Evaluating the Attractiveness of Fiscal Regimes for New Gold Developments: African and South American Peer Country Comparisons

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This research analysed the fiscal regimes that apply to gold mining in contrasting jurisdictions across ten African and South American countries to determine relative attractiveness for development.

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Summary of Action Research Activity

Evaluating the attractiveness of fiscal regimes for new gold developments:
African and South American peer country comparisons

The outlook for gold mining investment and the rate of development of the gold industry across selected economies in both Africa and South America is dependent, amongst other factors, upon the present and future gold production and government share of the gold mining revenues in these regions. Minerals policy therefore needs to be both competitive, to help grow the sector, and equitable, to ensure the government and people also benefit from the sector’s growth. However, each jurisdiction operates under a different mineral policy and often stakeholders, including both the government officials themselves and the gold mining companies, are unclear as to the relative degree of global competitiveness of the mineral policy regime in each country. That is, whilst the specific constituent parameters within the respective minerals policies are made clear, such as level of royalty payable, corporation tax rates and mandatory government ownership stakes, the holistic split of economic rents between the private and public sectors under the mineral policy is far from clear.

In this report, the perceived and actual impact of government mineral policy upon the government share from gold mining revenues is assessed for ten key countries in which the gold sector is of relevance in advancing economic growth. Five South American and five African jurisdictions are considered; Burkina Faso, Ghana, Mali, South Africa and Tanzania from Africa, and Brazil, Chile, Colombia, Guyana and Peru in South America.

The perceived impact is determined from the well-established Fraser Institute survey, published each year, and which most recently compared 122 minerals jurisdictions globally. The actual impact is determined from quantitative modelling of the financial performance of a hypothetical gold mining development in each country. The technical parameters of the project are held constant; instead the differing mineral policies in each jurisdiction are applied to determine the resultant impact upon the relative share of the economic rents delivered to both private and public sectors.

It is clear from the authors’ experiences, that representatives of government and other stakeholders in developing countries tend to focus not on the overall government share of likely future margins from gold mining (a top-down perspective), but rather on the details of royalty and taxation structure (a bottom-up perspective). The overall competitiveness and risk/return split between the mining company (as investor) and the state (as co-investor) are surprisingly secondary and largely unknown factors.

The preliminary results of this research have already been communicated via the IM4DC Mineral Policy and Economics course held in Perth in April-May 2015. This overview report is supported by ten separate detailed individual country reports that describe the gold industry and provide details of the specific mineral policy for each country. Summaries for each are incorporated into the overview as Appendices.

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Executive Summary

The perceived and actual impact of government mineral policy upon the government share from gold mining revenues is assessed for ten key countries in which the gold sector is of relevance in advancing economic growth. Five South American and five African jurisdictions are considered here, namely Burkina Faso, Ghana, Mali, South Africa and Tanzania from Africa and Brazil, Chile, Colombia, Guyana and Peru in South America.

The perceived impact is determined from the well-established Fraser Institute survey (Green and Jackson, 2015), published each year, and which most recently compared 122 minerals jurisdictions globally. The actual impact is determined from quantitative modelling of the financial performance of a hypothetical gold mining development in each country. The technical parameters of the project are held constant; instead the differing mineral policies in each jurisdiction are applied to determine the resultant impact upon the relative share of the economic rents delivered to both private and public sectors.

In the quantitative analysis, the total government share varies from 36.3% in South Africa to 66.5% in Ghana, using the modelled parameters and gold price and cost assumptions. The ranked list of countries by government share is as follows, ordered from high to low: Ghana (66.5%), Guyana (63.9%), Mali (60.4%), Tanzania (58.8%), Peru (58.5%), Colombia (55.0%), Burkina Faso (52.2%), Brazil (44.8%), Chile (44.3%) and South Africa (36.3%).

Both the headline corporate income tax rate and royalty level are identified as poor indicators for the total government share. The quantitative financial analysis at project level shows that there is no clear relationship individual taxation rates, taken in isolation, and the overall Average Effective Tax Rate (AETR) paid by the project over its life. This project concludes that Average Effective Tax Rate (AETR) should be more frequently modelled and publicised as a measure of government share and therefore the investment attractiveness of these countries for gold mining developments. Neither companies nor governments should use individual taxation rates to assess the overall competitiveness or equity of a country’s minerals taxation regime – such analysis can be very misleading.
Significant differences between industry perception and actual government tax levels are identified by this study.

Perhaps unsurprisingly the overall Average Effective Tax Rate (AETR) does not correlate with the country rankings of overall Investment Attractiveness as compiled by the Fraser Institute (Green and Jackson, 2015). Such comparisons underline the importance of minerals potential as a component of overall investment attractiveness, with governments therefore possessing two broad levers to encourage foreign investment in gold mining: improving the minerals potential; and improving the minerals policy regime (Trench and Sykes, 2015a). As such, any assessment of whether a country’s minerals industry is competitive should include analysis of both the minerals potential and minerals policy.

Guyana, Mali, Peru, Tanzania, Burkina Faso and Chile did however show a potential correlation between the Average Effective Tax Rate (AETR) and the rankings of Policy Perception as compiled by the Fraser Institute (Green and Jackson, 2015). This analysis ignores the mineral potential of a country and focuses solely on policy factors, so a correlation is to be expected. That six of the countries in this study potentially showed a correlation at the level of Policy Perception suggests both that levels of overall taxation are an important component of minerals policy; and that foreign investors generally understand the overall tax burden, even if individual taxation rates are misleading.

However, Colombia, Brazil and South Africa all showed poorer perceptions of policy than would be expected from their generally low Average Effective Tax Rate (AETR). Ghana, by contrast, had a slightly better perception of policy than expected based on its otherwise relatively high Average Effective Tax Rate (AETR).

Eight countries in the study (Guyana, Mali, Peru, Tanzania, Burkina Faso, Chile, Colombia and Ghana) showed a potential correlation between the Average Effective Tax Rate (AETR) and the more specific index ranking perceptions of the ‘Taxation Regime’ – the most direct comparison of perception available in the Fraser Institute report to the Average Effective Tax Rate (AETR) calculated in this research. The potential correlation suggests that in general foreign investors comprehend the overall taxation burden of a jurisdiction, even if individual headline taxation rates may be misleading.

However, the low Average Effective Tax Rates (AETR) of Brazil and South Africa (which has the lowest in this study) appears to go unrecognised. The suggestion here is that other problems exist within the taxation regime, not relating to the actual level of taxation. Brazil for example is noted for having a complex regime with multiple levels of bureaucracy.

Finally, that the Average Effective Tax Rate (AETR) of Colombia and Ghana does correlate with perceptions of the taxation regime, but not with perceptions of the overall policy regime, suggests policy factors beyond taxation play an important role in the investment attractiveness or risk of these countries – negatively for Colombia and positively for Ghana. Colombia is known to have problems with land rights, local communities and insecurity, for example; whilst Ghana is often seen as a stable country, within an unstable region.
1. Introduction

1.1 Gold as a Catalyst to Mining-led Economic Growth

The successful search for new gold deposits in developing economies is one means by which these countries can advance their future economic growth. Gold mines require only modest capital outlay by comparison to other commodities. For example, bulk commodities such as iron ore and coal; require much greater infrastructure for ore transport, which lifts project capital expenditures into the billions of dollars. In contrast, gold mines require only of the order of tens to hundreds of millions of dollars to develop, with the capital outlay dependent on the scale and type of the operation. The technical aspects of mining and processing of gold are well established. As such, the gold sector is open to not only major international companies but lies within the reach of emerging and mid-scale companies. Similarly, the gold sector is therefore open as a development pathway with relatively low entry barriers to many emerging jurisdictions, as gold occurs in a wide variety of mineralisation styles and geological terranes in many countries. Gold mining is thus a form of ‘starter-pack’ in terms of building capability in mining for many developing nations. Research to understand the competitiveness of fiscal regimes as they apply to gold mining in different jurisdictions therefore has widespread relevance to the International Mining for Development Centre (IM4DC) remit.

1.2 Balancing Competitiveness and Equity in Minerals Policy

The outlook for gold mining investment and rate of development of the gold industry across selected economies in both Africa and South America is dependent, amongst other factors, upon the present and future gold production and government share of the gold mining revenues in these regions. Minerals policy therefore needs to be both competitive to help grow the sector; and equitable to ensure the government and people also benefit from the sector’s growth (Trench & Sykes 2015b).

However, each jurisdiction operates under a different mineral policy, and often stakeholders including both the government officials themselves and the gold mining companies are unclear as to the relative degree of global competitiveness of the mineral policy regime in each country. That is, whilst the specific constituent parameters within the respective minerals policies are made clear such as level of royalty payable, corporation tax rates, and mandatory government ownership stakes; the holistic split of economic rents between the private and public sectors under the mineral policy is far from clear.

1.3 The Importance of Taxation in Minerals Policy

Levels of taxation make up just one aspect of mineral policy. In turn, mineral policy itself represents one criterion comprising the investment risk of various countries for mining (Green and Jackson, 2015). Finally ‘country risk’ makes up just one of the various non-technical risk factors faced by mining companies in seeking to develop mineral assets, alongside the well-known technical risks (Trench et al., 2014). However despite the fact that taxation is only one aspect of mineral policy it attracts significant attention when assessing country competitiveness. In part this is because it as a ‘hard’ economic factor, with an obvious bottom line impact, whereas softer factors such as the skills levels of the local workforce have a less clear impact on costs. Secondly its quantitative nature makes it easier to benchmark against
other jurisdictions. The ability to benchmark is therefore appealing to gold mining companies when choosing (and promoting) where to invest and government officials when attempting to make a measureable impact on mineral policy and promoting their host jurisdictions. However, as this research will show taxation in the minerals sector is neither easy to measure nor easy to benchmark and thus a potentially distorted view of the apparent risk or attractiveness of various jurisdictions may be perceived by all stakeholders.

1.4 Purpose of the Study

Most available analyses of gold production costs (both for African and South American gold mines and those elsewhere) focus either entirely at the individual mine and project level (for example to assess project- specific investment criteria) – else target the company level (to facilitate equity investment appraisal). Neither of these forms of analysis is sufficiently holistic to solve for the true cost competitiveness of either African or South American gold mines in the context of gold as an industry through which the economies of these countries can grow and prosper. For example, is the mineral policy of Mali more attractive than that of Burkina Faso or of Tanzania? Is the government share via taxes and royalties from gold mining sufficiently equitable in the various jurisdictions to achieve the dual goal of a) developing a thriving globally competitive gold industry and b) still returning sufficient revenues to the host government to contribute to positive government-led economic outcomes (Trench & Sykes 2015b)?

This research addresses this gap in the available literature – and critically moves beyond the perception- based normal industry practice of analysing the attractiveness of emerging mineral jurisdictions based on surveys of opinions rather than analytical data. In this research study, ten mining-dominated economies of various stages of economic development were chosen for detailed analysis – five from Africa and five from South America: Burkina Faso, Ghana, Mali, South Africa and Tanzania from Africa and Brazil, Chile, Colombia, Guyana and Peru in South America.

The preliminary results of this research have already been communicated via the IM4DC 2015 Mineral Policy and Economics course held in Perth in April-May. This overview report is supported by ten separate individual reports also completed as part of the research project that describe the gold industry in each country and which provide details of the specific mineral policy in each country.

Presenting the research to participants on the IM4DC program has been insightful. In discussions of mineral policy, it is clear that representatives of government and other stakeholders in developing countries tend to focus not on the overall government share of likely future margins from gold mining (a top-down perspective), but rather on the details of royalty and taxation structure (a bottom-up perspective). The overall competitiveness and risk/return split between the mining company (as investor) and the state (as co-investor) are surprisingly secondary and largely unknown factors.

1.5 Structure of the Report

In line with the observation that perceptions of mineral policy are often different to the actualities of the impact of the policy, this report will begin with a discussion of the perceptions of mineral policy, before the results of detailed modelling present the actual impact of the minerals policy.
The perception of each jurisdiction’s mineral policy is assessed using the most recent Fraser Institute Survey of Mining Companies 2014 (Green and Jackson, 2015). This review is presented in the section entitled ‘Industry Perceptions of Mineral Taxation Regimes’.

The actual economic impact of each country’s mineral policy and in particular taxation regime is assessed via financial modelling of a standard theoretical gold mine in each of the countries. The methodology and results arising from the modelling are discussed in the section entitled ‘Financial Modelling of Gold Mine Returns between Public and Private Sectors’.

The final section undertakes a ‘Comparison of Average Effective Tax Rate (AETR) to Industry Perceptions of Mineral Taxation Regime’ using the results from the financial model and the rankings from the Fraser Institute Survey of Mining Companies. Overviews of the individual countries then follow – which are further developed in detail in the individual country reports that accompany this report as both short appendices at the end of this report and detailed profiles as separate documents accompanying this report.

2. Industry Perceptions of Mineral Taxation Regimes

Since 1997, the Fraser Institute has conducted an ‘Annual Survey of Mining Companies’ (which also includes exploration companies) to assess how mineral endowments and public policy factors such as taxation and regulation affect exploration investment. The most recent survey of mining company executives conducted in 2014 was released in February 2015 (Green & Jackson, 2015). The Fraser Institute survey results represent the opinions of executives and exploration managers in mining and mining consulting companies operating around the world, with data collated on 122 jurisdictions worldwide in the most recent edition.

2.1 Overall Investment Attractiveness

Green & Jackson (2015) suggest that the most attractive jurisdiction in the world for mining investment based upon the 2014 survey data is Finland as this jurisdiction ranks the top of the ‘Investment Attractiveness Index’. The other top 10 ranked jurisdictions are Saskatchewan (Canada), Nevada (USA), Manitoba (Canada), Western Australia, Quebec (Canada), Wyoming (USA), Newfoundland & Labrador (Canada), Yukon (Canada), and Alaska (USA). Finland replaces Western Australia, which was the highest ranked jurisdiction in 2013 (Cervantes et al. 2014). Malaysia ranks as the least attractive jurisdiction in the world for investment, based on its position at the bottom of the ‘Investment Attractiveness Index’. This is a significant drop for Malaysia which ranked 70th (of 112) in 2013. Also in the bottom 10 (beginning with the worst) are Hungary, Kenya, Honduras, Solomon Islands, Egypt, Guatemala, Bulgaria, Nigeria, and Sudan (Green & Jackson 2015).

For the countries that are the focus of this report the Green & Jackson (2015) report ranks them as follows: Chile (13th), Peru (30th), Ghana (47th), Burkina Faso (50th), Brazil (52nd), Guyana (54th), Tanzania (56th), Colombia (58th), South Africa (64th) and Mali (82nd). Only Chile and Peru therefore rank in the top quartile of jurisdictions. Most (Ghana, Burkina Faso, Brazil, Guyana, Tanzania and Colombia) do however cluster in the second quartile, with South Africa and Mali in the third quartile globally, though Mali is somewhat adrift of the other jurisdictions. On average collectively the South American countries (41.4)
rank higher than the African countries (59.8) suggesting South America is generally more attractive than Africa for minerals investment.

### 2.2 Policy Perception

The overall investment attractiveness comprises both the geological potential of the jurisdiction and the effectiveness of the minerals policy. Each of these components is also separated out in individual country rankings within the Green and Jackson (2015) report.

The ten jurisdictions with the most attractive investment climate for mining (when assuming all countries are geologically equal) based on the Green and Jackson (2015) report’s ‘Policy Perception Index’ are: Ireland, Alberta, Finland, Sweden, New Brunswick (Canada), Saskatchewan (Canada), Newfoundland and Labrador (Canada), Wyoming (USA), Manitoba (Canada) and Western Australia. The ten least attractive (starting with the worst) are: Honduras, Philippines, Malaysia, South Sudan, Zimbabwe, Nigeria, Sudan, Central African Republic, Ethiopia and Venezuela.

Looking solely at the ‘Policy Potential Index’, ignoring geological prospectivity and potential, the countries in this report rank as follows in the Green & Jackson (2015) report: Chile (22nd), Burkina Faso (36th), Ghana (47th), Tanzania (50th), Peru (52nd), Guyana (59th), Mali (60th), South Africa (66th), Colombia (74th) and Brazil (87th). Only Chile therefore ranks in the top quartile for policy environment. Again most (this time Burkina Faso, Ghana, Tanzania, Peru, Guyana and Mali) fall into the second quartile, with South Africa, Colombia and Brazil in the third quartile. On average though the countries collectively rank lower on the Policy Perception Index (55.3), than on the overall Investment Attractiveness Index (50.6), suggesting improvements in policy would benefit the investment competitiveness of these countries. In contrast to overall investment attractiveness the African countries (51.8) perform better than the South American countries (58.8) collectively when just considering policy perception, suggesting there is more work for the governments of South America to do than Africa.

### 2.3 Mineral Potential

The perception of geological prospectivity can be established via the ‘Best Practices Mineral Potential Index’ in the Green and Jackson (2015) report. Here the ranking shows which country would be most attractive for mining investment if all jurisdictions had best practice mineral policy. The jurisdictions with the most favourably perceived geology are therefore: Yukon (Canada), Nevada (USA), Alaska (USA), Northwest Territories (Canada), Manitoba (Canada), Chile, Western Australia, Peru, Idaho (USA) and Quebec (Canada). The countries with the least favourably perceived geology (starting with the worst) are: Hungary, Malaysia, Kenya, Greece, Lesotho, Egypt, Guatemala, Solomon Islands, Bulgaria and Niger.

For the countries in this report the ranking is as follows in the Green & Jackson (2015) report: Chile (6th), Peru (8th), Brazil (20th), Colombia (47th), Mali (48th), Guyana (49th), Ghana (52nd), Tanzania (63rd), South Africa (67th) and Burkina Faso (72nd). The geological prospectivity of these countries is clear (though it is worth noting that this includes commodities beyond gold) with two (Chile and Peru) in the top ten, joined by Brazil in the top quartile and Colombia, Mali, Guyana and Ghana in the second quartile. Tanzania, South Africa and Burkina Faso rank towards the top of the third quartile. Collectively on average these countries rank higher for geological potential (43.2) than for overall Investment Attractiveness (50.6), again confirming that improvements in mineral policy in these countries would help encourage
investment in the mining sector. In addition, it is confirmed that the South American countries (26.0) are collectively perceived as geologically more attractive than the African countries (60.4), indicating that this indeed is a key component of their overall investment attractiveness.

2.4 ‘Room for Improvement’ in Mineral Policy

Many jurisdictions have considerable ‘Room for Improvement, as defined by the index of that name. These jurisdictions host a prospective geological environment, where improved mineral policy could unlock this geological potential. Papua New Guinea is the jurisdiction with the most room for improvement. Closely following it are Brazil, Santa Cruz (Argentina), Mongolia, Indonesia, Russia, Myanmar, Ecuador, California (USA) and Bolivia (Green & Jackson 2015). The countries where current policy practice is maximising their geological potential (i.e. there is little room for improvement) are Lesotho, Uruguay, Greenland, Botswana, Nova Scotia (Canada), Finland, Norway, Sweden, Liberia and Hungary. For these countries it is mainly the lack of geological prospectivity that is holding them back, though this in itself is variable, with some countries having poor geological potential, thus poor mineral policy matters less.

The countries in this report with the greatest perceived room for improvement in policy are: Brazil (121st), Colombia (99th), Peru (92nd), Mali (89th), South Africa (85th), Tanzania (70th), Chile (54th), Ghana (46th), Guyana (20th) and Burkina Faso (13th). Again this confirms that in general whilst South America is seen as overall a more attractive investment climate than Africa, much of this is based on geological potential, with the policy environment having scope for improvement. The South American countries collectively average 77.2 on room for improvement, lower than the collective average of 60.6 for the African countries, suggesting a greater room for improvement in South America. Brazil is perhaps an extreme example of this situation. Mali is the African country most characterised by a gap between geological potential and mineral policy environment.

2.5 Perception of Taxation Regime

This report focuses in particular on the taxation component of mineral policy. The Fraser Institute Survey of Mining Companies (Green & Jackson, 2015) also separates out a number of factors that make up the overall policy environment, including perceptions on taxation, via the ‘Taxation Regime Index’. This index sums the percentage of survey respondents who perceived the taxation regime to either “encourage investment” or was “not a deterrent to investment”. In this ranking (best first) Ireland, Newfoundland & Labrador (Canada), Alberta (Canada), Botswana, Lesotho, Sweden, Portugal, Norway, Manitoba (Canada) and Finland are perceived to have the best taxation regimes. By contrast (worst first), Bolivia, Zimbabwe, Honduras, Santa Cruz (Argentina), Mongolia, Ecuador, Mendoza (Argentina), Venezuela, La Rioja (Argentina) and Chubut (Argentina) appear to have unattractive minerals taxation regimes.

The countries in this report rank on the Green & Jackson (2015) ‘Taxation Regime Index’ at: Burkina Faso (27th), Chile (29th), Tanzania (37th), Ghana (47th), Colombia (49th), Mali (53rd), Peru (55th), Guyana (60th), Brazil (105th) and South Africa (106th). Again, only a couple (Burkina Faso and Chile) rank in the top quartile, with most (Tanzania, Ghana, Colombia, Mali, Peru and Guyana) fall into the second quartile, and two in the bottom quartile: Brazil and South Africa. On average, collectively, the countries rank slightly lower for perceptions of taxation regime (56.8), than for the Policy Perception Index (55.3) and overall Investment Attractiveness Index (50.6), suggesting that improvements in the perceptions of the taxation
regime could form part of a broader improvement in mineral policy perception and investment attractiveness. In general the taxation regimes in South America (59.6) are collectively seen as worse than those in Africa (54.0), again confirming that there is more room for improvement in the mineral policy, and in particular taxation, in South America, than in Africa. Brazil is the strongest example of this, with South Africa perceived as the African country with the greatest potential for improvement in taxation.

2.6 Conclusions on Industry Perceptions

In summary, if the most recent Fraser Institute Survey of Mining Companies (Green & Jackson, 2015) is an accurate assessment of the perception of world’s mineral policies then most of the countries in this report, whilst performing reasonably well (generally in the second quartile) could improve their policy perceptions, particularly in comparison to their geological potential.

In general, South America seems to have a larger gap between geological potential and policy environment than Africa, with Brazil perhaps the most extreme case. When looking at taxation regimes in particular, Brazil performs particularly poorly in comparison to geological potential, suggesting that improving the perception of its tax regime is an important component of improving the perception of its minerals policy and thus overall investment attractiveness.

South Africa is the African country with the poorest perceptions of its taxation regime, though overall its geological potential is now seen as lower than most of the other African countries and all of the South American countries, so improvements in taxation regime and mineral policy perceptions may only have a limited impact without improvements in the perceived geological potential of the country. Of the countries in Africa assessed in this report Mali has the largest gap between geological potential and minerals policy, though in this case the taxation regime does not seem to be a major factor and it is perhaps other areas of mineral policy that are perceived to require improvement.

Finally, however, it is important to note that whilst perceptions of a country are what drive investment in its minerals sector, those perceptions may not always be accurate, particularly when considering the complex nature of many minerals policies. Thus the next stage of analysis should be to determine whether a country’s mineral policy is actually unattractive, or whether it is just perceived to be unattractive. Different resolutions to these situations would of course be required. Similarly, some countries may be benefiting from a perception dividend, where there minerals policy and taxation regime is perceived to be better than in actuality. The next two sections of this report will deal with the actual economic impact of the taxation regimes of the countries and the comparison between the perceptions and actualities of these regimes.

3. Financial Modelling of Gold Mine Returns between Public and Private Sectors

A financial model of a potential new gold mine development was created for each country. To identify and to isolate the economic impact of the mineral policy from technical issues that drive costs such as geological, mining and metallurgical parameters, all these technical parameters for the gold mine were fixed and held constant in each case. As such, the differences in economic outcomes from the project in
each country can then be attributed solely to the differences in mineral policy in each country through the differing taxation treatment of cash flows and level of mineral royalties.

The financial model thus provides a tool for effective communication of the current split of economic rents from gold mining between state and industry (Figure 1)

Figure 1: Contrasts in the total government share from a hypothetical gold mine for each of ten gold mining jurisdictions. African jurisdictions are coloured blue whereas South American jurisdictions are coloured yellow.

3.1 Parameters of the Hypothetical Gold Mine

The hypothetical gold mine had the following technical parameters, which were considered to represent a mid-scale gold mine development with an operating cost profile that approximates that of working mines:

- Capital cost: US$300 million
- Weighted Average Cost of Capital (WACC): 10%
- Development Time: 3 years
- Production Capacity at Full-Scale Operation: 300,000 ounces per annum
- Ramp-up: 50% production in year 3; Full production from year 4.
- Mine Life: 11 years (50% production only in the final year)
- Combined Mining & Processing Costs: US$900 per ounce (at year 0)
- Gold Price Assumption: US$1300 per ounce (at year 0)
- Gold Price Escalation: 0.1% per annum
- Cost Escalation: 0.1% per annum
- Inflation: 3% per annum

The effect of debt financing was not included in the final model to ensure that the focus remained as a comparison of mining taxation in the selected jurisdictions without digressing into the additional variations that can result from the many permutations of project financing that could be selected.

3.2 Results of the Financial Modelling

The results of the financial modelling show significant differences between the impacts of mineral policy upon the split of economic returns between the private sector (the mine developer and their financiers) and the public sector (host government) over a life-of-mine basis.

Figure 2: Contrasts the various government charges that contribute to the total government share in each mining jurisdiction

The countries with the highest taxing regimes are Ghana and Guyana. That is, the Average Effective Tax Rate (AETR), being the combination of all the government charges, represents 66.5% of the economic return from the project in the case of Ghana and 63.9% in the case of Guyana. The full ranked list of countries by government share is as follows (ordered from highest government share to lowest): Ghana 66.5%, Guyana 63.9%, Mali 60.4%, Tanzania 58.8%, Peru 58.5%, Colombia 55.0%, Burkina Faso 52.2%, Brazil 44.8%, Chile 44.3% and South Africa 36.3%. These figures were also analysed with respect to their
component government charges (Figure 2). South Africa stands out as having a notably lower Average Effective Tax Rate (AETR) than its peers in this study.

This analysis shows that there is no clear relationship between the proportion of the project value that is paid as a particular government charge, and the overall Average Effective Tax Rate (AETR). In addition, there is seemingly little correlation between the Average Effective Tax Rate (AETR) and either the headline corporate income tax rate (Figure 3), or the headline royalty rate (Figure 4). Rather, it is the combination of all mineral taxation policies of these jurisdictions that determines the overall government returns from a project.

![Diagram](https://example.com/diagram.png)

**Figure 3:** Plots the Average Effective Tax Rate (AETR) for each mining jurisdiction against the corresponding corporate income tax rate.

It should be noted that these Average Effective Tax Rate (AETR) results have been calculated on the basis of a ring-fenced project within each jurisdiction. It is likely, however, that the mine will be developed by a parent company that is domiciled outside of the mining jurisdiction. In this case additional taxes may apply to funds that are transferred out of the mining jurisdiction. The exact manner in which the funds are transferred (i.e. as dividends, management fees, or repayment of loans, etc.) will determine the amount of additional tax to be paid.
3.3 Conclusions on Average Effective Taxation Rate (AETR)

Of the ten countries studied, nearly all Average Effective Tax Rates (AETR) over the life of the mine fell between about 35% and 65% (Ghana is 66.5%) suggesting a band of taxation rate where it is both equitable and competitive. Higher rates than 65% seem to become too uncompetitive, whereas rates below 35% are perhaps too inequitable.

Although the operating range of life of project tax rates spreads between 35% and 65% it is notable that only three countries of the sample of ten had rates below 50%: Brazil, Chile and South Africa. South Africa somewhat stands out with a rate of 36.3%, substantially below Chile and 44.3% and Brazil at 44.8%.

Of the make-up of the total Average Effective Tax Rates (AETR); corporate income tax rates and then royalties are the largest components. For those countries with ownership shares the dividend from this is a modest, though not inconsequential component. The ratio between the reliance on corporate income taxes and reliance on royalties is variable. Some countries such as Brazil and South Africa are mainly reliant on corporate income taxes, with low royalty rates. However, no countries seem to largely really on royalties. Chile is perhaps the nearest to having a mineral taxation regime based mainly on royalties; and with forecast royalty increases in the near future it may become one of the apparently rarer countries that structures its minerals taxation regime in this way.
The fairly balanced structure of the taxation regimes shared mainly between corporate income taxes, royalties and sometimes other taxation methods, means there is no clear correlation between headline royalty or corporate income tax rates and the Average Effective Tax Rate (AETR) of a country. Such headline rates for individual taxes should be ignored when assessing the taxation regime of a country, as the essentially convey no real information about the regime and could in fact be severely misleading. For example, Mali’s royalty rate is fairly low; however, its overall Average Effective Tax Rate (AETR) is relatively high. By contrast, Burkina Faso has comparably high royalty rates, but a comparably low Average Effective Tax Rate (AETR).

Finally from the perspective of a foreign investor it is actually the perception of the taxation regime that drives investment, not the actual taxation regime itself. The complexity of the taxation regimes described above suggests that there may be differences between perceptions of the taxation regime and reality. For countries hoping to attract foreign investment into the gold mining sector it is important that any tax rates lowered to attract investment are actually perceived by investors. As such the final part of this report will investigate the relationship between perceptions of the taxation regime and the Average Effective Tax Rate (AETR).

4. Comparison of Average Effective Tax Rate (AETR) to Industry Perceptions of Mineral Taxation Regime

4.1 Average Effective Tax Rate (AETR) versus Overall Investment Attractiveness

Figure 5 demonstrates that there is overall no correlation between the perceived overall investment attractiveness of a country and its Average Effective Tax Rate (AETR). The overall investment attractiveness takes into account the mineral prospectivity of a country so this is perhaps not surprising. The mineral prospectivity of some South American countries in particular seems to be a very important component of their overall investment attractiveness, so it seems unlikely that factors relating solely to the policy regime would correlate. At very least this suggests the assessments of a country’s investment ‘risk’ should be weighed against its mineral potential. Improving mineral potential increases overall investment attractiveness, as well as improving the policy regime. It is also seems to indicate that there is no correlation, positive or negative, between mineral potential and quality of minerals policy.
4.2 Average Effective Tax Rate (AETR) versus Policy Perceptions

The mineral potential of a country can be controlled for by just considering the Policy Perception Index in the Fraser Institute report (Green and Jackson, 2015). As expected, there does appear to be a weak correlation, for some of the countries in the study, between the Policy Perception and Average Effective Tax Rate (AETR). A group of countries including Guyana, Mali, Peru, Tanzania, Burkina Faso and Chile seem to follow the expected correlation with lower Average Effective Tax Rates (AETR) corresponding with higher favourability toward the policy regime.

However, a group of countries including South Africa, Brazil and Colombia, seem to rank much lower on perceptions of policy than their Average Effective Tax Rate (AETR) suggests. Assuming that the sample size is indeed large enough to draw conclusions over the correlation, two possible interpretations may explain this anomaly: first there is a mismatch between perceptions and actuality, and these countries are perceived to be worse to operate in than they actually are; or secondly, that taxation regime is not all that counts and there are other critical components to investors sentiments towards a country’s mineral policy regime.

The opposite scenario may be the case for Ghana, which seems to score higher in policy perception than its quite heavy Average Effective Tax Rate (AETR) suggests. Again, this could be have the same two interpretations: either Ghana is perceived to be better than it is an actuality (it is gaining a perception
or other factors beyond simple levels of taxation play a critical role in investor perceptions of a country’s mineral policy.

![Figure 6](image)

**Figure 6:** plots the Average Effective Tax Rate (AETR) for each gold mining jurisdiction against the Policy Perception index as compiled by the Fraser Institute (Green and Jackson, 2015).

### 4.3 Average Effective Tax Rate (AETR) versus Perceptions of Taxation Regime

The effect of taxation within a wider policy regime can be controlled for by comparing the Average Effective Tax Rate (AETR) to the perceptions of the Taxation Regime index in the Fraser Institute report (Green and Jackson, 2015). This may explain whether countries such as South Africa, Brazil and Colombia have a perception problem and foreign investors do not realise the actuality of their low tax regimes; or if it actually other factors that relate to policy that are the cause of poor foreign investor sentiment.

As expected most countries follow the expected trend with lower Average Effective Tax Rates (AETR) corresponding higher rankings in perceptions of the taxation regime, suggesting that in general the Average Effective Tax Rate (AETR), no matter how it is made up (royalties, corporate tax, shared ownership etc) is understood and makes up the majority of investors views on a country’s mineral taxation regime.

However, some anomalies arise within this analysis. Firstly there are some countries such as Colombia and Ghana, where their Average Effective Tax Rate (AETR) correlates with the perception of the taxation
regime (Figure 6), but does not correlate with the overall perception of policy (Figure 5). This suggests that for these countries, something other than taxation is having a significant impact on policy perceptions: in the case of Ghana of positive effect and in the case of Colombia a negative effect. The individual country profiles accompanying this report note that Ghana, in comparison to its neighbours is seen as stable, with good infrastructure, and a clear regulatory regime, which is perhaps providing it with the opportunity to charge a higher tax rate. Alternatively it could simply be that either investors do not realise the heavy burden of Ghana’s taxes; or that they are already committed to the country and have not yet had chance to divert investments. The opposite situation may apply for Colombia, where the policy regime is perceived to be worse than the Average Effective Tax Rate (AETR) suggests. Again the individual country profiles note that Colombia still has a number of policy issues, not related to taxation that may be effecting their policy perceptions; such as land claims, local community issues, weak infrastructure, a lack of skills and insecurity. Again, if this is the case a governance discount may apply. Again, however it could just be that investors have not yet realised the generosity of Colombia’s taxation regime; or that they have not yet been able to mobilise investment in that country’s direction.

A second series of anomalies exist with Brazil and South Africa. Both of these countries have low Average Effective Tax Rates (AETR), but have poor perceptions of both policy and taxation regimes. This suggests that not only are the low rates of taxation not recognised within the wider context of policy, but also not even within the narrower context of taxation. Again, this has two potential interpretations: either investors have not yet realised that South Africa and Brazil are low taxation regimes; or that there are
problems with their taxation regime that do not relate specifically to the rate of taxation. It would appear that foreign investors have a good perception of the overall Average Effective Tax Rate (AETR) for the other eight countries in the study, suggesting that it is problems within the taxation regime itself that afflict South Africa and Brazil. The individual country profiles accompanying this report highlight that Brazil in particular, whilst having low taxation rates has multiple layers of bureaucracy which make the regime complex. A similar situation may exist in South Africa.

4.4 Conclusions on the relationship between perceived and actual taxation regimes

No correlation exists between the Average Effective Tax Rate (AETR) and the Overall Investment Attractiveness of a country. This conclusion is unsurprising, as mineral potential as an important part of Overall Investment Attractiveness; however it does highlight the importance of considering minerals potential and minerals policy in concert, rather than in isolation.

There is a weak correlation for six of the countries (Guyana, Mali, Peru, Tanzania, Burkina Faso and Chile) in the study between Average Effective Tax Rate (AETR) and Policy Perception. This suggests that often foreign investors do recognise and consider the overall Average Effective Tax Rate (AETR) in their assessments of which countries minerals sectors to invest in.

However, South Africa, Brazil and Colombia do not follow this potential correlation, ranking much lower than expected for their Policy Perception, whereas Ghana breaks the potential correlation but ranks higher in Policy Perception than expected. This anomaly may be explained by either a mismatch between perceptions and actuality; or more likely, that other policy factors, beyond taxation rates, play a significant role in Policy Perception.

As expected there is a stronger potential correlation between Average Effective Tax Rates (AETR) and perceptions of a country’s Taxation Regime, as ranked by the Fraser Institute (Green and Jackson, 2015). All the countries in the study except South Africa and Brazil show this potential correlation.

By comparing the anomalous countries in Figure 5 (comparing Policy Perception and AETR) with the anomalous countries in Figure 6 (comparing Taxation Regime and AETR) two types of anomalous countries arise. Those, Colombia and Ghana where the Taxation Regime correlates with Average Effective Tax Rate (AETR), but the overall Policy Perception does not; and those, Brazil and South Africa where neither the Taxation Regime or the Policy Perception correlates with Average Effective Tax Rate (AETR).

In the case of Colombia and Ghana it appears that foreign investors understand their overall taxation regime well, but in the case of Colombia apply a discount to the country based on other negative factors within the policy framework. Colombia is noted for having problems with its mineral policy environment, outside of taxation, such as land and local community disputes, and high levels of insecurity (though Colombia is hardly an isolated example of these problems). In the case of Ghana foreign investors appear to attach a premium to the country based on other positive factors within the policy framework. Ghana is noted for being a somewhat stable country, amongst a more volatile region, which may partly explain its perception premium.
For Brazil and South Africa the situation is more complicated. Despite the Average Effective Tax Rate (AETR) being amongst the lowest in the study group of countries this factor does not appear to be recognised by foreign investors who rate both their overall policy framework and taxation regime unfavourably. Foreign investors’ views of very negative views of the taxation regimes in South Africa and Brazil are particularly surprising, as they rate them amongst the worst taxation regimes in the Fraser Institute report (Green and Jackson, 2015), despite the fact the offer amongst the lowest Average Effective Tax Rates (AETR); and indeed the lowest in the case of South Africa. Both these countries have paradoxical minerals taxation regime; it is both a deterrent to investment and does not raise as much revenue as other countries. These taxation regimes are potentially uncompetitive and inequitable. In theory, two situations could explain this anomaly, either there is a mis-match between investor perceptions and the actuality of the taxation regime; or that there is something negative about the taxation regime itself, beyond the simple level of taxation that is affecting perceptions. Brazil’s taxation regime is known to be complex with multiple layers of administrative bureaucracy, so the latter explanation may be the case.

5. Conclusions & Recommendations

5.1 Conclusions

The overall Average Effective Tax Rate (AETR) by country is as follows: Ghana (66.5%); Guyana (63.9%); Mali (60.4%); Tanzania (58.8%); Peru (58.5%); Colombia (55.0%); Burkina Faso (52.2%); Brazil (44.8%); Chile (44.3%) and South Africa (36.3%). Most countries fall within an Average Effective Tax Rate (AETR) band between 35% and 65%. Brazil, Chile and South Africa have notably lower rates; with South Africa having the substantially the lowest.

No correlation exists between headline individual royalty or corporation tax rates and the overall Average Effective Tax Rate (AETR). Individual taxation rates are misleading indicator of the overall tax burden of a regime. Minerals taxation usually comprises significant components of royalties, corporation taxes and other measures such as ownership stakes. Brazil and South Africa are unusual in mainly relying on corporate taxation. No country in the study primarily relies on royalties as a source of minerals tax revenues, though Chile may in the future do this.

The overall Average Effective Tax Rate (AETR) does not correlate with perceptions of the overall Investment Attractiveness of a country, as compiled by the Fraser Institute (Green and Jackson, 2015). The overall Investment Attractiveness of a country includes its mineral potential, diluting the impact of policy factors. As there appears to be no correlation between mineral potential and competitive minerals policy, both should always form part of an assessment of a country’s investment attractiveness for gold mining investment.

Six of the countries in the study (Guyana, Mali, Peru, Tanzania, Burkina Faso and Chile) show a potential correlation between Average Effective Tax Rate (AETR) and Policy Perception (Green and Jackson, 2015). Colombia, Brazil and South Africa have much poorer perceptions of policy than would be expected from their generally low Average Effective Tax Rates (AETR), whilst Ghana has a slightly better perception of policy than expected, based on its relatively high Average Effective Tax Rates (AETR).
Eight countries in the report show a potential correlation between Average Effective Tax Rate (AETR) and perceptions Taxation Regime (Green and Jackson, 2015), with Brazil and South Africa being the exceptions. The potential correlation demonstrates that foreign investors generally comprehend the overall taxation rate of the country, even if various individual tax rates are misleading.

The low Average Effective Tax Rate (AETR) of Brazil and South Africa however appears unrecognised, suggesting that although taxation rates are low, other problems may exist within the taxation regime, such as complexity and bureaucracy, which lead to poorer investor sentiment.

The fact that the Average Effective Tax Rate (AETR) of Colombia and Ghana does correlate with perceptions of Taxation Regime but not overall Policy Perceptions, suggests that policy factors not relating to taxation are affecting investors views of these countries’ mineral policy regimes: negatively in the case of Colombia and positively in the case of Ghana. Colombia is known to have problems with land rights and security for example, whereas Ghana is often seen as an area of stability in a volatile region.

5.2 Recommendations

Research such as this should be expanded to a broader range of countries with the aim of verifying or disproving the preliminary findings in this report. Developed countries with substantial gold mining industries should also form part of the study to investigate whether differences exist between developed and developing country minerals taxation regimes.

In the absence of new contrary information, neither companies nor countries should use single headline taxation rates to assess the overall taxation burden of a country. This project concludes that Average Effective Tax Rate (AETR) should be more frequently modelled and publicised as a measure of government share and therefore the investment attractiveness of these countries for gold mining developments.

Further research should focus on ranges of variables for gold mines to determine if the findings in this report are retained with different types of gold mines and at different gold prices. Similarly whether the findings hold with different mined commodities is also an important area of investigation – especially for the commodities which support larger mines, such as copper, iron ore and coal, which would be the next stage of mining related economic development for countries, after gold mining.

This research ignores the role of financing and how different structures of debt and equity may impact overall taxation rates. Again this is a recommended area of further investigation. Finally, the ownership structure of foreign investment (i.e. are domestic subsidiaries set up) is likely to play a role in taxation levels. This is another important area of further research.

Important findings reported by Collier (2010) suggest that different types of taxation have variable levels of opacity and volatility in revenue, which in turn appear to have a significant impact on the chances of successful economic development via mining. As such, follow up research, similar to this report, should focus on the comparative opacity and volatility of different minerals taxation regimes.
Finally, it is actually the perception of a minerals regime that encourages foreign investment, so it is important to further investigate the correlation between qualitative perceptions of mineral policy regimes and quantitative assessments of mineral policy regime.

Countries hoping to promote their gold mining sector need to ensure the facts of their minerals policy align with perceptions of their mineral policy. Similarly, companies when assessing gold mining investment destinations need to ensure the perceptions of a country’s mineral policy regime match the actuality of operating in that country.

6. References


Separate country reports accompany this report providing a detailed level of information on both the gold prospectivity and prevailing mineral policy in each of the ten focus countries. Summarised here are high-level outlines of the gold sector and mineral policy in each country.
Gold in Burkina Faso is hosted by the Archaean Birimian Greenstone Belt, which also stretches through Ghana, Côte d’Ivoire, Mali, Guinea and Senegal. Currently, six gold mines operate in the country. In 2012 they produced 1.3% of the world’s gold. Production increased rapidly between 2008 and 2011 from 2 to 3.2% per year as these new mines came online. Before this, it was solely artisanal mining that made up Burkina Faso’s gold industry.

Political stability makes exploration for new deposits relatively safe, with many companies actively exploring and developing gold projects in the country.

**Main Mines & 2012 Production**

<table>
<thead>
<tr>
<th>Mine</th>
<th>Yearly Production (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essakane</td>
<td>22.3 (790,000 oz)</td>
</tr>
<tr>
<td>Tasiakonou</td>
<td>23.2 (805,000 oz)</td>
</tr>
<tr>
<td>Pampa</td>
<td>9.1 (320,000 oz)</td>
</tr>
<tr>
<td>Kouritenga</td>
<td>5.7 (200,000 oz)</td>
</tr>
<tr>
<td>Inata (Avocet)</td>
<td>4.2i (140,000 oz)</td>
</tr>
</tbody>
</table>

**Main Development Projects**

- Kaba (Volta)
- Barka (Ougadougou)
- Guro (Stremco)

**Main Exploration Projects**

- Yaramoko (Rio Gold)
- Tanali (Channel)
- Houndé (Endeavour)

**References**

1. Raw Materials Group 2012
2. CRU Reports
3. CET Research

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**Recent Gold Production**

- Gold Production: Burkina Faso

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**Ghana: Gold Industry & Mineral Policy**

**A synthesis of the gold industry of Ghana**

Gold in Ghana is hosted by the Archaean Birimian Greenstone Belt, which stretches through much of western Africa. The vast majority of gold is found in a specific unit, the well endowed Ashanti Belt, which strikes northeast–southwest in Ghana’s southwest.

Ghana has produced gold since the 1800’s, where it was recovered from alluvial deposits. Modern exploration and mining has targeted the sources of these early finds. In 2012, Ghana produced 3.3% of the world’s gold from its fourteen operating mines. Production has steadily increased in the country over recent years.

Political stability, low rates of corruption, and a relatively high chance of exploration success make Ghana an attractive place to explore and operate. Key miners are the large western companies Goldfields, Newmont and Anglogold Ashanti, who operate successfully in Ghana.

**Main Mines & 2012 Production**

<table>
<thead>
<tr>
<th>Mine</th>
<th>Yearly Production (oz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarkwa (Goldfields)</td>
<td>22.3 (790,000 oz)</td>
</tr>
<tr>
<td>Ahafo (Newmont)</td>
<td>17.5 (617,000 oz)</td>
</tr>
<tr>
<td>Chirano (Kinross Gold)</td>
<td>9.1 (320,000 oz)</td>
</tr>
<tr>
<td>Obuasi (Anglogold)</td>
<td>8.7 (306,000 oz)</td>
</tr>
</tbody>
</table>

**Main Development Projects**

- Noym (African Queen Mines)
- Bogoso Expansion (Golden Star)

**Main Exploration Projects**

- Akramon Prospect (Endeavour Capital)
- Kinango (Mwana Africa PLC)
- Noyem (African Queen Mines)

**Mineral Taxation in Ghana**

- Corporate Income Tax: 17.5% for mining companies
- Withholding Tax:
  - Tech / Management Staff: 10%
  - Interest: 20%
  - Royalties: 20%
  - Dividends: 12.5%
- Govt Ownership: 10% free equity
- Royalties on gold: 3% if >$1000/oz Au
  - 4% if $1000/oz Au to $1300/oz Au
  - 5% if >$1300/oz Au
- VAT: 18% inclusive

**Recent Gold Production**

- Gold Production: Ghana

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**References**

1. Raw Materials Group 2012
2. CRU Reports
3. CET Research

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Figure 8: Burkina Faso: Gold Industry & Mineral Policy.

Figure 9: Ghana: Gold Industry & Mineral Policy.
Mali: Gold Industry & Mineral Policy

A synthesis of the gold industry of Mali

Gold in Mali is hosted by the regional Archaean Birrimian Greenstone Belt (see figure). It covers a significant portion of southwest Mali. Within Mali, significant deposits are associated with the Senegal-Malian Shear Zone.

Seven gold mines currently operate in Mali, which accounted for 1.55% of world gold production in 2012. There are two major mines: Randgold & AngloGold. There was a steady decline in gold production until 2011, but since, there has been an annual 10% increase.

The current military conflict in the country is likely to deter new explorers.

Main Mines & 2012 Production

<table>
<thead>
<tr>
<th>Mine</th>
<th>Production Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gourkiro (Randgold)</td>
<td>8.8t (290,000oz) per yr</td>
</tr>
<tr>
<td>Sadiola (AngloGold, lamgold)</td>
<td>7.8t (270,000oz) per yr</td>
</tr>
<tr>
<td>Loulo (Randgold)</td>
<td>8.9t (240,000oz) per yr</td>
</tr>
<tr>
<td>Mopta (AngloGold, Randgold)</td>
<td>8.5t (220,000oz) per yr</td>
</tr>
</tbody>
</table>

Main Development Projects

- Nampala (Robex)
- Fekola (Papillon resources, Mali SARL)
- Kibadi (African Gold)

Main Exploration Projects

- Telkoumala (Legent Gold)
- Medinendi (Papillon)
- Komana (Goldfields)

Recent Gold Production

South Africa: Gold Industry & Mineral Policy

A synthesis of the gold industry of South Africa

Historically, South Africa has been a major producer of gold. However, there has been a steady decrease in production over the last ten years. This is because the rate at which new deposits are found and mined is far lower than the rate at which South Africa is depleting its current reserves, a pattern typical of established producing countries.

Much of the gold in South Africa is mined from the Archaean Barberton Greenstone Belt, a terrane of the Kaapvaal Craton. In 2012, South Africa produced 152t, 5.7% of world gold, from its 62 gold mines.

South Africa continues to attract new investment due to its proven record, political stability, established mining infrastructure and low country risk.

Main Mines & 2012 Production

<table>
<thead>
<tr>
<th>Mine</th>
<th>Production Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kopanong, (AngloGold)</td>
<td>5.1t (180,000oz) per yr</td>
</tr>
<tr>
<td>Vaal River (AngloGold)</td>
<td>4.5t (165,000oz) per yr</td>
</tr>
<tr>
<td>Ergo JV, (DRD Gold)</td>
<td>4.4t (155,000oz) per yr</td>
</tr>
<tr>
<td>Target (Harmony)</td>
<td>3.8t (130,000oz) per yr</td>
</tr>
</tbody>
</table>

Main Development Projects

- ERPM Extension (DRD Gold)
- Venterburg (Gold 1)
- De Bron (Wits Gold)

Main Exploration Projects

- Bisa Gold (Wits Gold)
- Western Ultra Deep Levels (AngloGold)

Recent Gold Production

Corporate Income Tax: 25% for 14-16 years of production.

Withholding Tax:
- Tech / Management Staff: 17.5%
- Interest: 10% debt, 13% bonds
- Royalties: 17.5%
- Dividends: 10%

Govt Ownership:
- 10% free equity, can acquire further 10%. Domestic investors can acquire 5%.

Royalties on gold:
- 3%, plus additional taxes if mine exceeds 10% of expected production.

VAT:
- Prospectors and explorers exempt. Normally 18% for exports.

Reference

(1) Wikipedia; (2) Raw Materials Group 2012; (3) CRU Reports; (4) CET Research

Figure 10: Mali: Gold Industry & Mineral Policy.

Figure 11: South Africa: Gold Industry & Mineral Policy.
Tanzania: Gold Industry & Mineral Policy

A synthesis of the gold industry of Tanzania

The largest gold deposits in Tanzania are hosted by the Archaean Lake Victoria Greenstone Belt. This outcrops in the north of the country, south of Lake Victoria and adjacent to the Tanzania-Kenya border. Other gold occurrences are associated with the Mozambique Belt and also the Ubendian Belt, along Tanzania’s south western border.

Tanzania has maintained steady gold production at close to 40t annually for the past eight years. In 2012, its 40.3t accounted for 1.5% of world gold production. There are seven operating gold mines in the country, four of which are owned by Barrick. The other operators are Anglogold, Resolute and Shenta Gold.

References
(1) Tanzania Minerals Corp; (2) Raw Materials Group 2012; (3) CRU Reports; (4) CET Research

Main Mines & 2012 Production
- Geita (Anglogold) 16.5t (580,000oz) per yr
- Bulyanhulu (Barrick) 7.4t (260,000oz) per yr
- North Mara (Barrick) 6.0t (210,000oz) per yr
- Buzwagi (Barrick) 5.2t (180,000oz) per yr

Main Development Projects
- Buckreef (Tanz Royal)
- Nyauza (Barrick)
- Singida (Shanta Gold)

Main Exploration Projects
- SMP (Helio Corp)
- Magambazi (Denwill Mining)
- Nyakafuru (Resolute Ltd)

Recent Gold Production

Brazil: Gold Industry & Mineral Policy

A synthesis of the gold industry of Brazil

Gold production in Brazil increased until 2009, where it has stabilised at close to 63t per year. In 2012, Brazil produced 54t of gold from 15 gold mines, accounting for 2% of world gold production.

Over 60% of gold mined in Brazil is from the Faina Gold Belt in the state of Minas Gerais, which was the focus of a gold rush in the 1700’s. Other prospective areas are the Garupi Belt and the Taraira Gold Belt, which is situated in the northwest of Brazil, and extends into Columbia.

Brazil is the focus of many multinational gold mining companies, and its policies are considered friendly to the industry. Exploration is low risk, as the country is politically stable. Costs are low, as local labour is cheap, and infrastructure is well developed in the established gold regions.

References
(1) Wikipedia; (2) Raw Materials Group 2012; (3) CRU Reports; (4) CET Research

Main Mines & 2012 Production
- Paracatu (Kinross Gold) 15.5t (547,000oz) per yr
- Mineracao (Anglogold) 12.1t (427,000oz) per yr
- Serra Grande (Anglogold) 4.0t (140,000oz) per yr
- Chapada (Yamana) 4.0t (140,000oz) per yr

Main Development Projects
- C1 Santa Luz (Yamana)
- Gurupi (Jaguar Mining)
- Volta Grande (Belo Sun)

Main Exploration Projects
- Sao Jorge (Brz Gold)
- Culu Culu (Magellan)
- Cachoeira (Brazil Resources)

Recent Gold Production

Mineral Taxation in Brazil

Corporate Income Tax: 34%
Depreciation Allowance: Life of mine, 4%; plant & machinery, 10%. Up to 30% of taxable income.
Withholding Tax:
- Tech / Management Staff: 15%, or 25% if residing in tax haven.
- Interest: 15%, or 25% if residing in tax haven.
- Royalties: 15%, or 25% if residing in tax haven.
- Dividends: None
Govt Ownership: None
Royalties on gold: 1% on gold.
VAT: No VAT on exports.
Chile: Gold Industry & Mineral Policy

A synthesis of the gold industry of Chile

In 2012, Chile produced 47.7t of gold from its 18 operating gold mines. This accounted for 1.8% of world gold production. The major operating companies are Codelco, Antofagasta, FCX, Kinross Gold and Yamana, operating predominantly open pit mines.

Gold production in Chile has seen year on year increases since 2010. It has risen from 38t in 2010 to 50t in 2013.

Gold in Chile is mostly associated with porphyry Cu-Au deposits found in the Maricunga Greenstone belt in northern Chile and the El Indio Gold Belt, which runs along the Chile-Argentina border.

Main Mines & 2012 Production

<table>
<thead>
<tr>
<th>Mine</th>
<th>Production (oz) per yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>El Penon (Yamana)</td>
<td>9.9t (350,000oz)</td>
</tr>
<tr>
<td>Esperanza (Antofagasta)</td>
<td>7.7t (270,000oz)</td>
</tr>
<tr>
<td>Maricunga (Kinross Gold)</td>
<td>7.5t (260,000oz)</td>
</tr>
<tr>
<td>La Coipa (Kinross Gold)</td>
<td>3.3t (120,000oz)</td>
</tr>
</tbody>
</table>

Main Development Projects

- Pascua Lama (Barrick)
- Volcan (Hochschild)
- Cerro Casale (Barrick, Kinross Gold)

Main Exploration Projects

- Diatremia (Glencore Xtrata)
- Cerro Marcunga (Alacama Pacific)
- La Pea (Yamana)

Mineral Taxation in Chile

- Corporate Income Tax: 17%, maybe 20% after future reform.
- Depreciation Allowance: Straight line over useful life of assets.
- Withholding Tax:
  - Tech / Management Staff: 15%, 20% if residing in tax haven.
  - Interest: 4% to 35%
  - Royalties: 30%
  - Dividends: 35% less corporate tax credit.
- Govt Ownership: None.
- Royalties on gold: 0% to 14%, income dependant.
- VAT: No VAT on exports.

Recent Gold Production

Gold Production: Chile

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>% Increase</th>
<th>% Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>60</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>2007</td>
<td>50</td>
<td>20</td>
<td>80</td>
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<td>2008</td>
<td>40</td>
<td>20</td>
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<tr>
<td>2009</td>
<td>30</td>
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<td>80</td>
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<tr>
<td>2010</td>
<td>40</td>
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<td>80</td>
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<tr>
<td>2011</td>
<td>50</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>2012</td>
<td>60</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>2013</td>
<td>70</td>
<td>20</td>
<td>80</td>
</tr>
</tbody>
</table>

References

(1) Wikipedia; (2) Raw Materials Group 2012; (3) CRU Reports; (4) CET Research

Figure 14: Chile: Gold Industry & Mineral Policy.

