Banpu Power

Task Force on Climate-Related Financial Disclosures (TCFD) Preliminary Report

July 2022

Contents

1. Introduction

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

Banpu Power Public Company Limited (BPP) has published the Climate-Related Financial Disclosures Preliminary Report to respond investors' demand for climate-related disclosure. This report has been prepared in accordance with the Task Force on Climate-Related Financial Disclosure (TCFD) Recommendation, which are structured by four core elements, including Governance, Strategy, Risk Management, and Metrics and Targets. The information, assumptions and model in the report based on information as of April 2022.

Governance
The organization's governance around climate-related risks and opportunities

Strategy
The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning

Risk Management
The processes used by the organization to identify, assess, and manage climate-related risks

Metrics and Targets
The metrics and targets used to assess and manage relevant climate-related risks and opportunities

Reference: TCFD Implementing Guidance (2021)

2. Governance

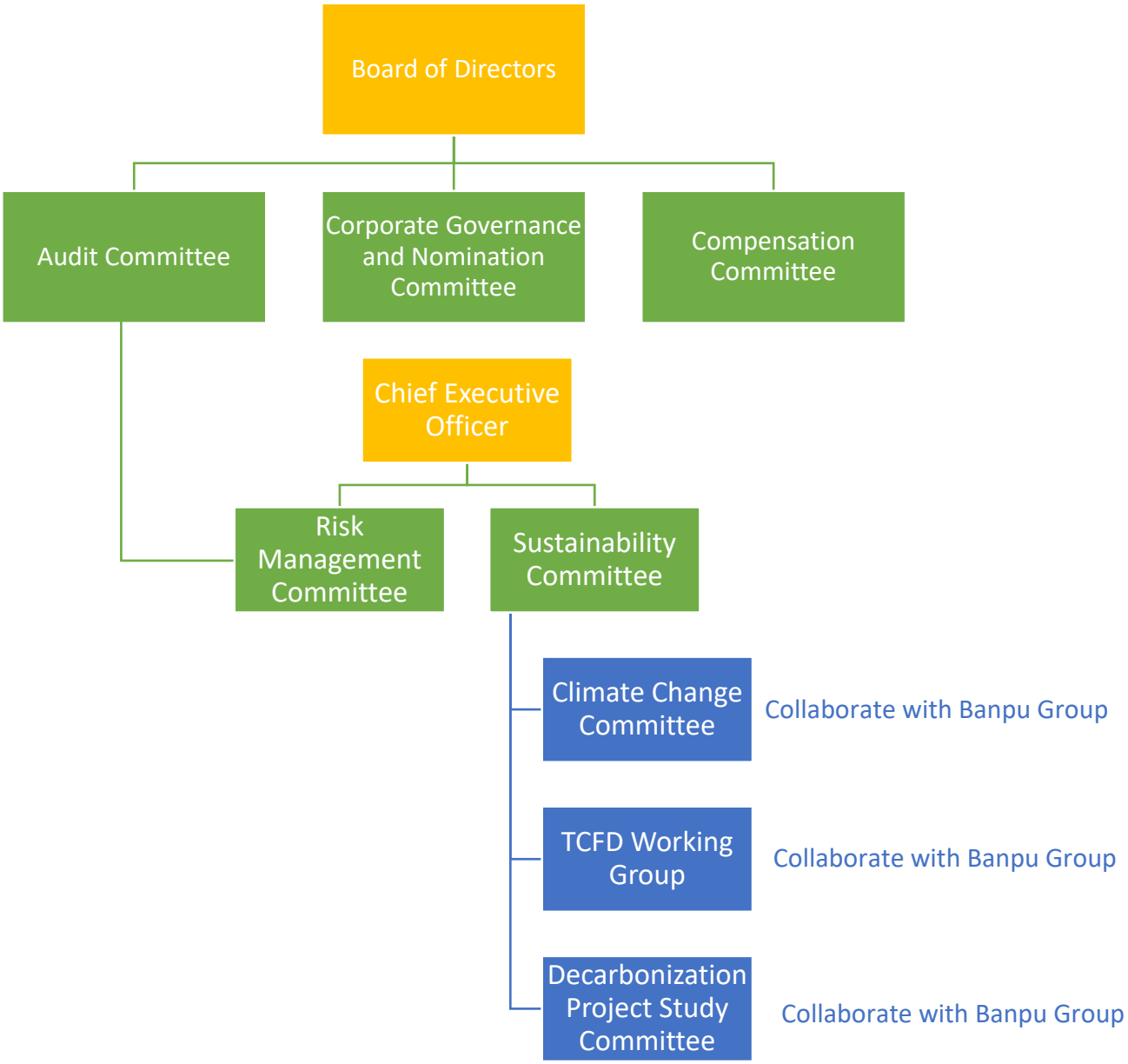
Recommended Disclosure

a) Describe the board's oversight of climate-related risks and opportunities
b) Describe management's role in assessing and managing climate related risks and opportunities.

