



INDUSTRY STUDY MISSION

INDONESIA | **2013**

TRADING KNOWLEDGE GOING GLOBAL

The International Trading Institute (ITI) is a tripartite collaboration between Singapore Management University (SMU), International Enterprise Singapore (IE Singapore) and leading industry partners. The Institute boasts a specialist focus on international trading and is supported by a unique public-private partnership. ITI aims to establish itself as the premier industry platform for thought leadership in the arena of international trading. ITI focuses on delivering training and education at executive and undergraduate levels, conducting high quality applied research with an Asian flavour, and providing consultancy services for firms in Singapore and the region. Through SMU, ITI offers the International Trading Concentration (ITC) which prepares undergraduates for a career in the international trading and related industries. Visit our website at www.iti.smu.edu.sg.



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 as 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: the School of Accountancy, the Lee Kong Chian School of Business, the School of Economics, the School of Information Systems, the School of Law and the 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. The SMU city campus is a state-of-the art facility located in the heart of downtown Singapore, fostering strategic linkages with the business and wider community.

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 Concentration (ITC) in July 2006. ITC is offered as a specialisation under the Finance major.

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) include visits to China, Abu Dhabi & Qatar, Vietnam, Australia, Indonesia and Malaysia.

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

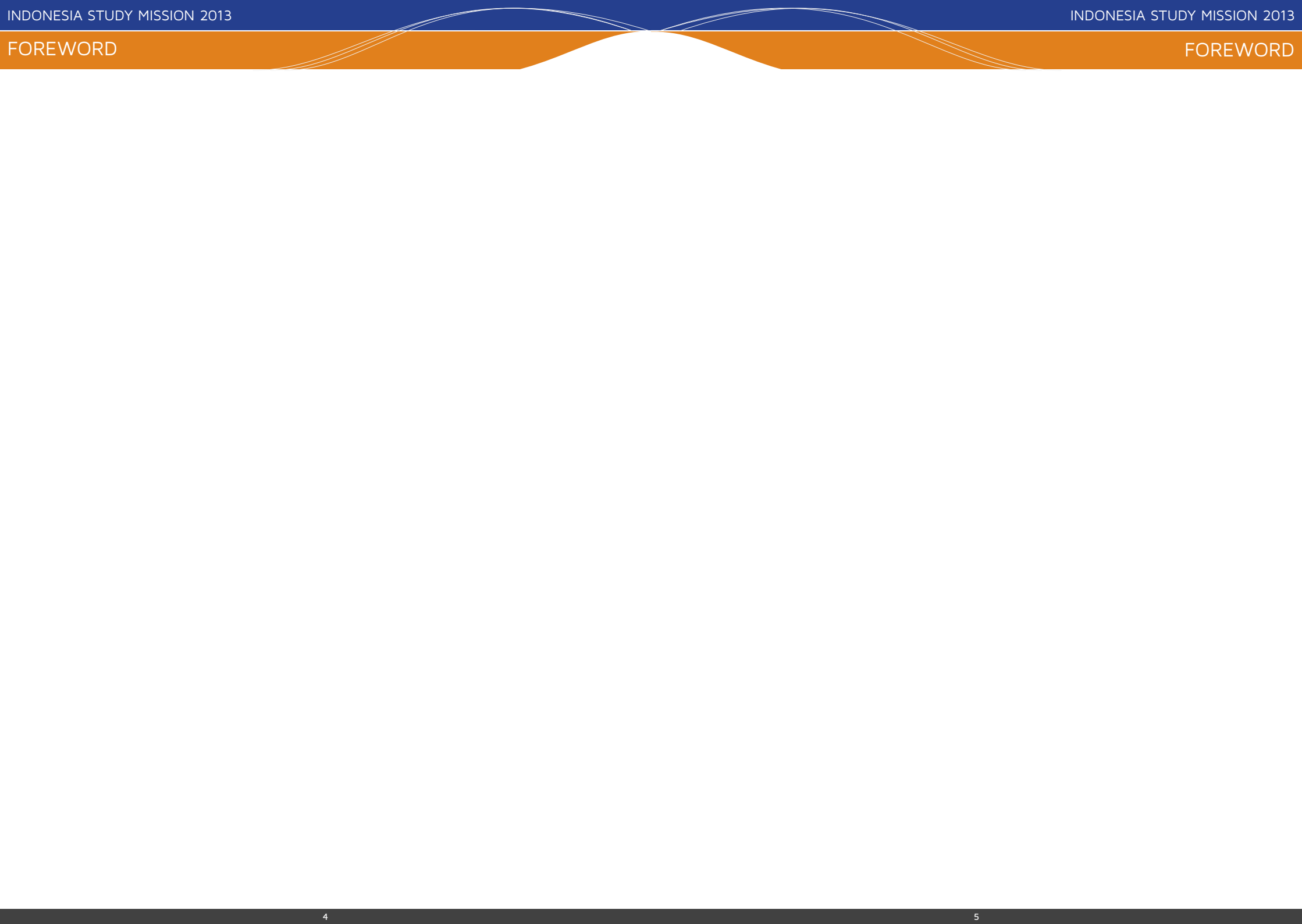
ITC CURRICULUM

- (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 305)
- (f) Shipping Business (TRAD 201)
- (g) Law of International Trade (LGST 223)

Non-credit courses

- (a) Oil Trading
- (b) Agri-commodity Trading
- (c) Iron Ore and Met Coal Trading
- (d) Petrochemicals Trading
- (e) Coal Trading

ITC students are required to complete at least 3 non-credit courses to graduate with an ITC specialisation.



EAST KALIMANTAN

OUR TRAVELS

