

Scenario Planning Approach of Coal Market Sales on PT ABCoal Towards Energy Transitions Era

Irfan Naufaldi^{1,*} and Yos Sunitiyoso²

ABSTRACT

Nowadays, energy transition is one of the major events faced by coal producers, particularly Indonesian coal producers. PT ABCoal is one of the largest coal producers in Indonesia. Based on the company's 5-year plan, PT ABCoal is expected to increase its production volume from 25 to 30 million metric tons to around 35 to 45 million metric tons. Within the export market, most of the sales (around 50%) were sold to the Chinese market through off-takers. Meanwhile, the 25% for the domestic market is obliged by the Indonesian government regulation and is not negotiable. This research aimed to understand the future condition of the coal market within the next five years and what scenario would likely happen in the next five years. Afterward, it would try to provide the coal sales strategy that will fit into those scenarios using explorative scenario planning with expert interviews to obtain the perspective and knowledge from an interviewee who has expertise in this field. The obtained answers are then mapped into the PESTLE analysis framework to obtain more understanding and collect thorough driving forces data. The critical impact and high uncertainty were determined through qualitative-quantitative analysis from interview results using content analysis. Based on the analysis in this research, it is concluded that the top driving forces that are being used for scenario elements are coal price and government regulation. This research creates four scenarios that are called business as usual, finding a new home, home sweet home, and more is better. Each scenario needs a different approach to coal sales strategy to optimize its revenue and ensure the sustainability of its selling operation. The coal sales strategy optimization for each scenario is based on domestic and export composition, preferable domestic industry target composition, and developing-country export composition.

Keywords: Coal market, coal sales strategy, energy transition era, scenario planning.

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1. INTRODUCTION

Coal is one of the most common fossil-fuel energy sources around the world. Its affordability is one of the key points that make coal become as famous as it is today among energy producers. Looking at the coal demand specifically, most of the demand is coming from China, as seen in Fig. 1. Other than China, India and other Asia countries will also become the primary demand for coal until 2025.

The changes in demand from 2022 until 2025 can be seen in Fig. 2. According to that chart, the increase in demand is driven mainly by China and India. India has the highest changes in demand compared to China and Other Asia Countries.

China and India are the two largest coal consumers in the world, as seen in Fig. 1. As the two largest consumers, they could be said to be the market makers for coal around the globe.

Most of the coal demand comes from coal-fired power plants. One of the critical points in the Paris Agreement is to limit global warming to 2 °C below the pre-industrial level. Therefore, the phase-out of coal-fired power plants will play a pivotal role. In the Paris Agreement, several scenarios usually describe the coal-fired power plant phase-out strategy, such as rapid and lower phases. This phase-out strategy will impact the global market demand for coal itself, whether the decline in demand will be steep or slow.



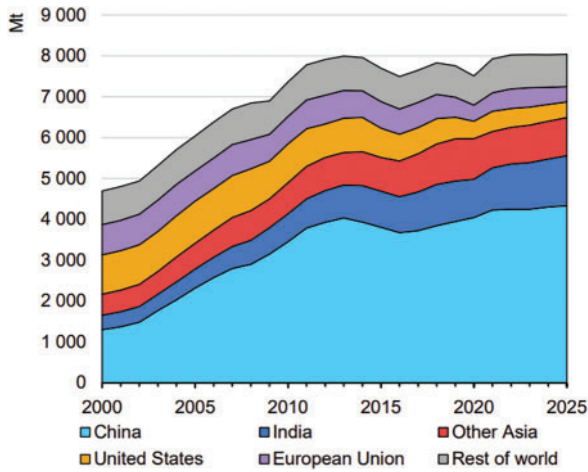


Fig. 1. Global coal consumption, 2020–2025 (Source: IEA, 2022a).

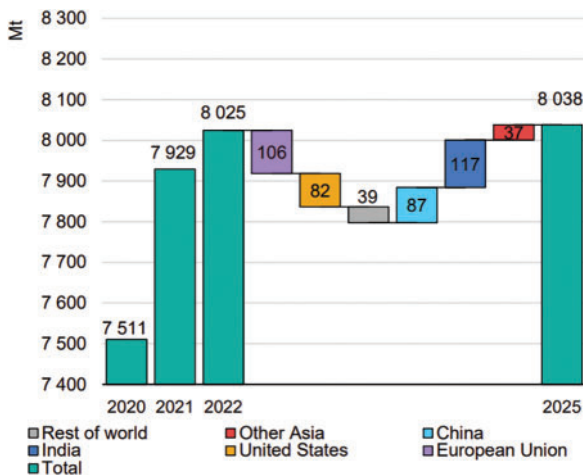


Fig. 2. Changes in global coal consumption, 2020–2025 (Source: IEA, 2022a).

PT. ABCoal is one of the largest coal mining productions in Indonesia. It amounted to around 25–30 million metric tons of coal produced in a year. The market portion of their coal sales is around 25% for domestic as a necessity from the government and the other 75% of its portion to the export market. Due to the disparity between domestic and export prices, coal producers prefer to explore the export market.

Meanwhile, more than half of their export is sold to China and India, and the other half is sold to other Southeast Asia or East Asia countries such as Vietnam, Malaysia, and Taiwan. By looking at the export countries’ distribution for PT. ABCoal, it can be said that most of its revenue depends on the Chinese coal market. Thus, this dependency will lead to an unsustainable market if there is any disruption within China.

This research is conducted to answer the following questions:

1. What is the future of the global coal market and the scenario that would likely to occur in the next 5 years?
2. What coal sales strategy needs to be done for each scenario that would likely to occur in the next 5 years?