Board's oversight and management's role for climate-related risks and opportunities are summarized as follows:

Governing Body	Roles and Responsibilities	Frequency
Board of Directors	***Decision-making and oversight*** The Board considers ESG risks to be critical to the long-term performance of Company • Provide oversight and its directive in align with company's vision and missions • Determine and approve ESG policies and strategies • Consider executive compensation with ESG targets	Monthly
Risk Management Committee	***Risks management oversight*** Management role in assessing and managing risk-related issues • Chaired by CEO • Review, manage and monitor Company's risk management, including climate-related risks and opportunities • Under supervision of the Board of Directors through Audit Committee (Board-level subcommittee),	Quarterly
Sustainability Committee	***Sustainability driven*** Management role in assessing and managing ESG matters • Chaired by CEO • Consist of top management from each department/business unit • Formulate and review ESG policies and strategies, which will be approved by the Board of Directors prior to further implementation. • Govern the deployment of sustainability policy and ESG strategy into day-to-day business operations • Review ESG targets and performance including climate-related topics.	Yearly/ as need

Governing Body	Roles and Responsibilities	Frequency
Climate Change Committee	***Execution*** Driving holistic climate change operations and managing the associated risks in order to reduce GHG emissions • Collaborated with Banpu Group to establish Climate Change Committee • Consist of representatives from operation across countries to drive initiatives • Provides expertise, and ensures best practices • Share and update climate-related information.	Quarterly
TCFD Working Group	***Execution*** Handling information disclosure in accordance with the TCFD guidelines • Collaborated with Banpu Group to establish TCFD Working Group • Consist of representative from functions at corporate level • Implement business impact analysis on climate related issues followed TCFD recommendation	Quarterly
Decarbonization Project Study Committee	***Execution*** Conducting a feasibility study in various GHG emission reduction projects • Collaborated with Banpu Group to establish Decarbonization Project Study Committee • Drive GHG emission reduction projects to meet target	Quarterly


Board of Directors
Audit Committee
Corporate Governance and Nomination Committee
Compensation Committee
Chief Executive Officer
Risk Management Committee
Sustainability Committee
Climate Change Committee
Collaborate with Banpu Group
TCFD Working Group
Collaborate with Banpu Group
Decarbonization Project Study Committee
Collaborate with Banpu Group

3. Strategy

Recommended Disclosure

a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.

b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.

c) Describe the resilience of the organization's strategy, taking into consideration different climate related scenarios, including a 2°C or lower scenario.

3.1 Risk, Impacts, and Opportunities Resulted from Climate Change

BPP has identified the climate-related risks and opportunities, and impact on the company's businesses, strategy, and financial planning as follows:

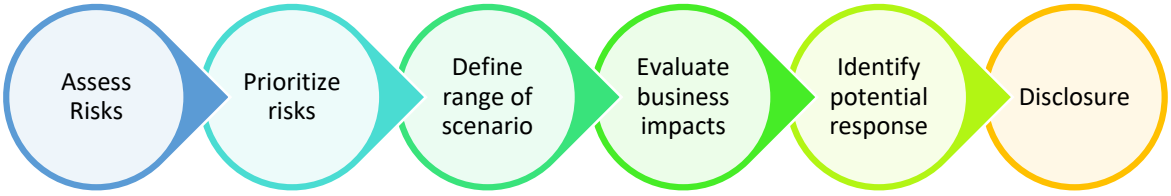
Risks	Impacts/Opportunities	Strategies and Operations	Lengths of Time Expected to Happen
1. Physical Risk			
1.1 Changes in climate patterns and seasonal fluctuations	• Lengths of time the winter season deviating from its normality affect the production plan of combined heat and power (CHP) plants to generate heat to the community in winter. • The temperature significantly higher than normal has resulted in lower heat sales for residents and costs from controlling the discharged water temperatures. • Significantly high/low temperature has resulted in the machinery unable to carry out productions due to exceeding its design values. • The amount of light and wind intensity deviated from the estimates has enabled the renewable power plants to generate less electricity than the target.	• Designing production with multiple production units for flexibility and having more options to produce with the highest efficiency in accordance with the community's demand for thermal energy. • Investing in a power plant designed to withstand high/low temperatures and create opportunities to generate power when other power plants or renewable power plants cannot operate, such as Temple I Gas-fired Power Plant. • Assessing the project's worthiness prior to investing by allowing for higher sunlight and wind discrepancies.	1 - 5 years

Risks	Impacts/Opportunities	Strategies and Operations	Lengths of Time Expected to Happen
1.2 Severe natural disasters such as storms, floods	• Production halts due to natural disasters have resulted in expenses on investing in natural disasters prevention, damage repair, and production opportunity loss.	• Investing in wind and flood prevention in the high-risk production units or those having a frequency of recurrence by taking into account the cost effectiveness in relation to the power plant's lifespan. • Designing and constructing a project by putting top concerns on natural disaster factors. • Procurement of property damage insurance and business interruption insurance suitable for various incidents.	1 - 5 years
1.3 Rising sea level	• Having an effect to production units located in coastal areas, possibly causing construction costs to prevent floods.	• BLCP Power Plant, a joint venture company, has been designed and constructed to exceed the estimated sea level rise over the power plant's life time. • Other power plants are not affected because they are not located on the coast.	10 years up
1.4 A decrease of precipitation volumes and freshwater shortages.	• Less rainfall has resulted in a shortage of fresh water in the area.	• All 3 CHP plants have taken steps to reduce water loss in the system, while the extension is designed to be able to recycle water as much as possible until it does not discharge water anymore (zero discharge). • BLCP Power Plant produces fresh water from seawater through the reverse osmosis method, making it not to draw fresh water in the area, and create opportunities to sell the fresh water produced to the nearby industrial plants. • HPC Power Plant manages its water sources with two wellsprings and monitors water levels management regularly.	1 - 5 years

