster for employees, documents submitted for reimbursements of medical expenses, flexible benefits/ COVID- 19 examination fees during the 'Work from Home' period were modified, allowing them to fill in information online, while original documents can be submitted later.
- To help employees have healthy minds and strong bodies, a **fitness room** has been provided for staff at Bangkok Office, allowing them to choose to participate in various sports clubs such as a golf club, a walking club, a badminton club, a tennis club, and a futsal club, etc.
- Adjusting the exercise activities at Bangkok Office to the home workouts by arranging an **online personal fitness consultation** and advices for employees, accommodating them to reserve a trainer time to provide personalized advice during the home workouts.
- Imitating the **'RelationFlip'** project to provide consultations relating to both work and personal matters for employees by the outside psychological consultants who have high experiences and keep their personal data confidentially.
- Organizing the **'Virtual IDP Clinic'** to help build understanding about developing IDPs during the COVID- 19 outbreak through an online conversation with the experts for 30 minutes per each person.
- Arranging the **'Doctor A to Z'** (Doctor on site) project, a welfare project engaging physicians from Rangsit University (RSU) Healthcare Center to give advice, medical treatments according to the initial symptoms, dispensing basic medicines, including issuing prescriptions to employees at Bangkok Office every Wednesday's afternoon of each week, starting from July 2020 onwards. The service was scheduled for three months and planned to add the tele consults as well.
- Holding the **'Money Delight'** session on July 9, 2020 to promote financial knowledge for employees especially those close to retirement so that they knew how to manage their finances. The session was conducted by the investment and wealth creation experts from UOB Bank.

## 2. Career Opportunity

BPP has continuously organized courses to develop employees' competencies every year in preparation for their functional career opportunities. These training courses have also helped strengthen the engagement and understanding between management and employees, for example:

- The **'Engaging Leader & Great Coach'** program has been continuously organized in order to develop executives to be the leaders who enhance the employee engagement. This program allows supervisors the opportunities to practice listening to suggestions on both work and personal life from their subordinates with whom they are close and able to learn at all times. This includes an emphasis on developing skills on coaching and creating motivations so as to understand how to develop a unified teamwork.
- Holding the activity called **'Accelerating Transformation Series'**, another form of leadership development encouraging executives to be role models in adapting to business goals during uncertain situations and being able to create new businesses with sustainable growth. The first series of this event was the **'Power of Clarity and Alignment'**.
- Organizing the **'Strategy Foundation Workshop'**, in which department managers and section-managers attended this training course to learn about basic skills of building key business strategies.
- Conducting the **'Future Leader'** training program for section- managers, with 20 executives and project coaches being the consultants. This program was designed to encourage employees to learn and practice solving various problems in the form of Learning Application Project (LAP). Seven LAPs were presented at the 'Future Leader Project Showcase' event. The benefits yielded from this program can be developed to create a true value for the organization.

## 3. Communication Effectiveness

BPP has improved the communication efficiency of various information related to employees, making it more clearly and meeting the employee's needs even more. The communication channels easily accessible by employees in diverse ways have been used, for example:

- Organizing the **Investor Relation Quarterly Communication**
- Producing **Banpu Insight** newsletters
- Organizing a workshop on the topic of **'Banpu Heart Experience'** for employees with an aim to make them understand and express behaviors truly reflecting the 'Banpu Heart' corporate values, etc.
- Senior executives have proactively managed communications with employees through the **informal meetings** every two months in order to allow employees to express their opinions. Such communication activities have made employees understand more about the policies and management approaches of BPP, encouraging them to present more ideas for improving work processes. As a result, the score in this area increased from the past year.

## Performance Management

BPP has adhered to three principles of human resource management, consisting of the employee's equality, the performance- based management (Performance Base), and the competency management (Competency Base). We have long been supporting collaborative works under diversities of races, languages, cultures, ages, and countries in which BPP has operated its businesses in order to strengthen the collaborative works and drive the innovations towards the sustainable business growth.

Performance management is a significant process driving the organization to achieve its established business goals. It is a linkage of the organizational needs towards each employee's individual working target. It is also an administrative tool allowing supervisors to know their subordinates' performances and his/her competency in addition to promoting collaborations among them on setting goals and key performance indicators (KPIs) together. This has led to the partnership and good relationships between supervisors and subordinates, ultimately escorting to the organizational success.

Defining a clear and tangible performance appraisal system able to measure and evaluate the success of each person is therefore essential. In addition, messages on performance management have been also communicated to all employees for acknowledgement and using them as a practice guidance as following:

- Defining a fair KPI system in order to manage performance in accordance with the targets of BPP. In addition, the company has revised the KPI scoring criteria divided into two sets, consisting of work-related KPIs accountable for 70% of the overall performance, and corporate cultural behavior- based KPIs representing the remaining 30%.
- Improving the performance appraisal standards as the single practice guideline across the organization. This guideline determined that each indicator must have at least one performance evaluation criteria from four criteria relating to quantity, progress & time, cost, and accuracy & quality. The improved performance appraisal standards have been communicated to employees for their clear acknowledgement and understanding of the performance assessment improvement.
- Identifying the key performance indicators beyond their own responsibilities, such as those involved with subordinate management skills. BPP has determined the leadership KPIs for department's managers and higher so that they are aware that in addition to managing his/ her department's works, paying high attention and caring for subordinates is also part of helping improve the department's performance better.

## Compliance with Laws and International Concepts

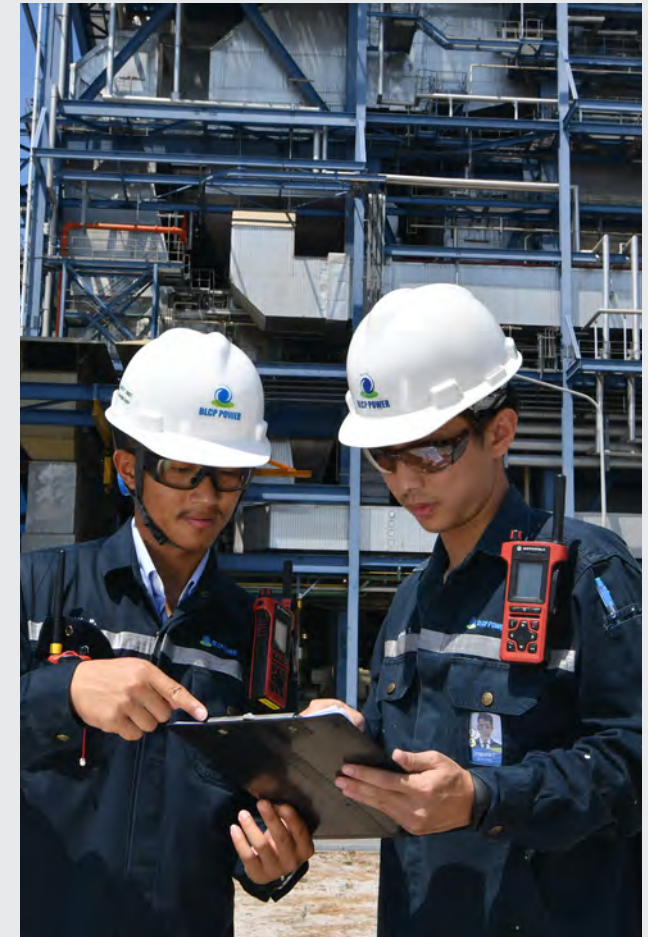
BPP has announced the Human Rights Policy since 2018 by adhering to the principles of liberty and rights, equality, and human dignity without discriminations on genders, races, religions or skin colors. It has also placed great importance on labor laws and respecting to human rights according to the 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 the labor laws of all countries where BPP has operated its businesses. This is to confirm that the employees and stakeholders, such as business partners, suppliers, communities, joint venture partners and external contractors are treated equally. In addition, the Quality Assurance Review (QAR) system has been employed while key indicators have been identified, inclusion of following up and reviewing the performance regularly.

To promote labor and human rights policies, BPP has hired visually impaired people from the Department of Empowerment of Persons with Disabilities to provide healing hands service for its employees every Tuesday and Thursday so as to reduce their office syndromes and relieve stresses from their daily works.

In addition, BPP has its employee representatives participate and express their opinions in the welfare committee meeting with Banpu Group on a quarterly basis. In the past year, several areas were improved such as:



- Flexible Benefits: Increasing the number of welfare items to be more diverse.
- Arranging the 'Relationflip' project for employees so that they can consult with the analytical counselor team.
- Providing the Doctor A to Z (Doctor on site) project, a welfare project engaging the physicians from Rangsit University (RSU) Healthcare Center to provide medical services for the employees at Bangkok Office.
- Arranging the 2020 flu vaccination service for employees with free of charges.
- Setting up a breast pumping room for employees preparing for breastfeeding and arranging a personal telephone room.
- Installing an Automated External Defibrillator (AED) in the office as well as providing a training for employees to use the AED.



## Prevention of Hiring Child and Forced Labors

BPP has no policy to hire child and forced labors. As a result, the minimum age of hiring employees is complied with that of stated clearly in the labor laws of each country. To prevent risks relating to child labor employment, the transparent employee's selection procedures have been established while the employment contracts have been made every time when hiring new employees.

# Occupational Health and Safety



## Strategy

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

## Indicator

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

## Target

- The LTIFR of employees and contractors is decreased to zero by the year 2024.
- Zero working accident resulting in fatalities of employees, contractors, and others involved with the operations of BPP.

## Performance

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

## Significance and Reporting Boundary




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

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

The boundary of this report covers all business entities in which BPP holds greater than 50% of investments and direct management control, inclusion of the three combined heat and power (CHP) plants in China, but exclusion of the joint venture power plants, of which data are separately reported under the topic of additional information.

## Management Approach

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

Zero Incident	Zero Repeat	Zero Compromise
 <p>There is no incident by preventing and correcting unsafe behaviors and working conditions.</p>	 <p>There is no recurrence by investigating for the real cause and correcting a mistake at its root cause as well as informing employees to prevent a recurrence of such an incident.</p>	 <p>Do not ignore complying with the safety rules, regulations, and practice standards.</p>



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



### **Duties and Responsibilities on Occupational Health and Safety (OHS)**

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



### **Complying with Laws and Regulations as well as Safety Standards of BPP**

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



### **Safety Related Risks Management**

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



### **Creating a Safety Culture**

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



### **Encouraging Employees to Gain Sufficient Knowledges and Expertise in OHS**

BPP has supported and educated its employees and contractors about OHS so that they have sufficient OHS abilities to work safely, including frequently examining and reviewing their understandings.



### **Innovation and Safety Technologies**

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

## **Performance**

In the previous year, all production units of the power plants in which BPP has management control, had no severe accidents resulting in injury or fatality. The LTIFR was zero while there were no incidents relating to working illnesses.

BPP has placed great importance on the work safety of its employees and contractors. It has employed the ISO 45001 Occupational Health and Safety Management System and integrated with the ISO 9001 Quality Management System and the ISO 14001 Environmental Management System. In addition, the three 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 organized the work safety promotion activities such as:

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

## Employee Health Promotion

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

- Conducting a health check- up for employees in accordance with the COVID- 19 preventive measure strictly.
- Conducting an annual health check-up and a physical fitness measurement based on risks arising from a nature of work for the employees.
- Measuring the working conditions in both offices and production units, and continually improving and standardizing working conditions regularly.
- Promoting exercising and maintaining good health among employees, such as setting up sports clubs, providing health related knowledges. including providing an individual exercise trainer for interested staff etc.



- Reducing the work syndrome symptoms by educating employees and allow them to stretch during working as well as providing them relaxing massages by the visually impaired persons.
- Providing a psychological consultation project called 'RelationFlip' for employees.
- Arranging the program for employees to see a doctor via an online system.
- Organizing the 'Flexible Benefit' project by supporting THB 12,000 per annum for employees so that they can utilize a financial support for the benefits of their health such as the membership fees for fitness and spas, and other membership expenses, etc.

## Digital Work Permit at Luannan Power Plant

BPP has adopted the Permit to Work Code of Conduct as a guideline for controlling and preventing works having risks leading to serious incidents. The Permit to Work system starts with analyzing risks and hazards, indicating types of licenses, specifying preventive and control measures, and monitoring compliances with the prescribed measures. The system has been used in conjunction with the energy isolation or Lock out/ Tag out, and the closing of permissions when finishing jobs.

The power plant therefore requires a procedure for obtaining permissions and working in different stages by using paper forms. This can sometimes create a mistake and take times since it is a complicated process involved with multiple agencies, such as obtaining permissions from the wrong agency, incomplete information relating to safety operation standards, and a delay in collecting documents, etc.

As a result, the Luannan Power Plant developed an application to **improve its work permission system by using a digital technology to verify identities with faces or fingerprints** in order to reduce the mistakes. The application developed has helped the power plant be able to prepare all operational safety standards and control hazardous points as well as take pictures and video clips while working in order to demonstrate a compliance with safety standards. Besides data collected are stored in a database to display statistics and quickly tracing back, enabling users to track the status of permission documents quickly and easily.

Luannan Power Plant organized trainings about how to use the digital work permit application for the three main functions, namely the electrical works, boilers & turbines involved works, and works related to heat controls. A total of 93 employees participated in the training, while the application has been implemented on 25 September 2020 onwards. After putting the digital work permit system in place, the application has help improve the operational efficiencies and reduce redundant processes. It is also accurate and ensures a full and efficient compliance with the safety standards as well as creates conveniences and accelerates a speed for the operators. A development of the digital work permit application is one of the sub- projects in the master plan to fully use the digital technology at the Luannan Power Plant in the future.

## Safety Operations and Business Continuity Management during the COVID- 19 Epidemic

During the COVID- 19 outbreak, BPP was able to operate continuously, while its business units did not have either disruptions or operational stoppages. Moreover, all employees were safe from the infections because they have been preparing themselves to cope with the situation for a long time. The implementation of a business continuity management system has made it possible to flexibly respond and adapt to a pre- crisis situation. More importantly, it was able to resume operations quickly, helping reduce losses and build confidences among stakeholders. The key operational targets were:



### Response

Effectively responding to incidents and preventing damage spreading as well as communicating information to internal and external parties appropriately.



### Recover

Able to restore major necessary activities in order to quickly deliver products and services acceptable by stakeholders.



### Restore

A fast recovery of the whole activities acceptable by stakeholders.

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

- 1. Travel Restrictions** by allowing all power plant's operators to live in the power plants' areas in order to reduce the infections caused by traveling.
- 2. Meeting Management** by avoiding unnecessary meetings, reducing the number of meeting attendees, keeping social distancing in the meeting, and conducting the online meetings instead.
- 3. Sterilizing the Organization/ Workplaces**
  - Daily registering and checking temperatures of all operators and contractors prior to starting working.
  - Keeping social distancing during operations.
  - Cleaning and disinfecting by obligating to clean up the areas and various equipment and supplies every day.
  - Providing adequate personal protective equipment for all operators and always checking it before using.
- 4. Working from Home** by allowing all employees working at offices both in Thailand and abroad to work from their residences during the epidemic.

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

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



### The key success factors helping Banpu Power maintain its ability to operate business during the COVID-19 outbreak included:

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

The organization engagement survey found that the employees recognized that BPP has placed the first priority to its employee's safety in all aspects. The score was as high as 94% while none of the employees were infected by the COVID- 19. More importantly, the COVID- 19 situation management has yielded a fruitful result, enabling all power plants to operate its productions continuously without receiving any effects. They were able to deliver quality products and services to both external and internal customers. In addition, the Beijing Office was certified the ISO 22301 Business Continuity Management System Standard in December 2020.