Colombia: Gold Industry & Mineral Policy

A synthesis of the gold industry of Colombia

Notable gold bearing regions in Colombia are the Miocene Middle Cauca Belt, the Eocene Choco Belt, the Cretaceous Antioquia Batholith and the Jurassic Segovia Belt. These are in the northwest of Colombia, and are host to numerous deposits. The relatively unexplored Taraira Belt in the country’s southeast is also prospective.

Currently only two legitimate gold mines are operating in Colombia. These are the Segovia and Marmato open pit gold mines, both operated by Gran Colombia. In 2012, they produced 3.3t of gold, less than 5% of total national production. Artisanal mining was responsible for the remaining 64.7t of gold produced.

Risk involved in operating in Colombia is fairly high due to terrorist threat, guerilla groups and risk of kidnap by drug gangs. Despite this, the country has seen a recent surge in exploration activity.

Main Mines & 2012 Production

<table>
<thead>
<tr>
<th>Mine</th>
<th>Production (oz) per yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segovia (Gran Colombia)</td>
<td>2.4t (84,000oz)</td>
</tr>
<tr>
<td>Marmato (Gran Colombia)</td>
<td>0.7t (24,000oz)</td>
</tr>
</tbody>
</table>

Main Development Projects

- La Colosa (Anglogold)
- Gramalote (Anglogold, B2Gold)
- Angostura (Eco Oro)

Main Exploration Projects

- Tintinti (Surward)
- La Mina (Bellhaven)
- Minifores (Seafield Resources)

Mineral Taxation in Colombia

- Corporate Income Tax: 10%
- Depreciation Allowance: Cost of asset / useful life calculation.
- Withholding Tax:
  - Tech / Management Staff: 15%
  - Interest: 14%, or 33% for non-resident lenders.
  - Royalties: 33%
  - Dividends: 35%
- Govt Ownership: None known.
- Royalties on gold: 4% on gold.
- VAT: 16% internally. No VAT on exports.

Recent Gold Production

Gold Production: Colombia

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>% Increase</th>
<th>% Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>60</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>2007</td>
<td>50</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>2008</td>
<td>40</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>2009</td>
<td>30</td>
<td>20</td>
<td>80</td>
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<tr>
<td>2010</td>
<td>40</td>
<td>20</td>
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<tr>
<td>2011</td>
<td>50</td>
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</tr>
<tr>
<td>2012</td>
<td>60</td>
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<td>80</td>
</tr>
<tr>
<td>2013</td>
<td>70</td>
<td>20</td>
<td>80</td>
</tr>
</tbody>
</table>

References

(1) GFMS World Gold Special Report 2011: Colombia (2) Raw Materials Group 2012; (3) CRU Reports; (4) CET Research

Figure 15: Colombia: Gold Industry & Mineral Policy.
Guyana: Gold Industry & Mineral Policy

A synthesis of the gold industry of Guyana

In 2013, artisanal miners in Guyana produced c. 14.1t of gold this is more than double the 6.4t produced in 2006. Currently there are no operating gold mines in Guyana, however, Mahdia Gold plans to re-open the historic Omai mine in the near future. Omai was one of the world’s largest gold mines and produced, on average, 250,000 oz of gold annually.

Most gold deposits in Guyana are associated with the Proterozoic Barama Mazaruni Greenstone Belt. Lode gold is associated with steeply dipping quartz veins, whereas placer deposits occur on the main rivers draining the greenstone terrain.

Many Canadian companies are actively exploring in Guyana’s gold belts with high rates of success.

Main Mines & 2012 Production
Dominantly artisanal mining. c. 10t (350,000oz) per yr

Main Development Projects
Omai Mine re-opening (Mahdia Gold)
Aurora (Guyana Goldfields)
Million Mountain (Sacre-C)

Main Exploration Projects
Groote (Gold Port)
West Omai (Troy Resources)
Eagle Mountain (Eagle Mountain)

Peru: Gold Industry & Mineral Policy

A synthesis of the gold industry of Peru

Peru is one of the world’s leading gold producers, accounting for 6% of world gold production in 2012. There are 52 operating gold mines, producing 140t annually. An additional 20t is produced by artisanal miners. Rates of production have slowly declined over the last 8 years, from 203t in 2006 to 162t in 2013. The biggest operator is Buenaventura who operate nine mines, and co-operate two others.

Peru is richly endowed in mineralised gold belts. These form the Andean mountains, which stretch 250km to 500km inland along the whole of Peru’s Pacific coast. Each belt is host to a characteristic style of gold mineralisation.

Peru is still regarded as undersampled for gold, despite already supporting a thriving gold production industry.

Main Mines & 2012 Production
Yanacocha (Newmont) 41.9t (1,480,000oz) per yr
Lagunas Norte (Barrick) 23.5t (829,000oz) per yr
Orcopampa (Buenaventura) 7.4t (260,000oz) per yr
La Arena (Rio Alto) 6.2t (220,000oz) per yr

Main Development Projects
Crespo (Hochschild)
Shahuindo (Sulliden)
Inmaculada (Hochschild)

Main Exploration Projects
AntaKori (Andean American)
Collota (Dana)
Tres Cuces (Oroperu Resources)

Mineral Taxation in Peru
Corporate Income Tax: 30%
Depreciation Allowance: Plant & machinery, 20%; buildings, 5%.
Withholding Tax:
Tech / Management Staff: 15% / 30%
Interest: 4.99% / 30%
Royalties: 30%
Dividends: 4.1%.
Govt Ownership: None
Royalties on gold: 1% to 12%, plus Special Mining Tax & Special Mining Contribution.
VAT: None on exports.
Summary

- Burkina Faso is favoured by exceptionally prospective geology for the existence of economic gold deposits; however perceptions of non-gold opportunities seem much weaker.
- Recent years have seen an expansion in exploration activity and mine development with gold now the principal export earner.
- The country is seen as a modestly attractive investment opportunity for mining and exploration at a global level and as one of the more attractive such opportunities in Africa.
- The country is now seen to host an efficient bureaucracy, clear regulatory framework and fair taxation regime.
- The Government is actively encouraging mining investment but has amended the Mining Code to increase revenues to Burkina Faso and to encourage the use of local employees and suppliers. It has also legislated to increase its share of equity in producing mines.
- The twofold challenges facing the minerals sector are now improving its geological prospectivity and broader ‘non-mining’ economic development challenges relating to weak infrastructure and legal systems, poor labour skills, and general political instability and insecurity.
- The landlocked position and substandard infrastructure in Burkina Faso has resulted in additional costs during all project phases but especially during production with high prices for transport, fuel, reagents, water and explosives.
- The region is under growing threat from terrorist groups particularly Islamic militants.
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1. Location, Physiography and Climate

Burkina Faso is a landlocked country in West Africa around 274,200km² in size. It is surrounded by six countries: Mali to the north; Niger to the east; Benin to the southeast; Togo and Ghana to the south; and Ivory Coast to the southwest. The capital is Ouagadougou. As of 2014, population was estimated at just over 17.3 million. Formerly called the Republic of Upper Volta, the country was renamed "Burkina Faso" on 4 August 1984. French is the official language of government and business.

Figure 1: Road map of Burkina Faso

Burkina Faso lies mostly between latitudes 9° and 15°N (a small area is north of 15°), and longitudes 6°W and 3°E. The larger part of the country is covered by a peneplain, which forms a gently undulating landscape with, in some areas, a few isolated hills representing the last vestiges of a Precambrian massif. The southwest of the country, on
the other hand, forms a sandstone massif, where the highest peak, Ténakourou, is found at an elevation of 749 meters. The average altitude of Burkina Faso is 400m and the difference between the highest and lowest terrain is no greater than 600 metres.

Figure 2: Satellite image of Burkina Faso

The country owes its former name of Upper Volta to three rivers which cross it: the Black Volta (or Mouhoun), the White Volta (Nakambé) and the Red Volta (Nazinon). The Black Volta is one of the country's only two rivers which flow year-round, the other being the Komoé, which flows to the southwest. The basin of the Niger River also drains 27% of the country's surface. The Niger's tributaries – the Béli, the Gorouol, the Goudébo and the Dargol – are seasonal streams and flow for only four to six months a year. The country also contains numerous lakes – the principal ones are Tingrela, Bam and Dem. The country contains large ponds, as well, such as Oursi, Béli, Yomboli and Markoye. Water shortages are often a problem, especially in the north of the country.

Burkina Faso has a primarily tropical climate with two very distinct seasons. In the rainy season, the country receives 600-900mm of rainfall; in the dry season, the harmattan – a hot dry wind from the Sahara – blows. The rainy season lasts approximately four months, May/June to September, and is shorter in the north of the country. Three climatic zones can be defined: the Sahel, the Sudan-Sahel, and the Sudan-Guinea. The Sahel in the north is a relatively dry tropical savanna which typically receives less than 600 mm of rainfall per year and has high temperatures, 5–47 °C. Situated between 11°3' and 13°5' north, the Sudan-Sahel region is a transitional zone with regards to rainfall and temperature. Further to the south, the Sudan-Guinea zone receives more than 900 mm of rain each year and has cooler average temperatures.
2. Infrastructure

Transport in Burkina Faso is hampered by a largely underdeveloped infrastructure. The main airport is at Ouagadougou and as of June 2014 it had regularly scheduled flights to many destinations in West Africa as well as Paris, Brussels and Istanbul. There is another airport at Bobo Dioulasso which has flights to Ouagadougou and Abidjan.

Rail transport in Burkina Faso consists of a single line which runs from Kaya to Abidjan in Côte d'Ivoire via Ouagadougou, Koudougou, Bobo Dioulasso and Banfora. Sitarail operates a passenger train three times a week along the route.

There are 12,506km of highway in Burkina Faso, of which 2,001km are paved.

While services remain underdeveloped, the National Office for Water and Sanitation (ONEA), has improved the production of and access to clean water. Since 2000, nearly 2 million more people have access to water in the four principal urban centres in the country.

The landlocked nature of the country and the poorly developed infrastructure within it pose additional problems to explorers, developers and producers. Input costs are high especially for fuel and reagents while delivery times for spares can be long.

3. Geology

3.1 Regional Geology

The geology of Burkina Faso is dominated by Precambrian rocks of the Guinea Rise, a dome of Archaean rocks, largely migmatites, gneisses and amphibolites. These are overlain by metamorphosed Paleoproterozoic rocks of the Birimian Supergroup. In the far west of the country Paleoproterozoic rocks dip below continental and marine platform sediments of the Taoudenni Basin, which comprise sediments of Proterozoic to Paleozoic age. In the southeast of the country the Paleoproterozoic rocks are concealed beneath Neoproterozoic to Lower Cambrian rocks of the Volta Basin. These largely unmetamorphosed sediments of the Volta Basin form a continuation of sedimentary sequences in Ghana, Togo, Benin and Niger.

The Birimian Supergroup which hosts the important gold deposits of West Africa comprises greenstone belts of early Proterozoic age. The dominant lithologies are metasediments and metavolcanics.
3.2 Gold Mineralisation

Mineralisation is essentially restricted to shear zones within intensely deformed and metamorphosed volcano-sedimentary sequences of the Birrimian Supergroup. Quartz veining is usually associated with the gold as are pyrite and arsenopyrite. Carbonate alteration is common and most host sequences are strongly silicified. As it is beyond the scope of this study to describe all the deposits in Burkina Faso, three orebodies have been selected (see below) for a more detailed approach. A table detailing production, reserves and resources has been included as Appendix 2.

Essakane is an orogenic gold deposit characterized by quartz-carbonate stockwork vein arrays and is hosted within the lower meta-sedimentary sequence. The deposit occurs in an upright asymmetric anticline that plunges shallowly to the northwest. The highest concentration of quartz veins and gold mineralization occurs in the 50-70m thick ‘main arenite unit’, and spatially in the hinge zone and eastern fold limb of the host anticline.
The Mana gold project comprises several gold deposits. The main ones are the Wona, Nyafe, Siou and Fofina. At Wona, mineralization occurs as disseminated pyrite and arsenopyrite with associated gold in highly deformed and silicified meta-volcanosedimentary rocks. The mineralization is often associated with carbonates (siderite, ferruginous dolomite). It is often brecciated and generally close to a graphitic horizon. It is continuously mineralized over a strike-length of 1.5 kilometres (Main Zone plus SW zone).

Nyafe comprises a series of high-grade narrow quartz vein structures in a shear zone. Host rocks are of volcanic nature.

Siou is located within a shear zone east of Wona. Gold mineralization is associated with abundant quartz veining and silicification principally within the intrusive side of the contact.

The Fofina Zone at the south is situated at the contact of a sequence of shale and minor volcanoclastic rocks, and intermediate to mafic volcanic flows. Most of the sericite-silica alteration is gold-bearing, including the steeply dipping zones of high grade gold.

At Kiaka mineralisation zones in the mine area trend north-south and are associated with networks of quartz mineralisation or disseminated sulphides. Exploration activities have determined a 1.9 kilometre wide mineralisation zone extending 750m and varying in thickness. Gold mineralisation occurs in two zones, including a low grade wide zone and higher grade main zone within this wide zone. Mineralisation is also found in the hangingwall and footwall structures of the main zone. Although mineralisation is of a higher grade it is not as thick as the main zone.
4. The Economy and Gold

Gold and cotton constitute more than 70% of the country's exports.

The value of Burkina Faso’s exports over time reflects the increasing importance of gold. Gold production increased 32% in 2011 at six gold mine sites, making Burkina Faso the fourth-largest gold producer in Africa, after South Africa, Mali and Ghana (York, 2012). That said, a subsequent fall to US$754 million in 2012 is indicative of a strong drop in gold revenue (OEC, 2012).

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Exports (US$M)</th>
<th>Gold (%)</th>
<th>Gold (US$M)</th>
<th>Cotton (%)</th>
<th>Cotton (US$M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>325</td>
<td>1.8</td>
<td>6</td>
<td>75.6</td>
<td>246</td>
</tr>
<tr>
<td>2007</td>
<td>729</td>
<td>1.6</td>
<td>11</td>
<td>72.4</td>
<td>528</td>
</tr>
<tr>
<td>2008</td>
<td>764</td>
<td>24.4</td>
<td>186</td>
<td>48.1</td>
<td>368</td>
</tr>
<tr>
<td>2009</td>
<td>1040</td>
<td>44.3</td>
<td>459</td>
<td>37.0</td>
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<tr>
<td>2010</td>
<td>1780</td>
<td>59.9</td>
<td>1020</td>
<td>23.7</td>
<td>402</td>
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<tr>
<td>2011</td>
<td>2770</td>
<td>70.7</td>
<td>1960</td>
<td>18.8</td>
<td>521</td>
</tr>
<tr>
<td>2012</td>
<td>754</td>
<td>36.4</td>
<td>274</td>
<td>43.4</td>
<td>327</td>
</tr>
</tbody>
</table>

Table 1: Value (in US$) of Burkina Faso's exports notably gold and raw cotton (Source: The Observatory of Economic Complexity)
The mineral sector has become a significant contributor to Burkina Faso’s economy as gold has overtaken cotton as the country’s main export commodity. Gold-related revenues accounted for about 7% of total Government revenues in 2011.

From 2007 to 2011, the total number of industrial gold mines operating in the country increased from one to seven, and by 2010 a total of 17 companies were actively exploring for gold in the country. Gold production (excluding production from artisanal mining) increased to over 1Moz in 2010.

### 4.1 Perceptions of Mineral Policy

Globally, Burkina Faso is perceived to be a modestly attractive investment opportunity for the mining and exploration sector, and amongst its African peers as one of the best investment opportunities (Table 2). Although it’s mineral potential is perhaps seen as modest; the country hosts with what seems to be an efficient bureaucracy and a clear legal framework and taxation regime (Table 2).

<table>
<thead>
<tr>
<th>Index</th>
<th>World Position (of 122)</th>
<th>World Quartile</th>
<th>Africa Position (of 30)</th>
<th>Africa Quartile</th>
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<tr>
<td>Investment Attractiveness</td>
<td>50</td>
<td>2nd</td>
<td>6</td>
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</tr>
<tr>
<td>Policy Perception</td>
<td>87</td>
<td>3rd</td>
<td>3</td>
<td>1st</td>
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<tr>
<td>Mineral Potential¹</td>
<td>72</td>
<td>3rd</td>
<td>13</td>
<td>2nd</td>
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<tr>
<td>Room for Improvement</td>
<td>13</td>
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<td>4</td>
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<tr>
<td>Uncertainty Concerning Existing Regulations²</td>
<td>23</td>
<td>1st</td>
<td>3</td>
<td>1st</td>
</tr>
<tr>
<td>Uncertainty Concerning Environmental Regulations</td>
<td>8</td>
<td>1st</td>
<td>5</td>
<td>1st</td>
</tr>
<tr>
<td>Regulatory Duplication &amp; Inconsistencies</td>
<td>32</td>
<td>2nd</td>
<td>9</td>
<td>2nd</td>
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<tr>
<td>Legal System</td>
<td>62</td>
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<td>Taxation Regime</td>
<td>27</td>
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<td>5</td>
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<td>7</td>
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<td>Uncertainty Concerning Protected Areas</td>
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<td>Quality of Infrastructure</td>
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<td>Trade Barriers</td>
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<tr>
<td>Political Stability</td>
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<td>3rd</td>
<td>11</td>
<td>2nd</td>
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<tr>
<td>Labour Regulations⁴</td>
<td>47</td>
<td>2nd</td>
<td>7</td>
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<td>Geological Database</td>
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<tr>
<td>Security</td>
<td>77</td>
<td>3rd</td>
<td>7</td>
<td>1st</td>
</tr>
<tr>
<td>Availability of Labour / Skills</td>
<td>85</td>
<td>3rd</td>
<td>9</td>
<td>2nd</td>
</tr>
</tbody>
</table>

¹ Known fully as the ‘Best Practices Mineral Potential Index’ which ranks countries by attractiveness if all countries applied Best Practice mineral policy i.e. if only geological prospectivity mattered.
² Known fully as the ‘Uncertainty Concerning the Administration, Interpretation and Enforcement of Existing Regulations’ index.
³ Known fully as the ‘Socioeconomic Agreements / Community Development Conditions’ index.
⁴ Known fully as the ‘Labor Regulations / Employment Agreements and Labour Militancy / Work Disruptions’ index.

Table 2: The position of Burkina Faso in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).

Foreign investors see little general room for improvement in this sense, so Burkina Faso arguably is making the best of its modest geological endowment. The main challenges facing Burkina Faso in developing its mining sector, now generally relate to broader challenges of economic development and progression into a middle income country
The country is seen to have a weak legal system; poor infrastructure and availability of skilled labour; and as with Western Africa as a whole is insecure and politically unstable (Table 2).

To develop its mining sector further Burkina Faso needs to improve its mineral potential and develop its economy more generally. Improving the poor national geological database may help improve the country’s mineral potential. Substantial economic development on the back of the gold industry (which has low barriers to entry globally so is generally marginally profitable) is difficult, so the discovery of more bulk commodity deposits such as copper, iron ore, bauxite and coal may provide the incentive to develop better infrastructure and skills within the country.

Burkina Faso has been seen as a modestly attractive investment opportunity for the mining and exploration sector for at least five years (Figure 6), generally scoring in the second quartile globally in the key indices. The country seems to have arrested a temporary decline in perceptions of attractiveness (Figure 6). However, in emerging from this period the mineral potential of the country is seen to be much diminished (Figure 6). Fortunately the country seems to have improved its policy climate during this period, partly mitigating its perceived fall in mineral potential (Figure 6). Again it is hard not to conclude that the main challenge facing Burkina Faso in attracting foreign investment into its mining sector is improving its mineral potential.

**Performance of Burkina Faso in Fraser Institute Survey of Mining Companies Rankings over time**

![Figure 6: The changing position over time of Burkina Faso in the three main indices (Investment Attractiveness, Policy Perception and Mineral Potential) of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).](image-url)
4.2 Perceptions of Investment Risk

Burkina Faso was ranked the 111th safest investment destination in the world in the 2011 Euromoney Country Risk rankings.

Burkina Faso is part of the West African Monetary and Economic Union (UMEOA) and has adopted the CFA Franc. This is issued by the Central Bank of the West African States (BCEAO), situated in Dakar, Senegal. The BCEAO manages the monetary and reserve policy of the member states, and provides regulation and oversight of financial sector and banking activity. A legal framework regarding licensing, bank activities, organizational and capital requirements, inspections and sanctions (all applicable to all countries of the Union) is in place, having been reformed significantly in 1999. Micro-finance institutions are governed by a separate law, which regulates micro-finance activities in all WAEMU countries.

The insurance sector is regulated through the Inter-African Conference on Insurance Markets (CIMA). Burkina Faso is a member of the Organization for the Harmonization of Business Law in Africa (OHADA). Burkina Faso is a member of the African Union, Community of Sahel-Saharan States, La Francophonie, Organisation of Islamic Cooperation, Economic Community of West African States, and United Nations.

5. Geopolitical Assessment and Sovereign Risk

The growth rate in Burkina Faso is high although it continues to be plagued by corruption and incursions from terrorist groups from Mali and Niger. The emergence of the violent pro-Islamic Boko Haram movement in Nigeria is of particular concern and has prompted travel warnings as in the example below:

Travel alert: The UK Foreign and Commonwealth Office advises against all travel to the area of Burkina Faso north of the town of Boulasa and against all but essential travel to the rest of the country. Please check with your relevant national government (Advice current at 12 February, 2015)
Within Burkina Faso, the Mining Code has recently been amended (attached as Appendix 1). Some aspects are of particular interest/concern to foreign investors and explorers.

6. Conclusions

- Burkina Faso is geologically highly prospective for the discovery and economic exploitation of gold, though non-gold mineral potential currently is perceived to be much weaker.
- Improving its mineral potential is one of the key challenges facing Burkina Faso’s mining and exploration sector.
- The government is pro-active in encouraging exploration and development in Burkina Faso, and it is now recognised to have an efficient bureaucracy and clear regulatory framework and taxation regime.
- However, the recently amended Mining Code (attached as Appendix 1) contains some concerning clauses especially for gold producers. These include the following:
  - The amended Mining Code provides an option for the Burkina Faso State to acquire an additional equity participation in all exploitation by mining companies, but does not set any limit to such additional participation.
  - The Mining Code proposes to remove the preferential rate for tax on industrial and commercial profits and tax on revenues on tangible assets that holders of exploitation permits currently benefit from during the exploitation phase.
The amended Mining Code proposes to remove certain tax exemptions as defined in article 90 of the current Mining Code.

- The other major challenge facing the mineral’s sector in Burkina Faso relate to the low level of general economic development in the country meaning it has a weak legal system, poor infrastructure, little skilled labour and is politically unstable and insecure.
- The regional terrorist threat cannot be ignored.

7. References


Avocet Mining Press Release, 6 March 2014; Full-year results – 2013


Endeavour Mining Press Release, 29 Jan 2014; Endeavour Mining delivers 324,275oz in 2013 and forecasts 400,000-440,000oz in 2014


IAMGOLD Report: Fourth quarter and full year 2013 Results. Release to TSX and NYSE, 19 February, 2014


SEMAFO Press Release, Quebec, Montreal, 12 March 2014


APPENDIX 1

Overview on Mining Law in Burkina Faso and current trends

(Adapted from Emery Mukendi Wafwana & Associates and Jonathan van Kempen, March 8 2013)

1. Introduction
Burkina Faso is rich in natural resources and is emerging as one of the most attractive mining destinations in Africa especially for gold exploration and exploitation. Burkina Faso is ranked by Fraser Institute the third most attractive in Africa for mining with only Botswana and Ghana ahead of Burkina Faso (1). The income from gold plays an important role for the national economy. Gold production has doubled since 2008 and has become the second largest export product after cotton (2). The mining sector currently represents 12.7 per cent of Burkina Faso GDP, but the Government is expecting the mining contribution to its GDP to double by 2015 as many gold, zinc and manganese projects are expected to generate revenues (3).

As in many other African mining jurisdictions, Burkina Faso is currently revising its 2003 Mining Code in view of increasing its benefits from the sector and improving its local economy by increasing local employment and business opportunities (4). This article gives a brief overview on mining law in Burkina Faso and discusses the main amendments proposed by the last draft of the new mining code that is expected to come into force by end of 2013.

2. Legal Framework
Burkina Faso’s legal system is based on civil law and is mainly copied from the French legal system. The Constitution provides that the richness and natural resources belong to the people and are used to improve their life conditions (5).

Mining activities are regulated by numerous Laws and Decrees prescribing tax and mining royalties and setting standard conventions for industrial exploitation permits, artisanal semi-industrial exploitation permits and exploration permits (together, “Mining Legislation”).

The Mining Code does not intend to create an exclusive and exhaustive legal framework for mining activities as many other legal instruments also regulate the mining activities in Burkina Faso.

At the regional level, Burkina Faso is a member of the West African Monetary and Economic Union (6) (“WAEMU”) whose currency is the CFA Franc or CFA and a member of the Economic Community of West African States (7) (“ECOWAS”). Burkina Faso also adheres to the Treaty on the Harmonization of Business Law in Africa (“OHADA”) (8).

3. General Principles
The Mining legislation aims to promote investment in the mining sector in Burkina Faso and to promote exploration and exploitation of natural resources necessary for the economic and social development of Burkina Faso. The scope of application of the Mining Code includes the prospection, exploration and exploitation of mineral deposits as well as the treatment, transport and transformation of mineral substances, except water and hydrocarbons (9). The natural deposits of mineral substances contained in the soil and sub-soil are ex officio the ownership of the State who shall ensure their development by resorting to private initiative in accordance with the provisions of the Mining Code (10).

In Burkina Faso, any individual or legal entity from Burkina Faso or of foreign nationality may carry out a mining activity regulated by the Mining Code. However, foreign legal entities are not eligible to hold exploitation permits.
So, foreign companies need to create and incorporate a legal entity in Burkina Faso to hold exploitation permits. Any titleholder, except if he has his residency in Burkina Faso, needs to be registered in Burkina Faso and have an agent whose identity and qualifications must be given to the Administration of Mines (11). The appointed agent must be sufficiently aware of the mining activities of its principal in order to be able to provide the Administration of Mines with the necessary information. Prior to carrying out such mining activity, a mining title or an authorization must be granted following the procedure set out by the Mining Code (12).

4. Mining Titles
The Mining legislation envisages different mining titles: exploration permit, industrial exploitation permit and semi-industrial artisanal exploitation permit. The activities of prospection, traditional artisanal exploitation and exploitation for quarry substances are granted by administrative authorizations. This article focuses only on mining titles.

4.1. Exploration permit
An exploration permit is granted by Decree of the Minister of Mines to any person who files an application in accordance with Decree No. 2005-047/PRES/PM/MCE of February 3, 2005. The application must be filed along with a program of exploration works that the applicant contemplates to carry out during the first year of validity of the permit and the related budget of such program (13). The exploration permit is valid for an initial period of three years from the date of granting and may be renewed twice for consecutive periods of three years provided the titleholder complies with its rights and obligations set by the Mining Legislation. An exploration permit may be granted for a surface maximum of 250km². Titleholders of exploration permit must start exploration works within the covered perimeter no later than 6 months of the date of validity of the permit and continue them diligently.

4.2. Industrial exploitation permit
An industrial exploitation permit is granted by Decree to a holder of an exploration permit who complies with all the obligations set out by the Mining legislation and files an application no later than three months before the expiry of the validity of the relevant exploration permit in accordance with the Mining Legislation. The application must be filed along with a feasibility study and a plan for the development and exploitation of the mining deposits which shall include, inter alia:
• an environmental impact study and
• a mitigation and rehabilitation plan.

The current Mining Code provides for a free-carried State equity participation of 10% in all companies on the delivery to the company of an industrial exploitation permit for large scale mining (14). The State equity participation is free and non-dilutable. The proposed draft of the new mining code (15) extends the mandatory state equity participation to all industrial exploitation permits and contemplates the possibility for the State to acquire additional equity participation on commercial terms to be agreed with the mining company.

Therefore, the current version of the Mining Code provides an option for the Burkina Faso State to acquire an additional equity participation in all exploitation by mining companies, but does not set any limit to such additional participation.

The additional state equity participation shall not be applicable to exploitation permits granted before the entry into force of the new mining code.

The industrial exploitation permit grants its holder the exclusive right to explore and exploit mineral deposits within the defined perimeter. Its term of validity is 20 years for large scale mines and 10 years for small scale mines renewable for consecutive periods of 5 years (16). The industrial exploitation permit is a real property
right which can be subject to mortgage or pledge (17). Unless the holder is exempted, the holder must commence the development and exploitation works no later than 2 years from the date of validity of the industrial exploitation permit and diligently continue in accordance with its undertakings (18).

4.3. Semi-industrial artisanal exploitation permit
The semi-industrial artisanal exploitation permit is granted by the Administration of Mines after consultation with the competent administrative authorities and local communities. Its term of validity is 5 years and renewable for a period of three years (19).

5. Mining Convention
The current Mining Code provides that exploration and exploitation permits shall be accompanied by a mining convention that the State will conclude with the titleholder (20). The application for an exploration or exploitation permit must include a proposed draft of the mining convention based on the standard form set by Decree No. 2005-049/PRES/PM/MCE of February 3, 2005 (21). The Mining convention supplements the provisions of the Mining Code and specifies the rights and obligations of the parties and may also offer to the titleholder the guarantee of stability for certain terms and conditions namely in relation to the fiscal, custom and change regimes. The duration of validity of the mining convention is for a maximum of 25 years and renewable for successive periods of 10 years.

The Mining Code envisages providing a mining convention only for industrial exploitation permits. Exploration permits and semi-industrial exploitation permits would not be subject to a mining convention, but to term sheets whose content should be defined by the mining legislation.

6. Transfer and assignment of mining rights
Mining rights attached to mining titles are assignable and transferable in accordance with the conditions set out in the mining legislation. However, prior to any partial or total assignment or transfer, approval from the Minister of Mines is required. The application should be filed along with the documents listed in the mining legislation and the assignee or transferee needs to be an individual or legal entity that is eligible to hold mining rights. If the assignee or transferee offers the same guarantees of execution of its mining obligations as the assignor or transferor, the approval of the Minister of Mines shall be given provided that the assignor or transferor also complies with its own obligations.

The Mining Code also provides for a tax on capital gains realized on such transaction in accordance with the Tax Code. The Mining Code proposes to set the tax on capital gains on such transaction at 20% on the gains realized. However, this tax will not apply to transfer of an exploration permit to a subsidiary’s company before its conversion into an exploitation permit.

7. Environmental and social considerations
The Mining Code contains provisions that regulate the environmental, health and safety aspects of mining activities. Environmental aspects are regulated by the Mining Code and the Environmental Code (22). Any applicant for a mining title, except for an exploration permit or authorization for quarrying exploitation, shall undertake an environmental impact study along with a public survey and an environmental management and mitigation plan.

The Mining Code includes new provisions to give preference to local businesses and recruitment. For the supply of goods and services, titleholders and holders of authorizations as well as their subcontractors will be obliged to give preference to local businesses provided they supply at the same quality, price and delivery terms. Concerning recruitment, titleholders, holders of authorizations and their subcontractors will be obliged to recruit, as a priority, local employees for executive positions to the extent they offer the same qualifications and the necessary competencies to carry out the mining operations. The mining company will be obliged to file with the Administration of Mines a training plan for local executives in order for them to progressively replace the
expatriate employees. It is also provided that the titleholder or holder of authorizations will be obliged to first recruit employees from the local community or the neighbouring communities for positions that do not require any specific qualification.

8. Tax and custom regime
The Mining Code provides for certain taxes that are specific to mining activities and offers certain tax incentives for titleholders at different stage of their projects to strengthen the competitiveness of the mining sector in Burkina Faso.

The tax and custom regime is protected by a stability clause. In this regard, article 93 of the Mining Code provides that the stabilization of the tax and custom regime is guaranteed to holders of exploitation permits and authorizations for exploitation during the period of validity of their permit or authorization in order to prevent an increase of their fiscal burden. During that period, tax rates, assessment rules and taxes shall be the same as those that existed at the date of the granting of the mining title or of the delivery of the authorization and no new taxes or charges of any nature shall be applicable to the titleholders during that period.

However, the current Mining Code expressly excludes from its stability clause mining taxes, royalties and charges. The Mining Code proposes to limit the stabilization clause to a period of 20 years maximum. Further, holders of authorizations to exploit quarry substances shall benefit from the stabilization clause only if they reach a certain level of investment to be defined by the Mining Regulations.

Holders of mining titles or authorizations are subject to the payment of fixed charges and proportional charges that include the surface area fees and the proportional mining royalties. The granting, renewal and transfer of mining titles or authorizations shall be subject to payment of fixed charges determined by Decree No. 2010-075 PRES/PM/MEF specifying taxes and mining royalties (23).

The holders of mining titles or authorizations are also subject to the payment of an annual surface area fee which is assessed based on the surface covered by the permit or authorization and its period of validity (24). Furthermore, holders of mining titles or authorizations are subject to the payment of mining royalties calculated in percentage on the value of sales of extracted products. The current rates for mining royalties are the following (25):

- 8% for uranium
- 7% for diamonds and gemstones
- 3% to 5% for gold and precious metals
  - the minimum rate is 3%
  - 4% for prices between US$1,000 and US$1,300 per ounce
  - 5% for prices above US$1,300 per ounce
- 3% for base metals and other mineral substances.

The Mining Code provides for some tax incentives for holders of exploration permits (26). The main incentives are exemption from the following taxes:

- VAT on imports of goods needed for the realization of geological and mining activities or geological services
- Tax on industrial and commercial profits
- Tax on patents
- Employer and apprentice tax
- Registration fees for certain corporate acts

Holders of exploitation permits also benefit from certain tax and custom incentives during the period of development work such as an exemption of the VAT on certain imported equipment and services provided by geosupply companies. The period of such exemption is a maximum 2 years which can be extended for another year provided that the level of investment reaches at least 50% of the projected investment (27).
During the period of development work, holders of exploitation permits are exempted from import duties on imports of goods, raw materials, equipment, fuels and lubricants intended for power generation and operation of vehicles and their components and spare parts excluding statistic charges, community solidarity charges, community charges and other community charges. This exemption lasts for 3 years maximum and ends at the date of the first commercial production (28). During the exploitation stage, holders of exploitation permits are subject to the payment of tax on industrial and commercial profits at the general rate reduced by 10% and the tax on revenues on tangible assets at the general rate reduced by 50% (29). The Mining Code provides for other tax incentives during the exploitation stage such as:

- Exemption for a period of 7 years of patent tax, employer and apprentice tax and registration fees for certain corporate acts (30).

The Mining Code proposes certain amendments to the current tax and custom regime. Firstly it proposes that holders of exploitation permits shall during any extension phase of the mine, benefit from the same custom incentives available during the development work. The extension phase covers any new mining investment program approved by the Minister of Mines which is initiated by a holder of an exploitation permit in exploitation phase for at least 2 years and which shall lead to an increase of 50% of the duration of the mine; a realization of new investments different from the replaced investments; and a significant increase in employment. Secondly it proposes to remove the preferential rate for tax on industrial and commercial profits and tax on revenues on tangible assets that holders of exploitation permits currently benefit from during the exploitation phase.

Thirdly it proposes to remove certain tax exemptions as defined in article 90 of the current Mining Code.

Finally it proposes the creation of a new fund called “Mining Fund for Local Development”. The holders of exploitation permits and authorizations for quarrying exploitation shall be subject to the payment of 1% of their turnover to the fund and the State shall pay 25% of the collected mining royalties to the new fund. The modalities and management of the fund shall be specified by the implementation measures.

- CFA/km2/year
- from the sixth year: 10,000,000CFA/km2/year
- from the eleventh year: 15,000,000CFA/km2/year

9. Conclusions
Burkina Faso is a relative stable country and emerging as one of the most attractive mining destinations in Africa, especially for gold exploration and exploitation. As in other African jurisdictions (31), Burkina Faso now intends to increase its benefits from the sector by:

- Increasing its equity participation in mining companies and increasing tax burdens for mining companies.
- Burkina Faso also intends to improve its local economy by increasing local employment and business opportunities for Burkinabe companies. Mining companies will also be expected to financially contribute to local communities by the creation of the Mining Fund for Local Development.
- The Government of Burkina Faso has acknowledged the importance of the mining sector to its economy and is reviewing its mining policy by balancing the interests and increasing the benefits to the country and its people.

10. References
1. Fraser Institute, 2012 Survey, 12.
4. For example: Guinea Conakry revised its Mining Code in September 2011; the Democratic Republic of Congo is currently reviewing is 2002 Mining Code; Mali revised its Mining Code in 2012 which has not yet been promulgated; Angola revised its Mining Code in 2011; Liberia is considering to review its Mining Code.
5. Article 14 of the Burkina Faso’s Constitution.
6. WAEMU countries include: Senegal, Togo, Côte d’Ivoire, Mali, Benin, Guinea Bissau, Niger, and Burkina Faso.
7. ECOWAS countries include: Benin, Burkina Faso, Capo Verde, Ivory Coast, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.
8. OHADA countries include: Benin, Burkina Faso, Cameroon, Chad, Republic of Central Africa, Comores, Republic of Congo, Democratic Republic of Congo, Ivory Coast, Gabon, Guinea, Guinea Bissau, Equatorial Guinea, Mali, Niger, Senegal, and Togo.
9. Article 2 of the Mining Code.
10. Article 5 of the Mining Code.
11. Article 31 of the Mining Code.
12. Article 6 of the Mining Code.
13. Articles 11 to 16 of the Mining Code.
16. Article 21 of the Mining Code.
17. Article 20 of the Mining Code.
18. Article 23 of the Mining Code.
19. Article 26 of the Mining Code.
20. Article 30 of the Mining Code.
23. Exploration permits for any mineral substances, except uranium: granting: 1,000,000 CFA; first renewal: 1,500,000 CFA; second renewal: 2,000,000 CFA; transfer: 3,000,000 CFA; Industrial exploitation permits for any mineral substances, except uranium: granting: 5,000,000 CFA; renewal: 12,500,000 CFA; transfer: 15,000,000CFA.
24. Exploration permits for any mineral substances, except uranium: first year: 2,500 CFA/km²/year; second year: 3,000 CFA/km²/year; third year: 4,500 CFA/km²/year; as from fourth year: 7,500 CFA/km²/year; Industrial exploitation permits for any mineral substances, except uranium: Five first years: 7,500,000 CFA.
26. Article 84 of the Mining Code.
27. Article 86 of the Mining Code.
28. Article 87 of the Mining Code.
29. Article 88 of the Mining Code.
30. Article 90 of the Mining Code.
### APPENDIX 2

#### Status of Gold Production, Development and Exploration Projects in Burkina Faso

<table>
<thead>
<tr>
<th>Mine</th>
<th>Owner</th>
<th>Status</th>
<th>Production</th>
<th>Resources</th>
<th>Mining</th>
<th>Processing</th>
<th>Source</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essakane</td>
<td>IAMGOLD</td>
<td>Production</td>
<td>2013:250,000 oz @cash cost of US$753/oz</td>
<td>As at 31 Dec 2013&lt;br&gt;Prob Reserves = 126.8Mt @ 1.1g/t = 4.573Moz&lt;br&gt;Ind Resources = 144.1Mt @ 1.1g/t = 5.270Moz&lt;br&gt;Inf Resources = 20.2Mt @ 1.1g/t = 0.704Moz</td>
<td>Drill, blast, load, haul surface mining&lt;br&gt;Conventional SAG circuit&lt;br&gt;Stockpiled ore into crushing and grinding circuit (SAG and ball-mills), thickening, CIP</td>
<td>Crush, mill and &quot;CIL&quot;</td>
<td>IAMGOLD Report: Fourth quarter and full year 2013 Results. Release to TSX and NYSE, 19 February, 2014</td>
<td></td>
</tr>
<tr>
<td>Mana</td>
<td>SEMAFO</td>
<td>Production</td>
<td>2013: 158,000oz at cash cost of US$777/oz</td>
<td>As at 31 Dec 2013&lt;br&gt;Prov &amp; Prob Reserves = 25.516Mt @ 2.81g/t = 2.303Moz&lt;br&gt;Mes &amp; Ind Resources = 35.875Mt @ 2.12g/t = 2.446Moz&lt;br&gt;Inf Resources = 14,712Mt @ 3.06g/t = 1,446Moz</td>
<td>Several open-pits and proposed underground operation</td>
<td>Crush, mill and &quot;CIL&quot;</td>
<td>SEMAFO Press Release, Quebec, Montreal, 12 March 2014</td>
<td></td>
</tr>
<tr>
<td>Inata</td>
<td>Avocet Mining</td>
<td>Production</td>
<td>2014: 86,037oz @1.77g/t</td>
<td>As at 31 Dec 2013&lt;br&gt;Prov &amp; Prob Reserve = 7.1Mt @ 2.16g/t = 0.491Moz&lt;br&gt;Mes Resource = 31.2Mt @ 1.61g/t = 1.617Moz&lt;br&gt;Ind Resource = 49.5Mt @ 1.39g/t = 2.207Moz&lt;br&gt;Inf Resources = 58.8Mt @ 1.47g/t = 2.274Moz</td>
<td>6 open-pits, drill, blast, load and haul by owner-operated fleet. Upper 35m is free-dig.</td>
<td>Crush, mill and &quot;CIL&quot;</td>
<td>Avocet Mining Press Release, 6 March 2014; Full-year results - 2013</td>
<td></td>
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<tr>
<td>Kalsaka</td>
<td>Cluff - 78%, IMARB - 12%</td>
<td>Mining ceased 6 August 2014</td>
<td>-</td>
<td>As at 31 Dec 2011&lt;br&gt;Prov and Prob Reserves = 1.7Mt @ 1,5g/t&lt;br&gt;Mes &amp; Ind Resources = 1.2Mt @ 1.7g/t</td>
<td>Open-pit surface mining&lt;br&gt;Conventional gravity, CIL plant</td>
<td>Endeavour Mining Press Release, 29 Jan 2014; Endeavour Mining delivers 324,275oz in 2013 and forecasts 400,000-440,000oz in 2014</td>
<td><a href="http://www.miningweekly.com/article/kalsaka-mine-burkina-faso-2012-11-02">www.miningweekly.com/article/kalsaka-mine-burkina-faso-2012-11-02</a></td>
<td></td>
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<tr>
<td>Youaga</td>
<td>Endeavour Mining</td>
<td>(mine life approx 3 yrs)</td>
<td>2013: 89,440oz</td>
<td>As at 31 Dec 2013&lt;br&gt;Prov &amp; Prob Reserves = 4.0Mt @ 2.0g/t = 0.265Moz&lt;br&gt;Mes &amp; Ind Resources = 15.5Mt @ 1.6g/t = 0.805Moz&lt;br&gt;Inf Resources = 2.2Mt @ 1.4g/t = 0.099Moz</td>
<td>Youga and Youga Satellite open-pits. Hard-rock drill, blast and haul under contract. Quare’ deposit 40km away</td>
<td>Conventional gravity, CIL plant</td>
<td>Endeavour Mining Press Release, 29 Jan 2014; Endeavour Mining delivers 324,275oz in 2013 and forecasts 400,000-440,000oz in 2014</td>
<td><a href="http://www.nordgold.com/operations/production/taparko/">www.nordgold.com/operations/production/taparko/</a></td>
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<tr>
<td>Taparko</td>
<td>High River Gold (Nordgold)</td>
<td>Production</td>
<td>2014: 112,000oz @ 2,34g/t</td>
<td>As at 1 Jan 2013&lt;br&gt;Prov &amp; Prob Reserves = 8.67Mt @ 2.52g/t = 0.703Moz&lt;br&gt;Mes &amp; Ind Resources = 16.3Mt @ 2.17g/t = 1.139Moz&lt;br&gt;Inf Resources = 8.7Mt @ 1.51g/t = 0.421Moz</td>
<td>4 open-pits with owner-operated fleet. Stockpiled ore into crushing and grinding circuit (SAG and ball-mills), thickening, CIP</td>
<td>Stockpiled ore into crushing and grinding circuit (SAG and ball-mills), thickening, CIP</td>
<td><a href="http://www.nordgold.com/operations/production/taparko/">www.nordgold.com/operations/production/taparko/</a></td>
<td>In 2015, Taparko will also invest in reserve replacement from near mine exploration focusing on resources conversion and extensions of current pits, which include future satellite pits (Yeou, Goengo, Bissinga and Zemce).</td>
</tr>
<tr>
<td>Kiaka</td>
<td>B2Gold Corp - 89% GEP Minerals - 10%</td>
<td>Development</td>
<td>Not yet in production</td>
<td>Calculated during PFS in 2012&lt;br&gt;Prov &amp; Prob Reserves = 3.89Moz @ 0.96g/t&lt;br&gt;Mes &amp; Ind Resources = 0.97Moz&lt;br&gt;Inf Resources = 1.10Moz</td>
<td>Stockpiled ore into crushing and grinding circuit (SAG and ball-mills), thickening, CIP</td>
<td>Stockpiled ore into crushing and grinding circuit (SAG and ball-mills), thickening, CIP</td>
<td><a href="http://www.b2gold.com/projects/burkina-faso/kiaeka-project.html">www.b2gold.com/projects/burkina-faso/kiaeka-project.html</a></td>
<td>Stripping ratio = 1.95:1&lt;br&gt;Gold recovery circa 90% PFS indicates 12Mtpa for 0.34Moz gold for 10.3 years&lt;br&gt;Pre-tax NPV8% of $548M and 23.3%IRR based on $1372 gold price and $671/oz operating cost</td>
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<tr>
<td>Location</td>
<td>Company</td>
<td>Project Details</td>
<td>Methodology</td>
<td>Economic Indicators</td>
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<tr>
<td>Natougou</td>
<td>Orbis Gold</td>
<td>DFS due for completion mid-2015</td>
<td>Not yet in production</td>
<td>Calculated during Scoping Study in August 2014: Indicated Resource = 7.1Mt @ 5.1g/t for 1.2Moz</td>
<td>Scoping Study assumes development of the deposit via a conventional open pit mining method comprising drill, blast, load and haul. DFS due for completion mid-2015 Not yet in production.</td>
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<td></td>
<td>Inferred Resource = 11.0Mt @ 2.3g/t for 0.8Moz</td>
<td><a href="http://www.orbisco.com/projects/burkina-faso/natougou-gold-project">www.orbisco.com/projects/burkina-faso/natougou-gold-project</a></td>
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<tr>
<td>Banfora</td>
<td>Gryphon Minerals</td>
<td>Optimation Study in February 2014</td>
<td>Measured &amp; Indicated Resources = 31.9Mt @ 2.12g/t for 2.17Moz</td>
<td>Gold ore recovery ~94% Stripping ratio = 11.7:1</td>
<td>Scoping Study assumes a conventional process route comprising: crushing, SAG/ball grinding, CIL, elution/electrowinning and smelting to produce gold bullion. Pre-tax NPV5% of US$33M and 100%IRR based on US$1300 gold price and US$665/oz operating cost.</td>
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<td>Inferred Resources = 7.8Mt @ 1.87g/t for 0.47Moz</td>
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<td><a href="http://www.gryphonminerals.com.au/index.../projects-en/.../banforagold-project">www.gryphonminerals.com.au/index.../projects-en/.../banforagold-project</a></td>
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<tr>
<td>Guiro</td>
<td>Stremco (Komet Resources subcontracting)</td>
<td>Resource definition and metallurgy</td>
<td>Underground mine</td>
<td>OS supports 2Mtpa heap leach operation producing 71,000oz (+80,000 in 1st 3 years) with a LoM of 8.7 years Ave grade over LoM = 1.44g/t Pre-tax NPV5% of US$154M and 39%IRR based on US$1200 gold price and US$665/oz operating cost.</td>
<td><a href="http://www.gryphonminerals.com.au/index.../projects-en/.../banforagold-project">www.gryphonminerals.com.au/index.../projects-en/.../banforagold-project</a></td>
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<td>Yaramoko</td>
<td>Roxgold (incl SSZ Zone and Bagassi South)</td>
<td>Feasibility Study of 22April 2014</td>
<td>Probable Reserve of 1.996Mt @ 11.8g/t for 759,000oz. Annual production of 99,300oz for mine-life of 7.4 years. Pre-tax IRR of 53.7% and NPV5% of US$300M at a gold price of US$1300 and cash costs of US$590/oz.</td>
<td>Underground mine</td>
<td><a href="http://www.infomine.com/intelligence/property/47555/yaramoko/">www.infomine.com/intelligence/property/47555/yaramoko/</a></td>
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</table>
Summary

- Ghana is well endowed with the requisite geology for the discovery and exploitation of economic gold deposits.
- Gold mining has been ongoing since the 1870’s and has increased dramatically over the last decade.
- The country remains a fairly attractive investment opportunity amongst global peers, and is one of Africa’s best perceived investment opportunities.
- Ghana’s stable political situation, advanced infrastructure and relative remoteness from the conflict zones of West Africa improve its attractiveness to investors.
- The current mining legislation, while continuing to provide improved benefits to the state and people of Ghana, is not unduly punitive to foreign investment.
- Potential minor weaknesses still exist in a legal system which could be improved and problems relating to socio-economic and local community agreements.
- The main challenge facing Ghana’s minerals sector is however improving its mineral potential, the perceived attractiveness of which, has dropped off in recent years. This will likely require improvements to the geological database and a diversification beyond gold to bulk scale commodities such as iron ore, coal and copper that can attract more substantial foreign investment.
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1. Location, Physiography and Climate

The Republic of Ghana is located in West Africa and covers an area of 238,535 square kilometers with over 2,000 kilometers of international land borders. Ghana is bordered by the Ivory Coast in the west, Burkina Faso in the north, Togo in the east and the Gulf of Guinea and Atlantic Ocean in the south. The Ghanaian coastline stretches 560 kilometers and the country lies between latitudes 4° and 12°N, and longitudes 4°W and 2°E (abridged from Wikipedia).

Ghana is dominated by grasslands mixed with south coastal shrublands and forests. The topography comprises plains, low hills, rivers and Lake Volta.

The climate of Ghana is tropical and there are two main seasons: the wet and the dry seasons. North Ghana experiences its rainy season from March to November while South Ghana experiences its rainy season from April to mid-November. The tropical climate of Ghana is relatively mild for its latitude. The harmattan, a dry desert wind, blows in north-east Ghana from December to March, lowering the humidity and causing hot days and cool nights.
2. Infrastructure

Transport in Ghana is serviced by road, rail, air and water. Ghana’s transportation and communications networks are centred in the southern regions, especially the areas in which gold, cocoa, and timber are produced. The northern and central areas are connected through a major road system.

The Ghana railway network occupies a length of 947 kilometers, comprising national rail lines that do not go outside the national border. The railway network is limited to the southern part of Ghana.

Road transport is the dominant carrier of freight and passengers in Ghana’s land transport system. It carries over 95% of all passenger and freight traffic and reaches most communities. The Trans–West African Coastal Highway, part of the Trans-African Highway network crosses Ghana along the N1, connecting it to Abidjan, (Ivory Coast), Lomé, (Togo) and to Benin and Nigeria.

There are ports on the Atlantic Ocean at Takoradi and Tema. Tema is the bigger of the two seaports, handles the majority of the nation’s import and export cargo and is Africa’s largest manmade harbour. Apart from handling goods for Ghana, it is also a traffic junction, where goods are transhipped, and transit cargo destined for the landlocked countries to the north of Ghana.

Ghana’s Volta River, Ankobra River, and Tano River provide 168 kilometres of navigation for launches, and Volta Lake provides 1,125 square kilometres of arterial and feeder waterway.
Ghana has a well-developed airline industry and five main regional airports: Kotoka International Airport in Greater Accra, Kumasi Airport, Sekondi-Takoradi Airport in Western Ghana, Sunyani Airport and Tamale Airport.

3. Geology

3.1 Regional Geology

The Ashanti belt of Ghana is the key district of gold mineralization in the Paleoproterozoic terrane of West Africa. This area in southwest Ghana comprises the volcanic-sedimentary Birimian Supergroup and the overlying clastic sedimentary Tarkwaian Group which were jointly folded and metamorphosed under greenschist facies conditions at about 2.1 Billion years. Regional foliation and subparallel shear zones hosting mesothermal gold mineralization developed during deformation coeval with metamorphism (Oberthur et. al. 1996).
3.2 Gold Mineralisation

Most of the gold in Ghana was emplaced relatively late in the Eburnian Orogeny (Feybesse et al, 2006, Milési et al, 1992, Alibone et al, 2002) principally in deformation zones in Birimian metasediments and metavolcanics, as paleoplacer (Witswatersrand-like) deposits in Tarkwaian braided fluvial quartz pebble conglomerates, and to a lesser extent within pre and syntectonic granitoid intrusive bodies within the greenstone belts and within basin sediments along regional structures. Metallogenetically the most important greenstone belt in Ghana is the Ashanti Belt.

Four major types of primary gold mineralization are present in the Ashanti belt:

- mesothermal, generally steeply dipping quartz veins in shear zones mainly in Birimian sedimentary rocks
- sulphide ores with auriferous arsenopyrite and pyrite, spatially closely associated with the quartz veins
- sulphide disseminations and stockworks in granitoids
- paleoplacers of the Tarkwaian Group.

The Tarkwa orebodies are located within the Tarkwaian System and are of paleoplacer style. The Tarkwaian unconformably overlies the Birimian and is characterized by lower intensity metamorphism and the predominance of coarse grained, immature sedimentary units including the Banket Series – comprising well sorted conglomerates and quartzites with clasts generally considered to be Birimian in origin and containing significant gold mineralization including the Tarkwa orebody. The Banket Series can be further sub-divided into a footwall and hangingwall barren quartzite separated by a sequence of mineralized conglomerates and pebbly quartzites. The
stratigraphy of the individual quartzite units is well established with auriferous reefs interbedded with barren immature quartzites.

Figure 4: Tarkwa – Geology and pit outline

The contact between the Birimian and the Tarkwaian is commonly marked by zones of intense shearing and is host to a number of significant shear hosted gold deposits including Prestea, Bogoso and Obuasi. Epigenetic deposits, such as those in the Chirano district, are mostly located within or adjacent to fault zones at the margins of the volcanic belts, which were re-activated late during the Eburnean tectonothermal event (Allibone et al., 2002). Recent open pit exposures show that gold mineralisation is hosted mostly within strongly hydrothermally altered mafic igneous rocks.
The Akyem deposit lies within a shear zone created by gradational contact between Birimian sedimentary rocks and the mafic metavolcanic rocks on the northern portion of the gold-bearing East Ashanti Belt in Ghana.

At Ahafo, contacts between the volcanic belts and basins are all major shear zones characterised by ductile fabrics superimposed by brittle shear zones. All of the deposits appear to be part of the same mineralised system and all of the Ahafo deposits are shear zone types. Almost all include a saprolite zone that is typically five to 50 metres thick. Gold occurs in structurally controlled zones of hydrothermal alteration that dip generally southwest at 30-60 degrees.

Gold occurs at Central Ashanti Gold Project both in classic Ashanti-style sediment hosted shear zones, and as disseminated mineralisation within the granites. The granite hosted mineralisation accounts for greater than 80% of known Mineral Resources. The granite hosted gold mineralisation is free milling and occurs in two to three generations of abundant narrow quartz veining.

The Obuasi deposits occur along a zone of intense shearing and faulting within precambrian greenstones. Mineralisation comprises two main types: quartz veins containing high-grade free gold and the main sulphide ore in which narrow veins contain gold trapped within arsenopyrite.

At Akropon the sedimentary sequence is dominated by Birimian aged phyllites and greywackes of the Anwia Domain on the eastern side of the Salman Shear Zone. Aeromagnetic images show that Akropon is located on a prominent NE trending geological contact that may be sheared and may provide a structural control for the gold mineralisation.
4. The Economy and Gold

The economy of Ghana has a diverse and rich resource base with a primary manufacturing and exportation base. Export of diverse and rich resources notably gold and hydrocarbons has allowed Ghana to attain one of the highest standards of living in Africa.