“Bhinneka Tunggal Ika” or Unity in Diversity, is the national motto of Indonesia and one that aptly reflects the Southeastern nation. Indonesia is home to numerous ethnic, cultural and linguistic groups, where Bahasa Indonesia is the official language. Indonesia has a current population of 247 million, and is projected to surpass the US and become the most populous nation after China and India by 2043. Often referred to as the world’s largest archipelago, its 17,000 islands span more than 5000 kilometres. The country’s main islands consist of Sumatra, Java, Sulawesi, Irian Jaya, and of course, Kalimantan.

Indonesia has the largest economy in Southeast Asia and is one of the fastest growing market economies of the world. Additionally, it is a member of G-20 major economies. Being classified as a newly industrialized country (NIC), social freedoms and civil rights, strong political leaders, and an open-market economy is becoming increasingly prevalent in Indonesia.



Our Travels has brought us to Balikpapan in East Kalimantan. Kalimantan is the Indonesian part of the island of Borneo, the 3rd largest island in the world. It has a total area of over 139,000 square kilometres with a population of about 3 million, making it the second largest Indonesian province. The economy of East Kalimantan heavily depends on natural resources such as oilfield exploration, natural gas, as well as coal and gold mining and as a result, East Kalimantan has one of the fastest growing economies in Indonesia.

With exports of oil, gas and coal steadily increasing; the province was responsible for a major portion of the country’s export output with a value of US\$37.97 billion. As of October 2012, its export output value stood at \$27.71 billion. In 2011, it had the highest gross regional domestic product (GRDP) per capita in the country, standing at Rp105.85 million per year.

More specifically, Balikpapan is a seaport city on the east coast of East Kalimantan. Shipping from the Semayang and Kariangau harbours and air travel from the Sultan Aji Muhamad Sulaiman Airport are the main modes of transportation available in the city. It is a resource-rich region known for its timber, mining, and petroleum export

products. Recently the economy of Balikpapan has shifted focus to mining as well.