# Community Engagement



## Strategy

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

## Indicator

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

## Target

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

## Performance

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

## Significance and Reporting Boundary

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

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

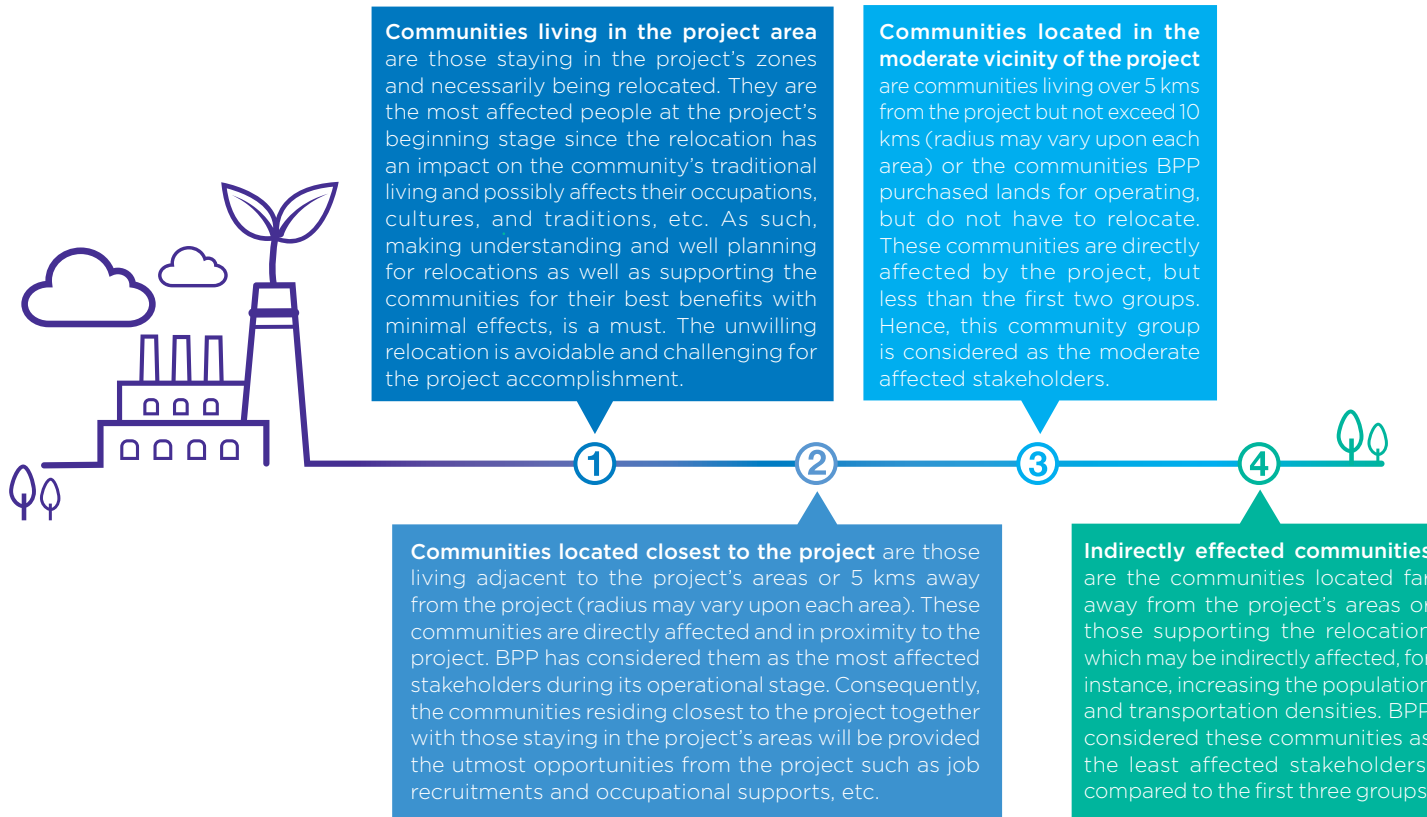
The boundary of this report covers the power plants in which BPP has more than 50% of shares and management control, including the three combined heat and power (CHP) plants in China and the projects under feasibility study.

## Management Approach

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

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

## Mitigation Measures on Social and Environmental Impacts



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

The CHP plants in China, namely Luannan 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 communities through various activities for each location. As communities are also one of the key customers buying heats from the power plants during winter, the power plants have to operate in accordance with the community's expectations. These include the stable operations, continuous quality heat supply, and flexibility to community's needs.

## Performance

In 2020, BPP received no significant complaints from the surrounding communities and had no incidents related to production halts or disruptive operations, resulting from community's grievances at both the power plants where BPP has management control and the joint-venture power plants.

In addition, Banpu Group has announced the additional guidelines related to community engagements, as follows:



- The guideline for community engagement through the establishment of a tripartite or the 'Guideline of Community Consultative Committee'.



- The guideline for engaging indigenous people or the 'Guideline of Indigenous Peoples Engagement'.

## 'Do by Heart' – Luannan Banpu Special Education School

Luannan Power Plant is located in Tangshan City, Luannan County, Hebei Province. As the only combined heat and power (CHP) plant in Luannan County, the plant takes care of the heat and power supplied for the residential and industrial users in the county. Since its operations, the plant has been running well and providing stable heat and power to the local market, strongly supporting the urban constructions and economic development of the Luannan County.

Since being acquired by BPP in 2006, the Banpu Group's corporate social responsibility (CSR) philosophy has been fully recognized by the power plant's management and integrated into its operations and management through carrying out the appropriate CSR programs. The aim is to improve the living standards and welfares of local people in the Luannan communities.

With a commitment to develop an industry in tandem with social and environmental development following the Banpu Group's business philosophy, the Luannan Power Plant did not hesitate to investigate the educational resources and social demands of the Luannan County. The plant learnt that the Luannan Special Education School was in urgent need of help for its shabby buildings and poor teaching facilities. As a full-time boarding school in special education, the school took care of 65 students with hearing impairments, speech deteriorations, intellectual challenges, and other physically challenged.

Rocky Zhang, who was the general manager of Luannan Power Plant, therefore proposed to sponsor the school as a long-term CSR project, hoping to assist the local government and communities to improve educational conditions for the physically challenged children and to achieve a common development of the plant and the communities.

In August 2008, Luannan Power Plant reached an agreement with Luannan Special Education School to provide CNY 50,000 per year to improve the school's facilities. In appreciation of BPP's support, the school later renamed itself as the **'Luannan- Banpu Special Education School'**. For 13 consecutive years (2008 to 2020), Luannan Power Plant has provided financial supports and educational materials including computers, school uniforms and beddings etc., amounting to around CNY 850,000 in values. As a result, **the school has been equipped with advanced teaching and training facilities while its dormitories are convenient to accommodate the students. Since 2012, the school has become the only one special education school in Hebei Province to provide free-of-charge education services**, offering educational opportunities for many more children.

In addition to the infrastructure improvement, the school has kept innovating teaching and learning models to meet the needs of each student and achieved satisfactory results. At present, there are 110 students studying in the school.

Throughout 13 years of the Luannan Power Plant's supports (since 2008), a total of 128 students graduated from the school, 5 of whom were admitted to universities for further studies while another 25 students have been successfully employed and can support themselves. Furthermore, most of the graduates can take care of themselves after years' training in the school. This has greatly help relieve any burdens/ dependencies on their families. The power plant's contributions have created the social stability and harmony.





Luannan Power Plant has committed to instilling and promoting the sense of social responsibility and caring for the unfortunate people among its employees by having more staff involve in this CSR project. Over the past years, the teachers and students of Luannan Banpu Special Education School were regularly invited to the power plant to join its activities such as the new year parties, the power plant visits and outings, etc. Through the CSR project participation, **over 80 employees are able to get close to and interact with the physically challenged children, delivering warmth and caring for children. Additionally, they have also had a better understanding of the corporate commitments in social responsibility and voluntary involvements.**

Luannan Power Plant is highly recognized by the local government as a model enterprise, providing consistent social contributions to local communities and a corporate supporter for special education for over a decade. **In recent years, this special education school has been gradually transforming itself from the educational and skills training center for physically challenged children to the rehabilitation training school for the growing group of autistic children, inclusion of providing psychological supports to their families.**

Throughout **13 years** of the Luannan Power Plant's supports (since 2008), a total of **128 students** graduated from the school

In 2020, Luannan Banpu Special Education School launched the home delivery education service, enabling autism children to be rehabilitated at home, while providing psychological guidance to their families. Under the new circumstance, the Luannan Power Plant will continue supporting the school to meet the communities' new needs. The plant will be also an active supporter for special education and a good corporate citizen in the Luannan County.

**Establishing a 'Community Consultative Committee' to engage communities at the joint venture power plants**

The large- scale power plant's projects, namely BLP Power Plant and HPC Power Plant, which are the joint venture companies of BPP have engaged communities through establishing a tripartite committee or a 'Community Consultative Committee'. The committee consists of representative from the power plant, the community, and the government sector. Its responsibilities include jointly monitoring and communicating environmental operations and community development projects, listening to opinions and complaints from the communities, and jointly considering on community development projects according to the true needs of the area.



Time Period	Establishment of Community Engagement
Feasibility Study and Project Development	<ul style="list-style-type: none"> <li>Classifying stakeholders who are directly and indirectly affected in order to communicate about the project's information and listen to their opinions.</li> <li>Developing a thorough community database.</li> <li>Analyzing significances of stakeholders, community's needs and concerns for further project designs.</li> <li>Complying with the preventive and impact mitigation measures for project construction as well as regularly communicating with the communities.</li> </ul>
Project Operation	<ul style="list-style-type: none"> <li>Setting up a committee, consisting of representatives from the power plants, the government and the communities in order to provide opinions and examine the efficiency of project's operations.</li> <li>Having a grievance procedure to analyze and resolve the complaints at the right time as well as prevent recurrences.</li> <li>Conducting the community development activities based on to the local's true needs and allowing community members to participate in running the activities to enhance their living standards. For instance, a participation in infrastructure and utilities development, traditional and occupational promotions and educational development, etc.</li> <li>Establishing a communication channel to receive the community complaints such as community relations activities, community visits, websites and other social media.</li> <li>Collaborating with business partners, traders and customers to engage with the communities such as co-organizing the corporate social responsibility (CSR) activities.</li> </ul>





## Board Game Design Competition Titled ‘Energy Sustainability’

BANPU B-Sports Thailand is a project supporting board games as a tool for the development of emotional, social and intelligence skills, or soft skills essential to our daily lives in the 21<sup>st</sup> century. The project’s activities were introduced in 2018 by Banpu Group with an aim to encourage and expand the playing of board games to a wider group of the new generation and to underline the benefits of this tool for soft skills development that not only enhances ‘**cognitive and intellectual skills**’ and ‘**emotional and social skills**’ but is also fun. Playing board games has been shown to improve critical thinking, planning and handling immediate problems while simultaneously strengthening human relationships. Furthermore, it helps players apply the skills gained for learning and working in a real-life.

In 2020, Banpu Group joined force with Board Game Night or BGN, a cast board game program attracting the biggest audience in Thailand, to organize the Board Game Design Competition under the topic of ‘Energy Sustainability’. **10 teams consisting of more than 30 students from universities nationwide joined this competition. The competition allowed participants to learnt about energy sustainability and participated in a board game development and design workshop** as well as visited a smart campus at Rugby School Thailand in Chonburi Province where they had an opportunity to learn more about clean and sustainable energy and technology management, experiencing how solar rooftop and electric vehicles were used in the school. The visit to a smart campus also helped them to use knowledge on energy sustainability for a design of board games, allowing players to gain knowledges with funs when playing the game.

The winning team will have opportunities to showcase their winning board game at a world- class board game fair in Taiwan in order to have these young board game designers experience the international board game events, fueling and inspiring them to develop their own board game to be better.

# FOLLOW US

To find out more and stay tuned on activities and news about the project, please visit:

<https://www.facebook.com/BanpuBSportsThailand/>  
 #EnergyOnBoard  
 #BANPUBSportsThailand



# Additional Information

# List of Business

Country	Project Name	Business Type	Ownership (%)	Capacity (MWe)		Current Status
				Gross	Equity	
<b>Thermal Power Business</b>						
China	Zhengding	Coal-fired CHP plant	100%	139	139	Operating
	Luannan	Coal-fired CHP plant	100%	227	227	Operating
	Zouping	Coal-fired CHP plant	70%	247	173	Operating
	Shanxi Lu Guang	Coal-fired power plant	30%	1,320	396	Operating <sup>(a)</sup>
Laos PDR	HPC	Coal-fired power plant	40%	1,878	751	Operating
Thailand	BLCP	Coal-fired power plant	50%	1,434	717	Operating
<b>Renewable Power Business (under Banpu NEXT)</b>						
China	Jinshan	Solar power plant	100%	28.95	28.95	Operating
	Huineng	Solar power plant	100%	21.5	21.5	Operating
	Haoyuan	Solar power plant	100%	20	20	Operating
	Huien	Solar power plant	100%	20	19.7	Operating
	Deyuan	Solar power plant	100%	52	51.64	Operating
	Xingyu	Solar power plant	100%	10	10.3	Operating
	Jixin	Solar power plant	100%	25.22	25.22	Operating
Japan	Olympia	Solar power plant	40%	10	4	Operating
	Hino	Solar power plant	75%	3.5	2.6	Operating
	Awaji	Solar power plant	75%	8	6	Operating
	Nari Aizu	Solar power plant	75%	20.5	15.4	Operating
	Mukawa	Solar power plant	56%	17	9.5	Operating
	Kurokawa	Solar power plant	100%	18.9	18.9	Operating
	Tenzan	Solar power plant	100%	1.96	1.96	Operating
	Muroran 1	Solar power plant	100%	1.73	1.73	Operating
	Muroran 2	Solar power plant	100%	1.63	1.63	Operating
	Takeo 2	Solar power plant	100%	1	1	Operating
	Yamagata	Solar power plant	100%	20	20	Operating <sup>(b)</sup>
	Yabuki	Solar power plant	75%	7	5.3	Operating <sup>(c)</sup>
	Shirakawa	Solar power plant	100%	10	10	Under construction
	Kesenuma	Solar power plant	100%	20	20	Under construction
Yamagata lide	Solar power plant	51%	200	102	Project development	
Vietnam	El Wind Mui Dinh	Wind power plant	100%	37.6	37.6	Operating <sup>(d)</sup>
	Vinh Chau	Wind power plant	100%	80	80	Project development

<sup>(a)</sup> Plant completed construction which will be ready to commission and supply heat in the 1<sup>st</sup> quarter of 2021.

<sup>(b)</sup> Commercial Operation Date (COD) in November 2020.

<sup>(c)</sup> Commercial Operation Date (COD) in December 2020.

<sup>(d)</sup> Acquired in July 2020.

# Awards & Memberships



## Awards

Business Unit	Awards/ Recognitions	Host Institute
<b>Banpu Power</b>	Thailand Sustainability Investment 2020	The Stock Exchange of Thailand
	Corporate Governance Report of Thai Listed Companies (CGR) 2020 with Excellent CG Scoring (5 Star)	Thai Institute of Directors Association
	The company obtained a full 100 scores for the quality of the Annual General Meeting of Shareholders for the year 2020	Thai Investors Association
<b>Luannan Power Plant</b>	The wastewater zero discharge project, 2B and 3A digitization products obtained RMB 200,000 as the Key Projects of Hebei Province Industrial Internet Innovation and Development in 2020	Industry and Information Technology Department of Hebei Province
	The first staff culture festival excellent organization unit of Luannan county	Labour Unions of Luannan County
	Honor certificate of obeying the contract and paying attention to credit	Tangshan Enterprise Credit Management Association Tangshan Enterprise Credit Evaluation Committee
<b>Zhengding Power Plant</b>	Top 100 Eco-environmental Innovation Projects in 2020, for Smoke Plume Control & Waste Heat Recovery Project	China Environment News Agency
	Advanced Central Heating Supply Unit in 2019 (Awarded in 2020)	Shijiazhuang Municipal People's Government Office
	One employee given Advanced Central Heating Supply Individual in 2020	Shijiazhuang Municipal People's Government Office
	6 national patent	China National Intellectual Property Administration
	Three employees obtained Zhengding Great Craftsman	Zhengding County Trade Union
	Chengfeng Innovation Studio selected as a municipal level innovation studio	Shijiazhuang City Federation of Trade Unions
	2 <sup>nd</sup> Place in Zhengding Workers Curling Competition of The 2 <sup>nd</sup> Zhengding County Winter Sports	Zhengding County People's Government; Zhengding County Bureau of Culture, Radio, Television and Tourism; Zhengding County Trade Union



## Memberships

Business Unit	Organization	Status	Role
<b>Banpu Power</b>	Thai Listed Companies Association (TLCA)	Director	Be a representative consultant on the rules and regulations of the Stock Exchange of Thailand and the Securities and Exchange Commission or other relevant consultation.
	The Securities and Exchange Commission	Expert Commissioner of The Securities and Exchange Commission Board	Formulates policies and promote the development of Thai capital market and establish rules and regulations according to Securities and Exchange Act B.E.2535 (1992) and Thailand's capital market-related laws
	Thailand's Private Sector Collective Action Coalition Against Corruption (CAC)	Committee Member	Support and promote anti- corruption in Thailand
<b>Zouping Power Plant</b>	Shandong Overseas Chinese Entrepreneurs Association	Member	-
	Binzhou Overseas Chinese Entrepreneurs Association	Member	-
	Shandong Electric Power Enterprises Association	Member	-

# Data Boundary

Sustainability Topic	Direct Operational Control			No Direct Operational Control			
	Office in Thailand	Office in China	Thermal Power Business in China	Banpu NEXT		BLCP Power Plant	HPC Power Plant
				Renewable Power Business	Energy Technology Business		
<b>Governance</b>							
Business Growth	●	●	●	○	○	○	○
Business Ethics	●	●	●	×	×	×	×
Anti- corruption	●	●	●	×	×	×	×
Compliance	●	●	●	○	○	×	×
Risk Management	●	●	●	×	×	×	×
Business Continuity Management	●	●	●	×	×	+	+
Availability and Reliability	-	-	●	×	×	+	+
Process Improvement and Innovation	●	●	●	×	×	+	+
Supplier Management	●	●	●	×	×	+	+
Contractor Management	-	-	●	×	×	+	+
Customer Management	●	●	●	×	×	+	+
<b>Environment</b>							
Greenhouse Gas Emissions	-	-	●	+	+	+	+
Energy	-	-	●	+	+	+	+
Air Quality	-	-	●	-	-	+	+
Water Resources Utilization and Water Discharge	-	-	●	+	+	+	+
Waste	-	-	●	+	+	+	+
Biodiversity	-	-	●	+	+	+	+
<b>Social</b>							
Corporate Culture	●	●	●	×	×	×	×
Competency and Leadership Development	●	●	●	×	×	+	+
Employee Engagement	●	●	●	×	×	×	×
Occupational Health and Safety	●	●	●	+	+	+	+
Community Engagement	-	●	●	×	×	+	+

● Management approach and performance data cover all parts of such business.