The objective of this research is to understand the future of the coal market in the next 5 years, what are the scenarios that might occur in the next 5 years, and the recommendation of a coal sales strategy to optimize the company’s revenue from each scenario.

2. BUSINESS ENVIRONMENT REVIEW

The current portion of coal sales in PT. ABCoal, which is dominated by China, amounted to about 50% of its export portion. The business issue is depicted in Fig. 3.

In the rich picture, coal producers are obliged to sell 25% of their annual production to the domestic market by current Indonesian government regulation. The selling transaction on the domestic market from the coal producer’s point of view might not be preferable. It is due to the current Indonesian government regulation and situation that creates a price gap between domestic price and export price, as can be seen in the Ministry of Energy and Mineral Resources Decree Number 139/2021 and 58/2022 regarding price-cap regulation (MEMR, 2021, 2022a). Therefore, the market and sales strategy should be well-defined to optimize the company’s revenue.

As of now, the major portion of export sales is in PT. ABCoal relies on the Chinese market, which amounts to around 50% of its annual sales plan for both long-term and short-term transactions, with most of the sales coming from off-takers or traders. The higher portion of its export sales to China could bring some risks when something happens within the Chinese market. One of the market disruptions that might occur nowadays is due to the worldwide energy transition, especially in China, which is one of the developed nations.

3. LITERATURE REVIEW

Coal is one of the commodities that have been traded for a long period. As a traded goods, the coal market relies on the supply and demand of its goods. Coal is a mined product that is commonly used as a feedstock for several industries, such as power plants, cement, fertilizer, and smelters.

3.1. China Coal Market and Regulation

China is a unique country that became the market leader in coal demand (IEA, 2022a) and the world’s largest coal producer (IEA, 2022a). As it is known, coal has the highest portion of China’s energy-mix; based on 2020 data, its coal-fired power plant amounted to 60% of its energy-mix portion (IEA, 2022b). This 60% from coal is expected to fall below 60% by 2025 (IEA, 2022b). The reduction of coal in the energy-mix in China is expected to be replaced by wind turbines and solar PV.

Although coal-fired power plants still dominate China’s energy-mix, China is the global leader in deploying renewable power plants (IEA, 2022b). In 2020, its renewable capacity reached over 930 GW, which exceeds its capacity target for the 13th five-year plan period (2015–2020), which is 715 GW. The installed capacity of solar PV is over 250 GW, and wind will be over 280 GW in 2020.

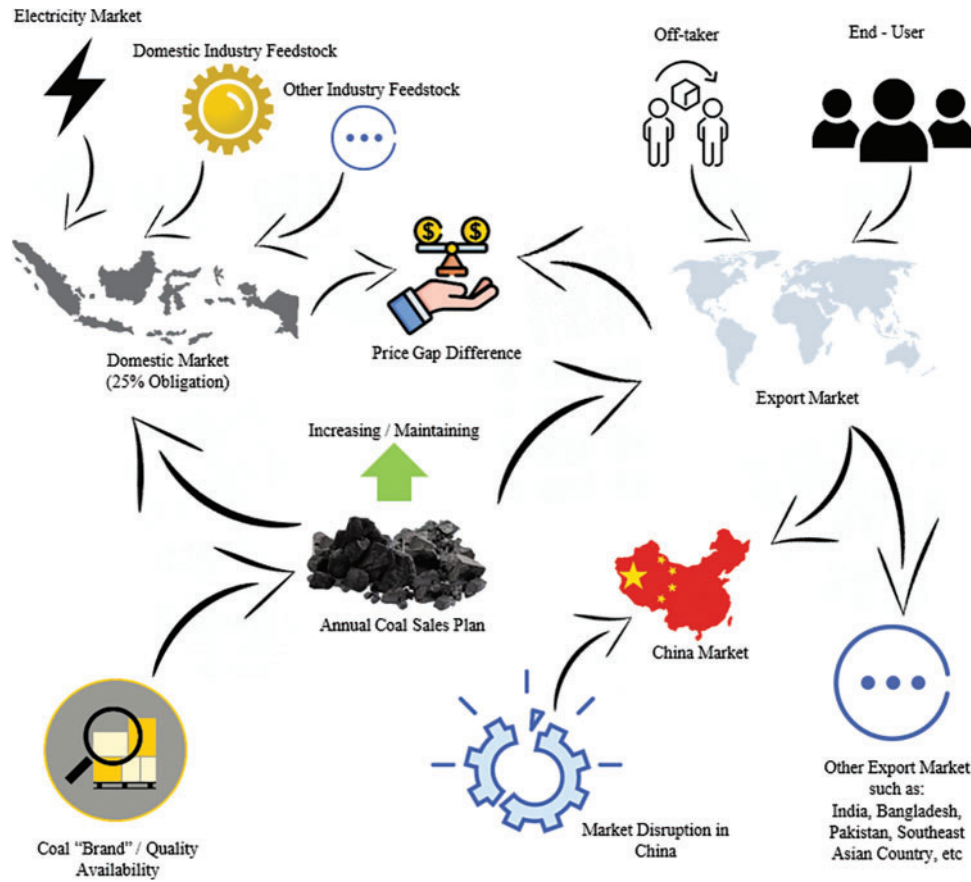


Fig. 3. Rich picture of PT ABCoal sales activity.

There will be an additional 100 GW combined capacity for both renewables in 2021. In comparison, the amount of renewable energy portion in 2000, only 16%, will grow tremendously by 2020. In 2020, China’s renewable energy portion reached 30% and is expected to increase to 45% in 2030, based on IEA’s APS (IEA, 2022b). However, China’s achievement of its 45% renewable energy portion target will be based on several factors, such as investment in renewables and electricity systems and adaptations in policy, regulatory, and market frameworks (IEA, 2021).

