



Frequently Asked Questions

Phu Bia Mining



PHU BIA MINING





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Managing Director's Introduction



The purpose of this document is to address some of the most frequently asked questions about Phu Bia Mining's operations and the mining sector in Laos. The information it contains has been taken from reports provided to the Government of Laos, from powerpoint presentations and from books and articles related to international best practice in mining.

Often, these frequently asked questions are raised by those who have had limited exposure to the international mining industry. Many of the most frequently asked questions deal with the concerns of communities living closest to the operations, or reflect concerns at the national level about development and the direction of the economy.

These questions are not only valid, but are often very important to the people asking them. Consequently, it is essential for Phu Bia Mining to try to answer these questions in the best way we can. This document



aims to highlight the positive as well as the negative aspects of mining, and in doing so, help stakeholders to ask well-informed questions about the impacts and benefits of the mining sector.

As an industry, we recognise the impacts we can have on the environment and communities and are committed to mitigating them as much as possible. Collectively, communities tend to discount the benefits of a mining sector at the macroeconomic level in terms of the utility and demand for the goods we produce. The copper and gold Phu Bia Mining produces is directly contributing to the growth and development of Asia and the rapid reduction in poverty across the region. We need to tell this story more clearly.

Optimising the contribution of mining is essentially about maximising the positive economic and social benefits of production while seeking to minimise and manage its impacts. Phu Bia Mining firmly believes that

the benefits outweigh the mitigated impacts. We hope that this document will contribute to raising the level of understanding and debate on the contributions – and the future – of mining in Laos.

Richard Taylor

Managing Director, Phu Bia Mining Ltd



What does Laos get from mining?

*Source: International Council on Mining and Metals:
The Role of Mining in National Economies*

The mining sector contributes to economic and social development in a variety of ways. Some of these are relatively well-understood and well-documented, while others have the potential to be transformative but are poorly understood and documented.

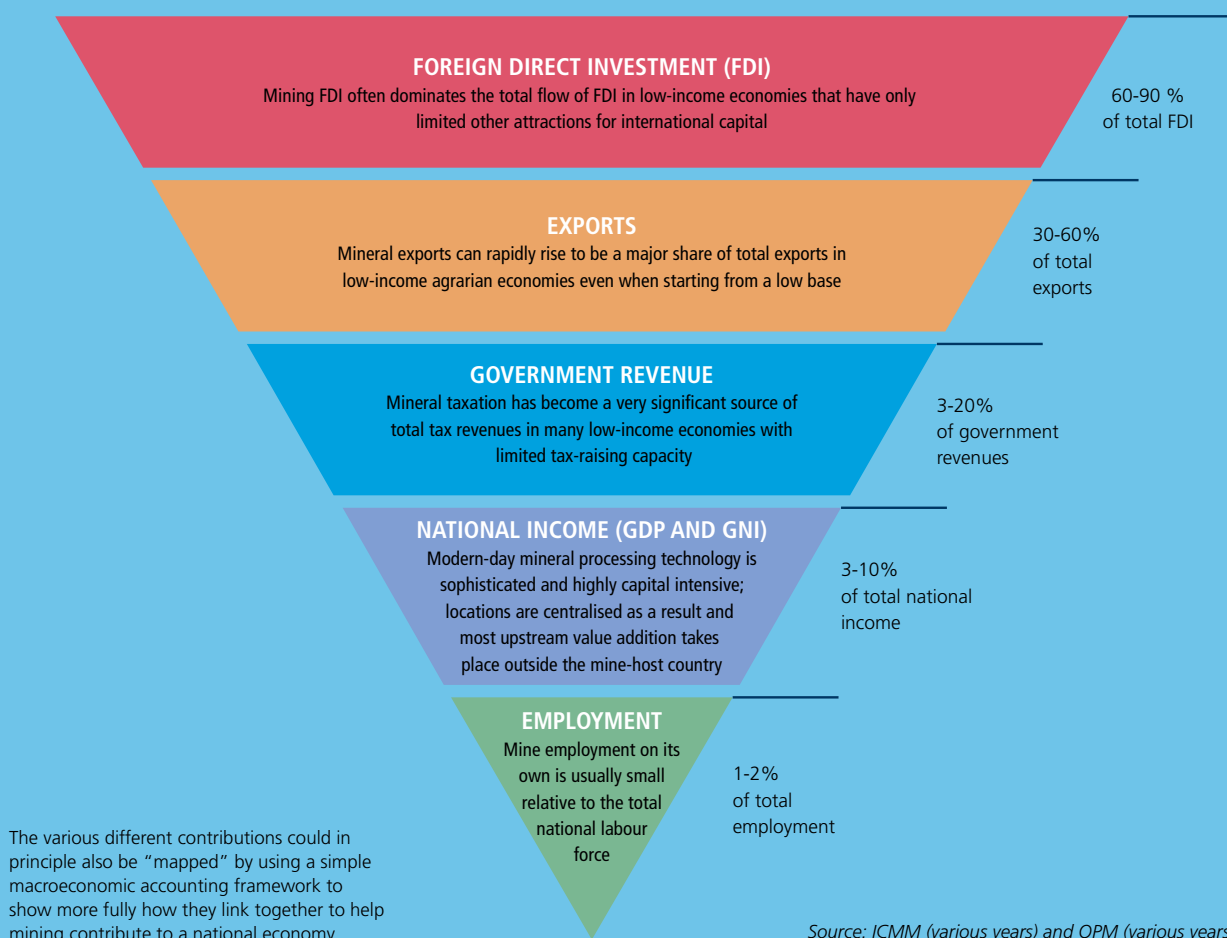
The diagram on the opposite page represents the macro-level contributions of mining in the shape of an inverted pyramid. The percentages are not intended to be added together but indicate the range of stand-alone contributions in each area. Every category is important in itself, and this section discusses each in turn.

The methodology for undertaking economic impact assessments for the mining sector is well established. Typically these involve analysing the direct impacts of mining projects – contributions to GDP, foreign

investment, government revenue, exports, jobs and community development activities. Indirect impacts – such as multiplier and exchange rate effects – can also be modelled to look at the full range of flow-on effects and opportunity costs.

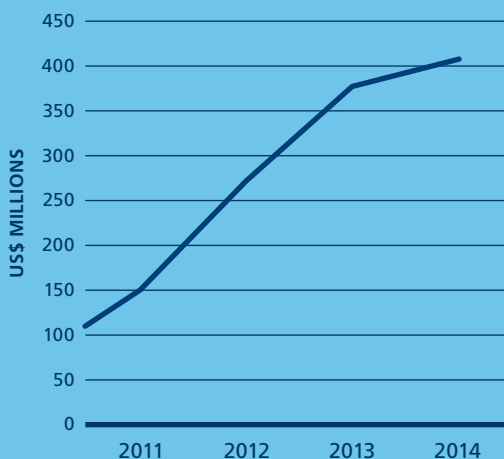
Phu Bia Mining recognises its responsibility to make positive social and economic contributions. The Company's approach is to partner with local authorities and community members to improve the socio-economic wellbeing of people in the villages, districts and provinces where it operates, as well as at the national level.

Macro-level contributions of mining in low and middle-income countries



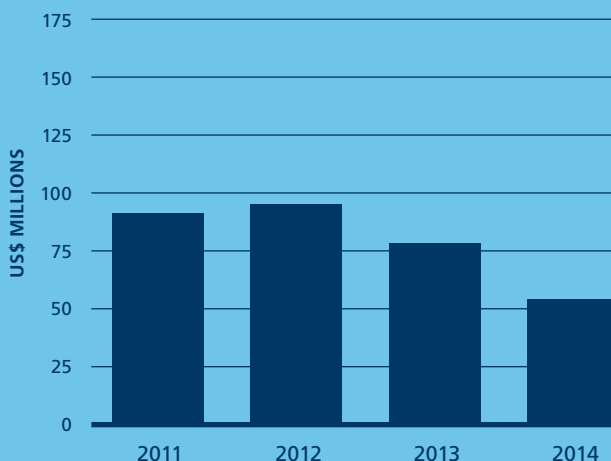
Direct contributions to Laos (cumulative)

Graph shows period 2011-2014 only; full detail on page 6



Direct contributions to Laos (annual)

Graph shows period 2011-2014 only; full details on page 6



The Government of Laos is aiming for the country to graduate from 'Least Developed Country' status by 2020. To achieve this, the Government has an annual GDP growth target of eight per cent.

Phu Bia Mining is contributing to the growth of the Lao economy in a number of ways, including through:

- Capital expenditure in exploration and project development and project operating costs, particularly through payments to Lao suppliers of goods and services
- Revenues from copper, gold and silver sales, and payments of royalties on such sales
- Profit tax and other payments such as tenement rental fees to the Government of Laos

- Salaries paid to employees and salary taxes paid to provinces
- Investments in community development programs
- Payment of dividends to the Government of Laos as a 10 per cent shareholder
- Investment in regional infrastructure including roads
- Engagement of local companies (Lao companies, and international companies based in Laos) to the extent feasible.

Thanks to the success of our operations, the Company has been able to make a significant contribution to the economy of Laos and host communities. To date, Phu Bia Mining has invested more than \$1.34 billion into Laos, and generated more than \$400 million in revenue for the government.