○ Management approach and performance data cover some parts of such business.

× Management approach and performance data do not cover such business due to the Company has no direct operational control or ownership not over 50%.

+ Management approach and performance data do not cover such business due to the Company has no direct operational control or ownership not over 50%. However, there are some sustainability performance interested by stakeholders, the partial of sustainability performance are report separately.

- No relevant to the business

# Performance Data: Banpu Power

## Economic Performance

Data	Unit	2017	2018	2019	2020
Revenue	THB Million	6,419	6,322	5,687	<b>5,506</b>
EBITDA <sup>(a)</sup>	THB Million	5,410	5,913	4,802	<b>5,230</b>
Net profit	THB Million	4,242	3,852	3,003	<b>3,702</b>
Gross profit margin	%	24%	20%	19%	<b>20%</b>
Interest coverage ratio	-	10.1	NA	NA	<b>NA</b>
Net debt to equity ratio	-	0.10	0.13	0.01	<b>0.07</b>

<sup>(a)</sup> Earning before interest, taxes, depreciation and amortization.

## Tax Payment

Data	Unit	2017	2018	2019	2020
<b>China</b>					
• Profit before tax	CNY Million	256,520	126,269	161,788	<b>338,724</b>
• Tax expense <sup>(a)</sup>	CNY Million	(67,088)	(31,375)	(45,821)	<b>(73,675)</b>
• Corporate income tax paid	CNY Million	(51,576)	(50,146)	(41,322)	<b>(59,790)</b>
• Income tax paid	%	25%	25%	25%	<b>25%</b>
<b>Banpu Power <sup>(b)</sup></b>					
• Profit before tax	THB Thousand	4,604,026	4,144,797	3,206,924	<b>4,083,515</b>
• Tax expense <sup>(a)</sup>	THB Thousand	(361,815)	(292,729)	(204,083)	<b>(300,491)</b>
• Corporate income tax paid	THB Thousand	(288,596)	(249,920)	(192,913)	<b>(274,644)</b>
• Income tax paid	%	10-25%	10-25%	20-25%	<b>20-25%</b>

<sup>(a)</sup> Consisting of Corporate Income Tax, Withholding Tax and Deferred Tax.

<sup>(b)</sup> Consolidated.

## Corporate Citizenship and Philanthropy

Data	Unit	2017	2018	2019	2020
<b>Philanthropic contributions - by category</b>					
• Charitable donation	% of Total costs	-	-	-	<b>0.8%</b>
• Community investment	% of Total costs	-	-	-	<b>80.6%</b>
• Commercial initiatives	% of Total costs	-	-	-	<b>18.6%</b>
<b>Philanthropic contributions - by type</b>					
• Cash contributions	CNY Thousand	-	-	-	<b>1,084</b>
• Time spent by volunteer employees during working hours	CNY Thousand	-	-	-	<b>179,065</b>
• In-kind giving	CNY Thousand	-	-	-	<b>65</b>
• Management overhead	CNY Thousand	-	-	-	<b>21,611</b>

## Economic Distributions

Data	Unit	2017	2018	2019	2020
<b>Ratio of the dividend payout to net profit</b>	-	0.38	0.48	0.64	<b>0.46</b>
<b>Economic value generated</b>					
• Sales	USD Thousand	188,465	192,903	178,015	<b>195,577</b>
• Other revenues	USD Thousand	128,779	159,111	135,921	<b>134,815</b>
<b>Economic value distributed</b>					
• Shareholder <sup>(a)</sup>	USD Thousand	49,376	56,986	63,444	<b>57,322</b>
• Supplier and contractor <sup>(b)</sup>	USD Thousand	45,680 <sup>(f)</sup>	53,052 <sup>(f)</sup>	56,450 <sup>(f)</sup>	<b>52,931</b>
• Employee <sup>(c)</sup>	USD Thousand	20,879	23,309	21,333	<b>21,591</b>
• Financial institution <sup>(d)</sup>	USD Thousand	1,921	6,115	6,855	<b>(3,757)</b>
• Government <sup>(e)</sup>	USD Thousand	13,014	9,375	9,032 <sup>(f)</sup>	<b>15,086</b>
• Community <sup>(f)</sup>	USD Thousand	616 <sup>(f)</sup>	730 <sup>(f)</sup>	680 <sup>(f)</sup>	<b>685</b>
• Environment <sup>(g)</sup>	USD Thousand	2,264	2,245	1,828 <sup>(f)</sup>	<b>2,042</b>
<b>Economic value retained</b>	USD Thousand	183,493	200,202	154,314	<b>184,491</b>

<sup>(a)</sup> Dividends.

<sup>(b)</sup> Includes contractor cost, fuel cost, and other operating costs.

<sup>(c)</sup> Includes remuneration and benefits, provident fund contributions and employee development expenses.

<sup>(d)</sup> Includes interest expense, financial expenses.

<sup>(e)</sup> Includes royalty fee, corporate income tax, local maintenance tax, property tax, specific business tax, and other additional taxes and payment to government.

<sup>(f)</sup> Includes community development expenses, corporate social responsibility activities and land compensation.

<sup>(g)</sup> Includes environmental treatment expenses and other environmental related activities.

<sup>(h)</sup> Updated from previous report.

## Policy Influence

Data	Unit	2017	2018	2019	2020
<b>Contributions and other spending</b>					
• Lobbying, interest representation	THB	-	-	0	<b>0</b>
• Political party or political interest	THB	-	-	0	<b>0</b>
• Trade association or tax-exempt groups	THB	-	-	305,378	<b>251,450</b>
• Other contributions	THB	-	-	0	<b>0</b>

## ■ Corporate Governance

Data	Unit	2017	2018	2019	2020
<b>Coverage of significant ESG aspects set as corporate ESG targets</b>	%	-	-	100%	<b>100%</b>
<b>Coverage of corporate ESG targets deployed to senior executives</b>	%	-	-	100%	<b>100%</b>
<b>Board type</b>					
• Executive directors	Person	3	3	3	<b>3</b>
• Independent directors	Person	3	3	3	<b>3</b>
• Other non-executive directors	Person	3	3	3	<b>3</b>
<b>Number of meeting</b>					
• Board of directors	Time/ Year	12	12	12	<b>14</b>
• Corporate governance and nomination committee	Time/ Year	4	3	4	<b>3</b>
• Audit committee	Time/ Year	10	8	11	<b>10</b>
• Compensation committee	Time/ Year	4	4	4	<b>4</b>
<b>Meeting attendance</b>					
• Board of directors	%	92.59%	95.37%	97.22%	<b>98.41%</b>
• Corporate governance and nomination committee	%	91.67%	100%	100%	<b>100%</b>
• Audit committee	%	93.33%	100%	100%	<b>100%</b>
• Compensation committee	%	100%	91.67%	93.94%	<b>96.67%</b>
<b>Performance evaluation <sup>(a)</sup></b>					
• Board of directors	-	4.81	4.74	4.86	<b>4.37</b>
• Sub-committees	-	4.79	4.79	4.92	<b>4.70</b>
• Individual directors	-	4.81	4.79	4.91	<b>4.68</b>

<sup>(a)</sup> Average score in the range of 0 to 5

## ■ Business Ethics

Data	Unit	2017	2018	2019	2020
<b>Number of significant corporate governance complaints</b>	Case	0	0	0	<b>0</b>
• Corruption	Case	0	0	0	<b>0</b>
• Use of information	Case	0	0	0	<b>0</b>
• Bribery	Case	0	0	0	<b>0</b>
• Human rights	Case	0	0	0	<b>0</b>
• Tax	Case	0	0	0	<b>0</b>
<b>Number of significant business ethics breaches</b>	Case	0	0	0	<b>0</b>
<b>Proportion of significant corporate governance complaints resolved through a dispute mechanism</b>	%	NA <sup>(a)</sup>	NA <sup>(a)</sup>	NA <sup>(a)</sup>	<b>NA<sup>(a)</sup></b>

<sup>(a)</sup> No significant complaints.

## ■ Risk Management

Data	Unit	2017	2018	2019	2020
<b>Proportion of business units with key risk indicators</b>	%	100%	100%	100%	<b>100%</b>
<b>Coverage of ESG issues in the enterprise risk management <sup>(a)</sup></b>	%	-	-	-	<b>92%</b>
<b>Proportion of business units with ESG risk management plan <sup>(b)</sup></b>	%	-	-	-	<b>NA<sup>(c)</sup></b>

<sup>(a)</sup> Based on COSO.

<sup>(b)</sup> For business unit(s) with high priority ESG risks.

<sup>(c)</sup> No business unit identified as high ESG risks.

## ■ Business Continuity Management

Data	Unit	2017	2018	2019	2020
<b>Coverage of CMT/IMT exercise <sup>(a)</sup></b>	%	50%	50%	50%	100%

<sup>(a)</sup> The real activation of CMT/IMT considered as a BCP exercise at Bangkok and Beijing offices.

## ■ Innovation/ Research & Development/ Digital Transformation

Data	Unit	2017	2018	2019	2020
<b>Innovation project expense</b>	CNY Million	-	-	-	<b>31.4</b>
<b>Digital project use-cases &amp; initiatives</b>					
• Number of use-cases & initiatives	Project	-	-	-	<b>7</b>
• Amount of actual cost spending	USD Million	-	-	-	<b>0.609</b>
• Amount of business impact value	USD Million	-	-	-	<b>1.15</b>
<b>Number of employees working in digital capability center</b>	Person	-	-	-	<b>25</b>
<b>Number of employees trained through the digital academy</b>	Person	-	-	-	<b>150</b>

## ■ Customer & Product Stewardship

Data	Unit	2017	2018	2019	2020
<b>Number of complaints</b>	Case	-	0	0	<b>0</b>
• Customer privacy	Case	-	0	0	<b>0</b>
• Safety and environmental issues from the use of products	Case	-	0	0	<b>0</b>
<b>Proportion of customer complaints resolved in a timely manner</b>	%	-	NA <sup>(a)</sup>	NA <sup>(a)</sup>	<b>NA<sup>(a)</sup></b>

<sup>(a)</sup> No significant complaints.

## Data Privacy & Cyber Security

Data	Unit	2017	2018	2019	2020
Number of cybersecurity breaches	Case	-	-	-	1 <sup>(a)</sup>
Number of IT infrastructure incidents	Case	-	-	-	1 <sup>(a)</sup>
Incident response rate	%	-	-	-	- <sup>(b)</sup>

<sup>(a)</sup> At Bangkok office.

<sup>(b)</sup> Data collection system under standardization.

## Availability & Reliability

Data	Unit	2017	2018	2019	2020
<b>Installed capacity</b>					
• Current capacity	MW	298	323	348	<b>348</b>
• Capacity under construction	MW	75	25	0	<b>0</b>
<b>System efficiency</b>					
• Efficiency rate for electricity generation	g/kWh	261.33	270.02	279.00	<b>246.63</b>
• Efficiency rate for steam production	kg/GJ	37.53	37.58	37.94	<b>37.75</b>
• Availability factor	%	93.72%	89.02%	94.07%	<b>97.72%</b>
• Overall efficiency	%	69.70%	66.69%	65.07%	<b>74.70%</b>
<b>Planned outage</b>					
• Planned outage frequency	Case/ Year	23	22	25	<b>15</b>
• Planned outage hours	Hours	9,534	13,851	6,023	<b>2,621</b>
• Average planned outage duration	Hours/ Case	1,303	1,867	241	<b>175</b>
<b>Unplanned outage</b>					
• Unplanned outage frequency	Case/ Year	7	4	1	<b>0</b>
• Unplanned outage hours	Hours	381	1,928	457	<b>0</b>
• Average unplanned outage duration	Hours/ Case	49	1,914	457	<b>0</b>
<b>Total outage</b>					
• Total outage frequency	Case/ Year	30	26	26	<b>15</b>
• Total outage hour	Hours	9,915	15,780	6,480	<b>2,621</b>
• Average total outage duration	Hours/ Case	1,078	1,870	249	<b>175</b>

## Socioeconomic Compliance

Data	Unit	2017	2018	2019	2020
<b>Significant socioeconomic non-compliance</b>					
• Number of non-monetary sanctions	Case	-	0	0	<b>0</b>
• Number of cases brought through dispute mechanisms	Case	-	0	0	<b>0</b>
<b>Significant fines from socioeconomic non-compliance</b>					
• Number of significant fines	Case	-	0	0	<b>0</b>
• Total amount of significant fines	USD	-	0	0	<b>0</b>

## Supplier Management

Data	Unit	2017	2018	2019	2020
<b>Number of suppliers</b>					
• All suppliers	Number	-	-	509	<b>910</b>
• Critical suppliers <sup>(a)</sup>	Number	-	-	147	<b>171</b>
<b>Proportion of suppliers assessed for ESG risks</b>					
• All critical tier-1 suppliers	%	-	-	-	<b>11%</b>
• New critical tier-1 suppliers	%	-	-	23% <sup>(d)</sup>	<b>-<sup>(b)</sup></b>
<b>Proportion of critical tier-1 suppliers classified as high-risk</b>	%	-	-	0%	<b>0%</b>
<b>Proportion of spending on local suppliers<sup>(c)</sup></b>	%	-	-	87%	<b>30%</b>
<b>Proportion of contracts that include ESG clauses</b>	%	-	-	28% <sup>(d)</sup>	<b>42%</b>

<sup>(a)</sup> Defined as high-volume suppliers, critical component suppliers, or non-substitutable suppliers.

<sup>(b)</sup> Data collection system under standardization.

<sup>(c)</sup> Supplier that operates in the same region.

<sup>(d)</sup> Updated from previous report.

## Product

Data	Unit	2017	2018	2019	2020
<b>Total energy sold</b>	MWh	6,371,807	6,238,273	5,648,619	<b>6,474,833</b>
<b>Energy sold</b>					
• Electricity (renewable fuel) sold	MWh			112	<b>107</b>
• Electricity (non-renewable fuel) sold	MWh	1,691,107 <sup>(a)</sup>	1,715,684 <sup>(a)</sup>	1,495,640	<b>1,563,091</b>
• Steam sold	MWh	4,236,338	3,975,903	3,328,603	<b>3,564,832</b>
• Heat sold	MWh	444,362	546,686	824,264	<b>1,346,803</b>

<sup>(a)</sup> Include renewable & non-renewable fuel in thermal and renewable power business.