According to China’s target and condition, the portion of its coal-fired power plant by 2030 will be based on the speed of renewable energy growth in its energy-mix. Based on the previous explanation, it can be said that the average annual growth of renewable energy portion in China is around 1.5% each year according to its actual portion in 2020, which is around 30%, and its target in 2030, which is around 45%, or increase by 15% from 2020. If China can achieve this energy-mix target, it would impact PT ABCoal’s coal sales volume target due to its reliance on the Chinese market.

3.2. Indonesia Coal Market and Regulation

Indonesia is one of the largest coal producers around the globe. Indonesia could be in the top 3 or 4 largest coal producers below China and India (IEA, 2022a). As one of the largest coal producers, the Indonesian government has a regulation that obliges local coal producers to sell 25% of their annual coal production to domestic markets, such as electricity, fertilizer, cement, and other kind of industries

that need coal as their feedstock. The unfulfillment of this regulation will result in fines and sanctions (MEMR, 2022b). Despite the regulation, the domestic market is not favorable from a coal producer’s point of view due to its price. Based on the decree of the Ministry of Energy and Mineral Resources of Indonesia (MEMR, 2021, 2022a) regarding coal prices on the domestic market, it said that the maximum coal price reference index for electricity generators is \$70/tons and for other domestic Industry is \$90/tons based on price equivalence with 6,322 CV GAR.

Fig. 4 shows that from early 2022 until today, HBA is still above \$90 per ton. Therefore, the price reference that will be used for the domestic electricity market is \$70/ton, and for other domestic markets is \$90/ton. This price-cap regulation and the fluctuation of the coal price index will bring uncertainties to the utilization of domestic sales strategy to optimize company revenue.

Other than that, based on the RUPTL (Rencana Usaha Penyediaan Tenaga Listrik) or electricity power supply business plan from PLN for 2021–2030, it is stated that the need for coal for power generation in Indonesia is expected to grow from 113.6 million metrics tons in 2021 to become 156.3 million metrics tons in 2023 or increase 42.7 million metrics tons or 37.5% increase from 2021 demand (MEMR, 2021) other than the demand for the electricity sector, in domestic, there is demand coming from other sectors of energy, such as smelter and cement industries, fertilizer industries, and textile industries. According to the Directorate General of Minerals and Coal (2020), the

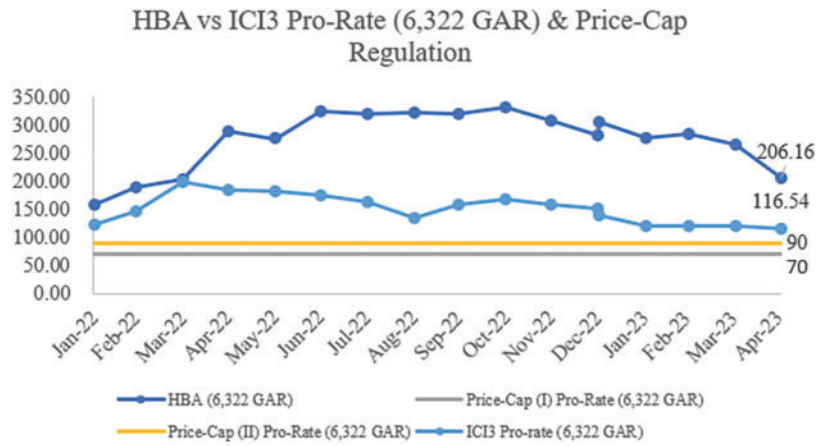


Fig. 4. HBA vs. ICI3 price gap.

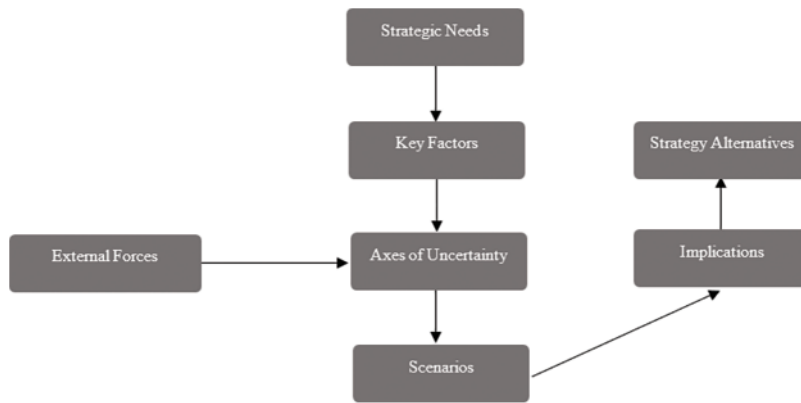


Fig. 5. Conceptual framework.

average demand composition from electricity and non-electricity is 70% to 30%. Looking at non-electricity sector demand, around 30% of it comes from the smelter business. Domestic market cap regulation does not affect the domestic price of smelter business, unlike other non-electricity sectors that are capped with an HBA of \$90/ton.

3.3. Conceptual Framework

Scenario planning is a strategic planning method that can be used to explore possible future situations and development paths, usually in the medium-term timeframe (Lindgren & Bandhold, 2003; Schoemaker, 1995; van der Heijden, 2005). Therefore, this research will use a scenario planning approach to obtain information related to the key trends and critical uncertainties (see Fig. 5). The scenario planning approach that is being used in this research is explorative scenario planning. The information received during the scoping, information search, and trend and uncertainty analysis will be mapped to the scenario grid matrix. From each of the grid matrices, the scenario building will be developed, and the strategy alternatives will be created as well by understanding the internal capabilities to withstand each scenario. The key trends and critical uncertainties will be classified into the PESTLE framework as part of the macro-environment analysis.