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Itinerary

DAY 1

Arrival at Balikpapan airport and travel to PT Gunungbayan Pratamacoal Block II

DAY 2

Safety induction and presentation of business operations

Visit to the Zoo

DAY 3

Site visit to PT Gunungbayan Pratamacoal Block II Mine Site and Run of Mill Stockpile

DAY 4

Travel to Balikpapan

Dinner hosted by Dato Low with staff of PT Bayan Resources

DAY 5

Visit to Balikpapan Coal Terminal

On board tour of Kalimantan Floating Transfer Station

ABOUT PT BAYAN RESOURCES



I learnt about a large portion of the coal supply chain, from exploration to excavation, transportation and storage. It was cool to have the opportunity
Hasisha

In **1973**, Dato' Low Tuck Kwong started his business in Indonesia. The company's extensive experience and knowledge in civil engineering enabled it to venture into contract coal mining in 1988. In November 1997, Dato' Low acquired his first mining concession through 2 companies, PT Gunungbayan Pratamacoal, and PT Dermaga Perkasapratama. These companies own and operate Balikpapan Coal Terminal. Since then, a number of new concessions have been acquired and formalised into a legal holding structure through PT Bayan Resources.

The Bayan Group is engaged in open cut mining of various coal quality from mines located primarily in East and South Kalimantan. The group owns the largest coal terminal in Indonesia, known as the Balikpapan Coal Terminal. The coal resources and reserves have been independently verified and certified to international JORC (Joint Ore Reserve Committee) standards by a third-party mining consultant.

It is also the only coal producer in the country to operate

a Floating Transfer-Station that can be moved to take advantage of the location with the greatest demand or to avoid bad weather and can be positioned to load capsized vessels. These infrastructure assets complement the logistical aspects of the Bayan Group's business and at the same time; take advantage of ample mining opportunities. Whenever capacity permits, third parties from whom the Bayan Group receives a secondary source of income also readily utilizes these infrastructural assets.

Being an integrated coal producer the Bayan Group produces coal ranging from semi-soft coking coal to environmentally-friendly low sulphur and sub-bituminous coal. This allows the group to cater to the varying needs of global buyers.

The Bayan Group continues to invest in exploration at its existing mine sites while also exploring potential acquisitions of new coal assets and expansion of infrastructure facilities to complement its existing portfolio.

COAL AS A COMMODITY



Coal is a fossil fuel. It is a combustible, sedimentary, organic rock which is composed mainly of carbon, hydrogen and oxygen. This fossil fuel has a long history of use, dating back to the Bronze Age (3000–2000 BC). Booming economies like China and India owe their economic success to coal primarily because coal is still the cheapest energy option, and is widely available in many countries across the globe.

Coal is classified into four types, lignite, sub-bituminous, bituminous and anthracite according to its carbon, ash, sulphur and water content. The harder the coal, the less moisture it has and the more efficient it is when used as a fuel.

Lignite, (a low quality thermal coal), has the lowest carbon content and heating value and alongside sub-bituminous coals is primarily used for electricity generation. Anthracite has the highest carbon content with the lowest amount of moisture and hence has the highest energy content of all coals.

It is used in high-grade steel production.

Bituminous is sub-divided into thermal and coking coal, (often referred to as semi-soft coking coal). It is used for both electricity generation and for making steel.

COAL ON A QUALITY CONTINUUM:

(i) Peat: Very poor quality. Not suitable for trade

(ii) Lignite: Very low in calorific value and very high with total moisture. GCV (Gross Calorific Value) can be as low as 3200 KCAL/KG ADB (Kilocalorie/Kilogram) (Air Dried Basis).

(iii) Sub-Bituminous: Quality considered low with GCV of 5000 KCAL/KG ADB. It is readily available in Indonesia.

(iv) Bituminous: Low moisture and high in calorific value (6600-7500 KCAL/KG ABD).

This is available mostly in South Africa, Australia, Russia, China, USA etc. Subdivided into thermal coal and coking coal (used primarily in the manufacture of iron and steel).

(v) Anthracite: Very high in GCV of up to 8800 KCAL/KG. Vietnam, USA and Russia have high anthracite availability.



Coming from Singapore where most of our basic needs are readily available, I often take for granted the little things that make life comfortable..