## Greenhouse Gas Emissions

Data	Unit	2017	2018	2019	2020
<b>GHG emissions</b>					
• Total (Scope 1 & 2)	Tonnes CO <sub>2</sub> e	3,650,542	3,824,124	3,822,073	<b>4,016,666</b>
• Direct (Scope 1)	Tonnes CO <sub>2</sub> e	3,648,340	3,821,632	3,814,884	<b>4,010,147</b>
• Indirect (Scope 2)	Tonnes CO <sub>2</sub> e	2,202	2,392	7,189	<b>6,519</b>
• Other indirect (Scope 3) <sup>(a)</sup>	Tonnes CO <sub>2</sub> e	-	-	-	<b>-</b>
<b>GHG emissions intensity</b>					
• Total (Scope 1 & 2)	Tonnes CO <sub>2</sub> e/ MWh	0.573	0.613	0.644	<b>0.620</b>
• Electricity generation	Tonnes CO <sub>2</sub> e/ MWh	0.954	0.991	0.575	<b>0.655</b>
• Steam & heat generation	Tonnes CO <sub>2</sub> e/ MWh	0.435	0.470	0.673	<b>0.609</b>
<b>SF<sub>6</sub> emissions</b>	Tonnes CO <sub>2</sub> e	-	110	1,086	<b>515</b>

<sup>(a)</sup> Data collection system under standardization



## Energy

Data	Unit	2017	2018	2019	2020
<b>Total energy consumption</b>	TJ	10,545	10,721	11,113	<b>9,937</b>
<b>Renewable energy consumption</b>					
• Renewable fuel	TJ	0	0	0	<b>0</b>
• Electricity purchased <sup>(a)</sup>	TJ	0	0	0	<b>0</b>
• Electricity self-generated	TJ	718	815	1,040	<b>0.39</b>
<b>Non-renewable energy consumption</b>					
• Non-renewable fuel	TJ	32,756	32,354	31,410	<b>33,220</b>
• Electricity purchased	TJ	9	10	30	<b>27</b>
• Steam, heating & cooling	TJ	0	0	0	<b>0</b>
<b>Renewable energy sold</b>					
• Electricity	TJ	701	809	1,033	<b>0.39</b>
<b>Non-renewable energy sold</b>					
• Electricity	TJ	5,387	5,368	5,384	<b>5,627</b>
• Steam	TJ	15,251	14,313	11,983	<b>12,833</b>
• Heating	TJ	1,600	1,968	2,967	<b>4,848</b>
<b>Energy consumption intensity</b>	GJ/ MWh	1.65	1.72	1.87	<b>1.54</b>

<sup>(a)</sup> Negligible purchased electricity for solar power plant during nighttime.

## Air Quality

Data	Unit	2017	2018	2019	2020
<b>Air emissions load</b>					
• NO <sub>x</sub>	Tonnes	455	323	246	<b>272</b>
• SO <sub>2</sub>	Tonnes	174	149	153	<b>164</b>
• Particular matters	Tonnes	35	24	18	<b>17</b>
• Mercury	Tonnes	-	-	0.0034	<b>0.0085</b>
<b>Air emissions intensity</b>					
• NO <sub>x</sub>	Kg/MWh	0.0737	0.0536	0.0435	<b>0.0420</b>
• SO <sub>2</sub>	Kg/MWh	0.0282	0.0248	0.0271	<b>0.0254</b>
• Particular matters	Kg/MWh	0.0057	0.0039	0.0031	<b>0.0027</b>
• Mercury	Kg/MWh	-	-	0.6e-6	<b>1.3e-6</b>
<b>Ozone-depleting substances (ODS)</b>					
• ODS consumption	Kg CFC-11e	0	0	1	<b>1</b>
• ODS imported	Kg CFC-11e	-	-	0	<b>0</b>
• ODS exported	Kg CFC-11e	-	-	0	<b>0</b>

## Water Resources Utilization and Water Discharge

Data	Unit	2017	2018	2019	2020
<b>Water withdrawal</b>					
• From all areas	Mega Liter	8,563	7,838	6,761	<b>7,611</b>
• From water stress areas	Mega Liter	-	7,838	6,761	<b>7,611</b>
<b>Water withdrawal - from all areas <sup>(a)</sup></b>					
• Surface water	Mega Liter	6,056	5,076	0	<b>0</b>
• Groundwater	Mega Liter	2,508	2,761	2,497	<b>2,231</b>
• Seawater	Mega Liter	0	0	0	<b>0</b>
• Produced water	Mega Liter	0	0	0	<b>0</b>
• Third-party water	Mega Liter	0.5	1	4,265	<b>5,380</b>
<b>Water withdrawal - from water stress areas <sup>(a)</sup></b>					
• Surface water	Mega Liter	-	5,076	0	<b>0</b>
• Groundwater	Mega Liter	-	2,761	2,497	<b>2,231</b>
• Seawater	Mega Liter	-	0	0	<b>0</b>
• Produced water	Mega Liter	-	0	0	<b>0</b>
• Third-party water	Mega Liter	-	1	4,265	<b>5,380</b>
<b>Third-party water withdrawal - from water stress areas <sup>(a)</sup></b>					
• Surface water	Mega Liter	-	1	2,897	<b>4,117</b>
• Groundwater	Mega Liter	-	0	0	<b>0</b>
• Seawater	Mega Liter	-	0	0	<b>0</b>
• Produced water	Mega Liter	-	0	0	<b>0</b>
• Reclaimed water <sup>(b)</sup>	Mega Liter	-	-	368 <sup>(c)</sup>	<b>1,263</b>
<b>Water discharge <sup>(a)</sup></b>					
• To all areas	Mega Liter	712	960	1,855	<b>1,779</b>
• To water stress areas	Mega Liter	-	960	1,855	<b>1,779</b>
<b>Water discharge (to all areas) <sup>(a)</sup></b>					
• Surface water	Mega Liter	0	0	0	<b>0</b>
• Groundwater	Mega Liter	0	0	0	<b>0</b>
• Seawater	Mega Liter	0	0	0	<b>0</b>
• Third-party water	Mega Liter	712	960	1,855	<b>1,779</b>
<b>Water consumption</b>					
• All areas	Mega Liter	7,851	6,878	4,906	<b>5,832</b>
• Water stress areas	Mega Liter	-	6,878	4,906	<b>5,832</b>
<b>Water consumption intensity</b>	m <sup>3</sup> / MWh	1.232	1.103	0.827	<b>0.901</b>
<b>Change in water storage</b>	Mega Liter	-	-	0	<b>0</b>

<sup>(a)</sup> Freshwater (≤1,000 mg/L Total Dissolved Solids).

<sup>(b)</sup> From wastewater treatment plant.

<sup>(c)</sup> Updated from previous report.

## Waste

Data	Unit	2017	2018	2019	2020
<b>Waste generated</b>					
• Hazardous waste	Tonnes	60	113	22	<b>103</b>
• Non-hazardous waste	Tonnes	130	2,589	916	<b>672</b>
<b>Hazardous waste disposal <sup>(a)</sup></b>					
• Reuse	Tonnes	-	0	0	<b>0</b>
• Recycling	Tonnes	5 <sup>(b)</sup>	10	13	<b>84</b>
• Composting	Tonnes	-	-	0	<b>0</b>
• Recovery (including for fuel sources)	Tonnes	0	101	3	<b>16</b>
• Incineration	Tonnes	0	3	6	<b>4</b>
• Deep well injection	Tonnes	-	-	0	<b>0</b>
• Landfill	Tonnes	0	0	0	<b>0</b>
• On-site storage	Tonnes	-	-	0	<b>0</b>
• Other	Tonnes	55	0	0	<b>0</b>
<b>Non-hazardous waste disposal <sup>(a)</sup></b>					
• Reuse	Tonnes	0	0	0	<b>0</b>
• Recycling	Tonnes	130	808	0	<b>17</b>
• Composting	Tonnes	-	1	0	<b>0</b>
• Recovery (including for fuel sources)	Tonnes	-	236	0	<b>0</b>
• Incineration	Tonnes	0	0	0	<b>0</b>
• Deep well injection	Tonnes	-	-	0	<b>0</b>
• Landfill	Tonnes	0	1,517	844	<b>583</b>
• On-site storage	Tonnes	-	-	0	<b>0</b>
• Other	Tonnes	0	27	72	<b>72</b>
<b>Hazardous waste transportation <sup>(a)</sup></b>					
• Hazardous waste transported	Tonnes	-	113	22	<b>103</b>
• Hazardous waste imported	Tonnes	-	0	0	<b>0</b>
• Hazardous waste exported	Tonnes	-	0	0	<b>0</b>
• Hazardous waste treated	Tonnes	-	113	22	<b>103</b>
<b>Waste transported across international borders</b>	%	-	0%	0%	<b>0%</b>
<b>Ash &amp; gypsum generated</b>					
• Ash	Tonnes	627,167	619,138	664,199	<b>677,395</b>
• Gypsum	Tonnes	53,306	90,346	85,097	<b>85,187</b>
<b>Ash disposal</b>					
• Reuse	Tonnes	0	0	0	<b>296,118</b>
• Recycling	Tonnes	571,402	619,138	664,199	<b>381,278</b>
• Landfill	Tonnes	0	0	0	<b>0</b>
• Onsite storage	Tonnes	0	0	0	<b>0</b>
• Other	Tonnes	55,765	0	0	<b>0</b>
<b>Gypsum disposal</b>					
• Reuse	Tonnes	0	0	0	<b>38,697</b>
• Recycling	Tonnes	53,306	90,346	85,097	<b>46,490</b>
• Landfill	Tonnes	0	0	0	<b>0</b>
• Onsite storage	Tonnes	0	0	0	<b>0</b>
• Other	Tonnes	0	0	0	<b>0</b>

Data	Unit	2017	2018	2019	2020
<b>Proportion of waste reused and recycled</b>					
• Hazardous waste	%	-	-	59%	<b>81%</b>
• Non-hazardous waste	%	-	-	0%	<b>2%</b>
• Ash	%	91%	100%	100%	<b>100%</b>
• Gypsum	%	100%	100%	100%	<b>100%</b>

<sup>(a)</sup> Excludes ash and gypsum from power plant.

<sup>(b)</sup> Includes recovery hazardous waste.

## Biodiversity

Data	Unit	2017	2018	2019	2020
<b>Number of operation</b>	Number	-	-	3	<b>3</b>
<b>Business unit(s) in relation to protected area</b>					
• In the area	Number	-	-	0	<b>0</b>
• Adjacent to	Number	-	-	0	<b>0</b>
• Containing portions	Number	-	-	0	<b>0</b>
<b>Business unit(s) in relation to high biodiversity wilderness area outside protected</b>					
• In the area	Number	-	-	0	<b>0</b>
• Adjacent to	Number	-	-	0	<b>0</b>
• Containing portions	Number	-	-	0	<b>0</b>
<b>Number of business units</b>					
• Assessed for potential biodiversity impact	Number	-	-	3	<b>3</b>
• Identified as high potential of biodiversity impact	Number	-	-	0	<b>0</b>
• Assessed for biodiversity value	Number	-	-	0	<b>0</b>
• Required biodiversity management plan <sup>(a)</sup>	Number	-	-	0	<b>0</b>
• Implemented biodiversity management plan <sup>(a)</sup>	Number	-	-	0	<b>0</b>
<b>Proportion of business units</b>					
• Assessed for biodiversity impact	%	-	-	100%	<b>100%</b>
• Assessed for biodiversity value	%	-	-	NA <sup>(b)</sup>	<b>NA<sup>(b)</sup></b>
• With biodiversity management plan <sup>(a)</sup>	%	-	-	NA <sup>(b)</sup>	<b>NA<sup>(b)</sup></b>

<sup>(a)</sup> For business unit(s) identified as high potential of biodiversity impact only.

<sup>(b)</sup> No business unit(s) identified as high potential of biodiversity impact.

## ■ Environmental Compliance

Data	Unit	2017	2018	2019	2020
<b>Number of significant environmental incident <sup>(a)</sup></b>					
• Effluent discharge limits	Case	0	0	0	0
• Air emissions standards	Case	0	0	0	0
• Other	Case	0	0	0	0
<b>Fines from environmental non-compliance <sup>(b)</sup></b>					
• Number of significant fines	Case	1	0	0	0
• Total amount of significant fines	USD	14,757	0	0	0
<b>Non-monetary Sanctions</b>	Case	0	0	0	0
<b>Cases brought through dispute mechanisms</b>	Case	0	0	0	0
<b>Spills <sup>(a)</sup></b>					
• Number of significant spills	Case	0	0	0	0
• Total amount of significant spills	Liter	0	0	0	0

<sup>(a)</sup> Referred to internal definition with criteria such as any damage to widespread area or potential fines that is greater than USD 10,000.

<sup>(b)</sup> Fines or potential fines that is greater than USD 10,000.

## ■ New Employee

Data	Unit	2017	2018	2019	2020
<b>Total new employee</b>	Person	75	65	56	40
<b>New employee - by gender</b>					
• Male	Person	65	56	41	37
• Female	Person	10	9	15	3
<b>New employee - by country</b>					
• Thailand	Person	3	3	5	0
• China	Person	70	57	50	40
• Japan	Person	2	4	1	0
• Vietnam	Person	0	1	0	0
• Other	Person	0	0	0	0

## ■ Corporate Culture

Data	Unit	2017	2018	2019	2020
<b>Level of alignment between employee behavior and the corporate culture - by country</b>					
• Thailand	%	77%	74%	65%	69%
• China	%	99%	-	95%	94%
• Japan	%	-	-	79%	56%

## ■ Employee

Data	Unit	2017	2018	2019	2020
<b>Total employee</b>	Person	952	968	966	786
<b>Employee - by gender</b>					
• Male	%	76.37%	76.96%	77.43%	82.80%
• Female	%	23.63%	23.04%	22.57%	17.20%
<b>Employee - by country</b>					
• Thailand	%	4.41%	4.44%	4.35%	4.30%
• China	%	95.17%	94.63%	93.58%	95.70%
• Japan	%	0.42%	0.83%	1.76%	0%
• Vietnam	%	0%	0.10%	0.31%	0%
• Other	%	0%	0%	0%	0%
<b>Employee - by nationality</b>					
• Thai	%	4.41%	4.55%	5.38%	4.80%
• Chinese	%	95.17%	94.42%	92.55%	95%
• Japanese	%	0.42%	0.62%	1.04%	0%
• Vietnamese	%	0%	0.10%	0.31%	0%
• American	%	0%	0.31%	0.21%	0%
• Other	%	-	-	0.52%	0.10%
<b>Employee - by age</b>					
• Under 30	%	26.37%	23.76%	20.70%	18.20%
• 30-39	%	39.39%	39.05%	37.68%	43.80%
• 40-49	%	27.94%	30.58%	32.40%	31.60%
• 50 and over	%	6.30%	6.61%	9.21%	6.50%
<b>Employee - by type</b>					
• Permanent	%	97.16%	96.90%	74.02%	96.40%
• Temporary/ contract	%	2.84%	3.10%	25.98%	3.60%
<b>Employee - by level</b>					
• Senior management	%	1.47%	1.45%	0.31%	0.60%
• Middle management	%	4.20%	4.96%	7.04%	5%
• Junior management	%	21.64%	22.00%	6.94%	5%
• Supervisor & staff	%	72.69%	71.59%	85.71%	89.40%
<b>Management - by gender <sup>(a)</sup></b>					
• Male	%	75.38%	73.82%	71.74%	81.80%
• Female	%	24.62%	26.18%	28.26%	18.20%

<sup>(a)</sup> Included middle and senior management.