4. RESEARCH METHOD

The design of this research is described in the flowchart in Fig. 6. At the beginning of the research, a problem was discovered in the coal sales market sector during the energy transition period. After that, this research was conducted to understand and solve the defined problem statement. This research uses a scenario planning approach to understand and analyze the issues and combine it with the PESTLE Framework for driving forces determination. During the data collection stage, various data sources were used, such as policy documents regarding the issue, relevant literature, journal articles, interviews, and surveys with experts and project stakeholders (Schwenker & Wulf, 2013). In this research, the primary data will be obtained through interviews with experts and stakeholders on this issue. Meanwhile, the secondary data will be obtained through literature and journal articles.

The data that is collected from this research is qualitative. The data analysis method used in this research is the quantitative-qualitative approach, content analysis. Content analysis is a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the context of their use (Krippendorf, 2019). Content analysis is a positivistic, rigorous method to extract “content” from texts, images, or any type of message that has meaning (Gheyle & Jacobs, 2017). In the content analysis process, there will be several activities: pre-coding and coding. In the pre-coding stage, one of

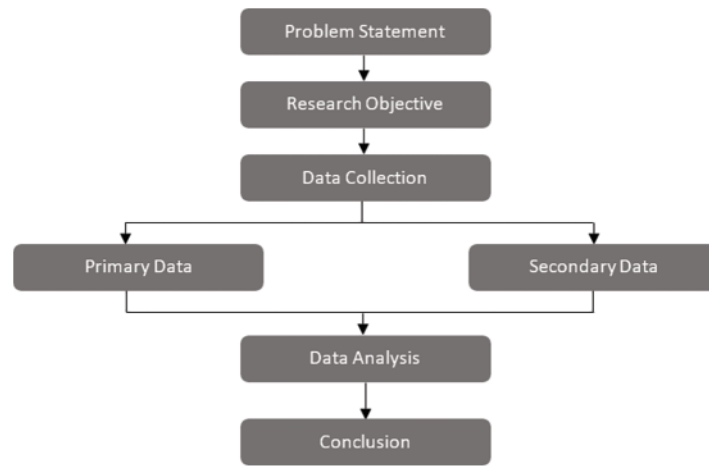


Fig. 6. Research design.

TABLE I: LIST OF DRIVING FORCES OBTAINED

No	Driving forces	YR	SP	JS	RI	AR	Total
Political							
1	Government commitment towards energy transition	I	III	III	-	II	10
2	Geopolitical development	III	II	-	I	II	8
Economic							
3	Macroeconomic condition (e.g., GDP growth, interest rates)	III	III	III	III	III	18
4	Coal prices	III	III	II	II	III	19
5	Other commodities prices (Gas/Oil)	III	III	-	-	-	7
6	Demand from power generator sector	III	III	II	-	II	12
7	Demand from another sector (e.g., Smelter)	III	II	II	I	II	11
8	Coal supply from domestic	-	III	II	-	II	8
9	Cost of electricity for CFPP	I	-	-	-	III	6
10	Cost of electricity for RE	-	-	-	-	II	2
11	Manufacturing index growth	-	-	-	-	III	4
Social							
12	Social behaviour related to energy usage	I	I	-	I	-	3
13	Social pressure on renewable energy usage	-	-	I	-	-	1
14	Urbanization of people from village to city	-	-	-	-	III	4
Technology							
15	Coal co-firing technology	I	-	-	-	-	1
16	Renewable energy technology development	III	III	III	II	II	14
17	Carbon capture technology in CFPP	-	II	-	-	-	2
Environment							
18	Climate change	I	II	II	I	-	6
19	Climate potential for RE generation	-	-	-	-	II	2
Legal							
20	Government regulation on energy-mix	III	III	III	III	III	20
21	Government regulation on domestic coal price	II	III	III	-	III	11
22	Other government regulation (royalty, tax, etc)	II	II	III	II	III	13

the processes is units and unitizing steps. A *unit* is an identifiable message or message component, which serves as the basis for identifying the population and drawing a sample, on which variables are measured, or which serves as the basis for reporting analyses (Carney, 1971). There are five ways to conduct systematic unitization: physical, syntactical, categorical, propositional, and thematic (Krippendorff, 2019). In this research, the unitizing steps are

conducted through a categorical system from the PESTEL category (Political, Economy, Social, Technology, Environment, and Law). Other than that, one of the approaches used in this research is the list-and-count approach. At the same time, every word that has already been coded through the PESTEL category is listed and counted by the number of interviewee’s answers mentioned about that word/list.

TABLE II: TOP 10 DRIVING FORCES

No	Driving forces	Number mentioned
1	Government regulation on energy-mix	20
2	Coal prices	19
3	Macroeconomic condition	18
4	Renewable energy technology development	14
5	Other government regulation (royalty, tax, etc)	13
6	Demand from power sectors	12
7	Demand from other sectors	11
8	Government regulation on domestic coal prices	11
9	Government commitment towards energy transition	10
10	Coal supply from domestic	8

5. RESULTS AND DISCUSSION

5.1. Key Focal Issue

Based on the result of the literature review for the Global Coal Market and Indonesia Coal Market, which affects PT. ABCoal business, the key focal issue of the research, is defined as “How will the Coal Market impact PT. ABCoal Business in the next five years during the energy transition era?”. The key focal issue will be based on the exploration during semi-structured interviews with pre-determined questions to develop the scenario planning of the company with all implications and options they may have in the next five years.