Kenley Goh

PT GUNUNGBAYAN PRATAMACOAL (GBP)

COAL MINING PROCESS

GBP is a subsidiary of PT Bayan Resources. It is located approximately 110km West of Balikpapan, nestled in the West Kutai Region of East Kalimantan. GBP has 2 mining sites, namely Block I and Block II. Mining commenced in 2008 and 1998 respectively. The coal quality varies anywhere from 5000 GCV (Gross Calorific Value) to 7000 GCV, with mining activities outsourced to a reputable mining contractor. PT Bayan engages in strategic planning, with revenue generated from GBP to acquire more mining concessions.

During our site visit to PT GBP Block II mine site, we had a first hand experience of coal mining operations. Accompanying us were various senior management staff of Bayan Resources, such as Mr. Duncan Buchanan (General Manager, Operations & Technical), who gave in-depth explanations of the on-site operations as well as interesting insights into the coal mining process.



Coal Mining Process

VARIOUS TYPES OF COAL MINING

Coal is extracted from the ground by mining, either underground or in open pits.

The choice of mining method is largely determined by the geology of the coal deposit. Underground mining currently accounts for a bigger share of world coal production than opencast; although in several important coal producing countries surface mining is more common. For example, surface mining accounts for around 80% of production in Australia; while in the USA it is used for about 67% of production.

SURFACE MINING:

Surface mining - also known as opencast or openpit mining - is only economic when the coal seam is near the surface. This method recovers a higher proportion of the coal deposit than underground mining as all coal seams are exploited - 90% or more of the coal can be recovered.



An adventure can teach someone something significant about themselves, other people, or the world in general. Learning should be an adventure.
Lau Wei Rui

Large opencast mines can cover an area of many square kilometres and use very large pieces of equipment, including:

- Draglines, which remove the overburden
- Power shovels
- Large trucks, which transport overburden and coal
- Bucket wheel excavators
- Conveyors

The overburden of soil and rock is first broken up by explosives; it is then removed by draglines or by shovel and truck. Once the coal seam is exposed, it is drilled, fractured and systematically mined in strips. The coal is then loaded on to large trucks or conveyors for transport to either the coal preparation plant or direct to where it will be used.

COAL MINING PROCESS ADOPTED BY PT BAYAN (GBP BLOCK I & II)

PT Bayan utilizes the standard truck-and-shovel open-pit mining method commonly used in Indonesia. However, they are exploring the possibility of applying other open-mining methods and underground mining, which are not commonly used in Indonesia.



COAL MINING PROCESS

COAL MINING PROCESS



I am thankful that much of the lessons learnt here cannot be learnt on the internet or through books. The site visit were especially insightful.

Lim Zhang Yi



I really like the fact that we were allowed to get up close to the mine site, and see the operations with our very own eyes, rather than just learn from visual illustrations.

Melvin Koh

MINING CONSIDERATIONS:

Before mining commences, as well as during the mining process, several factors need to be taken into consideration. These include the strip ratio (the amount of overburden/waste which must be removed to gain access to a unit of coal), the geological formation, the resulting pit design, financial viability, as well as maintaining quality and political factors such as reduced concession period (number of years a mine can be used). Mining needs to be done carefully to avoid gathering dirt, which in turn will increase ash content, although the inherent quality of the coal may be fine. Managing rainfall is crucial as well. Flooding in the mine is less than ideal. Indonesia experiences about 9m of rainfall/yr. unlike Australia and hence the mine pits require pumps to drain the water away. Net debt financing is used when coal prices are expected to be high. The funds are used for pre-stripping in order to prepare the land for mining when price of coal is high. The company then relies on the cash flows from mined and sold coal, in order to recover its cost of financing and repay the bank. All of the above are taken into due consideration to ensure optimal mining operations, quality and profitability.