## Employee Engagement

Data	Unit	2017	2018	2019	2020
<b>Employee engagement level - by country</b>					
• Thailand	%	57%	68%	68%	<b>48%</b>
• China	%	95%	94%	94%	<b>92%</b>
• Japan	%	-	-	50%	<b>38%</b>
<b>Total turnover rate</b>	%	3.03%	6.25%	5.69%	<b>4.30%</b>
<b>Voluntary turnover rate</b>	%	3.03%	3.13%	4.87%	<b>4.30%</b>
<b>Turnover rate - by country</b>					
• Thailand	%	3.03%	6.25%	2.38%	<b>2.90%</b>
• China	%	0%	0%	5.97%	<b>4.40%</b>
• Japan	%	0%	0%	0%	<b>0%</b>
• Other	%	0%	0%	0%	<b>0%</b>
<b>Employee taking parental leave - by country</b>					
• Thailand	Person	0	0	0	<b>0</b>
• China	Person	0	0	7	<b>1</b>
• Japan	Person	0	0	0	<b>-</b>
• Other	Person	0	0	0	<b>-</b>
<b>Employee returning to work after parental leave - by country</b>					
• Thailand	%	NA <sup>(b)</sup>	NA <sup>(b)</sup>	NA <sup>(b)</sup>	<b>NA<sup>(b)</sup></b>
• China	%	NA <sup>(b)</sup>	NA <sup>(b)</sup>	100% <sup>(a)</sup>	<b>100%</b>
• Japan	%	NA <sup>(b)</sup>	NA <sup>(b)</sup>	NA <sup>(b)</sup>	<b>-</b>
• Other	%	NA <sup>(b)</sup>	NA <sup>(b)</sup>	NA <sup>(b)</sup>	<b>-</b>

<sup>(a)</sup> Updated from previous report.

<sup>(b)</sup> No parental leave.

## Human Capital Development

Data	Unit	2017	2018	2019	2020
<b>Average training cost per employee - by country</b>					
• Thailand	USD/Person	1,300	1,540	2,320	<b>1,110</b>
• China	USD/Person	211	244	275	<b>271</b>
• Japan	USD/Person	685	1,020	1,730	<b>370</b>
• Other	USD/Person	1,500	2,000	7,140	<b>125</b>
<b>Average training cost per employee - by level</b>					
• Senior management	USD/Person	389	370	5,100	<b>3,127</b>
• Middle management	USD/Person	742	883	1,230	<b>1,058</b>
• Junior management	USD/Person	910	834	775	<b>793</b>
• Supervisor & staff	USD/Person	139	167	195	<b>193</b>
<b>Average training hour per employee - by country</b>					
• Thailand	Hour/Person	30	27.5	35.2	<b>30</b>
• China	Hour/Person	26	20.5	29	<b>35</b>
• Japan	Hour/Person	24	18	27	<b>20</b>
• Other	Hour/Person	56	40	27	<b>9</b>

Data	Unit	2017	2018	2019	2020
<b>Average training hour per employee - by level</b>					
• Senior management	Hour/Person	15	21	37	<b>27</b>
• Middle management	Hour/Person	22	44	62	<b>30</b>
• Junior management	Hour/Person	41	38	53	<b>35</b>
• Supervisor & staff	Hour/Person	19	25	25	<b>30</b>

## Succession Plan & Leadership Development

Data	Unit	2017	2018	2019	2020
<b>Proportion of critical positions having a succession plan</b>	%	100%	100%	100%	<b>100%</b>
<b>Critical positions having a succession plan - by level</b>					
• Senior management	%	100%	100%	100%	<b>100%</b>
• Middle management	%	100%	100%	100%	<b>100%</b>
<b>Proportion of employees having individual development plan - by country</b>					
• Thailand	%	-	-	-	<b>100%</b>
• China	%	-	-	-	<b>55%</b>
<b>Succession of leadership development program</b>	%	70%	72%	80%	<b>100%</b>
<b>Succession of leadership development program (by course)</b>					
• Strategic Leader	%	100%	100%	100%	<b>100%</b>
• Business Leader	%	41%	77%	82%	<b>82%</b>
• First Line Leader	%	50%	52%	66%	<b>75%</b>
• Future Leader	%	-	39%	56%	<b>60%</b>
• Engaging Leader	%	88%	90%	94%	<b>94%</b>

## Collection Bargaining Agreement

Data	Unit	2017	2018	2019	2020
<b>Employee covered by collective bargaining agreement</b>					
• Thailand	%	0%	0%	0%	<b>0%</b>
• China	%	0%	0%	0%	<b>0%</b>
• Japan	%	0%	0%	0%	<b>0%</b>
• Other	%	0%	0%	0%	<b>0%</b>

## ■ Community Engagement

Data	Unit	2017	2018	2019	2020
Significant community complaints	Case	0	0	0	0
Proportion of significant complaints from communities resolved through a dispute mechanism	%	NA <sup>(a)</sup>	NA <sup>(a)</sup>	NA <sup>(a)</sup>	NA <sup>(a)</sup>

<sup>(a)</sup> No significant complaint.

## ■ Community Resettlement

Data	Unit	2017	2018	2019	2020
Significant community resettlement complaints	Case	-	0	0	0
Proportion of significant resettlement complaints resolved through a dispute mechanism	%	-	NA <sup>(a)</sup>	NA <sup>(a)</sup>	NA <sup>(a)</sup>

<sup>(a)</sup> No significant complaint.

## ■ Human Rights

Data	Unit	2017	2018	2019	2020
Coverage of business units assessed for human right risks	%	-	100%	100%	100%
Proportion of business units with risk management plan <sup>(a)</sup>	%	-	NA <sup>(b)</sup>	NA <sup>(b)</sup>	NA <sup>(b)</sup>
Number of significant human rights issues	%	-	0	0	0
Proportion of significant human rights issues resolved through a dispute mechanism	%	-	NA <sup>(c)</sup>	NA <sup>(c)</sup>	NA <sup>(c)</sup>

<sup>(a)</sup> For business unit(s) identified as high human rights risks.

<sup>(b)</sup> No business units identified as high human rights risks.

<sup>(c)</sup> No significant issues.

## ■ Occupational Health and Safety

Data	Unit	2017	2018	2019	2020
<b>Workers covered by OHS management system</b>					
• Number of workers	Person	-	-	-	1,415
• Percentage of total workers	%	-	-	-	100%
<b>Workers covered by OHS management system that has been internally audited</b>					
• Number of workers	Person	-	-	-	1,310
• Percentage of total workers	%	-	-	-	92.6%
<b>Worker covered by OHS management system that has been audited or certified by third party</b>					
• Number of workers	Person	-	-	-	1,310
• Percentage of total workers	%	-	-	-	92.6%
<b>Number of occupational fatalities</b>					
• Employee	Person	0	0	0	0
• Contractor	Person	0	0	0	0
<b>Fatality rate</b>					
• Employee	Person/ Million man-hour	0	0	0	0
• Contractor	Person/ Million man-hour	0	0	0	0
<b>Number of recordable injury</b>					
• Employee	Case	0	0	0	0
• Contractor	Case	-	-	-	0
<b>Total recordable injury frequency rate (TRIFR)</b>					
• Employee	Person/ Million man-hour	0	0	0	0
• Contractor	Person/ Million man-hour	0	0	0	0
<b>Lost time injury frequency rate (LTIFR)</b>					
• Employee	Person/ Million man-hour	0	0	0	0
• Contractor	Person/ Million man-hour	0	0	0	0
<b>Injury severity rate (ISR) <sup>(a)</sup></b>					
• Employee	Day/ Million man-hour	0	0	0	0
• Contractor	Day/ Million man-hour	-	-	-	0
<b>Number of high-consequence work-related injuries</b>					
• Employee	Case	-	0	0	0
• Contractor	Case	-	0	0	0

Data	Unit	2017	2018	2019	2020
<b>High-consequence work-related injuries frequency rate</b>					
• Employee	Person/ Million man-hour	-	0	0	0
• Contractor	Person/ Million man-hour	-	0	0	0
<b>Number of hour worked</b>					
• Employee	Million hour	-	-	-	1,899,082
• Contractor	Million hour	-	-	-	598,794
<b>Process safety event <sup>(b)</sup></b>	Case	0	0	0	0
<b>Number of fatalities as a result of work-related ill health</b>					
• Employee	Person	-	-	-	0
• Contractor	Person	-	-	-	0
<b>Number of total recordable work-related ill health</b>					
• Employee	Case	-	-	-	0
• Contractor	Case	-	-	-	0
<b>Average OHS Training per employee</b>					
• China	Hour/ Person	-	-	-	25.42

<sup>(a)</sup> Refers to American National Standards Institute (ANSI) standard.

<sup>(b)</sup> Refers to internal definition with criteria such as fatality and catastrophic damage to ecosystem.

# Performance Data: Banpu NEXT

## Product

Data	Unit	2020
Electricity sold	MWh	338,763

## Greenhouse Gas Emissions

Data	Unit	2020
<b>GHG emissions</b>		
• Total (Scope 1 & 2)	Tonnes CO <sub>2</sub> e	3,273
• Direct (Scope 1)	Tonnes CO <sub>2</sub> e	72
• Indirect (Scope 2)	Tonnes CO <sub>2</sub> e	3,201
• Other indirect (Scope 3) <sup>(a)</sup>	Tonnes CO <sub>2</sub> e	-
<b>GHG emissions intensity</b>		
• Total (Scope 1 & 2)	Tonnes CO <sub>2</sub> e/ MWh	0.010
• Electricity generation	Tonnes CO <sub>2</sub> e/ MWh	0.010
SF <sub>6</sub> emissions	Tonnes CO <sub>2</sub> e	0

<sup>(a)</sup> Data collection system under standardization

## Energy

Data	Unit	2020
<b>Total energy consumption</b>	TJ	24
<b>Renewable energy consumption</b>		
• Renewable fuel	TJ	0
• Electricity purchased <sup>(a)</sup>	TJ	0
• Electricity self-generated	TJ	1,229
<b>Non-renewable energy consumption</b>		
• Non-renewable fuel	TJ	1
• Electricity purchased	TJ	14
<b>Renewable energy sold</b>		
• Electricity	TJ	1,220
<b>Energy consumption intensity</b>	GJ/ MWh	0.07

<sup>(a)</sup> Negligible purchased electricity for solar power plant during nighttime.

## Water Resources Utilization and Water Discharge

Data	Unit	2020
<b>Water withdrawal</b>		
• From all areas	Mega Liter	4
• From water stress areas	Mega Liter	4
<b>Water withdrawal - from all areas<sup>(a)</sup></b>		
• Surface water	Mega Liter	0
• Groundwater	Mega Liter	3
• Seawater	Mega Liter	0
• Produced water	Mega Liter	0
• Third-party water	Mega Liter	1
<b>Water withdrawal - from water stress areas<sup>(a)</sup></b>		
• Surface water	Mega Liter	0
• Groundwater	Mega Liter	3
• Seawater	Mega Liter	0
• Produced water	Mega Liter	0
• Third-party water	Mega Liter	1
<b>Third-party water withdrawal - from water stress areas<sup>(a)</sup></b>		
• Surface water	Mega Liter	1
• Groundwater	Mega Liter	0
• Seawater	Mega Liter	0
• Produced water	Mega Liter	0
• Reclaimed water <sup>(b)</sup>	Mega Liter	0
<b>Water discharge<sup>(a)</sup></b>		
• To all areas	Mega Liter	0
• To water stress areas	Mega Liter	0
<b>Water discharge (to all areas)<sup>(a)</sup></b>		
• Surface water	Mega Liter	0
• Groundwater	Mega Liter	0
• Seawater	Mega Liter	0
• Third-party water	Mega Liter	0
<b>Water consumption</b>		
• All areas	Mega Liter	4
• Water stress areas	Mega Liter	4
<b>Water consumption intensity</b>	m <sup>3</sup> / MWh	0.013
<b>Change in water storage</b>	Mega Liter	0

<sup>(a)</sup> Freshwater (≠1,000 mg/L Total Dissolved Solids).

<sup>(b)</sup> From wastewater treatment plant.

## Waste

Data	Unit	2020
<b>Waste generated</b>		
• Hazardous waste	Tonnes	0
• Non-hazardous waste	Tonnes	8
<b>Hazardous waste disposal</b>		
• Reuse	Tonnes	0
• Recycling	Tonnes	0
• Composting	Tonnes	0
• Recovery (including for fuel sources)	Tonnes	0
• Incineration	Tonnes	0
• Deep well injection	Tonnes	0
• Landfill	Tonnes	0
• On-site storage	Tonnes	0
• Other	Tonnes	0
<b>Non-hazardous waste disposal</b>		
• Reuse	Tonnes	0
• Recycling	Tonnes	0
• Composting	Tonnes	0
• Recovery (including for fuel sources)	Tonnes	0
• Incineration	Tonnes	0
• Deep well injection	Tonnes	0
• Landfill	Tonnes	0
• On-site storage	Tonnes	0
• Other	Tonnes	8
<b>Hazardous waste transportation</b>		
• Hazardous waste transported	Tonnes	0
• Hazardous waste imported	Tonnes	0
• Hazardous waste exported	Tonnes	0
• Hazardous waste treated	Tonnes	0
<b>Waste transported across international borders</b>	%	0%

## Biodiversity

Data	Unit	2020
<b>Number of operation</b>	Number	<b>33</b>
<b>Business unit(s) in relation to protected area</b>		
• In the area	Number	0
• Adjacent to	Number	0
• Containing portions	Number	0
<b>Business unit(s) in relation to high biodiversity wilderness area outside protected</b>		
• In the area	Number	0
• Adjacent to	Number	0
• Containing portions	Number	0
<b>Number of business units</b>		
• Assessed for potential biodiversity impact	Number	0
• Identified as high potential of biodiversity impact	Number	0
• Assessed for biodiversity value	Number	0
• Required biodiversity management plan <sup>(a)</sup>	Number	0
• Implemented biodiversity management plan <sup>(a)</sup>	Number	0
<b>Proportion of business units</b>		
• Assessed for biodiversity impact	%	<b>100%</b>
• Assessed for biodiversity value	%	<b>NA<sup>(b)</sup></b>
• With biodiversity management plan <sup>(a)</sup>	%	<b>NA<sup>(b)</sup></b>

<sup>(a)</sup> For business unit(s) identified as high potential of biodiversity impact only.

<sup>(b)</sup> No business unit(s) identified as high potential of biodiversity impact.

## Environmental Compliance

Data	Unit	2020
<b>Number of significant environmental incident <sup>(a)</sup></b>		
• Effluent discharge limits	Case	0
• Air emissions standards	Case	0
• Other	Case	0
<b>Fines from environmental non-compliance <sup>(b)</sup></b>		
• Number of significant fines	Case	0
• Total amount of significant fines	USD	0
<b>Non-monetary Sanctions</b>	Case	0
<b>Cases brought through dispute mechanisms</b>	Case	0
<b>Spills <sup>(a)</sup></b>		
• Number of significant spills	Case	0
• Total amount of significant spills	Liter	0

<sup>(a)</sup> Referred to internal definition with criteria such as any damage to widespread area or potential fines that is greater than USD 10,000.

<sup>(b)</sup> Fines or potential fines that is greater than USD 10,000.

## Occupational Health and Safety

Data	Unit	2020
<b>Workers covered by OHS management system</b>		
• Number of workers	Person	<b>236</b>
• Percentage of total workers	%	<b>85.8%</b>
<b>Workers covered by OHS management system that has been internally audited</b>		
• Number of workers	Person	<b>40</b>
• Percentage of total workers	%	<b>14.5%</b>
<b>Worker covered by OHS management system that has been audited or certified by third party</b>		
• Number of workers	Person	0
• Percentage of total workers	%	<b>0%</b>
<b>Number of occupational fatalities</b>		
• Employee	Person	0
• Contractor	Person	0
<b>Fatality rate</b>		
• Employee	Person/ Million man-hour	0
• Contractor	Person/ Million man-hour	0

Data	Unit	2020
<b>Number of recordable injury</b>		
• Employee	Case	0
• Contractor	Case	0
<b>Total recordable injury frequency rate (TRIFR)</b>		
• Employee	Person/ Million man-hour	0
• Contractor	Person/ Million man-hour	0
<b>Lost time injury frequency rate (LTIFR)</b>		
• Employee	Person/ Million man-hour	0
• Contractor	Person/ Million man-hour	0
<b>Injury severity rate (ISR) <sup>(a)</sup></b>		
• Employee	Day/ Million man-hour	0
• Contractor	Day/ Million man-hour	0
<b>Number of high-consequence work-related injuries</b>		
• Employee	Case	0
• Contractor	Case	0
<b>High-consequence work-related injuries frequency rate</b>		
• Employee	Person/ Million man-hour	0
• Contractor	Person/ Million man-hour	0
<b>Number of hour worked</b>		
• Employee	Hour	<b>256,712</b>
• Contractor	Hour	<b>144,742</b>
<b>Process safety event <sup>(b)</sup></b>	Case	0
<b>Number of fatalities as a result of work-related ill health</b>		
• Employee	Person	0
• Contractor	Person	0
<b>Number of total recordable work-related ill health</b>		
• Employee	Case	0
• Contractor	Case	0

<sup>(a)</sup> Refers to American National Standards Institute (ANSI) standard.