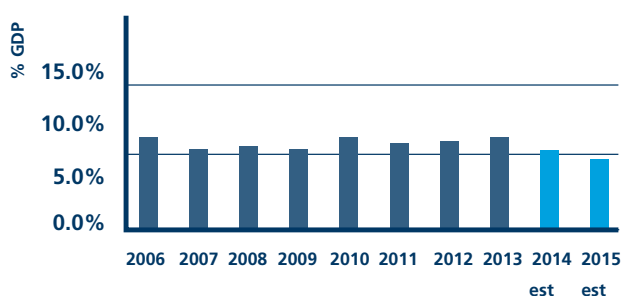
Total Direct Contribution to Laos since 2003

CONTRIBUTION	2003-2009	2010	2011	2012	2013	2014
Personal Income Tax (Salary tax)	7,550,619	3,271,080	5,244,821	6,091,773	5,567,899	5,471,544
Import service fee	201,836	1,030,632	1,544,859	2,562,880	2,484,415	1,135,471
Profit Tax		32,314,624	48,235,515	46,774,682	26,328,549	8,234,855
Royalty	11,395,366	27,901,799	34,790,465	35,574,321	45,092,563	35,373,609
Rental Fee (Concession fee)	290,660	58,916	58,916	58,916	38,911	99,061
Prepaid Profit Tax (VAT and BTT paid upfront)			16,303,736	21,973,779	20,692,915	15,419,985
Offset against Profit Tax (VAT and BTT paid upfront)			-16,303,736	-21,973,779	-20,692,915	-15,419,985
Prepaid Profit Tax (Fuel Custom Duty and Excise Tax)					2,447,888	5,113,335
Offset against Profit Tax (Fuel Custom Duty and Excise Tax)					-2,447,888	-5,113,335
Prepaid Profit Tax (Cross Border Tax)						78,023
Offset against Profit Tax (Cross Border Tax)						-78,023
Dividends				4,148,200	4,150,000	4,310,000
Total Contribution		64,577,051	89,874,576	95,210,772	83,662,337	54,624,540
Total Cumulative Contribution	19,438,481	84,015,532	173,890,108	269,100,880	352,763,217	407,387,756

The relationship between Laos' GDP and metals prices

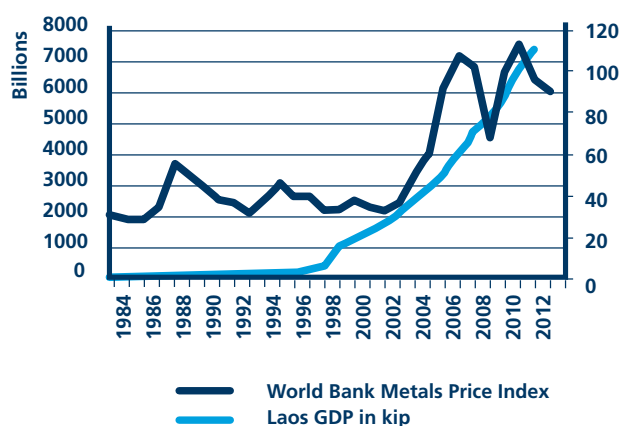
As outlined above, the Government of Laos has an ambitious target for annual GDP growth of eight per cent. However, GDP growth has moderated by a full percentage point since 2013 and there are substantial risks to future growth prospects as the moratorium on mining concessions leads to less resources activity.

Lao economic growth



Since around 2003, when the Sepon mine commenced production, Lao economic growth has been highly correlated with metals prices. In a period of low commodity prices, boosting volume (i.e. increasing the number of mines or increasing total mining exports) could offset declining prices. Other sectors of the economy are unlikely to be able to make up any future loss of mining revenue.

Lao GDP and metals prices

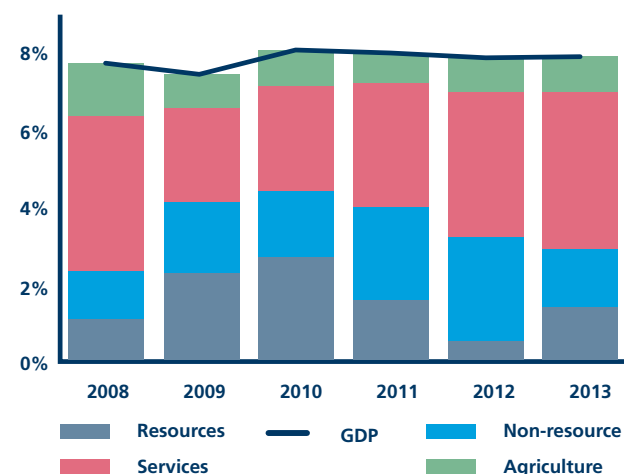


GDP per sector

The Lao economy remains heavily reliant on agriculture, and productivity in this sector remains low.

The mining sector makes up a significant component of non-agricultural GDP and jobs. International organisations sometimes comment that mining does not create many jobs in Laos, but that is only true in comparison to agriculture and the informal sectors of the Lao economy.

Contribution to GDP Growth



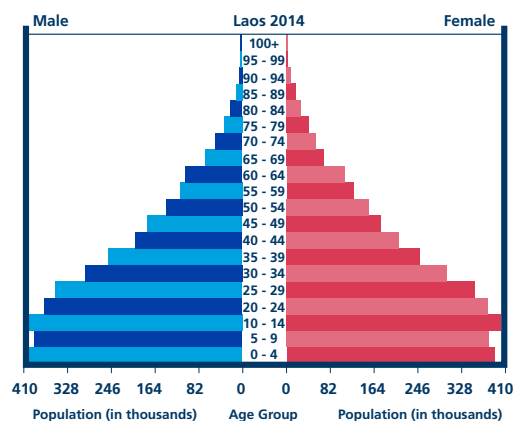
Source: National authorities; and IMF staff calculations.

1. Resource industries include mining and quarrying, electricity, water, and gas; non-resource industries include manufacturing and construction.

The Lao economy and population growth

Laos has a young and growing population. The population grew by 1.8% (or 125,000 people) in 2014 but has grown by as much as 3% in recent years. With a median age of 19, large numbers of young people are entering the labour market every year and the economy needs to grow to absorb these new workers.

Lao population by age and gender



Phu Bia Mining and MMG make up 99 percent of mining revenue despite making up less than 1 percent of the total number of mining companies

Mining directly employs over 6000 people in Laos, and probably an additional 20,000-30,000 jobs rely in some way on mining support and services. While small compared to the numbers employed in agriculture, mining represents a large part of Laos' industrial workforce and employment opportunities for engineers and skilled tradespeople. Mining is needed as part of the employment future in Laos.

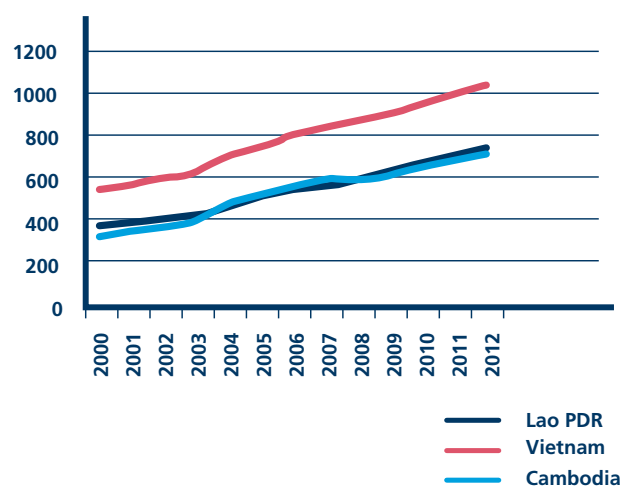
Economic welfare: Lao GDP per person (PPP) in comparison to neighbouring countries

Note: GDP per capita based on purchasing power parity (PPP) reflects differences in the cost of living in different countries. Using a PPP basis is therefore more useful than 'standard' GDP per capita when comparing differences in living standards between nations.

The Lao economy has grown more rapidly than that of most of its neighbours over recent years. However,

if you look at GDP per capita on a PPP basis, Laos has only kept pace with its neighbours. This is due to the high rate of population growth in Laos. Without comparable increases in industrial output and high wage groups, Laos risks falling behind its neighbours.

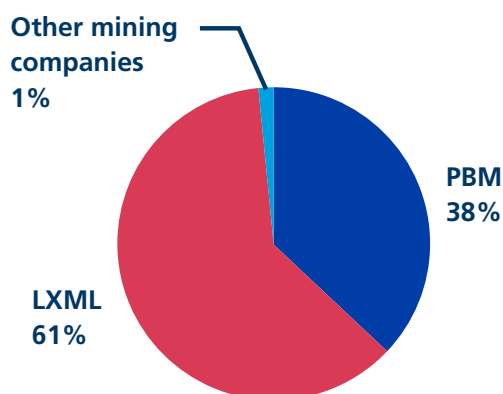
GDP Per Capita PPP



Where is the money from other mining companies?

Total contributions to overall government revenue from Phu Bia Mining and MMG compared to total contributions from rest of the Lao mining sector raise a real question about the value of the rest of the mining sector to the economy. There are 290 other mining companies in Laos. Phu Bia Mining and MMG deserve recognition for their contribution compared to others in the industry.

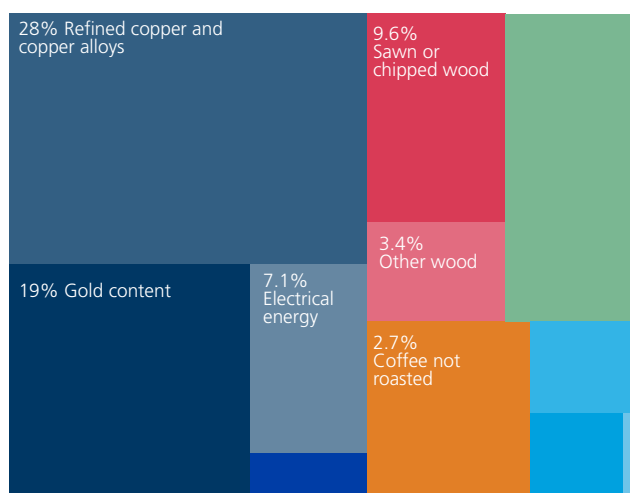
% share of revenue from mining companies paid to government of Lao (2013)



Mining share in all Lao exports

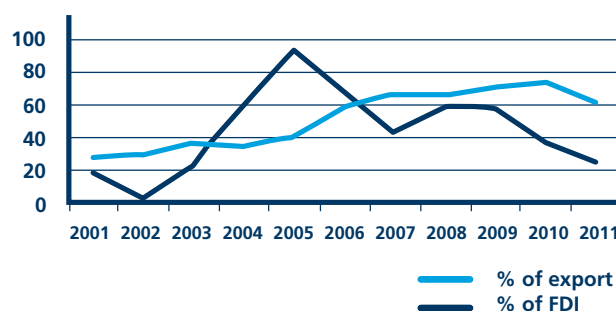
A 'treemap' of the economic diversity of Laos shows that it is heavily reliant on mining exports and more broadly on commodities. Commodities are Laos' area of comparative advantage.

Lao PDR Export Treemap from MIT Harvard Economic Complexity Observatory, April 2012



Without significant business environment reforms and development of financial markets, other (more complex) industries are unlikely to develop in Laos in preference to neighbouring markets. Laos cannot maintain its desired growth rates while there is a moratorium on mining.

Lao mining industry's share of exports and Foreign Direct Investment (FDI)



Are Phu Bia Mining's financial and community contributions fair?

Phu Bia Mining paid four types of taxes in 2014; the Government of Laos also owns 10% of the company and therefore also received a dividend:

1. Royalty of 6% (\$35m)
2. Profit Tax of 25% (\$8m)
3. Salary Tax (\$5m)
4. Import fee (\$2.5m)
5. Dividend (\$4m)

For more details, please see page 6.