Risks	Impacts/Opportunities	Strategies and Operations	Lengths of Time Expected to Happen
2. Transition Risk			
2.1 Policy and legal changes	• The government sector establishing policies and laws to reduce the greenhouse gas (GHG) emissions according to the Net- Zero target, has resulted in the limitation of fuel consumption and GHG emissions, which has been rising rapidly in China and Japan. This leads to costs in improving the production process/opportunities to invest in the renewable power plants supported by the government. • Expenses incurred from carbon tax/opportunity to sell electricity generated from clean energy. • An increase in financial costs or receiving no supports for the fossil fuel projects/ lower financial costs of clean energy projects.	• Improving the power plant efficiency for maximum energy consumption efficiency. • A transition of fossil fuels consumptions, such as biomass, waste, etc. • Adjusting the business plan to become an integrated energy solution and service provider such as providing solar rooftop installation services in China. • Conducting studies and investing in carbon capture, utilization and storage (CCUS). • Using the cost incurred from carbon taxes to calculate the investment worthiness of each project. • Looking for opportunities to sell carbon credits from clean energy production. • Upgrading the operations relating to environment, social and governance (ESG) to a sound level recognized internationally in order to create confidence among stakeholders and financial institutions.	1 - 5 years
2.2 Increased demand for clean energy	• Fluctuations in light intensity and wind speeds have resulted in the inconsistency and instability of renewable power generation. • An increase in demand for clean energy, but still unable to create stability in the local electricity system due to inadequacy of energy storage technology and a concentration of renewable energy power plants in some areas, has caused wastefulness from generating more power than the local demand, including stability of the power transmission and distribution system, which is derived from external management.	• Investing in energy technologies such as energy storage systems to stabilize the power supply. • Applying digital technology to analyze data to forecast production and energy consumption in each area, including a competitive advantage for sales of energy in the merchant market. • Investing in high-technology and low-emission energy, such as gas-fired power plants so as help stabilize the power generation of the area. • Investing in smart energy management technology (demand-side management).	1 - 5 years

Risks	Impacts/Opportunities	Strategies and Operations	Lengths of Time Expected to Happen
2.3 An increase in coal and other fossil fuels prices	• Higher coal and other fossil fuels prices due to lower production/opportunity to use other fuels from the government support.	• The power plants with long-term power purchase agreements (PPA) are not affected since the fuel costs are borne by the purchasers. • Managing coal purchases such as having long-term contracts, expanding coal stockyard areas to be able to accommodate coal reserves. • Seeking opportunities to use other fuels such as biomass, natural gas, waste, etc.	1 - 5 years
2.4 Restriction of water consumption and rising water prices	• The governmental restriction on using fresh water in the production process has resulted in improvements to reduce the amount of water used as specified by the government. • A shortage of fresh water in the area increases water prices.	• All 3 CHP plants have taken steps to reduce water loss in the system, while the extension is designed to bring water back to use as much as possible until the wastewater is not released from the power plant. • BLCP Power Plant produces fresh water from seawater through the reverse osmosis methodology, making it not to draw fresh water in the area. • HPC Power Plant manages water sources with two wellheads and monitors water levels management continuously.	1 - 5 years
2.5 Higher insurance costs	• Insurance companies increase their insurance premiums from natural disasters, which are more severe with higher frequency.	• Investing in the installation of equipment to prevent and reduce damage severity from natural disasters.	1 - 5 years

1.2 Climate Scenario Analysis



1) Climate Risk and Opportunities Assessment

Risk	
Policy & Legal	Carbon Pricing Mechanism
	Mandates on and regulation of existing products and services
	Enhanced emission-reporting obligation
	Exposure to litigation
Technology	Substitution of existing products and services with lower emission options
	Unsuccessful investment in new technologies
Market	Changing customer behavior
	Uncertainty In market signals
	Increased cost of raw materials
Reputation	Shift in customer preferences
	Stigmatization of sector and Increased stakeholders concern or negative stakeholder feedback
Physical	Acute: Increase severity and frequency of extreme weather events
	Chronic: Changes in precipitation pattern
Opportunity	
Energy Source	Use of lower-emission sources of energy
Products and Service	Ability to diversify business activities

2) Scenario Selection

Climate Risk	Agency	Scenario
Transition Risk	International Energy Agency World Energy Outlook (IEA WEO)	• Stated Policies Scenario (STEPS) • Sustainable Development Scenario (SDS)
Physical Risk	Intergovernmental Panel on Climate Change (IPCC)	• RCP 8.5

