THE COAL STORY

International Trading Track | Industry Study Mission 2010 | Kalimantan, Indonesia
Itinerary

**DAY 1**
- Journey to the PT Gunungbayan Pratamacoal Block II site

**DAY 2**
- Presentation of business process and operations
- Visit to the Zoo

**DAY 3**
- Site Visit to Block II of PT Gunungbayan Pratamacoal

**DAY 4**
- Dinner with Dato’ Low Tuck Kwong and Senior Management

**DAY 5**
- Visit to Balikpapan Coal Terminal
Since its launch in 2006, the International Trading Track (ITT) has been well-received by SMU students and the industry. This is an innovative and exciting programme that enables students to specialise in international commodities and emissions trading. We are proud that it remains the first and only such programme of its kind to develop trading talents for the sector.

The Track has been a premier track of choice for our undergraduates. Over the years, we have seen a rising interest - from 22 students in the pioneer batch to more than 100 in the current batch. For ITT graduates, placement rates too have been high, with most of them recruited by trading and related companies, including ITT’s industry partners.

One important factor contributing to ITT’s success in such a short time is that students have ample opportunities to explore and learn beyond the classroom. The students participate in company and site visits, trading simulation exercises as well as attend talks delivered by industry experts and practitioners. These events and visits happen throughout the year and help the students enrich their knowledge in commodity trading and be better prepared for their future careers.

Among these opportunities is the ITT Industry Study Mission (ISM), which takes place biannually. ISM is a key feature of the ITT programme. This crucial hands-on learning experience brings to life what is taught in the classroom.

This ISM to Kalimantan, Indonesia, in December 2011 has been a most rewarding experience for our ITT students. This would not have been possible without the generosity of PT Bayan Resources Tbk who went the extra mile in sharing their knowledge and their time with our students. We are very honored and grateful that Datok TK Low had personally hosted this visit to his premises for our ITT students. We look forward to more of such partnerships and industry study missions in the future.

Mention the word ‘coal’ and chances are that many a man on the street will associate it as a fossil fuel that saw its heyday during the Industrial Revolution. However, this could not be further from the truth as coal has established itself as one of the most important energy sources in the world’s economy today.

This was a primary motivation behind our decision to embark on our journey to Kalimantan, Indonesia as we wanted to better understand what it takes to bring this humble fossil fuel to the market. Kalimantan has become one of the most important centres of coal production in Asia due to the resurgence of coal as an energy source. Our aim was to provide the ITT students with an unbridled experience on what the coal business was like, so that they would be able to learn the hard facts and truths, absent of hearsay and preconceived notions. And we were not disappointed.

Our learning journey was made possible with the kind hospitality of Dato T.K. Low and his team at PT Bayan Resources, where no effort was spared to ensure that our visit was a fruitful one. Arrangements were made for us to visit PT Bayan’s mine site and coal terminal to learn about the intricacies of their operations and the coal value chain. Dato Low himself made a personal commitment to support our quest for knowledge and flew down from Jakarta to Balikpapan to spend two days interacting with the students. During the time he spent with us, Dato Low availed himself to answer any queries that the students had. He made it clear that there were no ‘OB markers’ to be avoided when asking questions and reciprocated all queries with candid and clear answers.

Our sincerest gratitude goes out to Dato Low and his team for their support in making the trip possible. The success of the trip would also have not been possible without the support of ITT’s industry partners. The commitment and belief that all of you have in us will ensure that the next generation of trading talent will be adequately equipped to face the challenges of the commodities sector.

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About Us

SINGAPORE MANAGEMENT UNIVERSITY

A premier university in Asia, the Singapore Management University (SMU) is internationally recognised for its world class research and distinguished teaching. Established in 2000, SMU's mission is to generate leading edge research with global impact and produce broad-based, creative and entrepreneurial leaders for the knowledge-based economy. It is known to be a pioneer for its interactive and technologically-enabled pedagogy of seminar-style teaching in small class sizes which remains its unique hallmark.

Home to 7,000 students, SMU comprises six schools: School of Accountancy, Lee Kong Chian School of Business, School of Economics, School of Law and School of Social Sciences, offering a wide range of bachelor’s, master’s and PhD degree programmes in business and other disciplines. With an emphasis on generating rigorous, high impact cross-disciplinary research that addresses Asian issues of global relevance, SMU faculty collaborates with leading foreign researchers as well as partners in the business community and public sector through its research institutes and centres.

Through executive education, the university provides public and customised training for working professionals in meeting the needs of the economy. Close relationships with leading universities, including The Wharton School, Carnegie Mellon, the University of Pennsylvania and the University of Chicago’s Booth School of Business, allow SMU to draw on their academic and research strengths. In various collaborations.