Models of Minerals taxation

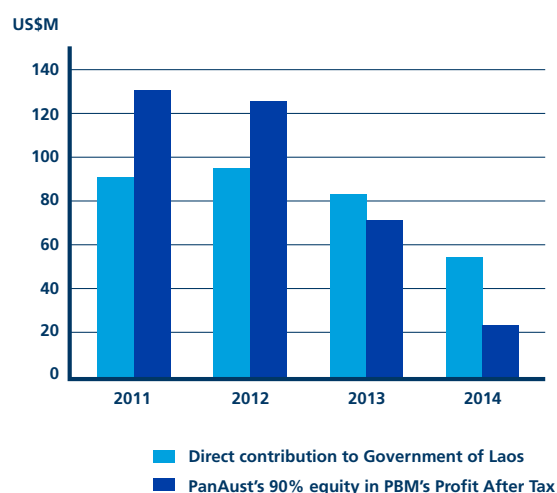
Analysis of mining taxation suggests that the viable range of tax regimes based on Average Effective Tax Rates (AETRs) lies between 40% and 60%. When the overall tax rate is closer to 40%, there are higher rates of exploration, discovery and new mining projects. When the overall tax rate is closer to 60%, it results in fewer projects – this taxation model lends itself to known resource areas.

Every country has a different model of minerals taxation and it is important to see how the taxes all add up to examine the effect on the project, the share for the host country, how the different taxes interact with each other e.g. higher royalties reduce income tax paid and dividends available. This then needs to be modelled over the project lifecycle. The IMF uses its FARI model to estimate Average Effective Tax Rates and project impacts.

A suitable tax structure and a target range of Average Effective Tax Rates result from this analysis. These simulations, and those of other sources, suggest reasonably achievable ranges of discounted Average Effective Tax Rates will be 40–60 percent for mining and 65–85 percent for petroleum. *IMF 2012*

Calculating the **Average Effective Tax Rate for the Phu Bia Mining tax regime** gives a rate of around **45%** depending on price, commodity and profitability assumptions. The GoL's share of revenue from the project varies over the life of the project and is higher in percentage terms during periods of low metals prices.

Division of revenue after tax



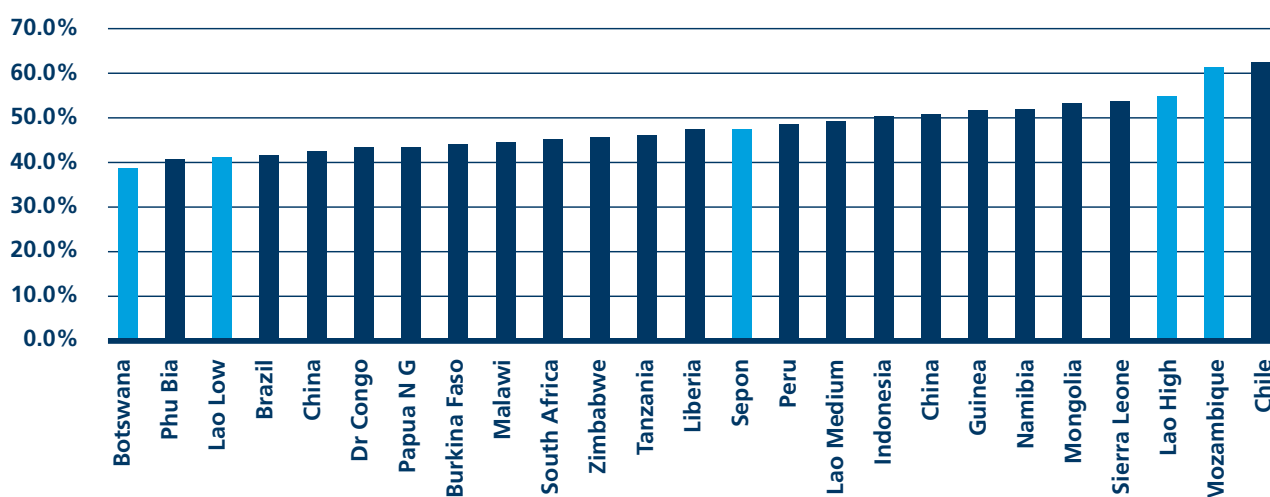
How to decide on a total effective tax rate?

According to Professor Jim Otto, the world's leading authority on mineral taxation, an Effective Tax Rate is calculated by taking the value of all amounts paid to government, and dividing it by the value of profits before taxes are paid. The AETR is simply the average of these rates over the project life.

In 2014, the World Bank modelled Average Effective Tax Rates for Laos, and compared its tax regime to other countries:

Country	Gold Royalty	Copper Royalty	Profit Tax	Dividend Withholding Tax	AETR
Botswana	3	5	25	7.5	45
Lao Low Option	4	4	30	0	43
Sepon-type Option	4.5	4.5	35	0	49
Lao High Option	6	6	35	10	57
Mozambique	5.5	10	32	20	64
Average for 20 mining countries	4.3	3.9	31	11	51

Average Effective Tax Rate Medium Profitability Scenario



The cases that follow were presented in Laos by Adam Smith International as part of the World Bank's Hydropower and Mining Technical Assistance (HMTA) Project.

Case Study: Burkina Faso

This case study represents a comparable situation to Laos, with an average AETR policy setting. This balances the interests of attracting investment and generating revenue from the mining sector to contribute to national development. Like Laos, Burkina Faso is relatively under-explored in terms of its mineral potential.

Royalty rates (net to mine or smelter return):

- 3% to 5% - gold and precious metals (minimum rate is 3%, which increases to 4% for prices between USD 1,000 and USD 1,300 per ounce, and to 5% for prices above USD 1,300 per ounce);
- 4% - base metals and other mineral substances;
- 7% - diamonds and gemstones;
- 8% - uranium

Corporate Income Tax:

- 30% of profit

Carried Interest:

- 10% retained by government

Current proposals for reform:

- 1% of turnover to a local Investment Fund and government to pay 25% of collected royalties to the new fund.

Case Study: New Brunswick, Canada

This case study represents an example of a low tax jurisdiction that wants to attract mining. In Canada, each state is responsible for mining, and therefore state legislation needs to be examined rather than Federal or Central Government policies. New Brunswick is a relatively mature mining jurisdiction which has had lots of mining activity in the past. It needs to encourage companies to invest in order to improve its understanding of the resource base, and to increase the pipeline of new projects. The tax regime includes low royalties, low profit tax and depreciation advantages for exploration costs.

Corporation Income Tax (Net Combined Canada & New Brunswick rate as % of profit): 26%

New Brunswick royalty under Metallic Minerals Tax Act:

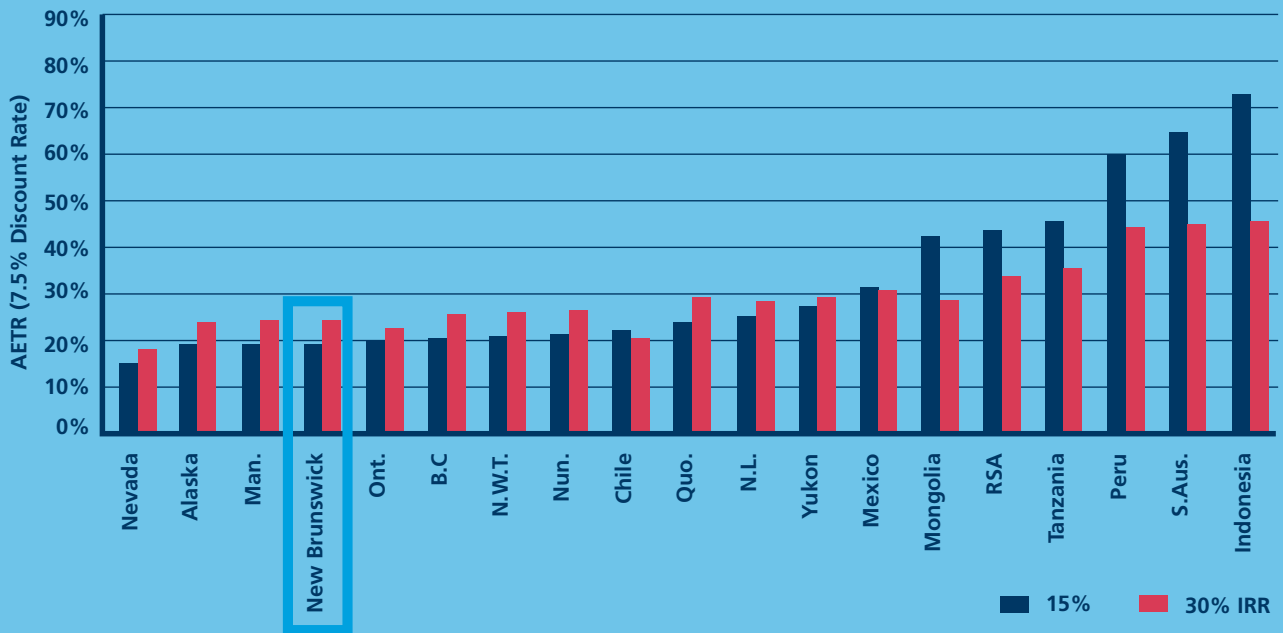
First tier: 2% on net revenue at mine mouth payable by "new mines" after first 2 years of production

Second tier: 16% on net profit after deduction of:

- first tier payments;
- preproduction development expenses;
- mine operating costs;
- 150% of exploration expenses in New Brunswick;
- depreciation of new or expanded mine assets at minimum 5% of undepreciated balance;
- depreciation of processing assets at 33.33%;
- processing allowances of 8% of milling asset cost, 15% of smelting assets and 20% of refining assets to maximum of 65% of net profit;
- a financing allowance of 8% of undepreciated assets in lieu of interest prepaid mine reclamation costs