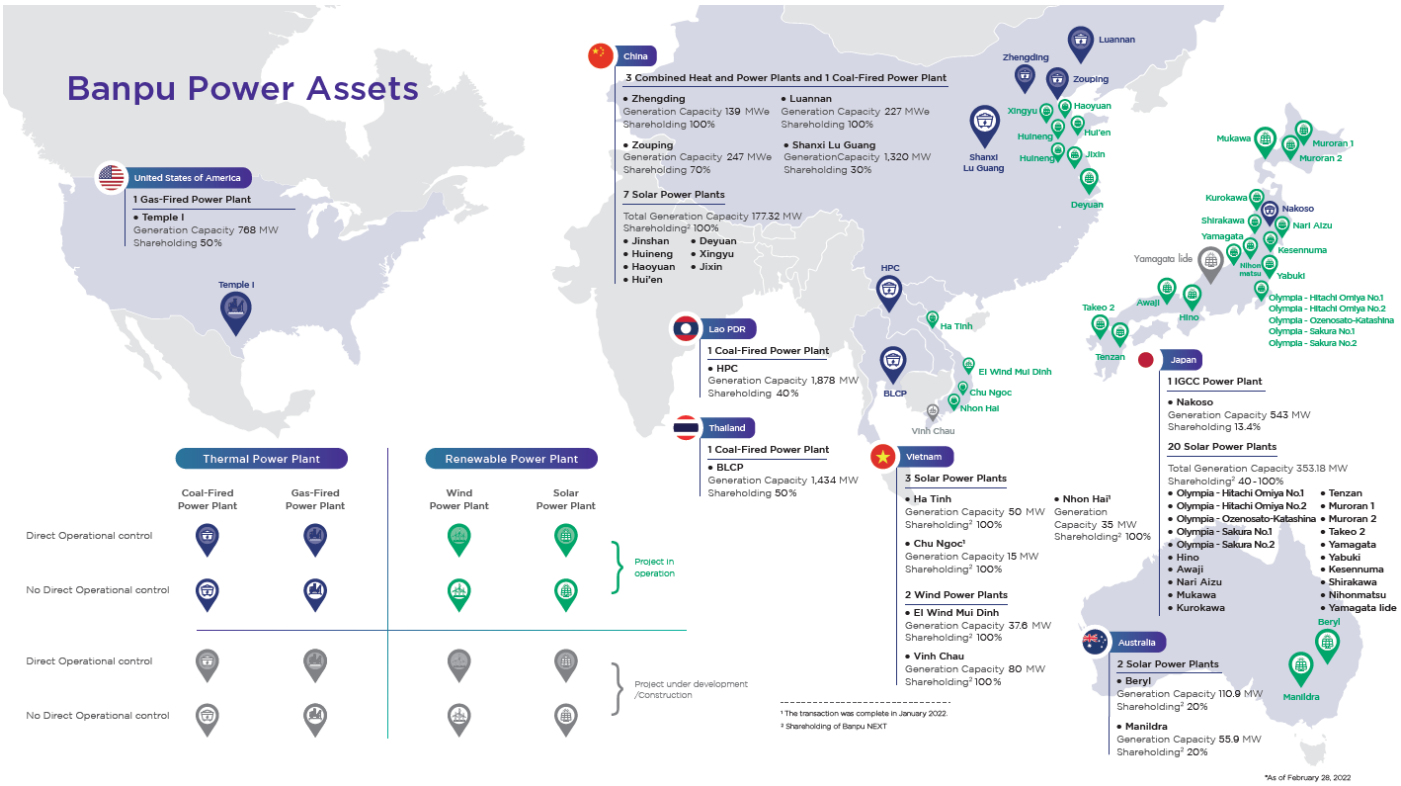
3) Business Impact Evaluation

Climate Risk & Opportunity	Indicator	Financial Impact
Transition Risk	• Coal cost • Carbon cost	• EBITDA
Physical Risk	• Insurance premium • Water price	
Opportunity	• CCUS • Biomass • Solar farm • Wind farm	

4) Scope of risk assessment

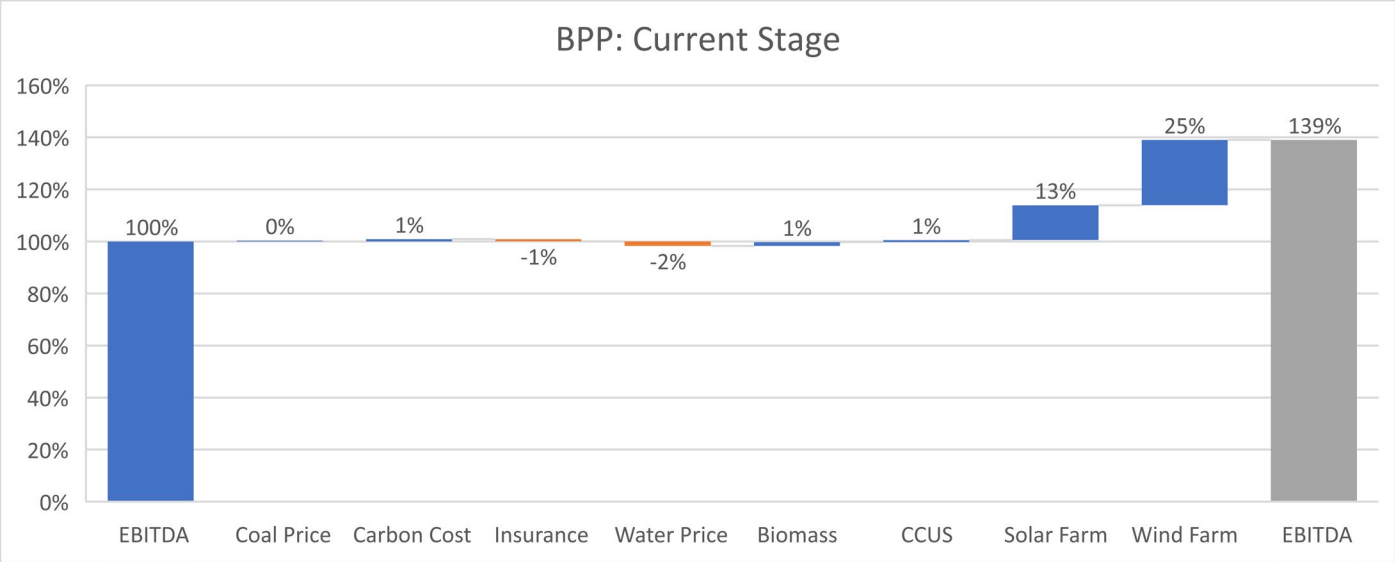
The boundary of this report covers all operating assets which BPP has direct and no direct management control including subsidiaries, associates, and joint-ventures companies which are including financial statement. BPP assets are shown in picture below.