Ghana has significant reserves of petroleum. Oil exploration is ongoing.

Mining in Ghana has grown in importance to the Ghanaian economy this century. Main mining extractions are bauxite, gold and phosphates.

Table 1 illustrates that gold has been a key part of Ghana’s economy for the past decade despite the increasing importance of petroleum. Ghana is Africa’s 2nd largest gold producer behind South Africa

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Exports (US$B)</th>
<th>Gold (%)</th>
<th>Gold (US$B)</th>
<th>Crude Petroleum (%)</th>
<th>Crude Petroleum (US$B)</th>
<th>Cocoa Beans (%)</th>
<th>Cocoa Beans (US$M)</th>
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</thead>
<tbody>
<tr>
<td>2006</td>
<td>4.30</td>
<td>26.32</td>
<td>1.13</td>
<td>0.17</td>
<td>0.01</td>
<td>26.76</td>
<td>1.15</td>
</tr>
<tr>
<td>2007</td>
<td>4.93</td>
<td>30.28</td>
<td>1.49</td>
<td>v. low</td>
<td>v. low</td>
<td>27.74</td>
<td>1.37</td>
</tr>
<tr>
<td>2008</td>
<td>6.00</td>
<td>29.33</td>
<td>1.76</td>
<td>v. low</td>
<td>v. low</td>
<td>28.19</td>
<td>1.69</td>
</tr>
<tr>
<td>2009</td>
<td>6.40</td>
<td>46.23</td>
<td>2.96</td>
<td>v. low</td>
<td>v. low</td>
<td>24.00</td>
<td>1.53</td>
</tr>
<tr>
<td>2010</td>
<td>7.73</td>
<td>44.57</td>
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<td>v. low</td>
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<td>2011</td>
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<td>28.53</td>
<td>4.16</td>
<td>19.26</td>
<td>2.81</td>
<td>17.98</td>
<td>2.62</td>
</tr>
<tr>
<td>2012</td>
<td>16.50</td>
<td>43.75</td>
<td>7.20</td>
<td>18.24</td>
<td>3.00</td>
<td>14.52</td>
<td>2.30</td>
</tr>
</tbody>
</table>

Table 1: Value (in US$) of Ghana’s exports notably gold, petroleum and cocoa beans (Source: The Observatory of Economic Complexity)

Hirsch (2013) notes that “after periods in the 70’s when Ghana was the fastest declining economy in the world its record since 1983 has been better than all of sub-Saharan Africa. That growth has translated into high capital incomes and real growth consistently rising over the years and a substantial reduction in poverty”.

Industry, including oil and mining, brought in about $4 billion in 2010 growing to over $9 billion within 3 years. However despite criticism that Ghana has become too dependent on commodity exports the services sector is still the biggest contributor to Ghana's GDP, providing over 50% of income.

4.1 Perceptions of Mineral Policy

Ghana is seen as a fairly attractive investment opportunity for mining and exploration when viewed in a global context, and remains one of Africa’s most attractive such investment opportunities (Table 2). Compared to both its global and African peers this attractiveness is based on good, but not world class mineral potential and a positive policy climate. The legal system and uncertainty around socioeconomic and local community agreements however remain a perceived source of weakness (Table 2). Along with most of Western Africa security also remains a problem.

Over the last five years the perceptions of Ghana as a minerals investment opportunity have generally consolidated in the second quartile globally, suggesting steady and solid in-country performance (Figure 6). Most notable however is a decline in mineral potential, compared to the general improvement in policy perception (Figure 6).
The challenge facing Ghana’s mineral sector is perhaps now increasing its mineral potential, which will likely involve increasing the quality of its national geological database – still a weakness (Table 2); and moving prospectivity beyond the search for gold deposits.

<table>
<thead>
<tr>
<th>Index</th>
<th>World Position</th>
<th>World Quartile</th>
<th>Africa Position</th>
<th>Africa Quartile</th>
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<td>5</td>
<td>1st</td>
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<tr>
<td>Policy Perception</td>
<td>47</td>
<td>2nd</td>
<td>4</td>
<td>1st</td>
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<tr>
<td>Mineral Potential(^1)</td>
<td>52</td>
<td>2nd</td>
<td>7</td>
<td>1st</td>
</tr>
<tr>
<td>Room for Improvement</td>
<td>46</td>
<td>2nd</td>
<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Uncertainty Concerning Existing Regulations(^2)</td>
<td>24</td>
<td>1st</td>
<td>4</td>
<td>1st</td>
</tr>
<tr>
<td>Uncertainty Concerning Environmental Regulations</td>
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<td>10</td>
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<tr>
<td>Regulatory Duplication &amp; Inconsistencies</td>
<td>36</td>
<td>2nd</td>
<td>11</td>
<td>2nd</td>
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<td>Legal System</td>
<td>65</td>
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<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Taxation Regime</td>
<td>47</td>
<td>2nd</td>
<td>9</td>
<td>2nd</td>
</tr>
<tr>
<td>Uncertainty Concerning Disputed Land Claims</td>
<td>22</td>
<td>1st</td>
<td>6</td>
<td>1st</td>
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<tr>
<td>Uncertainty Concerning Protected Areas</td>
<td>37</td>
<td>2nd</td>
<td>20</td>
<td>3rd</td>
</tr>
<tr>
<td>Quality of Infrastructure</td>
<td>59</td>
<td>2nd</td>
<td>8</td>
<td>2nd</td>
</tr>
<tr>
<td>Socioeconomic Agreements(^3)</td>
<td>64</td>
<td>3rd</td>
<td>8</td>
<td>2nd</td>
</tr>
<tr>
<td>Trade Barriers</td>
<td>55</td>
<td>2nd</td>
<td>5</td>
<td>1st</td>
</tr>
<tr>
<td>Political Stability</td>
<td>46</td>
<td>2nd</td>
<td>4</td>
<td>1st</td>
</tr>
<tr>
<td>Labour Regulations(^4)</td>
<td>48</td>
<td>2nd</td>
<td>8</td>
<td>2nd</td>
</tr>
<tr>
<td>Geological Database</td>
<td>67</td>
<td>3rd</td>
<td>8</td>
<td>2nd</td>
</tr>
<tr>
<td>Security</td>
<td>79</td>
<td>3rd</td>
<td>8</td>
<td>2nd</td>
</tr>
<tr>
<td>Availability of Labour / Skills</td>
<td>50</td>
<td>2nd</td>
<td>2</td>
<td>1st</td>
</tr>
</tbody>
</table>

\(^1\) Known fully as the ‘Best Practices Mineral Potential Index’ which ranks countries by attractiveness if all countries applied Best Practice mineral policy i.e. if only geological prospectivity mattered.

\(^2\) Known fully as the ‘Uncertainty Concerning the Administration, Interpretation and Enforcement of Existing Regulations’ index.

\(^3\) Known fully as the ‘Socioeconomic Agreements / Community Development Conditions’ index.

\(^4\) Known fully as the ‘Labor Regulations / Employment Agreements and Labour Militancy / Work Disruptions’ index.

Table 2: The position of Ghana in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
Figure 6: The changing position over time of Ghana in the three main indices (Investment Attractiveness, Policy Perception and Mineral Potential) of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).

5. Geopolitical Assessment and Sovereign Risk

5.1 Stability

In some respects Ghana has become the net beneficiary of instability elsewhere in West Africa. In a region where goods, people and weapons flow freely across porous borders, instability in any West African country is to the detriment of all the others. By comparison to its neighbours Ghana has emerged as one of the very few countries where elections are managed smoothly, and where electoral disputes are resolved by judges, not armed factions. Stable governments combined with internationally competitive deposits of oil, gold and agricultural commodities have made Ghana a key destination for foreign investors.

Hirsch (2013) also notes that “there are complaints of financial mismanagement by successive Ghanaian governments. Ghana’s budget deficit is one of the highest in Africa, 70% of state income is used to pay salaries in a bloated public sector, and inflation is rising fast. In 2013 inflation was at double-digit rates – at a concerning rate of around 11.9%”.

5.2 Mining Law and Taxation
The main law applicable to mining in Ghana is the Minerals and Mining Act of 2006. Details of this legislation are summarised and discussed in Appendix 1. Some of the most important financial clauses are:

Corporate Income Tax: 35%
Depreciation Allowance: 80% in 1st year, 50% thereafter
Withholding Tax:
  Tech/Management Staff: 15%
  Interest: 8%
  Royalties: 10%
  Dividends: 8%
Govt. Ownership: 10% free equity
Royalties on gold: 5%
VAT: No VAT on exports

Compared to some neighbouring countries (Mali and Burkina Faso), corporate income tax is high, withholding tax and VAT are more beneficial, the government equity percentage is standard and the royalties are slightly more burdensome.

6. Conclusions

- Ghana has a rich mining history with artisanal miners producing gold from the 1870’s.
- The country is endowed with excellent geology which has permitted gold mining to continue and expand until today, though prospectivity for non-gold deposits could be improved.
- Gold sales contribute some 40% to Ghana’s export revenue, rivalled only by petroleum.
- The Ghanaian government actively encourages exploration and mining investment.
- The country remains a fairly attractive mining and exploration investment opportunity globally, and one of Africa’s best opportunities, though a perceived decline in mineral potential is of concern.
- Ghana’s geographical position and superior infrastructure ensure that mining activities are little affected by supply issues.
- The country is also perceived to have an efficient bureaucracy and clear regulatory framework and taxation regime, though minor weaknesses are seen in the legal system and the problems with socioeconomic and local community agreements.
- In a region beset by conflict Ghana represents stability and democracy; however government overspending and inflation are ongoing concerns, though they currently remain under control.
- The Mining Law is comparable to legislation in neighbouring countries – better in some aspects, more onerous in others.
- Improving the perceived mineral potential of Ghana and its geological database are perhaps now amongst the larger challenges for the country’s mineral sector.

7. References

Clark, Nancy L. "Transportation and Telecommunications". A Country Study: Ghana (La Verle Berry, editor). Library of Congress Federal Research Division (November 1994). This article incorporates text from this source, which is in the public domain.


APPENDIX 1

Comments (Q & A’s) on Ghana’s Mining Law

(Adapted from Nene Amegatcher and Esine Okudzeto - Sam Okudzeto & Associates)

International Comparative Legal Guides
Practical Insights into Cross-Border Law

The International Comparative Legal Guides provide current and practical comparative legal information on a range of practice areas, following a Q&A format to ensure thorough coverage of each topic within different legal systems worldwide.


Chapters

1. Relevant Authorities and Legislation
2. Mechanics of Acquisition of Rights
3. Foreign Ownership and Indigenous Ownership Requirements and Restrictions
4. Processing and Beneficiation
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6. Dealing in Rights by Means of Transferring Subdivisions, Ceding Undivided Shares and Mining of Mixed Minerals
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14. Regional and Local Rules and Laws

1 Relevant Authorities and Legislation

1.1 What regulates mining law?
The main law applicable to mining in Ghana is the Minerals and Mining Act of 2006. The Act provides that the regulatory regime is governed by the Minister for Mines and Natural Resources, who acts on the recommendation of the Minerals Commission to grant, renew, revoke or suspend mineral rights. The following regulations are also applicable:

- the Minerals and Mining (General) Regulations;
- the Minerals and Mining (Health, Safety and Technical) Regulations;
- the Minerals and Mining (Compensation and Resettlement) Regulations;
- the Minerals and Mining (Support Services) Regulations;
- the Minerals and Mining (Explosives) Regulations; and
- the Minerals and Mining (Licensing) Regulations.

1.2 Which Government bodies administer the mining industry?
Licences for mining, exploration, reconnaissance and the processing of minerals are granted by the Minister of Mines and Natural Resources upon the recommendation of the Mineral Commission. The Minerals Commission is also mandated to regulate and manage the utilisation of mineral resources.
The Environmental Protection Agency (EPA) is the regulatory authority mandated to govern the environment. Health and safety is administered by the Inspectorate Division of the Minerals Commission. Where mining activities are in water bodies or forest reserves, permits to operate are granted by the Water Resources Commission or the Forestry Commission, respectively.

1.3 Describe any other sources of law affecting the mining industry.
Apart from the main legislation governing mining there are various sources of laws which affect operations in the mining industry. These laws range from the Conveyancing Decree, governing the documentation needed to transact in land; the Contracts Act and Internal Revenue Act, which regulate the payment of tax; the Environmental Protection Agency Act, governing obligations of the licence owner to the environment and the way and manner of obtaining environmental permits; and the laws relating to torts and the rules of equity, amongst others.

2 Mechanics of Acquisition of Rights

2.1 What rights are required to conduct reconnaissance?
An application for a reconnaissance licence is made to the Minerals Commission. The licence is valid for an initial period of not more than twelve months and can be renewed for a further term. The licence entitles the holder to carry out reconnaissance for minerals specified in a block or an area not exceeding 500 contiguous blocks and to conduct other incidental activity. The licence holder is permitted to set up camps and temporary buildings in the reconnaissance area but cannot engage in drilling or excavation.

2.2 What rights are required to conduct exploration?
A prospecting license entitles the holder to search for the minerals specified in the license cover an area not exceeding 750 contiguous blocks. The licence is valid for a period not exceeding three years, and can be renewed for a further term of no longer than three years. Holders of a reconnaissance license can apply for a prospecting licence over all or part of the land and a mineral(s) in its licence. The grant is subject to the holder having complied with the activities under the licence and its obligations under the Act. The holder of this licence has the right to enter the area specified in the licence and make boreholes and excavations, erect camps and temporary buildings. A licence holder is obligated to commence prospecting operation within three months after the date of the issue of the licence.

2.3 What rights are required to conduct mining?
An application for a mining lease can be made by either a reconnaissance or prospecting licence holder prior to the expiration of their licence. Approval of the lease is based on the licence holder having complied with the Act as well as the activities to be conducted under the licence. An application can be made by any other person in the prescribed form and upon the recommendation of the Minerals Commission a lease can be granted. A mining lease is for an initial term of thirty years or less and can be renewed for a further term of thirty years. The renewal application must be filed three months before the expiration of the mining lease. The lease is granted over an area not exceeding 300 contiguous blocks. A mining lease confers on the holder the ability to:
- mine for the minerals specified in the lease;
- erect equipment, buildings and plants for the purpose of mining or its ancillary activities;
- take minerals specified in the lease and dispose of them in accordance with an approved marketing plan; and
- conduct incidental or ancillary activity.

2.4 Are different procedures applicable to different minerals?
The same rules are applicable for different types of minerals except radioactive minerals wherein there is a further obligation to notify the Minerals Commission and the Geological Survey Department when a discovery is made.
Further, a holder of a licence or lease relating to radioactive minerals is mandated to furnish both the Commission and the Geological Survey Department with a true report of operations in writing within the first week of each month.

2.5 Are different procedures applicable to natural oil and gas?
Different legislation is applicable to natural oil and gas as opposed to minerals. The legal regime governing minerals is found under the Minerals and Mining Act of 2006 whilst that relating to natural oil and gas is the Petroleum (Exploration and Production) Act of 1984.

3 Foreign Ownership and Indigenous Ownership Requirements and Restrictions

3.1 Are there special rules for foreign applicants?
The mining legislation is applicable to both Ghanaians and foreigners except for small-scale mining which is reserved just for Ghanaians.

3.2 Are there any change of control restrictions applicable?
Approval has to be obtained from the Minister in writing before there is any transfer of ownership or interest in a mineral right. The Minister is mandated not to unreasonably withhold his consent or se unreasonably conditions for the transfer.

Further, an individual or an entity cannot obtain a controlling interest in a mining company unless that person or entity has served on the Minister a notice in writing indicating this intention. An objection to the change in control can be made by the Minister if he/she finds there are reasonable grounds by which the public interest would be prejudiced by that person or entity becoming a controller of the mining company.

3.3 Are there requirements for ownership by indigenous persons or entities?
There are no requirements that indigenous persons or a special class of persons have to hold a percentage interest in the equity of an exploration or mining project or company.

3.4 Does the State have free carry rights or options to acquire shareholdings?
The Government has a 10% carried right in regards to both exploration and mining activities for which the government is not required to give any consideration.
The law further provides that the Government can obtain a special share in a mining company for no consideration. This special share is in the nature of a preference share and the rights attached to this share can be agreed between the Government and the company. If there is no such agreement the following are considered to the rights attached to the special share:

- entitlement to notice of meetings;
- entitlement to speak at such meetings of the company;
- prior consent should be obtained before an amendment of the regulations of the company relating to matters provided for under section 51 to 60 of the Act;
- prior consent needs to be obtained before the voluntary winding-up or voluntary liquidation of the company; and prior consent should be obtained before the disposal of a mining lease for which a material part of the assets of the company attributable to the company’s operations in Ghana are held outside the country.

3.5 Are there restrictions on the nature of a legal entity holding rights?
Mineral licences can only be granted to legal entities incorporated under the Companies Act of 1962 or the Incorporated Private Partnership Act of 1963.

4 Processing and Beneficiation

4.1 Are there special regulatory provisions relating to processing and further beneficiation of mined minerals?
In regards to processing and the further beneficiation of mined minerals, a licence needs to be obtained. The licence generally given is to sell, assign or otherwise deal in gold. Generally in Ghana there are no major refineries although the gold mining companies under their mining licence mine the ore and process it into doré for export.

4.2 Are there restrictions on the export of minerals?
An individual cannot export a mineral unless that person has a licence to export. The licence is obtained in line with a refinery agreement and a marketing agreement submitted with the application. Levies are payable in respect of traditional minerals while non-traditional minerals are not levied.

5 Transfer and Encumbrance

5.1 Are there restrictions on the transfer of rights to conduct reconnaissance, exploration and mining?
A mineral right cannot be transferred without the prior approval of the Minister. The consent of the Minister cannot however be unreasonably withheld nor be made subject to unreasonable conditions.

5.2 Are the rights to conduct reconnaissance, exploration and mining capable of being mortgaged to raise finance?
A mineral right cannot be mortgaged or otherwise encumbered without the prior approval of the Minister. Approval cannot be unreasonably withheld or given subject to unreasonable conditions. Where approval is not given within thirty days, upon a request by the applicant the Minister has fourteen days to give written reasons for the delay in giving a response.

6 Dealing in Rights by Means of Transferring Subdivisions, Ceding Undivided Shares and Mining of Mixed Minerals

6.1 Are rights to conduct reconnaissance, exploration and mining capable of being subdivided?
The consent of the Minister has to be obtained prior to the portioning off or the disposal of subdivisions of existing rights to third parties. Consent however cannot be unreasonably withheld or subject to unreasonable conditions by the Minister.

6.2 Are rights to conduct reconnaissance, exploration and mining capable of being held in undivided shares?
There are no rules relating to whether or not a mining right can be held in undivided shares. However, whenever there is a change in control, the rules applicable to approval from the Minister before the change is effected have to be upheld.

6.3 Is the holder of a primary mineral entitled to explore or mine for secondary minerals?
The holder of a licence is restricted to the activities permitted under the mineral right, hence exploration or mining is limited to the specified mineral/minerals indicated in its license.

6.4 Is the holder of a right to conduct reconnaissance, exploration and mining entitled to exercise rights also over residue deposits on the land concerned?
Generally a licence for reconnaissance, exploration and mining over a particular block or blocks entitles the holder of the licence to conduct mining activities over the said area. Hence, the licence holder can exercise rights over residue deposits on the land.

6.5 Are there any special rules relating to offshore exploration and mining?
Where exploration and mining is located offshore, approval for mining operations will have to be obtained from the Water Resources Commission and the Fisheries Commission.
7 Rights to Use Surface of Land

7.1 What are the rights of the holder of a right to conduct reconnaissance, exploration or mining to use the surface of land?
The holder of a mineral right can make use of the surface of the land for activities that are directly linked to the licensed activity and for any purpose that is ancillary to its mineral operations including diverting, impounding, use of water from a stream watercourse or an underground reservoir after obtaining the necessary permits to do so. Note, however, should be made of the fact that the landowner or occupier has the right to graze livestock or cultivate the land if such the cultivation and grazing will not interfere with mining operations.

7.2 What obligations does the holder of a reconnaissance right, exploration right or mining right have vis-à-vis the landowner or lawful occupier?
Generally, upon obtaining a mineral licence, the holder has sufficient authority over the land and can enter the land to undertake the activity specified in the licence.

Despite this right, the licence holder is mandated to pay ground rent to the landowner and further to compensation the land owner if the mining activity disturbs the rights of the owner. Compensation is payable for the deprivation of the use of the land, damage to immovable properties, and where land is under cultivation compensation is payable for loss of earnings or loss of expected income. Compensation can also be in the form of resettlement and relocation.

The landowner and the licence holder can negotiate and agree on the quantum of compensation due the landowner. If, however, no agreement is made, either party can refer the issue to the Minister who, in consultation with the Land Valuation Board, will make an assessment of the amount due the land owner or occupier as compensation.

The landowner or occupier if dissatisfied with the quantum of compensation offered by the Minister can apply to the courts for redress.

7.3 What rights of expropriation exist?
Article 20 of the Constitution provides that the State can expropriate but it is subject to the acquisition being necessary in the interest of defence, public safety, order, morality, health, or for the development of the property to promote a public benefit. Further provision has to be made for the prompt payment of fair and adequate compensation and a right of access by any person who has an interest in the property so acquired to go to court for a determination of his/her interest or the amount of compensation they are entitled to.

8 Environmental

8.1 What environmental authorisations are required in order to conduct reconnaissance, exploration and mining operations?
Companies engaged in reconnaissance, exploration and mining are required to obtain an environmental permit from the EPA before commencing operations. The permit is valid for eighteen months. Companies that commence operations based on an environmental impact statement or a preliminary environmental report are required to obtain an environmental certificate within twenty four months of commencement of operations.

An environmental management plan must be submitted within eighteen months after operations commence and thereafter every 3 years.

Further, companies granted environmental permits are required to submit an environmental impact report every twelve months after the commencement of operations.
8.2 What provisions need to be made for the closure of mines?
Mining entities have to submit reclamation plans to the Environmental Protection Agency. The plans are normally included in a company’s environmental impact statement.

In addition to the reclamation plans, the mining entity has to provide security for any default in reclamation or rehabilitation of disturbed land. Security is in the form of a performance bond, rehabilitation bond, mining bond or funds set aside in a reputable bank.

8.3 What are the closure obligations of the holder of a reconnaissance right, exploration right or mining right?
A mine plan must be submitted to the Chief Inspector of Mines no later than sixty days before the beginning of the process of closure. The mine plan shall include some of the following: a description of the closure and rehabilitation of open pits; the methods by which explosives, fuses and detonators are to be secured; and how the shafts and its entrances are to be secured. The plan should also provide an inventory of contaminated areas, how they are to be rehabilitated and the use to which the land is proposed to be put to after restoration.

Upon closure of operations, the entity will have to satisfy the Chief Inspector of Mines that the closure of open pits, ancillary facilities, heap leach pad, tailings storage facilities, process ponds and waste dumps have been done in compliance with the provisions of the Mineral and Mining (Health, Safety and Technical) Regulations.

8.4 Are there any zoning requirements applicable?
Although there are zoning requirements where land is to be utilised for mining it takes preference.

9 Native Title and Land Rights

9.1 Does the holding of native title or other statutory surface use rights have an impact upon reconnaissance, exploration or mining operations?
The holding of a native title or any tribal rights does not have an impact on reconnaissance, exploration or mining operations.

10 Health and Safety

10.1 What legislation governs health and safety in mining?
The following are the legislation that governs health and safety:
- The Labour Act, Act 651.

10.2 Are there obligations imposed upon owners, employers, managers and employees in relation to health and safety?
The obligations of owner/licence holders include the following:
- to obtain the necessary permit from the EPA before commencing mining activities;
- to have in place an emergency response plan;
- to have accurate plans prepared by a certified surveyor of all underground and surface mines, as well as other structures;
- to report all accidents related to the operations of the mine to the chief inspector or the nearest inspector;
- to report all dangerous occurrences;
- to give notice of mining activities to the Chief Inspector of Mines;
- to ensure that a manager is always on site;
• to maintain a plan of every dam or dump that is being operated or has been abandoned which can affect operations or be a danger to people or animals;
• to ensure the holder or the manager of a mine shall maintain a plan of every dam or dump operated by the mine and of any abandoned dam or dump which may affect the mine operations or be affected in any way by the mine operations, or could be a danger to people and animals; and
• to personally supervise the erection of a beacon and the marking of its boundaries.
• The obligations of a manager include the following:
• the manager of the mine is mandated to control the working of the mine and is responsible for the enforcement of the health and safety regulations;
• the manager bears responsibility for any accident caused by an incompetent or inexperience worker unless the manager proves that he/she took proper precautions;
• to ensure that the regulations relating to health and safety as well as any lawful order given by the inspector of mines are observed by all employed at the mine;
• to provide for the proper discipline and training of all persons employed;
• the protection of the environment at the mine;
• to appoint a competent shift boss and mining foreman;
• to take reasonable steps to curb illegal activity that can result in injury to workers;
• to maintain and keep all mandated records;
• to give notice of activities to the Chief Inspector of Mines;
• to post warning signs or erect fences during the excavation of pits; and
• to ensure that any land utilised during exploration is rehabilitated back to its original use.

11 Administrative Aspects

11.1 Is there a central titles registration office?
The central titles registry is located at the Minerals Commission.

11.2 Is there a system of appeals against administrative decisions in terms of the relevant mining legislation?
All disputes between the holder of a mineral right and the State are to be resolved amicably. If, however, there is no resolution after thirty days and the dispute is between a citizen and the State, the dispute shall be settled through arbitration under the Alternative Dispute Resolution Act.

If the dispute is between a foreigner and the State, the dispute is submitted to arbitration in accordance with:
1. an international mechanism for the resolution of investment disputes;
2. within the framework of a bilateral or multilateral agreement on investment protection between the State and the country of which the holder of the mineral right is a national; or

12 Constitutional Law

12.1 Is there a constitution which has an impact upon rights to conduct reconnaissance, exploration and mining?
The Constitution provides for the protection of the fundamental human rights and freedom of all persons in Ghana.

12.2 Are there any State investment treaties which are applicable?
There are also bilateral agreements that have been executed between Ghana and other countries which provide protection for investment in the mining sector.

13  Taxes and Royalties

13.1  Are there any special rules applicable to taxation of exploration and mining entities?
The following are the rules applicable to taxation of exploration and mining entities:
   - corporate tax rate for mining and petroleum companies has been increased to 35%;
   - capital allowance is 20% a year; straight life for five years;
   - costs are to be ring fenced such that the cost of exploration on a new concession cannot be used to offset an already existing mining operation; and
   - exploration cost is capitalised, hence can be used as capital allowance and deducted from profit.

13.2  Are there royalties payable to the State over and above any taxes?
Royalties of 5% of total revenue earned are payable to the State over and above any other taxes due.

14  Regional and Local Rules and Laws

14.1  Are there any local provincial or municipal laws that need to be taken account of by a mining company over and above National Legislation?
Local or municipal laws do not take precedent over and above national legislation.

14.2  Are there any regional rules, protocols, policies or laws relating to several countries in the particular region that need to be taken account of by an exploration or mining company?
A list of some regional rules and laws which have to be taken into account by exploration and mining companies include the following:
   - The ECOWAS treaty.
   - The United Nations Framework Convention on Climate Change.
## APPENDIX 2

### Status of Gold Production, Development and Exploration Projects in Mali

<table>
<thead>
<tr>
<th>Operation/Owner</th>
<th>Status</th>
<th>Production</th>
<th>Resources</th>
<th>Mining</th>
<th>Processing</th>
<th>Source</th>
</tr>
</thead>
</table>
| **Tarkwa/Goldfields** | Production | 2014: 558,300oz | **As at 31/12/2013:** 
- Meas Res = 99.6Mt @ 4.73oz/t = 5.25Mt 
- Ind Res = 109.0Mt @ 3.30oz/t = 3.59Mt 
| **Damang/Goldfields** | Production | 2014: 177,800oz | **As at 31/12/2013:** 
- Meas Res = 4.6Mt @ 2.05oz/t = 0.303Mt 
- Ind Res = 75.7Mt @ 2.16oz/t = 6.1Mt 
| **Ahafo/Newmont** | Production | 2013: 270,000oz | **As at 31/12/2013:** 
- Prov Reserves = 41.1Mt @ 1.72oz/t = 71.8Mt 
| **Akyem/Newmont** | Production | 2013: 129,000oz | **As at 31/12/2013:** 
- Prov Reserves = 5.0Mt @ 1.69oz/t = 0.37Moz 
| **Obuasi/Anglogold Ashanti** | Production | 2013: 1.7Mt @ 4.94oz/t = 239,000oz | **As at 31/12/2015:** 
- Prov & Prob Reserve: 43.86Mt @ 5.77oz/t = 250.4Moz 
- Meas Res: 8.14Moz @ 3.25oz/t = 8.14Moz 
- Ind Res: 28.47Mt @ 5.47oz/t = 152.6Moz 
| **Edikan** (Formerly Central Ashanti Gold Project, Ayanfuri) | Production | FY to June 2014: 6.1Mt @ 1.0g/t = 180.519oz | **As at May 2014:** 
- Prov & Prob Reserves: 75.4Mt @ 1.1g/t = 2.68Moz 
- Meas Res: 74.2Mt @ 1.1g/t = 2.73Moz 
- Ind Res: 75.7Mt @ 1.0g/t = 2.55Moz 
<table>
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<th><strong>Location</strong></th>
<th><strong>Company</strong></th>
<th><strong>Type</strong></th>
<th><strong>Year</strong></th>
<th><strong>2014 Production (oz)</strong></th>
<th><strong>2013 Production (oz)</strong></th>
<th><strong>Resources (Mt @ g/t)</strong></th>
<th><strong>Technologies</strong></th>
<th><strong>Notes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Meas &amp; Ind Res: 15.356Mt @ 2.46g/t = 1.214Moz</td>
<td>Inf Res: 1.204Mt @ 3.43g/t = 0.133Moz</td>
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<td></td>
<td></td>
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<td></td>
<td>Crushing, ball mill grinding, leaching, and CIL. Gold is recovered by an elution circuit.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Meas &amp; Ind Res: 28.724M @ 3.28g/t = 3.023Moz</td>
<td>Inf Res: 5.270Mt @ 6.25g/t = 1,060Moz</td>
<td></td>
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</tbody>
</table>
Mali: Gold Industry & Mineral Policy

Report Prepared for

IM4DC

May 2015
Summary

- Mali is underlain by exceptionally prospective geology for the existence of economic gold deposits, and this is reflected by a positive perception by investors of its mineral potential.
- Recent years have seen an expansion in exploration activity and mine development with gold now the principal export earner. Mali is now the 3rd largest producer of gold in Africa (after South Africa and Ghana).
- The Government is actively encouraging mining investment but has amended the Mining Code to increase revenues to Mali and to encourage the use of local employees and suppliers. It has also legislated to increase its share of equity in producing mines.
- However globally, and even amongst African peers, Mali is seen as a fairly poor investment opportunity for mining and exploration, despite its geological potential.
- The gap between geological potential and investment attractiveness is largely due to the political instability and security problems in the country since 2012.
- The region is under growing threat from terrorist groups particularly Islamic militants with allegiances to Boko Haram. Despite the fact that most of the terrorist activity is confined to the north of the country, well away from the main gold producing area in the southwest, this insecurity substantially affects its investment attractiveness for mining and exploration.
- If the security and stability issues can be resolved the country is seen to have a fairly positive policy climate with efficient bureaucracy and clear legal frameworks and taxation regime. Minor weaknesses do however remain around the legal system, socioeconomic and local community agreements and the geological database.
- Mali also remains a relatively undeveloped country with poor infrastructure and limited skills amongst the workforce.
- Infrastructure in Mali was even poorer up to the early 2000’s, however, developments over the past 10-15 years have markedly improved transport links, especially with Dhaka in Senegal and Abidjan in Côte d’Ivoire.
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1. Location, Physiography and Climate

Mali is a landlocked nation in West Africa and with an area of 1,242,248km² it is the 8th largest in Africa. It lies between latitudes 10° and 25°N, and longitudes 13°W and 5°E. Mali is bordered by Algeria to the north, Niger to the east, Burkina Faso to the south, Guinea to the south-west, and Senegal and Mauritania to the west. The population of Mali is 14.5 million. The capital is Bamako.

Most of the country lies in the southern Sahara, which produces a hot, dust-laden Sudanian savanna zone. Mali is mostly flat, rising to rolling northern plains covered by sand. The Adrar des Ifoghas massif lies in the northeast.
Mali’s climate ranges from tropical in the south to arid in the north. Most of Mali receives negligible rainfall; droughts are frequent. Late June to early December is the rainy season. During this time, flooding of the Niger River is common, creating the Inner Niger Delta.

Mali has considerable natural resources, with gold, uranium, phosphates, kaolinite, salt and limestone being most widely exploited. Mali faces numerous environmental challenges, including desertification, deforestation, soil erosion, and inadequate supplies of potable water.
2. Infrastructure

Mali’s transportation infrastructure is regarded as poor, even by regional standards, and these deficiencies have limited economic growth and development. Nevertheless, improvements have been noted since the early 2000s.

Mali has one railroad, including 729 kilometre line-length within Mali, which runs from the port of Koulikoro via Bamako to the border with Senegal and continues on to Dakar. The Bamako-Dakar line is in poor condition and the line is closed frequently during the rainy season. The line is potentially significant because it links landlocked Mali to the port of Dakar. The track is increasingly of interest for Malian exports in the face of the disruption of access to Abidjan, Côte d’Ivoire, as a result of civil conflict in that country beginning in late 2002. A new rail line between Bamako and Kouroussa and Kankan in Guinea is a future option.

Mali’s road network totalled about 18,563 kilometres in 2000, including about 4,450 kilometres of paved roads. The main economic link to the coast is a paved road between Bamako and Abidjan in Côte d’Ivoire. In general, road conditions outside of urban areas are hazardous, especially at night. Because of isolation, poor road conditions, and the prevalence of banditry, overland travel to the north of Mali is regarded as especially dangerous. Flying or traveling by boat is reported to be preferable where possible. Many of Mali’s major thoroughfares in the north are little more than desert tracks with long isolated stretches.

This initial section of the report is abbreviated from the Mali country report of the United States Library of Congress Federal Research Division (2005).
Randgold’s Loulo – Gounkoto mining complex is serviced by the Senegal port of Dakar, 979 kilometres to the west and Bamako, 485 kilometres to the southeast. The new Dakar-Bamako highway passes between Loulo and Gounkoto and significantly improved access to these operations from both directions.

The Sadiola Mine is located in a remote part of Mali with little infrastructure. The minesite is accessed by a regional gravel road to Kayes. There is an airstrip at the Sadiola Gold Mine capable of handling light chartered aircraft. Kayes is serviced by rail, road and air from Bamako and from Dakar. Bamako has an international airport with daily flights to many West African and European destinations. Dakar is a major port of entry to West Africa by sea and air and the primary supply route for imported goods coming to the minesite.

Mali has no seaports because it is landlocked, but Koulikoro on the Niger River near Bamako, serves as a principal river port. Traditionally, Abidjan in Côte d’Ivoire has been Mali’s main seaport, handling as much as 70% of Mali’s trade (except for gold exports). Mali’s export trade suffered when turbulence in Côte d’Ivoire in the early 2000s interrupted that trade route.

Mali has 1,815 kilometres of inland waterways, principally the Niger River, some portions of which are navigable for medium and large shipping during the rainy season in years of normal rainfall. Parts of the Senegal River also are navigable, providing year-round access to the Atlantic from Kayes to St. Louis in Senegal.

In 2007 Mali reportedly had 29 airports, 8 of which had paved runways (CIA Fact Book). The main airport is Senou International Airport in Bamako, which offers flights to neighboring countries and to Europe. As part of early 21st Century infrastructure improvements, the runway at Bamako was extended, and new airstrips were built in previously isolated areas of the west—Kayes, Mopti, and Sikasso.

3. Geology

3.1 Regional Geology

The Early Proterozoic of the West African craton comprises a series of volcanic troughs and sedimentary basins (the Birimian) with granitic terranes accreted on Archean nuclei in the Man and Reguibat shields. Studies of the Birimian on the Man Shield indicate a model of polycyclic evolution, with a major collision event (D1; approximately 2.1 Billion years ago) thrusting part of the Proterozoic terrane over the Archean before individualization of numerous volcanic troughs and clastic-infill basins.

The Southern Mali region (which hosts the country’s principal gold deposits) is characterized by several volcano-sedimentary rock sequences intersected by various phases of intrusive granitic rock.
3.2   Gold Mineralisation of selected deposits

The Sadiola deposit is located within the Malian portion of the Kenieba–Kedougou window, a major Palaeoproterozoic inlier along the northeast margin of the Kenema–Man shield. Sadiola is situated in the north central section of the window and is hosted by sediments of the Kofi Formation, which have been intruded by numerous felsic intrusives. The sediments consist of fine-grained greywacke, probably distal turbidites, and impure carbonates with minor tuffs and acid volcanics.

The deposit occurs along the Sadiola Fracture Zone (“SFZ”), which is interpreted as a brittle-ductile splay off the Senegalo-Mali Shear Zone. The SFZ follows the steeply west dipping contact between greywacke to the west and impure carbonate to the east. The SFZ and its wallrock are intruded by discontinuous diorite dykes, which may contain a weak mineral foliation and rarely intense ductile deformation. Quartz-feldspar-porphyry (QFP) dykes intrude younger, steeply west dipping faults and preserve more brittle deformational features.

Pervasive gold mineralisation ranging in grade from 2 g/t to 20 g/t occurs along the SFZ over a strike length of approximately 2,500 metres and remains open to the north and south. The location and geometry of high grade mineralisation appears to be controlled by the confluence of the SFZ with the splays, resulting in steeply to vertically plunging zones within the plan of the SFZ.
Figure 4: Southwestern Mali showing major gold deposits

The **Loulo Gold Field**, which includes the **Gara, Yalea and Gounkoto** deposits, is located in western Mali, <2 kilometres east of the border with Senegal. The West Mali gold belt stretches for 180 kilometres north-south along the Senegal border. Operational mines include Gara, Yalea, Gounkoto, Sadiola and Yatela. These deposits are all linked to the Senegal-Mali shear zone, a major crustal scale lineament. The Tabakoto and Segala deposit are part of a parallel belt ~20 kilometres to the east.

The major Senegal-Mali shear zone provided the main regional conduit for hydrothermal fluids, with gold ores in second order, NNE-striking sinistral shear subsidiary structures within the Kofi Series along its eastern margin. To the east of the Senegal-Mali shear zone, in Mali, a third stage of deformation, D3, is associated with transtensional movement along the D2 structures and the development of sinistral, north and NW trending, third and fourth order Riedel shears. Gold mineralisation in the Loulo Gold Field is largely linked to this late D3 trans-tensional event (Lawrence et al., 2013).

The **Morila** gold mine, is spatially and temporally associated with prolonged (2098–2065 Ma) arc magmatism during the late stages of the Eburnean orogeny. Visible gold at Morila is associated with variably deformed mineralised veins suggesting a proximal intrusion-related source for this period of gold mineralization. This early formed mineralization is contained within a zone of hornblende hornfels contact metamorphism and is spatially associated with emplacement of quartz-diorite, granodiorite, and leucogranite magmas. The occurrence of immiscible Au-Sb-Bi-Te within sills or dikes associated with gold mineralization at the Morila deposit explicitly links granitic magmatism with gold mineralization.
Gold mineralisation at Syama lies within a major reverse fault zone on the margin of the Birimian volcanic/greenstone belt. This volcanic belt is a thin (0.5 to 2 km wide), but regionally extensive sequence of basalt and andesite with interbedded greywacke and argillite, and andesite-lamprophyre intrusives. It is bounded to the east by andesitic conglomerate and greywacke, and to the west by interbedded greywacke and argillite. In the Syama area this ore bearing sequence is structurally layered with massive competent basalt and conglomerate bounding the hangingwall and footwall of the mineralised interval respectively ( Olson, et al., 1992).

Lateritic/saprolitic weathering developed an oxide orebody that overlies the sulphide mineralisation. This oxide ore extends for 35 to 40 m below the surface, while the sulphide mineralisation has been tested to a depth of 500 m ( Olson, et al., 1992).

The sulphide ore consists of lenticular bodies of intense ankerite-quartz veinlet stockworks, zones of sheeted ankerite-quartz veinlets and breccia bodies. Breccias and intense stockwork zones host most of the higher grade (>4 g/t Au) ore. Sheeted veins are spaced at a density of more than 5 per metre and are 1 to 10 millimetres thick. Disseminated pyrite is the principal gold bearing mineral which occurs in veinlet halos and breccia clasts. Gold occurs as sub-micron to visible inclusions in and around the edges of pyrite crystals and as free gold. Green chloritic basalt is the preferred, but not exclusive, host of the mineralisation. The basalt is commonly bleached by ankerite, albite and sericite alteration in the pyritic gold bearing zones. Andesitic-lamprophyric intrusives and greywacke-argillite layers also host mineralisation. Within the intrusives, low grade ore occurs as weak stockworks of quartz-ankerite veins, while the sediments mainly hosts disseminated sulphides and fine quartz-ankerite stockworks. Faulted beds of graphitic greywacke-argillite and zones of silicification bound most individual ore lenses ( Olson, et al., 1992).

### 4. The Economy and Gold

Mali is among the ten poorest nations of the world and is a major recipient of foreign aid from many sources. The per capital gross domestic product (GDP) of Mali was $820M in 1999 while it had risen to around US$11,000M in 2013 (see Table 1).

Mali’s great potential wealth lies in mining and the production of agricultural commodities, livestock, and fish. The most productive agricultural area lies along the banks of the Niger River, the Inner Niger Delta and the southwestern region around Sikasso.

<table>
<thead>
<tr>
<th>Country</th>
<th>UN</th>
<th>IMF</th>
<th>World Bank</th>
<th>CIA World Factbook</th>
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**Table 1: GDP Rankings for Mali and Australia in 2013 (GDP figures in US$M), (source: Wikipedia)**

Mali is a part of "French Zone" (Zone Franc), which means that it uses CFA franc. Mali is connected with the French government by agreement since 1962 (creation of BCEAO). Today all seven countries of BCEAO (including Mali) are connected to the French Central Bank.

Following the lead of the International Development Association, Mali relaxed the enforcement of mining codes in 1991 which led to greater foreign investment in the mining industry. From 1994 to 2007, national and foreign companies were granted around 150 operating licences along with more than 25 certificates for exploitation and more than 200 research permits. Gold mining in Mali has increased dramatically, with more than 50 tonnes in 2007 from less than half a tonne produced annually at the end of the 1980s. Mining revenue totalled some US$1.71B in
The Government of Mali revised the Mining Code in 2012 to provide greater benefits to the Malian people. A review of the important changes is attached to this report as Appendix 1.

Gold accounted for some 80% of mining activity in the mid-2000s, while there remain considerable proven reserves of other minerals not currently exploited. Gold has become Mali’s largest export, after overtaking cotton—historically the basis of Mali’s export industry—and livestock. The emergence of gold as Mali’s leading export product since 1999 has helped mitigate some of the negative impacts caused by fluctuations in world cotton markets and loss of trade from the Ivorian Civil War to the south. Large private investments in gold mining include Anglogold-Ashanti ($250 million) in Sadiola and Yatela, and Randgold Resources ($140 million) in Morila - both multinational South African companies located respectively in the north-western and southern parts of the country.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Exports (US$M)</th>
<th>Gold (%)</th>
<th>Gold (US$M)</th>
<th>Cotton (%)</th>
<th>Cotton (US$M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1670</td>
<td>67.59</td>
<td>1130</td>
<td>14.10</td>
<td>235</td>
</tr>
<tr>
<td>2007</td>
<td>1490</td>
<td>72.97</td>
<td>1080</td>
<td>13.11</td>
<td>195</td>
</tr>
<tr>
<td>2008</td>
<td>1940</td>
<td>74.10</td>
<td>1440</td>
<td>10.96</td>
<td>213</td>
</tr>
<tr>
<td>2009</td>
<td>176</td>
<td>1.97</td>
<td>3.47</td>
<td>45.15</td>
<td>80</td>
</tr>
<tr>
<td>2010</td>
<td>2040</td>
<td>69.51</td>
<td>1420</td>
<td>8.58</td>
<td>175</td>
</tr>
<tr>
<td>2011</td>
<td>2500</td>
<td>67.85</td>
<td>1700</td>
<td>8.80</td>
<td>220</td>
</tr>
<tr>
<td>2012</td>
<td>2890</td>
<td>59.09</td>
<td>1710</td>
<td>13.72</td>
<td>397</td>
</tr>
</tbody>
</table>

Table 2: Value (in US$) of Mali’s exports notably gold and raw cotton (Source: The Observatory of Economic Complexity)

4.1 Perceptions of Mineral Policy

Mali is seen is a fairly unattractive investment opportunity for mining and exploration globally, despite its fairly strong mineral potential – indeed amongst the highest potential in Africa (Table 3). Substantial improvements in the country are however required to bridge the gap between its good geological potential and poor investment attractiveness (Table 3).

Generally the policy environment itself is seen to be fairly positive with efficient bureaucracy, clear regulatory frameworks and taxation regimes, though as with other Western African countries, weaknesses remain in the legal systems, geological database and socioeconomic and local community agreements (Table 3).

The main problem facing Mali is political stability and security stemming from the armed conflict with rebels in the north of the country, which broke out in 2012, followed by a military coup. The country suffered a notable drop in investment attractiveness that year, from which it has only partially recovered (Figure 5), as the situation essentially remains unresolved.

Beyond security and stability issues, Mali still faces the wider economic development challenges of improving its weak infrastructure and low level of skills amongst the work force.
<table>
<thead>
<tr>
<th>Index</th>
<th>World Position (of 122)</th>
<th>World Quartile</th>
<th>Africa Position (of 30)</th>
<th>Africa Quartile</th>
</tr>
</thead>
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<tr>
<td>Investment Attractiveness</td>
<td>82</td>
<td>3rd</td>
<td>16</td>
<td>3rd</td>
</tr>
<tr>
<td>Policy Perception</td>
<td>60</td>
<td>2nd</td>
<td>9</td>
<td>2nd</td>
</tr>
<tr>
<td>Mineral Potential(^1)</td>
<td>48</td>
<td>2nd</td>
<td>6</td>
<td>1st</td>
</tr>
<tr>
<td>Room for Improvement</td>
<td>89</td>
<td>3rd</td>
<td>23</td>
<td>4th</td>
</tr>
<tr>
<td>Uncertainty Concerning Existing Regulations(^2)</td>
<td>50</td>
<td>2nd</td>
<td>12</td>
<td>2nd</td>
</tr>
<tr>
<td>Uncertainty Concerning Environmental Regulations</td>
<td>12</td>
<td>1st</td>
<td>8</td>
<td>2nd</td>
</tr>
<tr>
<td>Regulatory Duplication &amp; Inconsistencies</td>
<td>11</td>
<td>1st</td>
<td>3</td>
<td>1st</td>
</tr>
<tr>
<td>Legal System</td>
<td>72</td>
<td>3rd</td>
<td>14</td>
<td>2nd</td>
</tr>
<tr>
<td>Taxation Regime</td>
<td>53</td>
<td>2nd</td>
<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Uncertainty Concerning Disputed Land Claims</td>
<td>53</td>
<td>2nd</td>
<td>13</td>
<td>2nd</td>
</tr>
<tr>
<td>Uncertainty Concerning Protected Areas</td>
<td>10</td>
<td>1st</td>
<td>8</td>
<td>2nd</td>
</tr>
<tr>
<td>Quality of Infrastructure</td>
<td>105</td>
<td>4th</td>
<td>22</td>
<td>3rd</td>
</tr>
<tr>
<td>Socioeconomic Agreements(^3)</td>
<td>82</td>
<td>3rd</td>
<td>15</td>
<td>2nd</td>
</tr>
<tr>
<td>Trade Barriers</td>
<td>70</td>
<td>3rd</td>
<td>10</td>
<td>2nd</td>
</tr>
<tr>
<td>Political Stability</td>
<td>102</td>
<td>4th</td>
<td>22</td>
<td>3rd</td>
</tr>
<tr>
<td>Labour Regulations(^4)</td>
<td>42</td>
<td>2nd</td>
<td>6</td>
<td>1st</td>
</tr>
<tr>
<td>Geological Database</td>
<td>73</td>
<td>3rd</td>
<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Security</td>
<td>109</td>
<td>4th</td>
<td>22</td>
<td>3rd</td>
</tr>
<tr>
<td>Availability of Labour / Skills</td>
<td>106</td>
<td>4th</td>
<td>22</td>
<td>3rd</td>
</tr>
</tbody>
</table>

\(^1\) Known fully as the ‘Best Practices Mineral Potential Index’ which ranks countries by attractiveness if all countries applied Best Practice mineral policy i.e. if only geological prospectivity mattered.
\(^2\) Known fully as the ‘Uncertainty Concerning the Administration, Interpretation and Enforcement of Existing Regulations’ index.
\(^3\) Known fully as the ‘Socioeconomic Agreements / Community Development Conditions’ index.
\(^4\) Known fully as the ‘Labor Regulations / Employment Agreements and Labour Militancy / Work Disruptions’ index.

Table 3: The position of Mali in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
5. Geopolitical Assessment and Sovereign Risk

In January 2012, an armed conflict broke out in northern Mali, when Tuareg rebels took control and declared the secession of a new state, Azawad. The conflict was complicated by a military coup that took place in March and later fighting between Tuareg and Islamist rebels. In response to Islamist territorial gains, the French military launched Opération Serval in January 2013.

The situation remains volatile especially in the north: The UK Foreign and Commonwealth office (Feb 2015) advises against all travel north of Segou and against non-essential travel to the rest of the country. The areas considered most dangerous are illustrated on Figure 5.

Figure 5: The changing position over time of Mali in the three main indices (Investment Attractiveness, Policy Perception and Mineral Potential) of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
Mali’s foreign policy orientation has become increasingly pragmatic and pro-Western over time. Since the institution of a democratic form of government in 2002, Mali’s relations with the West in general and with the United States in particular have improved significantly. Mali has a longstanding relationship with France, a former colonial ruler. Mali was active in regional organizations such as the African Union until its suspension over the 2012 Malian coup d’état.

Working to control and resolve regional conflicts, such as in Ivory Coast, Liberia, and Sierra Leone, is one of Mali’s major foreign policy goals. Mali feels threatened by the potential for the spillover of conflicts in neighbouring states making cross-border relations uneasy. General insecurity along borders in the north, including cross-border banditry and terrorism, remain troubling issues in regional relations. The spread of the Ebola virus in countries such as Guinea has recently proved to be a source of concern to investors and developers.

6. Conclusions

- Mali is underlain by geology which is highly prospective for the discovery and economic exploitation of gold especially in the west and southwest adjacent to the borders of Senegal, Guinea and Côte d’Ivoire. The country’s mineral potential is recognised globally, and it is seen as one of the most prospective countries in Africa.
- The Malian Government is actively encouraging exploration and development but has amended the Mining Code (attached as Appendix 1) to provide greater economic and social benefits to native Malians.
• Mali is however generally seen as a fairly poor investment opportunity for mining and exploration due to major security and political stability issues since 2012, relating to war in the north with rebels and a military coup that year.
• In-country risks such as the Ebola virus and the threat of terrorism are tangible obstacles to operating in Mali. However, the threat of Ebola appears to be diminishing and terrorism appears to be largely confined to the central and northern parts of the country, well away from the principal areas of gold interest.
• If the security issues can be resolved, Mali is perceived to have a fairly positive policy environment with efficient bureaucracy, clear legal frameworks and taxation regimes, though improvements to the legal system, socioeconomic and local community agreements and the geological database could help.
• Generally infrastructure and skills amongst the labour force are seen to be big weaknesses.
• Malian infrastructure has improved markedly over the past 10 years but is still poor in many places. The road and rail network is best developed in the areas where most of the gold-related activity is taking place

7. References


Mali gold reserves rise in 2011 alongside price Retrieved on 17 January 2013


Olsen, SF. et. al. (1992). Regional setting, structure, and descriptive geology of the middle Proterozoic Syama gold deposit, Mali, West Africa. Economic Geology April 1, 1992 vol. 87 no. 2 310-331.


APPENDIX 1

Amendments to the Malian Mining Code

(Adapted from Poupak Bahamin, Mark Bankes and Raj Karia (September 2012)

- Introduction
- Mining titles
- Participation of the State
- Beneficiation Rules
- Environment and Site Rehabilitation
- Community development
- Relationship with third parties
- Tax regime
- Fund for research, training and promotion of mining activities
- Insurance
- Financial rules
- Penal provision
- Transitory rules

1. Introduction

Through Law No. 2012-015 of 27 February 2012 which established the Mining Code (the new Mining Code), the Malian National Assembly has adopted new legislation resulting in amendments to the Mining Code of 19 August 1999 (the former Mining Code). The political instability which immediately followed the adoption of the law delayed promulgation of the new legislation. However, mining operators in Mali have recently been notified of the entry into force of the new Mining Code. The new Mining Code is supplemented by Decree No. 2012-311/P-RM dated 21 June 2012 (the new Mining Regulation).

Unlike the new legislation adopted in Guinea in September 2011, the Malian new Mining Code does not involve an in-depth restructuring of the Country’s regime. The parameters of the regime have remained substantially the same, but a number of innovations and adjustments have been introduced, with an apparent objective of protecting the interests of the Malian population and ensuring that they benefit from the development of the mining sector. Several of the significant changes in the new Mining Code are focused on promoting and implementing transformation within Mali, ensuring the development of local communities, protecting the environment and securing proper site rehabilitation and mine closure.

We have summarised below the major changes introduced by the new Mining Code.

2. Mining titles

The principal changes concerning the classification of minerals, superposition and mining titles are as follows:

- While the former Mining Code distinguished between ‘precious stones’ and ‘every other mineral’, the new Mining Code has a more detailed classification of minerals. There are now 5 groups of minerals consisting essentially in (a) precious and fine stones, (b) precious metals (gold, silver, platinum) and industrial metals (others), (c) bulk metals (ferrous metals and bauxite), (d) energy minerals, (e) non metallic substances others than energy minerals.

- The new Mining Code introduces new rules on title superposition whereby a mining title for substances in group 1 (diamond, emerald, sapphire, beryl, jade, opal, garnet, alexandrite, andalusite, chalcedony, quartz, tourmaline, and corundum) may be superposed with mining titles for substances in all other groups. However titles for substances in other groups may not be superposed among each other.
• The new Mining Code has retained the previous classes of mining titles, namely the exploration authorisation, the prospection authorisation, the research permit, the mechanical artisanal exploitation authorisation, the exploitation authorisation for small mines and the exploitation permit. However, a number of changes have been made to the rights attaching to these titles. For example:
  o the exploration authorisation can no longer be renewed and will no longer provide its holder with a priority right to apply for a research permit;
  o with respect to the exploration permit, the length of each renewal period has been reduced from 3 years to 2 years, although the new Mining Code has introduced the possibility of extending the second renewal period by an additional year if this is required in order to complete a feasibility study. Surprisingly, however, the obligation to return 50% of the surface area at each renewal seems to have been removed;
  o the holder of the exploitation permit is now required to begin exploitation within three (3) years of the issuance of the permit. The permit holder must notify the Administration in charge of Mines of its intention to begin exploitation, and must mention any significant changes in key parameters of the feasibility study. If the changes affect the completion times and the viability of the proposed operation, the permit holder must submit a new feasibility study.
• The list of events that could lead to the withdrawal of a mining title has remained substantially the same as in the former Mining Code, but it is no longer exhaustive. The new Mining Code states that any failure to observe the conditions, obligations and restrictions attached to a title may now lead to its withdrawal. The notice period of 90 days for exploitation permits and 60 days for all other titles has been maintained under the new Mining Code.
• The new Mining Code has retained the right of the Administration in charge of Mines to prescribe any reasonable measure to ensure an appropriate exploitation of the subsoil resources by the holder of an exploitation permit. In the event that the holder of an exploitation permit does not apply appropriate exploitation methods, the new Mining Code now also entitles the Administration in charge of Mines to authorise the suspension of activities, in accordance with the rules set out in the Mining Regulation.
• The new Mining Code has introduced the concept of the merging of contiguous exploration permits.