MINING PROCESS:

1. Exploration

Geological mapping is the very first step when searching for potential mine sites. Mapping is used to locate outcrop, identify surrounding topography, and other geological structures which may alludes to the presence of coal seams beneath the surface. Data points (holes drilled into the ground) are allocated on the surface during the geological study. The more complex the geology, the smaller the distances between any 2 data points. More holes are drilled at closer distances (<200m apart) in order to determine proven reserves. Once, a high level of confidence is achieved in terms of probable or proven resources, profitability of mining at that concession needs to be ascertained. Optimization is used in determining profitability of mining in a given pit shell. The computerized system “chops” up the area into “blocks” and generates a profitability figure for each “block”. Also, a concession is efficient only if there are waterways within 75km.

2. Exploration

Pit design is an essential aspect of mine planning. PT Bayan utilises high-tech equipment such as Minicom Software,

COAL MINING PROCESS

Surpac and Autocad to generate pit designs. This aids engineers to determine the mining sequence. The mine planning also links in closely with coal prices and the foreseeable cost and profit per tonne ratio. This will allow the management to match production with long term supply contracts.

It is also essential to manage the cost overburden removal with potential coal output, to achieve an optimum mining schedule and an economically viable output. Sensitivity analysis is used to determine the amount of overburden to be removed and consequently the amount of coal to be mined, so as to achieve maximum profitability.

If coal prices are forecasted to reduce, the management may decide to mine in a manner so as to reduce the strip ratio. This, however, may mean that the potential pit size is reduced and less coal can be mined over the lifetime of the concession.

Pit design is crucial in the planning stage as well. If the drilling/blasting is carried out at an angle too steep, the mine may be at risk of a landslide. If, on the other hand, the drilling/blasting is done too straight (vertically), too much waste/overburden may have to be cleared.

3. Overburden Removal

Removing excess soil and rock layer above the seams of coal is essential to access the coal. It is common to dig up to 50m depth before reaching the coal seam. At times, granite is present and due to its impenetrable nature, blasting is required. A typical blasting process requires 30 tons of explosives, consisting largely of ammonium nitrate.

Overburden removal encapsulates the concept of strip ratio and the economics behind it. The strip ratio refers to the ratio of the volume of overburden required to be handled in order to extract some volume of ore. The strip ratio affects the cost of operations of the mine as well as the resulting profitability.

The Standard profit margin that PT Bayan uses is 10% to 15% (Indonesia's industry average is 10%). These margins are balanced via the strip ratio. The strip ratio increases



COAL MINING PROCESS



The on the ground learning experience had given me the opportunity to learn about the intricacies of the coal trading industry. Over here, I get to experience and learn beyond what the classroom setting can offer..

Muhammad Fariz

if margins are high while the ratio decreases if margins are low. The logic behind is the increase in expenses as the strip ratio is increased, thus resulting in a fall in profit margins.

4. Coal Hauling & Processing

After the extraction of the overburden, trucks are used to remove overburden. The 100 ton capacity trucks are only used in mine site, while those allowed on the main roads may only carry a maximum of 30 tons. Water is also sprinkled on the roads leading in and out of the mines during transportation to ensure that minimal dust is lifted into the atmosphere during dry weather.

Upon arrival at the Run-of-mill (ROM) stockpile, the coal will be discharged from the trucks. Following which, they will be grinded accordingly to the customer's specifications, and loaded on to barges via a conveyer belt system. Quality management is vital as the strict requirements of clients has to be met. Every 5 minutes, coal samples will be collected to ensure that the standards meet the target set by PT Bayan. 50% of the

sample will be sent to Balikpapan Coal Terminal while the remaining 50% will be sent to an external contractor to ensure compliance of standards.