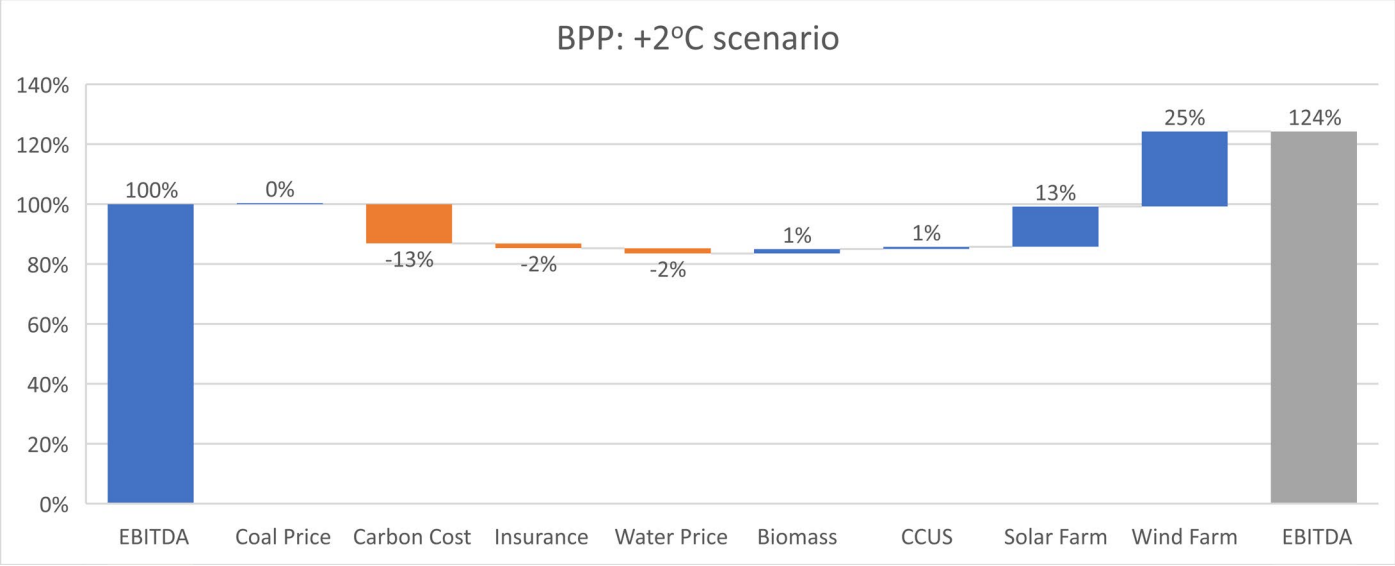
However, the scope of the report exclude Nakoso IGCC power plant located in Japan, operated as a joint venture company, where BPP has 13.4% shareholding.



Reference: BPP Sustainability Report (2021)

5) Financial Impact for the year 2022-2040 (based on information as of April 2022)





Indicators	Scenario	Outlook financial impact	Scenario Impacts 2022-2040
Transition Risks			
Coal price	Current Stage		No impact both scenarios by 2040 with the reasons as follows: • HPC is a mine mount power plant, operated coal mine and the coal price could pass through Power Purchase Agreement (PPA). • BLCP could bypass coal price through PPA. • CHPs refer to domestic coal price in China, which has been control by government and slightly impacted in long-term.
	2°C		
Carbon cost	Current Stage		In China, the operations could maintain high efficiency to gain surplus from ETS. In the meantime, there are no carbon cost regulations in Thailand and Laos PDR. In the current stage scenario, there is slight positive impact on EBITDA of 1% by 2040.
	2°C		• In the U.S., Temple I will have an impact on carbon cost from law and regulation, therefore it could be moderate negative impact on EBITDA of 13% by 2040. • In China, the carbon cost could slightly arise and possibly impact at high operation capacity power plant first. • In Thailand and Laos PDR, Carbon cost could be raised, however, the cost was negligible and limited by the PPA/ agreement regarding change in laws, the overall cost will be responded by counter parties.
Physical Risks			
Insurance	Current Stage		Premium insurances for thermal power plants have been increasing from physical climate impacts. This could be slight negative impact on EBITDA of 1% and 2% by 2040 for current stage and 2°C scenario, respectively.
	2°C		

Indicators	Scenario	Outlook financial impact	Scenario Impacts 2022-2040
Water price	Current Stage 2°C	↓	• Due to CHPs in China are located in water stress area, which may affect on water price. However, BPP has initiative projects to improve water efficiency and new production units were designed to be zero discharge, therefore there could be slight negative impact on EBITDA of 2% by 2040 for both scenarios. • For BLCP (Thailand) and HPC (Laos PD are not located in water stress area, both use sea water and surface water in own reservoir, respectively. As the result, they will not be impacted by water price.
Opportunities			
Biomass	Current Stage 2°C	↑	In China, Luannan power plant has been studying the possibility to use biomass as an alternative fuel. This could be slight positive impact on EBITDA of 1% by 2040. No significant differentiation between current stage and 2°C scenarios.
CCUS	Current Stage 2°C	↑	In China, Zhengding power plant has been studying the possibility to develop new technology, known as Carbon Capture, Utilization and Storage (CCUS). This product could be slight positive impact on EBITDA of 1% by 2040. No significant differentiation between current stage and 2°C scenarios.
Solar power plant	Current Stage 2°C	↑ ↑	With the Greener & Smarter strategy, BPP has plan to invest in solar farms through Banpu NEXT, which could be moderate positive impact on EBITDA of 13% by 2040. No significant differentiation between current stage and 2°C scenarios.
Wind power plant	Current Stage	↑ ↑	With the Greener & Smarter strategy, BPP has plan to invest in wind power plant through Banpu NEXT, which could be moderate positive impact on EBITDA of 25% by 2040. No differentiation between current stage and 2°C scenarios.