To find out more, visit www.smu.edu.sg

LOCAL TALENT, GLOBAL IMPACT

With the objective of grooming young international trading talent in Singapore, SMU launched the International Trading Track (ITT) in July 2006. ITT is offered as a specialization under the Finance major. SMU undergraduates on the track have the opportunity to explore international trading and related industries as attractive career options. Organisations also achieve a better fit between individuals and their talent needs.

To complement the classroom learning, students will have exciting opportunities to go on Industry Study Missions (ISM) overseas and site visits, attend networking events, ITI Guest Lectures and other seminars, as well as participate in commodity trading simulations. Past Industry Study Missions (ISM) included visits to China, Abu Dhabi & Qatar, Vietnam, Australia, Indonesia and Malaysia.

ITT students are also strongly encouraged to take up internships with organizations in commodity trading and related industries, such as commodity trading firms, banks and brokerages. This offers ITT students the opportunity to explore these industries as attractive career options, while organisations achieve a better fit between individuals and their talent needs.

ITT CURRICULUM

(a) Financial Institution, Instruments & Markets (FNCE 102)
(b) Corporate Reporting & Financial Analysis (ACCT 201)
(c) Trade Finance (FNCE 310)
(d) Enterprise Risk Management (FNCE 309)
(e) Analysis of Derivatives Securities (FNCE 308)
(f) Shipping Business (TRAD 201)
(g) Law of International Trade (LEST 223)

Non-credit courses

(a) Oil Trading
(b) Agri-commodity Trading
(c) Emissions Trading
(d) Petrochemicals Trading
(e) Coal Trading

ITT students are required to complete at least 3 Non-credit courses to graduate with ITT specialisation.
Indonesia - Kalimantan

With an area of over 1.9 million sq km and a population of 232 million, Indonesia is the largest country in the Association of South East Asian Nations (ASEAN) as well as the world’s fourth most populous nation. It comprises five main islands – Java, Sumatra, Borneo, New Guinea and Sulawesi, and a chain of thousands of islands which extends from Mainland Asia to Australia.

Ethnically highly diverse, Indonesia has over 300 native languages. The major religion is Islam, and the country has the world’s largest Muslim population.

Indonesia is a republic with a presidential system. It has a market economy in which central and provincial governments play significant roles. It is also the largest economy in Southeast Asia and a member of the world’s G20 major economies. Its major trading partners include Japan, China, Singapore and the USA, and major exports include oil & gas, plywood, textiles, rubber, palm oil and coal.

KALIMANTAN

Kalimantan is the Indonesian portion of Borneo, the third largest island in world, with a total size of 544,150 square kilometres and a population of over 13.5 million. It is divided into four provinces as shown in the map opposite. The ISM group visited East Kalimantan, where PT Bayan Resources Tbk’s mining sites are located.

Balikpapan is a seaport city on the eastern coast of East Kalimantan province, a resource-rich region well known for its timber, mining and oil exports. Two harbours, Semayang and Kariangau (a ferry port), and the Sepinggan International Airport provide the main transportation links to the city. The city has a population of 469,884, making it the second-largest city in East Kalimantan, after the capital Samarinda. Many multinational corporations including Total SA, Chevron Texaco (US), and Schlumberger (France) all have a presence in the area.

Source: http://news.bbc.co.uk/2/hi/country_profiles/1260544.stm
Coal is composed primarily of carbon along with variable quantities of other elements, mainly sulphur, hydrogen, oxygen and nitrogen. It exists in several states, which determines its suitability for different uses.

Coal is generally deposited in layers under the surface of the ground, also known as coal seams. The quality of each coal seam is determined by:

- the varying types of vegetation from which the coal originated;
- its burial depth;
- the temperatures and pressures at those depths;
- the length of time the coal has been forming in the deposit.

According to Stanford University’s Program on Energy and Sustainable Development, coal is the single largest source of primary energy in the world; in absolute terms, coal use has grown faster for most of this decade than that of any other fuel; over the last decade, coal consumption achieved a CAGR of 3.4% as compared to 0.08% and 2.1% for oil and natural gas respectively.

It is estimated that current worldwide coal reserves will last for another 119 years. As the developing world industrialises and struggles to meet a seemingly insatiable demand for power, coal is becoming an increasingly desirable alternative source of energy.

The graph on the right shows a change projection scenario for global primary energy demand from 2008 to 2035, taking into account countries’ endeavours to reduce greenhouse gas emissions and plans to phase out fossil-fuel subsidies (Note: 1 mtoe = 1.528 mtce).*

Mtoe = million tonnes of oil equivalent. Mtce = million tonnes of coal equivalent.

On the basis of this trend, SMU’s ITT students recognise that coal in the near future has a major chance to become a primary energy commodity, side by side with oil. As they train to become commodity traders, the students also realise the need to gain a thorough understanding of value chains (including that of coal), not only from the business perspective but also from the operational aspect. Thus was born this journey to study the value chain of the coal industry in Indonesia.