3. Participation of the State
The Malian Government has retained its right to a 10% non-dilutable free carried interest in the capital of a company holding an exploitation permit, in addition to an option to acquire another 10% for cash. However, the new Mining Code has also introduced the option for domestic private investors to acquire for cash at least 5% of the shares of the exploitation company, under the same conditions as other private shareholders. The conditions for the exercise of such right by Malian private investors and the exact obligations of a mining operator have not been specifically set out in either the new Mining Code or the new Mining Regulation.

4. Beneficiation Rules
While the new Mining Code has essentially maintained operators’ obligations with regard to the employment, training and promotion of Malian personnel, new beneficiation rules have been introduced through the new article 21 which requires mining operators to proceed with the treatment, refining or transformation of mineral products in units based in Mali. This however remains a flexible rule as companies may be exempted if a specific authorisation is delivered by the Administration in charge of Mines. Neither the new Mining Code, nor the new Mining Regulation specifically set out the criteria under which such authorisation can be obtained.

5. Environment and Site Rehabilitation
More stringent obligations have been introduced in relation to the protection of the environment. For example:
• The new Mining Code has retained the obligation that the holder of an exploitation permit submit a first demand bank guarantee from an internationally recognized bank (designed to ensure the rehabilitation and security of the site) following the termination of works. The Mining Regulation - which sets out the applicable amount and modalities - states that the bank guarantee must be 5% of the anticipated turnover, unless such amount proves to be insufficient in which case the mining company is required to cover any
shortcomings. In comparison, the old Mining Regulation required the guarantee amount to equal the expected rehabilitation expenses.

- New rules have also been introduced in relation to mine closure and site rehabilitation, which must be the subject of a detailed plan filed as part of the application for an exploitation permit. The plan, which may have to be updated every five (5) years, must set out the method for the dismantlement and regeneration of the various components of the mining facilities. It must also set out progressive rehabilitation work that is to take place during exploitation and before mine closure.

- **A number of new provisions enshrined in the new Mining Regulation introduce new environmental obligations on holders of mining titles.** These include the obligation to:
  - develop and implement appropriate procedures to manage chemicals and to ensure transportation, warehousing, handling and secure means of disposal of such substances as well as fuels and lubricants;
  - build on site wastewater treatment facilities;
  - establish a programme for waste reduction, sorting and recycling;
  - ensure storages of oil and lubricants is made over large areas with containment walls;
  - implement a management plan for water and mud tanks on the site;
  - formulate and implement a site-specific program to monitor the quality of drained water and water collected from the dumps, the tailings and the tailing sites well as surface water and groundwater that can be contaminated by mining activity;
  - establish regular procedures for inspection, monitoring, verification of the data recording and reporting pertaining to the tailings dams; and
  - implement technical mechanisms to reduce emissions of greenhouse gas.

- The new Mining Code also imposes continued civil liability on the holder of an exploitation permit in respect of damages or accidents caused by old equipment, even after the closure of the mine and issuance of an environmental discharge.

6. **Community development**

New rules have also been introduced to promote the development of local communities. These include the obligation to file a Community Development Plan together with the exploitation permit application, which is developed in consultation with the interested local communities as well as the local and regional authorities. The modalities of this consultation are set by the new Mining Regulation. The Community Development Plan must be updated every 2 years. The Administration in charge of Mines is required to create a Technical Committee on Local and Community Development which is in charge of approving and implementing the Community Development Plan.

7. **Relationship with third parties**

The rules covering the relationship between holders of mining titles and owners or occupants of land have remained substantially the same, except for the following processes which have been introduced:

- the option for the title holder to request that a building – both within or outside its mining perimeter – necessary for the works and installations be declared of public utility. The same may apply for facilities aimed at the transportation and warehousing of mineral production; and
- the possibility for land owners and occupants burdened by an easement to request an expropriation or indemnification if the easement renders the normal use of the property impossible.

The title holder must also return any cultivated land to its previous state, by re-establishing the layer of topsoil as well as public roads.

8. **Tax regime**

8.1 **Fixed Fees, Surface Rights and ISCP**
As with the former Mining Code, title holders must pay fixed fees for the grant, assignment, transfer and renewal of mining titles, as well as annual surface rights. However, contrary to the previous regime, the quantum of such fees or rights are provided in the Mining Regulation rather than being set out in the Mining Code. This will give the Administration increased flexibility to change the figures, including when an indexation is required, since this will not require a new law to be promulgated.

Special tax on certain products (Impôt Spécial sur Certains Produits or ISCP), calculated on the basis of turnover exclusive of VAT, also continues to apply. However, while the Mining Code implies that the ISCP is payable in respect to substances in groups 1 to 4, the new Mining Regulation imposes a 3% ISCP only for substances in groups 1 and 2.

8.2 Ad Valorem Tax
The new Mining Code has introduced an ad valorem tax applicable to all substances, the taxable basis of which is the square-mine value (“valeur carreau mine”) of extracted substances, exported or not, minus intermediary fees and expenses. The tax rate is set at 3% for substances in groups 1 and 2 and at 1% for all other substances.

8.3 Capital Gains Tax
The rate of tax on capital gain arising from the assignment of a mining title is reduced to 10%, compared to 20% under the former Mining Code. However, even when no capital gain is realised, a tax equal to 2% of the costs of works performed (for research permits and prospection authorisations) and 1% of the value of the project as per the feasibility study (for exploitation permits and exploitation authorisations) is payable upon the assignment of the relevant title.

8.4 General Taxes and Exemptions
Holders of prospection authorisations and exploration permits are exempted from all taxes, including VAT, except for the following:
- the mining taxes, royalties and fees referred to above;
- youth employment tax and vocational training tax;
- the housing tax;
- expenses and payroll taxes due by employees, as prescribed by the regulations;
- tax on salaries and wages due by employees;
- road tax discs on vehicles, except heavy equipment exclusively used for prospection or exploration operations;
- tax on insurance contracts, except for site vehicles and / or other vehicles exclusively used for exploration or prospection operations;
- registration fees;
- contribution to the import verification programme; and
- statistical charges.

In addition to the taxes payable by holders of exploration and prospection permits, as stated above, holders of exploitation permits are also subject to:
- lump sum contribution of employers;
- tax on security generated income;
- patent rights and related charges;
- tax on industrial and commercial profits or corporate tax (impôt sur les bénéfices industriels et commerciaux or l’impôt sur les sociétés);
- stamp duty on the intentions to export mining products.

The above is substantially similar to the regime existing under the former Mining Code, except that the tax on the import of petroleum and oil products applicable to holders of exploration permits and prospection authorisations (provided under Article 108(k) of the former Mining Code) and the tax on real estate income
applicable to holders of exploitation permits and authorisations (provided under Article 109(j) of the former Mining Code) do not seem to have been maintained under the new regime.

In addition to the above, the new Mining Code has maintained the 3 year VAT exemption for holders of exploitation permits, and has reduced the rate of tax on industrial and commercial profits or corporate tax to 25% during fifteen years from commencement of production.

A new tax has been introduced applying to holders of an exploitation permit that would produce, in one year, more than 10% of the expected quantity fixed in the annual production program approved by their shareholders’ general assembly. This consists of standard taxes and rights applying to operations and results relating to overproduction.

Finally, the new Mining Code has extended certain tax benefits to investments in infrastructure, accommodation facilities, catering, education, health and leisure.

8.5 Particular regime
A new particular regime has been introduced by Article 135 of the new Mining Code, available to holders of exploitation permits and authorisations, in relation to works consisting in the extension of old activities in Mali, on the basis of a feasibility study previously approved by the State, and to investments of particular importance to the development of the Malian mining industry.

8.6 Stabilisation regime
The new Mining Code does not introduce significant changes in relation to tax stability, except that in addition to mining rights, taxes, and royalties – which have been and are still excluded from the realm of stabilisation – the new Mining Code provides for new exclusions covering rights, taxes, and royalties set by international organisations to which Mali is party.

9. Fund for research, training and promotion of mining activities
The new Mining Code provides for the creation of a fund to finance research, training and promotion of mining activities to allow the optimal exploitation of the mineral potential. This fund is set up on a yearly basis and managed in accordance with the Finance Law. The fund is financed by:

- the allocation of an amount from the Gold Resources Special Allocation Account, aimed at financing mining exploration;
- the training resources, paid by mining companies upon signing of their Mining Convention (Convention d’Établissement) or upon transfer of mining rights;
- the resources intended for the profit-sharing of agents (intérressement), indexed on a portion of the penalties under the Mining Code and the discovery premium

10. Insurance
In relation to insurances covering their equipment, exploitation and responsibility, holders of exploitation permits are required to subscribe to policies provided by insurance companies licensed in Mali under the Conférence Interafricaine sur les Marchés d’Assurances (CIMA) Code of 1992 (the CIMA Code). It is noteworthy that the CIMA Code provides that the subscription of direct insurance abroad is prohibited.

11. Financial rules
The new Mining Code creates new banking, accounting and reporting obligations for mining companies which use foreign bank accounts to finance certain transactions, including, among others, the acquisition, circulation and import of materials and equipment.

12. Penal provision
The penal regime existing under the former Mining Code has remained substantially unchanged, except that the failure by the holder of a research permit or the holder of an exploitation permit which carries on research activities to file quarterly activities reports has now been added to the list of penal offences. In addition, the quantum of fines has been substantially increased in several instances.

13. Transitory rules
As a general principle, mining titles which were valid before the entry into force of the new Mining Code remain subject to the provisions of Ordinance No. 91-065/P-CTSP of 19 September 1991 and the former Mining Code and their respective implementing regulations.

However, the new Mining Code provides for a number of exceptions to the above general principle, namely for provisions relating to the following: groups of substances, renewal of titles and procedures for area reduction, waiver, transfer, transmission, leasing, requirements for administrative supervision and mining police, demarcation of mining exploitation title, protection and rehabilitation of the environment, community development plan and mine closure. This means that the provisions of the Mining Code pertaining to the foregoing would apply to all mining titles.

Also, holders of mining titles which were valid before the entry into force of the new Mining Code have been given a period of six (6) months to comply with health, hygiene and safety provisions.

The new Mining Code does not refer to any renegotiation of mining conventions.
## APPENDIX 2

### Status of Gold Production, Development and Exploration Projects in Mali

<table>
<thead>
<tr>
<th>Operation</th>
<th>Owner</th>
<th>Status</th>
<th>Production</th>
<th>Resources</th>
<th>Mining</th>
<th>Processing</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gounkoto</td>
<td>Randgold</td>
<td>Production</td>
<td>2014: 256,957oz</td>
<td>As at 31/12/2013: Reserves = 2.3 Moz Resources Meas + Ind = 4.0 Moz Resources, Infr = 0.4 Moz</td>
<td>Open-pit with strip ratio = 10:1 viability of underground extension beneath pit being assessed</td>
<td>Crushing, milling and CIL at Loulo plant</td>
<td><a href="http://www.randgoldresources.com/loulo-gounkoto-mining-complex">http://www.randgoldresources.com/loulo-gounkoto-mining-complex</a></td>
</tr>
<tr>
<td>Morila</td>
<td>Randgold (40%) Anglogold Ashanti (40%)</td>
<td>Production (moving towards closure in 2017)</td>
<td>2014: 110,272oz</td>
<td>As at 31/12/2013: Reserves = 0.3 Moz Resources Meas + Ind = 0.4 Moz Resources, Infr = 0.2 Moz</td>
<td>In 2009, Morila was converted to a stockpile treatment operation. Closure of the operation was originally scheduled for 2013 but a pit pushback and tailings treatment project is expected to extend its life to 2017.</td>
<td>Crushing, milling and CIL with increased tailings treatment, SAG mills removed</td>
<td><a href="http://www.randgoldresources.com/sites/randgoldresources/files/Morila%20Update%20%2031%20December%202014.pdf">http://www.randgoldresources.com/sites/randgoldresources/files/Morila%20Update%20%2031%20December%202014.pdf</a></td>
</tr>
<tr>
<td>Sadiola</td>
<td>Anglogold Ashanti (41%)</td>
<td>Production</td>
<td>2013: 210,000oz</td>
<td>As at 31/12/2013: Reserves = 56.4 Mt @ 1.9 g/t = 3.402 Moz Meas 16.26 Mt @ 0.8 g/t = 0.433 Moz Ind Resources 94.9 Mt @ 2.0 g/t = 6.171 Moz Infr Resources 4.9 Mt @ 0.2 g/t = 0.953 Moz</td>
<td>Mining is carried out using conventional open pit techniques. There are currently five open pits.</td>
<td>Stockpile - crusher - SAG - cyclone - leach - CIP</td>
<td><a href="http://www.iamgold.com/English/Operations/Operating-Mines/Sadiola-Gold-Mine/Mining-Processing/default.aspx">http://www.iamgold.com/English/Operations/Operating-Mines/Sadiola-Gold-Mine/Mining-Processing/default.aspx</a></td>
</tr>
<tr>
<td>Syama</td>
<td>Resolute</td>
<td>Production</td>
<td>2014: 165,493oz</td>
<td>As at 30/03/2014: Prov &amp; Prob Reserves = 29.1 Mt @ 2.5 g/t = 2.379 Moz Other Oxide Reserves = 11.3 Mt @ 2.4 g/t = 0.857 Moz</td>
<td>Deepening open-pit to access deeper, higher-grade sulphide ore</td>
<td>Due to the refractory nature of the ore it is treated using conventional four-stage crushing, ball milling, sulphide floatation and dewatering, roasting, calcine leaching and elution</td>
<td><a href="http://www.resolute-ltd.com.au/operations/syama/">http://www.resolute-ltd.com.au/operations/syama/</a></td>
</tr>
<tr>
<td>Fekola</td>
<td>Papillon</td>
<td>Development</td>
<td>No production yet</td>
<td>As at September 2013: Meas and Ind Resource = 5.15 Moz at 2.35 g/t</td>
<td>Conventional open-pit</td>
<td>Conventional CIL with gravity process circuit</td>
<td><a href="http://www.informine.com/index/pr/PR27821.PDF">www.informine.com/index/pr/PR27821.PDF</a></td>
</tr>
<tr>
<td>Tabakorole (formerly Tiekoumala)</td>
<td>Legend Gold</td>
<td>Advanced stage Exploration</td>
<td>No production yet</td>
<td>As at November 2014: Oxide Ind Resource = 1.04 Mt @ 1.01 g/t = 0.034 Moz Oxide Infr Resource = 0.96 Mt @ 1.14 g/t = 0.035 Moz Sulphide Ind Resource = 6.840 Mt @ 0.94 g/t = 0.207 Moz Sulphide Infr Resource = 9.59 Mt @ 1.03 g/t = 0.318 Moz</td>
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<td></td>
<td><a href="http://www.legendgold.com/s/tabakorole.asp">http://www.legendgold.com/s/tabakorole.asp</a></td>
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<tr>
<td>Diba</td>
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<td>No production yet</td>
<td>As at 30 June 2013: Ind Resource = 6.348 Moz @ 1.35 g/t = 0.275 Moz Infr Resource = 0.721 Mt at 1.40 g/t = 0.032 Moz</td>
<td></td>
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<tr>
<td>Project</td>
<td>Company</td>
<td>Stage</td>
<td>Exploration</td>
<td>Exploration</td>
<td>As at August 2011:</td>
<td>As at October 2011:</td>
<td>Resources</td>
</tr>
<tr>
<td>------------------</td>
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</tr>
<tr>
<td>Medinandi</td>
<td>Papillon</td>
<td>Mid-stage</td>
<td>Exploration</td>
<td>No production</td>
<td>Total Resource = 4.6Mt @ 2.04g/t = 0.302Moz</td>
<td>No production yet</td>
<td>Resources</td>
</tr>
<tr>
<td>Yanfolila (incl. Komana West &amp; Komana East)</td>
<td>Goldfields</td>
<td>Mid-stage</td>
<td>Exploration</td>
<td>No production</td>
<td>As at October 2011:</td>
<td>Total Resource = 9.1Mt @ 2.5g/t = 0.740Moz</td>
<td>Resources</td>
</tr>
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</table>

**Resources:**
- [https://www.goldfields.co.za/mzp_ops_yanfolia.html](https://www.goldfields.co.za/mzp_ops_yanfolia.html)
- [http://www.goldfields.co.za/mzp_ops_yanfolia.html](http://www.goldfields.co.za/mzp_ops_yanfolia.html)
South Africa: Gold Industry & Mineral Policy

Report Prepared for

IM4DC

May 2015
Summary

- South Africa has a long and successful history of gold mining based on the renowned grades and resources of the Witwatersrand.
- However, declining production has resulted in South Africa declining from the number one gold producing country in 2006 to the number six country in 2014.
- South Africa is now seen as a relatively poor investment opportunity for mining, both amongst global and African peers.
- The challenges facing the South African mining sector are generally the opposite of those facing African mining sectors; in that South Africa has a strong existing mining sector, relatively good infrastructure, wide availability of relevant skills and a good geological database. However all of the positive factors are facing challenges.
- The gold mines are getting deeper with consequent increased costs associated with accessing the ore-bodies through multi-shaft, multi-level systems. The costs of cooling, ventilation, haulage and the impact of rock stresses have also increased in line with mining at depth. As such, although grades remain high, production costs are placing increased pressure on profitability.
- In addition, the mature status of the mining industry generally means the remaining mineral potential is now perceived to be lower than that found elsewhere in the world and Africa.
- Similarly, South African infrastructure has not kept up with economic growth and power supply problems in particular are affecting mining production performance.
- Finally, the wide availability of skilled labour and mining professionals is offset by labour regulation concerns, with work stoppages and strikes increasing, and more recently turning violent and deadly.
- The poorly perceived labour regulations are part of a generally weak regulatory environment, not helped by weak bureaucracy and legal systems, all of which could be improved substantially.
- Similarly, the violence associated with the strikes reflects generally high levels of criminal violence and insecurity in the country.
- The negative factors affecting the perceptions of South Africa’s gold and mining sector should be partially offset by a generous taxation scheme to encourage gold and other mining investment, however, so far this is unrecognised by foreign investors who see South Africa’s taxation regime as one of the most problematic amongst mining peer countries globally.
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Table 1: The position of South Africa in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
1. Location, Physiography and Climate

South Africa is located at the southernmost region of Africa, with a long coastline that stretches more than 2,500 km and along two oceans (the South Atlantic and the Indian). At 1,219,912 square kilometers South Africa is the 25th-largest country in the world and lies between latitudes 22° and 35°S, and longitudes 16° and 33°E.

The interior of South Africa consists of a vast, in most places, almost flat, plateau with an altitude of between 1,000 m and 2,100 m, highest in the east, sloping gently downwards towards the west and north, and slightly less so to the south and south-west. This plateau is surrounded by the Great Escarpment whose eastern, and highest stretch is known as the Drakensberg.

The south and south-western parts of the plateau and the adjoining plain is known as the Great Karoo, consisting of sparsely populated scrubland and flat topped hills (called koppies). To the north the Great Karoo fades into the even drier and more arid Bushmanland, which eventually becomes the Kalahari Desert. The mid-eastern, and highest part of the plateau is known as the Highveld. To the north of Highveld, from about the 25° 30’ S line of latitude, the plateau slopes downwards into the Bushveld, which ultimately gives way to the Limpopo lowlands or Lowveld.

South of the Lowveld the annual rainfall increases as one enters KwaZulu-Natal which, especially near the coast, is sub-tropically hot and humid. The coastal belt below the south and south-western stretches of the Great Escarpment contains several ranges of mountains which run parallel to the coast, separating the Great Escarpment from the ocean. In the south-west corner of the country the Cape Peninsula forms the southernmost tip of the country.
South Africa has a generally temperate climate, due in part to being surrounded by the Atlantic and Indian Oceans on three sides, by its location in the climatically milder southern hemisphere and due to the average elevation rising steadily towards the north (towards the equator) and further inland. Due to this varied topography and oceanic influence, a great variety of climatic zones exist. The climatic zones range from the extreme desert of the southern Namib in the farthest northwest to the lush subtropical climate in the east along the Mozambique border and the Indian Ocean. Winters in South Africa occur between June and August.

2. Infrastructure

South Africa has historically benefited from an excellent infrastructure system which has played a large part in the country’s growth. Five large harbours and numerous smaller ports allied to an outstanding rail and road network have ensured rapid and secure transport links facilitating efficient imports and exports. Within the country, supply of goods and services has always been relatively easy to accomplish.

South Africa has not kept pace with increased infrastructure demands however as the economy has grown. Nedbank senior economist Nicola Weimar notes that the weakness in the South African economy can largely be attributed to persistent and significant infrastructure constraints, with the most broadly felt being the lack of sufficient and reliable power supply. Weimar notes also that while there is an urgent need to address the issue of energy supply in South Africa, a lack of capacity in a number of other forms of economic infrastructure, from insufficient road, rail, port, communications and other logistical infrastructure.

The government has responded with an ambitious but slow infrastructure spending programme (see Figure 2) to unlock the country’s economic growth potential (SA Commercial Prop News, 2014) In the wake of the downgrade by credit ratings agency Standard & Poor’s and Fitch’s decision to revise its outlook of the country to negative from stable, the Cabinet has given assurance to South Africa’s critics that government is accelerating the implementation of the National Development Plan (NDP).
A consequence of these infrastructure constraints is that the cost of production has been driven higher, contributing in part to a loss of international competitiveness among local producers and exporters, restricting fixed investment by private companies. The unfortunate reality is that general foreign investor sentiment towards South Africa has deteriorated, which was most recently demonstrated by the downward adjustment of sovereign ratings by Fitch and Standard & Poor’s. Frequent and devastating labour conflicts, combined with continued strained power capacity, have added to the disquiet, by continuing to generate large current deficits.

South Africa’s central bank revised its 2015 growth forecast from 2.5% to 2.2%, explicitly blaming the country’s electricity woes for the cut (Mail & Guardian Africa, 2015).

3. Geology

3.1 Regional Geology

The Witwatersrand Basin formed over a period of 360 Ma between 3074 and 2714 Ma. Pulses of sedimentation within the sequence and its precursors were episodic, occurring between 3086-3074 Ma (Dominion Group), 2970-2914 Ma (West Rand Group) and 2894-2714 Ma (Central Rand Group). Detritus was derived from a mixed granite-greenstone source of two distinct ages; the first comprises Barberton-type greenstone belts and granitoids > 3100 Ma old, and the second consists of the greenstone belt-like Kraaipan Formation and associated granitoids < 3100 Ma old. Subsequent granitoid plutonism was episodic and coincided with hiatuses in sediment deposition, but continued throughout the evolution of the basin. Many of the provenance granitoids are characterized by
hydrothermal alteration, are geochemically anomalous with respect to Au and U, and may represent viable source rocks for palaeoplacer mineralization. Tectonically, the basin evolved in response to processes associated with the encroachment and ultimate collision of the Zimbabwe and Kaapvaal cratons.

Metamorphism of the Witwatersrand Basin occurred at ca. 2500, 2300 and 2000 Ma. The first two events coincided with the progressive loading of the basin by Ventersdorp and Transvaal cover sequences, whereas the last reflects intrusion of the Bushveld Complex and/or the Vredefort catastrophe.

3.2 Gold Mineralisation

The economically important Witwatersrand reefs are contained within conglomerates of the fluvially dominated Central Rand Group. This sequence comprises numerous unconformity or disconformity bounded stratigraphic units which accumulated in response to periodic tectono-magmatically induced uplift in the basin hinterland. The sedimentary packages are composed mainly of arenites, with lesser rudites, and were deposited in alluvial fan and alluvial braid plain environments. Ore bodies are associated with gravel facies and occur mainly in the form of very mature scour-based pebble lag and gravel bar deposits. The gravel facies is generally located on degradation surfaces, either on the basal unconformity of a genetic sedimentary package or on retrenched degradation surfaces within such packages (Minter, 1978, 1981). It is clear, however, that Witwatersrand conglomerates show a highly varied set of characteristics. A wide range of combinations of sand and pebble layers is present, extending from single layers of scattered pebble to well-packed thick conglomerates which tend to contain internal partings of pebbly pyritic arenite. In general, sedimentary features of Witwatersrand conglomerates can be expressed in terms of common lithologies in modern braided stream systems (Minter, 1978).
3.3 Major Gold Producers

As recently as 2007 South Africa was the world’s top gold producer. The drop in its global ranking thereafter is not due to resource depletion (South Africa ranks close behind leader Australia in reserves) but rather to its high costs of production. In fact South Africa has the highest mining cash costs among all major producing regions.

(Data compiled from CPM Group, Morgans Financial)

Production and resource data for most of the larger gold producers is presented in Appendix 2. A summary of the three major gold companies is as follows:

3.3.1 AngloGold Ashanti
AngloGold Ashanti is world’s 3rd biggest gold producer at 3.944Moz in 2012.
Figure 5: Map showing location of Anglogold Ashanti operations in South Africa

AngloGold Ashanti’s five South African deep-level mines and surface production facilities are divided into three areas of operation: Vaal River, West Wits and Surface Operations.

Vaal River
The Vaal River mining operations include Great Noligwa, Kopanang and Moab Khotsong, which are located around 170km to 180km from Johannesburg, near the Vaal River on the Free State-North West Province border. These three mines share a milling and treatment circuit.

West Wits
The West Wits operations, Mponeng and TauTona, are situated southwest of Johannesburg, on the border between Gauteng and North West Province.

Surface Operations
Surface Operations extracts gold from marginal ore dumps and tailings storage facilities on surface at various Vaal River and West Wits operations.

As at 31 December 2013, the total Mineral Resource (inclusive of the Ore Reserve) for the South Africa region was 94.27Moz (2012: 98.60Moz) and the Ore Reserve 30.90Moz (2012: 31.56Moz). This is equivalent to around 40% and 45% of the group’s Mineral Resource and Ore Reserve respectively.
3.3.2 Gold Fields

The South Deep Gold Mine is Goldfield’s sole remaining gold mine in South Africa following the unbundling of the legacy operations into Sibanye Gold Limited. South Deep is a major asset for Gold Fields and represents one of the last mega-projects to be built that exploits gold in the West Wits goldfields.

The mechanised mine is still in the production ramp-up phase but is designed to produce 0.65-0.70Moz of gold per annum. The current Life of Mine is estimated to extend to 2087 (74 years).

3.3.3 Harmony Gold

Harmony runs nine underground mines, one open pit operation and several surface sources in South Africa. It also provides employment to about 34 686 people (including 5 695 contractors). In 2014, Harmony was the third largest producer of gold in South Africa and the eleventh largest gold producer in the world.

The underground operations are split between the Free State (Bambanani, Joel, Masimong, Phakisa, Target, Tshepong and Unisel) and the West Rand (Doornkop and Kusasalethu).

Ore at surface is contributed by the Kalgold open-pit in the Northwest Province, the Phoenix tailings treatment in the Free State and the mining if surface dumps.
The Kalgold operation is different from the Witwatersrand in that it exploits shallow dipping quartz veins in the Amalia-Kraaipan Greenstone terrain which comprises linear belts of Archaean meta-sedimentary and meta-volcanic rocks separated by granitoid units.

The graphics below illustrate the contribution from each source.

Figure 7: Harmony gold production and grades

4. Geopolitical Assessment and Sovereign Risk

4.1 Production Outlook

In 1983 South Africa produced roughly 64% of the world’s output. Today it accounts for a little over 6%. Over the last decade, the country has seen a steady decline year-on-year as mines are getting older, no new discoveries are being made, grades are dropping and mines are getting deeper.

4.2 Sustainability

The view that South Africa is a good, safe country in which to invest in gold exploration and production is coming under increased threat. Corruption and crime has made foreign investors nervous and has made the cost of operating higher than necessary.
Labor strikes have plagued the South African mining industry over the last few years and while the strikes have been focused in platinum group metals, it does not help the perception of an outside gold investor.

South Africa has not kept pace with the required improvements to its infrastructure. Port, rail and road networks have deteriorated affecting the supply of goods and services. However, it the shortage of reliable power that is hampering economic development of the nation.

4.3 Perceptions of Mineral Policy

Despite its major status in the global mining sector for over a century, South Africa is currently perceived to be a fairly poor investment opportunity for mining exploration (Table 1). The maturity of the country’s mining sector, leading to reduced perceptions of the mineral potential has combined with a poor policy and business climate to make an overall undesirable investment climate.

The challenges facing South Africa are generally the opposite of those faced by other African countries. As a moderately developed middle income country with a substantial mining sector the country already has good infrastructure; availability of skilled labour and geological database (Table 1) – all of which are usually absent in many other African countries.

<table>
<thead>
<tr>
<th>Index</th>
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<th>World Quartile</th>
<th>Africa Position (of 30)</th>
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<tr>
<td>Mineral Potential(^4)</td>
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<td>3rd</td>
<td>11</td>
<td>2nd</td>
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<td>Room for Improvement</td>
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<td>3rd</td>
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<td>Quality of Infrastructure</td>
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<td>Socioeconomic Agreements(^3)</td>
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<tr>
<td>Trade Barriers</td>
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<td>Political Stability</td>
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<td>Labour Regulations(^4)</td>
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\(^1\) Known fully as the ‘Best Practices Mineral Potential Index’ which ranks countries by attractiveness if all countries applied Best Practice mineral policy i.e. if only geological prospectivity mattered.

\(^2\) Known fully as the ‘Uncertainty Concerning the Administration, Interpretation and Enforcement of Existing Regulations’ index.

\(^3\) Known fully as the ‘Socioeconomic Agreements / Community Development Conditions’ index.

\(^4\) Known fully as the ‘Labor Regulations / Employment Agreements and Labour Militancy / Work Disruptions’ index.

Table 1: The position of South Africa in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
In contrast to the rapidly developing West African mining sectors, for example, South Africa has a weak and uncertain regulatory framework, poor bureaucracy and a tax regime perceived to be amongst the worst in the world for mining focused countries (Table 1). This last factor comes despite the fact that South Africa has low rates of taxation compared to other African countries (see main overview report), suggesting the problems may be in the implementation of taxes, rather than their levels. Particular areas of regulatory concern include land claims, socioeconomic and local community agreements and labour laws, all of which are ranked as amongst the poorest in the world (Table 1). The last factor, labour regulation, is emphasised by the severe problems that have faced the platinum mining sector in the country, where strikes have turned violent and deadly. The violence is also part of more general security issues, amongst a country, particularly around the mining centre of Johannesburg, which has very high violent crime levels.

Despite the substantial problems facing the mining sector in South Africa, its overall investment attractiveness has increased steadily over the last five years (Figure 8), though as with all relative rankings, whether this is due to improvements in South Africa itself or worsening problems elsewhere in the world is not clear.

![Performance of South Africa in Fraser Institute Survey of Mining Companies Rankings over time](image)

**Figure 8:** The changing position over time of South Africa in the three main indices (Investment Attractiveness, Policy Perception and Mineral Potential) of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
4.4 Mining Law and Taxation

The main law applicable to mining in South Africa is the Mineral and Petroleum Resources Development Act (MPRDA), which recognized state rather than private custodianship over minerals in the country; it was passed in October 2002 and came into force in 2004.


Some of the most important financial clauses are:

- Corporate Income Tax: 26.67%, plus 15% on dividends declared to non-residents
- Depreciation Allowance: 20% per annum for plant and machinery
- Withholding Tax:
  - Royalties: 12%
  - Dividends: 10%
- Govt. Ownership: None
- Royalties on gold: Formula-based but normally from 0.5% to 7%
- VAT: No VAT on exports

Curtis (2009), suggests that South African mining companies enjoy generous tax treatment: they are able to deduct 100% per cent of much of their capital expenditures against tax while gold mining companies pay a corporation tax rate according to a formula that keeps remittances to government low. Moreover, the government is introducing a new mineral royalty system after agreeing to many of the mining industry’s requirements: this will impose low royalty rates that his report estimates will cost the country $359m - $499m a year compared to previous proposals made by the government. Mining companies paid taxes of $2.01b in 2006 – equivalent to 9.9 per cent of exports: a low figure.

5. Conclusions

- South Africa has declined from the number one gold producing country in 2006 to number six in 2014.
- The country is now seen as a relatively unattractive option for foreign investment in mining, globally, and even amongst African peers.
- The challenges facing South Africa’s mining sector are generally the opposite of those faced by the developing economies elsewhere in Africa.
- The maturity of the mining sector, means mineral potential is generally seen as lower than elsewhere in Africa and the world.
- Gold mines are getting deeper with consequent increased costs associated with cooling, ventilation haulage and rock stresses. Although grades remain high, production costs are placing increased pressure on profitably.
- Although the country is seen to have good infrastructure and skilled labour availability, unlike its African peers, problems are also emerging in these areas.
- South African infrastructure has not kept up with growth and power supply problems in particular are affecting production performance.
- In addition, labour concerns and industrial activity are increasing, recently becoming violent and deadly.
- The labour concerns are part of wider perceived problems in the regulatory framework and legal system, where South Africa is now seen to have some of the most problematic regulations (in general contrast top the substantially improved frameworks elsewhere in Africa).
- The violence around recent strikes in platinum mines is also part of wider perceived security problems in the country, which has high violent crime rates.
• The regulatory problems, security issues, limited mineral potential and declining quality mines and infrastructure should partially be offset by a generous taxation scheme, however, currently this is largely unrecognised and South Africa’s taxation regime is thought to be one of the worst in the world for mining.

6. References


APPENDIX 1

Mining and tax in South Africa: - Costs and benefits by Mark Curtis (2009)

www.curtisresearch.org

Summary
The South African economy overall continues to benefit greatly from mining, but it is not benefiting as much as it could, and the costs of mining are increasingly borne by communities in rural areas. Mining accounted for 7% of GDP, $20.7b worth of primary exports and employed 459,000 people in 2006. The mining sector’s total contribution to the South African economy is estimated at $25.9b in 2006, including all taxes, procurement and wages.

However, South African mining companies enjoy generous tax treatment: they are able to deduct 100 per cent of much of their capital expenditures against tax while gold mining companies pay a corporation tax rate according to a formula that keeps remittances to government low. Moreover, the government is introducing a new mineral royalty system after caving in to many of the mining industry’s demands: this will impose very low royalty rates that this report estimates will cost the country $359m - $499m a year compared to previous proposals made by the government. Mining companies paid taxes of $2.01b in 2006 – equivalent to 9.9 per cent of exports: a low figure. At the same time, many companies are making large profits. Gold mining companies collectively made pre-tax profits of $672m in 2007, of which only $127m went to the state in taxation. Platinum companies did better: Anglo Platinum, the world’s largest platinum producer based in South Africa, made $1.6b after tax in 2006; Impala Platinum, the country’s second producer, made a massive $2.2b.

Mining in South Africa has major costs for many mine-workers, no less than 2,869 of whom have died in the mines over the past ten years while over 4,000 were injured in 2006 alone. Health and safety regulation has been shown to be inadequate.

Furthermore, many rural communities are now in open conflict with mining companies, seeing few benefits from their activities or being made poorer. Some entire villages are being ‘relocated’ while losing farmland or access to water. There is evidence of water pollution and harmful health effects on people from gold, platinum and uranium mining. Companies’ ‘community development’ spending is miniscule in comparison to profits. The South African government needs to review its fiscal policies and audit the local impacts of mining.

Introduction
The economy of South Africa has been built on mining and has greatly benefited from its rich deposits of platinum, gold, diamonds and coal. South Africa’s two major mineral exports – platinum and gold – both saw large price rises in 2006: the platinum price rose by 27% in 2006 and the gold spot price by 45%. But this report asks: is South Africa benefitting as much as it could be? and how extensive are the costs, notably for the communities in the mining areas as well as mineworkers?

1. Brief History in Mining
Large-scale mining has taken place in South Africa for well over a century. Diamonds were first discovered in the 1860s near the town of Kimberley followed over the next two decades by the discovery of several diamond-bearing kimberlite pipes. Gold mining began in the 1870s but took off when gold was discovered in the Witwatersrand area in the 1880s, triggering a gold rush and thousands of foreigners to descend on the region. By the turn of the century, the value of South Africa’s gold output exceeded $40m. Ownership of the diamond and gold mines sector was concentrated in a few hands - in the early decades, by a handful of entrepreneurs known as Randlords.
The mining industry, led by gold and diamonds, continued to grow throughout the twentieth century, with revenues providing capital to purchase machinery and petroleum products to support an expanding manufacturing base, driving South Africa’s industrialisation. Many towns and cities and much of South Africa’s infrastructural development – the road and rail networks in particular – arose due to the development of the mining industry. Under the apartheid regime after 1948, the mineral industry continued to grow, and, with high commodity prices in the 1970s and early 1980s, boomed. South Africa’s minerals continued to be seen by Western governments, especially the USA and UK, as vital for their postwar economic development, their militaries and their own commercial interests – factors which explain why Washington and London gave de facto backing to white-ruled governments for so long, allowing them to escape full international censure and sanctions. A year after the end of apartheid and the election of a democratically elected government in 1994, a review of the mining industry began and culminated in the release of a White Paper – A Minerals and Mining Policy for South Africa – in October 1998.

The White Paper set the basis for the principal mining legislation, the Mineral and Petroleum Resources Development Act (MPRDA), which recognized state rather than private custodianship over minerals in the country; it was passed in October 2002 and came into force in 2004. However, these policies made few major changes to the structure of the mining industry and the power of the large companies, some of which had profited under the apartheid regime and which continued to operate in the new era. In particular, the industry remained overwhelmingly controlled by whites. The government’s Mining Charter (‘The broad-based socioeconomic empowerment charter for the mining industry’) of 2002, which came into effect in 2004, has sought to promote black empowerment in the sector, and calls for 26% ownership of mining assets by ‘historically disadvantaged South Africans’ (HDSA) by 2014; 51% ownership of mining projects by HDSA by 2014; and 40% of mining managers to be HDSA and 10% to be women by 2009.

The Charter, whose goals are rather technocratic and modest, is being reviewed in 2009. Currently, while blacks account for more than 70% of the mining industry’s labour force, they still occupy less than 5% of management positions.

Some black-owned mining companies, such as Mvelaphanda, African Rainbow Minerals and Exxaro Resources, are, however, beginning to play important roles in the economy.

2. Importance of mining
South Africa is the world’s largest producer of platinum group metals, chrome ore, manganese and vanadium and a major supplier of gold (world rank 2) coal (5), iron ore (9), nickel (5) and uranium (5).5 The Bushveld Igneous Complex in northern South Africa is a hugely mineral-rich region extending for 400km which contains most of the world’s platinum reserves. In 2006, the country produced 53 different minerals from 1,212 mines and quarries of which 47 produced gold, 33 platinum group minerals, 89 coal and 240 diamonds. Many of the world’s largest mining companies are South African or have their origins there, notably De Beers, Anglo American, Anglo Platinum and Anglo Gold Ashanti.

In 2006, mining accounted for 7% of GDP, which rises to 18% if the indirect multiplier effects are considered, according to the Chamber of Mines of South Africa (CMSA).

$20.7b worth of primary mineral exports and $28.9b worth of sales. This amounts to 32% of South Africa’s merchandise exports (and 25% of all exports), but 50% if ‘beneficiated’ (ie, processed or refined) mineral goods (eg ferroalloys, steel and catalytic converters) are added.

459,000 workers; the CMSA estimates that five million people are directly dependent on mine employees for their daily subsistence.
Mining is the largest employer after the public sector. Platinum is the country’s largest export – accounting for 2.1% of GDP and 15% of merchandise exports - followed by gold (1.1% of GDP and 8% of merchandise exports); diamonds accounted for 0.4% of GDP and 2.3% of merchandise exports in 2006.

Although mining remains vital to South Africa, the pace of mineral exploration has fallen over the years and the mineral base has been depleted. Twenty years ago, mining accounted for a much higher proportion of GDP – 12%. Gold, traditionally the major driver of the economy, has seen a consistent contraction; it reached its production peak in 1970 (1,000 tons); in 2006 production was at its lowest level since 1922 (275 tons). China overtook South Africa as the world’s major gold producer in 2007. Reports suggests an average annual growth in South Africa’s mining sector of just 0.47% over 2007. The number of people employed in mining has fallen by 17% since 1997, mainly due to rising production costs and automation.

3. Outline of the Mining Tax Regime
In the past few years, a number of mining laws have been revised. New legislation has been introduced for diamonds, precious metals and health and safety, while a new MPRDA and a new royalty bill have been written. Most of the tax provisions for the mining sector are outlined in the Income Tax Act (ITA) of 1962. Its key provisions are:

Income tax:
The standard corporate income tax rate for all mining companies except gold miners was 29% of profits in 2007 and 28% in 2008.

Companies have also been required to pay a Secondary Tax on Companies (STC) of 10 per cent (in 2007) of the net amount of dividends declared; however, this is due to be abolished in 2009 and replaced by a withholding tax on dividends paid to shareholders.

Gold mines’ taxable income is derived from a formula which takes account of the ratio of profits to revenues. As profits rise, the state takes a larger proportion in tax; if the company makes no profits (or low profits at around 5% of revenues), the state receives no tax; however, shareholders can still receive dividends in this time. For example, companies with a profit to revenue ratio of 15% paid 30% corporation tax in 2005; those with a 30% ratio paid 37.5% corporation tax.

Gold mining companies can elect to be taxed with or without paying the STC; the basic rate of tax for gold mining companies in 2008 is up to 34% for those paying the STC and up to 43% for those electing to be exempt. With the proposed abolition of the STC in 2009, the 43% per cent option will be discontinued.

Capital expenditure allowances:
South African law offers generous capital expenditure allowances to mining companies: Considerable capital expenditure by mining companies can be fully deducted against tax including spending on: prospecting; mining equipment and shaft sinking; and development, general administration and management prior to commencement of production. Mining companies are allowed to deduct these capital expenditures in the year in which they occur; this is more favourable than in the manufacturing industry, which has a 40% write-off in the first year and 20% in the subsequent three years. Some other mining company expenditures are subject to less capital allowance, such as employee housing at 10% in the first year and private cars at 20%.

The Income Tax Act also provides for a further capital allowance for gold mines, which is deducted against capital expenditure and which serves as an incentive for new mining development. The allowance is calculated as a percentage of capital expenditure, ranging from 10 to 12% per year depending on the mine. Mining companies can offset against tax their obligatory spending on organizations engaged in mining-related environmental rehabilitation or protection. As with other sectors, mining companies can carry
forward any losses for an indefinite period and set these against future profits. There are no restrictions on the repatriation of profits.

**Ringfencing**
The ITA has a ring-fencing arrangement, whereby capital expenditure in relation to a mine is restricted to the taxable income of that mine and not to other mines owned by the same company. However, the Minister of Finance can rule that company costs can be offset against another mine; mining companies can then transfer up to 25% of the capital exemption from unprofitable mines to offset income from profitable mines.

**VAT**
VAT is applied at the standard rate of 14% cent but exports are zero-rated. This means that since most mineral production is exported, mining companies not only pay no VAT on those exports but are also entitled to a refund for all the input taxes paid by them. This is a major gain for gold and diamond companies, for example, who export virtually 100% of their production.

**Withholding tax**
No withholding taxes are imposed except for the proposed replacement for the STC, noted above, and a withholding tax on royalties calculated at 12% of the royalty.

**Fiscal stabilization**
There are no provisions in the legislation (apart from in the new royalty bill, see below) to stabilize the tax regime for the duration of a mining right, unlike in some other countries.

**South Africa’s generous tax regime**
A 2006 report by the Foreign Investment Advisory Service of the International Finance Corporation and the World Bank concluded that South Africa provides ‘generous tax treatment’. Indeed, it calculated that the Marginal Effective Tax Rate (METR) – the extent to which the tax system reduces the real rate of return on investment – was just 0.4% for mining sector; the lowest of six industry sectors analysed; this compared to 13.9% for tourism and 5.7% for agriculture.

The study gave two reasons for the low mining tax rate:
- the fact that gold mines are subject to a formula for calculating corporate income tax (CIT) that depends on the ratio of taxable income to turnover, which substantially lowers the CIT rate in the gold sector. Depending on their election of the formula, ‘in some cases gold mines do not have to pay STC on dividend distributions’.
- mining companies are able to immediately write off 100% of their expenditure on machinery and equipment and on mine development.

The study noted that, in the case of equipment, the METR was negative 32%. ‘This suggests a substantial subsidy to investment in equipment in the mining sector’. One recent academic study comparing the total effective tax rate in one mining sub-sector - copper - in 25 developed and developing key mining countries found that South Africa ranked 10th lowest, with a rate of 45% (the amount paid to the government in all forms as a proportion of annual cash flow). This was a higher rate than Zimbabwe and China but lower than Ghana, Ivory Coast and the Philippines.

**Royalties: Profits over people?**
A new draft Royalty Bill was first introduced in March 2003 and has undergone four revisions; it was finalized at the end of 2008 and is set to become law in May 2009. Until now, royalty payments for privately owned mineral rights have been determined by agreement between the mineral rights holders,
often meaning local chiefs, and mining companies. For state-owned mineral rights, the standard royalty rate has been 1% of gross mine revenue for all minerals except diamonds, where the rate has been 5% per cent. The new bill has the following main features:

- The royalty rate is a variable one based on profitability and calculated according to a formula which takes account of earnings before interest on loans and taxes (a measure of companies’ operational profits). Thus royalty rates will be higher at a time of high company profits and high commodity prices. At the same time, the variable royalty rates mean that marginal mines will pay little or no royalties.
- Two different formula are applied for unrefined (ie, raw) and refined (ie, processed) minerals. The minimum royalty rate is 0.5% while the maximum royalty rates will be 7% for unrefined minerals and 5% for refined minerals.
- Royalty payments are tax deductible. In determining the royalty calculation, mining companies have the option of obtaining fiscal stability for the term of the mining agreement. In this case ‘legislative amendments will have no force and effect’, the government has said, and companies will be entitled to compensation in the event of the state breaching the agreement. The government says this provision is intended ‘to ensure that an extractor’s investors have certainty with respect to the royalty regime...given the substantial investments and long lead times to production required for most mining operations’. For prospecting and exploration rights, such a fiscal stability agreement can also be ‘freely’ assigned to other companies when selling mining rights; for companies in production, fiscal stability can only be transferred within the same group of companies.

Problems with the new royalty law
The government has said that the revised royalty regime is both ‘investor friendly’ and ensures ‘that the fiscus receives its fair share of tax revenue’. The government is more right on the first point than the second; there are three major problems:

1.1 Low royalty rates.
Due mainly to industry pressure, the government substantially reduced the proposed royalty rates for most minerals with each draft. The first draft of the royalty bill called for royalties of 8% for diamonds, 4% for platinum, 3% for gold and 2% for copper, coal, nickel and manganese. The study for the International Finance Corporation and World Bank noted above stated that, at these levels, ‘there is little to suggest that imposing royalties as outlined in the proposed legislation will render South Africa’s mining industry uncompetitive’.35 Yet the second draft of the bill reduced these rates, then the third draft reduced them still further, as outlined in table 1:

<table>
<thead>
<tr>
<th></th>
<th>2nd draft</th>
<th>3rd draft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diamonds</td>
<td>2</td>
<td>3.7</td>
</tr>
<tr>
<td>Gold</td>
<td>2.25</td>
<td>2.1</td>
</tr>
<tr>
<td>PGMs</td>
<td>4.5</td>
<td>2.7</td>
</tr>
<tr>
<td>Manganese</td>
<td>3</td>
<td>3.3</td>
</tr>
<tr>
<td>Iron ore</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Coal</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Chrome</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Base metals</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

*Table 1: Average royalty rates in the 2nd and 3rd drafts of the Royalty Bill (%)*


By the fourth and final draft average royalty rates were reduced even further. Table 2 below shows the average royalty rates that would have prevailed in retrospect in 2006 and 2007 using the new formulae agreed in the final draft of the bill.
Table 2: Average royalty rates that would have prevailed using the proposed new formulae (%)

<table>
<thead>
<tr>
<th></th>
<th>Refined minerals</th>
<th>Unrefined minerals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1.56</td>
<td>1.97</td>
</tr>
<tr>
<td>2007</td>
<td>2.55</td>
<td>3.4</td>
</tr>
</tbody>
</table>


2. \textit{Profit rather than revenue-based.}

Earlier drafts of the bill called for royalties on turnover not profits; the move towards a profit-based system is again due to industry pressure. The profit-based system means that the state will accrue little from the (depleting) resources extracted unless the companies make significant profits.

3. \textit{No guarantees to communities.}

The government also rejected proposals by some civil society groups and unions, and indeed some mining companies, to earmark royalty revenues to communities affected by mining: all the royalty revenues go to the central government. The Minister of Finance, Trevor Manuel, has said that ‘not only is earmarking contrary to sound fiscal policy, but also earmarking would negate the underlying principle of the MPRDA that the minerals of our country belong to all South Africans’. However, Manuel has also said that the ‘government is amenable to consider an on-budget spending programme targeted at mining and labour supplying communities directed at human and/or local economic development’.

### South Africa’s lost income

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refined minerals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unrefined minerals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth draft Royalty Bill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average royalty rate (%)</td>
<td>1.56</td>
<td>1.97</td>
</tr>
<tr>
<td>Revenues to government</td>
<td>394m</td>
<td>498m</td>
</tr>
<tr>
<td>Revenues to government</td>
<td>923m</td>
<td>$1.24b</td>
</tr>
<tr>
<td>Rejected Third draft Royalty Bill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average royalty rate (%)</td>
<td>2.98</td>
<td>3.94</td>
</tr>
<tr>
<td>Revenues to government</td>
<td>753m</td>
<td>997m</td>
</tr>
<tr>
<td>Revenues to government</td>
<td>1.26b</td>
<td>$1.68b</td>
</tr>
<tr>
<td>DIFFERENCE</td>
<td>-359m</td>
<td>-499m</td>
</tr>
</tbody>
</table>

Table 3 shows the difference in government revenues from the fourth and final draft Royalty Bill and the rejected third draft.


This table shows that the South African government would have earned $1.24b in 2007 from unrefined minerals by introducing the proposed royalty rates; however it could have earned $1.68b by adopting the
formula rejected in the third draft - a gain of $440m. Overall, the table shows that the government will lose $359-$499m a year. We turn now to the current situation with government revenues, which shows that the mining sector already contributes a significant amount to the South African Treasury, and that many companies are making large profits.

4. Government Revenues

4.1 Economic benefits
The mining sector provides large revenues to the government in South Africa, as outlined in the following table, based on information from the CMSA. The total amounts to R205b, or $25.9b.

<table>
<thead>
<tr>
<th>Procurement (eg, materials, electricity, legal services)</th>
<th>90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wages</td>
<td>40</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>25</td>
</tr>
<tr>
<td>Dividends to providers of capital</td>
<td>15.6</td>
</tr>
<tr>
<td>Interest payments</td>
<td>5.5</td>
</tr>
<tr>
<td>Payments to specialized sub-contractors</td>
<td>5</td>
</tr>
<tr>
<td>Payments to municipalities for services</td>
<td>5</td>
</tr>
<tr>
<td>Insurance Premiums</td>
<td>1</td>
</tr>
<tr>
<td>Advertising</td>
<td>1</td>
</tr>
<tr>
<td>R&amp;D and product development</td>
<td>0.8-1</td>
</tr>
</tbody>
</table>

Table 4: Contribution of mining to the national economy, 2006, Rand billion
Source: StatsSA cited in Dick Kruger, Chamber of Mines, Presentation to Sustainable Development Conference, 18 October 2007

The mining sector in South Africa is so large that it contributes a number of ‘multipliers’ and ‘linkages’ to the wider economy - between 7 and 10 people rely on each mineworker for their daily survival while mining creates or sustains various other services and thus employment. Backward linkages arise from the sector’s purchase of goods and services (eg, the gold mines consume 15% of all the electricity generated in South Africa); forward linkages arise from the use of minerals in other industries, such as jewellery and manufacturing. The government ministry responsible for mining, the Department of Minerals and Energy (DME), notes that the mining industry contributed R94.3b ($11.9b) to gross value added (GVA) in the South African economy in 2005 and has over the past decade accounted for around 7.4% of all GVA; if the contribution of processed minerals is added, the figure is higher.

Beneficiation’ - the smelting or refining of mineral ores to a more finished product - has been identified by the government as a major growth area. Processed minerals now account for significant export revenues and grew by 16% in 2006 to reach R43b ($5.4b); the most important areas were chromium alloys and aluminium. However, the Minister for Minerals still notes that ‘with mining activities ongoing for well over a century in this country, there has been limited value addition or beneficiation of some of the commodities produced in this country’ and that many of the ores exported by South Africa are processed elsewhere.

4.2 Taxes
Taxes paid by the mining sector were: R16.2b ($2.06b) in direct taxes and ‘a major portion of indirect taxes’ to the government in 2006. This figure is the equivalent of 9.9% of mineral exports and 7.2% of sales, using the same export/sales figures noted above. This ratio (at around 10%or less) is no greater than in many other African countries, such as Tanzania, where mining is widely seen as benefiting the country little.
Around R17b ($2.1b) in the fiscal year 2007/08. This represented 12% of all corporation tax revenues - the second largest sectoral contribution after manufacturing.
Revenues to the state from mining have fallen over the past ten years. In 1990, the mining sector paid income tax of 6.7% of gross sales, which fell to 1.5% in 2001; this decrease was partly attributable to declining profits rather than low tax levels. Gold mining companies now pay a much lower proportion of their operating profits in taxes than in the past; in 1975-84, their taxes amounted to 48% of operating profits, while in 1995-2004, the proportion was 1%. This is also partly explained by declining profits (given the tax formula applied to gold which increases taxes as profits rise). South Africa is the highest cost gold producer in the world and has the deepest gold mines, the production costs increasing significantly as depth increases. Though gold prices have recently been at a high, there are also very high production costs.

Company profits and taxes
However, the available figures show mining companies are still making large profits. As shown in table 5, gold mining companies made total profits in 2007 of R5.28b ($672m), of which R1b ($127m) went to the state in taxation. R650 million ($83m) in dividends were paid out to shareholders in 2007.

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total profits</td>
<td>6.69</td>
<td>5.28</td>
</tr>
<tr>
<td>Of which: taxation to the state</td>
<td>0.98</td>
<td>1.00</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>5.95</td>
<td>8.14</td>
</tr>
<tr>
<td>Declared dividends</td>
<td>1.25</td>
<td>0.65</td>
</tr>
</tbody>
</table>

Table 5: Gold mining companies profits and taxation, 2006-07 (Rand billion) (1 Rand = $0.127)

5. Advertising impacts of mining
The fact that mining has adverse impacts has often been drowned out in debates in South Africa, including in the media, which tends to focus on the benefits that mining has brought. Yet for many mineworkers, and increasingly for many communities in the mining areas, the impacts are often extremely severe.

Mineworkers
Mining accounts for 4.7 per cent of those employed in the non-agricultural formal sector of the economy and 2.7% of all employees. Wages per mining worker amounted to R86, 345 ($10,890) in 2006, considerably higher than R49, 435 ($6,240) a decade earlier (in real terms with 2006 as the base year). In 2008, average monthly wages in the mining sector were R8, 305 ($1,047), higher than in the manufacturing and construction sectors, but lower than in the transport and finance sectors. Yet mining in South Africa remains dangerous for many while some mineworkers endure inhuman working and living conditions. Two big strikes in the mining industry have taken place in the last two years. One in August 2008 brought the industry to a virtual standstill when the umbrella union, COSATU, protested at the rising cost of living, demanding higher wages for workers including mineworkers; another took place in December 2007 when the National Union of Mineworkers held a national strike protesting at the rising death toll in the mines.