5.2. Driving Forces

Driving forces information is gathered from the stakeholders’ interviews related to the key focal issue, covering environment and industry analysis from the industry players. The driving forces are divided based on the PESTEL framework, which consists of political, economic, social, technological, environmental, and legal factors. Each factor is counted using a list-and-count approach to measure how many stakeholders mentioned each factor during the interview process. The driving forces obtained will be summarized to become the top 10 based on the content analysis method as listed in Table I, to become Table II. Since the interviewees come from diverse stakeholders with diverse experience, the result is expected to avoid any bias due to the summary of driving forces coming from different points of view.

5.3. Critical Uncertainties

Several answers from interviewees were taken during the interview process to determine the critical factors. The summary of the critical impact and the high uncertainties are summarized in Table III.

Based on the result of the qualitative interviews, Government Regulation on Energy-Mix and Coal Prices became the critical uncertainty in determining coal market sales during the energy transition era. Government regulation on energy-mix indicates how aggressively the coal-fired power plant composition affects the country’s energy-mix and Coal price, indicating the gap between export and domestic prices due to the current price cap for the domestic market.

Coal price has a critical impact on the determination of coal market sales, particularly due to the current price cap policy for the domestic market. The domestic market

may not become the preferred market target due to the implementation of the domestic price cap policy, which states that when the HBA is greater than 70, then the coal sales price determination will be based on an HBA equal to \$70/ton. Meanwhile, the export market will be based on the current Indonesian coal price index. The uncertainties of the coal price movement will create another coal market sales strategy for PT. ABCoal.

As it is known, our industry is currently facing the energy transition era. The government regulation on energy-mix will greatly impact the coal market sales strategy. Especially China’s government regulation on energy, as it is known that China is the majority export target for PT. ABCoal. The aggressiveness on energy-mix regulation will determine the aggressiveness of coal-fired power plant phase-out. Hence, this uncertainty will impact PT’s coal market sales strategy. ABCoal.

5.4. Scenario Framework

A scenario framework will be created on the 2×2 matrix with the two critical uncertainties as the scenario axis. Two critical uncertainties identified from the literature review and key stakeholder interviews are coal prices and government regulation on energy-mix mix. The coal prices axis will describe the export and domestic price conditions, whereas the coal price will be higher than the price cap. This coal prices axis will compare the Indonesian Coal Reference Price (*Harga Batubara Acuan*; HBA) with the price cap, which is about \$70/ton based on the current Indonesian Regulation for the Electricity Domestic market. Meanwhile, the government regulation on energy-mix will describe the speed of changes in the energy transition in China from coal-fired power plant generators to renewable energy generators. The conditions of each scenario are described in Fig. 7.

The first scenario is Business as Usual. This scenario should be anticipated when the coal prices index is still above the HBA price cap, which is \$70/ton for Indonesia’s domestic market, and China’s regulation on energy-mix is still below its 5-Year Plan target. The second scenario is Finding a New Home. The scenario should be anticipated where the coal prices index is still above the HBA price cap, which is \$70/ton for Indonesia’s domestic market. China’s energy regulation has aggressively reduced the number of coal-fired power plants. The third scenario is Home Sweet Home. The scenario should be anticipated where the coal price index is below the HBA price cap of \$70/ton

TABLE III: DEGREE OF UNCERTAINTY AND CRITICAL IMPACT SUMMARY

		Degree of uncertainty		
		Low	Medium	High
Degree of impact	High	<ul style="list-style-type: none"> •Social habit related to energy usage •Urbanization of people from village to city 	<ul style="list-style-type: none"> •Demand from power generator sector •Demand from another sector •Gas price 	<ul style="list-style-type: none"> •Government regulation on energy-mix •Coal price
	Medium	<ul style="list-style-type: none"> •Geopolitical development 	<ul style="list-style-type: none"> •Government regulation on domestic coal price •Coal supply from domestic 	<ul style="list-style-type: none"> •Macroeconomic condition •Renewable energy technology development
	Low	<ul style="list-style-type: none"> •Coal co-firing technology •Social pressure on renewable energy usage 	<ul style="list-style-type: none"> •Cost of electricity for CFPP •Cost of electricity for RE •Climate potential for RE 	<ul style="list-style-type: none"> •Climate change •Government commitment

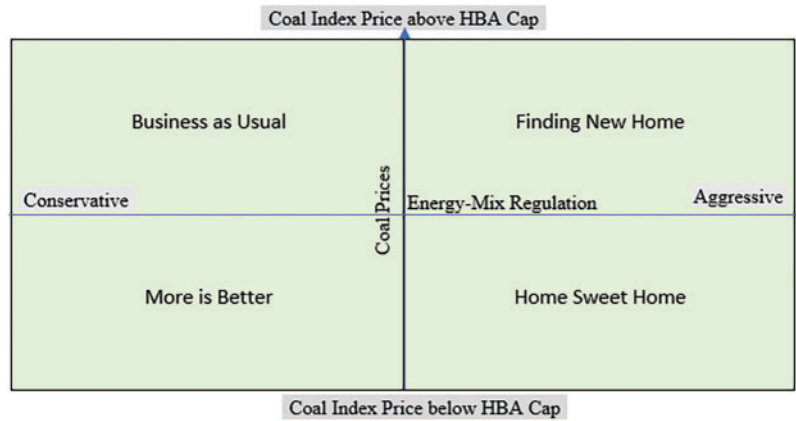


Fig. 7. Scenario framework of coal prices and energy-mix regulation.

for Indonesia’s domestic market. China’s regulation on energy-mix has aggressively reduced the number of coal-fired power plants. The last scenario is More is Better. The scenario should be anticipated where the coal prices index is below the HBA price cap, which is \$70/ton for Indonesia’s domestic market, and China’s regulation on energy-mix is still conservative. The next subsections will describe the scenarios.