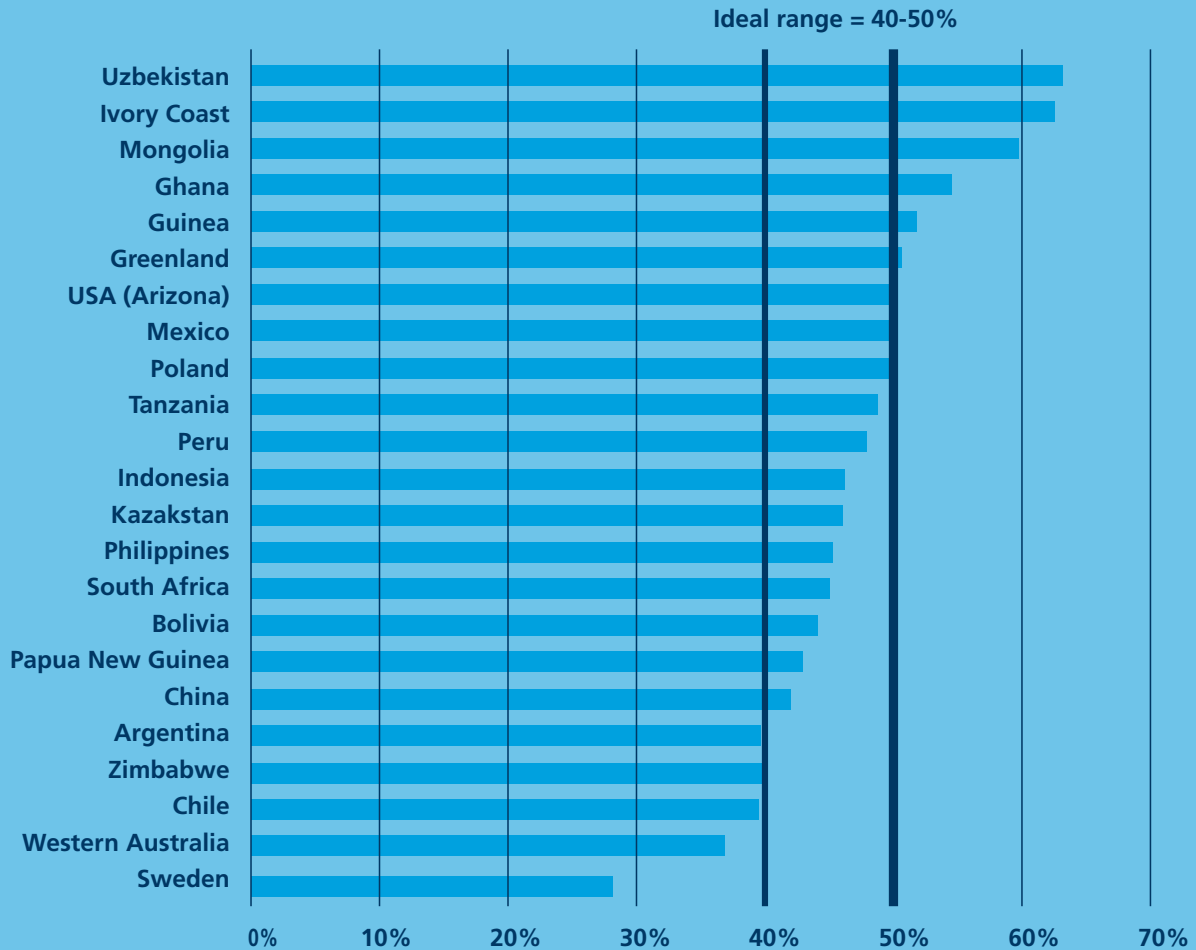
Conclusion – Laos MEPA tax regimes are fair and allow investors an opportunity to generate a return on capital.

Average Effective Tax Rates for Projects With 15% and 30% IRR



Source: Canada Ministry of Natural Resources modelling, 2010-11 <http://www.nrcan.gc.ca/mining-materials/markets/8358>

Ideal range for Effective Tax Rates



How does each revenue stream work?

Royalties: Value based (ad valorem) royalty. In its simplest form, an ad valorem royalty consists of a uniform percentage (the rate) of the value (the base) of the mineral(s) in the products sold by the miner. The value of the resource should be at the point of extraction, but very few sales of crude ore take place, after crushing and screening, at the “mine gate”. The first at-arm’s-length sale is generally in the form of a product to which some value has been added by downstream processing, as for instance with sales of mineral concentrates or refined metals.

In Laos the royalty is calculated on a Net Smelter Returns (NSR) basis or ‘realised value of sales’. This is the value shown on the sales invoice, which often represents the Net Smelter Return (NSR) freight on board (FOB) value. Its advantage is that it is unequivocally defined and leads to simpler audits, lower administrative costs and fewer disputes.

Profit tax: Profit-based tax. A percentage rate is applied to a measure of accounting profit realised by the project. The accounting profit base is computed at the project level and may or may not be consistent with the contribution that the project makes to the consolidated profit of the holding entity on which corporate income tax is levied. An accounting profit based tax has greater economic allocative efficiency, but results in unstable government revenue and high compliance costs for both government and industry.

Salary tax: A sliding scale of tax rates applied to national and expatriate taxation rates. Salary taxes are often withheld by the company.

Other taxes: Indirect taxes such as VAT, fuel, other excise taxes as well as import duties all have a direct impact on raising the cost base.

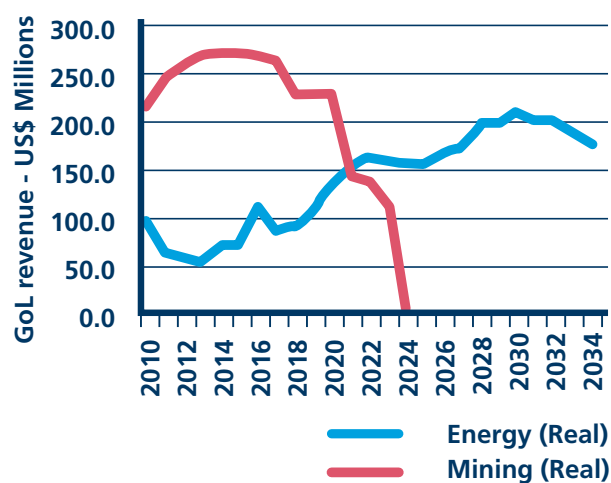
Dividends: In Laos, the government takes a 10% equity in mining cost (at the price of sunk costs) up until the decision point. The company can offer to provide a loan for this amount and to cover any equity calls required during construction.

Other Tax Issues: The Lao Fiscal Cliff of 2017

If Laos chooses a development path without a copper industry – in other words, if the moratorium on new mining concessions continues – this implies significantly reduced growth, government revenue and standards of living for the Lao PDR. The country will reach a major turning point in 2017 (if not earlier due to commodity price changes) when projects discovered by western companies in the early 1990s reach the final phase of their mine lives, and production and profitability decline. New discoveries since 1997 have been limited, and other types of mines will not generate sufficient revenue to replace copper.

A major factor in the severity of these changes is that hydropower revenues (in real terms) will not arrive in time or in sufficient strength to offset a fiscal turning point, or ‘fiscal cliff’.

Lao PDR Fiscal Cliff



As the table shows, this is a moment when revenues from copper mining will rapidly decline. In addition, potash and bauxite are unlikely to deliver revenues sufficient to replace copper’s role in the economy unless structural market or technical changes transform these operations’ project economics. The significant benefits created by Phu Bia Mining’s mines will be multiplied if we have government support to extend mine life or commission new projects.

Other Tax Issues: Local vs national level benefits

In many countries, portions of the royalty payments or additional allocations from profit tax payments are returned to local communities or provincial governments which host mining operations. In Laos,

the payments collected by the central government from mining are redistributed to other areas. The central government receives the bulk of the benefits from the project under these agreements. Phu Bia Mining has argued for a reallocation of these funds to benefit Xaisomboun as the host province for the project and because of the development needs in the area.

Case Study: Local vs National

Phu Bia Mining's Community Development Fund (CDF) programs spend (when some supplementary expenditure is included) around \$500,000 a year. Phu Bia Mining has effective control over this expenditure but has to co-ordinate closely with local government in the choice of investment type.

By contrast, the company paid \$78.9 million in taxes to government in 2013 – it has no control or even influence on how those funds are spent.

Even at a local level the CDF monies are dwarfed by the most important local mining benefit: wages. According to the 2012 household survey, Phu Kham respondents reported that in all they received 22.8 billion kip (or \$2.85 million) in wages from Phu Bia Mining (and its contractors) – of which \$2.36m went to Nam Mo and Nam Gnone alone. In addition, the Ban Houayxai household survey for 2012 reported wages paid by the mine to be in the region of 5.8 billion kip or a little more than \$700,000.

While Phu Bia Mining could influence to a small degree how those funds are spent, that influence is tiny. So, even at a local level, of the \$4m or so the company spends every year on wages and the CDF program, only 12% of that - the company's contribution to the CDF - is significantly under Phu Bia Mining's control.

Source: Professor Richard Jackson



Why doesn't Phu Bia Mining invest in a smelter and promote downstream manufacturing?

The International Council on Mining and Metals workshop in Laos in 2011 found that...

Governments are increasingly asking mine operators to add value to minerals production by investing in downstream processing. However, the degree of processing chosen by a mine operator is a simple question of economics. Most minerals pass through several stages of processing, with the volume usually decreasing and the price per unit of weight increasing as further value is added to the raw mineral in the process ("beneficiation"). This section outlines the circumstances in which copper smelting is economically feasible and desirable.

- First, the processing may require particular inputs. If these are not available locally and can only be brought to the site at great cost the economic feasibility of smelting is negatively affected.
- Second, many smelting and refining processes need to be carried out on a large scale if they are to be economically viable. Therefore, small- or medium-sized ore deposits often cannot support the establishment of a costly capital-intensive processing unit.
- Third, logistics may argue against processing. Semi-fabricated products of copper, for example, need to be produced relatively close to their markets, since the buyers, who are anxious to keep their inventories low, do not accept long delivery times. A large part of the world's capacity for semi-fabricates of non-ferrous metals has migrated to China and other East Asian countries, as a result of the dramatic increase in demand in this region.

- Finally, market conditions and uneven expansion of capacity at different production stages often mean a large part of the overall profit is made at a particular stage in the supply chain. In the case of copper, as well as other non-ferrous metals, the existence of non-integrated smelters has led to an almost permanent situation of excess smelting and refining capacity globally relative to mining capacity. The reasons for this are mainly historical. Smelters have often been established close to mines but, when the mine closes, the smelter often stays open, managing to survive since the initial investment has been paid off and production costs are relatively low. Many such smelting facilities exist in the Asia Pacific region as a legacy of previous mining activities, and have been turned into custom smelting facilities. Close to half the world's copper output leaves the mine in the form of copper concentrate and is sold to non-integrated smelters. Accordingly, smelters and refineries operate on very small margins.