Source:
http://pesd.stanford.edu/research/coal_markets/
http://www.worldcoal.org/coal/
The Bayan Group is a rapidly expanding Indonesian company with integrated coal mining, processing and logistics operations. It is engaged in open cut mining in East and South Kalimantan, producing a relatively extensive range of coals extending from semi-soft coking coal to low sulphur, sub-bituminous coal. It has been awarded exclusive mining rights under five Coal Contracts of Works (CCOWs) and three Kuasa Pertambangan’s (KPs) over a total concession area of more than 81,265 hectares.

The Bayan Group holds 100% ownership in state-of-the-art infrastructure facilities such as the Balikpapan Coal Terminal and Floating Coal Terminal.

In 2007, the Bayan Group was officially listed on the Indonesia Stock Exchange as PT Bayan Resources, Tbk.

The Group has a total of 14 subsidiaries, which are mainly operated through its two holding companies, PT Banyan Energy and PT Met-alindo Prosestama. In line with company’s vision statement of “delivering sustainable growth and premium products”, the company has established a joint venture with Australia’s White Energy Company to pioneer binderless coal briquetting (BCB) technology in Indonesia.
Land Exploration and Mining Viability Assessment

Our host company, PT. Bayan Resources, has selected JORC as its standard reporting guideline due to its stringent characteristics as the main foundation for further subsequent guidelines. JORC is a principle-based code: it is not prescriptive, meaning that it is highly dependent on user goodwill in terms of implementation. Every company which decides or is required to employ the JORC standard must appoint a Competent Person (CP) to supervise the implementation of JORC guidelines. Three main principles are used in the JORC code: transparency, materiality & competence.

As a result, local governments have had to reform their internal structures to accommodate the huge increase in responsibility that has been passed on from the central government. The absence of a detailed plan for the transition process and the lack of supporting regulations to clarify the required procedures have hampered this sweeping devolution of authority. This clearly has major ramifications for the concession allocation process.

FEASIBILITY STUDY

Coal mining starts with a feasibility study to examine the geographical characteristics, as well as to confirm the presence of coal. Geologists work to study the stratification of the terrain, while an independent surveyor is usually employed to study the coal characteristics. At the same time, management also need to know the amounts of coal reserves at/around the location in order to determine whether bidding for a concession and mining at that particular site are economically viable. In most countries, listed mining companies are required to follow certain standards when reporting their resources & reserves as well as to meet various stakeholders’ concerns and prevent fraud.

The development of mining reporting standards began as early as 1972 in the US and Russia, as these countries recognised a need to standardise ore and mine reporting practice in order to ensure uniformity and conformity across different companies and locations. As of 2010, there are three guidelines in wide-spread use, namely: the Canadian CIM classification (NI43-101), the Australasian Joint Ore Reserves Committee Code 2004 (JORC Code), and the South African Code for the Reporting of Mineral Resources and Mineral Reserves 2007 (SAMREC).

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Coal Mining: Overburden Removal Process

Overburden Removal Process
- Land clearing
- Topsoil removal and stockpile
- Overburden drilling and blasting
- Overburden loading and waste dump

Outsourcing
- Cost structure
- Know-how factor

Risk Management
- Equipment breakdown
- Labour Strikes
- Accident
- Force Majeure

TOPSOIL
Land clearing is the first step in the overburden removal process: top soil is removed and kept for rehabilitation purposes once the mining is completed. Most of the time, the removed top soil is used to fill other pits that are undergoing rehabilitation.

SLOPE ANGLE
During the overburden removal process, engineers must look not only at the stripping ratios, but also at the angle of the slopes, as excessively steep angles may induce a sliding effect and may be dangerous. If the angle is too wide, however, the mine will produce less coal due to the increased overburden clearance required. Finely-honed economic calculations are therefore an integral part of mining.

DRAINAGE
The company may be forced to declare a force majeure event in the event of severe flooding, especially during the monsoon season when it is impossible for mining operations to continue. To mitigate this issue, high numbers of drainage systems are used to drain away the water. The company tries to assess the weather forecast and plan the number of drainage systems they need daily in order to ensure that the area does not flood.

LANDSLIDES
One of the engineers also told us about a landslide which had occurred in one of the coal seams, due to the excessively high vertical batter angle. As a result, mining operations had to cease in that area for safety reasons, and the mixture of the overburden with the topsoil resulted in topsoil wastage as neither can this be sold to third parties, nor can it subsequently be used for rehabilitation purposes.

Blasting
Blasting is usually used to loosen the overburden and simplify its removal. Blasting only takes place at stipulated times – noon or 4 pm daily. This is to ensure that nearby villages are aware of blasting times, and stay clear of the sites during those times. Holes 10 m in depth and approximately 100 m apart are required in order to insert the explosives for the blasting process.
COAL EXTRACTION

The company uses its own equipment and personnel to extract and haul coal from open pits. 4.03 million tonnes of coal were produced from open pits in 2009, with a forecast of 3.5 million tonnes in 2010. The majority of the coal is clean, with only a small portion going to the wash plant. Coal is hauled from the mine to the barge loading facilities at Manau (20-25 km away) or to Teplan Ulak (27-42 km away) using 20 and 30 tonne trucks.