South Africa is notorious for its high fatality rate in mining, the most common cause of which are falls of ground. The Minister of Minerals and Energy, Buyelwa Sonjica, has referred to mining deaths as ‘a dismal and abysmally dark side of our mining industry’. Figures from the CMSA show that 199 people died in the mines in 2006 and that 2,869 people died in the ten year period to 2006 – the majority of them in the gold mines which are the deepest in the world. By May 2008, there had been 71 fatalities in the mining industry so far that year, compared to 96 in the same period the previous year. After 3,200 workers became temporarily trapped underground at the Elandskraal gold mine in 2007, operated by Harmony Gold, President Thabo Mbeki ordered a full safety audit for 333 mines across the
country. The chief inspector of mines at the DME has said that ‘generally levels of compliance [with health and safety legislation] in our industry are low’. Many companies have recently improved their performance on fatalities, and the government has increased the fines payable by companies. However, mines managers are still not held criminally liable for fatalities under the law; therefore the costs of upholding the laws on safety are not punitive.

The problem is not just fatalities, but injuries and adverse health impacts. Over 4,000 people were injured in the mines in 2006 alone.

South African mine-workers have long suffered from lung diseases, such as silicosis, while tuberculosis rates are ten times higher among mineworkers than in the general population. Another problem is noise induced hearing loss; Impala Platinum alone, the country’s second major platinum miner, recorded 43 new cases in 2007.

Many South African mines also rely heavily on sub-contracted labourers, who have long played an integral role in the mining industry, especially gold. They tend to be less unionized, less well-trained and live in poorer accommodation than other workers. These workers also tend to be migrant labourers, notably from Lesotho; the Chamber of Mines estimates that 60 per cent of Lesotho’s GDP is accounted for by mineworkers’ remittances to the country.

Housing offered to mine-workers is often extremely poor quality, with some labourers living in shacks with poor access to water or electricity. A recent report on the Helam diamond mine, in North West province, owned by Petra Diamonds, the country’s second largest diamond producer, claimed that hostels were filthy, that the grounds stank of raw sewage, that food was kept in filthy kitchens, and was overall ‘unfit for human habitation’. The housing situation in the mining industry ‘remains a sore point’, Buyelwa Sonjica has said.

Communities

This paper, focused mainly on revenue issues, cannot do justice to the large range of impacts that mining in South Africa has on local communities, which have been highlighted in a number of recent NGO reports. The key issues include:

Relocation. There have been several relocations of village communities, sometimes involving thousands of people at a time, especially in platinum mining. The result has sometimes been a net loss of agricultural land and access to water while compensation provided tends to be low.

Intrusion. Some communities have lost farming land due to mining encroachments or been subject to intrusive and sometimes harmful (especially to houses) dynamite blasting by companies; mining rigs all too easily pop up in the centre of villages or on grazing or farming land.

Pollution/health. There are significant concerns about water pollution and the impact of mine waste facilities such as tailings dams on air quality. The gold and uranium mines are the most common source of trace and heavy metal water pollution in South Africa. One recent NGO report, by the Benchmarks Foundation, noted doctors in the Rustenburg platinum mining area of North West province reporting a dramatic increase in respiratory ailments in the last five years: mine waste management, especially of tailings, combined with carbon dioxide emissions and sulphur dioxide have contributed to a toxic mix which affects breathing.

Consultation. Mining companies are required under the legislation only to ‘consult’ with communities who might be affected by their operations in areas where they hold mining rights; their consent is not required
even for relocations. Consultation processes between companies and communities are clearly weighted more in favour of the former than the latter, who have more money and legal advice, in dealing with communities where many people are illiterate, read little or no English, and poor. Communities are often excluded from policies that affect them, such as the Social and Labour Plans which companies are obliged to draw up in their localities, but which communities rarely if ever even see let alone influence.

**Security.** Some companies have resorted to calling in the police or private security forces to clamp down on protests against their operations, which have often turned violent, and use legal methods to prosecute protesters or to silence lawyers defending them.

The impact of Anglo Platinum in Limpopo province. A recent report by ActionAid analyses the impact on local communities around three platinum mines in Limpopo (Twickenham, Modikwa and Potgietersrust) managed by Anglo Platinum. The company is the world’s largest platinum producer, based in South Africa, and majority-owned by the global mining giant, Anglo American, based in the UK. The report found that thousands of poor rural people have lost agricultural land – their principal means of subsistence – due to mining activities. They are generally offered little compensation and insufficient ways of making an alternative living. Some communities have lost access to adequate clean drinking water while independent water sampling commissioned by ActionAid discovered serious water pollution near one of the mines; mining activities are the most likely cause of this pollution, which has made the water unfit for human consumption.

Around 10,000 people from the villages at Mohloholo near the Potgietersrus mine are being ‘relocated’ to new villages built by Anglo Platinum. Villagers were never offered a choice as to whether they wanted to move or not and although they signed relocation agreements, these are with associations (Section 21 companies) that Anglo Platinum claims represent the community but which have been established by the company itself to effect the relocation; the Section 21 companies’ legal advisers are also paid by Anglo Platinum. Community protests here, and near other mines in the area, to improve services offered to villagers or to challenge the company over land take-overs are routinely met with brutality by the police or legal action by the company. Anglo Platinum has refuted the analysis in the report, calling it ‘extremely one-sided’ and saying that it distorts the facts.

The large transnational companies do have internal policies that require consultation with affected communities and monitoring of social and environmental impacts. However, these are not always implemented while the reporting often glamourises reality in a context of inadequate monitoring by the local authorities. The smaller companies provide very little reporting on their environmental policies at all.

The companies’ voluntary spending on community development around the mines is usually completely inadequate to compensate villagers for the adverse impacts of mining. The international diamond industry website, diamondsfacts.org, notes that the South African diamond industry produces $1.5b worth of diamonds each year and spends approximately $4.15m on community development projects – this amounts to just 0.28 per cent of the value of the exports.

**The government’s ambivalent role**

The government’s role in mining is very ambivalent. Ministers regularly complain that the mines have brought too few benefits to the country; at the same time, they continue to offer generous tax treatment to corporations. In many rural areas, communities simply do not see the local government as an independent arbiter between them and the companies but as siding with the latter and failing to uphold peoples’ rights; indeed, there appears to be widespread collusion between the state and mining companies in undermining the constitutional land rights of communities.
The biggest overall problem is that the South African government largely accepts the same neo-liberal, economic model, based on arguments about international competitiveness, low tax rates and improving investment climates, that primarily benefits corporations. There are also concerns about current and former government officials acting as shareholders, board members or managers in mining companies. The board of one major gold company, Goldfields, for example, includes a former premier of Gauteng province, a senior member of the ANC and a senior civil servant in the office of the President. Another issue is that the DME lacks the capacity to adequately oversee and regulate the mining industry, notably its social and environmental impacts. The department has a staff turnover so high that the Minister has called it ‘scary’. It is clear that improvements in both the will and the means to address the mining sector in South Africa need to be made.

6. Recommendations
South African minerals still have tremendous potential to contribute to the long-term development of South Africans. Yet for this to happen, a number of major steps need to be taken. The South African government should:

- Review again the Royalty Bill, and increase the royalty rates upwards.
- Conduct a comprehensive audit of the impact of the country’s largest mines on human rights and the environment, with a view to ensuring that the constitutional rights of South Africans (to water, adequate housing and land) are upheld. This audit should follow the recent audit into mine safety.
- Strengthen the MPRDA to ensure that community rights to land and water are respected in mining operations.
- Ensure that all company Social and Labour Plans around mines involve the participation of local communities, and are made public.

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24 Deloitte, Investing in South Africa: 2007, p.31
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27 Foreign investment advisory service, Sector study of the effective tax burden: South Africa, April 2006, pp. vi, xiv
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Wiseman Khuzwayo, ‘Where diamonds are a workers’ worst enemy’, Business report, 17 August 2008


Especially, Action Aid, Precious metal: The impact of Anglo Platinum on poor communities in South Africa, March 2008; Benchmarks Foundation, Review of the corporate social responsibility programmes of the platinum, gold and uranium mining and coal sectors in South Africa, June 2008; Benchmarks Foundation, The policy gap: A review of the corporate social responsibility programmes of the platinum mining industry in the North West province, 2007. The following information is drawn from these studies unless otherwise stated


24

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For example, the Minister of Minerals and Energy, Buyelwa Sonjica, has recently said that ‘I believe that communities would not oppose mining if they were meaningful beneficiaries of the mining operations… We would like to implore mining companies that as they structure their BEE [black economic empowerment] deals, they must ensure that employees and communities become the collective beneficiaries of this wealth distribution process’. Speech, 6 June 2008, www.dme.gov.za

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## APPENDIX 2

### Status of Gold Production, Development and Exploration Projects in South Africa

<table>
<thead>
<tr>
<th>Operation/Owner</th>
<th>Status</th>
<th>Production</th>
<th>Resources</th>
<th>Mining</th>
<th>Processing</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bambanani, Joel, Masimong, Target, Tahepong, Unisel, Phakisa/Harmony</td>
<td>Prod.</td>
<td>2012: 0.734Moz 2013: 0.739Moz 2014: 0.689Moz</td>
<td>As at 30/6/2014: Meas. Res. = 67.4Moz @ 9.25g/t = 20.007Moz Ind. Res. = 59.4Moz @ 9.34g/t = 17.822Moz Inf. Res. = 129.8Moz @ 7.16g/t = 93.589Moz Total Res. = 256.6Moz @ 8.21g/t = 67.688Moz</td>
<td>Numerous mid-depth mines targeting the Basal Reef unified under Harmony.</td>
<td>Underground crushing, SAG, thickening, gravity concentration, cyanide leaching and CIP.</td>
<td>Harmony Gold website. Accessed at: <a href="https://www.harmony.co.za/">https://www.harmony.co.za/</a>. Retrieved 20 February 2015</td>
</tr>
<tr>
<td>Doornkop and Kusasalethu/Harmony</td>
<td>Prod.</td>
<td>2012: 0.280Moz 2013: 0.205Moz 2014: 0.235Moz</td>
<td>As at 30/6/2014: Meas. Res. = 10.2Moz @ 9.84g/t = 3.235Moz Ind. Res. = 24.1Moz @ 9.03g/t = 6.968Moz Inf. Res. = 25.4Moz @ 6.61g/t = 5.403Moz Total Res. = 59.7Moz @ 8.14g/t = 15.624Moz</td>
<td>Kusasalethu (formerly Elandrand &amp; Deelkrans): Twin-shaft operation with sub-vertical twin shaft system Doornkop: Single shaft</td>
<td>Underground crushing, SAG, thickening, gravity concentration, cyanide leaching and CIP.</td>
<td>Harmony Gold website. Accessed at: <a href="https://www.harmony.co.za/">https://www.harmony.co.za/</a>. Retrieved 20 February 2015</td>
</tr>
<tr>
<td>Kalgold, Phoenix, Surfacedumps/Harmony</td>
<td>Prod.</td>
<td>2012: 0.093Moz 2013: 0.110Moz 2014: 0.108Moz</td>
<td>As at 30/6/2014: Meas. Res. = 391.3Mt @ 9.29g/t = 3.594Moz Ind. Res. = 680.0Mt @ 0.24g/t = 5.198Moz Inf. Res. = 51.3Moz @ 0.47g/t = 0.769Moz Total Res. = 1122.6Mt @ 0.26g/t = 9.561Moz</td>
<td>Kalgold: open-pit Phoenix: slime treatment Surface dumps: low-grade waste</td>
<td>Underground crushing, SAG, thickening, gravity concentration, cyanide leaching and CIP.</td>
<td>Harmony Gold website. Accessed at: <a href="https://www.harmony.co.za/">https://www.harmony.co.za/</a>. Retrieved 20 February 2015</td>
</tr>
<tr>
<td>ERGO/DRD Gold</td>
<td>Prod.</td>
<td>2014: 0.137Moz</td>
<td>As at 30/6/2014 Meas. Res. = 176.8Moz @ 0.31g/t = 1.732Moz Ind. Res. = 414.7Moz @ 0.27g/t = 3.535Moz Inf. Res. = 865.2Moz @ 0.21g/t = 11.177Moz</td>
<td>Sand dumps: Sand loaded onto conveyor belts, screened and washed into a sump and pumped to the plant. Slimes: Jets of high pressure water turn slimes into slurry which is the plant.</td>
<td>Flotation to recover pyrite uranium and gold followed by CIL circuit</td>
<td>DRD Gold website. Accessed at: <a href="http://www.drd.co.za/our-business/ergo/process/metallurgical-process/">http://www.drd.co.za/our-business/ergo/process/metallurgical-process/</a>. Retrieved 21 February 2015</td>
</tr>
<tr>
<td>De Bron Merriespruit/ Wits Gold</td>
<td>Development</td>
<td>Planned: 200,000oz per annum for 18 years. First production planned for 2016.</td>
<td>As at 2013: Ind. Res. 26.7Mt @ 5.80g/t = 4.99Moz Reef at 500-1150m below surface. Planned 2-shaft system with semi-mechanised mining and down-dip mining methodologies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beisa Gold/ White Rivers Exploration (Mark Creasy) and Harmony Gold</td>
<td>Explorati on, Drilling</td>
<td>Currently completing PFS</td>
<td>Not provided Underground operations with multiple reef targets. Steeply-dipping to vertical reefs. The Basal, Beisa and ‘B’ reefs are the major targets</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Summary

- The geology of Tanzania is particularly well-suited for the existence of greenstone-hosted, economically viable gold deposits, though perceptions of the mineral potential in the country by foreigners are fairly low.
- There are currently five gold mines in the country producing around 1.2Moz per annum (2013 figures).
- Numerous development and exploration programmes are underway and more production is expected to come on stream over the next few years.
- Tanzania welcomes foreign investment and in an African context, is a reasonably straightforward place to do business. A solid legal system (unusual for Africa), clear regulatory framework and taxation regime support this situation.
- Some minor improvements to labour regulations, land claims and socioeconomic and local community agreements may further improve perceptions of the minerals policy climate in the country.
- The Mining Act was tightened-up in 2010 to increase the flow of royalties to the State and to provide better opportunities to local Tanzanians but is not onerous to investors.
- Tanzania is viewed as politically, economically and militarily stable, though as with many African countries, security is still seen as an issue.
- The two challenges facing the Tanzanian mining sector are now: improving the perceived mineral potential of the country, part of which would likely involve improving the poor geological database; and stimulating wider economic development, which improves the quality of infrastructure and availability of skilled labour within the country.
- Some improvements in infrastructure are thought to be already facilitating economic development in the country.
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Table 2: The position of Tanzania in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
1. Location, Physiography and Climate

Tanzania lies in East Africa within the African Great Lakes region. It is bordered by Kenya and Uganda to the north; Rwanda, Burundi, and the Democratic Republic of the Congo to the west; Zambia, Malawi, and Mozambique to the south; and the Indian Ocean to the east.

Tanzania covers 947,303 square kilometers and is the 13th largest country in Africa. It is located on the eastern coast of Africa and has an Indian Ocean coastline approximately 800km long. It also incorporates several offshore islands, including Unguja (Zanzibar), Pemba, and Mafia. Tanzania is mountainous and densely forested in the northeast, where Mount Kilimanjaro is located. Three of Africa's Great Lakes are partly within Tanzania. To the north and west lie Lake Victoria, Africa's largest lake, and Lake Tanganyika, the continent's deepest lake. To the southwest lies Lake Nyasa. Central Tanzania is a large plateau, with plains and arable land. The eastern shore is hot and humid, with the Zanzibar Archipelago just offshore.

Figure 1: Road map of Tanzania (Source: Ezilon Maps)

Climate varies greatly within Tanzania. In the highlands, temperatures range from 10 - 20 °C during cold and hot seasons respectively. The rest of the country has temperatures rarely falling lower than 20°C. The climate is cool in high mountainous regions. Tanzania has two major rainfall regimes: one is uni-modal (October–April) and the other is bi-modal (October–December and March–May).
Figure 2: Satellite image of Tanzania

2. Infrastructure

Tanzania lies in East Africa within the African Great Lakes region. It is bordered by Kenya and Uganda to the north; Rwanda, Burundi, and the Democratic Republic of the Congo to the west; Zambia, Malawi, and Mozambique to the south; and the Indian Ocean to the east.

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Tanzania is expected to become one of the fastest-growing economies in Africa. Key drivers will be recent natural gas discoveries, regional integration supported by an extension of transport infrastructure networks and long-term stable democracy.

Tanzania’s infrastructure performs fairly well compared to its African peers, but quality is still too poor and has a negative impact on the economy’s productive capacity.

Infrastructure in Tanzania has witnessed impressive investment in recent years and there is more to come. Transport and utilities infrastructure projects worth $19 billion are in the pipeline.
Figure 3: Tanzania: Proposed infrastructure projects

Tanzania has made great progress in reforming its trunk roads, improving the quality of the road network. The country has also seen significant gains in ICT networks, and has one of the most competitive domestic air transport sectors in Africa. The power sector poses Tanzania’s most serious infrastructure challenge. Despite significant improvements in pricing and operational performance in recent years, inefficiency still absorbs about 1.4 percent of GDP. Moreover, due to heavy reliance on hydro-power the sector remains vulnerable to climate variability (Shkaratan, 2012).

3. Geology

3.1 Regional Geology

The geological framework of Tanzania is a result of a series of events that began with evolution of Archean shield, followed by its modification through metamorphic reworking and accretion of other continental rocks, in turn covered by continentally derived sediments. Pre-rift magmatism followed by active rifting has also left a major mark upon the Tanzanian landscape.

Several major litho-structural provinces from Archean to recent age have been recognised. The Archean craton covers most of the western two thirds of the country, roughly bounded to the east by the East African Rift. Archean rocks host all of the country’s kimberlite pipes and contained lode diamond deposits, and most of its lode gold deposits. The Archean basement terrain is bounded to the east and west by a series of Proterozoic mobile belts; this area, particularly that to the east, hosts most of the country’s wide variety of coloured gemstone deposits.
The Archean and to a lesser extent, the Proterozoic host the vast majority of Tanzania’s gold deposits:

3.1.1 The Archean

The Archean rocks (>2.5Ma) of Tanzania consist of granite – greenstone belts in which linear belts of greenstones (volcano-sedimentary) sequences, are found within a larger region of predominantly granitic rocks; most of the granitic rocks are younger than the greenstones but a few may be older.

Dodoman System

The Dodoman System contains few mineral deposits and discoveries of commercial interest to date.

The Dodoman System forms an east southeast-trending spine of lowermost Archean age rocks across the lower one third of the Archean craton; it appears to be older than the greenstones and their surrounding granites and comprises mainly metasediments, along with mafic volcanics and ultra-mafic intrusives. High grade metamorphic rocks such as granulites, and garnet-amphibolite gneisses are prevalent, as well as greenschist-facies talc, chlorite, and sericite schists.

Nyanzian System

The Nyanzian greenstones are of major economic importance, as they host most of Tanzania’s gold deposits, and almost all of Tanzania’s known kimberlites.

The Nyanzian System (2.6 – 3.0Ma) comprises a series of typical Archean volcano-sedimentary sequences, or greenstone belts, within a much larger area of granite-gneiss complexes (Buganda Toro). The greenstones consist of evolved volcanic complexes comprising mafic through to felsic submarine and subaerial volcanic rocks, derived volcaniclastic and sedimentary rocks, iron formations, etc., along with associated intrusives of a variety of intermediate to felsic compositions. The rocks can be divided into a Lower and an Upper Series on the basis of a recognizable upward transition from mafic to felsic lavas, with minor tuffs and interbedded sediments. The Lower Series consists primarily of basalt, andesite and dacite pillow lavas. The sediments include banded iron formation (“BIF”), recrystallized cherts, and some shale and conglomerate. The Upper Series is characterized by an assemblage of felsic lavas, tuffs, ferruginous cherts, BIF and subordinate meta-pelites. The greenstones are generally metamorphosed to greenschist-facies and are folded about steeply dipping axial planes, which define a generally east-west fabric.
Figure 4: Simplified geological map Tanzania

**Buganda Toro (Granite Gneiss) Terrane**

The Buganda Toro comprises an intensely folded, generally east-west-trending series of rocks, which surround the Nyanzian greenstone belts. Age relations are not yet resolved for the terrane: some age dates are clearly Proterozoic, whilst others are Archean.

**Kavirondian System**

These rocks occur in northernmost Tanzania. They consist mainly of conglomerates, coarse arkosic and feldspathic grits and quartzites, along with minor granitic (some gold-bearing) and volcanic rocks. This system lies unconformably over the Nyanzian.

3.1.2 **The Proterozoic**

**Usagaran System**

Rocks of this system make up much of the central and eastern part of Tanzania. The system includes a variety of high-grade metamorphic rocks of both sedimentary and igneous origin. Amphibolite grade metamorphic assemblages predominate, and are related to granitization and migmatization that occurred during the Pan-African tectono-thermal event, the same that affected the Mozambique mobile belt. Structural trends are mainly north-south. Rocks of this system host a variety of gemstone deposits, as well as a number of gold deposits along its entire extent, from Kenya south across Tanzania and into Mozambique.
A significant component of re-worked Archean basement may exist in the Usagaran. This is proposed in the Handeni area, specifically, where it is hypothesized that gold mineralization observed therein may be a more highly metamorphosed equivalent of the more typical shear-hosted and banded iron formation related gold deposits found in the Lake Victoria gold district, a few hundred kilometers to the northwest.

**U bendian System**

Rocks of the Ubendian System comprise Lower Proterozoic to Archean mobile belt rocks that bound the Archean craton on its southwest side. The Ubendian includes a variety of high-grade metamorphic rocks of both sedimentary and igneous origin. The dominant lithology is gneiss with minor mafic and ultramafic intrusives. Metamorphism is mainly of the garnet-amphibolite-facies, rarely reaching the granulite facies. Structural trends are mainly northwest-southeast. Similar to the Usagaran, Ubendian rocks host gemstone deposits, as well as a number of gold and base metal occurrences/deposits. South of the Archean craton, where the northeastern shore of Lake Nyasa forms the boundary of southern Tanzania, rocks of the Ubendian and Usagaran systems merge into a zone dominated by an east-west structural fabric, where numerous synorogenic granitic intrusive complexes are also found.

**Karagwe-Ankolean System**

This system extends west of Lake Victoria, and is found along the northwest boundary of Tanzania with Burundi, Rwanda, and Uganda. It is younger than the Ubendian and Usagaran, consisting mainly of argillaceous and arenaceous formations. The sedimentary features of the Karagwe-Ankolean rocks reflect shallow-water deposition; low-grade metamorphism has converted many of these units to sericite schists, and quartzites. Granite complexes intrude rocks of this system, and host tin and tungsten mineralization in veins. Rocks of this system are dated at 1.3-1.4 billion years.

### 3.2 Gold Mineralisation

Tanzania is Africa’s third leading gold producer, after Ghana and South Africa, with several major and junior companies producing and exploring for gold, mostly in NW Tanzania, south of Lake Victoria, in an area informally known as the Lake Victoria gold belt.

**Geita Gold Mine (AngloGold Ashanti)**

Geita is the largest of AngloGold Ashanti’s seven open-pit mines in Africa. Prior to April 2004, Geita was managed under a joint venture agreement between Ashanti and AngloGold. Since the merger of the two companies, Geita is a wholly-owned subsidiary of AngloGold Ashanti.

The Geita gold deposit is largely hosted in a Banded Ironstone Formation (BIF). Mineralisation is found where auriferous fluids, which are interpreted to have moved along shears often on BIF-diorite contacts, reacted with the BIF. Some lower-grade mineralisation can occur in the diorite as well (usually in association with BIF-hosted mineralisation). Approximately 20% of the gold is hosted in the diorite.
Bulyanhulu, North Mara and Buzwagi (Acacia Mining)

Acacia Mining (formerly African Barrick Gold plc) is the largest gold producer in Tanzania with three operating mines – Bulyanhulu, North Mara and Buzwagi. Acacia's majority shareholder is Barrick Gold, which owns 63.9% of the company.

**Bulyanhulu** is a narrow-vein gold mine containing gold, silver and copper mineralisation in sulphides. The mineralisation of Bulyanhulu is associated with steeply-dipping reefs. A number of distinct reefs have been identified including Reef Zero, Reef One and Reef Two.
Figure 7: Bulyanhulu Gold Plant

The **North Mara** gold deposits are situated in the Mara Musoma greenstone belt. There are several types of gold mineralisation including shear-zone-related quartz vein and disseminated gold.
Figure 8: Mining activities in the North Mara open-pit

**Buzwagi** is a shear-hosted quartz-veined deposit, hosted in porphyritic granite. The mine is a low grade bulk deposit with a single large open pit.

**New Luika (Shanta Gold)**

The deposit is located in the Lupa Goldfield in the SW, the second largest gold producing region in Tanzania. The geology is characterised by deformed, folded, sheared and metamorphosed Paleoproterozoic rocks with major fold axes trending east southeast to west northwest. The Gneiss Formation, the main ore bearing host, is the dominant rock unit within the Lupa Goldfield. The Gneiss Formation has been subjected to at least three granitic intrusive events that have given rise to a variety of rock types such as felsitic gneiss, biotite and hornblende granite gneiss, leucocratic granular gneiss. Diorite, granodiorite and granite rocks are evident within the Gneiss Formation. Mineralised quartz veined targets are hosted within brittle-ductile to ductile deformational features of variable orientation.
4. The Economy and Gold

Tanzania’s economy is dependent on gold exports (Table 1) which have been increasing in both percentage and US$ terms over the past decade. The importance of gold is even more pronounced when local wages, goods and services; levels of employment; and royalties are considered. The importance of increased royalties to the State is considered in Chapter 5.2.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Exports (US$B)</th>
<th>Gold (%)</th>
<th>Gold (US$B)</th>
<th>Tobacco (%)</th>
<th>Tobacco (US$B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2.43</td>
<td>26.53</td>
<td>0.64</td>
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<td>2007</td>
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<td>2008</td>
<td>3.40</td>
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<td>0.81</td>
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<td>2009</td>
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<td>2010</td>
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<td>2011</td>
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<td>2012</td>
<td>5.57</td>
<td>33.06</td>
<td>1.84</td>
<td>5.88</td>
<td>0.33</td>
</tr>
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</table>

Table 1: Value (in US$) of Tanzanian exports notably gold and raw tobacco (Source: The Observatory of Economic Complexity)
Figure 10: Levels of employment in large-scale gold mines in Tanzania from 2005-13.

4.1 Perceptions of Mineral Policy

Tanzania is seen to be a fairly attractive investment opportunity for foreigners seeking to become involved in the country’s mining and exploration sector (Table 2). A fairly modest view of its mineral potential is offset an attractive (especially by African standards) policy climate (Table 2). Despite this some room for improvement is seen (Table 2).

Whilst the overall regulatory framework, legal system (unusually for Africa) and taxation regime are viewed positively there are some areas of weakness relating to land claims, labour regulations and uncertainty over socioeconomic and local community agreements (Table 2).

Like many developing African countries, Tanzania is still perceived to have weak infrastructure; a limited availability of skilled labour and poor geological database (Table 2). Improvements in the geological database may also help improve the perceptions of its mineral potential and increase its investment attractiveness.

Although politically stable, the country still has perceptions of insecurity that are common across Africa.

Over the last five years the gap between Tanzania’s perceived mineral potential and investment attractiveness has narrowed, leaving it as a fairly attractive minerals investment opportunity (Figure 11). This is mainly due to perceived substantial improvements in the policy climate, as the mineral potential itself has generally be seen to decline.
The challenges facing Tanzania’s mineral sector are perhaps now focused mainly on two key areas: improving its geological prospectivity, and energising wider economic development (beyond the mining sector itself) which would improve infrastructure and workforce skill levels.

<table>
<thead>
<tr>
<th>Index</th>
<th>World Position (of 122)</th>
<th>World Quartile</th>
<th>Africa Position (of 30)</th>
<th>Africa Quartile</th>
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<tr>
<td>Investment Attractiveness</td>
<td>56</td>
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<tr>
<td>Policy Perception</td>
<td>50</td>
<td>2nd</td>
<td>6</td>
<td>1st</td>
</tr>
<tr>
<td>Mineral Potential(^1)</td>
<td>63</td>
<td>3rd</td>
<td>10</td>
<td>2nd</td>
</tr>
<tr>
<td>Room for Improvement</td>
<td>70</td>
<td>3rd</td>
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<td>2nd</td>
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<tr>
<td>Uncertainty Concerning Existing Regulations(^2)</td>
<td>47</td>
<td>2nd</td>
<td>11</td>
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<tr>
<td>Uncertainty Concerning Environmental Regulations</td>
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<td>1st</td>
<td>14</td>
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<tr>
<td>Regulatory Duplication &amp; Inconsistencies</td>
<td>35</td>
<td>2nd</td>
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<td>Legal System</td>
<td>51</td>
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<td>6</td>
<td>1st</td>
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<tr>
<td>Taxation Regime</td>
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<td>7</td>
<td>1st</td>
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<tr>
<td>Uncertainty Concerning Disputed Land Claims</td>
<td>70</td>
<td>3rd</td>
<td>16</td>
<td>3rd</td>
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<tr>
<td>Uncertainty Concerning Protected Areas</td>
<td>17</td>
<td>1st</td>
<td>13</td>
<td>2nd</td>
</tr>
<tr>
<td>Quality of Infrastructure</td>
<td>64</td>
<td>3rd</td>
<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Socioeconomic Agreements(^3)</td>
<td>73</td>
<td>3rd</td>
<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Trade Barriers</td>
<td>68</td>
<td>3rd</td>
<td>9</td>
<td>2nd</td>
</tr>
<tr>
<td>Political Stability</td>
<td>60</td>
<td>2nd</td>
<td>7</td>
<td>1st</td>
</tr>
<tr>
<td>Labour Regulations(^4)</td>
<td>70</td>
<td>3rd</td>
<td>12</td>
<td>2nd</td>
</tr>
<tr>
<td>Geological Database</td>
<td>72</td>
<td>3rd</td>
<td>10</td>
<td>2nd</td>
</tr>
<tr>
<td>Security</td>
<td>90</td>
<td>3rd</td>
<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Availability of Labour / Skills</td>
<td>78</td>
<td>3rd</td>
<td>8</td>
<td>2nd</td>
</tr>
</tbody>
</table>

\(^1\) Known fully as the ‘Best Practices Mineral Potential Index’ which ranks countries by attractiveness if all countries applied Best Practice mineral policy i.e. if only geological prospectivity mattered.

\(^2\) Known fully as the ‘Uncertainty Concerning the Administration, Interpretation and Enforcement of Existing Regulations’ index.

\(^3\) Known fully as the ‘Socioeconomic Agreements / Community Development Conditions’ index.

\(^4\) Known fully as the ‘Labor Regulations / Employment Agreements and Labour Militancy / Work Disruptions’ index.

Table 2: The position of Tanzania in the various indices of the Fraser Institute's Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
5. **Geopolitical Assessment and Sovereign Risk**

5.1 **Stability**

Tanzania’s 2014 GDP was an estimated $36.6 billion. Tanzania is a poor country, with a per capita GDP of $1,813 which was 32% below the average the 45 sub-Saharan African countries and ranked 23rd among those countries.

From 2009 through 2013, Tanzania’s per capita GDP grew an average of 3.5% annually, higher than any other member of the East African Community (EAC) and exceeded by only nine countries in Sub-Saharan Africa: the Democratic Republic of the Congo, Ethiopia, Ghana, Lesotho, Liberia, Mozambique, Sierra Leone, Zambia, and Zimbabwe.

Tanzania’s largest trading partners in 2012 for its US $5.5 billion in exports were South Africa, Switzerland, and China. Its imports totalled US$11.7B with Switzerland, China, and the United Arab Emirates being the biggest partners.

Tanzania weathered the global financial crisis of 2008/09 relatively well. Strong gold prices, bolstering the country’s mining industry, and Tanzania's poor integration into global markets helped to insulate the country from the downturn. The Tanzanian economy has expanded in the tourism, telecommunications, and banking sectors.
According to the UNDP however, recent growth in the national economy has benefited only the "very few", leaving out the majority of the population. Tanzania’s dependence on outside markets for investment, exports and aid exposes it to external risk, while its continued reliance on rain-fed agriculture and hydroelectric power has perpetuated its vulnerability to poor weather.

5.2 Mining Law and Taxation

Current mineral taxation in Tanzania is as flows:

- **Corporate Income Tax:** 30% or 35% if offering 30% equity on local stock exchange
- **Depreciation Allowance:** 100% capital expenses on exploration & development
- **Withholding Tax:**
  - Tech/Management Staff: 5% for residents, 15% for non-residents
  - Interest: 10%
  - Royalties: 15%
  - Dividends: 20%
- **Govt. Ownership:** none
- **Royalties on gold:** 4%
- **VAT:** 18% internally, no VAT on exports

Changes to the Tanzanian Mining Act and their effect on explorers and developers are summarised in Bates and Gray, (2010) and also in Appendix 1 (Ratansi, 2011).

On 23 April 2010 Tanzania’s Parliament passed The Mining Act 2010 (the Act). The Act is a composite of a document presented to Parliament together with a schedule of amendments. The intention of the Government of Tanzania (the GOT) is to address challenges that the GOT has identified in relation to the mining sector in Tanzania; specifically, low integration with other sectors of the economy, low contribution to the GDP compared to the sector growth and low capacity of the GOT to effectively regulate and administer the sector.

5.2.1 Industry Concerns

The Act is more restrictive than its predecessor and is consistent with other recent legislation which seeks to concentrate a greater interest in the hands of Tanzanian nationals with increased regulation in key sectors whilst continuing to encourage inward investment. Some of the publicly expressed concerns were due to the restrictions contained in the Initial Reading (such as reservation of mineral rights and licenses for dealing in minerals being reserved to Tanzanian citizens and corporate bodies under the exclusive control of Tanzanian citizens) which were subsequently relaxed by the provisions of the Amendments. However, the Act does materially increase the levels of royalty payable to the GOT and places restrictions on non-Tanzanian participation in small scale mining, dealing in minerals and gemstone operations.

There are concerns within the industry that the restrictions will have a negative impact on the Tanzanian mining industry both in terms of its competitiveness and as a magnet for foreign investment.

5.2.2 Key provisions

The Act will introduce significant changes to mining policy, in particular the following.

(a) Mineral rights and licenses for dealing in minerals will be reserved exclusively to Tanzanian citizens and corporate bodies under the exclusive control of Tanzanian citizens. It has been said that agreements/licences currently in force with non-Tanzanian controlled mining companies remain unchanged but there is no clear provision on this. The main point to note, however, is that the
Amendments significantly mitigated the Tanzanian control issue in respect of general mining licences, and the restrictions will apply only to "primary mining licences", which are licences with respect to small scale mining operations involving capex of less than US $100,000. (Section 8 and Section 73)

(b) Licences to mine for gemstones are only to be granted to Tanzanians, regardless of the size of the operation, except where the Minister determines that the development is most likely to require specialised skills, technology or a high level of investment in which case the licence may be granted to an applicant so long as the non- Tanzanian participation element is no more than 50% (Section 8(4)).

(c) The Act gives the Minister power to prescribe a standard model form Mining Development Agreement for all projects exceeding US $100m. (Section 8(4))

(d) The Act gives the Minister power to make regulations authorising the GOT to participate in the conduct and financing of mining operations and give the GOT a free carried interest, the level of which is not set by statute but rather by negotiation between the GOT and the relevant mineral rights holder (Section 10).

(e) It amends the method by which GOT royalties are calculated so that they are levied on the gross value of minerals, rather than the previous method of calculation which refers to the net value (Section 87).

(f) It increases the rates of royalties levied by the GOT on the gross value of minerals as follows: (Section 87)

- Uranium : 5%
- Gemstone and diamond: 5%
- Metallic minerals (copper, gold, silver and PGM): 4%
- Gem: 1%
- In the case of other minerals, including building materials, salt and all minerals within the industrial minerals group: 3%.

(g) Although some writers have asserted that the Act imposes an obligation for mining companies to list on the Dar es Salaam Stock Exchange, whilst the Act does refer to the Minister having the right to make regulations relating to a public offering, provisions for doing so are not contained within the Act itself. (Section 109)

(h) The Act requires a greater degree of disclosure by the holders of mineral rights in respect of reports, records and general information. (Section 100 and Second Schedule)

6. Conclusions

- Tanzania is geologically well-suited for the existence of greenstone-hosted, economically viable gold deposits, though in general its mineral potential is still seen to be fairly modest.
- There are currently 5 producing gold mines in the country and numerous development and exploration programmes.
- Tanzania welcomes foreign investment and in an African context, is a reasonably easy place to do business, with a more stable legal system than African countries, though some areas of improvement exist in relation to labour regulations, land claims and socioeconomic and local community agreements.
- The Mining Act was tightened-up in 2010 to increase the flow of royalties to the State and to provide better opportunities to local Tanzanians but is not onerous to investors.
- Tanzania is viewed as politically, economically and militarily stable, though as with many African countries security is still perceived to be an issue.
The two main challenges facing Tanzania’s minerals sector are now: increasing the perceived mineral potential in the country (for which improving the poor geological database will likely help) and more general economic development which improves infrastructure and skills availability in the country.

Some infrastructure improvements are thought to be facilitating economic development.

7. References


APPENDIX 1

Implication of the New Mining Law on Investment in Tanzania

By Shamiza Ratansi, ADEPT Chambers
ALN INSIGHT 1 October 2011

1. Introduction
The Mining Act, 2010, Cap 123, (the “Mining Act”) came in the wake of public concerns at what the Tanzanian citizenry was getting out of the mining sector and the meagre royalties the government was getting. The Mining Act, 2010, among other things, places mining rights—particularly in small scale mining, dealing in minerals and gemstone operations—in the hands of Tanzania nationals and limitedly to corporate bodies who may include foreign nationals whose interests may not exceed 50 percent in the undertaking. Another striking feature of the Mining Act is the requirement for mining companies to list with the Dar-es-Salaam Stock Exchange (the “DSE”).

2. Citizenship Requirements for the Grant of Mineral Rights
The Mining Act essentially restricts participation of non-Tanzanians in small scale mining, dealing in minerals and gemstone operations.

3. Small Scale Operations
Small scale operations involving a grant of a primary mining licence, which mean mining operations whose capital investment is less than USD100,000 or its equivalent in Tanzanian Shillings, are reserved exclusively to citizens of Tanzania (“Tanzanians”). For purposes of the Mining Act, “Tanzanians” include inter alia, an individual who is a Tanzanian, a partnership composed exclusively of Tanzanians or a body corporate whose membership and directorship is

4. Gemstone Mining
As is the case with small scale operations, gemstone mining is equally reserved for Tanzanians regardless of the size of the operation. However, gemstone mining may involve non-Tanzanians where the Minister determines that the development of gemstone resources in an area that is subject to a mineral right is most likely to require specialised skills, technology or a high level of investment. Where the Minister so determines, the licence may be granted to a corporate body so long as the aggregate non-Tanzanian participation element in such an undertaking is no more than 50%. Thus, with gemstone mining, non-Tanzanians may participate but not on their own, they need Tanzanians who will have at least 50% participation or shareholding in the mining operations.

5. Dealing in Minerals
Under the Mining Act, a dealer licence can only be issues where there is at least 25% share ownership by Tanzanians. This means that, a dealer licence which is for gold, metallic minerals, coloured gemstones, diamond, coal and industrial minerals, can only be granted to foreign national(s) where the undertaking is jointly owned by Tanzanians and the Tanzanians hold a minimum of 25% of the share of the applicant.

6. Royalties payable to the Government
As opposed to the previous Mining Act of 1998, the Mining Act changed the method of calculation for Government royalties from the previous net back values to the gross value of the minerals. Apart from the change of method of calculation, it also increases the rates of royalties to the following new rates:

- Gemstone: 5%
- Metallic minerals (Cu, Au, Ag and PGM): 4%
- Other minerals e.g., building materials, salt and all minerals within the industrial minerals group: 3%
- Diamond: 5%
- Uranium: 5%.
Further, the Mining Act allows the Government to have a free carried interest and to participate in mining operations under a special mining licence which would be set through negotiations between the Government and the respective mineral right holder. The law gives the Minister power to make regulations in respect of such partnerships.

7. **Listing with the Dar es Salaam Stock Exchange**
   The Mining Act envisages in future, the possibility of mining companies being obliged to list on the Dar es Salaam Stock Exchange. This is based on the fact that the Minister is empowered, in consultation with holders of special mining licences, to make regulations prescribing the minimum shareholding requirement and a procedure for selling shares to Tanzanians, in accordance with the provisions of the Capital Market and Securities Act and offering shares to the public through listing with the stock exchange.
## APPENDIX 2

### Status of Gold Production, Development and Exploration Projects in Tanzania

<table>
<thead>
<tr>
<th>Operation/Owner</th>
<th>Status</th>
<th>Production</th>
<th>Resources</th>
<th>Mining</th>
<th>Processing</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulyanhulu/ Acacia Mines</td>
<td>Prod</td>
<td>2013: 0.198Moz, 2012: 0.237Moz, 2011: 0.262Moz, 2010: 0.260Moz, 2009: 0.249Moz</td>
<td><strong>As at 31/12/2013:</strong> &lt;br&gt; Proven &amp; Prob: 29.61Moz @ 9.53g/t = 0.2961Moz, Measured &amp; Indicated: 10.23Moz @ 10.65g/t = 0.1023Moz, Reported: 7.97Moz @ 1.23g/t = 0.098Moz</td>
<td>Narrow-vein gold mine with mineralisation associated with steeply-dipping reefs. Underground mine with shaft access and mining by long-hole and drift &amp; fill</td>
<td>Plant has capacity to process 1.1Mtpa and produces both doré and copper/gold concentrate. In 2014 a 2.4Mtpa CIL circuit was added to the process plant to reprocess tailings</td>
<td>Acacia Mining website. Accessed at: <a href="http://www.acaciamining.com/operations.aspx">http://www.acaciamining.com/operations.aspx</a>. Retrieved 25 February 2015.</td>
</tr>
<tr>
<td>(formerly African Barrick)</td>
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<tr>
<td>Buzwagi/ Acacia Mines</td>
<td>Prod</td>
<td>2013: 0.182Moz, 2012: 0.166Moz, 2011: 0.197Moz, 2010: 0.186Moz, 2009: 0.189Moz</td>
<td><strong>As at 31/12/2013:</strong> &lt;br&gt; Proven &amp; Prob: 24.11Moz @ 1.45g/t = 0.122Moz, Measured &amp; Indicated: 87.2Moz @ 1.29g/t = 0.357Moz, Indicated: 7.18Moz @ 1.18g/t = 0.084Moz</td>
<td>Shear-hosted quartz-veined deposit, host in porphyritic granite. The mine is a low grade bulk deposit with a single large open pit.</td>
<td>Plant designed with a throughput capacity of 4.4Mtpa and produces both doré and copper/gold concentrate.</td>
<td>Acacia Mining website. Accessed at: <a href="http://www.acaciamining.com/operations.aspx">http://www.acaciamining.com/operations.aspx</a>. Retrieved 25 February 2015.</td>
</tr>
<tr>
<td>(formerly African Barrick)</td>
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<tr>
<td>North Mara/ Acacia Mines</td>
<td>Prod</td>
<td>2013: 0.257Moz, 2012: 0.193Moz, 2011: 0.171Moz, 2010: 0.213Moz, 2009: 0.212Moz</td>
<td><strong>As at 31/12/2013:</strong> &lt;br&gt; Proven &amp; Prob: 21.71Moz @ 3.17g/t = 0.2212Moz, Measured &amp; Indicated: 57.7Moz @ 3.32g/t = 0.2694Moz, Indicated: 7.17Moz @ 3.92g/t = 0.065Moz</td>
<td>Situated in the Mara Musoma greenstone belt. Shear-zone-related quartz vein and disseminated gold. High grade mine comprising 3 open pits: Nyabirambo, Gokona and Nyabigena. Possible future underground mine at Gokona.</td>
<td>Plant has capacity to process 2.8Mtpa and produces both doré.</td>
<td>Acacia Mining website. Accessed at: <a href="http://www.acaciamining.com/operations.aspx">http://www.acaciamining.com/operations.aspx</a>. Retrieved 25 February 2015.</td>
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<td>(formerly African Barrick)</td>
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<tr>
<td>Geita/ AngloGold Ashanti</td>
<td>Prod</td>
<td>2014: 0.098Moz, 2013: 0.154Moz, 2012: 0.154Moz, 2011: 0.149Moz, 2010: 0.357Moz, 2009: 0.272Moz</td>
<td><strong>As at 31/12/2013:</strong> &lt;br&gt; Indicated: 48.23Moz @ 2.43g/t = 0.114Moz, Measured &amp; Indicated: 31.38Moz @ 3.17g/t = 0.3138Moz, Indicated: 3.23Moz @ 3.85g/t = 0.0123Moz, Indicated: 7.18Moz @ 3.52g/t = 0.084Moz</td>
<td>Multiple open-pit operation with underground potential. Mining currently by conventional truck and shovel open-pit mining on three active pits (Nyankanga, Geita Hill and Star &amp; Comet).</td>
<td>Serviced by a 5.2Mtpa CIL processing plant</td>
<td>AngloGold Ashanti website. Accessed at: <a href="http://www.aggold.com">http://www.aggold.com</a>. Retrieved 25 February 2015.</td>
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<tr>
<td>Golden Pride/ Resolute</td>
<td>Closed</td>
<td>2013: 0.098Moz, 2014: 0.038Moz</td>
<td><strong>Resources:</strong> &lt;br&gt; Indicated: 48.23Moz @ 2.43g/t = 0.114Moz, Measured &amp; Indicated: 31.38Moz @ 3.17g/t = 0.03138Moz, Indicated: 3.23Moz @ 3.85g/t = 0.0123Moz, Indicated: 7.18Moz @ 3.52g/t = 0.084Moz</td>
<td>A number of small to medium sized high grade, open-pit deposits in a close area. Bahinia Creek and Luika are two key gold deposits anchoring the New Luika Gold Mine.</td>
<td>Conventional three stage crushing, two mills in parallel and a CIL operation.</td>
<td>Resolute Mining Limited website. Accessed at: <a href="http://www.resolute-ltd.com.au/operations/golden-pride/">http://www.resolute-ltd.com.au/operations/golden-pride/</a>. Retrieved 25 February 2015.</td>
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<td>Mining</td>
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<tr>
<td>New Luika/ Shanta Gold</td>
<td>Prod</td>
<td>2014: 0.084Moz</td>
<td><strong>As at December 2011:</strong> &lt;br&gt; Measured: 10.07Moz @ 2.05g/t = 0.2007Moz, Indicated: 38.97Moz @ 1.12g/t = 0.4397Moz, Indicated: 23.35Moz @ 1.32g/t = 0.3098Moz</td>
<td>Mine design consists of a number of conventional open pit layouts with access to the mineralisation provided via a series of ramps into the pits.</td>
<td>Testwork indicated that oxide and transitional types amenable to CIL and fresh mineralization may benefit from flotation and a finer grind</td>
<td>Shanta Gold website. Accessed at: <a href="http://www.shantagold.com/operations/chnuya">http://www.shantagold.com/operations/chnuya</a>. Retrieved 25 February 2015.</td>
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[APPENDIX 2]: https://www.acaciamining.com/operations.aspx

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<tr>
<th>Project Area</th>
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<th>Project Details</th>
<th>Gold Mineralisation Notes</th>
<th>Source Details</th>
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<tr>
<td>Acacia Gold</td>
<td>PFS</td>
<td>As at 2011: Meas. Res: 0.433Moz @ 4.05g/t Ind. Res: 0.118Moz @ 1.96g/t Inf. Res: 0.309Moz @ 2.28g/t</td>
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<tr>
<td>Helio Resource</td>
<td>PFS</td>
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<td>Corp.</td>
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<td>East Africa</td>
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<td>Testwork confirms conventional gravity concentration and cyanide leaching.</td>
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<td>Metals</td>
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<td>Resolute 70%</td>
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<td>African</td>
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<tr>
<td>Barrick 30%</td>
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Brazil: Gold Industry & Mineral Policy

Report Prepared for

IM4DC

May 2015
Summary

- The geology of Brazil is highly favourable for the discovery and exploitation of economic gold deposits; and potential is recognised globally, with Brazil seen as having amongst the highest levels of mineral prospectivity in the world.
- Brazil already hosts a mature mining sector with total gold production for 2014 was 2.15 Moz. Approximately 85% of this was produced at company mines and 15% by garimpeiros. The measured and indicated gold reserves are estimated by the USGS to be in excess of 60 Moz, or approximately 4.3% of the world’s reserve.
- In general, however, it is iron ore mining for which the country is recognised.
- Brazil is politically and economically stable, with an educated workforce.
- However despite its mineral potential, and political and economic stability, Brazil is still not seen as a top investment opportunity for mining – a situation that has persisted for several years.
- Investors take a poor view of almost all aspects of Brazil’s policy environment, including the bureaucracy, regulatory framework, legal system, local community agreements and taxation regime.
- Systemic improvements in Brazil mineral policy climate are required. Such improvements could unlock the country’s undoubted potential mineral wealth. Brazil sits with Papua New Guinea as one of two countries for which the gap between mineral potential and actual investment climate are the largest.
- The particular areas of concern amongst the many, for foreign investors are corruption; an inept bureaucracy; poor labour regulations; uncertainty over environmental regulation; and high levels of criminal violence.
- In addition, the mining taxation regime is seen as particularly problematic (amongst the worst in the world). This is despite that the taxation levels are not particularly onerous. The problems is that it is complex, with the federal and state governments as well as local municipalities all involved – a testament to how serious the bureaucratic problems in the country are.
- Finally, despite its relative level of economic development, Brazil’s infrastructure has not kept pace with economic growth. The transport system is heavily reliant on road freight and there are long delays at the ports. Energy production is antiquated and supply can be interrupted. However, most of the gold-producing areas are fairly well served with transport and power infrastructure and no severe impacts on production are envisaged.
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1. Location, Physiography and Climate

Brazil is the largest country in South America and the fifth largest in the world both by geographical area and by population. Bounded by the Atlantic Ocean on the east, Brazil has a coastline of 7,491 km. It borders all other South American countries except Ecuador and Chile.

Brazil spans four time zones and is the only country in the world that lies on the equator while having contiguous territory outside the tropics. Brazilian topography is diverse and includes hills, mountains, plains, highlands, and scrublands. Much of the terrain lies between 200 meters and 800 meters in elevation. The main upland area occupies most of the southern half of the country. The NW parts of the plateau consist of broad, rolling terrain broken by low, rounded hills. The SE section is more rugged, with a complex mass of ridges and mountain ranges reaching elevations of up to 1,200m. Brazil has a dense and complex system of rivers, one of the world’s most extensive, with eight major drainage basins, all of which drain into the Atlantic (CIA World Fact Book 2008).

![Figure 1: Map of Brazil showing major features and roads](image)

The climate of Brazil comprises a wide range of weather conditions across a large area and varied topography, but most of the country is tropical. The different climatic conditions produce environments ranging from equatorial rainforests in the north and semiarid deserts in the northeast, to temperate coniferous forests in the south and tropical savannas in central Brazil (CIA World Fact Book 2008).
2. Infrastructure

Brazil has the world’s third largest road network but over 80 per cent is unsealed. The lack of all-weather roads can be a real impediment in a country subject to tropical downpours. The railroad system is under-developed with the network consisting of a limited set of freight lines and routes. The majority of freight is transported by road. Brazil’s 34 ports are run by a state bureaucracy. Slow port infrastructure investments have led to missed opportunity to expand in key export markets including iron ore. Port road infrastructure links are often subject to long queues of trucks and ports with container ships suffer bottlenecks (Crocitti & Vallance 2011).

The airports are also state-managed, by Infraero, and can be the cause of additional bottlenecks within Brazil’s infrastructure. Infraero is undertaking a series of airport upgrades but these have been subject to delay in their roll-out.

The failure to build timely infrastructure is considered an impediment to realizing Brazil’s potential. The Global Competitiveness Report 2012-2013 ranks Brazil’s ports 135th out of 144 countries; the roads are ranked 123rd. High transportation costs have been a significant drag on Brazil’s competitiveness (Crocitti & Vallance 2011).
3. Geology

3.1 Regional Geology
Brazil is totally contained in the South American Platform. The Archean basement is of very complex geologic evolution and comprises metamorphic rocks of amphibolite to granulite facies and granitoids. These are associated with Proterozoic units represented usually by folded belts of greenschist facies rocks and volcano-sedimentary sequences and granitoids. The basement is widely exposed in shields, separated from each other by Phanerozoic coverings, whose limits extend to neighbouring countries. Prominent are the shields of Guyana, Central Brazil and Atlantic (see Figure 3).

Figure 3: Geological map of Brazil showing crystalline shields and sedimentary basins

The shield of Guyana extends to the north of the basin of Amazonas. The shield of the Brazil-central, or Guaporé extends to the interior of Brazil and south of that basin, while the Atlantic shield is exposed in the oriental portion reaching the Atlantic border. These shields are exposed in more than 50% of the area of Brazil. For the purpose of this report and for any discussion on gold geology and mineralisation, only the shield areas are relevant.

3.2 Gold Mineralisation
One of the most traditional regions for gold exploration in Brazil is known as Quadrilátero Ferrífero, or Iron Quadrangle in the south-central region of the state of Minas Gerais.

The Amazon currently plays an important role in the gold mining business. Other main areas for the extraction of gold in Brazil are:
• The state of Bahia, especially near the cities of Itapicuru and Jacobina
• The state of Goiás, in cities like Crixás and Goiás Velho
• The state of Pará, with big mines in cities like Andorinhas, Inajá do Sul and Serra Pelada
• Other northern states, like Rondônia and Tocantins

Producers include Kinross Gold, AngloGold Ashanti and Yamana Gold. Over 60 percent of Brazil’s gold is mined in the state of Minas Gerais, with Bahia and Para also significant contributors.

3.2.1 Paracatu (Kinross Gold)

Kinross Gold owns a large open-pit gold mine near the city of Paracatu, about 230km from Brasilia. The Paracutu mine produced 0.47Moz in 2012 from proven and probable reserves of 17.9Moz. The mine undertook a major expansion of its mill in recent years with the aim to lift output to 61Mtpa and extend the mine life until 2042 positioning Paracatu as the biggest gold producer in Brazil.

Paracatu is hosted within the Brasilia Belt, a north-south trending Neoproterozoic belt that extends along the western side of the São Fransisco-Congo Craton. Sedimentary units are mostly preserved in the northern part of the belt, whereas in the southern part where Paracatu is located, there is intense deformation and metamorphism, and contacts between metasedimentary units are primarily tectonic. The property is underlain by a thick sequence of phyllites belonging to the basal Morro do Ouro Member of the Paracatu Formation of the Upper Proterozoic Canastra Group.

The Paracatu deposit is a metamorphic gold system with finely disseminated gold mineralization hosted within metasedimentary rocks. Very fine and evenly distributed gold is disseminated throughout a thinly bedded, highly deformed phyllite of Upper Proterozoic age. The deposit is part of a northwest-southeast lineament of gold occurrences including Cabeça Seca and Luziânia.

Gold mineralization was introduced syn-tectonically as the result of metamorphic alteration during thrusting of the Morro do Ouro Sequence over the rocks of the younger Vazante Formation. Structural interpretation suggests that mineralization was precipitated within a high strain zone where silica and carbonate were depleted from host phyllites, resulting in an increase in graphite content that may have acted as a chemical trap, precipitating out gold and sulphide mineralization remobilized during the metamorphic alteration of the Morro do Ouro Sequence.