1) Scenario 1: Business as Usual

Business as Usual–The Coal Prices Index is Above the HBA Price Cap, and China’s Regulation on Energy-mix is still Conservative.

World Coal News, April 30th, 2028

China’s annual thermal coal demand remains strong compared to the post-COVID demand amidst the energy transition.

China’s economy has bounced back from the post-covid growth. China’s GDP growth and Manufacturing Index come back stronger, and it is supported by the huge amount of electricity that is coming from its coal-fired power plant. Amidst to the pressure of energy transition around the globe, China still expected to use the cheapest source of electricity generation to push their industry and economy forward.

China CCS/CCUS project in their CFPP has successfully lowered its carbon footprints while still maintaining the most cost-effective base-load power plant generation, said a Chinese government official. As the largest coal producer in the world, Chinese government official said, “We believe that in order to achieve our country’s vision and objectives, our economy should be supported by the most efficient and effective way, 24 hours a day, 7 days a week; 52 weeks a year;

our economy environment should be fully running, one of it is by coal-fired power plant that already implemented with CCS”. Despite pressure from other G20 countries, China still insists that their solution still manages to comply with COP26 related to the carbon footprints.”

2) Scenario 2: Finding New Home

Finding New Home–The Coal Prices Index is Above the HBA Price Cap, and China’s Regulation on Energy-mix is Aggressive towards Renewable Energy.

World Coal News, June 30th, 2028

China’s power sector no longer relies on coal; thermal coal is looking to seek its new home.

China is no longer the world’s largest coal demand. As a developed country, China has successfully met its target of 45% of renewable energy generation by 2030 in 2028. This condition changes the energy-mix composition in China, from previously 60% of its energy-mix coming from coal by 2020 becoming most of China’s energy-mix, and currently, coal is no longer the majority source of electricity generation. Although this achievement was not expected previously, with the grit of China’s government and the capital they have, China once again becomes the nation to make the impossible possible.

This huge achievement of China put the coal Industry in an unfavorable position. Many coal producers around the world are fighting to find their new home outside China; experts said that developing Asia countries are the main target of coal producers to put their flag into those countries’ electricity sector. The limitation of capital from developing Asia countries is a major reason why those countries still rely on coal.

3) Scenario 3: Home Sweet Home

Home Sweet Home—Coal Prices Index is Below HBA Price Cap, and China's Regulation on Energy-mix is Aggressive towards Renewable Energy.

World Coal News, August 17th, 2028

Indonesia became a strong nation that utilized its own coal for its people's prosperity.

During the current situation in the globe, "coal price competitiveness is the key between export and domestic coal market," said Mr. A, a coal researcher expert in Indonesia. The condition in China and the gap between export price and domestic price that is not as high as what happened in 2022 create a unique condition in the Indonesian market. Many coal producers in Indonesia are trying to supply their cargo to Indonesian industries ranging from power plants to smelters, cement, and others. The decreasing demand in China, increasing demand in domestic, and price competition among exports with domestic shift as the preferable option among coal producers.

The transition from internal combustion engine vehicles to electric vehicles increased the demand for electricity from coal-fired power plants in Indonesia. Not only that, but this transition also increases the demand from the smelter industry in Indonesia, which produces batteries for electric vehicles. Many coal producers see this condition as a new opportunity for their cargo in the Indonesian market. As one of the top 5 coal producers around the world, Indonesia has successfully used its own resources to improve prosperity and satisfy the needs of its people."

4) Scenario 4: More is Better

More is Better—The coal Prices Index is Below the HBA Price Cap, and China's Regulation on Energy-mix is Conservative towards Renewable Energy.

World Coal News, September 30th, 2028

Indonesia remains to become a coal exporter around the globe.

Indonesia is one of the largest coal exporters in the world. As a top 5 coal producer in the world, Indonesian coal producers have contributed to supplying their cargos to many Asian countries, from developed countries such as China to developing countries such as Malaysia, Philippines, etc. Not only can it successfully support the coal demand around the globe, but Indonesia is also able to successfully suffice its own coal demand. Due to the gap between the domestic price and the export price not being as high as in 2022, the competitiveness between the domestic market and export market is increasing. Many Indonesian coal producers no longer prefer the export market to the domestic market; any kind of market is possible for Indonesian coal producers during these circumstances.

These conditions lead to a more balanced market among Indonesian coal producers; they have many options to sell their cargo from China market, other developing Asia country market, or even Indonesia's domestic market.

5.5. Implications and Options

The implications and options will be different in each scenario. The details of each implication and option are as follows.

In a business-as-usual scenario, where the coal prices index is above the HBA price cap, which is \$70/ton, China's

regulation on energy-mix mix is conservative towards renewable energy. The implication in this scenario is that there will still be a gap between the domestic and export market prices, which will lead to unpreferable opportunities in domestic markets. The smelter industries in domestic markets will become the most preferable choice due to the price cap policy not being applied in this industry. Other than that, the China regulation on energy-mix will be conservative towards renewable energy means that there is no significant growth of renewable energy power plant. Hence, no significant coal-fired power plant phase-out will occur in the next five years. The options that PT ABCoal has in this scenario are the optimum sales plan that would be applicable is 75% and 25% for export and domestic markets. The next one is that PT ABCoal should increase the portion of the smelter market in the domestic market to obtain a larger portion of the premium price in DMO by using spot deals. In this scenario, due to China becoming the major portion of the export, PT ABCoal can increase the portion of its end-user compared to the trader. As well as obtain more long-term deals in the Chinese market.