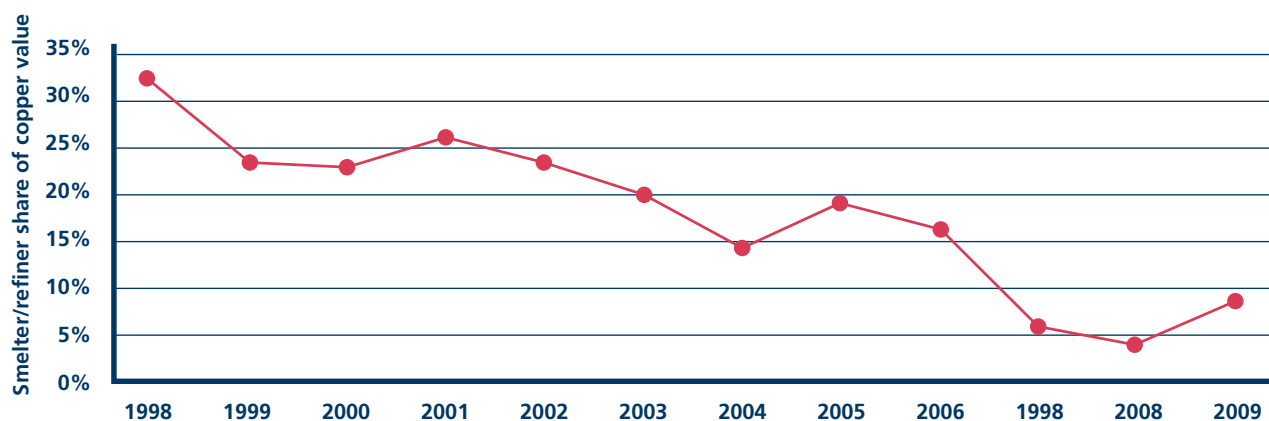
However, in recent years large new smelters have been established in countries such as China where, because of their location in a huge domestic market, they enjoy a competitive advantage. This advantage is often further reinforced by higher import tariffs on unwrought metal (copper cathodes) than on (copper) concentrates and by lower capital costs.

It is estimated that the cost of copper capacity for a Chinese smelter is around US\$2,500/tonne, as compared with a "Western" smelter of US\$6,000/tonne. This means that, for the last two decades, any company opening a new copper mine has usually not chosen to build a smelter unless, for some reason such as transport costs, it would be clearly unprofitable to sell copper concentrates.

In summary, the return on capital is low for most smelters and is expected to remain so. From the point of view of a developmental impact, it must also be emphasized that smelters are extremely capital-intensive operations that generate little employment. In addition, the very large smelters only seen in huge domestic markets such as China bring with them other less desirable impacts on the environment and immediate surroundings.

Particularly in the last decade, smelter/refinery operations have seen their share of the copper value chain significantly eroded. As a proportion of the overall "value added", the proportion going to the operator of a smelter/refinery as compared with a miner has fallen from 32.5% in 1998 to 9% in 2009 (see Figure 1.5). It is precisely because of the substantial smelter capacity increases and resulting lower capacity utilization of smelters that the share of value has fallen so dramatically.

Falling Value of Smelter/Refinery in Copper Value Chain (1998-2009)



Source: CRU Analysis, Copper Concentrates Service.

Note: Smelter/refinery share of copper value based on typical contract treatment charges and refining charges, Pacific Rim basis, plus any applicable price participation. The treatment charges calculation assumes a 30% copper concentrate (29% payable). Smelter/refinery revenue includes average cathode premia, cif Japan.

Overview

Downstream processing of copper concentrate is favoured by proximity to both a port and a large domestic market for the copper cathode produced. A smelter constructed in the current economic environment needs to have a capacity of at least 200 ktpa to be viable, and would therefore require at least thirteen more Phu Kham sized deposits to be developed before proceeding. The technological and environmental risks associated with such an investment decision are significant. The Government of Laos and Phu Bia Mining would gain higher returns if the investment required to support a smelter was directed towards developing additional mines to produce copper concentrate.

More detail is available in the sections below.

Mineral Exploration and Production Agreement (MEPA)

The MEPA contains a requirement for Phu Bia Mining to undertake a feasibility study into the construction of a copper smelter once concentrate production exceeds 660 ktpa.

"[Phu Bia Mining] will work towards and assist the Government in achieving the policy of the establishment of downstream metals processing facilities in The Lao PDR in relation to smelting, refining and/or metals manufacturing and fabricating if according to recognised economic, technical and scientific standards the Minerals to be mined by [Phu Bia Mining] are of sufficient tonnages and are Minerals amenable to smelting, refining or metal manufacturing and provided it is economically and practically feasible to do so."

Phu Bia Mining's Phu Kham orebody is large (200Mt) and low grade (0.5% Cu). The ore mineralogy is dominated by primary copper minerals (chalcopyrite and bornite), so a pyrometallurgical (smelting) processing route is favoured for the production of copper cathode.

In comparison, the Sepon orebody is small (20Mt) and high grade (5% Cu). The ore mineralogy is dominated by secondary (chalcocite) and oxide (malachite) copper

minerals, so a hydrometallurgical processing route is used for the production of copper cathode at Sepon.

There is comparatively little further value added by converting copper concentrate into copper cathode. Concentrate is already a highly value-added product, as substantial expertise across a multiple of disciplines is required to produce it. Capital and operating costs are also substantial, and there is significant risk associated with discovery and investment.

Operation	Feed grade	Production grade	Upgrading	Value captured
Phu Kham	0.5%	25%	x50	>90%
Sepon	5%	99%	x20	100%
Smelter/refiner	25%	99%	x4	<10%

To be economically viable in the marketplace today, a new smelter would need to have the capacity to produce around 200 ktpa of copper cathode. Based on current grades at Phu Kham, this would require the processing of 600 Mt of ore per year – three times current annual production. To feed such a smelter over its entire operating life, the mining operation would need to produce a total of 40 Mt of concentrate, instead of the 2.88 Mt it will actually produce.

In other words, a new smelter would require at least 13 more Phu Kham-sized orebodies to be viable. Phu Kham cost about \$250 million to develop, so to develop a further 13 orebodies would require an investment of a further \$3 to \$6 billion.

Such a smelter could only be constructed if a number of assumptions turned out to be true - that there are 13 more Phu Kham sized ore bodies, that they are discovered, and that each new project can be regulated in such a way to only come into production when the smelter required more ore. (This last point is highly unlikely, as deferring production to suit a smelter would affect employment, revenue and taxes.)

The total funding requirement for a copper smelter equates to \$5,000/t of annual copper cathode production; the cost of the concentrator at Phu Kham equates to less than \$3,000/t.



The investment of \$250 million in Phu Kham enables us to upgrade the ore 50 times – taking it from 0.5% copper to 25% copper. However, to upgrade the product a further four times (from 25% copper to 100% copper) would require investing a further \$1billion in a smelter.

Investment Analysis of a Copper Smelter in Laos

At average prices, a 200 ktpa smelter/refinery is able to earn the equivalent of about 40 cents per pound of copper in concentrate. However, reagent and transport costs would make a smelter uneconomic unless acid prices and smelting terms were highly favourable.

	Annual revenue/costs (US millions)
Revenue	40
Direct operating costs	-18
Cathode transport	-5
Acid transport	-31
Waste disposal	-3
Total	-17

A smelter in Laos would require the development of 13 Phu Kham-sized deposits

Production of Sulphuric Acid as a byproduct of smelting

A 200 ktpa smelter treating Phu Kham concentrate would generate up to one million tonnes of sulphuric acid per annum. The only significant market for sulphuric acid in Laos is the Sepon mine, which consumes about 50 ktpa. Therefore, over 900,000 tonnes per year of sulphuric acid would need to be transported to a port and shipped to customers overseas. This quantity would generate safety concerns amongst communities along the transport route.

Smelter capacity

New smelters are being built primarily to service the growing domestic demand of China and typically are located adjacent to regions of high consumption. Increasing smelter capacity has comfortably kept pace with increasing mine output. This increased competition

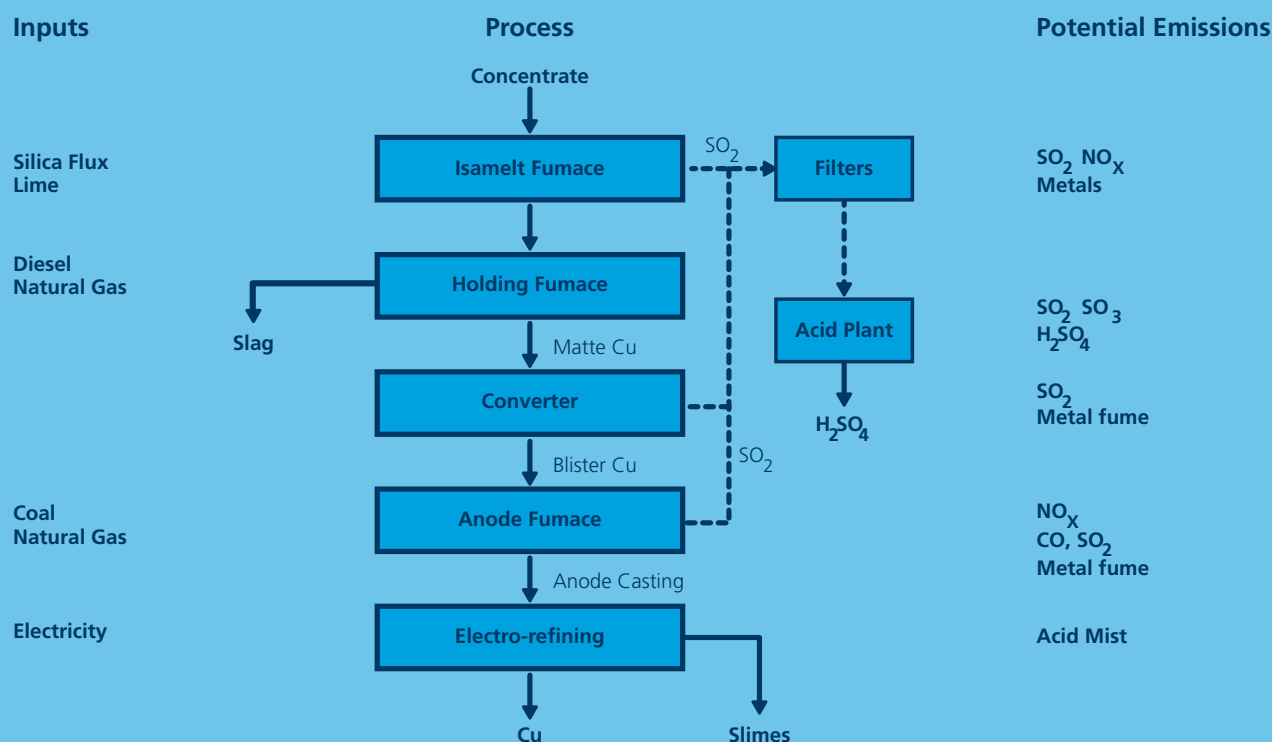
for concentrate has resulted in smelter revenues being reduced, while the revenue of concentrate sellers has correspondingly increased. For the foreseeable future, most industry analysts agree that smelter capacity will exceed the supply of mine concentrate.