The deposit has extensive lateral and longitudinal continuity. The majority of exploration efforts have sought to better define the continuous longitudinal continuity of mineralized phyllites at depth west of Rico Creek and the lateral limits of the economic mineralization.
3.2.2 AGA Mineração and Serra Grande (AngloGold Ashanti)

AngloGold Ashanti Córrego do Sítio Mineração has two gold-producing complexes in Brazil, Cuiabá and Córrego do Sítio, with the former including the Cuiabá and Lamego mines and the Cuiabá and Queiroz plants. AngloGold also has three underground mines at its Serra Grande operation in the state of Goiás. Total gold production from all operations amounted to 0.5Moz annually.

The AGA Mineração Mining Complex is located in the state of Minas Gerais. This area hosts numerous other historic and current gold mining operations, as well as open-pit limestone and iron ore operations. The company now encompasses the mining operations at Cuiabá, Lamego, Queiroz, Córrego do Sítio and the former São Bento Mine, which is part of the Córrego do Sítio Complex. Ore is sourced from the Cuiabá and Lamego underground mines and processed at the Cuiabá and Queiroz plants, while the Córrego do Sítio open pit mine has a heap-leaching facility. A study on the Nova Lima Sul project, which involves the re-opening of the mothballed Raposos mine, is under consideration. All these operations are primarily gold mines, while sulphur (for the production of sulphuric acid) is a by-product of the Cuiabá and Lamego mining operations.

The Cuiabá mine has gold mineralisation associated with sulphides and quartz veins in Banded Iron Formation (BIF) and volcanic sequences. The ore appears strongly stratiform due to the selective sulphidation of the iron-rich layers. Steepl-y-plunging shear zones tend to control the ore shoots, which commonly plunge parallel to intersections between the shears and other structures. Apparent intersection of thrust faults with tight isoclinal folds in a ductile environment tends to control the mineralisation structures.
Mineralisation is believed to be due to the interaction of low salinity, carbon dioxide rich gold-bearing fluids with the high-iron BIF, basalts and carbonaceous graphitic schists. Sulphide mineralisation consists of pyrite and pyrrhotite with subordinate arsenopyrite and chalcopyrite; the latter tends to occur as a late-stage fracture fill and is not associated with gold mineralisation. Wallrock alteration is typically carbonate, potassic and silicic, showing clear zonation in the underground environment. The ore is mainly concentrated in the silicic and sulphidation zones, inside the BIF or in potassic (and sericitic) zones near the basalts. The main deposits at Cuiabá are as follows:

- normal limb: Fonte Grande Sul and Serrotinho; and
- overturned limb: Balancão, Galinheiro and Canta Galo.

At Lamego the gold mineralisation is characterised by deposits associated with two horizons of chemical sedimentary rocks: BIF and metachert (MCH), and also with shear zones containing abundant quartz veinlets. The proportions of these lithotypes vary substantially from one deposit to another. In the BIF, sulphide mineralisation is associated with gold, whilst in the MCH and quartz veins the gold occurs either as native gold or in sulphides.

The Arco da Velha deposit is located on the eastern side of a large fold and extends for 250m along the strike. In the NE portion the mineralisation is concentrated in the MCH, whilst in the SW portion it is concentrated in the BIF. Carbonaceous phyllite and chlorite-sericite schists occur in the hangingwall contact, while hydrothermally-altered meta-andesite occurs in the footwall.

The Cabeça de Pedra deposit is located in the hinge region of the large Lamego structure. The area which has shown the best economic potential contains both BIF and MCH. Carbonaceous phyllites and clorite/sericite schists normally occur in the hangingwall and meta-andesites in the footwall.

Carruagem is the main deposit and it is located close to the junction of two fold limbs in the northeast portion of the major structure. It is a boudined body with two large disruptions in the structure (pinch and swell), followed by eastward displacement. The gold mineralisation is mainly associated with hydrothermal zones within the BIF.

Córrego do Sítio mine comprises two sulphide underground operations, currently Cachorro Bravo, Laranjeiras and Carvoaria located at CdSI and Sangue de Boi located at CdSII, and open-pit oxide operations (currently Rosalino, Carvoaria and Laranjeiras). The entire Córrego do Sítio complex comprises 23 mineral deposits reported as Mineral Resource plus some exploration targets being developed. Currently the Córrego do Sítio complex is the largest mineral resource within the Brazilian assets.

Nova Lima Sul is located in the western portion of the Rio das Velhas greenstone belt, and all the exploration targets are within a 16km radius of the Queiroz metallurgical plant. Nova Lima Sul exploration targets comprise mothballed operations (Raposos underground mine), old mines (Mina Grande, Morro da Glória, Bicalho, Faria, Bela Fama), as well as old prospects (Luzia da Mota, Limoeiro) and several old surface workings (Saboeiro Raspão, Urubu and Luzia’s Mina Grande). The main exploration goal is to add to and convert the mineral resource in order to fill the Queiroz plant’s spare capacity.

The Nova Lima Group hosts the main gold mines and mineral occurrences in the Iron Quadrangle and consists of a basal tholeitic– komatiitic volcanic unit with abundant chemical sedimentary rocks, which is overlain by a volcaniclastic unit with associated felsic volcanic rocks. This is in turn overlain by an upper clastic unit. The mineralised deposits in the Rio das Velhas greenstone belt are structurally controlled and are associated with hydrothermal alterations along D2 thrust shear zones, on a regional scale. The mineralisation is epigenetic and the most common mineralisation styles at Nova Lima Sul are massive,
banded and disseminated sulphides hosted in banded iron formations (BIF) and albitised hydrothermal rocks.

Since 2012, Mineração Serra Grande S.A (Serra Grande) has been a wholly-owned AngloGold Ashanti company. The mine complex is located in the municipality of Crixás, in the central portion of Brazil, 400km from the Capital, Brasília, and about 350km from the state capital of Goiás.

The main producing areas are the Palmeiras Mine in the southern portion of the mine camp, Pequizão accessed from Mina Nova, Mina III (orebody IV) and the open pit (outcrop of Mina III). Exploration strategy is focusing on high-grade targets. In 2013 new high-grade mineralisation (average > 8g/t) was identified beneath Pequizão. This target, Ingá, displays visible gold in the same structure that hosts Mina III.

The Serra Grande gold deposits are hosted by the Upper Archean Crixás Group in the Crixás greenstone belt. Two main deformation events have been identified in the region, the second of which generated the structures that control the gold mineralisation. This is associated with quartz veins, massive to disseminated sulphides in metasedimentary, metavolcaniclastic rocks and metabasalts, with different degrees of hydrothermal alteration. The mineralisation is controlled by regional shear-thrust structures and occurs as stacked lenses, generally concentrated in the same high deformation positions in the mentioned structures. Geometry of the mineralised deposits is typically complex, with pinch and swell features, folds and boudinages.

Figure 5: Portal to the Mina Nova –Serra Grande

3.2.3 Chapada (Yamana Gold)
The Chapada open pit gold-copper mine, located northwest of Brasília in Goiás state, began production in 2007. It is a relatively low-cost operation. Development of new ore bodies Corpo Sul and potential contribution from Suruca, and Arco Sul are being evaluated.

Production is 0.13Moz of gold and 150Mlb of copper (2012). Exploration in the southern part of the deposit is targeting increased throughput by blending ore from the main Chapada pit with higher grade ore from Corpo Sul. Production from the Suruca gold deposit, 6km from Chapada, is expected to contribute 0.45 to 0.50Moz annually for an initial five years.

![Image](image.png)

**Figure 6:** Aerial view of Chapada mine complex

### 3.2.4 Jacobina (Yamana Gold)

The Jacobina operation, located in Bahia state in northeast Brazil, consists of a complex of underground gold mines and a 6,500tpd Carbon-in-Pulp (CIP) processing plant.
The mine poured first gold in 2005. The mine produced 0.74Moz of gold in 2013 with 2.2Moz of gold in proven and probable reserves.

3.2.5 Paciencia, Caete and Turmalina (Jaguar Mining)

Jaguar’s gold operations, Turmalina, Paciência and Caeté, are located in the Iron Quadrangle region near Belo Horizonte in the state of Minas Gerais. Jaguar controls 27,357 hectares of mineral concessions in the Iron Quadrangle.

Significant expansion opportunities include the Gurupi Project, a potential open pit gold mining operation in the state of Maranhão in Northern Brazil, where Jaguar controls 141,525 hectares and the Pedra Branca Project, a gold exploration project covering 41,578 hectares at a greenfield site in the state of Ceará.

3.2.6 Serra Pelada (Colossus Minerals 75%, COOMIGASP 25%)

Discovered in 1979, Serra Pelada hosted the largest ever gold rush in Latin America. During the 1980s, up to 80,000 garimpeiros (artisanal miners) produced an estimated 2Moz of gold plus Platinum Group Metals (PGM), from a hand dug open pit. Garimpeiro production declined due to pit wall collapse and flooding causing the cessation of bedrock mining since the late 1980s.

Figure 7: Jacobina tailings dam
Vale, which held the underlying title to Serra Pelada until 2007, explored the area from 1980 to 1998, completing more than 200 drill holes in the Serra Pelada mineralised system.

The mineralization at Serra Pelada is hosted by metasedimentary rocks of the Rio Fresco Group. The lithologies include metaconglomerate, metasandstone, dolomitic carbonate and metasiltstone. Au-PGM mineralization is spatially and temporally associated with intense hydrothermal carbon and argillic (kaolinite-mica) alteration and to a minor extent with iron oxide-rich breccias. Alteration is fracture controlled at all scales and is strongest in fault-related siltstone breccias. Carbon-rich and argillic alteration involved de-silicification but broadly synchronous siliceous alteration, mainly replacing calcareous sandstones.

4. The Economy and Gold

According to the United States Geological Survey (USGS), Brazil has one of the 10 largest global gold reserves, and is currently ranked as the 11th top producer in the world. USGS estimates that Brazil mined 75Mt of gold ore in 2013. This production is growing: in 2011, Brazil was the 12th top producer. If the Brazilian government’s intent of doubling the national production becomes a reality, there is the possibility that the country can reach 7th position by 2017.

In 2012 gold accounted for only 1.23% (US$3.05) of Brazil’s exports compared to 13.25% for iron-ore, 8.37% for crude petroleum and 7.04% for soybeans. This contrasts markedly with countries such as Ghana, Mali and Burkina
Faso and reflects Brazil’s increasing diversity in agriculture, manufacturing as well as mineral and hydrocarbon production.

In 2012, mining royalties collected by Brazil amounted to $912 million compared with a revised $777 million in 2011. The prevailing rate for gold is 1% (gold in prospecting is exempt).

Gold production increased to 2.15Moz in 2012 from a revised 2.10Moz in 2011, or by about 2.4%; mining companies produced 84.9% and garimpeiros 15.1% of this amount. In 2012, the leading producing companies were Kinross Gold Corp. of Canada (30%), AngloGold Ashanti Brasil Mineração Ltda. (25%), Yamana Gold Inc. of Canada (20%), and others (25%); the leading garimpeiros were Gold Digging (43%), Jaguar Mining (38%), and others (19%). The leading producing States were Minas Gerais (52.4%), Bahia (14.2%), Goias (10.3%), Mato Grosso (9.5%), Para (7.9%), and Maranhão (4.1%) (Departamento Nacional de Produção Mineral, 2013c; Instituto Brasileiro de Mineração, 2013a, p. 55–56).

### 4.1 Perceptions of Mineral Policy

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¹ Includes countries from South America, Central America, Caribbean Basin and the separate states of Argentina.
² Known fully as the ‘Best Practices Mineral Potential Index’ which ranks countries by attractiveness if all countries applied Best Practice mineral policy i.e. if only geological prospectivity mattered.
³ Known fully as the ‘Uncertainty Concerning the Administration, Interpretation and Enforcement of Existing Regulations’ index.
⁴ Known fully as the ‘Socioeconomic Agreements / Community Development Conditions’ index.
⁵ Known fully as the ‘Labor Regulations / Employment Agreements and Labour Militancy / Work Disruptions’ index.

Table 1: The position of Brazil in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
As a moderately economically developed democracy, Brazil is seen as politically stable, with an educated population and good availability of skills (Table 1). The vast size of the country, and jungle interior, however means the country’s infrastructure is perhaps not as good as would be expected (Table 1). Brazil also still suffers a lot of violent crime and seen by foreigners to be fairly insecure (Table 1).

Brazil is seen as a fairly attractive investment opportunity for mining and exploration (Table 1). The fact that it is seen as only ‘fairly attractive’, despite hosting what is seen to be some of the best mineral potential both in South America (a generally high potential region) and the world, is down to a poorly thought of policy climate, with some particularly serious problems (Table 1).

Over the last five years this gap between high mineral potential and poor policy perception has not changed (Figure 9). The gap may even have increased (Figure 9). Globally Brazil is thought to be one of the two countries (along with Papua New Guinea) with the most room for improvement in minerals policy (Table 1), in that significant improvements could unlock a highly prospective minerals sector.

There is generally a poor perception by foreigners of all parts of Brazil’s policy environment, including the bureaucracy, regulatory framework, legal system, taxations regimes and socioeconomic and local community agreements (Table 1). There are however some particularly serious areas of concern for foreigners, including labour regulations, thought to be amongst the worst in the world of major mining countries; significant uncertainty surrounding protected areas and environmental regulations; a weak legal system; and an inefficient bureaucracy (Table 1).

Figure 9: The changing position over time of Brazil in the three main indices (Investment Attractiveness, Policy Perception and Mineral Potential) of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
The levels of taxation on the mining sector in Brazil are actually fairly generous (see main overview report), despite this, the taxation regime for mining is seen as one of the worst in the world, by foreigners (Table 1). This suggests that either foreign investors do not realise the generosity of Brazil’s taxation regime; or that the problem with the regime is not the level of tax, but its administration. The poor perception of its policy environment and bureaucracy in general would add credence to the latter interpretation.

5. Geopolitical Assessment and Sovereign Risk

5.1 Stability

International investors that are attracted to Brazil by its stable political and economic environment face levels of bureaucracy, taxes, crime and corruption that typically are far greater than in their home markets (Business Insurance 2014)

Many companies come to Brazil because the business environment is more familiar than the other BRIC countries (Brazil, Russia, India and China). It also has a more stable public and private sector and a better-proven legal framework than some other BRIC countries. However, it is not without issues with myriad complex tax rules, corruption and a slow legal process hurdles to overcome. The levels of bureaucracy and lack of transparency can make Brazil a difficult country in which to do business.

The significant opportunities for foreign companies in Brazil’s growing economy have to be weighed up against the country’s relatively high taxes and labour costs. The tax system is antiquated with many layers of taxes. Labour laws are generous to workers and distort the market. There is a large “informal” job market in Brazil because “favourable employee rights” discourage employment on a full-time basis.

One of the main problems for foreign investors in Brazil is corruption in Brazilian government ministries. The levels of political risk in Brazil are now far lower than a decade ago but, while Brazil is politically stable, there are differences in risk between its 27 states and 5,000 municipalities.

Despite little risk of political violence, there is concern among foreign companies with personal security and crime. Kidnap and ransom and high crime rates are problems and the security environment has failed to keep pace with gains in the economy. Crime has been reduced in major cities like Rio de Janeiro and São Paulo, but it has spread to smaller cities, and crime rates have risen in the north and northeast parts of the country and midsize cities. The bulk is petty crime and robbery, although theft is a particular problem. Law enforcement on the road is poor such that theft from vehicles including truck cargo is a concern.

Brazil is a relatively open market for foreign companies, but there are restrictions. In some sectors companies are required to source at least 60% of goods and services internally, and local content comes at an additional cost. There also is potential for increased levels of government intervention in strategic sectors such as oil and gas, including increased taxes and harsher regulation. However the risk of expropriation remains negligible.

5.2 Mining Law and Taxation

In Brazil, there has been much discussion concerning modernisation of the taxation of the mining sector (PricewaterhouseCoopers, 2012). The Brazilian Mining Royalty (CFEM) which is the “Financial Compensation for the Exploitation of Mineral Resources” is under discussion with the objective to increase the tax. Brazilian modifications discussed include creating a framework for a standard mineral product price reference and a maximum and minimum tax rate which can be altered by decree at any given time. The CFEM is collected by the federal
government which is responsible for the distribution of the collected mining tax to states and municipalities. The municipalities are the main beneficiaries of the CFEM. In addition, two Brazilian states enacted laws to create state mining taxes which are being challenged in court. Brazilian states Minas Gerais and Pará have enacted mining taxes based upon tonnage of mineral. Further, Brazil enacted thin capitalisation rules that limit the amount of interest deductions attributable to related party indebtedness of Brazilian subsidiaries of non-Brazilian companies. A summary of prevailing mining law and taxation is provided in Appendix 1.

Gold production is affected mainly by two different fees: royalties and regular taxes.

The royalties — formally known as CFEM, acronym for Compensação Financeira pela Exploração de Recursos Minerais — are charged monthly on top of the net revenue obtained from mineral production and sale. The aliquot charged for gold is 1% on top of the net revenue, being divided as follows:

- The Federal government collects 12% of the charged amount
- The government of the state where the gold field is located collects 23% of the charged amount
- The government of the city where the gold field is located receives 65%

The main regular taxes that apply to the gold extraction activity are:

**ICMS**
This varies from state to state, but usually stays between 17% and 19%. ICMS is the Brazilian tax charged upon sales, services, movement of goods, transportation and communication services, and supplying of any goods.

**COFINS**
This is intended to finance welfare, health and social programs. COFINS is calculated over the gross revenue of private legal entities in Brazil. Currently COFINS is the second largest source of tax revenue for the Brazilian government, and the rate largely varies depending on the tax regime the company operates under.

**PIS**
Better known by the acronyms PIS/PASEP, these are social contributions, payable by legal entities, in order to finance the payment of insurance unemployment allowance and participation in revenues from agencies and entities for public and private workers. The employer is responsible for registering the employees on the program.

6. **Conclusions**

- The crystalline shield areas which underlie huge parts of Brazil offer excellent opportunities for the discovery of economic concentrations of gold mineralisation. The measured and indicated gold reserves are estimated by the in excess of 60Moz, or approximately 4.3% of the world’s reserve. The mineral potential (including for gold) is recognised to be amongst the highest in South America and the world.
- As at the end of 2014, there were 15 company-controlled mines in Brazil plus countless artisanal miners (garimpeiros). Total gold production was 2.15Moz with the garimpeiros responsible for around 15% of this amount.
- Brazil is a politically and economically stable country, with an educated workforce, that should be a good place to conduct business.
- Despite the high mineral potential and stable political and economic climate of the country, Brazil is not seen as a great opportunity for minerals investment by foreigners. A gap has existed for several years between its perceived minerals potential and the actualities of doing business in the country.
- The main problem in Brazil is its policy climate which is poor across all areas including bureaucracy, regulatory framework, legal systems, local community agreements and (the perception of the) taxation regime.
• Of particular concern are corruption, an inept bureaucracy, labour regulations and issues, uncertainty over protected areas and environmental regulations; and increasing and high levels of criminal violence.
• The mining taxation regime in Brazil is seen as particularly problematic (indeed one of the worst in the world), despite the fact the taxation levels are not particularly onerous. The taxation regime if however complex, with the federal and state governments as well as local municipalities all involved.
• Finally, although Brazil is a moderately developed country its infrastructure has not kept pace with growth. The transport system is heavily reliant on road freight and there are long delays at the ports. Energy production is antiquated and supply can be interrupted. However, most of the gold-producing areas are fairly well served with transport and power infrastructure and no severe impacts on production are envisaged.

7. References


Business Insurance (Brazil’s stable politics, economy offset by higher taxes, crime. Accessed at: http://www.businessinsurance.com/article/99999999/NEWS040102/120309899?tags=%7C59%7C332%7C338%7C76%7C313%7C80%7C84. Retrieved 2 March 2015

Central Intelligence Agency 2008 Geography of Brazil. The World Factbook.


APPENDIX 1

Corporate income taxes, mining royalties and other mining taxes. A summary of rates and rules in Brazil

(Adapted from PricewaterhouseCoopers LLP, 2012)

Corporate Income Tax (CIT)
Top rate of CIT: 34.0% (29)
Level at which applied: Federal

Rates of tax amortisation
Ore assets: useful life of mine (30)
Lands/Improvements: useful life of mine (30), (31)
Buildings: 4.0%
Plant and Machinery: 10.0% (32)
Tailing liners: useful life of mine (30)
Work/Construction in progress: useful life of mine/licence agreement (33)
Restriction on use of tax losses: 30% taxable income (34)
Special allowances/contracts: Yes (35)

Mineral Taxes
Mineral tax name: CFEM—Compensation for the Exploitation of Mineral Resources
Level: Federal
Basis: Adjusted Revenue (36)

Rates (37)
Copper: 2.0%
Gold: 1.0%
Iron ore: 2.0%
Coal: 2.0%
Deductible in CIT calculation: Yes

Other Taxes and Payments
Name:
(i) ICMS (38), (40)
(ii) PIS/COFINS (39), (40)

Basis:
(i) price of mineral
(ii) Gross revenue

Rate:
(i) varies
(ii) 3.65% or 9.25%

Tax on exports
Ore extracted: 0%
Processed ore: 0%
Refined metal: 0%
Other: 0%
VAT charged on exports: No (41)
Average time for VAT refund: N/A

Withholding Tax
Dividends: 0% (42)
Interest: 15.0% – 25.0% (43)
Royalties: 15.0% – 25.0% (43), (44), (45)
Services fees: 15.0% – 25.0%

Any other payments: Licence fees (46)
Fiscal stability agreements: No
Social contributions: No
Additional in-country information: (47), (48), (49)

Notes
29. The 34% statutory CIT rate is made up of 25% for Corporate Income Tax (IRPJ), and 9% for Social Contribution on Net Profit (CSLL). The actual IRPJ tax rate is 15%, plus a surcharge of 10% on taxable income exceeding BRL240,000 a year. The Social Contribution is levied on a taxable base similar to the Corporate Income Tax.
30. Assets can be amortised using two methods: (i) on a straight-line basis or (ii) based on the units-of-production method over the useful life of the mine.
31. Land cannot be depreciated.
32. Depreciation rates depend on the useful life of the good. However, Brazilian tax authorities published acceptable depreciation rates for some items on a straight-line basis. In general, 10% is the rate acceptable for plants and machinery. Furthermore, Brazilian tax law allows an accelerated depreciation regime on machines and equipment based on their hours of utilisation. In certain cases, machines and equipment can be depreciated on duplicate bases.
33. Expenditures (including research and development costs, start-up costs and pre-operating costs) that would expect to generate future benefits can be capitalised. These can be amortised either on a straight-line basis (a minimum period of 5 years), or considering the units-of-production method, over the useful life of the mine or licence agreement. Amortisation is possible after the asset has been installed ready for use.
34. The use of tax losses is limited to a maximum of 30% of the taxable income. There is no statute of limitation on the amount of loss carried forward.
35. There are no special tax benefits or tax holidays applicable to mining companies. However, Brazilian mining companies usually make use of general tax incentives available for companies that exploit activities in some Brazilian states with lower economic development located in the Northeast area (SUDENE) or/and Amazon area (SUDAM). New companies incorporated in SUDENE and SUDAM areas, whose activities are considered as a priority to the development of the region, can benefit with the reduction of 75% of the income tax, subject to certain conditions. The mining industry is recognised as a priority activity through Presidential Decree.
36. The taxable event of the CFEM is the direct sale of the mineral or its utilisation for industrialisation by the mining company which has extracted the mineral. The CFEM is levied on the mining company’s net revenue, i.e., the mineral sales revenue less taxes levied on revenue, insurance and freight costs.
37. Mining tax rates: (i) 3% is levied on aluminium, manganese, halite and potassium; (ii) 2% is levied on iron, fertilizers, coal and other mineral substances; (iii) 1% is levied on gold and (iv) 0.2% is levied on precious stones, coloured cuttable stones, carbonates and noble metals.
38. ICMS is an indirect tax similar to VAT. It is a State VAT tax and the rates vary according to where the product/good/mine is being sold, depending on the specific state legislation.

39. PIS and COFINS are Federal social contribution taxes due by all entities in Brazil (i.e. not restricted to mining companies) and calculated based on gross revenues. There are two different regimes applicable for PIS and COFINS: the non-cumulative and the cumulative regime. Under the first one, the tax rate 9.25% (1.65% PIS and 7.6% COFINS), but taxpayers may calculate credits upon some inputs and expenses allowed in tax legislation; Under the cumulative regime, no tax credits are allowed, but the rate is inferior, 3.65% (0.65% PIS and 3% COFINS).

40. ICMS, PIS and COFINS are levied on internal mining sales.

41. ICMS (VAT) is collected under the systematic of offsetting debits and credits. Due to the fact that exports are ICMS exempt, the Brazilian mining companies have been accumulating relevant ICMS credits over the years, which are not refunded by the states. Thus, the ICMS accumulated credits not offset and refunded represent a relevant tax cost to the mining companies in Brazil.

42. The taxation on dividend payments by companies in Brazil was eliminated in 1996. However, Brazilian tax laws allow ‘The Interest on Net Equity’ (‘notional interest deduction’) where interest paid to shareholders in the company as a return on invested capital (equity) can be deducted from income tax purposes. Entities are allowed to remunerate their shareholders by paying interest on net equity, subject to certain limitations. This results in a deductible expense for CIT purposes, thereby reducing the taxes due.

43. The rates will depend on the home country of the foreign investment. The standard rate is 15% and the 25% rate is levied on payments made to persons residing or domiciled in tax havens.

44. Any payments, credits or remittances for royalties, technical or administrative services to non-residents will have a 10% impact on the Economic Domain Intervention Contribution (‘CIDE’), with the exception of dividend payments.

45. The 25% WHT rate applies when CIDE of 10% is not levied.

46. Based on the size of the area. Licence fees are referred to Annual Tax on Hectare (TAH). The calculation basis is the size of the mining site, measured in hectares. It is due at the rate of 2.02 BRL per hectare, annually for over the period of concession. This amount is increased to 3.06 BRL if the period of concession is extended.

47. The Brazilian Government has been discussing the modernisation of the mining sector’s rules through the set-up of a regulatory framework. In the same context, the modification of the CFEM rules with aim of increasing tax collection is being discussed. The main modifications are: a) the adoption of gross revenue as base of calculation; b) creating a standard mineral product, taking into consideration the technical and commercial criteria to avoid interpretation differences when applying tax rates; c) deferring the imposition of the CFEM on operations between related parties until the product is sold to a third party and using this value as base of calculation; d) creating a reference price for the standard mineral products; e) creating minimum and maximum tax rates by law, which can be altered at any given time through decree, making CFEM a mineral policy instrument, since it will rule the market according to the collection increase or decrease., the Brazilian states of Minas Gerais. Pará and Amapá (the first two states with the highest mining activity) have enacted laws to create State Mining Taxes, this before the new Federal Mining Law is approved. These laws, however, are being challenged in court. They establish that the tax will be levied in accordance with the tonnage of mineral extracted from the territory. In 2012, each tonnage corresponds approximately to 2.3 BRL for Minas Gerais, 6.9 BRL for Pará and 4.5 BRL for Amapá.

48. Transfer Pricing: Brazil is not a member of the OECD (Organisation for Economic Co-operation and Development), and does not follow US or OECD Transfer Pricing Rules. Contrary to the OECD Guidelines, Brazilian transfer pricing rules do not adopt the arm’s length principle. Instead, Brazilian rules define a maximum price ceiling (parameter price) for deductible expenses on intercompany import transactions and a minimum gross income floor for intercompany export transactions.

49. Thin capitalisation rules have been enacted in Brazil since 2011. These act as a limit for indebtedness of Brazilian companies with their parent companies located abroad.
## APPENDIX 2

### Status of Gold Production, Development and Exploration Projects in Tanzania

<table>
<thead>
<tr>
<th>Operation/Owner</th>
<th>Status</th>
<th>Production</th>
<th>Resources</th>
<th>Mining</th>
<th>Processing</th>
<th>Source</th>
</tr>
</thead>
</table>

| **Serra Grande/ AngloGold Ashanti** | Prod | 2013: 1.3Mt @ 3.42g/t = 0.039Moz 2012: 0.9Mt @ 3.36g/t = 0.099Moz 2011: 0.6Mt @ 3.59g/t = 0.067Moz 2010: 0.6Mt @ 4.05g/t = 0.077Moz 2009: 0.5Mt @ 4.52g/t = 0.077Moz | As at 31/12/2013: Prov + Prob. Res: 5.87Mt @ 3.00g/t = 0.570Moz Total Resource: 22.23Mt @ 4.19g/t = 9.29Moz | 3 mechanised u/g mines using cut and fill, sub-level stoping and room and pillar methods. Also an open-pit on the outcrop of the Mina III orebody | Annual plant capacity, which has grinding, leaching, filtration, precipitation and smelting facilities, is 1.15Mt. | AngloGold Ashanti Integrated Report, (2014). Accessed at: [http://www.ago-reports.com/13fr/review/regional-reviews/americas. Retrieved 26 February 2015](http://www.ago-reports.com/13fr/review/regional-reviews/americas) |

| **AGA Mineracao/ AngloGold Ashanti** | Prod | 2013: 2.3Mt @ 5.70g/t = 0.391Moz 2012: 2.2Mt @ 6.07g/t = 0.368Moz 2011: 1.7Mt @ 7.43g/t = 0.361Moz 2010: 1.6Mt @ 7.21g/t = 0.338Moz 2009: 1.5Mt @ 7.02g/t = 0.329Moz | As at 31/12/2013: Prov Res: 4.98Mt @ 5.08g/t = 0.818Moz Prob. Res: 7.85Mt @ 4.58g/t = 1.16Moz Meas. Res: 11.25Mt @ 6.11g/t = 2.21Moz Ind. Res: 16.68Mt @ 5.42g/t = 0.91Moz Inf. Res: 37.97Mt @ 5.60g/t = 2.069Moz | Cuiabá: Changed from cut-and-fill to long-hole; Lamego: Combination of cut-and-fill and room-and-pillar Córrego do Sítio: Sub-level caving with rock fill | Ore from the Cuiabá and Lamego u/g mines is concentrated at the Cuiabá plant and then transported 135km by aerial ropeway to the Queiroz plant where milling, flotation, roasting, leaching, precipitation and refining occur. The Córrego do Sítio open pit mine has a heap-leaching facility. | AngloGold Ashanti Integrated Report, (2014). Accessed at: [http://www.ago-reports.com/13fr/review/regional-reviews/americas. Retrieved 26 February 2015](http://www.ago-reports.com/13fr/review/regional-reviews/americas) |

| **Chapada/ Yamana Gold** | Prod | 2014: 0.113Moz | As at 31/12/2014: Prov. & Prob. Res: 509.2Mt @ 0.25g/t = 4.03Moz Meas & Ind Res: 247.1Mt @ 0.27g/t = 2.13Moz Inf. Res: 79.8Mt @ 0.25g/t = 0.65Moz | Low cost open-pit | Ore is treated in a flotation plant (22Mtpa). | Yamana Gold Inc. - Portfolio (2014). Accessed at: [http://www.yamana.com/Englisportfolio/producing-mines/chapada/default.aspx. Retrieved 27 February 2015](http://www.yamana.com/Englisportfolio/producing-mines/chapada/default.aspx) |


| **Turmalina/ Jaguar Mining** | Prod | 2012: 0.038Moz | As at 31/12/2013: Prov & Prob Res:1.472Mt @ 3.05g/t = 0.415Moz Meas & Ind Res: 5.93Mt @ 4.67g/t = 0.787Moz Inf. Res: 3.20Mt @ 3.00g/t = 0.309Moz | Turmalina is an underground mine utilizing the "cut-and-fill" mining method with paste fill. | Ore produced at the Turmalina Mine is transported to the adjacent 2,000 tonnes per day carbon-in-pulp processing plant. | Jaguar Mining website. Accessed at: [http://www.jaguarmining.com/s/Turmalina.asp. Retrieved 27 February 2015](http://www.jaguarmining.com/s/Turmalina.asp) |

<p>| <strong>Caeté/ Jaguar Mining</strong> | Prod | 2012: 0.55Moz | As at 31/12/2013: Prov &amp; Prob Res:3.76Mt @ 2.28g/t = 0.276Moz Meas &amp; Ind Res: 13.89Mt @ 3.50g/t = 1.565Moz Inf. Res: 7.64Mt @ 2.75g/t = 0.676Moz | Caeté’s mining complex is composed of two underground mines (Roça Grande and Pilar) that utilize a combination of &quot;cut and fill&quot; and &quot;sublevel stoping&quot; mining methods | Ore produced from the mines is transported to the adjacent 2,200 tonnes per day capacity carbon-in-pulp processing plant. | Jaguar Mining website. Accessed at: <a href="http://www.jaguarmining.com/s/Caete.asp">http://www.jaguarmining.com/s/Caete.asp. Retrieved 27 February 2015</a> |</p>
<table>
<thead>
<tr>
<th>Company</th>
<th>Category</th>
<th>Year</th>
<th>Grade/Prod. (Moz)</th>
<th>Note</th>
<th>Website</th>
<th>Accessed Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paciência/Jaguar Mining</td>
<td>Care &amp; Maint.</td>
<td>2012</td>
<td>0.010Moz</td>
<td>Multiple underground mines that utilize the &quot;cut and fill&quot; mining method and a treated tailings backfill system. Placed on care &amp; maintenance 8/5/2012 after a complete remediation of mines &amp; mine plans recommended. Ore produced from the mines is transported to the adjacent 2,000 tonnes per day carbon-in-pulp processing plant.</td>
<td>Jaguar Mining website. Accessed at: <a href="http://www.jaguarmining.com/Paciencia.asp">http://www.jaguarmining.com/Paciencia.asp</a>. Retrieved 27 February 2015</td>
<td></td>
</tr>
<tr>
<td>Gurupi/Jaguar Mining</td>
<td>Dev</td>
<td>No production to date</td>
<td>As at 31/12/2013: Proved &amp; Prob. Res: 63.7Mt @ 1.24g/t = 2.33Moz Meas &amp; Ind Res: 142.3Mt @ 0.77g/t = 3.52Moz Inf. Res: 7.7Mt @ 0.67g/t = 0.165Moz</td>
<td>Jaguar Mining website. Accessed at: <a href="http://www.jaguarmining.com/ExplGurupi.asp">http://www.jaguarmining.com/ExplGurupi.asp</a>. Retrieved 27 February 2015</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volta Grande/Belo Sun Mining</td>
<td>Adv. Expl.</td>
<td></td>
<td>As at 31/10/2013: Meas. &amp; Ind. Res: 93.82Mt @ 1.69g/t = 5.08Moz Inf. Res: 45.51 @ 1.75g/t = 2.57Moz</td>
<td>Conventional shovel and truck operation. 10 year LOM. Gyrotry crushe to ball and SAG mill and CIL.</td>
<td>Belo Sun website. Accessed at: <a href="http://www.belosun.com/Projects/Volta-Grande/">http://www.belosun.com/Projects/Volta-Grande/</a>. Retrieved 28 February 2015</td>
<td></td>
</tr>
<tr>
<td>Cachoeira/Brazil Resources</td>
<td>Expl</td>
<td></td>
<td>As at 2/10/2013: Ind. Res: 17.4Mt @ 1.40g/t = 0.787Moz Inf. Res: 15.6Mt @ 1.12g/t = 0.563Moz</td>
<td>Brazil Resources website. Accessed at: <a href="http://brazilresources.com/projects/cachoeira/">http://brazilresources.com/projects/cachoeira/</a>. Retrieved 28 February 2015</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chile: Gold Industry & Mineral Policy

Report Prepared for
IM4DC

May 2015
Summary

- The gold sector in Chile has gained impetus through the discovery of a series of sub-volcanic, mainly epithermal, gold deposits mostly located at elevations of more than 4,000 m in the Andean Cordillera. In addition to these epithermal deposits, Chile also holds significant gold reserves in copper-gold porphyry deposits.
- Chile’s mineral potential (including for gold) is recognized as amongst the most prospective in the world.
- Gold production is significant on a global level with 55 tonnes produced in 2013; however, the dominant mining industry in Chile is for copper.
- Chile is politically stable and economically developed (a member of the OECD), with well-developed transport, power, water supply and telecommunications infrastructure and a skilled work force.
- Chile has a reputation as one of the most attractive business destinations in South America, with a well-functioning market economy and sophisticated financial markets. Nearly 90% of Chile’s trade is conducted within free trade agreements.
- Chile actively encourages mining investment and has a strong mining culture founded upon the country’s world-leading copper industry. The country is recognised as one of the most attractive investment opportunities for mining and exploration, both due to its high mineral potential and high quality policy environment.
- The Chilean government is transparent and well administered, with efficient bureaucracy; a respected legal system, clear regulatory framework.
- The country’s mining and environmental regulations are well defined, and the government is working in the direction of sustainable development.
- The taxation regime for mining is seem positively, and only places a modest burden on activities, in comparison to other countries; however, royalty levels are increasing and increases in company tax are also planned. The government is under general pressure to increase taxation to fund further economic and infrastructure development.
- The main challenges facing Chile’s mining sector are rising costs and diversification beyond copper (for which the recent gold discoveries may help). The increasing costs are evidenced by the number of gold mines currently closed or on care and maintenance.
- Some improvements in Chile’s labour and environmental regulations would rectify some minor weaknesses in the policy environment.
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Table 2: The position of Chile in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
1. Location, Physiography and Climate

Chile occupies a long, narrow strip of land between the Andes in the east and the Pacific Ocean to the west. Chile stretches over 4,300km north to south, but is only 350km at its widest point east to west.

It borders Peru to the north, Bolivia to the northeast, Argentina to the east, and the Drake Passage in the far south. Chile’s northern desert contains great mineral wealth, principally copper. The relatively small central area dominates in terms of population and agricultural resources. Southern Chile is rich in forests and grazing lands, and features a string of volcanoes and lakes.

The Far North hosts the Atacama Desert. To the south is the Norte Chico, extending to the Aconcagua River. The Central area is the most populated region of the country. The coastal plains are wide and allow the establishment of cities and ports along the Pacific. Patagonia extends from within Reloncavi, at the height of parallel 41 ° S, to the south.

The diverse climate of Chile ranges from the world's driest desert in the north—the Atacama Desert—through a Mediterranean climate in the centre, humid subtropical in Easter Island, to an oceanic climate, including alpine tundra and glaciers in the east and south (CIA Fact Book 2014).
2. Infrastructure

Chile’s unique geography raises particular challenges for transport infrastructure. Roadbuilding remains the primary focus, but railways and ports are also undergoing expansion and new development. (Business Monitor International December 2014). Chile also has well-developed telecommunications networks and coverage.

Chile plans to intensify the development of the country’s infrastructure targeting over US$20 Billion projects to 2021. Infrastructure target areas include improving the transport corridors, constructing reservoirs, expanding the healthcare system and building new housing. The most important projects are in the following categories:

Government projects focused on major road and reservoir construction totalling approximately US$ 5.6B. New concession projects targeting a multitude of smaller and medium-sized projects: These projects range from the airport expansion, to the construction of roads, bridges, tunnels and cable cars, to the construction of community centres, bus stations and multi-storey car parks totalling US$4.5B.

Private projects supported by the public sector (motorway construction, access roads totalling USD2.3B).
3. Geology

All the gold mines, development projects and exploration ventures discussed in this report are located in northern Chile. Consequently, the geological discussion will be limited to this region.

3.1 Regional Geology

Northern Chile has four well-defined metallogenic belts which run parallel to the axis of the Andes. From youngest to oldest, these are:

*Upper Tertiary gold belt (El Indio & Maricunga sectors):* located in the main Andean cordillera and characterised by high sulphidation epithermal and porphyry gold systems, including Esperanza, La Coipa, La Pepa, Marte-Lobo, Refugio and Cerro Casale-Aldebaran, of the Maricunga sector, and El Indio-Tambo and Pascua-Lama (formerly Nevada) of El Indio sector.

*Lower Tertiary gold belt:* east of the coastal belt in the back-arc basin, and characterised by both low and high sulphidation epithermals, including San Cristobal, Guanaco and El Peñon gold and silver deposits.

*Lower Tertiary porphyry copper belt:* located in the Precordillera (Domeyko Range) and parts of the main Andean Range, contains the world-scale Cu (Mo-Au) porphyries (El Teniente, Chuquicamata, Escondida, Zaldivar, Collahuasi, Los Pelambres, Los Bronces, Andina, and others). These deposits are controlled by the Falla Oeste (West Fault), a ~3,000km long regional structural feature.

*Mesozoic Iron Oxide Copper-Gold belt (IOCG):* located along the Coastal Ranges and parts of the Precordillera of Northern Chile. This is part of a Mesozoic volcanic arc characterised by Andean Iron Oxide Copper Gold (IOCG) deposits, which include Los Colorados (Fe), El Algarrobo (Fe), El Romeral (Fe), Mantos Blancos (Cu-Ag), Mantoverde (Cu), Candelaria (Cu-Au-Fe), El Soldado (Cu) and Andacollo (Cu-Au) in Chile, and Marcona (Fe, Cu) in Peru.

Associated with many of the above are copper and gold-rich veins, supergene oxide-Cu and secondary-enriched sulphide and oxide copper blankets, skarns and exotic-type/Cu-cemented paleogravel deposits. Polymetallic Au-Ag vein and VMS deposits occur in the south of Chile. Arqueros lies within the Esperanza-La Coipa sub-belt (Miocene age), located within the northern part of the Maricunga section of the Upper Tertiary gold belt.
Figure 3: Map of northern Chile showing Upper Tertiary gold belts
3.2 Gold Mineralisation

The present gold sector interest in Chile has gained impetus through the discovery of a series of sub-volcanic, mainly epithermal, gold deposits mostly located at elevations of more than 4,000 m in the Andean Cordillera. In addition to these epithermal deposits, Chile also holds significant gold reserves in porphyry deposits. The epithermal gold deposits in Chile were formed during the Cretaceous through the Cenozoic, as a result of a non-collisional ocean-continent convergent plate margin. The crustal stresses resulting from the plate margin created long, sinuous north-northeast trending magmatic belts that roughly parallel the Pacific coast. These belts’ mineralization varies in a north-south direction, as a result of the timing of magmatism along the plate margin.

Although porphyry type deposits are as common as epithermal type deposits, the quality of mineralization in these deposits are sporadic. Gold mined from porphyry deposits is usually as a by-product of copper and molybdenum.

Valuable gold vein deposits have been discovered in the coastal zone of northern Chile. These veins are a result of a relatively recent (during the last 15 million years) enrichment event, which involved the movement of chlorine brine near the earth’s surface. This brine added additional surficial gold enrichment.

3.2.1 El Penon (Yamana Gold)

Located in northern Chile, El Peñón is a high grade underground gold-silver mine. Since production began in 2000, continuing exploration has established a track record of replacing ounces mined. Positive exploration results continue to indicate potential for extending the mine’s life. The mine has estimated reserves of 2.72Moz of gold and 84.6Moz of silver.\(^1\)
The El Peñón gold-silver deposit comprises six epithermal veins hosted in Paleocene and Eocene mafic to felsic volcanic rocks. The veins that comprise the El Peñón deposit range from <0.5 m to 22 m wide; the bonanza-grade Quebrada Colorada vein has a strike length of ~2 km, vertical extent of ~500 m and varies in width from 0.5 m to 4.5 m. Ore minerals observed in oxidised veins consist of electrum (mostly 40-60 wt % Au), acanthite, gold, silver, silver sulfosalts, silver halides, and rarely pyrite, chalcopyrite, and galena. High ore grades are generally associated with massive bands of fine-grained quartz and adularia, breccias composed of vein clasts in a matrix of fine-grained quartz and adularia, and, less commonly, colloform quartz bands.

Figure 5: Location and regional setting of El Peñón
3.2.2 Esperanza (Antofagasta)

Esperanza started production in 2011 with a life-of-mine of 49 years. Production in 2013 totalled 174,900t of copper @ 0.65%Cu and 0.237Moz gold.

It is one of many deposits associated with the Late Eocene to Oligocene Cu-rich Domeyko Fault Zone. Mineralisation is hosted in granodiorites which have undergone quartz-sericite alteration, and drill core also suggests that grade increases with depth. The deposit is structurally controlled by NE trending strike-slip faults relating to the Antofagasta-Calama Lineation (ACL) that dextrally displaces the Domeyko fault.
3.2.3 Maricunga and La Coipa (Kinross Gold)

Maricunga and La Coipa comprise the Verde and Pancho deposits of the Maricunga Gold Belt of the high Andes in northern Chile. Since 1980, a total of 40Moz of gold have been defined in the belt, (Muntean and Einaudi, 2000).

Gold mineralization at Maricunga has been interpreted to be porphyry gold style. At Verde West, gold mineralization is centred about an elliptical porphyry plug measuring 175 by 100 m and oriented at N30°W. At Verde East, the porphyry plug measures 130 by 80 m and is oriented at N35°E. The porphyries occur within a sequence of intermediate tuffs, porphyries and breccias that are the host rocks to the gold mineralization.

The gold mineralization at Pancho is also described as porphyry style mineralization. It occurs within a sequence of intermediate tuffs, porphyries and breccias that are the host rocks to the gold mineralization.

The La Coipa mine is located at the northern end of the Maricunga belt. The main hosts to the mineralisation include the Triassic La Ternera Formation and the Tertiary volcanic sequence. The La Ternera formation contains black shale and interbedded sandstones. The Tertiary volcanic sequence lies above the Triassic La Ternera formation. It consists of pyroclastic rocks, tuffs, latite breccias, dacite flows and quartz. Mineralisation is widespread across the mine in the form of high-sulphidation epithermal systems. It is spread across three zones - the upper zone, oxidised zone and primary zone. The upper zone in enriched
with Ag, the oxidised zone contains intermediate levels of gold and silver and the primary zone contains gold and copper.

3.2.4 Cerro Casale (Barrick 75%, Kinross 25%)

Cerro Casale is one of the world’s largest undeveloped gold-copper deposits. On a 100% basis, Cerro Casale has total proven and probable gold and copper mineral reserves of 23Moz of gold and 5.8 billion pounds of copper contained within reported gold reserves.

Barrick announced in 2013 that a construction decision for Casale would not be made "for the time being," but that permitting activities and exploration would continue.

3.2.5 Pascua Lama (Barrick)

Pascua-Lama is currently the largest of Chilean gold projects with proven and probable reserves of 17.8Moz gold and 671Moz of silver. The mine has an estimated life of more than 25 years, and approximate operating cash costs of $20 to $50 per ounce, which if realized would make Pascua-Lama one of the lowest cost gold mines in the world.

The project is under development, but during the fourth quarter of 2013, Barrick announced the temporary suspension of construction except for those activities required for environmental and regulatory compliance. The rampdown was completed on schedule and budget in mid-2014 and the mine is now on
care and maintenance. Engineering studies indicate that an increase in the capacity of the water management system may be required above the volume approved in the project’s Chilean environmental approval. Barrick expects to submit the application for the new water management system by June 2015, with permitting taking about two years. A decision to re-start development of the project will depend on improved economics and more certainty regarding legal and permitting matters.

### 3.2.6 Caspiche (Exeter Resource Corp)
Exeter Resource Corp is an exploration stage company working in Chile on the Caspiche Project, located in the Maricunga Belt between Barrick and Kinross Gold’s Cerro Casale gold-copper deposit. Caspiche is emerging as a material new gold discovery.

### 3.2.7 Florida (Yamana Gold)
Minera Florida is an underground gold-silver mine located south of Santiago in central Chile. The mine has been in operation for over 20 years. Retreatment of historic tailings commenced in 2013 and is expected to increase annual production by approximately 30,000oz per year for five years.

### 3.2.8 Florida (Yamana Gold)
The Volcan Gold Deposit was acquired from Andina Minerals in November 2012. The deposit is located in Chile’s Atacama Region, approximately 120km east of Copiapo. The property is located in the prolific Maricunga gold belt, which hosts a number of important gold deposits, including the Maricunga gold mine (Kinross), the La Coipa mine (Kinross), the Cerro Casale deposit (Kinross/Barrick), and the Lobo-Marte deposit (Kinross).

Proven and probable mineral reserves total 6.6Moz of gold. Hochschild intends to carry out extensive technical and geological evaluation of the deposit over a significant period of time and consequently during this process will re-classify the reported reserves as resources.

### 3.2.9 Cerro Maricunga (Atacama Pacific)
The 100%-owned property is located 140km NE of Copiapo, at the northern end of the Maricunga Mineral Belt, 20km south of Kinross Gold’s La Coipa silver-gold mine. Since 2010, Atacama Pacific has completed more than 100,000m of drilling on the property outlining one of the largest undeveloped oxide gold deposits in the world.

A proven and probable reserve of 3.74Moz (294.4 Mt grading 0.40 g/t Au) has been calculated at a 0.15g/t Au cut-off grade. In October 2014, Atacama Pacific reported the results of a PFS which envisions a large open pit operation mining 80,000 tonne per day with a conventional heap leach processing facility recovering 2.96Moz of gold over a 13 year mine life.

### 3.2.10 La Pepa, Amancaya and Jeronimo (57%), (Yamana Gold)
These three exploration are all owned by Yamana Gold (Jeronimo 57%) and are all longer-term projects that are seen as contributing to the future growth of the Company.

La Pepa is located in the prolific Maricunga gold belt and comprises of several deposits and areas. Mineralization is confined to an area of moderate to strong quartz veinlets with disseminated pyrite in an argillic, advanced argillic and phyllic alteration zone. A zone of surface oxidation of approximately 30 to 40 metres in thickness covers a much larger unoxidized deposit.

Measured and indicated resources are estimated at 1.985Moz and inferred resources add an additional 0.561Moz.
Amancaya is located approximately 160km south of the El Penon mine. Yamana is evaluating it as a stand-alone project or in conjunction with the further expansion of El Penon.

The epithermal deposit is low sulphidation and hosted in the steeply dipping, structurally controlled, Central Vein a steeply dipping quartz vein extending over a length of 1,300m, of which half is under alluvial. The vein has an average thickness of 1.5m and is currently known to have 280m of vertical extent. Drilling has shown that the vein and mineralization are continuous.

The Amancaya Project is viewed as both an open-pit and underground operation. The inferred mineral resources is estimated at 0.35Moz gold and 3,27Moz silver at average grades of 7.9 g/t Au and 73 g/t Ag, respectively.

Yamana holds a 57% interest in the Jeronimo Project along Codelco which holds the remaining 43%. Jeronimo is located in Region II of northern Chile. Gold mineralization is hosted by sub-horizontal carbonates of Jurassic age. It is best developed in a fossiliferous limestone near the base of the carbonate sequence and occurs as very fine grained disseminated gold. The mineralization has been traced along a strike length of 3km in three spatially and genetically related deposits. Indicated resources are estimated at 0.63Moz (3.88Mt @ 5.02 g/t). Inferred resources add an additional 1.53Moz (11.7Mt @ 4.07 g/t).

4. The Economy and Gold

The mining sector in Chile is one of the pillars of Chilean economy. The Chilean government strongly supports foreign investment in the sector and has modified its mining industry laws and regulations to promote the country as a destination for foreign mining investment. Chile is the world’s largest copper producing nation, producing one-third of global copper mine output.

Table 1 illustrates how copper dominates the Chilean economy but also provides a significant indication of how gold production is becoming increasingly important.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Exports (US$B)</th>
<th>Gold (%)</th>
<th>Gold (US$M)</th>
<th>Refined Copper (%)</th>
<th>Refined Copper (US$B)</th>
<th>Copper ore (%)</th>
<th>Copper ore (US$B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>60.0</td>
<td>0.97</td>
<td>584</td>
<td>29.75</td>
<td>17.8</td>
<td>20.71</td>
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<tr>
<td>2007</td>
<td>70.5</td>
<td>0.89</td>
<td>626</td>
<td>30.02</td>
<td>21.1</td>
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<td>14.6</td>
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<tr>
<td>2008</td>
<td>67.8</td>
<td>0.98</td>
<td>662</td>
<td>28.99</td>
<td>19.7</td>
<td>15.57</td>
<td>10.6</td>
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<tr>
<td>2009</td>
<td>56.2</td>
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<tr>
<td>2010</td>
<td>72.1</td>
<td>1.45</td>
<td>1050</td>
<td>33.18</td>
<td>23.9</td>
<td>18.87</td>
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<tr>
<td>2011</td>
<td>83.2</td>
<td>1.80</td>
<td>1500</td>
<td>31.52</td>
<td>26.2</td>
<td>17.31</td>
<td>17.3</td>
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<tr>
<td>2012</td>
<td>78.7</td>
<td>2.09</td>
<td>1640</td>
<td>27.91</td>
<td>22.0</td>
<td>20.39</td>
<td>16.0</td>
</tr>
</tbody>
</table>

Table 1: Value (in US$) of Chile’s copper and gold exports (Source: The Observatory of Economic Complexity)

4.1 Perceptions of Mineral Policy

Chile remains one of the most attractive countries in the world for investment in mining and exploration by foreigners (Table 2), though this is largely due to the attractiveness of its globally-leading copper industry, than its gold sector (of which much is a by-product of the copper industry).
Chile is perceived to have amongst the highest mineral potential and one of the best policy climates (Table 2); a position it has largely retained in recent years (Figure 9). It is an economically developed country; a member of the Organisation for Economic Co-operation and Development (OECD) since 2010. As an economically developed country, it has fairly good infrastructure and availability of skills.

Chile is recognised as having a first class regulatory regime for mining, efficient bureaucracy, solid legal system and fair taxation regime (Table 2). Some minor scope for improvement could perhaps be conceived in environmental regulation, labour regulation and land claims (Table 2). There is scope for improvement in the geological database, which may help facilitate diversification beyond copper mining.

<table>
<thead>
<tr>
<th>Index</th>
<th>World Position (of 122)</th>
<th>World Quartile</th>
<th>S. America Position¹ (of 27)</th>
<th>S. America Quartile</th>
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</thead>
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<tr>
<td>Investment Attractiveness</td>
<td>13</td>
<td>1st</td>
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<td>1st</td>
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<tr>
<td>Policy Perception</td>
<td>22</td>
<td>1st</td>
<td>2</td>
<td>1st</td>
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<tr>
<td>Mineral Potential²</td>
<td>6</td>
<td>1st</td>
<td>1</td>
<td>1st</td>
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<tr>
<td>Room for Improvement</td>
<td>54</td>
<td>2nd</td>
<td>8</td>
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<tr>
<td>Uncertainty Concerning Existing Regulations³</td>
<td>14</td>
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<tr>
<td>Uncertainty Concerning Environmental Regulations</td>
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<td>7</td>
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<tr>
<td>Regulatory Duplication &amp; Inconsistencies</td>
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<td>1</td>
<td>1st</td>
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<td>Taxation Regime</td>
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<td>1st</td>
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<td>1st</td>
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<td>Uncertainty Concerning Disputed Land Claims</td>
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<td>4</td>
<td>1st</td>
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<tr>
<td>Uncertainty Concerning Protected Areas</td>
<td>48</td>
<td>2nd</td>
<td>5</td>
<td>1st</td>
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<tr>
<td>Quality of Infrastructure</td>
<td>51</td>
<td>2nd</td>
<td>7</td>
<td>2nd</td>
</tr>
<tr>
<td>Socioeconomic Agreements⁴</td>
<td>39</td>
<td>2nd</td>
<td>4</td>
<td>1st</td>
</tr>
<tr>
<td>Trade Barriers</td>
<td>58</td>
<td>2nd</td>
<td>7</td>
<td>2nd</td>
</tr>
<tr>
<td>Political Stability</td>
<td>36</td>
<td>2nd</td>
<td>2</td>
<td>1st</td>
</tr>
<tr>
<td>Labour Regulations⁵</td>
<td>51</td>
<td>2nd</td>
<td>3</td>
<td>1st</td>
</tr>
<tr>
<td>Geological Database</td>
<td>46</td>
<td>2nd</td>
<td>3</td>
<td>1st</td>
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<tr>
<td>Security</td>
<td>50</td>
<td>2nd</td>
<td>4</td>
<td>1st</td>
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<tr>
<td>Availability of Labour / Skills</td>
<td>40</td>
<td>2nd</td>
<td>1</td>
<td>1st</td>
</tr>
</tbody>
</table>

¹ Includes countries from South America, Central America, Caribbean Basin and the separate states of Argentina.
² Known fully as the ‘Best Practices Mineral Potential Index’ which ranks countries by attractiveness if all countries applied Best Practice mineral policy i.e. if only geological prospectivity mattered.
³ Known fully as the ‘Uncertainty Concerning the Administration, Interpretation and Enforcement of Existing Regulations’ index.
⁴ Known fully as the ‘Socioeconomic Agreements / Community Development Conditions’ index.
⁵ Known fully as the ‘Labor Regulations / Employment Agreements and Labour Militancy / Work Disruptions’ index.