In the finding-new-home scenario, where the coal prices index is above the HBA price cap, which is \$70/ton, China's regulation on energy-mix mix is aggressive towards renewable energy. The implication in this scenario is that there will still be a gap between the domestic and export market prices, which will lead to unpreferable opportunities in domestic markets. The smelter industries in domestic markets will become the most preferable choice due to the price cap policy not being applied in this industry. Other than that, China's regulation on energy-mix will be aggressive towards renewable energy, which means that there will be a significant growth of renewable energy power plants and will reduce the coal demand from the power sector. Hence, a significant coal-fired power plant will be phased out in the next five years. The options that PT ABCoal has in this scenario are the optimum sales plan that would be applicable, which is 75% and 25% for export and domestic markets, respectively. The next one is that PT ABCoal should increase the portion of the smelter market in the domestic market to obtain a larger portion of the premium price in DMO by using spot deals. In this scenario, also due to the China regulation, China will no longer become reliable to be the majority in the export portion. Hence, PT ABCoal should focus on searching for traders with a strong market in Asian countries such as the Philippines, Vietnam, Bangladesh, etc. PT ABCoal should also increase the number of long-term deals for its end-user portion in the export market, especially for developing Asian countries.

In the home-sweet-home scenario, where the coal prices index is below the HBA price cap, which is \$70/ton, China's regulation on energy-mix mix is aggressive towards renewable energy. The implication in this scenario is that there will no longer be a gap between the domestic and export market prices, which will lead to more competitive prices among them. There will not be any preferable market in this situation between the smelter industry, cement industry, fertilizer industry, or electricity industry. Other than that, China's regulation on energy-mix will be aggressive towards renewable energy, which means that there will be

TABLE IV: SUMMARY OF EARLY WARNING SIGNALS FOR EACH SCENARIO

Scenario	Factor	Indicator measures	Signals
Business as usual	Economic	China GDP growth	China's GDP growth rate is around 5%
		Indonesia GDP growth	Indonesia's GDP growth rate is around 5%
		Developing Asia's GDP growth	Developing Asia's GDP growth rate is around 5%
		Coal price	Indonesia's coal price reference (<i>HBA</i>) is above \$90/ton
	Technology	CCS/CCUS technology Implementation	China successfully implemented CCS/CCUS in CFPP to reduce its carbon footprint while maintaining its CFPP contribution to energy-mix
		Renewable energy development	China's annual installed capacity growth for renewable energy power plants is lower than 1.5% to meet the 45% target energy-mix in 2030
Regulation	Energy-mix	The target energy-mix for coal-fired generation in 2030 is higher than 40%	
	Carbon tax policy	Carbon tax regulation fails to suppress the CFPP utilization	
Finding new home	Economic	China GDP growth	China's GDP growth rate is below 5%
		Indonesia' GDP growth	Indonesia's GDP growth rate is around 5%
		Developing Asia GDP growth	Developing Asia's GDP growth rate is above 5%
		Coal price	Indonesia's coal price reference (<i>HBA</i>) is above \$90/ton
	Technology	CCS/CCUS technology implementation	China fails to implement CCS/CCUS in CFPP to reduce its carbon footprint while maintaining its CFPP contribution to energy-mix
		Renewable energy development	China's annual installed capacity growth for renewable energy power plants is higher than 1.5% to meet the 45% target energy-mix in 2030
Regulation	Energy-mix	Target energy-mix for coal-fired generation in 2030 is smaller than 40%	
	Carbon tax policy	Carbon tax regulation successfully suppressed the CFPP utilization	
Home sweet home	Economic	China GDP growth	China's GDP growth rate is around 5%
		Indonesia GDP growth	Indonesia's GDP growth rate is above 5%
		Developing Asia GDP growth	Developing Asia's GDP growth rate is around 5%
		Coal price	Indonesia's coal price reference (<i>HBA</i>) is below \$70/ton
	Technology	CCS/CCUS technology implementation	China fails to implement CCS/CCUS in CFPP to reduce its carbon footprint while maintaining its CFPP contribution to energy-mix
		Renewable energy development	China's annual installed capacity growth for renewable energy power plants is higher than 1.5% to meet the 45% target energy-mix in 2030
Regulation	Energy-mix	Target energy-mix for coal-fired generation in 2030 is smaller than 40%	
	Carbon tax policy	Carbon tax regulation successfully suppressed the CFPP utilization	
More is better	Economic	China GDP growth	China's GDP growth rate is around 5%
		Indonesia GDP growth	Indonesia's GDP growth rate is around 5%
		Developing Asia GDP growth	Developing Asia GDP growth rate is above 5%
		Coal price	Indonesia's coal price reference (<i>HBA</i>) is above \$70/tonn
	Technology	CCS/CCUS technology implementation	China successfully implemented CCS/CCUS in CFPP to reduce its carbon footprint while maintaining its CFPP contribution to energy-mix
		Renewable energy development	China's annual installed capacity growth for renewable energy power plants is lower than 1.5% to meet the 45% target energy-mix in 2030
Regulation	Energy-mix	Target energy-mix for coal-fired generation in 2030 is higher than 40%	
	Carbon tax policy	Carbon tax regulation failed to suppress the CFPP utilization	