<sup>(b)</sup> Refers to internal definition with criteria such as fatality and catastrophic damage to ecosystem.



# Performance Data: BLCP

Data	Unit	2017	2018	2019	2020
<b>Installation Capacity</b>					
Electricity	MW	1,434	1,434	1,434	<b>1,434</b>
Capacity under construction	MW	0	0	0	<b>0</b>
Planned future investment	THB	0	0	0	<b>0</b>
<b>Production</b>					
Electricity sold	MWh	10,091,687	10,383,584	10,912,012	<b>11,284,046</b>
	GJ	36,330,073	37,380,902	39,283,243	<b>40,622,565</b>
Electricity generated	MWh	10,572,880	10,877,823	11,436,600	<b>11,823,652</b>
<b>System Efficiency</b>					
Production efficiency					
• Efficiency rate (power production)	g/KWh	348.66	355.66	357.45	<b>355.78</b>
• Efficiency rate (steam production)	Kg/GJ	0	0	0	<b>0.00</b>
• Availability factor	%	84.2%	86.6%	89.69%	<b>89.88%</b>
• Overall efficiency	%	38.3%	38.7%	38.75%	<b>38.76%</b>
Planned outage					
• Planned outage frequency	Case/Year	2	2	2	<b>2</b>
• Total outage hours	Hour	2,208	1,968	1,054	<b>532</b>
• Average power outage duration	Hour/Case	1,104	984	527	<b>266</b>
Unplanned outage					
• Planned outage frequency	Case/Year	2	1	1	<b>1</b>
• Total outage hours	Hour	257	14	7	<b>10.8</b>
• Average power outage duration	Hour/Case	128.50	14.00	7.00	<b>10.8</b>
Total outage					
• Planned outage frequency	Case/Year	4	3	3	<b>3</b>
• Total outage hours	Hour	2,465	1,982	1,061	<b>542.8</b>
• Average power outage duration	Hour/Case	616.25	660.67	353.67	<b>181</b>
Transmission					
• Length of transmission line	Km	47	47	47	<b>47</b>
<b>Energy</b>					
Direct fuel consumption					
• Total	GJ	96,781,462	99,917,245	104,652,927	<b>108,553,084</b>
• Coal	GJ	96,731,871	99,894,682	104,633,968	<b>108,529,744</b>
• Diesel	GJ	49,591	22,563	18,959	<b>23,341</b>
Indirect energy consumption					
• Electricity purchased	GJ	0	0	0	<b>0</b>
	MWh	0	0	0	<b>0</b>

Data	Unit	2017	2018	2019	2020
Energy intensity	MJ/MWh	9,590	9,620	9,590.62	<b>9,620.05</b>
<b>Greenhouse Gas (GHG)</b>					
GHG emissions					
• Total GHG (Scope 1 & 2)	Ton CO <sub>2</sub> e	8,849,960	9,111,041	9,589,975	<b>9,902,083</b>
• Direct GHG (Scope 1)	Ton CO <sub>2</sub> e	8,846,181	9,109,143	9,588,300	<b>9,900,455</b>
• Indirect GHG (Scope 2)	Ton CO <sub>2</sub> e	3,779	1,898	1,675	<b>1,628</b>
• GHG intensity (Scope 1 & 2)	Kg CO <sub>2</sub> / KWh	0.837	0.838	0.839	<b>0.837</b>
<b>Air</b>					
NO <sub>x</sub>					
• Average concentration	mg/ m <sup>3</sup>	237.30	228.6	228.1	<b>272.10</b>
• Degree of compliance	%	100%	100%	100%	<b>100%</b>
SO <sub>x</sub>					
• Average concentration	mg/ m <sup>3</sup>	279.40	258.10	360.60	<b>366.40</b>
• Degree of compliance	%	100%	100%	100%	<b>100%</b>
Particulate matter (PM)					
• Average concentration	mg/ m <sup>3</sup>	16.60	32.4	10.6	<b>16.30</b>
• Degree of compliance	%	100%	100%	100%	<b>100%</b>
<b>Biodiversity</b>					
Total operation area	KM <sup>2</sup>	0.96	0.96	0.96	<b>0.96</b>
Operation area related to protected area					
• Located inside protected area	KM <sup>2</sup>	0	0	0	<b>0</b>
• Adjacent to protected area	KM <sup>2</sup>	0	0	0	<b>0</b>
• Contain portion in protected area	KM <sup>2</sup>	0	0	0	<b>0</b>
IUCN red list species in operation area					
• Critically endangered	Number	0	0	0	<b>0</b>
• Endangered	Number	0	0	0	<b>0</b>
• Vulnerable	Number	0	0	0	<b>0</b>
• Near threatened	Number	0	0	0	<b>0</b>
• Least concern	Number	0	0	0	<b>0</b>
<b>Water</b>					
Water withdrawal					
• Total water withdrawal	ML	765	518	492	<b>460</b>
• Surface water (river, lake, and ocean)	ML	765	518	492	<b>460</b>
• Groundwater	ML	-	-	-	<b>-</b>
• Municipal water supply	ML	-	-	-	<b>-</b>
Water recycled	ML	147	291	354	<b>546</b>

Data	Unit	2017	2018	2019	2020
<b>Effluent</b>					
Water discharged					
• Total water discharged	ML	447	181	159	<b>149</b>
• Surface water	ML	0	0	0	<b>0</b>
• Groundwater	ML	0	0	0	<b>0</b>
• Seawater	ML	0	0	0	<b>0</b>
• Third-party water (total)	ML	447	181	159	<b>149</b>
• Third-party water sent for use to other organization	ML	0	0	0	<b>0</b>
<b>Effluent quality</b>					
• BOD	mg/ L	< 2.0 - 2.5	< 2.0 - 4.3	< 2.0 - 2.6	<b>&lt; 2.0 - 2.0</b>
• COD	mg/ L	< 25.0	< 25.0	< 25.0	<b>&lt; 25.0</b>
• pH	-	7.83	7.61	7.66	<b>7.84</b>
• Average temperature	°C	34.26	34.45	35.30	<b>35.47</b>
<b>Oil and chemical spill</b>					
• Total number of significant spill	Case	-	0	0	<b>0</b>
• Total volume of significant spill	Liter	-	0	0	<b>0</b>
<b>Waste</b>					
<b>Hazardous waste disposed</b>					
• Total hazardous waste	Ton	345	231	303	<b>98</b>
• Landfill	Ton	150	43	155	<b>26</b>
• Recycle	Ton	116	105	50	<b>34</b>
• Recovery	Ton	79	83	98	<b>37</b>
• Other disposal	Ton	0	0	0	<b>0</b>
<b>Non-hazardous waste disposed</b>					
• Total non-hazardous waste	Ton	543,927	580,697	604,365	<b>541,502</b>
• Landfill	Ton	823	1,269	726	<b>839</b>
• Recycle	Ton	455	348	289	<b>218</b>
• Recovery	Ton	542,648	579,081	603,350	<b>540,444</b>
• Other disposal	Ton	-	-	-	<b>-</b>
Total waste disposed (hazardous & non-hazardous)	Ton	544,272	580,928	604,668	<b>541,600</b>
<b>Production of ash &amp; gypsum</b>					
• Total production of ash	Ton	543,467	592,708	608,594	<b>580,496</b>
• Fly ash	Ton	473,077	532,713	535,818	<b>510,193</b>
• Bottom ash	Ton	70,390	59,995	73,776	<b>70,303</b>
• Gypsum	Ton	0	0	0	<b>0</b>
<b>Recycled ash &amp; gypsum</b>					
• Fly ash recycled	Ton	472,922	532,474	535,529	<b>494,338</b>
• Bottom ash recycled	Ton	70,390	59,995	73,776	<b>60,303</b>
• Gypsum recycled	Ton	0	0	0	<b>0</b>

Data	Unit	2017	2018	2019	2020
<b>Environmental Compliance</b>					
Total monetary value of significant fines	Case	-	0	0	<b>0</b>
	THB	-	0	0	<b>0</b>
Total monetary sanctions	Case	-	-	-	<b>-</b>
Case brought through dispute resolution mechanism	Case	-	-	-	<b>-</b>
<b>Environmental Grievance Mechanism</b>					
Complaints from related stakeholders on environment					
• Significant environmental complaint	Number	0	0	0	<b>0</b>
• Significant complaint resolved	Number	0	0	0	<b>0</b>
<b>Safety Performance</b>					
<b>Employee</b>					
Man hour	Hour	627,848	642,712	622,640	<b>383,568</b>
Number of fatality					
• Male	Person	0	0	0	<b>0</b>
• Female	Person	0	0	0	<b>0</b>
Number of injuries					
• Male	Person	1	0	1	<b>0</b>
• Female	Person	0	0	0	<b>0</b>
Number of high consequence work related Injuries					
• Male	Person	0	0	0	<b>0</b>
• Female	Person	0	0	0	<b>0</b>
Number of day lost (excluding fatality and permanent disability)					
• Male	Day	0	0	0	<b>0</b>
• Female	Day	0	0	0	<b>0</b>
Fatality rate	Person/ Million Man hour	0	0	0	<b>0</b>
Injury frequency rate (IFR)	Person/ Million Man hour	1.59	0	0	<b>0</b>
Lost time injury frequency rate (LTIFR)	Person/ Million Man hour	0	0	0	<b>0</b>
Injury severity rate (ISR)	Day/ Million Man hour	1.59	0	0	<b>0</b>
Total recordable injury rate (TRIR)	Day/ Million Man hour	1.59	0	0	<b>0</b>
<b>Contractor</b>					
Man hour	Hour	1,656,177	1,783,171	1,295,363	<b>1,027,738</b>
Number of fatality					
• Male	Male	1	0	0	<b>0</b>
• Female	Female	0	0	0	<b>0</b>

Data	Unit	2017	2018	2019	2020
Number of injuries					
• Male	Person	7	3	3	1
• Female	Person	1	1	2	0
Number of high consequence work related Injuries					
• Male	Person	0	0	0	0
• Female	Person	0	0	0	0
Number of day lost (excluding fatality and permanent disability)					
• Male	Day	0	0	0	0
• Female	Day	0	0	0	0
Fatality rate	Person/ Million Man hour	0.6	0	0	0
Injury frequency rate (IFR)	Person/ Million Man hour	3.62	0.56	3.09	3.89
Lost time injury frequency rate (LTIFR)	Person/ Million Man hour	0	0	0	0
Injury severity rate (ISR)	Day/ Million Man hour	3.02	0.56	0	0
Total recordable injury rate (TRIR)	Day/ Million Man hour	3.02	0.56	3.09	3.89
<b>OHS Training/ Communication</b>					
OHS training hour					
• Employee	Hour	-	18,173	18,189	6,538
• Contractor	Hour	-	21,033	18,984	9,216
<b>Expense and Investment for Safety</b>					
Expense for safety operation					
• Operation expense	THB	-	24,300,000	24,013,750	25,431,249
• Capex	THB	-	0	0	0
Expense for safety improvement project					
• Operation expense	THB	-	0	0	0
• Capex	THB	-	550,000	1,400,000	2,147,100
<b>Employee</b>					
Total employee	Person	278	278	280	292
Number of employee (by gender)					
• Male	Person	232	229	234	241
• Female	Person	46	49	46	51
Number of employee (by type)					
• Permanent	Person	268	265	263	267
• Temporary/ contract	Person	10	13	17	25
Number of employee (by level)					
• Senior management	Person	7	7	6	5
• Middle management	Person	32	31	33	41

Data	Unit	2017	2018	2019	2020
• Junior management	Person	47	46	47	38
• Supervisor & staff	Person	182	181	180	183
New employee					
• Total new employee	Person	15	16	9	16
• Male	Person	11	12	8	11
• Female	Person	4	4	1	5
Turnover					
• Turnover of permanent employee	Person	17	14	8	8
• Turnover rate	%	6.12%	5.04%	2.86%	2.74%
<b>Gender Diversity</b>					
Senior management					
• Male	Person	6	6	5	5
• Female	Person	1	1	1	0
Middle management					
• Male	Person	25	25	25	31
• Female	Person	7	6	8	10
Junior management					
• Male	Person	39	39	41	30
• Female	Person	8	7	6	8
Supervisor & staff					
• Male	Person	158	155	156	164
• Female	Person	24	26	24	19
<b>Employee Development</b>					
Training hour					
• Total training hour	Hour	8,084	18,173	18,189	11,469
• Senior management	Hour	186	512	648	162
• Middle management	Hour	1,537	3,297	3,393	1,815
• Junior management	Hour	2,014	3,010	3,780	2,178
• Supervisor & staff	Hour	4,347	11,354	10,368	7,314
Average training hour	Hour/Person	29.08	65.37	64.96	39.28
<b>Parental Leave</b>					
Employee take parental leave					
	Person	6	6	2	11
	%	2.16%	2.16%	0.71%	3.77%
Number of employee return to work after parental leave					
	Person	5	6	2	0
	%	83%	100%	100%	0%

# Performance Data: HPC

Data	Unit	2017	2018	2019	2020
<b>Installation Capacity</b>					
Electricity	MW	1,878	1,878	1,878	<b>1,878</b>
Capacity under construction	MW	0	0	0	<b>0</b>
Planned future investment	THB	0	0	0	<b>0</b>
<b>Production</b>					
Electricity sold	MWh	11,391	12,512	11,406	<b>11,355</b>
	GJ	41,007	45,042	41,062	<b>40,878</b>
Electricity generated	MWh	12,655	13,780	13,087	<b>12,980</b>
<b>System Efficiency</b>					
Production efficiency					
• Efficiency rate (power production)	g/ KWh	1,140	1,113	1,099	<b>1,087</b>
• Efficiency rate (steam production)	Kg/ GJ	0	0	0	<b>0</b>
• Availability factor	%	83.61%	89.65%	82.18%	<b>82.33%</b>
• Overall efficiency	%	31.51%	32.06%	32.49%	<b>32.57%</b>
Planned outage					
• Planned outage frequency	Case/ Year	2	3	3	<b>2</b>
• Total outage hours	Hour	1,940	1,225	1,143	<b>2,367</b>
• Average power outage duration	Hour/ Case	969.96	408.32	381.00	<b>1,183.50</b>
Unplanned outage					
• Planned outage frequency	Case/ Year	20	20	17	<b>17</b>
• Total outage hours	Hour	2,126	1,275	3,530	<b>2,273</b>
• Average power outage duration	Hour/ Case	106.30	63.76	207.65	<b>133.71</b>
Total outage					
• Planned outage frequency	Case/ Year	22	23	20	<b>19</b>
• Total outage hours	Hour	3,096	1,683	3,911	<b>3,457</b>
• Average power outage duration	Hour/ Case	140.72	73.19	195.55	<b>181.92</b>
Transmission					
• Length of transmission line	Km	167	167	167	<b>167</b>
• Transmission loss	%	0.20%	0.21%	0.20%	<b>0.20%</b>
• Length of distribution line	Km	6	6	6	<b>6</b>
<b>Energy</b>					
Direct fuel consumption					
• Total	GJ	144,980,196	154,938,500	145,217,278	<b>143,611,047</b>
• Coal	GJ	144,469,158	154,604,073	144,917,349	<b>143,353,524</b>
• Diesel	GJ	511,039	334,427	299,930	<b>257,523</b>