Table 2: The position of Chile in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
Figure 9: The changing position over time of Chile in the three main indices (Investment Attractiveness, Policy Perception and Mineral Potential) of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).

5. Geopolitical Assessment and Sovereign Risk

5.1 Stability

Chile is presently one of South America’s most stable and prosperous nations (Fraser Institute 2015). It leads Latin American nations in rankings of human development, competitiveness, income per capita, globalization, state of peace, economic freedom, and low perception of corruption. It also ranks high regionally in sustainability of the state, and democratic development.

Chile has the highest degree of economic freedom in South America (ranking 7th worldwide), owing to its independent and efficient judicial system and prudent public finance management. In May 2010 Chile became the first South American country to join the OECD.

Copper mining makes up 20% of Chilean GDP and 60% of exports.

Sound economic policies, maintained consistently since the 1980s, have contributed to steady economic growth in Chile and have more than halved poverty rates. Real GDP growth in 2012 was 5.5%. Growth slowed to 4.1% in the first quarter of 2013 (The World Factbook. Central Intelligence Agency 2015).
5.2 Mining Law and Taxation
A summary of prevailing mineral law in Chile is attached as Appendix 1.

In 2013, mining exports were worth US$44.295 million. Statistics provided by the National Geology and Mining Service show that as at 2012, mining concessions had been granted in relation to 42% of Chilean territory. The state has absolute, exclusive and inalienable rights over all mines. However, a person (natural and/or legal) can obtain exploration and exploitation mining concessions, regardless of who owns the land. This means that there is an absolute distinction between the ownership of surface land and ownership of the mining concession granted within the same piece of land.

Chilean mining legislation allows two types of mining concessions:
- Exploration concession. This type of concession grants its holder the exclusive right to investigate and prospect the existence of all mineral substances for which concessions can be granted.
- Exploitation concession. This type of concession grants its holder an exclusive right to:
  - Freely explore and exploit the concession, having previously obtained the corresponding permits and complied with all legal and regulatory obligations, and;
  - Become the owner of all the mineral substances extracted from land within the limits of the exploitation concession.

Apart from the application fees and annual licence fees that interest holders must pay, Chilean taxation law recognises three types of miners, which are subject to different tax regimes:
- Small artisanal miners pay a single tax that is calculated on gross sales, with rates of 1%, 2% or 4% of copper’s international price. For mineral products without copper, gold or silver content the rate is 2%.
- Medium level miners are subject to a presumed income tax regime under which taxes are paid on the basis of gross annual sales. Depending on the average price of a copper pound (referential payment unit determined by the Chilean Copper Commission), the tax base/presumed income of a copper miner can be 4%, 6%, 10%, 15% or 20% of gross annual sales. The tax rate is 20% of such presumed income.
- Major miners pay taxes on their effective income, at the rate of 20%.

In addition, interest holders must pay a royalty calculated on the basis of production and sales levels. For instance, copper mining producers whose sales are less than 12,000 metric tons of copper per year are exempt from payment of the royalty, while mining producers whose sales levels are between 12,000 and 50,000 metric tons of copper per year pay between 0.5% and 4.5% of their operational taxable income.

There are no other taxes, fees or licences than the ones described above. There are no specific taxes applicable to joint venture agreements.

6. Conclusions
- The present gold rush in Chile has gained impetus through the discovery of a series of sub-volcanic, mainly epithermal, gold deposits mostly located at elevations of more than 4,000 m in the Andean Cordillera. In addition to these epithermal deposits, Chile also holds significant gold reserves in porphyry deposits.
- The mineral potential (including for gold) is recognised to be amongst the highest in the world.
- Chile is an economically developed country (a member of the OECD) with fairly good infrastructure and skills availability. Transport, power, water supply and telecommunications infrastructure are all thought to be excellent.
- Chile currently has more than US$60B of infrastructure projects in its pipeline, including transportation and power transmission. With its strong set of attributes, the EIU expects Chile to attract US$28B of foreign direct investment by 2017.
Chile has a reputation as one of the most attractive business destinations in South America, with a well-functioning market economy and sophisticated financial markets. Nearly 90% of Chile’s trade is conducted within free trade agreements.

The minerals policy environment is recognised as first class; including the bureaucracy, regulatory framework, legal system and taxation regime. The government is now also focusing on sustainable development.

Although the Mining Law has recently been amended by increasing royalties, Chile still actively encourages mining investment. The tax regime is currently stable, but the Chilean government is under pressure to increase company tax rates.

The main challenge for Chile’s mining sector is maintaining (and even developing) its strong and attractive position within the global industry. Costs are becoming an increasing problem, as is diversification beyond copper. For example, many of the country’s gold mines are mothballed or on care and maintenance awaiting an improvement in economic conditions.

Some minor improvements to aspects of the policy environment could also perhaps be made surrounding labour and environmental regulations and land claims.

7. References


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A guide to mining regulation in Chile

(as at 01-May-2014)
Gonzalo Nieto and Maximiliano Urrutia (Urrutia & Co.)

This is part of the multi-jurisdictional guide to energy and natural resources. For a full list of content visit www.practicallaw.com/energy-mjg.

Overview
Chile’s most important mineral resources are copper, molybdenum, silver and gold. Their exploitation is concentrated mostly in the north, in the Antofagasta and Atacama regions. In 2013 production was as follows:

- Copper: 5.8Mt or 32% of world production.
- Molybdenum: 39,000t or 14% of world production.
- Silver: 1,217t or 5% of world production.
- Gold: 49t or 2% of world production.

Although there are no official updated statistics, according to the Chilean Copper Commission (COCHILCO), by 2011, investments in the mining industry represented 25% of total investment in Chile, while foreign investment in the mining industry represented 35%.

With regards to Chile’s gross domestic product, the mining sector contributes approximately 15%. In 2013, mining exports were worth US$44.295 million.

Some of the current major mining projects in Chile are:
- Chuquicamata, El Teniente & Andina, owned by CODELCO.
- Minera Escondida, owned by BHP Billiton.
- Anglo American Sur Andes, owned by Anglo American.
- Collahuasi, owned by Glencore Xtrata plc, Anglo American and Mitsui & Co. Ltd.
- Los Pelambres, owned by Antofagasta PLC.
- El Abra and Candelaria, owned by Freeport-McMoran.

Some of the upcoming major projects are:
- Caserones, a copper and molybdenum mine owned by the Japanese firm SCM Minera Lumina Copper Chile, with an estimated investment of US$4,200 million.
- Copper development projects by CODELCO, with an estimated investment of US$4,370 million.
- Organic Growth Project 1, a copper mine owned by Minera Escondida Limitada, with an estimated investment of US$3,800 million.

Regulatory structure
The regulatory framework governing the exploration and extraction of mineral resources in Chile consists of:
- The Political Constitution of the Republic of Chile, which provides the legal basis for mining legislation, as it expressly stipulates that ownership of a mining concession is protected by the constitutional guarantee related to property rights.
- The Organic Constitutional Law on Mining Concessions, which describes in general terms what mining concessions are, their duration and expiration, and the rights and obligations of titleholders.
- The Chilean Mining Code, which addresses topics covered in the Organic Constitutional Law on Mining Concessions in more detail, and sets out:
• The procedure for obtaining exploration and exploitation concessions;
• How such concessions are protected; and
• The regime governing contracts related to mining operations.
• The rules that complement those of the Mining Code, the Mining Code Regulations, which explain the different requirements needed to exercise the rights and comply with the duties stated in the Code, and detail the phases of each procedure.
• The Mining Safety Regulation contained in Supreme Decree No 132/2004, whose objective is to protect the life and physical integrity of those who work in and are related to the mining industry, as well as to protect facilities and infrastructure that allow mining operations and their continuance.

The Regulation on the System of Environmental Impact Assessment and some provisions of the Water Code, Health Code and Labour Code are also applicable to mining operations.

Regulatory authorities
The main authority responsible for dealing with mining issues is the National Geology and Mining Service (Servicio Nacional de Geología y Minería), which serves as an adviser to the Ministry of Mining on geology and mining issues. Some of its duties are to keep a record of mining concessions granted and to supervise compliance with the Mining Code Regulations, among others.

Some other public entities are involved with mining operations, such as the Environmental Assessment Service and the Superintendence of Environmental Affairs.

Ownership
The state has absolute, exclusive and inalienable rights over all mines, which cannot be taken away by prescription or lapse of time (Mining Code). This is regardless of any claim by natural or legal persons over lands within which mines are located. However, a person (natural and/or legal) can obtain exploration and exploitation mining concessions, regardless of who owns the land.

This means that there is an absolute distinction between the ownership of surface land and ownership of the mining concession granted within the same piece of land. As a result, the land owner and the mining concession owner can co-exist if they are different persons. Mining law stipulates that land ownership is subject to the obligations and limitations established by law to facilitate mining exploration and exploitation as well as mineral processing via, for example, mining easements.

Statistics provided by the National Geology and Mining Service show that as at 2012, mining concessions had been granted in relation to 42% of Chilean territory.

Authorisation
A mining concession is a right in rem (against all persons), which is different to and independent from the ownership of the surface land, even if both rights belong to the same person, and as such is enforceable against the state and all persons (Article 2, Mining Code).

Mining law also prescribes that surface property is subject to the obligations and limitations established by law to facilitate mining exploration, exploitation and mineral processing.

Chilean mining legislation allows two types of mining concessions:
• Exploration concession. This type of concession grants its holder the exclusive right to investigate and prospect the existence of all mineral substances for which concessions can be granted.
• Exploitation concession. This type of concession grants its holder an exclusive right to:
  o freely explore and exploit the concession, having previously obtained the corresponding permits and complied with all legal and regulatory obligations, and;
○ become the owner of all the mineral substances extracted from land within the limits of the exploitation concession.

In general, both types of mining concession can be subject to any type of contract, such as a mortgage, lease agreement or purchase and sale agreement.

**Lease/licence/concession term**

Exploration concessions last for two years from the date of grant, although they can be renewed for another two years.

Exploitation concessions do not expire, provided that the right holder pays applicable annual taxes. If the holder fails to pay these taxes, the concession is auctioned off.

**Fees**

An application fee must be paid after the filing of a request for a mining concession, and its amount depends on whether it is an exploration or an exploitation concession, as well as on the area it covers (measured in hectares). The payment unit is calculated on 1/100 of a Monthly Tax Unit (MTU), a Chilean inflation-linked currency (1 MTU is about US$80), and the rate is applied through a progressive tax system.

For instance, the application fee for an exploration concession of over 3,000 hectares is 4/100 MTU per hectare, while the application fee for an exploitation concession of over 600 hectares is 5/100 per hectare.

In addition, after the mining concession is granted, the titleholder must pay an annual licence fee of 1/50 MTU per hectare for an exploration concession and 1/10 MTU per hectare for an exploitation concession. However, if the mining exploitation concession relates to non-metallic substances, the amount payable is 1/30 MTU per hectare.

**Liability**

A concession holder must pay an annual licence fee. Concession holders are not liable to third parties for non-payment of their licence fee.

**Restrictions**

The general principle under Chilean mining law is that all metallic and non-metallic substances can be the object of a mining concession, in whatever form they may be naturally found. However, there are certain mineral substances that are reserved only to the owner of the surface land, such as surface clays. Concessions cannot be granted in relation to hydrocarbons (either liquids or gases), lithium, underwater deposits and mineral deposits of any kind located wholly or partially within areas defined by law as relevant for national security.

The Mining Law prohibits the overlap of mining concessions owned by different titleholders. It sets out different mechanisms and procedures to protect the preference of the first applicant and annul or cancel mining concessions requested or granted after that.

Finally, there are some legal restrictions regarding foreign ownership of lands located in border areas. However, Chile has signed a Mining Integration and Complementaion Treaty with the Republic of Argentina.

**Awarding of leases, licences and concessions**

Mining concessions are granted by a judicial resolution issued at a non-contentious proceeding. Although the procedure for granting both exploitation and exploration concessions have some particular features and steps, they both start with a request for an exploration or exploitation concession filed by any person interested in undertaking a mining activity before the court in whose jurisdiction the concession will be located, providing the exact geographical location of the area to be explored or exploited.
Such requests must be registered in the Registry of Mining and published in the Mining Gazette, and the applicant must then pay the application fees. After this, the file is sent to the National Geology and Mining Service for it to issue a report either in favour or against the grant of the mining concession. If the report is favourable, the court grants the concession by a final judgement that must also be registered in the Registry of Mining and published in the Mining Gazette.

If the above procedure is not complied with, the concession may be subject to cancellation at the request of any third parties who notice omissions or illegalities in the procedure.

Environment
Generally, the environmental protection measures that mining companies must adopt depend on the environmental components that may be affected by the mine’s operation, such as water resources that might be polluted by mining waste, or communities settled nearby that could be affected in any way by the operations. With regards to mining waste, the most important issues are the location and construction of the waste dump and the functioning and maintenance of tailings dams.

The Health Code requires the prior approval of the National Health Service for the construction of a waste-treatment plant of any kind. The Mining Safety Regulation requires that the stability of waste dump projects be guaranteed and that the highest safety measures are adhered to with regards to their construction and expansion. Such projects must be reviewed and approved by the National Mining and Geology Service. There is a specific regulation on the construction and operation of tailings dams, Supreme Decree No 248/2007, which establishes procedures for the approval of tailings-dam projects and requirements for their design, construction, operation and closing that guarantee the safety of people and assets.

Health and safety
All health and safety regulations related to mining activity are contained in the Mining Safety Regulations, although there are some provisions of the Labour Code and Health Code that are also binding, as well as specific regulations in other Chilean legislation, such as that relating to tailings dams

Some of the most important regulations on health and safety matters concern:
- The obligation to train workers to operate heavy machinery and work in high altitude conditions.
- The need for proper signage at work sites.
- The need for proper facilities and evacuation procedures.
- The need for an adequate system for the treatment and disposal of all types of waste.

Foreign ownership
Chilean legislation does not restrict foreign investment and ownership of mining concessions in any way. On the contrary, foreign investment is encouraged and welcomed.
Under the Foreign Investment Statute (Decree Law No 600) and Chapter XIV of the Foreign Exchange Regulations of the Chilean Central Bank, a foreign investor and the Chilean state must sign a foreign investment contract that sets out the parties’ rights and obligations. The investor’s obligations include bringing the investment capital into the country within a specified amount of time and in a previously determined form. The state guarantees that the investor will not be discriminated against in economic matters, among others.

Tax
Apart from the application fees and annual licence fees that interest holders must pay, Chilean taxation law recognises three types of miners, which are subject to different tax regimes:
- Small artisanal miners pay a single tax that is calculated on gross sales, with rates of 1%, 2% or 4% of copper’s international price. For mineral products without copper, gold or silver content the rate is 2%.
• Medium level miners are subject to a presumed income tax regime under which taxes are paid on the basis of gross annual sales. Depending on the average price of a copper pound (referential payment unit determined by the Chilean Copper Commission), the tax base/presumed income of a copper miner can be 4%, 6%, 10%, 15% or 20% of gross annual sales. The tax rate is 20% of such presumed income.

• Major miners pay taxes on their effective income, at the rate of 20%.

In addition, interest holders must pay a royalty calculated on the basis of production and sales levels. For instance, copper mining producers whose sales are less than 12,000 metric tons of copper per year are exempt from payment of the royalty, while mining producers whose sales levels are between 12,000 and 50,000 metric tons of copper per year pay between 0.5% and 4.5% of their operational taxable income.

There are no other taxes, fees or licences than the ones described above. There are no specific taxes applicable to joint venture agreements.

All income derived from the importation and exportation of mineral resources is included in the general tax regime. There are no additional taxes or specific regulations regarding the import and export of mineral resources.

Reform
In relation to the application procedure for mining concessions, in October 2013 a group of Senators presented a bill to parliament requiring that requests for mining concessions be published in a regional newspaper and notified by radio, in addition to the current mandatory publication in the Mining Gazette.

In May 2013, another bill was presented to parliament to revise the water rights regime applicable to holders of mining concessions.

Discussion of and voting on both bills is still pending.
## APPENDIX 2

### Status of Gold Production, Development and Exploration Projects in Chile

<table>
<thead>
<tr>
<th>Operation/Owner</th>
<th>Status</th>
<th>Production</th>
<th>Resources</th>
<th>Mining</th>
<th>Processing</th>
<th>Source</th>
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<td>Esperanza/ Antofagusta</td>
<td>Prod</td>
<td>2013: 174,900t @ 0.64% Gold: 0.237Moz</td>
<td>As at 31/12/2014: Reserves: 1790Mt @ 0.45% Cu and 0.16g/t Au</td>
<td>Conventional open-pit mine</td>
<td>Produces copper concentrate (containing gold and silver) through a milling and flotation process.</td>
<td>Antofagasta website. Accessed at: <a href="http://www.antofagasta.co.uk/our-business.aspx/#/northchile/all/esperanza">http://www.antofagasta.co.uk/our-business.aspx/#/northchile/all/esperanza</a>. Retrieved 3 March 2015</td>
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<tr>
<td>Project Name</td>
<td>Phase</td>
<td>Details</td>
<td>Source</td>
<td>Date of Access</td>
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<td>-------------------------------------------------------------------------------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inf. Res: 42Mt @ 0.50g/t = 0.61Moz</td>
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<tr>
<td>Atacama pacific</td>
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<td>Open pit operation mining 80,000tpd over a 13 year mine life.</td>
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<tr>
<td></td>
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<td>Open-pit</td>
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<td></td>
<td>Open-pit and underground</td>
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<tr>
<td>CODELCO 43%</td>
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<td>Metallurgical testwork including flotation, pressure oxidation and bio leaching is currently underway to accommodate the unoxidized and refractory nature of the Jeronimo mineralization</td>
<td></td>
<td></td>
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Colombia: Gold Industry & Mineral Policy

Report Prepared for

IM4DC

May 2015
Summary

- In 2014, Colombia was the 19th ranked global gold producer with 43.1 tonnes; however most of the production was derived from informal or artisanal miners.
- Modern mining is a new concept in Colombia and there are no modern gold mines. Potential exists for large-scale porphyry, epithermal and placer gold deposits; however these would all require modern mining techniques for extraction. In addition, the downturn in the global mining sector has made these sorts of capital intensive projects less attractive.
- Similarly, gold exploration has declined in recent years, again due to the downturn in the mining sector, particularly amongst junior exploration companies.
- Colombia is recognised as having fairly high mineral potential; however, this is mitigated by a number of problems with its policy climate. The perceptions of the country’s mineral industry have declined in recent years.
- The country remains economically undeveloped, lacking quality infrastructure (though improvements are underway) and wide availability of skills. Serious security problems remain in the country and it is still somewhat politically unstable. The legal system is also weak.
- The overall regulatory framework, bureaucracy, taxation regime and labour regulations in Colombia are seen fairly positively. In addition, the prevailing tax and royalty regimes looks reasonable compared to other jurisdictions.
- There are however specific concerns relating to the mining industry. There are problems with land claims and protected areas, whilst the granting of concessions and permitting is slow and bureaucratic. Uncertainty also exists around environmental regulations and socioeconomic and local community agreements.
- There are specific concerns about government plans to create ‘strategic reserve areas’, which total about 12.1M ha. In these areas, exploration will be conducted by the government, before they are auctioned to outside investors.
- These factors together mean that there is growing concern that having found a deposit, whether a private or foreign company would be able to develop a mine in Colombia and get the approvals to do so in a timely manner.
- Colombia remains very cautious about how its approach to modern mining; in contrast to Chile and Peru, where there have been many new mine developments. Therefore, the main challenge for Colombia’s mining sector is perhaps in educating local governments, communities and politicians about modern mining; its benefits, the processes and the technologies.
- Ultimately however, until a major, new mine project is permitted and developed in Colombia; there will be some uncertainty about whether mine development is possible in the country. The Buritica project owned by Continental Gold could perhaps be crucial in this regard, as it is seen as having amongst the best development potential in Colombia.
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Table 2: The position of Colombia in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
1. Location, Physiography and Climate

Colombia lies in the NW of South America, bordered to the northwest by Panama, to the east by Venezuela and Brazil and to the south by Ecuador and Peru.

Colombia is dominated by the Andes which contain the majority of the country's urban centres. Beyond the Colombian Massif these are divided into three branches known as cordilleras:

- the Cordillera Occidental, running adjacent to the Pacific coast and including the city of Cali;
- the Cordillera Central, running between the Cauca and Magdalena River valleys and including the cities of Medellín, Manizales, Pereira and Armenia;
- the Cordillera Oriental, extending north east to the Guajira Peninsula and including Bogotá, Bucaramanga and Cúcuta.

![Figure 1: Colombia – major cities, roads and departments](image)

East of the Andes lies the savanna of the Llanos, part of the Orinoco River basin, and, in the far SE, the Amazon rainforest Colombia’s climate varies widely. Below 1,000m in elevation is the tierra caliente, where temperatures are above 24 °C (75.2 °F). Over 80% of the country's total area lies in this region.

The majority of the population can be found in the tierra templada from 1,000 - 2,000m, where temperatures vary from 17 - 24 °C.
In the tierra fría, from 2,000 - 3,000m, mean temperatures range between 12 and 17 °C. Beyond the tierra fría lie the alpine conditions of the forested zone and then the treeless grasslands of the páramos. Above 4,000m, where temperatures are below freezing, is the tierra helada, a zone of permanent snow and ice.

Figure 2: Satellite image of Colombia

2. Infrastructure

The quantity and quality of infrastructure in Colombia is fairly low due to a lack of investment. The government’s infrastructure plan involves new inter-departmental highways, ports and airports to make Colombia more competitive. The plan requires over US$50B investment for capital expenditures and significant support from the private sector. The government’s goals are a 100% increase in four-lane highways, a 50% increase in length of railways in operation, a 50% increase in load capacity for ports and a 35% increase in passengers mobilised in airports.

By 2018 the government expects to have 2,343km of railways in operation. Given that the rail projects are all freight, most of the railway concessions are expected to be awarded as a private initiative to mining contractors in the area that already have considerable interests in the country. This would enable them to transport mining goods from the central region of the country to the major ports and reduce their export costs.

Most ports in Colombia are privately owned or are already under a concession agreement. Therefore the amount of opportunities in this sector is limited. Airport projects are also not a high priority. However, some projects are

3. Conclusion

The government’s infrastructure plan will require significant investment and support from the private sector to make Colombia more competitive. The plan involves new inter-departmental highways, ports and airports, with a focus on freight transportation. The government’s goals are to increase the length of railways and the load capacity of ports and airports, and to reduce export costs. Most ports are already privately owned, and airport projects are not a high priority.
proposed including the improvement of 23 local airports and the structuring of two projects - one for Bogota’s alternate airport and another for the Flandes airport.

A couple of waterway projects are being considered by the administration including a Río Magdelan waterway corridor network that will streamline services on the river. Also, the government is considering similar projects for the Orinoco River and the Amazon. The country is also interested in undertaking studies in the navigability of the Putumayo and Meta rivers as well as the deepening of the San Antonio Lagoon in the Cauca Valley.

The country’s climate and high precipitation have provided most of its energy by hydroelectric plants.

The Vive Digital Plan aims to increase internet connectivity around Colombia. The proposal includes tripling the number of municipalities connected to the Internet, connecting 50% of all households and 50% of small and medium sized businesses. This includes a US$200 million investment to provide a fibre optic network to 500 municipalities

3. Geology

3.1 Regional Geology

Colombia’s geological history has been controlled by its tectonic location, on the northern edge of the subduction boundary between the Nazca oceanic plate and the South American continental plate, with the Caribbean plate lying close to the north.

The western third of Colombia is therefore underlain by accreted oceanic terranes; while the bulk of the country sits mainly on continental, cratonic terrane of the Guiana Shield. A long geological history of subduction has given rise to numerous and extensive phases of magmatic intrusion and regional deformation and metamorphism. Major, crustal-scale faulting is prevalent throughout the north and western portions of the country, with regional faults breaking the continental plate into a series of tectonic blocks; most notably the North Andes block and the Maracaibo Blocks.

3.2 Metallogenic belts

Four major gold belts or districts are recognised in the northern Colombian Andes, trending north to north-easterly. From west to east, these are: Choco belt, Middle Caucà belt, Segovia belt and the California-Angostura district (Figure 3).

The Choco belt is a zone of predominantly placer deposits formed from erosion of the epithermal and porphyry related gold mineralisation in the Western Cordillera. The most significant Colombian placer deposits occur, however, to the east of this belt, along the Rio Nechi river system.

The Middle Caucà belt is characterised by porphyry gold deposits, most significantly La Colosa (AngloGold Ashanti); although associated intermediate epithermal gold deposits also occur, as at Marmota (Medoro Resources). Mineralisation is closely associated with fine-grained, porphyritic diorite and dacite stocks of Miocene age (7-26 million years old).

Oxidised, pluton-related gold deposits define the Segovia belt in the northern part of the Central Cordillera, although a significant proportion of historic gold production has also come from placers derived from these deposits. The late Jurassic age (c.150 million years old) Segovia batholith is of calc-alkaline composition, dominated by hornblende diorite and tonalite intrusives.
In the *California-Angostura* district, a number of high and intermediate-sulphidation epithermal deposits occur in the Santander Massif of the Eastern Cordillera. The northeast trending Rio La Baja fault zone is considered to be a splay of the crustal-scale Rio Cucutilla fault and is the principal control on alteration and mineralisation at Angostura (Greystar), La Bodega (Ventana) and Norte de Santander (CB Gold).

![Diagram showing major metallogenic belts of NW Colombia](image)

**Figure 3:** Major metallogenic belts of NW Colombia (Source: proactive investors)

### 3.3 Gold Mineralisation

Porphyry gold, porphyry copper-gold, high and intermediate-sulphidation epithermal and placer gold deposits are all significant types of mineral deposits in Colombia; as are oxidised pluton-related vein deposits. As a group, the term oxidised, pluton-related deposits includes porphyry and high-sulphidation mineralisation, but it also encompasses skarn, manto and mesothermal vein styles of mineralisation that are spatially, if not temporally, related to intermediate-felsic (calc-alkaline) porphyritic intrusions.

Unlike some of its South American neighbours to the south, Colombia has yet to fully explore its porphyry potential. There is strong geological evidence that Colombia may host porphyry gold/copper deposits similar in grade and size to those found in Chile and Peru. Details for some of the more significant gold deposits are provided below:

#### 3.3.1 Segovia (Gran Colombia Gold)

Located in the Segovia-Remedios mining district of Antioquia in the Segovia Batholith, approximately 220km NE of Medellin. These mines have been in operation for over 150 years and produced an estimated 5Moz at an average production grade of 9.7g/t Au. The assets were purchased by Gran Colombia in August
2010 and include the El Silencio, Providencia and Sandra K underground mines in the Municipality of Segovia, and the Carla underground mine in the Municipality of Remedios, located approximately 10 km SE of the Segovia Mining Operations.

Gold mineralisation is hosted by a series of quartz-sulphide veins associated with mafic porphyry intrusion and thrust-faulting within the Segovia Batholith. The average width of the quartz veins is 0.95m, with a maximum width of 9.0m.

The geological history is summarized as follows:
1. Intrusion of granodiorite.
2. Development of low angle fault system.
3. Intrusion of basic porphyry sills along the low angle faults.
4. Formation of quartz-sulphide veins along the low angle faults.
5. Late stage high angle reverse fault movement causes vertical off-sets of the quartz veins.

![Gold-bearing vein at the Sandra K Mine](image)

**Figure 4: Gold-bearing vein at the Sandra K Mine**

Production in 2012 (mainly from the Providencia Mine) was reported to be 0.261Mt @ 11.0 g/t Au for 97,061 ounces of gold. With the intention lowering costs and increasing gold production at Segovia, Gran Colombia has embarked on the Pampa Verde Project. This will combine all the assets of the existing mines and will include mechanized mining and a new scalable 2,500tpd plant. Planned production is 150,000oz gold annually.

3.3.2 Laguna Norte (Barrick)
The Marmato project in the Caldas department is in the heart of the Middle Cauca gold district some 80km south of Medellin. The Project comprises the Zona Alta exploration project, the Zona Baja mine and the Echandia exploration project to the north. The Zona Baja mine currently produces about 0.023Moz of gold annually.

Gold mineralisation is hosted in sulphide-rich veins in the Late Miocene (6.5-7M years) Marmato porphyry which at Marmato, is 4.6 to 5.8km wide and extends east to the Cauca River, where it is in contact with schists. Five porphyry types have been identified in drill core and by geological mapping. The two main intrusions are dacite P1 and andesite P4, while P2, P3 and P5 form dikes. The main host rock to mineralisation is the dacite porphyry stock (P1).

In 2012, the Company announced a measured and indicated resource of 11.8Moz an inferred resource of 2.6Moz. Recent drilling has outlined a new deep zone that contains approximately 300Mt of potential mineralization, and is not represented in the current total resource estimate. These findings extend mineralization trends to approximately 700m below the limit of the current preliminary pit outline.

3.3.3 Gramalote (51% AngloGold Ashanti, 49% B2 Gold)

The Gramalote property is located on the eastern flank of the Cordillera Central near the town of Providencia and San Jose del Nus in the municipality of San Roque, northwest of the Department of Antioquia, Colombia. It is approximately 230km northwest of the Colombian capital of Bogota.
The Gramalote Project comprises three distinct deposits, Central Gramalote, Trinidad and Monjas West within a greater mineral tenement block of some 35,000ha exclusively retained under license by the joint venture.

Gramalote is interpreted to be an intrusive-hosted structurally-controlled stockwork gold and silver deposit. Gold mineralisation is controlled by northeast-southwest trending shear zones and north-northwest to south-southeast trending shear extensional zones affecting the tonalites and granodiorites of the Antioquia Batholith. Mineralisation is associated with stockwork veining, particularly quartz with fine-pyrite veins, quartz-carbonate veins, and quartz with coarse pyrite veins.

Figure 6: Aerial view of Gramalote

3.3.4 LaColosa (AngloGold 100%)
The project is located 150km west of Colombia’s capital city, Bogota. Mineralisation at La Colosa was discovered by AngloGold Ashanti in 2006. Drilling commenced in 2007 and a conceptual study was completed in 2008. Pre-feasibility studies commenced in September 2008 and are ongoing. The mine is expected to produce over 25Moz of gold over its lifetime with a production rate of 70Mt per year [1].

The La Colosa project is centered on a late Miocene (8.1 Ma) multiphase diorite porphyry gold complex intruded into reduced Paleozoic metasedimentary rocks. The highest grade gold mineralisation is closely associated with a suite of early porphyry intrusions/breccias with potassic and sodic-calcic alteration and a high intensity of gold-sulphide veinlets.
The multiphase diorite porphyry gold complex is elliptical in shape and the contacts are mostly structurally bound. Additional upside for mineralisation occurs at the NW extension of the porphyry and structurally controlled along the La Colosa creek fault complex.

San Antonio is a separate much smaller porphyry centre 1.2km south of La Colosa and characterised by hydrothermal and intrusion breccias associated with inter-mineral diorites and a late dacite stock. La Colosa has been plagued by protest action. Protesters, along with the unions, have asked the government to prevent the process of exploration and subsequent exploitation of La Colosa by multinationals (Figure 7).

Figure 7: Protest against La Colosa Project

3.3.5 Zancudo (Gran Colombia Gold)
The Zancudo Project comprises an historical gold mine, the Independencia Mine, in the Middle Cauca Gold Belt that produced about 130,000oz Au with recovered grades of 14.6 g/t Au & 108.4 g/t Ag. The mine exploited an epithermal to mesothermal, intermediate sulphidation type vein system that was exploited over 3.5km with known depths of over 900m. Gran Colombia Gold refurbished the 100tpd plant and completed a drilling program in 2011.

3.3.6 Buritica (Continental Gold)
Buriticá is located in the Middle Cauca belt and is approximately a two-hour drive from Medellín, Colombia’s second largest city. The two major vein systems (Yaraguá and Veta Sur) are located in mountainous terrain with the majority of the mineral resource located above the Higabra valley floor, the potential future location of surface mining infrastructure.
The current combined mineral resource estimate (17/11/2014) which covers two major vein systems is as follows:

- Meas. & Ind. Res: 8.39Mt @ 10.4g/t = 2.80Moz
- Inf. Res: 16.7Mt @ 7.8g/t = 4.20Moz

The Company has completed development of three commercial-scale working fronts: the Yaraguá Ramp, Veta Sur Ramp and Higabra Valley Tunnel. These working fronts will eventually be used for commercial operations, subject to additional successful economics studies, but serve as key points of access to the mineral bodies for underground definition and expansion drilling that will continue throughout 2015.

### 3.3.7 El Limon (Red Rock Resources)

The mine is located in the region of Antioquia, between Zaragoza and Segovia, along the Frontino Gold Belt, one of Colombia’s premier gold districts.

The El Limon mine has been in periodic production for over 60 years, with extraction on seven levels down to over 350m, and a new eighth level opened by Red Rock. Mining operations were restarted in 2011 after a ten year hiatus due to instability in the region.

A programme of improvements has taken place during 2012 and 2013. Initially this concentrated on ore transportation, plant improvement, mine safety and mine design. More mine development work gave greater predictability of production levels.

### 3.3.8 Batero-Quinchia (Batero Gold Corp)

The property is located in the municipality of Quinchia. Batero is evaluating the most efficient and cost effective mine scenario, possibly including a leaching circuit and a starter pit producing from the near and at surface higher grade oxidized gold mineralization at the La Cumbre deposit, one of three porphyry deposits at the Batero-Quinchia project. The development of a prospective starter pit at La Cumbre could potentially serve as the first phase of a larger staged mine development.

### 3.3.9 Angostura (Eco Ora Minerals Corp)

The property is situated in the Santander Massif, within the western branch of the Eastern Cordillera in NE Colombia. The oldest rocks in the massif are Precambrian gneissses and schists that were part of the Guyana Shield, and which have been regionally metamorphosed to upper amphibolite grade in the Palaeozoic.

The Angostura deposit is a typical example of a high-sulphidation epithermal deposit. Gold mineralization occurs within the Angostura–California gold province, a belt of epithermal gold occurrences that has developed along the regional-scale Rio La Baja fault in association with the Middle Miocene stocks.

Mineralization occurs in bands, veinlets, stringers, and silicified hydrothermal breccias within individual and composite veins.

The Angostura deposit is sub-divided geographically into a number of areas or zones that, from south to north, are referred to as El Vivito, El Silencio, Nueva Alta, La Perezosa, El Diamante, La Alta and its eastern neighbour La Alta Este, El Pozo, Veta de Barro, Veta de Barro Este, and Cristo Rey.

A preliminary economic assessment (Golder Associates, 23 March 2012) provided the following highlights:

- BIOX was the most economically beneficial method evaluated
- Total recovery of 2.7Moz gold equivalent ounces (90% Au)
- Production between 222,000 and 303,000 gold equivalent ounces per annum for 10 years with average annual production of 269,000 gold equivalent ounces.

### 3.3.10 Titiribi (Sunward Resources)
The project is located roughly 70km SW of Medellin in the historic mining district of the mid-Cauca Belt on the NW margin of Colombia’s Central Cordillera and represents prime exploration and development territory for gold-rich porphyries.

Sunward has advanced Titiribi through engineering studies to assess optimal mining options. Mineralization in the district is widespread, and is considered to be temporally related to the emplacement of a late Miocene intrusive suite. The mineralization is peripheral to a poly-phase hypabyssal porphyritic intrusive. The porphyritic body is also mineralized as are various sills which emanate from it. Mineralization extends to depth, well into the Palaeozoic schists, which have been extensively mined especially to the north (Los Chorros – Zancudo sectors) and north-west (Otra Mina sector) of the Titiribi townsite. Mineralization and alteration effects are observed throughout an area of over 9km² surrounding the intrusive complex.

3.3.11 La Mina (Bellhaven Copper & Gold)
La Mina is a porphyry gold-copper project located 45km southwest of Medellin in the Antioquia region of Colombia. La Mina is currently in the resource stage, with ongoing exploration and drilling at the site.

La Mina lies in the Middle Cauca Belt of Colombia, which hosts significant porphyry gold deposits such as AngloGold’s La Colosa and Sunward Resources’ Titiribi. La Mina flanks the intrusive centres associated with porphyry-type mineralisation and alteration. Gold and copper are found disseminated in volcanic rocks, sub-volcanic breccias and porphyries at shallow level.

3.3.12 Quinchía (Seafield Resources)
Located 100km south of Medellín in the Mid-Cauca Belt. The Company's project hosts two identified deposits, Miraflores and Dosquebradas, which currently host resource estimates totalling 3Moz of gold. Regional exploration programs are underway to identify more drill targets within Seafield's concession, 80% of which remains unexplored. NNW trending structures identified in the district provide strong geological evidence that more mineralized deposits exist within Seafield's land package.

4. The Economy and Gold
Colombia over the last decade has experienced a historic economic boom despite past issues. Poverty levels were as high as 65% in 1990, but decreased to under 15%. Modern Industries like shipbuilding, electronics, automobile, tourism, construction, and mining, grew rapidly during the 2000s and 2010s, however, most of Colombia’s exports are still commodity-based.

Colombia has a long history of gold production that stretches back to 1500s and, in fact, up until 1937, Colombia was the largest gold producer in the Americas. Production has increased from 21t in 2000 to 43t in 2014 when it ranked 19th in the world and 5th in South America. Much of the country’s gold production comes from informal, often illegal mining.

In 2012, Mineros SA produced 3,683kg of gold from its Colombian operations. The company also produced 2,747 kg of silver. Gold production from Gran Colombia’s Segovia Operations was about 2,460 kg, and silver production was about 2,760 kg. Gold production from the company’s Marmato operation was 675 kg, and production of silver was about 1,100 kg.

Known production from the operations run by Gran Colombia and Mineros accounted for just 12% of the total gold produced in Colombia in 2012. Most of the rest was produced by artisanal miners. Production from the Antioquia Department accounted for 41% of the country’s total reported production, and that from the Choco Department accounted for 37% (Gran Colombia Gold Corp., 2013; Sistema de Información Minero Colombiano, 2013a, b; Willis and Smith, 2013; SNL Metals Economics Group, 2014).
4.1 Perception of Mineral Policy

Colombia is seen as a fairly attractive investment opportunity for mining and exploration globally (Table 2). This attractiveness is based on a perceived fairly high mineral prospectivity, and comes despite a relatively unattractive policy environment in the country (Table 2). The country is seen as having significant potential for improvement in policy environment that could do much to unlock its mineral potential (Table 2). Colombia’s investment attractiveness has been declining for several years, from one of the most attractive opportunities globally, to now more modest levels of attractiveness (Figure 8). The decline has been in both perceptions of the mineral potential and the policy environment (Figure 8).

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<td>20th</td>
<td>19th</td>
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</tr>
</tbody>
</table>

Table 1: Colombian gold production and global rankings (Source: GFMS World Gold Report 2014)

<table>
<thead>
<tr>
<th>Index</th>
<th>World Position (of 122)</th>
<th>World Quartile</th>
<th>S. America Position (of 27)</th>
<th>S. America Quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment Attractiveness</td>
<td>58</td>
<td>2nd</td>
<td>10</td>
<td>2nd</td>
</tr>
<tr>
<td>Policy Perception</td>
<td>74</td>
<td>3rd</td>
<td>13</td>
<td>2nd</td>
</tr>
<tr>
<td>Mineral Potential²</td>
<td>47</td>
<td>2nd</td>
<td>9</td>
<td>2nd</td>
</tr>
<tr>
<td>Room for Improvement</td>
<td>99</td>
<td>4th</td>
<td>20</td>
<td>3rd</td>
</tr>
<tr>
<td>Uncertainty Concerning Existing Regulations³</td>
<td>55</td>
<td>2nd</td>
<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Uncertainty Concerning Environmental Regulations</td>
<td>71</td>
<td>3rd</td>
<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Regulatory Duplication &amp; Inconsistencies</td>
<td>45</td>
<td>2nd</td>
<td>8</td>
<td>2nd</td>
</tr>
<tr>
<td>Legal System</td>
<td>73</td>
<td>3rd</td>
<td>13</td>
<td>2nd</td>
</tr>
<tr>
<td>Taxation Regime</td>
<td>49</td>
<td>2nd</td>
<td>4</td>
<td>1st</td>
</tr>
<tr>
<td>Uncertainty Concerning Disputed Land Claims</td>
<td>92</td>
<td>4th</td>
<td>17</td>
<td>3rd</td>
</tr>
<tr>
<td>Uncertainty Concerning Protected Areas</td>
<td>94</td>
<td>4th</td>
<td>13</td>
<td>2nd</td>
</tr>
<tr>
<td>Quality of Infrastructure</td>
<td>73</td>
<td>3rd</td>
<td>14</td>
<td>2nd</td>
</tr>
<tr>
<td>Socioeconomic Agreements⁴</td>
<td>90</td>
<td>3rd</td>
<td>14</td>
<td>2nd</td>
</tr>
<tr>
<td>Trade Barriers</td>
<td>69</td>
<td>3rd</td>
<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Political Stability</td>
<td>65</td>
<td>3rd</td>
<td>10</td>
<td>2nd</td>
</tr>
<tr>
<td>Labour Regulations⁵</td>
<td>61</td>
<td>2nd</td>
<td>4</td>
<td>1st</td>
</tr>
<tr>
<td>Geological Database</td>
<td>79</td>
<td>3rd</td>
<td>16</td>
<td>3rd</td>
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<tr>
<td>Security</td>
<td>108</td>
<td>4th</td>
<td>25</td>
<td>4th</td>
</tr>
<tr>
<td>Availability of Labour / Skills</td>
<td>79</td>
<td>3rd</td>
<td>17</td>
<td>3rd</td>
</tr>
</tbody>
</table>

¹ Includes countries from South America, Central America, Caribbean Basin and the separate states of Argentina.
² Known fully as the ‘Best Practices Mineral Potential Index’ which ranks countries by attractiveness if all countries applied Best Practice mineral policy i.e. if only geological prospectivity mattered.
³ Known fully as the ‘Uncertainty Concerning the Administration, Interpretation and Enforcement of Existing Regulations’ index.
⁴ Known fully as the ‘Socioeconomic Agreements / Community Development Conditions’ index.
⁵ Known fully as the ‘Labor Regulations / Employment Agreements and Labour Militancy / Work Disruptions’ index.
Table 2: The position of Colombia in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).

Colombia has a long history of insecurity, particularly relating to the drugs trade and communist militancy. Despite recent improvements the country is still seen as one of the highest risk in terms of security (Table 2).

The picture with respect to policy environment is complex (Table 2). The overall regulatory framework is seen is reasonably clear; the bureaucracy fairly efficient; the taxation regime not too heavy; and labour regulations reasonably free (Table 2). However there are perceived to be serious problems arising from land claims and protected areas (Table 2). Environmental regulations; socioeconomic and local community agreements; and the geological database could all be improved (Table 2).

Colombia is still a developing country, with limited infrastructure and poor availability of skills (Table 2). Although a democracy; political stability is still an issue and the legal system is weak (Table 2).

![Performance of Colombia in Fraser Institute Survey of Mining Companies Rankings over time](image)

Figure 8: The changing position over time of Colombia in the three main indices (Investment Attractiveness, Policy Perception and Mineral Potential) of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).

5. Geopolitical Assessment and Sovereign Risk

5.1 Stability
The business climate in Colombia is stable and friendly to foreign investment. The country is classed as one of the emerging countries of the world and is a member of the new BRIC economies, the so-called CIVETS (Colombia,
Indonesia, Vietnam, Egypt, Turkey and South Africa). As the oldest and most stable democracy in South America, Colombia has never defaulted on a foreign loan or expropriated foreign assets.

The country has witnessed a huge improvement in personal safety since President Alvaro Uribe’s election in 2002. In the last 10 years – under the tenure of Uribe and now president Juan Manuel Santos – violent crime has decreased significantly, terrorist groups have been restricted to specific areas outside urban populations, and foreign direct investment (FDI) has increased. However as illustrated in Figure 8, travel warnings are still in place and terrorism and the kidnapping of foreigners remains an issue.

Figure 9: Travel advice for Colombia

5.2 Taxation and Mining Law

The main mining authorities in Colombia are:

- Ministry of Mines and Energy (MME): The highest mining authority in the country.
- IN GEOMINAS: The MME has delegated the administration of mineral resources to INGEOMINAS and some Departmental Mining Delegations. INGEOMINAS has two departments, the Geological Survey and the Mines Department responsible for all mining contracts except where responsibility for the administration has been passed to the Departmental Mining Delegations.
- Departmental Mining Delegations. It administers mining contracts in the Departments with the most mining activity, including Caldas and Antioquia.
- Mining Energy Planning Unit (UPME): Provides technical advice to the MME regarding planning for the development of the mining and energy sector and maintains the System of Colombian Mining Information (SIMCO).
A detailed overview of Colombian Mining Law is provided in Appendix 1. Figures pertinent to gold exploration and production are summarised below:

<table>
<thead>
<tr>
<th>Corporate Income Tax:</th>
<th>25% (Trading Economics, 2015)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation:</td>
<td>Straight-line, declining balance over useful life</td>
</tr>
<tr>
<td>Withholding Tax:</td>
<td></td>
</tr>
<tr>
<td>Technical/Consulting Staff:</td>
<td>10%</td>
</tr>
<tr>
<td>Interest:</td>
<td></td>
</tr>
<tr>
<td>Royalties:</td>
<td>33%</td>
</tr>
<tr>
<td>Dividends:</td>
<td>33%</td>
</tr>
<tr>
<td>Government Ownership:</td>
<td>None</td>
</tr>
<tr>
<td>Royalties on Gold:</td>
<td>4%</td>
</tr>
<tr>
<td>VAT:</td>
<td>16% on goods &amp; services and imports. No VAT on exports</td>
</tr>
</tbody>
</table>

6. Conclusions

- In 2014, Colombia was the 19th ranked global gold producer with 43.1 tonnes, a 5% increase on 2013 (41.2 tonnes) and 2012 (39.1 tonnes). Most of the production was derived from informal miners with only around 10% from formal mining companies. Modern mining is a new concept in Colombia and there are no modern gold mines.
- Colombia remains an exploration opportunity at this stage. The challenge is showing and educating governments, communities and politicians about modern mining, its benefits, the processes and the technologies. Modern mining has yet to become established in Colombia. For example, heap leaching for gold is not yet undertaken. Large-scale mining for gold does not yet exist.
- Many mineral explorers came to Colombia to explore the Middle Cauca Belt for gold, copper-gold and gold-copper porphyries, which if successful would more than likely be billion-dollar mine development projects, however, all would require modern mining techniques for full extraction. In addition, since this period, a downturn in the global mining industry means these large, capital intensive projects have become less attractive.
- Colombia is recognised to have fairly good mineral potential; however, this is mitigated by a number of general and specific problems with its policy climate. The perceptions of the country’s mineral industry have declined in recent years, as has investment in gold exploration, though this is partly due to a dearth of junior exploration funding worldwide.
- At the broadest level the country is still somewhat economically undeveloped lacking decent infrastructure and wide availabilities of skills. The country also has a long history of severe insecurity, is somewhat politically unstable and has a weak legal system.
- Specifically in reference to mining, although the overall regulatory framework, bureaucracy, taxation regime and labour regulations are seen as relatively good, there are some areas of concern and an increasing number of issues.
- For example, there are concerns about government plans to create ‘strategic reserve areas’, which total about 12.1M ha. The government plans to conduct its own exploration and then auction these areas off. There is also growing concern over whether, having found a deposit, a private or foreign company would be able to develop a mine in Colombia and get the approvals to do so in a timely manner.
- In general there is still significant concern from foreign investors about land claims and protected areas, as well as perceived problems associated with environmental regulations and socioeconomic and local community agreements.
- Colombia remains very cautious about how its approach to modern mining; in contrast to Chile and Peru, where there have been many new mine developments. Until the first new mine project is permitted and
developed in Colombia, there will be some uncertainty about whether mine development is possible in the country.
• The Buriticá project owned by Continental Gold will be a good test case for this, as it is regarded as one of the projects with the best chance of progressing from discovery to production in Colombia in the modern era.

7. References


Gran Colombia Gold Corp., 2013, Gran Colombia Gold announces year end 2012 results and Segovia operations processing 1,000 tonnes per day in March 2013: Gran Colombia Gold Corp., March 27. (Accessed August 12, 2013, at http://www.grancolombiagold.com/investors/press‐Releases/press‐releases‐details/2013/Gran‐Colombia‐Gold‐announces‐year‐end‐2012‐results‐and‐Segovia‐operations‐processing‐1000‐tonnes‐per‐day‐in‐March‐2013/default.aspx.)


APPENDIX 1

Review of Mining Law in Colombia

(Sourced from Bernardo P Cárdenas Martínez
(Cárdenas & Cárdenas)

1 Overview of the mining industry in Colombia
The Colombian mining industry has grown at a fast pace during the past decade, mostly due to government policies which have favoured foreign investment and promoted investment specifically in the mining sector, in addition to higher governmental control of public order and military reinforcement of areas that had long been in control of rebel or paramilitary groups.

Colombia is an important player in the world mining industry as a producer of high quality minerals. Colombia is the largest producer of nickel in South America, the largest producer of coal in Latin America, the second largest producer of emeralds in the world, and it has significant reserves of gold. The country has a high mining potential, with a relatively unexplored territory which is ideal to begin prospective projects. The participation of mining in the Colombian GDP was 2% in 2013. The value of mining exports in the third quarter of 2013 was of US$ 2,458.22 FOB.

The above being said, foreign direct investment in the mining sector in Colombia has increased significantly over the past decade. In 2013, foreign direct investment in the oil and mining industry in Colombia exceeded US$ 13.7 million.

2 Legal and regulatory framework
The legislative branch, and specifically Congress, is the single competent authority in Colombia to enact laws. Furthermore, the executive branch may issue the necessary regulations, directives and guidelines to ensure that the laws issued by Congress may be effectively applied. The regulatory powers of the executive branch are limited by the scope of the laws and must not modify or exceed the terms, conditions and general principles established therein.

Since 1940 the Mines and Energy Ministry (formerly the Mines and Petroleum Ministry) has been the main mining authority with the legal capacity to regulate mining activities in accordance with the laws issued by Congress. In 2011, the government undertook a reform of the state bodies regulating and controlling mining activities in Colombia. As a result, INGEOMINAS (the former mining authority) was liquidated and the following bodies were created:

- the Deputy Minister of Mines was appointed as a high government official specifically dedicated to the mining sector;
- the National Mining Agency: belonging to the central government, this government agency was created as the national mining authority, overseeing the activities to be performed under the titles that have been granted to date, administering the mining cadastre – the registry where titles are recorded – and conducting the granting of new titles;
- the Colombian Geological Service: belonging to the central government, this government agency was created as the entity in charge of performing geological surveys to determine the mining potential of the Colombian territory. It is also in charge of supervising the use and manipulation of nuclear and radioactive materials.

3 Investment regime applicable to foreign company involvement in mining projects
Under Colombian law, foreign individuals and corporations which act as mining concessionaires have the same rights as Colombian individuals and corporations, and Colombian governmental regulatory bodies are specifically
prohibited from requiring any additional or different requirements. Foreign companies, however, will have to constitute a branch, subsidiary or affiliate in Colombia before they may be granted a concession agreement.

As general rule, the payments made by Colombian residents or domiciled Companies (including branches of foreign entities) to other Colombian entities (including branches of foreign entities) should be made only in Colombian pesos. In that sense, they should (i) issue invoices to its clients in Colombian pesos, dollars or any other foreign currency, (ii) they would only be able to receive the payment in Colombian pesos if the client is a Colombian resident, and (iii) make the payments in Colombian pesos when it is paid to Colombian residents or domiciled companies.

The branches of foreign companies, however, that perform activities of exploration and exploitation of petroleum, natural gas, coal, ferronickel or uranium; or services related to the hydrocarbon sector (as determined by article 16 of law 9 of 1991 and Decree 2058 of 1991) are subject to the foreign exchange special regimen.

Those branches that request to be registered to the special foreign exchange regime are NOT allowed to obtain any type of foreign loans; however, they have the following benefits: Branches are not obligated to reimburse to the Colombian exchange market the amounts related with export operations or any other type of operation; in other words, the branch could receive in a bank account abroad that is not registered with the Central Bank the amounts coming from exportation of goods from Colombia or for the rendering of services to foreign entities, and such amounts would not require to come to the Colombian market in any moment.

The Ordinary Exchange regime requires that all amounts coming to Colombia from foreign residents related to foreign market operations be channeled through the foreign exchange market which is composed mainly of the local commercial banks or bank accounts opened abroad but registered before the Colombian Central Bank (as compensation or off set accounts). Please be informed that the payment of services can be received in a bank account abroad which is not registered with the Central Bank to the extent such operations do not require a foreign exchange market channeling.

These branches are not allowed to use the Colombian exchange market. This means that they can only bring through local banks foreign currency required to attend expenses in Colombian pesos (COP). Thus these branches can make payments through its Parent Company abroad, increasing the value of the supplementary investment account.

Branches are allowed to execute contracts with other companies of the special exchange regime and receive the payment on foreign currency for their operations.

Are allowed to treat as supplementary investment to the assigned capital payments of goods and services made through their parent company.

Dividends are payable to foreign investors as they would be payable to any local investor. We remark that as of 2013, the branches’ profit is considered as a dividend for tax purposes.

Furthermore, section 19 of Decree 3026 of 2013 determines the procedure to identify the moment in which it is transferred to its main office the dividends of a branch registered in the special foreign exchange regime. No prior authorisation is required for the remittance of dividends abroad.

And in the case of dividends remittance, the foreign currency will be negotiated with the relevant foreign intermediary and remitted abroad through the filing of certain forms before the Colombian Central Bank.
4 International investment treaties applicable to mining projects undertaken or sponsored by foreign companies

Colombia is a party to several bilateral investment treaties (nine in total – signed with Chile, Spain, Switzerland, Belgium, the United Kingdom, Peru, India, China and Japan) as well as several free trade agreements which include chapters on the protection of investments (with the United States, Canada, Mexico, El Salvador, Guatemala and Honduras, Iceland, Liechtenstein, Norway and Switzerland), and is also a member of Mercosur and the Andean Community.

As a general rule, these treaties afford investors from the signing state several protections, including fair and equitable treatment, national treatment, non-discrimination, expropriation redress, most-favoured nation clause, and full protection and security clause. As a general rule, BITs and FTAs entered into by Colombia do not include umbrella clauses.

In addition to these protections which allow investors additional protection from local government authority arbitrariness, these instruments generally include dispute resolution clauses allowing foreign investors to access investment arbitration, either through arbitration administered by the International Centre for the Settlement of Investment Disputes (ICSID) or through ad-hoc arbitration under the UNCITRAL rules. However, Colombia has not seen any investment arbitration brought against it to this date.