4. Risk Management

Recommended Disclosure

a) Describe the organization's processes for identifying and assessing climate related risks.
b) Describe the organization's processes for managing climate related risks.
c) Describe how processes for identifying, assessing, and managing climate related risks are integrated into the organization's overall risk management.

4.1 Risk Management Process

BPP risk management process begins with defining objectives according to the business plan and allocating them into the business units, departments, and sections. For identifying risks, the operational level employees who have knowledge and expertise in that activity will determine operational risks under his/her areas in details. The likelihood and impacts of such risks will be assessed along with preparing practice guidelines to mitigate risks possibly arisen. The risk management process also includes reporting the results to commander-in-chief and supervisors as well as monitoring the progress continuously.

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

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

4.2 Climate Change Risk Management Strategy

BPP has implemented measures to control and reduce the impacts caused by climate change as following:

- Operating businesses under Greener & Smarter strategy by focusing on utilizing advanced technology for a power generation process.
- Reducing GHG emissions in all business units, targeting to have GHG emission intensity not exceeding 0.676 tonnes CO_2e/MWh and the renewable energy production capacity of no less than 800 MWe by 2025.
- Increasing investment proportions in renewable power plants and energy technology through an investment in Banpu NEXT.
- Raising investment proportions in thermal power plants using clean and environmentally friendly technology with low GHG emissions intensity, such as the power plants employing the ultra-supercritical technology, the integrated gasification combined cycle (IGCC) and the combined cycle gas turbines (CCGT), etc.
- Conducting a study on developing plans and disclosing financial information following the Task Force on Climate-Related Financial Disclosures (TCFD) to assess climate change impacts and risks management.

5. Metrics and Targets

Recommended Disclosure

a) Disclose the metrics used by the organization to assess climate related risks and opportunities in line with its strategy and risk management process.
b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
c) Describe the targets used by the organization to manage climate related risks and opportunities and performance against targets.

5.1 GHG Calculation, Assumption, Methodology and Standard Used

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

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

5.2 GHG Emissions Performance

The boundary of the performance covers all business entities in which BPP has direct management control in accordance with the principle of The GHG Protocol Corporate Accounting and Reporting Standard (Revised Edition), which is in line with Banpu Group, including the three combined heat and power plants (CHP) in China. This is exclusion of Temple I Gas-fired Power Plant in which the company has invested in late November 2021.

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

The GHG emissions data in the last 4-years are provided in table below, which has been verified by third parties since 2018, the assurance statement included in BPP's Sustainability Report 2021, Edge of Energy Transformation.

Data	Unit	Performance			
		2018	2019	2020	2021
Total Scope 1 & 2	Tonnes CO_2e	3,824,124	3,822,073	4,016,666	3,641,189
Direct (Scope 1)	Tonnes CO_2e	3,821,632	3,814,884	4,010,147	3,633,788
Indirect (Scope 2)	Tonnes CO_2e	2,392	7,189	6,519	7,402
Other indirect (Scope 3)	Tonnes CO_2e	GHG Emissions (Scope 3) preliminary assessment conducted, but the data collection system under standardization.			
GHG emissions intensity (Total Scope 1 & 2)	Tonnes CO_2e/MWh	0.635	0.675	0.620	0.603

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	✓	Effluent treatments or disposals by external persons/ parties such as hazardous waste treatments and disposals, water treatment, as well as a utilization of fly ash and bottom ash, etc.
6. Business Trips	○	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.

Activities	Association	Description
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.
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

5.3 Performance Against Climate-related Targets

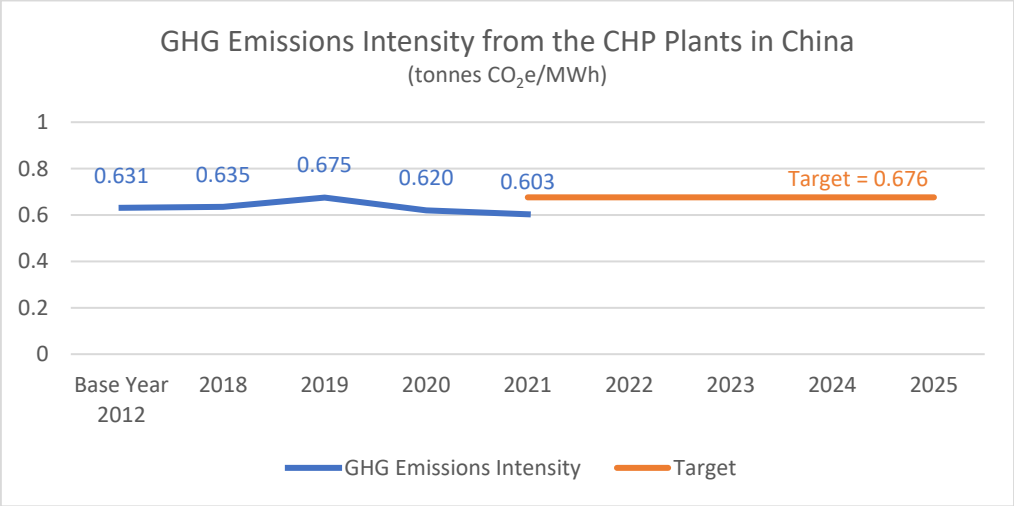
Since 2021, BPP has set climate-related targets as follows:

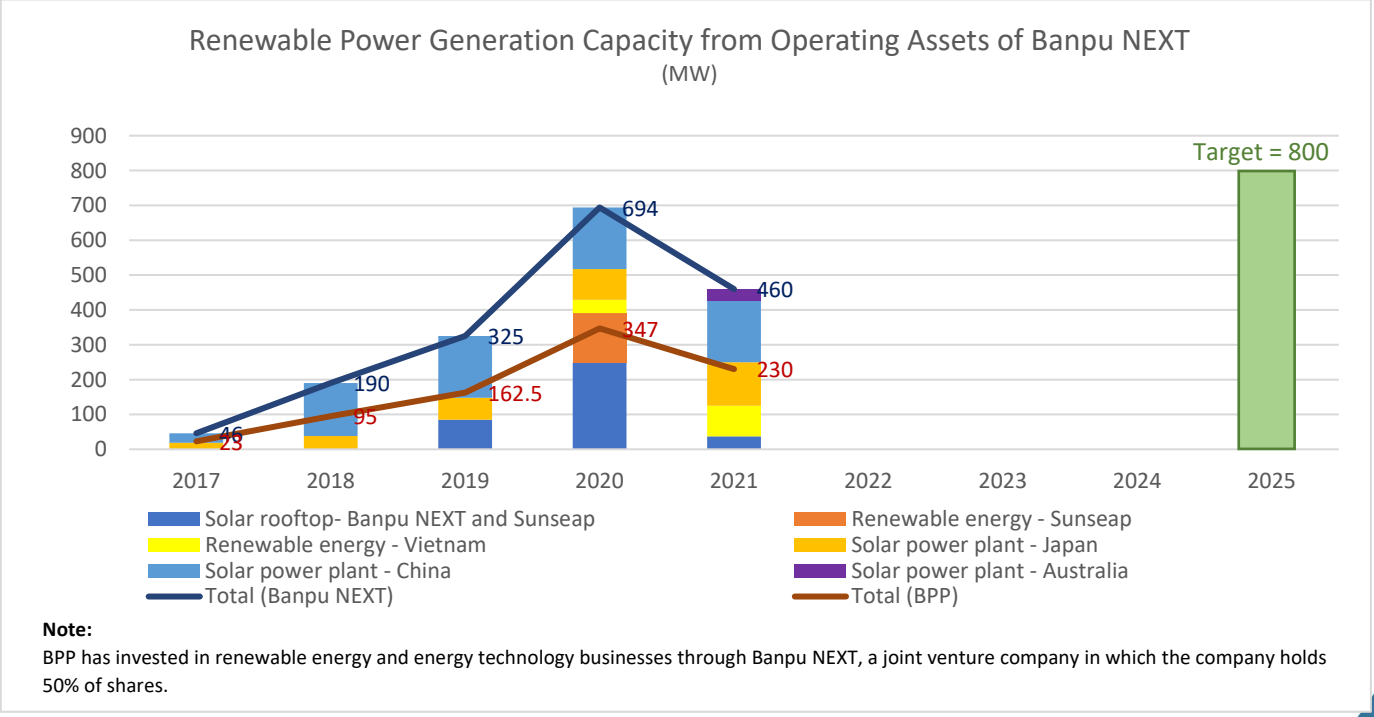
Target 1

GHG emissions intensity is not exceeding 0.676 tonnes CO_2e/MWh during the year 2021 - 2025.

Target 2

The renewable energy production capacity of no less than 800 MWe by 2025.





Note:
BPP has invested in renewable energy and energy technology businesses through Banpu NEXT, a joint venture company in which the company holds 50% of shares.

6. Conclusion and Recommendations

This report discloses climate-related financial information according to TCFD guideline including Governance, Strategy, Risk Management, and Metrics and Targets. The scenario analysis was conducted by using scenarios STEPS and SDS from IEA WEO for transition risks and RCP 8.5 from IPCC for physical risks, transition risks and opportunities in new business. The results were found the EBITDA will be increased to 139% and 124% by 2040 in current stage and 2^{o}C scenarios, respectively. In addition, the lower EBITDA caused of carbon cost (decreasing of 13%) from forecasting law and regulation in the U.S.

With the limitation of this report, the recommendation for the next report, such as

- Assess and update new operating assets where contribute significant financial impact in the scope of assessment such as Nakoso IGCC power plant, etc.
- Disclose more quantitative financial impact details
- Consider and conduct scenario analysis for climate physical risk impact on renewable business (radiation, climate pattern, etc.), impact from regulations, over/ under renewable energy supply at some period of the year, and carbon trading opportunities.
- Integrate into business plan and strategy in the future e.g. Net-Zero target
- Regularly review for update the assessment for strategic planning e.g. update forecast demand, changes in law, etc.
- Disclose GHG Scope 3 and assessment through supply chain.