TABLE V: STRATEGIC ROADMAP FOR EACH SCENARIO

Scenarios	2024–2025	2025–2026	2026-Onwards
Business as usual	China end-user market exploration through spot deal. Smelter spot deal exploration for the domestic market.	Increase the end-user penetration in China market to not only through trader. Try to increase the smelter portion in Domestic market in exchange for electricity portion.	Manage the composition between end-user and trader for export market to ensure sustainability of sales activity. Manage the domestic portion to still around 25% but the portion of smelter market can be increase to long-term deals (above 1 year).
Finding new home	New Asia developing market exploration through spot deal trial and experience through trader channels for the export market. Smelter spot deal exploration for the domestic market.	Increase the export portion for New Asia developing market in exchange for China market. Exploring end-user direct penetration for New Asia developing market not only trough trader. Try to increase the smelter portion in domestic market in exchange for electricity portion.	Manage the country diversification for New Asia developing market to not only rely on single country but spread the risk. Manage the composition between end-user and trader for each new Asia developing market.
Home sweet home	Smelter spot deal exploration for the domestic market. New Asia developing market exploration through spot deal trial and experience through trader channels for the export market.	Try to increase the smelter portion in domestic market without reduce the current electricity portion. Maintain the portion of domestic market to become more than 25% by dealing the smelter portion through spot deal or mini-term deal (below 1 year). Increase the export portion for new Asia developing market in exchange for China market. Exploring end-user direct penetration for new Asia developing market not only trough trader.	Manage the ratio between export and domestic market , domestic market portion can be more than 25%. Manage the country diversification for new Asia developing market to not only rely on single country but spread the risk.
More is better	China end-user market exploration through spot deal. New Asia developing market exploration through spot deal trial and experience through trader channels for the export market.	Increase the end-user penetration in China market to not only through trader. Exploring end-user direct penetration for new Asia developing market not only trough trader.	Manage the country diversification for export market to not only rely on single country but spread the risk between China and other countries. Manage the composition between end-user and trader for export market to ensure sustainability of sales activity.

a significant growth of renewable energy power plants and will reduce the coal demand from the power sector. Hence, a significant coal-fired power plant will be phased out in the next five years. PT ABCoal's option in this scenario is to increase its domestic market portion to more than 25%. This means that it can increase either sports deals or long-term deals portion of end-users in the domestic market, such as electricity (PLN) and smelter industries, which are in the highest demand in Indonesia. In this scenario, also due to the China regulation, China will no longer become reliable to be the majority in the export portion. Hence, PT ABCoal should focus on searching for traders with a strong market in Asian countries such as the Philippines, Vietnam, Bangladesh, etc. PT ABCoal should also increase the number of long-term deals for its end-user portion in the export market, especially for developing Asian countries. There will not be any preferable market; it will be solely based on which buyer can give the best premium price.

In the more-is-better scenario, where the coal prices index is below the HBA price cap, which is \$70/ton, and China's regulation on energy-mix mix is conservative towards renewable energy. The implication in this scenario is that there will no longer be a gap between the domestic and export market prices, which will lead to more competitive prices among them. There will not be any preferable market in this situation between the smelter industry, cement industry, fertilizer industry, or electricity industry. Other than that, the China regulation on energy-mix will be conservative towards renewable energy means that there is no significant growth of renewable energy power plant. Hence, no significant coal-fired power plant phase-out will occur in the next five years. PT ABCoal the option in this scenario is to increase its domestic market portion to more than 25%. This means that it can increase either sports deals or long-term deals portion of end-users in the domestic market, such as electricity (PLN) and smelter industries, which are in the highest demand in

Indonesia. In this scenario, China can still be reliable and become a major portion of the export market. PT ABCoal can increase its long-term deals in all markets, whether its domestic or export market. During this scenario, there will not be any preferable buyer/market between export and domestic. All buyers/markets can be penetrated, and the sales strategy will be based on which buyer can give the best premium price.

5.6. Early Warning Signals

An early warning signal becomes the indicator of which scenarios will be heading to us. This early warning signal will help the company's decision-maker identify and decide the required initiatives and actions in each scenario. In this study, the indicators of early warning signals for each scenario will be based on regulations, economic factors, and technological factors, as shown in Table IV.

5.7. Strategic Roadmap

The strategic roadmap was identified for each scenario, with the timeframe being within these 5 years or up to 2028. The strategic roadmap will be based on the sales optimization strategy in the export and domestic portion, export developing countries portion, and domestic preferable industry, as explained in Table V.

6. CONCLUSION AND RECOMMENDATION

Based on the result of this research, it can be concluded that during the energy transition era, there are 4 scenarios that might occur, which are business-as-usual, finding-new-home, home-sweet-home, and more is better. This scenario will impact PT ABCoal sales activity. Therefore, PT ABCoal's sales strategy will be impacted by the scenario elements, which are the gap between export coal prices and domestic coal prices, as well as the aggressiveness of the Chinese government towards renewable energy power generation. Each of the scenarios could be overcome with a certain sales strategy in order to obtain optimum revenue.

The strategy to obtain optimum revenue within each scenario will be based on the proportion of exports and the domestic market, whether the domestic market will be higher than the obligation from the government (higher than 25%). Other than that, its strategy will also be based on the other Asia developing countries as well in the export market, including the penetration level of end-users in the export market. Nevertheless, in the scenario faced by PT ABCoal, the strategic roadmap built in this research tries to overcome its obstacles and still ensure the company achieves its objective, revenue optimization, as stated in the previous part.

CONFLICT OF INTEREST

The authors declare that they do not have any conflict of interest.

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