It is expensive to have coal sitting in stockpiles, due to high storage and other costs. The company is therefore keen to ship the coal out as fast as possible, and appropriate coal demand forecasting is vital to ensuring that there is no excessive coal mining at any point in time.

WASHING PLANT

A small portion of the mined coal is dirty coal, which must be sent to the washing facilities for cleaning. The washing facility separates the coal by pouring the run-off mine coal into a magnetite solution (magnesium dioxide) in which the coal floats and can then be removed by conveyor belt, while other sediments sink and are then removed by another, lower conveyor belt. This system is flexible, as the density of the magnetite solution can also be controlled to achieve optimal coal quantities.

The facility has enabled the use of coal which would otherwise have to be thrown away due to its high overburden or ash material content.

Mr Duncan Buchanan also indicated that the washing plant is able to recover a substantial amount of coal and that they hope to increase this recovery rate with the new washing plant which is currently in the pipeline.
## Coal Production: Crushing & Stockpiling

### Coal Crushing

There are two crushers and two barge loading conveyors at Manau. Barging is not possible during high water periods for fear of disturbing the local houses adjacent to the river. In 2005, the company commissioned an alternative barge loading facility at Tepian Ulak on the Mahakan River. GBP has a single crusher and single barge loading facility at Tepian Ulak.

### Stockpiling

The coal mine is approximately 40 km from the stockpile. At the stockpile, after crushing, a conveyor belt is used to recover the coal from the stockpiles and transport this to awaiting barges at the riverside. The amount of coal to be unloaded from the conveyor belts onto the barges can be preset such that only the desired quantity is loaded to the barges. After that, the barges are moved to the BCT using tugboats. One point of interest is that the barges are only allowed to pass at low tide – passage is forbidden at high tide. This is to prevent flooding of villages situated close to the river by barges passing at high tide.

### Coal Barging to the Terminals

The Manau barge loading facility on the Kedang Pahu River has a vessel loading capacity of 3,500 tonnes. During the dry season when the river levels drop, barges are typically partially loaded at Manau. The barges travel approximately 444 km from Manau to BCT, a trip which takes about 3½ days in each direction. The Mahakan River is navigable by 8,000-tonne barges all year round. The arrival of the coal from GBP at BCT for unloading onto stockpiles marks the end of the barging process.

## Reclamation and Re-cultivation

### Replanting

The company has its own nursery for the nurturing of seedlings prior to replanting. All mined-out areas are rehabilitated with acacia and other plant species which have a fast reproduction rate. Acacia in particular grows very rapidly and produces high amounts of waste which can help the soil to regain its fertility more rapidly. Other types of plant grown for re-cultivation include sengan, rubber, palm oil and gamai. Fruit trees are also planted to promote the return of wildlife. Before re-planting, the company also consults the community about the kind of ecosystem they want in the area, as its philosophy is that it is part of the community and does not simply want to enforce its ideologies on the community. Once the plants and trees are fully grown, the land can then be returned to the community and government, thus minimising as far as possible the damage caused to the ecosystem in the mining area.

### Reclamation

Local communities are also play a part in assisting GBP with the task of rehabilitation. The reclamation process begins with the cutting and filling of overburden, followed by profiling and re-contouring. This is followed by the spreading and/or stockpiling of top soil, with land cover crop sowing as the last stage of the process. Reclamation is based on the feasibility study and environmental impact assessment carried out by an independent body and accepted by the government, the management and monitoring of the environment plan (which is presented to the government annually and aligned with the annual plans of the mining sites), the work and budget plan and the reclamation deposits.

### Fish Farm

The arowana fish farm is further evidence of non-contamination of the river and provides employment for the villages.
The crushed coal is transported in barges to the Balikpapan Coal Terminal where this is unloaded onto different stockpiles. Each stockpile contains approximately 65,000 tonnes of coal. Blending then takes place at the Balikpapan Coal Terminal, after which the blended coal is eventually loaded onto ships and traded internationally.

Bayan’s competitive advantage lies in its flexibility to mix and match coal seams at the Balikpapan Coal Terminal (BCT) according to its customers’ specifications. At BCT, the entire process of loading, unloading and blending is automated by means of central monitoring system.

Coal transport and handling in the terminal is a highly integrated process in which operational decisions relating to the location of stockpiles, the size of ship and frequency of service all involve balancing the needs of users as well as mining, transport and port service companies. Bottlenecks which may occur in one segment of the transport chain (i.e. unloading the coal from the barges) will have a deleterious impact on the performance of the subsequent operations. Correspondingly, efficiencies achieved in one area are brought forward and help to improve the performance of the other segments in the chain.