Domestic demand and transport costs

Without a substantial domestic market for the cathode produced by a smelter, transport costs would substantially erode profitability. Sepon currently sells less than 5% of its production domestically and exports the remainder. The cost of transporting copper cathode to reach export markets is likely to be about \$100 per tonne (to truck the cathode to a port), plus the shipping. It would be economically sound to ensure that all currently available copper cathode produced domestically (i.e. Sepon cathode) was consumed locally before producing more.

Environmental considerations

During the smelting process, the harmful components that were previously safely locked up in the concentrate may be released.



Technical considerations

The construction and operation of a large smelter carries considerable technical risk. Smelters are restricted to a narrow range of feed grades. Deviations from the preferred range typically result in sub-economic production. The technical complexity of a smelter would require a much greater proportion of expatriates in the workforce. However, the overall workforce is relatively smaller - the number of employees per tonne of copper produced will be a lot less compared to a mine and concentrator operation. In addition, Phu Bia Mining has no expertise or previous experience in smelting operations.

Financial considerations (for government)

A smelter generates a much smaller incremental return for government. A smelter would not pay any additional royalties on its production of copper cathode since these are already paid at the mine gate.

A smelter is highly unlikely to make substantial profits and therefore the taxation revenue will be modest if there is any at all. New smelters in China and other countries usually attract investment concessions and subsidies, and similar or greater subsidies would be required in Laos to keep the smelter operating.

Energy needs

Smelters require a lot of energy. Currently, energy supply in Laos is insufficient to meet the year-round needs of existing mining operations, so there would not be enough energy available to meet the needs of a smelter. Smelters cannot reduce power without damaging the plant, and blackouts would therefore need to become more common in cities in Laos.

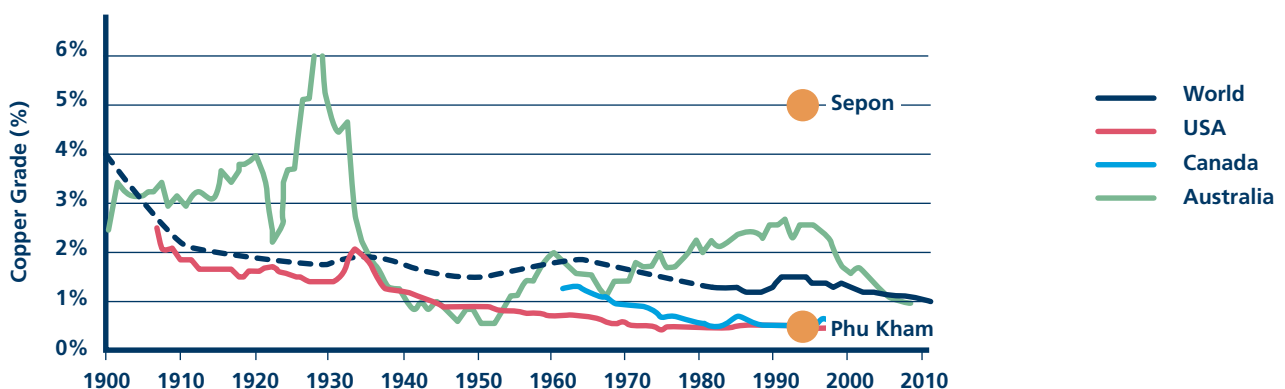
Why does Phu Bia Mining produce less revenue for the Government of Laos than MMG LXML Sepon?

Phu Bia Mining's Phu Kham operation and MMG's Sepon mine produce similar amounts of copper – but the revenue produced by the two mines cannot be directly compared, as the two mines are very different. Sepon and Phu Kham are at different ends of the copper grade spectrum.

Sepon is a spectacularly high grade small scale deposit, whereas Phu Kham is a low grade, bulk tonnes mining operation. The grade of any individual mine simply depends on what has been discovered – it cannot be improved by harder work or better operation.

Ore grades mined have declined over time

Copper ore grade for World and selected countries: 1900-2008



As a consequence of the lower grade of ore at Phu Kham, Phu Bia Mining has to work 5-10 times harder than MMG LXML Sepon to produce a similar amount of copper. This results in Phu Bia Mining's costs being approximately 85-90% higher than LXML's:

Comparison Area	Phu Bia Mining	MMG LXML Sepon	Difference
Ore grade (average)	0.5%	5%	1000%
Material mined	50mt+	16mt	313%
Ore processed	19.5mt	1.8mt	1000%
Trucked product	360,000t	85,000t	424%
Distance to market	2500kms	750kms	330%

Another reason that revenue produced by the two mines should not be compared is that MMG LXML Sepon reached peak production during periods of high prices for gold and copper. In comparison, production at Phu Kham commenced in the middle of the Global Financial Crisis (GFC), and gold production at Ban Houayxai commenced only a short time before prices, fell, as the graph below illustrates.

Global prices in relation to production at Sepon and Phu Bia





What are the impacts of mining on the environment?

Phu Bia Mining acknowledges that mining operations often entail a mix of positive and negative impacts. The key to an acceptable mining development is well-defined and achievable positive benefits and rigorous application of adequate management measures. Phu Bia Mining maintains an Operational Environmental and Social Management Plan (OP-ESMMP) for each site which aims to ensure that impact on the environment is minimised, and that measures to prevent environmental impact are understood and implemented.

Direct impacts on the environment occur primarily due to production activities, especially the open pit and waste handling, the process plant, the Tailings Storage Facility and access roads.

Land

Disturbed land broadly falls into three categories:

Permanently disturbed land: land for which it is not feasible to re-establish both the landform and land use that existed before the Operations were developed.

Changed land: land on which land use different to the original can be established.

Temporarily disturbed land: land for which the original land usage can be re-established.

Change in land use is one of the main areas of impact from operations. However, compared to agriculture or hydropower, mining uses very little land. The total land disturbed at Phu Kham, Ban Houayxai and by exploration activities is only around 1360 hectares.



Water

While Phu Bia Mining's water use is significant, the vast majority is recycled. Approximately 96 per cent of the water used at the Phu Kham Operation is recycled. Water recycling is limited at the Ban Houayxai Operation due to geographical constraints. None of the water abstracted from local rivers or streams compromises usage by other users or general base flow in the watercourses concerned.

At both operations, there are no discharges from the open pit, ROM pad, crusher or processing plants, which all direct run-off water to the Tailings Storage Facilities. The only permitted discharges are from the TSF impoundments (and from the Heap Leach Gold polishing pond at Phu Kham). Discharges are subject to intensive monitoring, which ensure that the discharges maintain acceptable quality. Downstream monitoring demonstrates that the discharges have no impact on

water quality and aquatic life. The Government of Laos and Phu Bia Mining monitor water quality, and samples are tested in independent laboratories.

Sediment

Suspended sediment will be generated as a result of exposed land surfaces and the substantial amount of material that is excavated and moved each day, combined with high monsoonal rainfall in the area, particularly during the wet season. Sediment management and mitigation measures (in the form of sediment traps) reduce erosion and sediment transport from the site, although earthworks in a tropical and mountainous environment will inevitably result in some erosion.

The program for managing Acid Rock Drainage risks at both operations is highly developed

Acid Rock Drainage (ARD)

PBM has adopted 'best practise' systems for preventing and controlling ARD, in order to avoid the water pollution that can occur when rocks are exposed long-term to the air and generate acid. Regular reviews of ARD management at Phu Kham and Ban Houayxai by independent consultants have confirmed that the program for managing ARD risks at both operations is highly developed and the systems adopted for the prevention and control of ARD are consistent with methods described in the Global Acid Rock Drainage Guide. Acid drainage and the consequent mobilisation of metals is one of the most significant environmental issues associated with metalliferous mines. Where sulphidic materials are exposed to oxidising conditions, which can occur during mining or other disturbances, the sulphide can react with oxygen and water can transport the reaction products (acid, metals and sulphate) into surface waters and groundwater.

Extensive ARD testwork shows that much of the ore, tailings and waste rock at Phu Kham has strong acid generation potential. Based on Column Leach testwork, any ARD emerging from primary or transition waste can be expected to contain elevated concentrations of Fe, Mn, Cu and Zn, depending on the nature of the mineralisation.

In order to permit production without significant damage to the receiving environment from acid and Metalliferous drainage, the entire operation at Phu Kham has been designed around the central philosophy of controlling Acid Rock Drainage. Key features of the site wide design are: All drainage from the open pit, ROM pad, crusher and processing plant reports to the TSF. All waste rock with elevated acid generation potential is deposited in the Red Waste Stockpile within the catchment of the TSF. It is progressively compacted through heavy traffic and rollers and is submerged by the rising TSF waters,

thereby minimising oxidation of sulphide minerals. Tailings are deposited sub-aqueously, i.e. under water in the TSF impoundment, thereby preventing exposure to atmospheric oxygen. The tailings stream from the processing plant is dosed with lime to maintain high alkalinity in the TSF impoundment, which in turn precipitates metals from solution from the TSF water. The remaining clear supernatant water in the TSF is low in metals concentration and is then discharged to the Nam Mo River receiving environment. Rigorous monitoring of water quality in the TSF and open pit takes place on a daily basis.

Dust

The primary impacts on air quality are the generation of dust from mining and ore processing operations during the dry season, including the pit, haulroads and stockpiles. Particulate matter has the capacity to affect human health (for example in the form of increased acute respiratory infections) and can cause nuisance effects.

Dispersion of mineralised dust can also have a delayed impact on the surrounding land and water resources, as metal minerals in deposited dust can be oxidised and mobilised by later rainfall. In particular, 'first flush' events at the start of the rainy season represent a risk of pollution.