Data	Unit	2017	2018	2019	2020
Indirect energy consumption					
• Electricity purchased	GJ	0	0	0	<b>0</b>
	MWh	0	0	8,590	<b>5,193</b>
<b>Greenhouse Gas (GHG)</b>					
GHG emissions (Power Plant)					
• Total GHG (Scope 1 & 2)	Tons CO <sub>2</sub> e	16,920,258	16,185,216	15,539,000	<b>15,539,513</b>
• Direct GHG (Scope 1)	Tons CO <sub>2</sub> e	16,920,207	16,185,164	15,538,951	<b>15,539,471</b>
• Indirect GHG (Scope 2)	Tons CO <sub>2</sub> e	51	52	48	<b>42</b>
• Other indirect GHG (Scope 3)	Tons CO <sub>2</sub> e	1,488	1,714	1,461	<b>1,939</b>
• GHG intensity (Scope 1 & 2)	Tons CO <sub>2</sub> e/ MWh	1.600	1.384	1.403	<b>1.299</b>
GHG emissions (Mine)					
• Total GHG (Scope 1 & 2)	Tons CO <sub>2</sub> e	457,751	444,439	459,669	<b>423,071</b>
• Direct GHG (Scope 1)	Tons CO <sub>2</sub> e	455,065	443,680	459,005	<b>422,693</b>
• Indirect GHG (Scope 2)	Tons CO <sub>2</sub> e	2,686	759	665	<b>378</b>
<b>Air</b>					
NO <sub>x</sub>					
• Average concentration	mg/ Nm <sup>3</sup>	313.05-338.00	158.70-214.68	162.74-198.10	<b>200.55-222.87</b>
• Standard	mg/ Nm <sup>3</sup>	510	510	510	<b>510</b>
• Degree of compliance	%	100%	100%	100%	<b>100%</b>
SO <sub>x</sub>					
• Average concentration	mg/ Nm <sup>3</sup>	99.95-117.66	128.74-142.23	128.35-129.61	<b>131.90-135.59</b>
• Standard	mg/ Nm <sup>3</sup>	230	230	230	<b>230</b>
• Degree of compliance	%	100%	100%	100%	<b>100%</b>
Particulate matter (PM)					
• Average concentration	mg/ Nm <sup>3</sup>	24.16-31.41	5.18-7.87	4.92-7.99	<b>4.33-12.36</b>
• Standard	mg/ Nm <sup>3</sup>	50	50	50	<b>50</b>
• Degree of compliance	%	100%	100%	100%	<b>100%</b>
<b>Biodiversity</b>					
Total operation area	KM <sup>2</sup>	86.7	86.7	86.7	<b>86.7</b>
Operation area related to protected area					
• Located inside protected area	KM <sup>2</sup>	-	-	-	<b>-</b>
• Adjacent to protected area	KM <sup>2</sup>	-	-	-	<b>-</b>
• Contain portion in protected area	KM <sup>2</sup>	-	-	-	<b>-</b>

Data	Unit	2017	2018	2019	2020
IUCN red list species in operation area					
• Critically endangered	Number	0	Conduct every 5 years		
• Endangered	Number	0	0	Conduct every 5 years	Conduct every 5 years
• Vulnerable	Number	2	2		
• Near threatened	Number	4	4		
• Least concern	Number	201	201		
<b>Effluent</b>					
Water discharged					
• Total water discharged	ML	8,100,154	During installation of flow meter	8,277,573	<b>16,946,610</b>
• Surface water	ML	8,100,154	8,100,154	8,277,573	<b>16,946,610</b>
• Groundwater	ML	-	-	-	-
• Seawater	ML	-	-	-	-
• Third-party water (total)	ML	-	-	-	-
• Third-party water sent for use to other organization	ML	-	-	-	-
Effluent quality (Power Plant)					
• TSS	mg/ L	13.0-160.0	8.0-42.0	5.0-36	<b>5-82</b>
Standard	mg/ L	≤50	≤50	≤50	<b>≤50</b>
Degree of compliance	%	99.1%	100%	100%	<b>100%</b>
• BOD	mg/ L	0.5-7.4	0-1.4	0.1-2.4	<b>0.3-4.5</b>
Standard	mg/ L	≤40	≤40	≤40	<b>≤40</b>
Degree of compliance	%	100%	100%	100%	<b>100%</b>
• COD	mg/ L	≤40	≤40	<40-51	<b>&lt;40</b>
Standard	mg/ L	≤120	≤120	≤120	<b>≤120</b>
Degree of compliance	%	100%	100%	100%	<b>100%</b>
• pH	-	8.27-8.85	8.54-9.6	8.5-9.2	<b>8.6-8.9</b>
Standard	-	6-9	6-9	6-9	<b>6-9</b>
Degree of compliance	%	100%	99.1%	91.7%	<b>100%</b>
• Temperature	°C differential	0-1	0-1	0-1	<b>0-2</b>
Standard	°C differential	<3	<3	<3	<b>&lt;3</b>
Degree of compliance	%	100%	100%	100%	<b>100%</b>
Effluent quality (Mine)					
• TSS	mg/ L	<10.0-64.2	10.2-276	5.0-66	<b>10.1-49.2</b>
Standard	mg/ L	≤50	≤50	≤50	<b>≤50</b>
Degree of compliance	%	99.1%	100%	100%	<b>100%</b>
• BOD	mg/ L	2.0-12.3	0.3-2.4	0.0-2.5	<b>0.1-2.7</b>
Standard	mg/L	≤50	≤50	≤50	<b>≤50</b>
Degree of compliance	%	100%	100%	100%	<b>100%</b>

Data	Unit	2017	2018	2019	2020
• COD	mg/ L	<40.0-52.7	≤40	<40-47	<b>43.2-78.4</b>
Standard	mg/ L	≤150	≤150	≤150	<b>≤150</b>
Degree of compliance	%	100%	100%	100%	<b>100%</b>
• pH	-	6.8-8.4	6.4-10.3	6.1-8.3	<b>6.0-8.2</b>
Standard	-	6-9	6-9	6-9	<b>6-9</b>
Degree of compliance	%	100%	99.1%	100%	<b>100%</b>
• Temperature	°C differential	0-1	0-1	0-1	<b>0-2</b>
Standard	°C differential	<3	<3	<3	<b>&lt;3</b>
Degree of compliance	%	100%	100%	100%	<b>100%</b>
Oil and chemical spill					
• Total number of significant spill	Case	5	0	0	<b>5</b>
• Total volume of significant spill	Liter	120	0	0	<b>1,500</b>
<b>Waste</b>					
Hazardous waste disposed					
• Total hazardous waste	Ton	528,714	870,302	261,622	<b>368,543</b>
• Reuse	Ton	0	0	122	<b>14</b>
• Recycle (liquid)	Liter	528,406	864,802	259,237	<b>368,108</b>
• Recycle (solid)	Ton	308	-	2,045	<b>7.30</b>
• Recovery (including energy recovery)	Ton	-	-	-	<b>-</b>
• Incineration	Ton	-	-	5	<b>-</b>
• Deep well injection	Ton	-	-	-	<b>-</b>
• Landfill	Ton	-	-	-	<b>-</b>
• On-site storage	Ton	-	5,500	213	<b>414</b>
• Other disposal	Ton	-	-	-	<b>368,543</b>
Non-hazardous waste disposed					
• Total non-hazardous waste	Ton	4,867	9,316	5,755	<b>5,683</b>
• Reuse	Ton	-	-	-	<b>-</b>
• Recycle (solid)	Liter	42.96	3,736	5.15	<b>317</b>
• Compositing	Ton	-	-	0.846	<b>1</b>
• Recovery (including energy recovery)	Ton	-	-	-	<b>-</b>
• Incineration	Ton	-	-	-	<b>-</b>
• Deep well injection	Ton	-	-	-	<b>-</b>
• Landfill	Ton	4,688.7	5,580	5,749	<b>5,365</b>
• On-site storage	Ton	65	-	-	<b>-</b>
• Other disposal	Ton	71	-	-	<b>-</b>
Total waste disposed (hazardous & non-hazardous)	Ton	533,581	879,618	267,377	<b>374,226</b>
Production of ash & gypsum					
• Total production of ash	Ton	2,250,012	3,027,776	3,402,781	<b>3,413,872</b>
• Fly ash	Ton	2,250,012	3,027,776	3,402,781	<b>3,413,872</b>
• Bottom ash	Ton	-	-	-	<b>-</b>
• Gypsum	Ton	451,001	687,376	740,373	<b>706,477</b>

Data	Unit	2017	2018	2019	2020
Recycled ash & gypsum					
• Fly ash recycled	Ton	123,615.21	320,481	355,795	<b>174,556</b>
• Bottom ash recycled	Ton	-	-	-	-
• Gypsum recycled	Ton	-	30	0	<b>2,736</b>
<b>Environmental Compliance</b>					
Total monetary value of significant fines	Case	0	0	0	<b>0</b>
	THB	0	0	0	<b>0</b>
Total monetary sanctions	Case	0	0	0	<b>0</b>
Case brought through dispute resolution mechanism	Case	0	0	0	<b>0</b>
<b>Return on Environmental Investment</b>					
Environmental expenditure and cost					
• Capital investment expense	THB	2,904,798	5,891,397	146,100	<b>929,183.36</b>
• Operating expense	THB	15,330,592	10,935,231	22,397,424	<b>26,921,192.90</b>
Environmental improvement project					
• Operating expense	THB	-	-	-	-
• Capex	THB	12,823,021	48,574,584	-	-
<b>Environmental Grievance Mechanism</b>					
Complaints from related stakeholders on environment					
• Significant environmental complaint	Number	3	5	1	<b>1</b>
• Significant complaint resolved	Number	3	5	1	<b>1</b>
<b>Safety Performance</b>					
<b>Employee</b>					
Man hour	Hour	1,664,701	1,727,688	1,757,550	<b>1,798,075</b>
Number of fatality					
• Male	Person	0	0	0	<b>0</b>
• Female	Person	0	0	0	<b>0</b>
Number of high consequence work related Injuries (excluding fatality)					
• Male	Person	0	0	0	<b>0</b>
• Female	Person	0	0	0	<b>0</b>
Number of lost time injury					
• Male	Person	0	0	0	<b>0</b>
• Female	Person	0	0	0	<b>0</b>
Number of recordable work-related injuries					
• Male	Person	6	5	4	<b>3</b>
• Female	Person	0	0	0	<b>0</b>

Data	Unit	2017	2018	2019	2020
Number of day lost (excluding fatality and permanent disability)					
• Male	Day	0	0	0	<b>0</b>
• Female	Day	0	0	0	<b>0</b>
Fatality rate	Person/ Million Man hour	0	0	0	<b>0</b>
Lost time injury frequency rate (LTIFR)	Person/ Million Man hour	0	0	0	<b>0</b>
High consequence work related injury rate	Person/ Million Man hour	0	0	0	<b>0</b>
Total recordable injury rate (TRIR)	Day/ Million Man hour	3.60	2.89	2.28	<b>1.67</b>
Main type of work-related injury					
• Amputation	Person	0	0	0	<b>0</b>
• Burn	Person	0	0	0	<b>0</b>
• Chemical	Person	0	0	0	<b>0</b>
• Contamination	Person	0	0	0	<b>0</b>
• Contusion	Person	4	2	1	<b>3</b>
• Dry heat friction	Person	0	0	0	<b>0</b>
• Fracture	Person	0	0	0	<b>0</b>
• Hernia	Person	0	0	0	<b>0</b>
• Irritation	Person	0	0	0	<b>0</b>
• Laceration	Person	2	3	2	<b>0</b>
• Puncture	Person	0	0	1	<b>0</b>
• Rash	Person	0	0	0	<b>0</b>
• Strain & Sprain	Person	0	0	0	<b>0</b>
• Other	Person	0	0	0	<b>0</b>
Number of occupational disease					
• Male	Person	0	0	0	<b>0</b>
• Female	Person	0	0	0	<b>0</b>
<b>Contractor</b>					
Man hour	Hour	12,939,159	15,389,796	15,393,461	<b>13,871,450</b>
Number of fatality					
• Male	Person	0	1	1	<b>0</b>
• Female	Person	0	0	0	<b>0</b>
Number of high consequence work related Injuries (excluding fatality)					
• Male	Person	0	0	0	<b>0</b>
• Female	Person	0	0	0	<b>0</b>
Number of lost time injury					
• Male	Person	4	3	5	<b>4</b>
• Female	Person	0	0	0	<b>0</b>

Data	Unit	2017	2018	2019	2020
Number of recordable work-related injuries					
• Male	Person	21	21	25	<b>15</b>
• Female	Person	2	0	0	<b>0</b>
Number of day lost (excluding fatality and permanent disability)					
• Male	Day	27	189	1,865	<b>56</b>
• Female	Day	0	0	0	<b>0</b>
Fatality rate	Person/ Million Man hour	0	0.06	0.06	<b>0</b>
Lost time injury frequency rate (LTIFR)	Person/ Million Man hour	0.31	0.26	0.39	<b>0.29</b>
High consequence work related injury rate	Person/ Million Man hour	0	0	0	<b>1.00</b>
Total recordable injury rate (TRIR)	Day/ Million Man hour	1.62	1.36	1.62	<b>1.08</b>
Main type of work-related injury					
• Amputation	Person	0	0	1	<b>0</b>
• Burn	Person	2	1	1	<b>0</b>
• Chemical	Person	0	0	1	<b>0</b>
• Contamination	Person	0	0	0	<b>0</b>
• Contusion	Person	10	10	11	<b>8</b>
• Dry heat friction	Person	0	0	0	<b>0</b>
• Fracture	Person	0	0	2	<b>4</b>
• Hernia	Person	0	0	0	<b>0</b>
• Irritation	Person	2	1	0	<b>0</b>
• Laceration	Person	7	5	8	<b>3</b>
• Puncture	Person	1	4	0	<b>0</b>
• Rash	Person	0	0	0	<b>0</b>
• Strain & Sprain	Person	1	1	1	<b>0</b>
• Other	Person	0	0	0	<b>0</b>
Number of occupational disease					
• Male	Person	0	0	0	<b>0</b>
• Female	Person	0	0	0	<b>0</b>
<b>OHS Training/ Communication</b>					
<b>Employee</b>					
• OHS training program	Number	42	38	42	<b>30</b>
• OHS training hour	Hour	1,102	1,024	5,571	<b>2,153</b>
<b>Contractor</b>					
• OHS training program	Number	780	539	802	<b>423</b>
• OHS training hour	Hour	17,571	17,579	29,989	<b>15,817</b>

Data	Unit	2017	2018	2019	2020
<b>Expense and Investment for Safety</b>					
Expense for safety operation					
• Operation expense	THB	23,892,511	24,701,400	27,232,209	<b>33,446,374</b>
• Capex	THB	29,384,720	2,045,800	1,200,000	<b>328,800</b>
Expense for safety improvement project					
• Operation expense	THB	-	-	-	<b>0</b>
• Capex	THB	36,016,260	20,500,000	18,120,000	<b>0</b>
<b>Impacted Community</b>					
Plant area					
• Impacted household	Household	-	2,588	2,588	<b>2,588</b>
• Impacted people	Person	-	12,335	12,335	<b>12,335</b>
• Compensated household	Household	-	975	975	<b>975</b>
• Compensated people	Person	-	5,265	5,265	<b>5,265</b>
Transmission line					
• Impacted household	Household	-	249	249	<b>249</b>
• Impacted people	Person	-	1,345	1,345	<b>1,345</b>
• Compensated household	Household	-	249	249	<b>249</b>
• Compensated people	Person	-	1,345	1,345	<b>1,345</b>

# GRI Content Index

Disclosure	Description	Page		Omission	External Assurance
		SR	AR		
<b>GRI 101: Foundation 2016</b>					
<b>GRI 102: General Disclosures 2016</b>					
<b>Organizational profile</b>					
102-1	Name of the organization	Front cover			
102-2	Activities, brands, products, and services	10			
102-3	Location of headquarters	Back cover			
102-4	Location of operations	9			
102-5	Ownership and legal form	115	18-19		
102-6	Markets served	9, 13-14			
102-7	Scale of the organization	115, 118, 123			
102-8	Information on employees and other workers	123			
102-9	Supply chain	60-64, 120			
102-10	Significant changes to the organization and its supply chain	11-12			
102-11	Precautionary Principle or approach	47-50	35-38		
102-12	External initiatives	30-31			
102-13	Membership of associations	116			
EU1 <sup>E</sup>	Installed capacity, broken down by primary energy source and by regulatory regime	120			
EU2 <sup>E</sup>	Net energy output broken down by primary energy source and by regulatory regime	120			
EU3 <sup>E</sup>	Number of residential, industrial, institutional and commercial customer accounts	-	On the process of data standardization		
<b>Strategy</b>					
102-14	Statement from senior decision-maker	6-7			
102-15	Key impacts, risks, and opportunities	13-14, 47-50			
<b>Ethics and integrity</b>					
102-16	Values, principles, standards, and norms of behavior	37-39			
102-17	Mechanisms for advice and concerns about ethics	38			
<b>Governance</b>					
102-18	Governance structure	15-18			
102-19	Delegating authority	15-18			
102-20	Executive-level responsibility for economic, environmental, and social topics	19-22			