5. Coal Barging

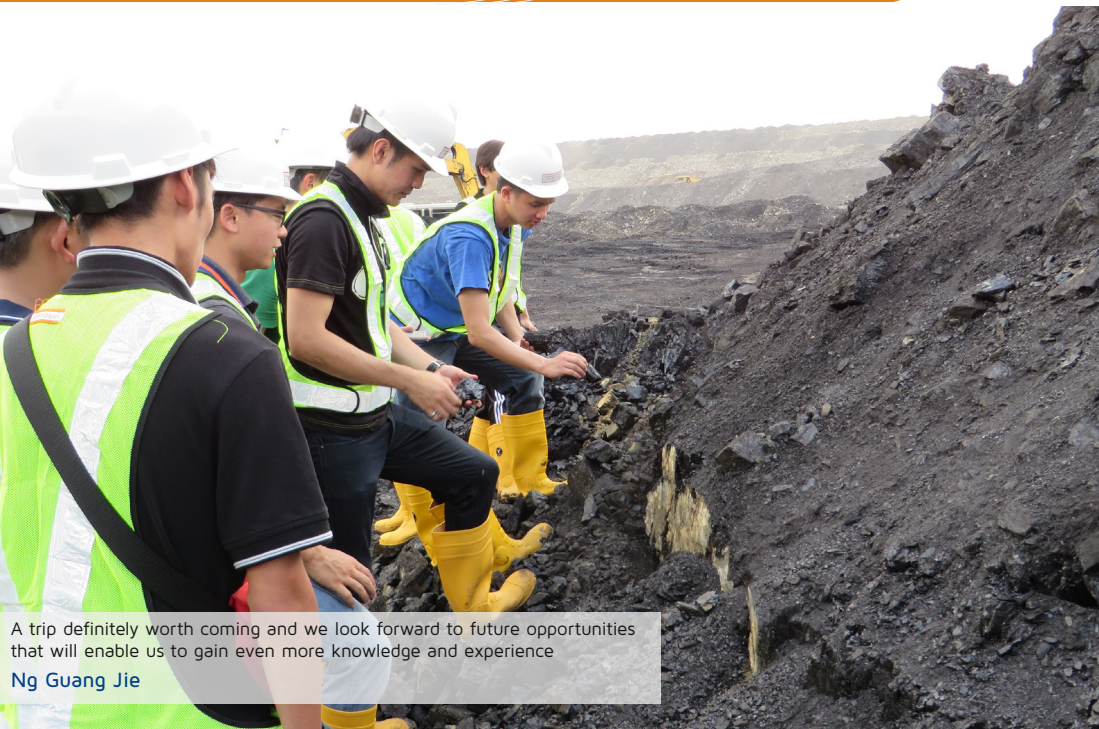
To transport the coal from the stockpile to the coal terminal, barges are utilized. Barges have to be loaded at a 30 degree angle to prevent exerting extraneous pressure and damaging its structure. Once the 30 degree threshold has been reached, the barge will be floated downstream to load the other end.

The tide of the river has to be taken into account as well. If the tide is high, the barge may displace water from the river and flood riverside communities. 8000 tonne barges travel from the loading station down the Mehakam River to the Balikpapan Coal Terminal (BCT), taking about 3.5 days each way.

6. Transshipment / Coal Terminal Loading

Balikpapan Coal Terminal, Kalimantan Floating Transfer Stations, and Perkasa Inakakerta Jetty infrastructures handle the final stage of the coal value chain. ROM or

COAL MINING PROCESS



A trip definitely worth coming and we look forward to future opportunities that will enable us to gain even more knowledge and experience

Ng Guang Jie

crushed and washed coal are trucked and/or barged to these facilities before being shipped to buyers on a Free on Board (FOB) basis.

With strategic investors such as Enel and KEPCO on board, PT Bayan Resources has effectively secured long-term contracts to supply coal, mitigating spot price fluctuations. Ultimately, this allows a highly vertically integrated supply chain to function efficiently given the stable demand from a wide range of contracts.

7. Environmental & Social Activities

Under Indonesian law, companies are required to fill the mining pits after mining has been completed. This is known as rehabilitation. Overburden removed initially is used to fill the empty pit, with planting of Acacia trees the most preferred method by the local community in Kalimantan. Other alternatives include palm oil plantation or recreational pond, which are not time and cost efficient.