At Phu Kham, dust management measures are employed during dry conditions, including: Watering of roads and working areas by dedicated water trucks; Compaction of red waste stockpile upper surface to prevent wind scouring; Sprays at ore transfer points such as the crusher, coarse ore stockpile and reclaim points; Regular monitoring of air quality (both airborne and fall-out dust) in Ban Nam Gnone and Ban Nam Mo and water truck usage in response as required; Dust monitoring in villages along the primary road access route to Phu Kham, with water trucks deployed on that route.

Noise

Elevated noise levels in excess of background conditions can disturb the local community and reduce quality of life. Noise levels are highest for those communities closest to regular noises sources such as the mining operations and haulage activities along the primary road access route to Phu Kham.

However, monitoring during the original ESIA for the Phu Kham project indicated that the existing night time LAeq (1 hour) noise levels in the Project area frequently exceed the Lao PDR and IFC ambient LAeq, 1 hour guideline for night time noise (45 dB(A)), which will minimise the impact of noise introduced by the Phu Kham activities.

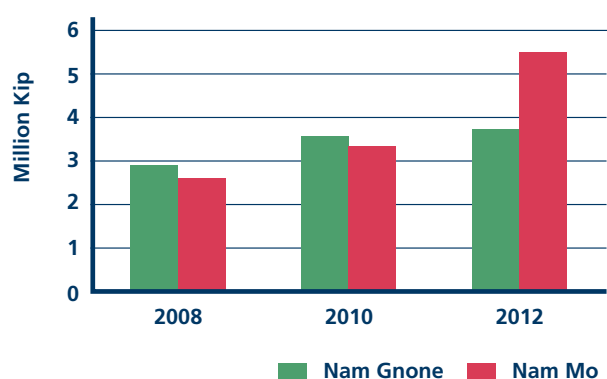
Regular monitoring in the villages, particularly Ban Nam Gnone and Ban Nam Mo, indicates that currently the LA90 (1 hour) value is usually below the Lao PDR and IFC ambient guideline value, and does not materially exceed the background noise level. On this basis, the equivalent continuous noise level experienced by these communities is acceptable.

What are the impacts of mining on communities?

Social impacts associated with the company's Operations have been both positive and negative, but with a strong positive impact overall. For example, income per capita (from employment with Phu Bia Mining) in Nam Gnone and Nam Mo (the two villages closest to Phu Kham) has increased more than sevenfold since operations began until 2012, and increased particularly strongly between 2008 and 2012. More than 300 local villagers are employed by Phu Bia Mining at Phu Kham and many more work for local contractors. Local employees are also prioritised through the company's 'true local' system.

The company has contributed to the development of social infrastructure, including 13 schools¹, community centres and roads. Phu Bia Mining is active in

Income per capita from mine wages



agricultural training, maternal and child health and the provision of community awareness activities on topics such as road safety, health and hygiene.

1. Construction of new schools (or parts thereof) of 13 new schools providing access to improved education facilities for approx. 1,700 children

Phu Bia Mining maintains a Community Development Fund that has invested over \$3.3m in development activities across all sectors, contributing significantly to progress towards the attainment of the Millennium Development Goals (MDGs) in the local area.

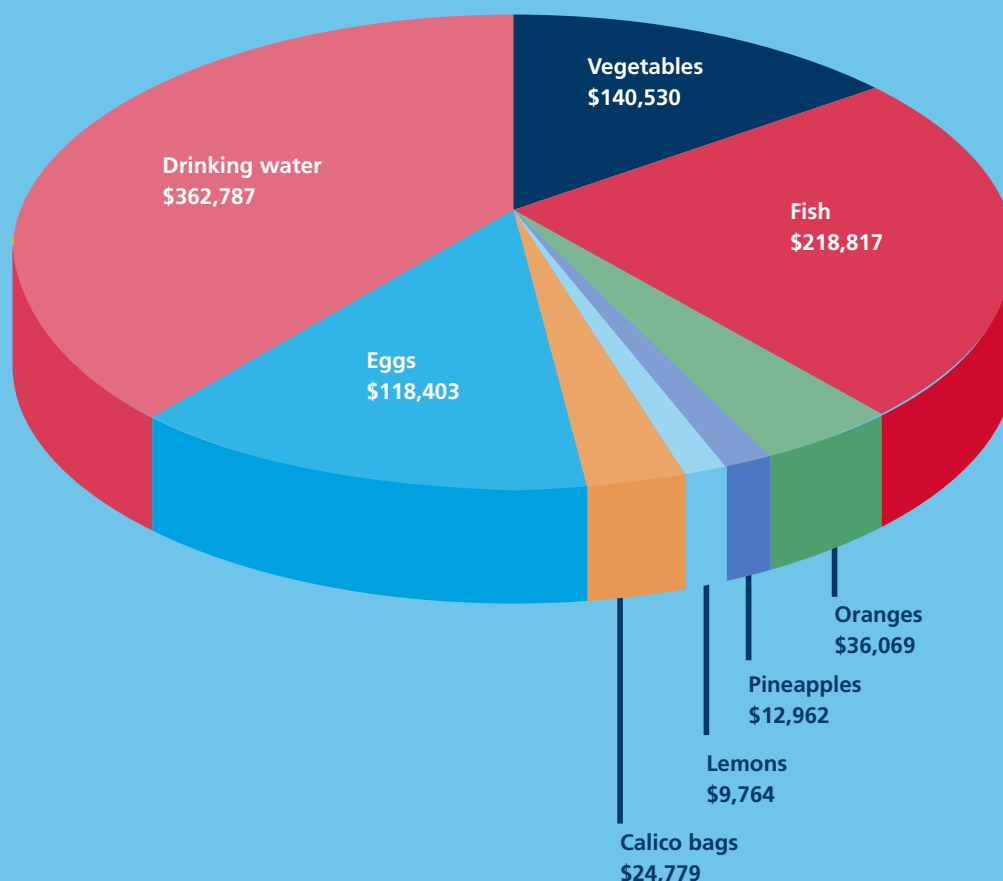
Phu Bia Mining purchases around \$1m of goods annually from villages near to its operations. The company's policy is to procure locally where possible, and supports local businesses with a microfinance program which encourages investment back into productive assets.

Phu Bia Mining has contributed \$2m to the ADB's urban water and sanitation program that will provide clean water to more than 11,000 people and is the first partnership of its kind that the ADB has entered. A separate sponsorship with Australian NGO Interplast has provided life changing surgery for 211 UXO and burns victims since 2012. Phu Bia Mining

has contributed close to \$54m in road upgrades and makes local community donations worth \$150,000 per annum.

Negative impacts to date have included loss of agricultural land, rapid social change, limited in-migration, increased traffic, new community health and safety hazards and pressure on local governance capacity. Key social impacts were identified through the Environmental and Social Impact Assessment (ESIA) process and these aspects have been monitored in the years since approval of the project, to identify whether predicted impacts have in fact materialised. Mitigation plans and strategies have been developed as required.

Goods purchased from local communities, 2014





Land and In-migration

In the case of the Phu Kham, development of the Operation resulted in the loss to local communities of areas of land that were formerly used for agriculture, grazing of livestock, hunting and collection of timber and non-timber forest products. These impacts are less applicable at the Ban Houayxai Operation as the closest communities are some distance from the site.

Social Change

Widespread changes in the social structure of local communities have occurred as a result of the company's Operations. Employment has brought a rapid transition from a semi-subsistence economy to a cash economy with changes in distribution of wealth, consumption patterns and traditional power relationships.

These changes may be positive (e.g. empowering previously poorer sections of the community), but have also put stress on community cohesion, prices and resources. For example, the combined population of Ban Nam Mo and Ban Nam Gnone villages has grown from 1,240 in 2003 to an estimated 4,000 at the end of 2012. This population growth is principally due to economically-motivated in-migration by people not native to the locality.

Traffic

Road traffic intensity has increased in several villages through ongoing development but also due to vehicles servicing both the Phu Kham and Ban Houayxai Operations (both Phu Bia Mining and contractor traffic).

Local Governance

Increased population and changing social norms has placed increased demands on local authorities and institutions with limited capacity to anticipate, adapt to and deal with large-scale changes in the region,

including increased demand for delivery of social services and infrastructure for health, education, water supply, electricity, law enforcement, etc.

Case Study: Community Development Fund

The focus of Phu Bia Mining's Community Development Management Plan is on communities directly and indirectly affected by the company's operations, including those along the primary road access route.

Community Development objectives include:

- Implementing sustainable socio-economic measures and livelihood activities that improve the standard of living of local communities;
- Establishing methodologies that foster a sense of ownership and fiscal responsibility by local communities regarding development issues;
- Addressing obstacles, both social and physical, to socio-economic development in local communities;
- Ensuring that all households benefit from community development activities - especially the poorest households;
- Ensuring active community participation in prioritising, planning, implementing and monitoring development projects;
- Ensuring alignment with Lao PDR national policies, strategies and plans for poverty reduction.

Priorities and plans are determined with participation of Project Affected Persons, and in consultation with relevant local government authorities. Community development priorities include health, agriculture, education and training, infrastructure development and institutional capacity building.





Does Phu Bia Mining do enough to promote Lao human resource development?

Workforce

Phu Bia Mining recognises the value of attracting, developing and retaining employees given that they make the most significant contribution to the Company's success. The Company's code of conduct, The PanAust Way aligns employees' actions with PanAust's Values and behavioural expectations.

Employees	2012	2013	2014
Lao Nationals	3,239	3,533	3,623

During 2014, Phu Bia Mining's workforce in Laos increased primarily as a result of finalising insourcing of concentrate haulage activities (previously provided by third-party contractors), and increased roles for activities relating to site security. In addition, the company created 37 new entry-level mining and drill trainee roles to ensure a pool of trained replacements are immediately available for operator positions.

Health

Systems supporting the health and wellbeing of employees operate throughout the Company in both a global and country-specific capacity. In-house medical and recreational facilities are available to employees at the company's mining operations and a comprehensive range of insurance plans ensures protection for unexpected events. An Employee Assistance Program (EAP) provides a confidential counselling service for all employees.



Diversity

Phu Bia Mining continued to underpin diversity in Laos with the Mentoring Program. Under the program, senior PanAust managers and executives mentor high-potential employees including Lao-national ethnic minority and female employees. A pilot program launched in 2012 was successfully concluded in 2014, with fifteen Lao-national employees, including three senior Lao female employees, completing the program as mentees. This program will now be extended for another cycle, and will continue to provide an avenue for valuable professional experience to be transferred between employees and support the development of effective management skills and Phu Bia Mining's succession planning processes.