**KEY PERFORMANCE INDICATORS**

Establishing performance indicators relating to service quality and efficiency at the coal terminals sheds some light on BCT’s ability to provide service to its clients. It also serves to measure the effectiveness and efficiency of its operations. These indicators relate to the measurement of aspects of performance that are relevant to daily operations and which impact the company or its clients in ways that are not fully internalised in its pricing.

In an integrated coal production value chain, the various entities (i.e. blending operations, stockpile management, export jetty operations) are highly interdependent. This means that performance effectiveness is strongly mediated by the management of factors which include:

i. Supply chain coordination
   - Effectiveness of communication
   - Percentage of on-time arrivals within a scheduled timeframe

ii. Operational effectiveness
   - Maintenance schedule – time spent on planned and unplanned maintenance
   - Number of operational hours lost due to equipment breakdowns
   - Coal throughput
   - Net operating utilisation

iii. Stockpile management
   - Time taken for reclamation of coal for blending
   - Blending accuracy
   - Time taken for assembly of coal for shipment
   - Storage capacity available

iv. Loading and unloading efficiency
   - Average unloading time for barges
   - Average loading time for vessels by category of vessel
   - Average vessel waiting time
   - Average vessel unloading time

v. Customer relationship management
   - Accuracy of coal quality
   - Number of delayed shipments

Determining capacity at the Balikpapan Coal Terminal (BCT) is a critical driver for coal transportation and is considered pivotal to the service provided by the terminal. Insufficient capacity results in delays to coal unloading, causing unacceptable vessel queuing levels. To mitigate this issue, BCT has initiated plans to increase capacity at the terminal. This provides an assurance that customer service quality will not be compromised under increasing demand.

The company also maintains operational effectiveness by carrying out regular service maintenance to ensure service quality and reliability.
Coal Terminal

As of 2010, BCT had storage capacity for 1 million tonnes on 16 coal stockpiles. These stockpiles consist of various types of coal and can be conveniently retrieved through underground conveyors for blending. There are also magnetic separators in place to remove any metallic matter from the coal, ensuring no undesirable residue. The number of stockpiles is the result of applying possible management decisions that will increase the storage capacity without necessarily increasing the storage area (e.g. allowing higher stacking of coal).

One of the fundamental principles underpinning the effectiveness of terminal management is the choice of performance indicators which balance both the needs of the coal terminal and the mine site. This effectively means that the Marketing team has to work closely with the operations department to ensure that the interdependent nature of each party’s needs is satisfied. This principle is an essential pre-requisite for ensuring the long term sustainability of the contractual arrangements between the parties.

Quoted from a 2002 policy statement by the US Department of Transport and Regional Services which reinforces the importance of relationships between producers and customers:

“The essence of best practice logistics chain management is the constant assessment of business practices to ensure firms have adequate information and communication systems and strong and supportive relationships with suppliers and customer…….It is not surprising that firms achieving best practice here the right people with the right skills capable of managing — and constantly improving — these systems and relationships.”

The above statement recognises the importance of effective communications and information sharing in this respect.

BLENDING COMPETENCY

One competitive advantage which enables PT Bayan Thk to sustain its market position stems from the establishment of its superior blending competency. The two elements that continue to underpin the latter capability is the accuracy and flexibility of the blending process which enables the production of tailored coal products for its customers. The consistent 100% acceptance ratio from PT Bayan Thk’s customers is a testament to its fine blending competence.

BCT is where most of the blending process takes place and it is one of the very few coal terminals in Indonesia that can blend from up to 4 stockpiles. This flexibility in achieving coal quality of different variations allows them to capture demand by catering to the specific needs of their customers. The quality of the blended coal to satisfy the desired specifications is monitored through the supply of coal onto the conveyor belts at a predetermined rate which can be controlled through the use of computer-controlled reclaim gates beneath the stockpile. The latter also ensures the accuracy of the characteristics of the blended coal, e.g. for sulphur content. PT Bayan Thk takes a stringent approach to precision and prides itself in its low 1% permissible margin of error in the attributes of blended coal.

This blending competency built upon high flexibility and accuracy has allowed PT Bayan Thk to maximize the value of its coal by enhancing the quality parameters of the coal, i.e. its calorific value, ash content, total moisture, sulphur content such that it is more saleable on the market. Thus, for example, obtaining and selling a mid range quality coal that is demanded on the market by blending a high and low quality together is more economically sound and viable than trying to sell the low and high quality coals individually. The latter may command too high a premium but attract no market buyers, whereas the former may simply lack commercial lustre. Moreover, PT Bayan Thk’s prime ability to precision-blend its coal compared to its competitors commands a premium on the value of its coal, which works in the company’s favour. The effects of maximizing coal value through superior blending is also manifested in the processing of third party coal, a sideline activity in which the company is engaged.