PORT & SHIPPING FACILITIES



...to see the actual operation indeed gained me relevant first hand exposure on coal mining operation and barge transportation

Ricky Nguyen

Port & Shipping Facilities

BALIKPAPAN COAL TERMINAL (BCT)

We had the opportunity to visit the Balikpapan Coal Terminal, located at Balikpapan Bay and is one of the largest coal terminals in Indonesia which has a handling capacity of 15 million tonnes per annum and stockpiling capacity of a million tonnes across 16 stockpiles.

Barges originating from the Mehakam River is discharged and stored at various stockpiles via luffing/slewing, hoppers and conveyor belts, achieving rates up to 4000MT/h. Furthermore, PT Bayan Resources has the flexibility to customize products for its clients as they are able to use computer generated blending ratios to ensure high blending accuracy and are able to blend up to 3 types of coal.

As explained by BCT port operators, their main objective is to aim for the shortest turnaround time possible to maximize dispatch and avoid demurrage costs. Loading

and discharge rates are constantly monitored in a central control room, manned by a team of 4 working on 12-hour shifts, who can signal the ground crew for investigation and execute remedial actions when operations are not as efficient as required.

PT Bayan Resources has plans to further expand their value chain by possibly being involved in a 1,000-megawatt coal fired power plant within Balikpapan Bay. This vertical integration will be similar to Adaro's strategy of 'Pit to Power'.

The Balikpapan Bay area is unable to load a capsize vessel. Due to draft restrictions, the capsize vessels are partially loaded in the bay and the remainder is loaded further outside the bay. PT Bayan has to engage resources to dredge the channel leading into the bay area every 2 years.

PORT & SHIPPING FACILITIES



Enriching journeys are those that change and transform us or quite simply, these are the trips that we return from somewhat different

Teng Hee Chuan

Port & Shipping Facilities

KALIMANTAN FLOATING TRANSFER STATION (KFT)

The Kalimantan Floating Transfer Station - 2 (KFT-2) is an 80,000 DWT non-propulsion mobile vessel built in Dalian, China. As the name suggests, it is one of the 2 floating transfer stations in the region, both solely owned by PT Bayan Resources. Being mobile, a key objective of the KFTs is to provide operational capabilities by positioning themselves nearer to the barge or steering clear of bad weather.

During the on-board tour, we learnt that equipped with blending facilities and engines, the KFT-1 is built to be more mobile and versatile. The recognition of the need for a mobile ship loader led to the upgrading of KFT-1 to facilitate the efficiency of loading and discharging. On the other hand, KFT-2 requires towage and has only basic blending capabilities. KFT-2 is equipped with 2 movable ship loaders, 4 clam bucket cranes, SGS certified automatic sampling system, onboard crushing facilities and a magnetic separator. Similar

to BCT operations, the ship loaders and discharging bucket cranes are optimized to work at the same rate of 6,000MT/h while the 80,000MT storage capacity allows KFT-2 to stock up sufficient coal to provide a loading head start while barges can return for more cargo.

These key differences between the 2 KFTs are mainly due to the unique demands they cater to. For example KFT-2 is due to be stationed at the delta of Mahakam River, acting as a secondary storage to the upcoming Tabang/Pakar Project. Due to the expected consistency in low calorific value coal coming from the project, KFT-2 aims to further streamline the logistics process in order to maintain profit margins: Barges are expected to save 2 to 3 days of travelling as the KFT-2 is located nearer to the origin. Additionally, with an expected loading time of 10 hours for Panamax vessels, KFT-2 will ultimately minimize the exposure of low calorific value coal to weather, preventing 'stickiness' of coal.

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Rabobank International | Shell International Eastern Trading Company
Stemcor (SEA) Pte Ltd | Swiss Singapore Overseas Enterprises Pte Ltd
Toepfer International Asia Pte Ltd | Total Trading Asia Pte Ltd
Trafigura Pte Ltd | Vitol Asia Pte Ltd
Womar Logistics Pte Ltd

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