Disclosure	Description	Page		Omission	External Assurance
		SR	AR		
102-21	Consulting stakeholders on economic, environmental, and social topics	23-26			
102-22	Composition of the highest governance body and its committees	15-18			
102-23	Chair of the highest governance body	15-18	20		
102-24	Nominating and selecting the highest governance body	15-18	24		
102-25	Conflicts of interest	15-18, 41	21-25		
102-26	Role of highest governance body in setting purpose, values, and strategy	15-18, 20-22			
102-27	Collective knowledge of highest governance body	17-18	22-23		
102-28	Evaluating the highest governance body's performance	18			
102-29	Identifying and managing economic, environmental, and social impacts	19-22			
102-30	Effectiveness of risk management processes	19-22, 48			
102-31	Review of economic, environmental, and social topics	19-22			
102-32	Highest governance body's role in sustainability reporting	19-22			
102-33	Communicating critical concerns	19-22, 48			
102-34	Nature and total number of critical concerns	24-26, 49-50			
102-35	Remuneration policies	18, 21-22	21-22		
102-36	Process for determining remuneration	18, 21-22	24		
102-37	Stakeholders' involvement in remuneration	-			
102-38	Annual total compensation ratio	-			
102-39	Percentage increase in annual total compensation ratio	-			
<b>Stakeholder engagement</b>					
102-40	List of stakeholder groups	24-26			
102-41	Collective bargaining agreements	124			
102-42	Identifying and selecting stakeholders	23			
102-43	Approach to stakeholder engagement	24-26			
102-44	Key topics and concerns raised	24-26			
<b>Reporting practice</b>					
102-45	Entities included in the consolidated financial statements	115	18-19		
102-46	Defining report content and topic Boundaries	29			



Disclosure	Description	Page		Omission	External Assurance
		SR	AR		
102-47	List of material topics	29			
102-48	Restatements of information	11			
102-49	Changes in reporting	11			
102-50	Reporting period	11			
102-51	Date of most recent report	11			
102-52	Reporting cycle	11			
102-53	Contact point for questions regarding the report	Inner back cover			
102-54	Claims of reporting in accordance with the GRI Standards	11			
102-55	GRI content index	136-139			
102-56	External assurance	140			
<b>Economic</b>					
<b>GRI 201: Economic Performance 2016</b>					
103-1	Explanation of the material topic and its Boundary	33		Not a material topic	
103-2	The management approach and its components	34			
103-3	Evaluation of the management approach	34-46			
201-1	Direct economic value generated and distributed	118			
201-2	Financial implications and other risks and opportunities due to climate change	49, 70-72			
201-3	Defined benefit plan obligations and other retirement plans	-			
<b>GRI 203: Indirect Economic Impacts 2016</b>					
103-1	Explanation of the material topic and its Boundary	-		Not a material topic	
103-2	The management approach and its components	-			
103-3	Evaluation of the management approach	-			
203-1	Infrastructure investments and services supported	-			
203-2	Significant indirect economic impacts	118			
<b>GRI 204: Procurement Practices 2016</b>					
103-1	Explanation of the material topic and its Boundary	60		Not a material topic	
103-2	The management approach and its components	61			
103-3	Evaluation of the management approach	62			
204-1	Proportion of spending on local suppliers	120			
<b>GRI 205: Anti-corruption 2016</b>					
103-1	Explanation of the material topic and its Boundary	41			
103-2	The management approach and its components	41			
103-3	Evaluation of the management approach	42			

Disclosure	Description	Page		Omission	External Assurance
		SR	AR		
205-1	Operations assessed for risks related to corruption	42			
205-2	Communication and training about anti-corruption policies and procedures	42			
205-3	Confirmed incidents of corruption and actions taken	42			
<b>GRI G4 Sector Disclosures: System Efficiency</b>					
EU11 <sup>F</sup>	Average generation efficiency of thermal plants by energy source and by regulatory regime	120			
<b>Environment</b>					
<b>GRI 302: Energy 2016</b>					
103-1	Explanation of the material topic and its Boundary	74			
103-2	The management approach and its components	75			
103-3	Evaluation of the management approach	75-76			
302-1	Energy consumption within the organization	121			Yes
302-2	Energy consumption outside of the organization	121			
302-3	Energy intensity	121			Yes
302-4	Reduction of energy consumption	72, 75, 121			
302-5	Reductions in energy requirements of products and services	76, 121			
<b>GRI 303: Water and Effluents 2018</b>					
103-1	Explanation of the material topic and its Boundary	81			
103-2	The management approach and its components	81-82			
103-3	Evaluation of the management approach	83-84			
303-1	Interactions with water as a shared resource	82-84			
303-2	Management of water discharge-related impacts	81-84			
303-3	Water withdrawal	121			Yes
303-4	Water discharge	121			Yes
303-5	Water consumption	121			Yes
<b>GRI 304: Biodiversity 2016</b>					
103-1	Explanation of the material topic and its Boundary	88		Not a material topic	
103-2	The management approach and its components	88			
103-3	Evaluation of the management approach	89			
304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	122			
304-2	Significant impacts of activities, products, and services on biodiversity	-			
304-3	Habitats protected or restored	-			

Disclosure	Description	Page		Omission	External Assurance
		SR	AR		
304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	-			
EU13 <sup>F</sup>	Biodiversity of offset habitats compared to the biodiversity of the affected areas	-			
<b>GRI 305: Emissions 2016</b>					
103-1	Explanation of the material topic and its Boundary	69, 77			
103-2	The management approach and its components	70, 77			
103-3	Evaluation of the management approach	71-73, 78-80			
305-1	Direct (Scope 1) GHG emissions	120			Yes
305-2	Energy indirect (Scope 2) GHG emissions	120			Yes
305-3	Other indirect (Scope 3) GHG emissions	120			
305-4	GHG emissions intensity	120			Yes
305-5	Reduction of GHG emissions	72, 120			
305-6	Emissions of ozone-depleting substances (ODS)	121			Yes
305-7	Nitrogen oxides (NO <sub>x</sub> ), sulfur oxides (SO <sub>x</sub> ), and other significant air emissions	121			Yes
<b>GRI 306: Effluents and Waste 2016</b>					
103-1	Explanation of the material topic and its Boundary	85			
103-2	The management approach and its components	86-87			
103-3	Evaluation of the management approach	87			
306-2	Waste by type and disposal method	122			Yes
306-3	Significant spills	123			
306-4	Transport of hazardous waste	122			Yes
<b>GRI 307: Environmental Compliance 2016</b>					
103-1	Explanation of the material topic and its Boundary	43		Not a material topic	
103-2	The management approach and its components	43-45			
103-3	Evaluation of the management approach	45-46			
307-1	Non-compliance with environmental laws and regulations	123			
<b>GRI 308: Supplier Environmental Assessment 2016</b>					
103-1	Explanation of the material topic and its Boundary	60		Not a material topic	
103-2	The management approach and its components	61			
103-3	Evaluation of the management approach	62			
308-1	New suppliers that were screened using environmental criteria	120			

Disclosure	Description	Page		Omission	External Assurance
		SR	AR		
<b>Social</b>					
<b>GRI 401: Employment 2016</b>					
103-1	Explanation of the material topic and its Boundary	-		Not a material topic	
103-2	The management approach and its components	-			
103-3	Evaluation of the management approach	-			
401-1	New employee hires and employee turnover	123-124			
401-3	Parental leave	124			
<b>GRI 403: Occupational Health and Safety 2018</b>					
103-1	Explanation of the material topic and its Boundary	104			
103-2	The management approach and its components	105-106			
103-3	Evaluation of the management approach	105-107			
403-1	Occupational health and safety management system	45, 104-105			Yes
403-2	Hazard identification, risk assessment, and incident investigation	105			Yes
403-3	Occupational health services	105			Yes
403-4	Worker participation, consultation, and communication on occupational health and safety	105			Yes
403-5	Worker training on occupational health and safety	97, 105			Yes
403-6	Promotion of worker health	106			Yes
403-7	Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	105-108			Yes
403-8	Workers covered by an occupational health and safety management system	125			Yes
403-9	Work-related injuries	125-126			Yes
403-10	Work-related ill health	126			
<b>GRI 404: Training and Education 2016</b>					
103-1	Explanation of the material topic and its Boundary	95		Not a material topic	
103-2	The management approach and its components	95-96			
103-3	Evaluation of the management approach	97-99			
404-1	Average hours of training per year per employee	124			
404-2	Programs for upgrading employee skills and transition assistance programs	97-99			
404-3	Percentage of employees receiving regular performance and career development reviews	97-99			

Disclosure	Description	Page		Omission	External Assurance
		SR	AR		
<b>GRI 405: Diversity and Equal Opportunity 2016</b>					
103-1	Explanation of the material topic and its Boundary	-		Not a material topic	
103-2	The management approach and its components	17			
103-3	Evaluation of the management approach	17			
405-1	Diversity of governance bodies and employees	17			
<b>GRI 412: Human Rights Assessment 2016</b>					
103-1	Explanation of the material topic and its Boundary	-		Not a material topic	
103-2	The management approach and its components	50			
103-3	Evaluation of the management approach	125			
412-1	Operations that have been subject to human rights reviews or impact assessments	125			
<b>GRI 413: Local Communities 2016</b>					
103-1	Explanation of the material topic and its Boundary	108		Not a material topic	
103-2	The management approach and its components	108-109			
103-3	Evaluation of the management approach	109-113			
<b>GRI 414: Supplier Social Assessment 2016</b>					
103-1	Explanation of the material topic and its Boundary	60		Not a material topic	
103-2	The management approach and its components	61			
103-3	Evaluation of the management approach	62			
414-1	New suppliers that were screened using social criteria	120			
<b>GRI 415: Public Policy 2016</b>					
415-1	Political contributions	118			
<b>GRI 418: Customer Privacy 2016</b>					
103-1	Explanation of the material topic and its Boundary	65		Not a material topic	
103-2	The management approach and its components	66			
103-3	Evaluation of the management approach	66-67			
418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	119			
<b>GRI 419: Socioeconomic Compliance 2016</b>					
103-1	Explanation of the material topic and its Boundary	43		Not a material topic	
103-2	The management approach and its components	43-45			
103-3	Evaluation of the management approach	45-46			

Disclosure	Description	Page		Omission	External Assurance
		SR	AR		
419-1	Non-compliance with laws and regulations in the social and economic area		120		
<b>GRI G4 Sector Disclosures: Access</b>					
EU28 <sup>F</sup>	Power outage frequency		120		
EU29 <sup>F</sup>	Average power outage duration		120		
EU30 <sup>F</sup>	Average plant availability factor by energy source and by regulatory regime		120		
<b>Material topics not covered by GRI Standards</b>					
<b>Business Ethics</b>					
103-1	Explanation of the material topic and its Boundary		37		
103-2	The management approach and its components		37		
103-3	Evaluation of the management approach		38-40		
<b>Employee Engagement</b>					
103-1	Explanation of the material topic and its Boundary		100		
103-2	The management approach and its components		100		
103-3	Evaluation of the management approach		101-103		
<b>Business Continuity Management</b>					
103-1	Explanation of the material topic and its Boundary		51		
103-2	The management approach and its components		51-52		
103-3	Evaluation of the management approach		52-53		
<b>Risk Management</b>					
103-1	Explanation of the material topic and its Boundary		47		
103-2	The management approach and its components		47-49		
103-3	Evaluation of the management approach		49-50		
<b>Process Improvement and Innovation</b>					
103-1	Explanation of the material topic and its Boundary		57		
103-2	The management approach and its components		57		
103-3	Evaluation of the management approach		58-59		

<sup>F</sup> GRI-G4 Electric Utilities Sector Disclosures 2010.



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- GRI 403-5 Worker training on occupational health and safety (2018)
- GRI 403-6 Promotion of worker health (2018)
- GRI 403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships (2018)
- GRI 403-8 Workers covered by an occupational health and safety management system (2018)
- GRI 403-9 Work-related injuries together with Lost Time Injury Frequency Rate (LTIFR) and Injury Severity Rate (ISR)

#### Criteria

The Subject Matters were assessed according to the following criteria:

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

#### Directors’ and management’s responsibilities

The directors and management of BPP are responsible for the preparation and presentation of the Subject Matters, specifically ensuring that in all material respects the Subject Matters are prepared and presented in accordance with the Criteria. This responsibility also includes the internal controls relevant to the preparation of the Report that is free from material misstatement whether due to fraud or error.

#### Procedure performed

In forming our limited assurance conclusion over the Subject Matters, our procedures consisted of making enquiries and applying analytical and other evidence gathering procedures including:

- Interviews with senior management and relevant staff at corporate and operating sites;
- Inquiries about the design and implementation of the systems and methods used to collect and process the information reported, including the aggregation of source data into the Subject Matters;
- Visits 1 site at Luannan site, selected on the basis of risk analysis including the consideration of both quantitative and qualitative criteria;
- Agreeing the Subject Matters to relevant underlying sources on a sample basis to determine whether all the relevant information has been included in the Subject Matters and prepared in accordance with the Criteria.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement and consequently the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed. Accordingly, we do not express a reasonable assurance opinion.

#### Inherent limitations

Due to the inherent limitations of any internal control structure it is possible that errors or irregularities in the information presented in the Report may occur and not be detected. Our engagement is not designed to detect all weaknesses in the internal controls over the preparation and presentation of the Report, as the engagement has not been performed continuously throughout the period and the procedures performed were undertaken on a test basis.

#### Restriction of use of our report

Our report should not be regarded as suitable to be used or relied on by any party wishing to acquire rights against us other than BPP, for any purpose or in any other context. Any party other than BPP who obtains access to our report or a copy thereof and chooses to rely on our report (or any part thereof) will do so at its own risk. To the fullest extent permitted by law, we accept or assume no responsibility and deny any liability to any party other than BPP for our work, for this independent limited assurance report, or for the conclusions we have reached.

*KPMG Phoomchai Audit Ltd.*

**KPMG Phoomchai Audit Ltd.**

Bangkok

26 April 2021

# Independent limited assurance report

To the Directors of Banpu Power Public Company Limited (“BPP”)

#### Conclusion

Based on the procedures performed, as described below, nothing has come to our attention that causes us to believe that the selected subject matters (“Subject Matters”) identified below and included in the Sustainability Report 2020 (the “Report”) for the year ended 31 December, are not, in all material respects, prepared in compliance with the reporting criteria (the “Criteria”).

#### Our Responsibilities

We have been engaged by BPP and are responsible for providing a limited assurance conclusion in respect of the Subject Matters for the year ended 31 December 2020 to be included in the Report as identified below.

Our assurance engagement is conducted in accordance with the International Standard on Assurance Engagements ISAE 3000 *Assurance Engagements other than Audits or Reviews of Historical Financial Information* and ISAE 3410 *Assurance on Greenhouse Gas Statements*. These standards require the assurance team to possess the specific knowledge, skills and professional competencies needed to provide assurance on sustainability information, and that we plan and perform the engagement to obtain limited assurance on whether the Subject Matters are prepared, in all material respects, in compliance with the Criteria. We have complied with the independence and other ethical requirements of the International Ethics Standards Board for Accountants’ International Code of Ethics for Professional Accountants (including International Independence Standards) (IESBA Code), which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior. The firm applies International Standard on Quality Control 1 and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

We have not been engaged to provide an assurance conclusion on any other information disclosed within the Report.

#### Subject Matters

Subject Matters comprised of the following data expressed numerically or in descriptive text for the year ended 31 December 2020:

- GRI 302-1 Energy consumption within organization
- GRI 302-3 Energy intensity
- 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
- GRI 305-2 Energy indirect (Scope 2) GHG emissions
- GRI 305-4 GHG emissions intensity
- GRI 305-6 Emissions of ozone-depleting substances (ODS)
- GRI 305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions (NOx, SOx, PM and Hg)
- GRI 306-2 Waste by type and disposal method
- GRI 306-4 Transport of hazardous waste
- GRI 403-1 Occupational health and safety management system (2018)
- GRI 403-2 Hazard identification, risk assessment, and incident investigation (2018)
- GRI 403-3 Occupational health services (2018)
- GRI 403-4 Worker participation, consultation, and communication on occupational health and safety (2018)

KPMG Phoomchai Audit Ltd., a Thai limited liability company and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative (“KPMG International”), a Swiss entity.



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