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After becoming the world’s largest steam coal producer, Indonesia would be expected to improve its coal mining industry, considering that there are existing deposits waiting to be exploited.

National coal production has also grown extremely rapidly over the last five years, from 135.1 million tonnes in 2004 to 214.6 million tonnes in 2009. Domestic consumption has also grown by 57% over past five years. Indonesia’s coal industry has also withstood the recent global financial crisis, with a production growth rate of approx. 6% in 2008 and 2009.

Rapid growth figures however reveal little about the paramount challenges facing Indonesia’s coal producers to maintain productivity and remain competitive on the market. It is worth mentioning a number of challenges facing Indonesia’s coal industry and the ways in which companies are trying to overcome these.

COSTING

Costing is vital to the success of any company involved in coal mining. Intensive capital investment must come with a comprehensive plan for optimising the apportionment of costs between those which are fixed and others which are variable.

It is worth noting the way in which PT Bayan Resources Tbk has handled the cost structure of GBP II. The site includes a dozen or so functioning pits, a washing plant, and two barge loading ports. Other equipment and machinery includes two conveyor belts, two crushing machines, drills, trucks and water pumps. One way of managing the risk inherent in major capital investments is outsourcing, as GBP has entered into a long-term contract with Petrosa to remove overburden.

Managing variable cost is also a major challenge for coal producers as recent fuel price hikes seriously affect the variable component of the cost structure.

Indonesia’s coal producers are striving to strategically hedge against unpredictable fuel price movements. Bayan Resources’ management plans to construct a coal power plant that would effectively reduce their dependence on diesel fuel for machinery operation.

Challenges to overcome in Indonesia’s coal industry

Most of Indonesia’s mines operate on Kali- mantan rather than in Java, because of the higher calorific value of the region’s coal as well as its strategic location advantage for the markets of North Asia.

The geographical location of Kalimantan determines its wet weather, with high precipi- tation all year round. The average annual precipitation in Balikpapan is 2766.3 mm or 108.9 inches, giving the region one of the world’s highest rain fall levels.

Heavy downpours can occasionally slow down or even halt mining operations, sig- nificantly affecting productivity. Heavy rain can also cause flooding in the open pit mines. In fact, recent flooding in November and December 2010 at the Wa- ham site forced Bayan Resources, Tbk. to declare a force-majeure event for the con- tracts on the particular sites.

For private coal producers, transporta- tion difficulties are directly related to in- creased in transportation cost – which is a variable cost. On the other hand, however, there is a great industrial demand for the raw materials used within the mining projects, which results in fixed cost. Thus, unless these make economic sense (for example, where cost savings from the availability of improved roads or railways exceed the cost of con- structing these), private coal producers do not implement transportation infrastruc- ture projects.

To tackle this constraint with minimal cap- ital cost, coal producers practice an eco- nomical yet efficient strategy of utilising the country’s river systems. For example, PT Cemagahan Paratmacoal (CBP) has built two barge-loading facilities close to its mine sites on the banks of Menau and Teluk in order to effectively transport coal to the Balikpapan Coal Terminal.

Mining in Indonesia is heavily regulated. The country’s constitution claims natural resources for the prosperity of the people. Coal mines operate on a concession basis, these concessions under the relatively favour- able terms of first-generation Coal Con- tracts of Work.

Coal production in Indonesia is a highly competitive industry. This is especially true for recently established companies, as pioneer producers hold a huge advantage in that they own vast areas of favourable concessions under the relatively favou- rable terms of first-generation Coal Con- tracts of Work.

Under such circumstances, companies such as Bayan Resources, Tbk. have to be very efficient and innovative in terms of operations, logistics and management in order to maintain their competi- tiveness. As previously mentioned in this re- port, strategic decisions to acquire the Balikpapan Coal Terminal and ensure efficient operations have largely contributed to the high productivity of the company compared to other producers.

FUEL PRICE VULNERABILITY

The heavy equipment used for mining, such as trucks and excavators, are mostly reliant on diesel fuel. As mentioned earlier, fuel price hikes pose a major costing challenge in coal mining operations.

Besides heavy equipment, the coal terminals also use large amounts of diesel fuel for power generators (despite improvements in the electricity supply in recent years, it is still preferable to own electric generator to en- sure the non-disruption of operations). Moreover, diesel is the only source of energy for floating coal terminals.

This reliance increases the company’s fuel price vulnerability. To tackle this, some producers are building their own coal-fueled, steam power generators.
Challenges

However, most mining equipment and vehicles will still rely on diesel for the foreseeable future. In addition to the replacement of power generators, some large-scale coal producers could minimise their exposure to fuel price volatility by managing hedging tools.

CORPORATE SOCIAL RESPONSIBILITY

Mining has always been negatively perceived by the general public: the clearance of land for mining, destruction of habitats and major devastation to the environment. In addition, pollution can occur when untreated waste resulting from mining operations is released back into the environment. Other than the significant environmental concerns raised in the advent of mining, communities living close to mine areas are also affected by land clearance for mining activities.