A recent focus has been on encouraging females who are in roles with leadership potential (supervisors-in-training) to participate in the Company's in-house Leadership Development Program.

As at 31 December 2014, 17 per cent of the workforce were female, giving a total of 614 female employees. Of these, 21 were in management roles, 75 in supervisory/professional roles, and 89 in operator-type roles typically filled by males. PanAust's Lao workforce reflects the ethnic diversity of communities in Laos including from Lao Loum, Hmong, and Khmu backgrounds.

Phu Bia Mining remains focused on the localisation of its workforce

Training and Development

Phu Bia Mining is determined to leave a long-lasting legacy in Laos including a skilled workforce that can participate in and help grow the Lao economy through professional services, mining and other heavy industry. In the shorter term, Phu Bia Mining remains focused on the localisation of its workforce to enable Lao nationals to increasingly operate, maintain and manage the Company's operations in Laos.

	2012	2013	2014
Full-time employees (permanent and fixed-term)	3,239	3,533	3,623
% of Lao employees	87	88	88

Company training is provided internally and in conjunction with a wide range of partners. Paramount to the annual training plan is compliance and competency training which is undertaken by employees in relevant roles to ensure each is skilled to safely and competently perform their role. This training also ensures employees are aware of their personal and Company obligations in relation to appropriate workplace, safety and environment standards, as well as industry and international standards. In addition to compliance and competency training, technical enhancement training is also available for employees to explore contemporary technical ideas and concepts to build upon their existing technical knowledge. PanAust training is delivered via face-to-face learning and/or through online e-learning tools.

Development programs at PanAust ensure employees have the required capability to enable business performance and growth. These programs include the graduate development program, leadership development program and internships. Development programs target particular sectors of PanAust's workforce for tailored learning.

In Laos, training delivered by Phu Bia Mining's in-house specialists and training partners totalled 325,110 hours in 2014 (an average of 95 hours of training per employee).

Training subject/focus area	Total hours	% of all training provided
Mine operations	103,182	32
Apprenticeship Program	100,564	31
Safety and induction	36,775	11
Professional and leadership development	36,739	11
Clerical, education and awareness programs	30,225	9
Trades and engineering	17,625	6

Mentoring Program

As noted above, the Company's in-house Mentoring Program provides employees (mentees) with access to experienced and knowledgeable senior employees (mentors) who can help them achieve individual and business-focused development outcomes. Of the 15 mentees who participated in the pilot, nine have been promoted, two have had their roles broadened to include more responsibility, and one is now in an acting manager capacity.

Leadership Development Program

The Company's leadership programs build the capability of existing and potential leaders, equipping each employee with the professional and interpersonal skills they need to lead Company strategy and drive improved performance. Leadership Development Programs are attended by supervisors and high-

potential employees. Superintendents and managers attend externally facilitated workshops (via an Australian-based training provider). Course content targets professional development of communication and negotiation skills, planning and strategy, managing performance and problem-solving techniques. In 2014, a group of 63 Lao employees completed the Leadership Development Program designed for front line supervisors, building on the 40 graduates from 2013 and 20 from 2012.

Graduate Program

Phu Bia Mining's Graduate Program is targeted at Lao national graduates across a range of disciplines including mining engineering, environment, sustainability and technical services. The program accepts graduates from Lao-based institutions, providing a two-year in-house technical and professional development pathway. In 2014, a group of 17 graduates completed the program (this follows 2012's 16 graduates and 2013's 14 graduates). All 17 were offered permanent roles within the Company. Nine graduates, including one female, commenced the program in 2014 and are scheduled to complete it in 2016.

Trades Training Program

The Phu Bia Mining Trades Training Program in Laos offers five-year apprenticeships in technical trades conducted in partnership with the Lao-German Technical College in Vientiane, Laos. This program has been run by the Company since 2013 and was established in response to a review of trades training which concluded that a more comprehensive and targeted program was required to address a general shortage of qualified tradespeople within Laos and to generate a pool of appropriately qualified candidates for the Company.

In 2014, a total of 69 existing apprentices (including 12 females) were in the first or second year of their training.

Are mines unsafe?

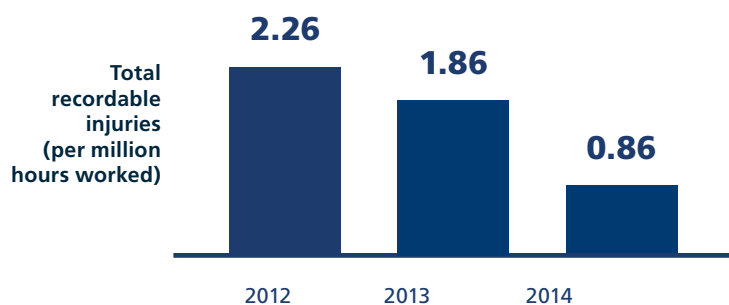
Phu Bia Mining's commitment to health and safety is built on the Zero Harm philosophy whereby all workplace incidents and injuries are considered preventable. The Company's Vision and Values outline our commitment to health and safety. Through visible leadership – including their words and actions – company leaders are required to promote a culture of Zero Harm.

Phu Bia Mining's Total Recordable Injury Frequency Rate (TRIFR) of 0.86 for 2014 is a 54 per cent year-on-year improvement from 2013's result of 1.86. The Company's Lost Time Injury Frequency Rate (LTIFR) was 0.17 which was also an improvement on 2013's 0.34. PanAust's TRIFR and LTIFR continue to be significantly better than industry averages.

54%

Improvement in TRIFR compared to 2014

2012-2014 PBM Total Reportable Injury Frequency rate (Controlled work sites)





Phu Bia Mining is in the process of updating its 17 Health and Safety standards. This review is expected to be completed and implemented in 2015. Supporting these standards are the eight Cardinal Rules which are a clear and simple set of safety instructions with which the entire workforce is required to comply at all times. The Cardinal Rules focus on activities within the mining industry that have historically caused harm to people.

The company requires employees, contractors and visitors to be inducted prior to entering any controlled work sites. Standardised general safety and workplace-specific inductions form part of the induction programs. In addition to inductions, the Phu Bia Mining runs a number of mandatory core safety training programs as well as specialist training for high-risk activities.

Approximately 38,000 hours of induction and health, safety and environment training was completed at Phu Bia Mining's operations during 2014. The company conducts regular benchmarking activities to help shape the development of safety programs across the organisation.

Since 2009, Phu Bia Mining's parent company PanAust has held annual Risk and Sustainability Workshops with senior managers from both the corporate and operational areas to progress safety leadership programs and to develop a Group action plan for the coming year in the areas of risk (including safety) and sustainability. The workshops provide an opportunity to discuss and address common issues or challenges.



Statistically, PBM's mines are some of the safest in the world

Each site has also identified specific visible leadership initiatives in order to focus on meaningful safety improvements. Throughout 2014 a number of initiatives were implemented including:

- regular leadership walk-throughs
- improvements in the quality of job safety observations (JSOs) undertaken at operating sites
- improvements in housekeeping standards across each site, including segregation of people and equipment, and improved traffic management
- improvements in the quality of JSO's undertaken at operating sites
- implementation of General-Manager led safety and employee engagement activities
- a 'one hazard per person per day' program in the Project Implementation workgroup
- development of procedures and templates to support JSOs, planned task observations and deep dive reviews.

Case Study: Vehicle Safety: Haulage and Logistics

GPS tracking and monitoring was expanded to personnel transport vehicles in 2014 with the system now operating across all concentrate logistics and personnel transport routes used by Phu Bia Mining. The GPS tracking assesses how well a driver is controlling a vehicle by monitoring outputs like speed, harsh breaking, accelerating and cornering. The system generates driver behaviour scorecards which are used for on-going training and, where required, counselling of drivers.

In 2014, a dedicated driver trainer was responsible for developing and implementing a light vehicle defensive driver training package across Phu Bia Mining's operations. The training is a two-week course that focuses on driver performance and behaviour, and is supported by on-going in-vehicle assessments and coaching.

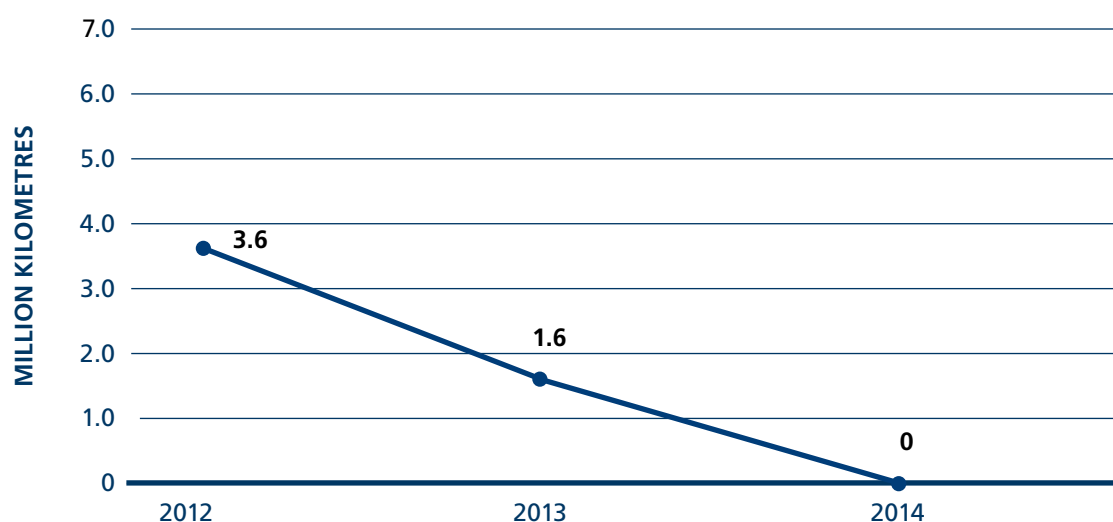
Other initiatives for personnel transport include escorted convoys, the development of a driver values system, formal driver safety alerts and the development of a driver manual. Within the Logistics Department, two driver reviver stations have also been set up along the logistics corridor from Phu Kham to Vientiane, in addition to those previously implemented. Along the 840-hundred kilometre logistics corridor in Laos, 10 reviver stations are in place. The reviver stations are compulsory stops (with four located on high-fatigue sections) and are staffed by a driver reviver officer who is trained to assess driver fatigue.

Vehicle safety along transport and haulage routes in Laos has improved after the implementation of a number of safety initiatives and additional controls.

100%

Reduction in Concentrate Haulage Safety Incidents over two years

Controlled significant incidents per million kilometres



10

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