7. References

1) Task Force on Climate-related Financial Disclosures (TCFD), Implementing the Recommendations (October 2021), assessed 21 July 2022, https://assets.bbhub.io/company/sites/60/2021/07/2021-TCFD-Implementing_Guidance.pdf
2) Banpu Power, Sustainability Report 2021, assessed 21 July 2022, https://www.banpupower.com/wp-content/uploads/2022/03/BPP_SDR_2021_EN_Final.pdf

Appendix

List of Business

Country	Business Unit	Business Type	Ownership (%)	Capacity		Status	Direct Operational Control
				100%	Equity		
Thermal Power Business							
China	Zhengding	Combined heat and power (CHP) plant	100%	139 MWe	139 MWe	Operating	✓
	Luannan	Combined heat and power (CHP) plant	100%	227 MWe	227 MWe	Operating	✓
	Zouping	Combined heat and power (CHP) plant	70%	247 MWe	173 MWe	Operating	✓
	Shanxi Lu Guang	Coal-fired power plant	30%	1,320 MW	396 MW	Operating[b]	x
Lao PDR	HPC	Coal-fired power plant	40%	1,878 MW	751 MW	Operating	x
Thailand	BLCP	Coal-fired power plant	50%	1,434 MW	717 MW	Operating	x
Japan	Nakoso	IGCC power plant[a]	13.4%	543 MW	73 MW	Operating[c]	x
The U.S.	Temple I	Gas-fired power plant	50%	768 MW	384 MW	Operating[d]	✓
Renewable Power Business[e]							
China	Huineng	Solar power plant	100%	21.51 MW	21.51 MW	Operating	x
	Jinshan	Solar power plant	100%	28.95 MW	28.95 MW	Operating	x
	Haoyuan	Solar power plant	100%	20.00 MW	20.00 MW	Operating	x
	Hui'en	Solar power plant	100%	19.70 MW	19.70 MW	Operating	x
	Deyuan	Solar power plant	100%	51.64 MW	51.64 MW	Operating	x
	Xingyu	Solar power plant	100%	10.30 MW	10.30 MW	Operating	x
	Jixin	Solar power plant	100%	25.22 MW	25.22 MW	Operating	x
Japan	Olympia - Hitashi Omiya No.1	Solar power plant	40%	2.00 MW	0.80 MW	Operating	x
	Olympia - Hitashi Omiya No.2	Solar power plant	40%	2.00 MW	0.80 MW	Operating	x
	Olympia - Ozenosato-Katashina	Solar power plant	40%	2.00 MW	0.80 MW	Operating	x
	Olympia - Sakura No.1	Solar power plant	40%	2.00 MW	0.80 MW	Operating	x
	Olympia - Sakura No.2	Solar power plant	40%	2.00 MW	0.80 MW	Operating	x
	Hino	Solar power plant	75%	3.50 MW	2.63 MW	Operating	x
	Awaji	Solar power plant	75%	8.00 MW	6.00 MW	Operating	x
	Nari Aizu	Solar power plant	100%[f]	20.46 MW	20.46 MW	Operating	x

Country	Business Unit	Business Type	Ownership (%)	Capacity		Status	Direct Operational Control
				100%	Equity		
	Mukawa	Solar power plant	56%	17.00 MW	9.52 MW	Operating	x
	Kurokawa	Solar power plant	100%	18.90 MW	18.90 MW	Operating	x
	Tenzan	Solar power plant	100%	1.96 MW	1.96 MW	Operating	x
	Muroran 1	Solar power plant	100%	1.73 MW	1.73 MW	Operating	x
	Muroran 2	Solar power plant	100%	1.63 MW	1.63 MW	Operating	x
	Takeo 2	Solar power plant	100%	1.00 MW	1.00 MW	Operating	x
	Yamagata	Solar power plant	100%	20.00 MW	20.00 MW	Operating	x
	Yabuki	Solar power plant	75%	7.00 MW	5.25 MW	Operating	x
	Kesennuma	Solar power plant	100%	20.00 MW	20.00 MW	Operating[g]	x
	Nihonmatsu	Solar power plant	100%	12.00 MW	12.00 MW	Operating[g]	x
	Shirakawa	Solar power plant	100%	10.00 MW	10.00 MW	Operating[h]	x
	Yamagata Iide	Solar power plant	51%	200.00 MW	102.00 MW	Under development	x
Vietnam	El Wind Mui Dinh	Wind power plant	100%	37.60 MW	37.60 MW	Operating	x
	Vinh Chau	Wind power plant	100%	80.00 MW	80.00 MW	Under construction and development	x
	Ha Tinh	Solar power plant	100%	50.00 MW	50.00 MW	Operating[i]	x
	Chu Ngoc	Solar power plant	100%	15.00 MW	15.00 MW	Operating[j]	x
	Nhon Hai	Solar power plant	100%	35.00 MW	35.00 MW	Operating[j]	x
Australia	Beryl	Solar power plant	20%	110.90 MW	22.18 MW	Operating[k]	x
	Manildra	Solar power plant	20%	55.90w MW	11.18 MW	Operating[k]	x

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

[b]Commercial Operation Date (COD) in October 2021.

[c]Commercial Operation Date (COD) in April 2021.

[d]Completed acquisition in November 2021.

[e]Ownership reported for Banpu NEXT's (BPP holds a 50% stake).

[f]Adjusted to 100% ownership by Banpu NEXT

[g]Commercial Operation Date (COD) in November 2021.

[h]Commercial Operation Date (COD) in January 2022.

[i]Completed acquisition in December 2021.

[j]Completed acquisition in January 2022.

[k]Completed acquisition in July 2021.

Reference: BPP Sustainability Report (2021)