In “Corporate Social Responsibility (CSR) in the mining industry – the risk of community dependency” by Jenkins and Obara, mining companies “tend to focus on community initiatives as their impact in economic, social and environmental terms is felt greatest at the local level”. Some of the social impacts that mining companies face include “damage to livelihoods”, “social tensions”, and “land title disputes”.

Well-respected coal producers such as PT Bayan Resources place a strong emphasis on responsible social conduct, which includes employee welfare and training, exemplary safety practices promoting “Zero Accidents” and community development programmes that focus on sustainability and economic prosperity.

As part of an environmental rehabilitation programme in which the mining pits are re-covered with top soil after the completion of mining operations, GBP also operates its own nursery to nurture seedlings before replanting these over the mined land. The company also engages local villages to assist GBP in the rehabilitation process.

Indonesia’s coal industry is very young when compared to its counterparts in Australia, the USA, the UK, South Africa, China, and India. Except for government-owned PT Bukit Asam (PTBA), Indonesia’s major coal producers only started serious exploration work from the early 1980s. Due to economic liberalisation and a steep increase in global demand for fossil fuels, however, Indonesia’s coal industry has been growing rapidly. From 1989 to 1999, the industry recorded a compound annual growth rate (CAGR) of 30%. Moreover, from 2000 to 2009, despite the aftermath of the Asian financial crisis, political turmoil and the recent global economic recession, the industry achieved an annual growth rate of 12%.


Outlook for Indonesia’s coal industry
It is therefore interesting to investigate the short-term outlook for Indonesia’s coal industry, as the industry itself has come under intense pressure from safety and environmental campaigns and regulations. Comparisons were used to illustrate the outlook trends more clearly. For this purpose, Australia’s coal industry was chosen because:

(1) Australia is the world’s leading coal exporter after Indonesia (largest exporter for coking coal and second largest for thermal coal), and

(2) Due to their strategic locations, Australia and Indonesia compete for market share in the rapidly developing regions of East Asia and India.

SHARES OF COAL RESERVES & COAL QUALITY

Australia holds 8.1% of global hard coal reserves and 9.3% of global brown coal reserves, with total proven reserves of 82 billion tonnes. Australian coal is suitable for surface mining, which ensures high recovery rates and allows economies of scale. Given the huge reserves and continuing demand on the coal market, proven reserves should remain sufficient until 2050 and Australia still has huge potential for further exploration. However, production costs will increase as new deposits tend to be located further away from major export facilities.

In contrast, Indonesia holds much lower coal reserves of only 38.8 billion tonnes. Quality wise, they are generally low in ash and sulphur but high in volatile matter and moisture content. The recent rapid expansion of Indonesia’s coal industry has depleted the country’s R/P ratio by more than half, from 68 years in 2000 to only 37 years in 2005. If this trend continues, Indonesia could run out of economic recoverable coal much earlier than expected. To ensure the sustainability of coal and improve coal reserves by technological means, Indonesia should follow Australia’s example by investing more into novel coal exploitation technologies.

COAL EXPORT

Australia is so far the world’s largest supplier of coal (thermal coal and coking coal combined), earning around US$5 billion in 2008-2009, and accounting for approximately one-third of world black coal trade. It is also the largest supplier of coking coal, accounting for more than 50% of total coking coal exports. Australia faces relatively less competition, largely due to the superior quality of its coking coal and higher production costs. As a result, it benefits from higher prices. However, the market niche for coking coal is smaller as world demand for coking coal is nine times smaller than that for thermal coal, and secondly, the coking coal demand has remained virtually flat over the past 20 years, despite growth in the iron and steel manufacturing industry. The majority of coking coal exports is intended for Asia and Europe, where it is used for steel manufacture. Australia’s thermal coal exports are mainly destined for Japan, the Republic of Korea, and Taiwan for use in electricity generation. This success has mainly been attributable to reliable and competitive supplies of high quality coking and thermal coal and relatively sufficient infrastructure support for seaborne trade.

India overtook Australia to become the world’s largest exporter of thermal coal in 2005. In 2007, Indonesian producers shipped 165 million tonnes, almost 30% of seaborne thermal coal supply. The country generally exports more than 75% of total coal production, with major export markets including Japan, Taiwan, South Korea, Hong Kong, India, other Southeast Asian countries and Western Europe.

Coal transshipments from the mine to the shipping terminal is primarily by means of a combination of trucking and river barging. The track and shovel method provides a high degree of flexibility to Indonesian coal mines, but as mentioned above, their heavy reliance on diesel fuel results in surges in transportation costs.

Thus, many Indonesian coal companies are considering the construction of on-site coal fired power plants by replacing diesel-fuelled shovels and dump trucks with electric “in-pit” crushers and conveyors to transport coal from mine sites to barges.

REGULATORY FRAMEWORK

The Australian coal industry generally enjoys favourable government policy support from the Australia Coal Association, as well as Federal Labor, who have just launched national clean coal initiatives for the sustainable development of the coal industry, given that it provides more than 30,000 jobs and Australia is heavily dependent on coal for half of the country’s power stations.

In contrast, the Indonesian mining industry has faced a number of unfavourable regulatory measures that have affected their coal production. A process of deregulation from the central to regional governments, a heavy tax burden and land conflicts have...
Coal has been gradually replaced with natural gas, which is far more environmentally friendly and generates higher electricity efficiency. In the EU, coal has been gradually age the production of coal and encourage its replacement with natural gas, which is designed to enhance both the efficiency and environmental acceptability of coal extraction.

Outlook

A further innovative step towards sustain- ing the future growth of Indonesia's coal industry is widely believed to be coal up- grading.

In contrast to Australia or South Africa, Indonesia has huge reserves of brown or low-quality coal. As of 2007, 29% of its coal reserves comprised lignite with a GAR of less than 4500, of which 60% was sub-bitu- minous, with a GAR of 4500-5800.

Until recently, Indonesian coal produc- ers showed little interest in mining lower quality coal as this is marketed at much lower prices – typically, less than $30 per tonne for brown coal compared to $100 per tonne for bituminous coal as of De- cember 2010. Thus, producers generally assumed that it was uneconomical to ex- tract and market low quality coal.

In recent years, however, substantial in- creases in coal prices generated by strong demand from China and India have motivated Indonesian coal producers to mine low quality coal and upgrade this to high quality bitumino- nous coal.

COMPETITION

Based on publicly available information, three major projects in Indonesia are al- ready vying to upgrade low quality coal on a commercial scale:

1. PT Kaltim Supacoal, a joint venture between Bayan Resources Tbk and Aus- tralia’s White Energy, will soon complete its coal upgrading plant at the company’s Tabang mine.

2. Japanese Kobe Steel Ltd., together with PT Arutimun Indonesia, is setting up a brown coal upgrading plant at Arutimun’s Santri mine, which will turn high-moisture sub-bituminous coal with a calorific value of 4500 kcal/kg into product yielding ap- prox. 4200 kcal/kg.

3. Australia’s Esferco is also planning a plant with an annual capacity of up to 12 million tonnes, which will generate 6000 kcal/kg coal from 4000 kcal/kg raw prod- uct.

During our ISM Indonesia visit, we had the chance to find out more about PT Kaltim Supacoal through presentations by and discussions with Mr Buchanan and Bayar’s senior management. The coal upgrading plant, construction of which is currently more than 60% complete, will use the Binderless Coal Briquetting (BCB) process to signifi- cantly reduce moisture and help cleaner burning.

The products are found to be physically and chemically stable enough for ordinary transportation and utilisation. This value- adding process is expected to start oper- ating soon and, if successful, would be a major breakthrough in Indonesia’s coal industry.
Boosts to Revenue

Assuming that upgrading hypothetically comprises one-to-one conversion, simple mathematics can be used to easily figure out that a plant successfully converting one million tonnes of low-quality brown coal ($30 per tonne) to high-quality bituminous coal ($100 per tonne) will generate an additional $70 million in annual revenue to the company. In this sense, coal upgrading is clearly a lucrative investment for producers.

Challenges

However, upgrading does not come without its challenges. Firstly, it increases production costs significantly and in the event of a bearish coal market, it might become uneconomical to continue to operate the coal upgrading plant. Moreover, due to the drying technology used, the product may become less stable during transport. It has been found that in most instances, the upgraded products form excessive fine granules or reabsorb moisture during handling and storage.

One contributory factor to the low sale prices of low-quality coals is the weak demand for such coal types. In recent years, however, the Government of Indonesia has embarked on projects to encourage the utilisation of domestic coal or, in other words, lower quality coal. A prominent example is PT Perusahaan Listrik Negara’s “fast track programme”, which plans to build 33 coal-fired power projects with a total capacity of 9,483 MW; most of the plants are designed to use Indonesian low-rank coals.

This creates a huge and viable market for Indonesia’s low-rank coals, which previously did not exist. In the short term, risk-averse producers may prefer to produce and sell their low-end coals, readily on the low-rank market generated by government-created projects rather than invest heavily in coal upgrading, which will provide a higher return, albeit at a higher risk and larger capital cost.

With its huge proportion of sub-bituminous and lignite reserves (these make up approx. 89% of total reserve), coal upgrading appears to be merely a matter of time for the Indonesian coal industry. However, as we have seen, a closer look would not encourage excessive optimism since technology challenges, a high cost barrier, and alternative markets for low-rank coal should all not be underestimated by coal producers who are developing breakthroughs in coal upgrading technologies.

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