5 The mining exploration and exploitation permit or concession regime

Mining regulations in Colombia follow the principle that (with limited exceptions) the subsoil and all mineral resources are property of the state and therefore may only be exploited with the permission of the relevant mining authority which, as described before, is the National Mining Agency.

According to Colombian regulations, any person and public or private entity which expressly includes in its object mining exploration and exploitation may apply for a mining title.

Notwithstanding the foregoing, territorial entities (ie, municipal or regional governments), or contractors which intend to construct, repair, maintain or improve a national, departmental or municipal public road will be able to, subject to the environmental regulation, request before the mining authorities a temporary authorisation to extract from neighbouring rural properties to the working site, the necessary construction materials to perform the mentioned activities.

There are two main bodies of law that regulate mining titles that are in force in Colombia: Decree 2655 of 1988, which is the former mining code, which still governs mining titles issued since 23 December 1988 and until 17 August 2001; and Law 685 of 2001, which is the current mining code. Law 685 was amended in 2010 by Law 1382 of 2010, which was declared unconstitutional and which is no longer in force. Therefore, Law 685 as issued in 2001 is the primary source of mining law in Colombia.

Under Decree 2655 of 1988, the rights to explore and exploit national mining reserves were granted through four mechanisms:

Exploration licences

This authorisation granted the holder the right to explore a determined area for a limited term determined by the size of the requested area. Once the term of the exploration licence lapsed and if the title holder had complied with all its obligations, it had the right to request the corresponding exploitation licence (if the exploitation project was considered small-scale) or concession agreement (for medium or large-scale mining projects). Currently all the holders of an exploration license can convert it into a Concession agreement under the Law 685 of 2001.

Exploitation licences
Once the area had been explored in accordance with the exploration licence and if as a result the mining project was classified as a small mining project, the titleholder was entitled to request an exploitation licence. This title permitted the exploitation of the area for an initial term of 10 years. Two months before the initial term had lapsed the title holder was entitled to request the extension of the exploitation licence for 10 years or apply for a concession agreement.

**Concession agreement**
This title granted the titleholder the exclusive right to extract the corresponding minerals and to conduct the necessary efforts to explore, exploit, process, transport and ship the relevant minerals. These titles had a 30-year term.

**Aporte minero**
The Ministry of Mines and Energy granted its related entities having as part of their purpose the development of mining activities, the exclusive and temporary right to explore and exploit the deposits located in a determined area. The entities that were granted this right were entitled by law to subcontract the mining activities with any third party.

In 2001, Congress issued Law 685 (the Mining Code). This law established that, from that date, the rights to explore and exploit mining reserves would only be granted solely through mining concession agreements. This new form of contracting did not affect the pre-existing mining titles (licences, aportes and concessions) which continue to be in force until their term lapses.

The Concession Agreements under Law 685 of 2001 includes the exploration, construction and exploitation phases and are granted for periods of up to 20 or 30 years, depending on the applicable legal regime. The mining concession contract has three phases, as follows:

**Exploration:** This phase has an initial term of 3 years, extendible for time periods of 2 years up to a maximum of 11 years. During this phase, the titleholder will have to perform the technical exploration of the concession area.

**Construction:** Once the exploration term lapses the title holder may begin the construction of the necessary infrastructure to perform exploitation and related activities. This phase has an initial three-year term which may be extended for one additional year.

**Exploitation:** During the remainder of the initial term minus the two previous phases, the title holder will be entitled to perform exploitation activities.

With respect to the minerals included in a mining title, it is important to note that mining rights are granted for specific minerals within the concession area; however if the title holder finds other minerals within the granted area, it may request the mining authorities to extend the object of the agreement to include them.

In relation to the environmental requirements, Colombian laws have distinguished between the environmental requirements for exploration activities and those that have to be fulfilled for construction and exploitation works. During the exploration phase, the title holder does not require a specific environmental permit or licence (unless it plans to use natural resources during this phase, case in which the respective permit will have to be obtained with the relevant environmental authority); however, it will have to comply with the mining and environmental guides issued by the Mines and Energy Ministry and the Environmental Ministry.

In order to begin and perform construction and exploitation operations, the title holder must obtain an environmental licence. Environmental licences may include all the necessary permits, authorisations and concessions for the use of natural renewable resources in the development or operation of the mining project, construction or activity.
In order to obtain an environmental licence, the applicant must file an environmental impact assessment which includes among others; a description of the project, the natural renewable resources to be used and a report of the possible environmental impacts and the measures that are going to be taken to prevent, mitigate, correct or compensate them. Depending on the size of the mining project, the relevant authority to issue the environmental licence may be Environmental Licences Agency or the Regional Environmental Authority (CAR).

6 Duties, royalties and taxes
There are different government fees and royalties payable by mining titleholders. During the exploration and construction phases, the holder of a concession agreement must pay a surface fee. For concession agreements granted before 9 February 2010 and after 12 May 2013 (the date on which Law 1382 of 2010 became ineffective by decision of the Constitutional Court) the surface fee is equivalent to one Colombian minimum daily wage (approximately US$ 11.40 in 2014) per hectare per year for areas up to 2,000 hectares, two minimum daily wages per hectare per year for areas of 2,000 to 5,000 hectares, and three minimum daily wages per hectare per year for areas between 5,000 and 10,000 hectares.

Concession agreements granted after the enactment of Law 1382 of 2010 and up until 11 May 2013 will have to pay a surface fee equivalent to one Colombian minimum daily wage per hectare per year for the first five years of exploration. Thereafter, the surface fee for the sixth and seventh year of exploration is of 1.25 minimum daily wage per hectare per year, and from the eighth to the eleventh year of exploration is of 1.5 minimum daily wage per hectare per year. For the construction phase, the titleholder will have to pay a surface fee at the same rate that it paid during the last year of exploration.

Likewise, the titleholders must pay to the Mining Authority the control and auditory services for the monitoring compliance of their legal and technical obligations. These rates are valued according to the stage of the concession agreement, its number of hectares, and the offset distance. Notwithstanding the powers and supervision exercised by the environmental competent authorities.

During exploitation, the titleholder will have to pay a royalty equivalent to a determined percentage of the value of the production at the mine pit depending on the extracted mineral as follows:

- coal (exploitation of more than 3 million tons/year): 10%;
- coal (exploitation of less than 3 million tons/year): 5%;
- nickel: 12%;
- iron and copper: 5%;
- gold and silver: 4%;
- alluvial gold: 6%;
- platinum: 5%;
- salt: 12%;
- limestone, gypsum, gravel and clay. 1%;
- radioactive minerals: 10%;
- metallic minerals: 5%;
- non-metallic minerals: 3%; and
- construction materials: 1%.

7 Water rights
The water supplies for the mining concession projects in Colombia are obtained from natural water sources located near the mining areas. For legal use of the hydro natural resources permits must be obtained from the relevant authorities.

In general terms, water rights may be granted to individuals or entities by law, permits or concessions. In relation to mining activities, water rights are granted by means of a water concession which is granted by the environmental authorities and which is independent to the mining concession or to landownership.
As described before, water concessions may be included in the environmental licence which the mining projects must obtain before performing construction or exploitation works, or may be requested independently for a specific use. Generally, the water rights related to mining activities are included in the environmental licences which are granted for the duration of the mining projects.

The terms and conditions under which a water concession is granted may depend on the amount of water available in the specific region, the possible environmental impact of the concession and the different users that the water source services.

- The water concessionaire is by law obliged to:
- use water efficiently in the permitted location and for the intended purposes;
- use only the permitted amounts;
- build appropriate water facilities;
- contribute proportionately to the conservation of hydraulic structures, roads, law enforcement and other works and common facilities;
- avoid any damages to water resources; and
- avoid the contamination of the water necessary for public supply or for agricultural or industrial purposes.

Failing to comply with the aforementioned obligations may result in the cancellation of the water concession.

8 Surface rights regime

Law 685 of 2001 declared the mining industry as an activity of public interest. Thus, in order to ensure a correct performance of the works, the Law entitles the titleholder to establish easements over the property or to request the expropriation of the properties and all rights derived therein required to develop the activity.

Colombian Law entitles the holder of a mining title to establish easements over properties located outside or inside the area covered by the mining title. The easement can be established by means of a private agreement between the interested party and the holder or landlord of the property, and unless otherwise determined by the parties, it could be established for the same term as the concession it benefits.

If the party interested in the easements decides not to enter into an agreement with the holder or landlord of the property, he/she/it may file a request before the ordinary judges for the imposition of the easement. In the final ruling the judge will fix the amount to be paid as indemnification to the owner of the property over which the easement will be imposed.

Expropriation may also be requested by the title holder over the properties that may be indispensable for the development of the mining project. Exceptionally, the expropriation will be feasible in the exploratory phase. The mining expropriations may be requested before the mining authority who will perform an evaluation to verify that the property to be expropriated is necessary to establish and operate the mining project and to determine the value of the compensation that must be paid to the surface rights owners. Thereafter, the holder will be able to start the judicial procedure within the three (3) months following the day in which the Resolution of the mining authority is in force. If the expropriation is declared, and once the ruling is in force and the proper indemnification amount is paid, the judge will order the delivery of the property.

9 Availability of power for remote mining facilities

The national power grid covers an estimate of almost 90% of the national territory which means that most mining facilities will probably have access to electric power services. However if for any reason the mining project requires or wishes to generate its own electricity, national electric regulations allow all economic agents to own and operate their own power generation facilities, provided that they comply with all the environmental requirements.
10 Termination of rights under a mining concession

In general terms, mining concession will be terminated upon expiration of its term; if the title holder resigns the concession; if the parties to the agreement mutually agree on its termination; upon death of the concessionaire provided that within the two years following the decease the legatees do not request the mining authorities to be assigned the rights under the mining concession. Additionally, the mining authorities may declare the caducity (unilateral termination) of the agreement if the titleholder:

- being a legal entity, is dissolved;
- falls into financial incapacity that hinders the performance of the agreement which may be presumed if the titleholder enters into a liquidation (bankruptcy) procedure;
- fails to carry out the works within the terms set forth in the agreement or suspends the performance of the agreement for more than six months without authorisation;
- fails to make timely payments of the royalties and economic rights provided under the agreement;
- fails to request authorisation from the mining authorities before it assigns its rights under the agreement;
- fails to make timely payment of all fines;
- is in material and reiterated breach of technical regulation regarding exploration, exploitation, hygiene, safety; or the competent authority revokes any environmental authorisation needed to perform the agreement;
- is in breach of any statute regarding areas where mining is excluded or restricted;
- is in material and reiterated breach of any of its obligations under the agreement;
- declares that the origin of the mineral is other than its true and correct origin, and as a result economic compensations are paid to a municipality other than that where the mineral was extracted; or

Technical disputes that arise between the concessionaires and the mining authorities which are not solved directly by the parties will be finally settled by a technical arbitration panel. Legal and economic disputes will be subject to Colombian courts. If there is no agreement as to the nature of a dispute, it will be deemed to be legal. Environmental licenses may be suspended or revoked by the relevant environmental authority if the license holder fails to comply with any of the terms, obligations or conditions under the license, set forth in law, regulation or in the resolution that granted the license. The termination or suspension will have to be duly reasoned by the environmental authorities based on a technical concept issued by an officer of that entity and will be subject to legal remedies.

11 Installation or provision of essential infrastructure.

The regulatory regime and governmental policies have sought to increase investments in infrastructure projects. The fact the Colombian laws establish that infrastructure projects are of public and national interest means that tools such as expropriation and easements may be used for their development.

Generally speaking, the applicable regulations and laws as well as recent national policies, have conducted to the installation and provision of essential infrastructure in Colombia.

On November 22, 2013, the National Congress enacted the Law 1682 2013, which gives to the national government the necessary tools for the construction, rehabilitation, improvement and maintenance of the infrastructure. In addition, there is the Law 1508 of 2012, which allows the establishment of public-private partnerships in order to promote the investment of private capital to develop and maintain infrastructure projects in all productive sectors.

12 Collateral security

Mining regulations allow the establishment of pledges over the rights to explore and exploit a mining title in order to secure credits or other obligations assumed by the titleholder to obtain the funds to develop the mining project. Additionally the titleholder may constitute pledges over future production of the mine and on the movable goods, machinery and implements dedicated to the exploiting activity from the mining title. These securities are registered
at the National Mining Registry and may be executed before a court of law. Any transfers of these mining rights to a third party will be limited by the collateral security.

Likewise, the titleholder may constitute pledges over the mining establishment or the elements that make part of it, with the minerals in the marshalling yard or with the future products of the exploitation that would eventually be property of the exploiter, once they are extracted.

No such collateral security is permitted over environmental permits or over related easements which simply allow the mining concessionaire to access the parcel of land over which the mining title has been granted.

13 Creation, perfection or acknowledgement of the collateral security interests granted to the creditors in mining projects

The only security available is the pledge mechanism described above. Mining pledges do not require the previous authorisation from the mining authority; however, they must be registered with the National Mining Registry.

14 Means of enforcement available to creditors in connection with collateral security interests in mining rights

Mining pledges may be foreclosed by the creditor requesting the attachment of the rights to explore and exploit the mining title and requesting the seizure of the infrastructure and equipment of the mine. At the end of the day, the judge will sell the relevant assets in a public auction and will pay the creditors with the proceeds of the auction.

In order to foreclose the pledge effective, the creditor may also request that the judge appoints a manager to continue the exploitation of the pledged title and that the revenues obtained from such activity are used to pay the amounts owed by the title holder to the creditor.

15 Insurance

Under law 685 of 2001, the title holder must furnish a mining and environmental insurance policy. During the exploration phase, the insured amount must be of 5 per cent of the value of the planned annual exploration expenditures. For the construction phase, the insured value must be of 5 per cent of the planned investment for assembly and construction. During the exploitation phase the insurance policy will have to cover 10 per cent of the result of multiplying the estimated annual production by the mine pit price of the extracted mineral, as established by the Colombian government.

According to Law 1328 of 2009 these kind of policies can only be hire with entities duly authorized by the Finance Superintendency to develop the insurance business in Colombia.

It is expressly prohibited to hiring this kind of policy with foreign insurance companies that do not have the authorization to intervene in the Colombian insurance market.

16 Labour requirements

According to Law 685 of 2001, the titleholders will prefer Colombian nationals that have the job skills required for the execution of studies, mining and environmental works. The mining authority shall indicate the minimum percentages of native workers from the respective region and domiciled in the area of influence of the mining project that should be hired. These percentages may be reviewed periodically.

17 Extensions of liabilities to owners, mortgagees or creditors

Depending on the business vehicle used to establish the company in Colombia, the liabilities for their shareholders, owners or partners (as applicable) for tax and labour matters differ as follows:
Simplified stock corporation (SAS): Unless the corporate entity or veil is disregarded the shareholders will not be liable for the tax, labour or any other liability of the corporation. The corporate entity or veil is disregarded when the corporation is used as a fraud to the law or in detriment of third parties. Shareholders, as well as the administrators involved in the fraud, are jointly liable for the obligations derived from such fraud and for any damages caused.

Stock corporation (SA): the shareholders are liable up to the amount of their capital contributions.

Limited liability company (LTDA), Partnership (Sociedad Colectiva): partners are jointly and severally liable for the company’s tax and labour obligations as follows:

- The company’s taxes depending on: each of the partner’s percentage of quotas (a pro rata);
- The period of time they have been partners; and
- The company’s labour obligations up to the percentage of each partner’s quotas.

Environmental liabilities do not extend beyond the mining project company.

18 Legal considerations related to financing of mining projects
The Colombian market has seen an increased presence of international and multilateral banking institutions financing mining projects in Colombia. The delays associated with the establishment of pledges over production or mining rights have resulted in the use of fiduciary mechanisms which allow the creditor to receive the mining rights directly through a trust in the event of default.

Financing for mining projects, especially metals, has also been active in recent years with the operation of Colombian mining concessionaires by Canadian, TSX-listed companies who have financed projects through IPOs.

19 Renegotiation of concessions, revisiting royalty and taxation regimes
Overall, in the licenses and the mining concession agreements executed under the law 685 of 2001 and Decree 2655 of 1988, there are not place to do any renegotiation of the granted conditions.

The cases in which there have been renegotiations of the initially terms, were in the Contratos de Aporte, due to these agreements were pre-negotiated for each mining project, wherein the mining authority agreed the nature of their economic and operating participation on the project. The renegotiations are performed for the parties under the parameters established in the Contrato de Aporte Minero. With respect to the concession agreements executed under the Law 1382 of 2010, for the obtention of the contract extension up to an additional 20 years, the titleholder should negotiate the terms of that extension, where they may agree trade-offs different to the royalties.
APPENDIX 2

Status of Gold Production, Development and Exploration Projects in Colombia

<table>
<thead>
<tr>
<th>Operation/Owner</th>
<th>Status</th>
<th>Production</th>
<th>Resources</th>
<th>Mining</th>
<th>Processing</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marmato/Gran Colombia</td>
<td>Prod.</td>
<td>Approx. 25,000 oz/y at an average grade of 4 g/t Au.</td>
<td><strong>As at 21/6/2012:</strong> Meas. &amp; Ind. Res: 410Mt @ 0.90g/t = 11.79Moz Inf. Res: 79Mt @ 1.02g/t = 2.59Moz</td>
<td>Stops are developed over several vertical levels and extend horizontally along the strike of the veins</td>
<td>Crushing, milling and flotation. The concentrate is cyanide leached and is then passed through a Merrill Crowe process where it is precipitated, filtered and smelted to form doré bars</td>
<td>Gran Colombia Gold website. Accessed at: <a href="http://grancolombiagold.com/operations-and-projects/marmato/mining-and-processing/default.aspx">http://grancolombiagold.com/operations-and-projects/marmato/mining-and-processing/default.aspx</a>. Retrieved 10 March 2015</td>
</tr>
<tr>
<td>Angostura/Eco Ora Minerals Corp</td>
<td>Dev.</td>
<td>Predicted at 0.269Moz (gold equiv.)</td>
<td><strong>As at 23/3/2012:</strong> Ind. Res. at 1.5g/t cut-off: 30.62Mt @ 3.09g/t Inf. Res. at 1.5g/t cut-off: 22.24Mt @ 3.02g/t</td>
<td>Underground only</td>
<td>BIOX</td>
<td>Golder Associates report. Accessed at: <a href="http://www.ecoora.com/pdf/Reports/12-03-27%2016%205030%20Rev%20V001%203404.pdf">http://www.ecoora.com/pdf/Reports/12-03-27%2016%205030%20Rev%20V001%203404.pdf</a>. Retrieved 11 March 2015</td>
</tr>
<tr>
<td>Project</td>
<td>Resource drilling</td>
<td>Status</td>
<td>Technology &amp; Operations</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---------------------------------</td>
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<tr>
<td><strong>La Mina/ Bellhaven Copper &amp; Gold</strong></td>
<td>Resource drilling</td>
<td>As at July 2012: Inf. Res: 1.6Moz @ 0.62g/t</td>
<td>Open-pit; Testwork in progress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Quinchía/ Seafield Resources</strong></td>
<td>Resource drilling</td>
<td>Miraflores as at 2/4/2013: Meas. &amp; Ind. Res: 73Mt @ 0.27g/t = 1.82Moz Inf. Res: 3.8Mt @ 0.51g/t = 0.06Moz Dosquebradas as at 13/12/2011: Inf. Res: 58Mt @ 0.50g/t = 0.92Moz</td>
<td>Open-pit; Conventional gravity concentration followed by gold flotation and cyanidation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Guyana: Gold Industry & Mineral Policy

Report Prepared for
IM4DC

May 2015
Summary

- Guyana shares similar geology to West Africa to which it was joined prior to the separation of the Gondwana palaeo-continent. Greenstone equivalents to the West African Birimian are found in the Barama, Cuyuni and Mazaruni Greenstone Belts of Guyana. These Greenstone Belts have proven to host significant gold deposits amenable to both open-pit and underground mining.

- The minerals potential of Guyana is now fairly well understood amongst foreign investors. Numerous junior and mid-level explorers have recognised the gold potential of Guyana and exploration activity is at an all-time high. A number of projects have advanced to development stage, amongst the most significant of which include:
  - The reopening of the Omai Mine which historically has produced 3.7 Moz;
  - The Aurora Project with commissioning set to begin in 2015;
  - Karouni with 2 open-pits followed by an underground mine;
  - Eagle Mountain where Phase 1 production is planned for late 2015;
  - Toropara which is planned for production in late 2016;

- However, whilst alluvial and artisanal mining of gold has taken place for centuries, there are no modern mines in Guyana. Facilitating the development of modern mines in the country is therefore one of the main challenges facing the government.

- The government is pro-mining investment and as such Guyana has become recognised as an attractive country for minerals investment, both in terms of mineral potential and policy climate.

- Guyana’s policy environment towards mining has improved substantially in recent years and it is recognised for hosting an efficient bureaucracy and clear regulatory framework for mining and the environment. The taxation regime; certainty around land claims and protected areas; and socioeconomic and local community agreements are also seen fairly positively. Only labour regulation seems to be an area of weakness.

- That the taxation regime is seen positively by foreign investors, despite corporate income taxes of 49% and gold royalties of 5% must be a testament to the overall efficiency of the system.

- Guyana does however face some challenges, many of which reflect the fact it is still only a developing country. It has relatively poor infrastructure, particularly inland; a poorly educated workforce; and a weak legal system.

- Similarly whilst the country is politically stable, it still suffers high levels of insecurity, particularly in relation to violent crime and the drugs trade.

- More specific to the mining sector, the permitting process, whilst simple, leaves small- and medium-scale property titles only for Guyanese nationals, reducing the availability of prospective land. Foreign companies may only apply for Prospecting Licences for areas between 500 and 12,800 acres.

- In summary, Guyana’s mining industry faces three challenges to further advancing its minerals sector:
  1. More general economic development which improves infrastructure and workforce qualities. For example, recent investment in hydro-electric projects will undoubtedly facilitate progress in the mining sector and more generally across the economy.
  2. Investment has largely focused on exploration, so the country must now prove that mines can be successfully developed as well. The successful development of flagship projects will be invaluable in this case.
  3. Because minerals policy, outside of broader economic challenges, is now seen as so good, there is little scope for improving minerals policy as a method for attracting further investment into the sector. Guyana must therefore focus on improving the mineral potential and geological database of the country.
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Table 2: The position of Guyana in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
1. Location, Physiography and Climate

Located in South America, Guyana is bordered by Venezuela on the west, Suriname on the east, Brazil on the south and the Atlantic Ocean on the north. Guyana's land area is approximately equal to the United Kingdom with a population of only 770,000 people, 31% living in the capital city of Georgetown on the Atlantic coast.

The country can be divided into five natural regions; a narrow and fertile marshy plain along the Atlantic coast where most of the population lives; a white sand belt more inland containing most of Guyana's mineral deposits; the dense rain forests in the southern part of the country; the desert savannah in the southern west; and the smallest interior lowlands consisting mostly of mountains that gradually rise to the Brazilian border.

The local climate is tropical and generally hot and humid, though moderated by northeast trade winds along the coast. There are two rainy seasons, the first from May to mid-August and the second from mid-November to mid-January.

Figure 1: Physical map of Guyana

2. Infrastructure

According to The Guyana Office for Investment, Guyana has adequate infrastructure coverage to support production, communication and access to regional and international markets in the short term. With over 2500km of paved and unpaved roads connected by the key coastal and inland arteries, the road network provides access to all the central services provided in the Georgetown area, as well as providing commercial links between urban and
rural areas. In recent years, the key inland road to Brazil has been developed and for the first time in Guyana’s history, is accessible all year round. Improving the road network is an ongoing Government priority. Currently there are a number of large scale projects underway with respect to most major aspects of the road infrastructure.

![Figure 2: Satellite image of Guyana](image)

Other major transport hubs in Guyana also have reasonable short term capacity. The Port of Georgetown is able to serve Guyana’s current regional and international water traffic and with around 1000km of navigable river waterways. Most areas of economic activity in Guyana are accessible by boat to facilitate trade in goods and services.

Guyana’s current air transportation system provides direct links with the United States, Canada, Barbados, Brazil, Trinidad and Tobago, and Suriname and the major airports are able to accommodate a wide range of aircraft.

Although significant improvements have been made or are planned with respect to transport infrastructure, the Government recognizes that many challenges remain. There remains a need to deliver a modern, efficient and flexible transport system for Guyana that will help the country compete effectively internationally. The Government plans to increase the role of the private sector in transport provision.

Guyana is further developing telecommunications services. This includes a significant increase in the number of working landlines as well as satellite, internet and mobile services. The Government wishes to see liberalisation of the telecommunications market-place in Guyana, believing that the properly-regulated introduction of market forces will reduce the costs and improve the quality of services.
The cost and reliability of electricity is a major factor for profitability and growing business operations, especially in energy intensive industries such as mining and manufacturing. A combination of Government and private sector initiatives suggests that improvements in the supply and distribution of electricity will be achieved. The most promising option is the development of Guyana’s hydropower potential. In this regard, negotiations are currently ongoing to develop a 100 MW scheme at Amaila Falls in western Guyana.

3. Geology

3.1 Regional Geology

Figure 3: Schematic of South America and West Africa prior to the Gondwana separation
The Birimian Shield in West Africa, which includes Ghana, the area's largest gold producer, is distinctly similar to the Guiana Shield and hosts some of the world's largest gold deposits. The Proterozoic Guiana Shield of South America represents the single largest under-explored greenstone belt in the world. The greenstone belts in Guyana are named the Barama, Cuyuni and Mazaruni.

The relatively undeveloped nature of Guyana presents a significant mineral exploration and development opportunity. Guyana has a geological profile containing greenstone belts that are very similar to those found in Ghana, West Africa and Timmins, Ontario. The Guiana Shield, a 2.2 billion year old Precambrian geological formation, underlies Guyana, Suriname, French Guiana parts of Venezuela, Brazil and Columbia. It is the least explored of the world's Archaean and Proterozoic terrains.

Exploration in the past two decades has resulted in the discovery of large-scale deposits such as Crystallex's Las Cristinas deposit in Venezuela, Omai in Guyana, Rosebel in Suriname and Camp Caiman and Dorlin in French Guiana.

### 3.2 Gold Mineralisation and Major Deposits

#### 3.2.1 Omai (Mahdia Gold)

The *Omai Gold Mine* was built in the early nineties and was the largest gold mine in South America. In a period spanning 13 years, Omai produced over 3.7 Moz of gold.
The granitoid- and greenstone-hosted deposit is located in the Paleoproterozoic Barama-Mazaruni greenstone belt, of the Guiana Shield. At regional scale, the emplacement of the deposit was controlled by crustal shearing. At local scale, the gold-bearing quartz veins are associated mainly with a quartz monzodioritic intrusion (Omai Stock, Fennell Pit) and subvolcanic quartz-feldspar porphyry and rhyolite dikes, and subordinately, with intermediate volcanic flows and metasedimentary rocks (Wenot Pit). Six gold-bearing undeformed subhorizontal and subvertical vein sets can be distinguished in the two ore zones. On the basis of their internal structures and textures, the veins can be classified as crack and seal, laminated, breccia, and open-space-filling veins. The geometrical and textural relationships between the vein sets suggest that they are broadly contemporaneous. The formation of most veins can be summarized by two filling stages and a late fracture-filling stage related to a protracted hydrothermal process (Voicu et al., 1999).

In August 1995 the mine caused an environmental disaster when cyanide-saturated waste escaped into Guyana’s major river. A dam cracked such that waste entered the river system and on into the Essequibo river to the Atlantic (Figure 6).
Figure 6: Tailings dam failure at Omai in 1995

Mahdia Gold is also exploring two other prospects in Guyana:

The **Tiger River** Property is located near the Omai Mine (Figure 3) and has historically been mined by artisanal miners. Over the last century, it is estimated that over 1Moz of alluvial gold has been recovered from the region using unsophisticated gold mining methods.

Scodnick (1995) refers to high grades of gold having been recovered from the Williams Creek section of the Tiger River property in 1947. The Scodnick report is important in verifying the potential of Tiger River and further establishes the need for a proper exploration program aimed at identifying and extracting gold assets from the property.

The **White Creek** property (Figure 3) was originally explored by the BHP in 1998. Regional stream sediment sampling identified anomalous gold. Soil geochemistry identified a large gold in soil anomaly which was not investigated further. This gold anomaly is considered to be the eastern extension of the Arakaka trend, a northeast-trending mineralized and structural corridor within the Barima-Waini District of Northwestern Guyana.

In 2007, StrataGold and Newmont confirmed the presence of significant gold values in both stream sediments and soil anomalies over 6km in length.
3.2.2 Aurora (Guyana Goldfields)
The Aurora gold project is situated on the eastern side of the Aurora zoned intrusion in the Cuyuni-Mazaruni Greenstone Belt. The Cuyuni Belt consists of basalts, rhyolites, shales and graywackes.

Aurora is an open pit and underground mining operation spread across an area of 12km². The open pit operations are initially targeted at extracting the near-surface saprolite and hard rock ore. The feasibility study for the project was completed in January 2013 and commissioning is due to commence mid-2015. Aurora's total gold production is estimated to be 3.29Moz over its 17-years mine life. Production is anticipated to be 0.231Moz in the first ten years, with a peak production rate of 0.349Moz in 2020.

The deposit is classified into four gold mineralisation zones, namely Rory's Knoll, Aleck Hill, Walcott Hill and Mad Kiss. High-grade mineralisation is found in mesothermal quartz veins, while the majority of mineralisation is found in quartz-ankerite veins that consist of minor pyrite and associated hydrothermal alteration. Quartz-carbonate veins ranging from weak to moderate stockwork and distinct tabular zones were also identified. Aurora gold mine is estimated to contain proven reserves of 2.38Mt grading at 3.04g/t and probable reserves of 37.22Mt grading at 2.72g/t. The contained gold reserve at the mine was estimated to be 3.47Moz, as at January 2013.

Mining at the Aurora gold project will begin with Rory's Knoll open pit deposit, which will be mined to a depth of 160m at a rate of 5,000t a day, followed by the remaining deposits. Open benching and sub-level retreat mining methods will be applied at Rory's Knoll, reaching a depth of approximately 1,000m below ground surface.

Underground mining of the Rory's Knoll zone, along with the satellite pits, is expected to commence in early 2018, and to continue for a further eight years after the exhaustion of the satellite pits.
3.2.3 Million Mountain (Sacre Coeur)
The Million Mountain Zone 1 property hosts a hard-rock measured resource of 12.1Mt grading 1.0g/t gold and an indicated resource of 2.18Mt grading 0.9g/t total of 0.451Moz combined. Since completion of the resource estimate, an additional 40 holes have been drilled into the body, which are expected to add to the total in an updated resource estimate as part of the feasibility study. In addition, another eight targets are situated along the 20 kilometre structural trend.

The assessment of the deposit will be broken into two phases, the first of which is the subject of current work and will be limited to the saprolitic portion of the deposit. The heavily weathered rock will not require drilling and blasting, and will need only nominal crushing or grinding for processing.

Feasibility analysis of mining the un-weathered portion of the deposit will be a separate undertaking, to be commissioned at a later date - once mining of the saprolite body is well advanced. The Million Mountain Zone 1 hard-rock mine is anticipated to initially produce from the tropically weathered horizon for 5 to 7 years.

Sacre Coeur is aiming at the development of several near-surface modest size resource bodies, as well as targets for potential major discoveries along the Million Mountain trend.

3.2.4 Groete Creek (Codrington Resource Corporation)
The Groete Creek Gold Project is an advanced stage exploration project. It is the second largest gold zone known in Guyana. Gold has been associated with this area since 1895, but no systematic exploration was
undertaken until 1967. The area was identified to be underlain by an approximately 2km wide E-W striking belt of greenstone (part of the Barama Greenstone Belt) consisting of volcaniclastic and sedimentary rocks compressed between two large granitic intrusions. Mineralization was identified associated with a large shear zone. This structure, the Groete Creek Shear Zone lies near the transition from mafic/intermediate to felsic volcanic rocks. The Groete Creek Shear Zone has been intruded by a series of closely spaced felsic dikes which, as a unit, can be correlated along the entire strike of the mineralized zone.

A non-compliant polygonal resource estimate of 93.6Mt averaging 0.594g/t Au and 0.11% Cu has been calculated at the 0.10 g/t Au cut-off for 1.8Moz. A similar estimate at a 0.34 g/t Au cut-off yielded a geologic resource of 65.4Mt averaging 0.761 g/t Au and 0.13% Cu. No economic parameters have been applied to these estimates, other than cut-off grade and a hypothetical pit boundary. They can, therefore, be considered only as estimates of the available mineralized material and do not provide any indication of the mineability of this material. The area remained open to the east and west and down dip.

Gold Port Resources in 2013 announced a resolution to change the name of the company from Gold Port Resources Ltd. to Codrington Resource Corporation. Since that time, Codrington has focused attention on designing and developing a small scale gold recovery operation on site. Mercury has long been associated with the concentration of gold in Guyana. Its widespread use has become an environmental issue in the country, and around the world where artisanal mining is common practice. Codrington is testing an extraction system designed to concentrate the free gold without the use of mercury, nor any other toxic chemical. At the mining area, a slurry will be created and pumped to a recovery site via a large gravel pumping system. Gold concentration will be completed utilizing a gravity shaker table that can process up to 4 tons per hour of -200 sand size material.

Codrington also owns 100% of the Georgetown West Property located just northeast of Groete Creek. Previous work, most notably the results of the 1997 soil geochemical survey has revealed the presence of a curvilinear north south trending structure, indicating another structure similar to the Groete Creek shear zone, but of a different orientation and exhibiting more pronounced alteration.

12
3.2.5 Karouni (Troy Resources)
The Karouni Project formally known as the West Omai Project is located in the central-northern portion of Guyana approximately 180km SSW of Georgetown (Figure 7). The tenements have been acquired by either direct grant to the Company or by contractual agreements with tenement holders.

The basement geology of the Karouni Project is dominated by WNW trending greenstone belts of the Barama-Mazaruni Supergroup, interspersed with extensive granitoid batholiths. The greenstones comprise a basal succession of basalts and andesites, which are locally intruded by a felsic to intermediate porphyry, overlain by a succession of intermediate volcanoclastics and sediments, incorporating more persistent carbonaceous shale horizons. This stratigraphy is reasonably consistent with that recorded at the Omai Mine, 35km to the SE.

Much of the SW portion of the northern tenement block, which incorporates the Hicks, Eldorado and Whitehall (Kaburi) mineralised zones, is veneered by Tertiary to Holocene sediments including oligomictic conglomerates which are frequently strongly mineralised with gold where proximal to basement mineralisation.

Primary gold mineralisation is exposed at several localities, the most notable being the Hicks, Smarts and Larken Zones along the northern extremity of the Project. Here the cover has been removed by erosion to expose the underlying mineralised successions of the Barama-Mazaruni Group. Extensive superficial cover within the central and south portions of the project tenements masks the basement lithology and conceals any gold mineralisation. The acquisition and evaluation of airborne geophysical data has however indicated
that the Barama-Mazaruni Greenstone Belts and associated syntectonic intrusives persist at shallow depth beneath this cover.

**Figure 9: Location of Karouni Project and Omai Mine**

On 21 January 2014, Troy Resources announced results of the PEA for development of the Karouni Project. The PEA considers a combination of two open cut and one underground mine feeding a conventional carbon-in-leach gold plant with a nominal capacity of 750,000tpa. The PEA assumes a total of 5.2Mt of material will be processed with an average grade of 4.13g/t with recovered gold production of 0.633oz over a 7 year mine life.

### 3.2.6 Eagle Mountain (Goldsource Mines)

The Eagle Mountain Property occurs within the Palaeoproterozoic Barama-Mazaruni Greenstone Belt of the northern part of the Guiana Shield. The oldest rocks consist of folded, lower greenschist meta-volcanic and meta-sedimentary rocks intruded by multi-phase plutons of the 1.9 to 2.2 Ga Younger Granite Group. The greenstones and granites are unconformably overlain by the Middle Proterozoic Uatuma Supergroup, which includes folded sediments of the Moruwa Formation and locally tilted volcanics of the overlying Iwokrama Formation. These are overlain by a thick succession of flat-lying sediments of the Roraima Formation.

A composite granodiorite pluton intruding the greenstone rocks hosts most of the known gold mineralization on the Eagle Mountain Property.

Alluvial gold has been exploited in the Eagle Mountain area since at least the 1880s, with commercial exploration starting at Eagle Mountain in the period 1947-1948. The Geological Survey of Guyana, carried
out a number of subsequent exploration phases at EagleMountain until modern systematic exploration commenced in 1988 (Golden Star Resources Ltd).

The bulk of the gold resource is contained within the shallow dipping Zion (includes the previously separate Saddle) and Kilroy (includes the previously separate Millionaire) mineralized shear zones. Gold mineralization is associated with a distinctive chlorite – silica – actinolite – epidote – sulphide (mainly pyrite) ± biotite alteration assemblage and minor quartz veining. Individual zones vary in thickness up to approximately 42m, and are separated from each other by 1 - 40m of barren rock that can be distinguished based on minor variations in trace element chemistry; for example, the Zion zone is relatively enriched in copper while Kilroy and Millionaire zones contain elevated arsenic. This style of mineralization has been delineated over an area of approximately 2km².

Goldsource is working aggressively to develop the project towards low cost, Phase I production in H2 2015. The project has an existing gold resource of 0.188Moz Indicated and 0.792Moz Inferred (effective date November 21, 2012), with strong potential to expand its resources. A Preliminary Economic Assessment (“PEA”) has been completed (effective date June 15, 2014), which sets out the economic parameters for the project’s development. On December 30, 2014, the Company completed a $7.1 million equity financing, enough to conclude Phase I of project construction.
3.2.7 Toroparu (Sandspring Resources)
Located in the Upper Puruni River region of western Guyana, the Toroparu Gold Deposit forms a WNW oriented elongated cloud of disseminated mineralization located along the contact zone between a sequence of intermediate metavolcanics and an intrusive of tonalitic to quartz-dioritic composition. The mineralization is marked by a chalcopyrite-bornite-pyrite-molybdenite ore assemblage that appears to be controlled by a stockwork of disseminated fine fractures and veinlets of dilational aspect.

The system, which forms a corridor that is approximately 2.7km long, 200 - 400m wide, and over 400m deep, consists of several mineralized lenses:
- The main eastern lens contains the largest part of the resource and displays the highest gold and copper grades in its core zone;
- The main western lens contains lower average gold grades, and very low copper grades; and,
- The southeastern lens also contains lower average gold and copper grades than the main eastern lens.

This mineralized corridor is surrounded by a phyllic to propylitic alteration cloud that represents several alteration phases. These geological and mineralogical features reflect overprinting magmatic-hydrothermal events, indicating that the Toroparu Gold Deposit is an intrusion related, possibly overprinted porphyry style, deposit.

The Toroparu Gold Project contains one of the world's largest undeveloped in-situ gold deposits owned by a junior mining company and is to be developed as a conventional open pit mine. It has a 4.1Moz proven and probable gold reserve, 211Mlb of economic byproduct copper, and a 16-year mine life. The ore processing facility is being designed to accommodate two ore types with varying amounts of copper.

It will consist of flotation and leaching circuits, and produce gold-bearing copper concentrates for shipment to a smelter, and gold doré bars that will be poured on-site and flown to a refinery. This facility is expected to process an initial throughput of 19,000tpd and increase to 22,500tpd in its fourth year of production. Sandspring expects to have a conventional open pit in operation by late 2016.
4. The Economy and Gold

In 2013, Guyana recorded its highest ever annual gold production with 458,105oz according to state news agency Gina (BN Americas, 18/12/2013). The figure includes both the Omai mine and small-scale operators. Following the previous peak of 455,918oz in 2001, production declined steadily until 2007, when output began to pick up again. In August, the Guyana Gold and Diamond Miners Association projected 2013 production of 500,000oz.

Gold maintained its reputation as the biggest producer in the mining sector for 2012, with a production value in excess of GUY$137 billion (One Guyana dollar = US$0.01 cents) and accounting for 78.2 per cent of total value of mining output (Caribbean 360, 26/8/2013)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Exports (US$M)</th>
<th>Gold (%)</th>
<th>Gold (US$M)</th>
<th>Raw Sugar (%)</th>
<th>Raw Sugar (US$M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>720</td>
<td>16.02</td>
<td>115</td>
<td>18.10</td>
<td>130</td>
</tr>
<tr>
<td>2007</td>
<td>891</td>
<td>16.67</td>
<td>148</td>
<td>17.97</td>
<td>160</td>
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<tr>
<td>2008</td>
<td>1060</td>
<td>21.58</td>
<td>228</td>
<td>14.81</td>
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<tr>
<td>2009</td>
<td>965</td>
<td>34.47</td>
<td>333</td>
<td>11.89</td>
<td>115</td>
</tr>
<tr>
<td>2010</td>
<td>1120</td>
<td>42.95</td>
<td>481</td>
<td>8.69</td>
<td>97</td>
</tr>
<tr>
<td>2011</td>
<td>1480</td>
<td>45.33</td>
<td>671</td>
<td>9.07</td>
<td>134</td>
</tr>
<tr>
<td>2012</td>
<td>1690</td>
<td>46.63</td>
<td>790</td>
<td>8.06</td>
<td>137</td>
</tr>
</tbody>
</table>
The importance of gold to the Guyanese economy is illustrated in Table 1 where it is compared to exports of raw sugar, previously the biggest export earner.

Growth in Guyana in 2014 was slower than in 2013 and was mainly driven by the agricultural and mining sectors. The slowdown in 2014 was partly due to a 17% decline, in the first part of the year, in gold production, one of the key driving forces behind Guyanese economic growth during the past decade, as well as a 25% fall in export revenue. This decline resulted from an exhaustion of mine reserves and in exploration and development activities. New mines could, however, be brought into production in 2015, financed by foreign capital. In addition, China, Canada and Argentina are currently assisting the government to map the country’s geological resources.

### 4.1 Perception of Mineral Policy

<table>
<thead>
<tr>
<th>Index</th>
<th>World Position (of 122)</th>
<th>World Quartile</th>
<th>S. America Position (of 27)</th>
<th>S. America Quartile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment Attractiveness</td>
<td>54</td>
<td>2nd</td>
<td>9</td>
<td>2nd</td>
</tr>
<tr>
<td>Policy Perception</td>
<td>59</td>
<td>2nd</td>
<td>10</td>
<td>2nd</td>
</tr>
<tr>
<td>Mineral Potential(^2)</td>
<td>49</td>
<td>2nd</td>
<td>10</td>
<td>2nd</td>
</tr>
<tr>
<td>Room for Improvement</td>
<td>20</td>
<td>1st</td>
<td>2</td>
<td>1st</td>
</tr>
<tr>
<td>Uncertainty Concerning Existing Regulations(^3)</td>
<td>22</td>
<td>1st</td>
<td>4</td>
<td>1st</td>
</tr>
<tr>
<td>Uncertainty Concerning Environmental Regulations</td>
<td>11</td>
<td>1st</td>
<td>1</td>
<td>1st</td>
</tr>
<tr>
<td>Regulatory Duplication &amp; Inconsistencies</td>
<td>18</td>
<td>1st</td>
<td>3</td>
<td>1st</td>
</tr>
<tr>
<td>Legal System</td>
<td>68</td>
<td>3rd</td>
<td>11</td>
<td>2nd</td>
</tr>
<tr>
<td>Taxation Regime</td>
<td>60</td>
<td>2nd</td>
<td>7</td>
<td>2nd</td>
</tr>
<tr>
<td>Uncertainty Concerning Disputed Land Claims</td>
<td>49</td>
<td>2nd</td>
<td>5</td>
<td>1st</td>
</tr>
<tr>
<td>Uncertainty Concerning Protected Areas</td>
<td>52</td>
<td>2nd</td>
<td>6</td>
<td>1st</td>
</tr>
<tr>
<td>Quality of Infrastructure</td>
<td>78</td>
<td>3rd</td>
<td>17</td>
<td>3rd</td>
</tr>
<tr>
<td>Socioeconomic Agreements(^4)</td>
<td>31</td>
<td>2nd</td>
<td>2</td>
<td>1st</td>
</tr>
<tr>
<td>Trade Barriers</td>
<td>56</td>
<td>2nd</td>
<td>5</td>
<td>1st</td>
</tr>
<tr>
<td>Political Stability</td>
<td>55</td>
<td>2nd</td>
<td>8</td>
<td>2nd</td>
</tr>
<tr>
<td>Labour Regulations(^5)</td>
<td>63</td>
<td>3rd</td>
<td>5</td>
<td>1st</td>
</tr>
<tr>
<td>Geological Database</td>
<td>91</td>
<td>3rd</td>
<td>23</td>
<td>4th</td>
</tr>
<tr>
<td>Security</td>
<td>88</td>
<td>3rd</td>
<td>20</td>
<td>3rd</td>
</tr>
<tr>
<td>Availability of Labour / Skills</td>
<td>81</td>
<td>3rd</td>
<td>19</td>
<td>3rd</td>
</tr>
</tbody>
</table>

\(^1\) Includes countries from South America, Central America, Caribbean Basin and the separate states of Argentina.

\(^2\) Known fully as the ‘Best Practices Mineral Potential Index’ which ranks countries by attractiveness if all countries applied Best Practice mineral policy i.e. if only geological prospectivity mattered.

\(^3\) Known fully as the ‘Uncertainty Concerning the Administration, Interpretation and Enforcement of Existing Regulations’ index.

\(^4\) Known fully as the ‘Socioeconomic Agreements / Community Development Conditions’ index.

\(^5\) Known fully as the ‘Labor Regulations / Employment Agreements and Labour Militancy / Work Disruptions’ index.

Table 2: The position of Guyana in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
Globally, and within South America, Guyana is seen as a fairly attractive investment opportunity for mining and exploration (Table 2). Both the mineral potential and the policy environment are viewed fairly positively. This position has increased significantly over the last few years, particularly as the perception of the minerals potential has improved (Figure 12). In comparison to its inherent mineral potential, investors see little room for improvement in policy. The key to increasing minerals investment in Guyana is perhaps then in further increasing its mineral potential. Improvements in its poor geological database would undoubtedly help in this regard (Table 2).

Guyana possesses a first class regulatory climate for mining and the environment and an apparently slick bureaucracy, particularly by South American standards (Table 2).

The taxation regime and situation surrounding land claims, protected areas and socioeconomic or local community agreements are also seen fairly positively (Table 2). The positive attitude towards the taxation regime is despite a fairly high overall tax burden (in comparison to peers – see main overview report), suggesting that administering the taxation regime efficiently is perhaps as important as the level of taxation, when viewed by outside investors.

Guyana, however, is still a developing country and thus portrays a number of common weaknesses amongst such countries, including fairly poor infrastructure; limited skills amongst the workforce; and a weak legal system. Although politically stable, like much of South America, security remains a problem. Labour regulations could also be improved.

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**Performance of Guyana in Fraser Institute Survey of Mining Companies Rankings over time**

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment Attractiveness</th>
<th>Policy Perception</th>
<th>Mineral Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-12</td>
<td>70</td>
<td>80</td>
<td>70</td>
</tr>
<tr>
<td>2012-13</td>
<td>75</td>
<td>85</td>
<td>80</td>
</tr>
<tr>
<td>2013</td>
<td>80</td>
<td>90</td>
<td>85</td>
</tr>
<tr>
<td>2014</td>
<td>85</td>
<td>95</td>
<td>90</td>
</tr>
</tbody>
</table>

Fraser Institute Report Edition
5. Geopolitical Assessment and Sovereign Risk

5.1 Stability
Guyana gained its independence from Britain in 1966 and has a democratically elected government that respects private sector development. The Guyana Mining Act (see Appendix 1) is similar to the Canadian Mining Act. English is the official language and Guyana is a Member of CARICOM (Caribbean Community).

According to an article in COFACE the decreased place of gold in economic growth in 2014 was offset by a major improvement in rice production. There was also strong growth in the sugar industry at the beginning of the year. The agricultural sector is nevertheless still vulnerable to climate factors, such as floods. Growth is also being held back by a shortage of suitably qualified labour, particularly in science, technology and engineering. This is leading to wage pressure and impacting the country’s competitiveness. Finally, the government’s economic policy is based around the long-term application of a Low Carbon Development Strategy (LCDS), which includes the reduction of both emissions and deforestation in exchange for development aid. For this, as part of a partnership agreement, Norway should provide financial aid for Guyana to support its policy for the protection of virgin forests.

Inflation in 2014 held relatively stable but, with the application of a 2013 decree on minimum wages, inflation is likely to accelerate in 2015.

Guyana’s main exports are raw materials (gold, rice, bauxite and sugar). Despite good sugar harvests, its current account deficit deepened in 2014, a result of falling raw material prices. This trend is likely to continue in 2015, especially given the existing doubts concerning the volume of its agricultural exports. Finally, despite the government’s desire to boost public-private partnerships, FDI is not particularly high and is undermined by the limited appeal of the country and its weak local market. The implementation of spending decisions and public investments is being hindered by the existing political impasse. Projects relating to the LCDS or the renovation of public infrastructure (roads, sanitation, etc.) are being blocked because of this. Money laundering is a problem within the banking sector. The country is under scrutiny by international bodies, which are pushing it to adopt laws against this crime.

Since the last legislative elections in 2011, Guyana has been ruled by a form of coalition. This situation is problematic because of the ethnic (Indian/African) segmentation of the country. The next elections are scheduled for December 2016.

Guyana continues to develop links with neighbours Brazil and Venezuela through trade, shared membership of regional organisations and the construction of cross border transport links. It is, however, involved in a border dispute with Suriname.

5.2 Mining Taxation
*(Tax rates derived from PKF Worldwide Tax Guide 2013)*

**A: TAXES PAYABLE**

**CORPORATE INCOME TAX**
- Non-commercial companies: 30% of chargeable profit. Losses may be carried forward indefinitely and offset is limited to 50% of the chargeable profits in future years.
- Commercial Companies: 40% of chargeable profits or 2% of turnover whichever is higher. Any payment in excess of 40% of profit is carried forward as a credit to be used to reduce the tax whenever it is higher than 2% of turnover.
PROPERTY TAX
This is payable on the net assets of the company as at 1 January each year. Assets which attract Wear and Tear Allowances will be included in their income tax values.
The rates on net property are as follows:
- The first GYD1,500,000 is exempt
- The next GYD5,000,000 is taxed at 0.5%
- The remainder is at 0.75%.
An offset would be granted to investors who hold shares in local companies at the appropriate rate.

CAPITAL GAINS
The rate is 20% on the gain on disposal unless the asset was held for more than 25 years when it becomes exempt. Capital losses are carried forward indefinitely and could be set off against future capital gains until fully recouped. Gain on disposal of investments in local public companies is exempt.

BRANCH PROFITS
The after tax profits of a branch of a non-resident company is deemed distributable whether distributed or not and will be subject to withholding tax at 20% or at treaty rates unless the company has reinvested to the satisfaction of the Commissioner General such profits or any part thereof in Guyana.

VALUE ADDED TAX
The rate is 16%. Some items are zero rated and very few are exempt. Registration is required if the turnover exceeds GYD 10M per annum.

FRINGE BENEFITS
There are no specific rules for granting of tax free allowances except for overseas travel assistance which is described in the Income Tax Act. In practice, some management staff may obtain car and entertainment allowances but the amount would be limited to 10% of their remuneration in each case.

B. DETERMINATION OF TAXABLE INCOME

CAPITAL ALLOWANCES
The rates for Wear and Tear Allowances for different categories of assets are as follows:
- Aircraft 33 1/3%
- Boats 10%
- Furniture and fittings 10%
- Motor vehicles 20%
- Office equipment/electrical 20%
- Other 15%
- Plant and machinery 20%
- Computers 50%
- Buildings (Housing Machinery) 5% on cost.

The claim is computed on reducing balance basis unless stated otherwise. An accelerated write off is granted to pioneer industries and certain other undertakings.

The rates for the initial allowances are:
- Plant, equipment and motor vehicles 40%
- Industrial Buildings 10%.
There is a special regime for gold and diamond mining companies which enjoy a 20% write off on all assets for each year. There is no limit to the carried forward losses to be set off for each year.

DIVIDENDS
Dividends paid to residents are tax free. Dividends paid to non-residents are subject to withholding tax at 20% or at treaty rates. For large and medium scale gold and diamond companies the rate is 6.25% under the special regime.

C. PERSONAL TAXATION
INCOME TAXES There is a standard deduction of GYD 600,000 per annum after which the balance of chargeable income is taxed at 33 1/3%. There are no other allowances.

PROPERTY TAXES
Individuals are taxed on their net property as follows: (Wealth Tax)
- The first GYD 7.5M is exempt
- The next GYD 5.0M is at 0.5%
- The remainder is taxed at 0.75%.  
The income tax value of the assets is used when computing net property.

TREATY AND NON-TREATY WITHHOLDING TAX RATES
Guyana has double taxation treaties with the United Kingdom, Canada and Caricom Countries. The withholding taxes applicable for each territory are as follows:
- On dividends and interest 15%
- On other payments 10%.

D. ROYALTIES
Gold: 5%
Diamonds: 3%

While understanding that investment is critical in growing the economy, investors require competitive terms and conditions, and solid assurances that the investment environment will be stable. The National Development Strategy (NDS) highlighted that Guyana’s current tax structure for the mining sector is not, on the face of it, competitive. It includes charges of 5% royalty on gold, 3% on diamonds, and a 35% corporate income tax. Both the royalty and the corporate income tax are located in the upper echelons of international norms.

The royalty rate of 5%, which has been pointed out is at the very top of the international scale, also causes special problems in the case of gold, where it encourages leakages of the product across the hinterland borders to neighbouring countries, and other forms of evasion. In this case, a complicating factor is that the borders are quite permeable. Indeed, access to neighbouring countries from some hinterland mining districts is easier than access to Georgetown. Hence in practice the attempt to sustain the royalty rate above that of Brazil’s, for example, results in reduced declarations nationally.

6. Conclusions

- The northeastern part of South America has similar geology to western Africa, a consequence of the two continents being contiguous before the break-up of Gondwana. Three greenstone belts - the Barama, Cuyuni and Mazaruni have thus far been identified. As a result, Guyana and its neighbours represent viable targets for economic gold deposits.
- Guyana’s minerals potential is increasingly recognised by foreign investors, and exploration has increased over the last decade, with several projects advancing into the development stage.
• However whilst alluvial and artisanal mining has taken place for centuries, very little formal mining has occurred, which presents the next challenge for the government after attracting the exploration investment – facilitating the successful development of modern mines.

• The government is strongly in favour of foreign investment, particularly in mining, and the country is currently viewed fairly positively by foreign investors, both in terms of mineral potential and policy environment.

• Significant improvements have been made to the policy environment for mining in Guyana, and this has been recognised by foreign investors. Guyana hosts a world leading bureaucracy and regulatory climate for mining and the environment. The taxation regime; situation with respect to land claims and protected areas; and socioeconomic and local community agreements are also seen fairly positively.

• The positive attitude towards the tax regime comes despite an overall high tax burden, which for example, includes a corporate income tax of 49% and gold royalties of 5%, suggesting efficient administration is at least as important as the tax rate itself.

• As with most developing countries though, Guyana, faces a number of more general economic problems that could affect the mining sector, including relatively poor infrastructure (especially inland); a poorly educated workforce (which unhelpfully combines with problematic labour regulations); and weak legal system.

• Guyana is regarded as economically and politically stable but issues exist with inequality and poverty, increasing crime and corruption and the narcotics trade. Like many South American countries, security is still seen as a substantial problem.

• Guyana’s mining industry therefore faces three challenges in further advancing its minerals sector:
  4. More general economic development which improves infrastructure and workforce qualities. Infrastructure development, for example, is underway and improved power supply from incoming hydro-electric projects will facilitate progress in the mining sector and more generally across the economy.
  5. Proving that mines can be developed in the country, as well as just facilitating the discovery of new deposits. The successful development of flagship projects will be invaluable in this case.
  6. Minerals policy (outside of broader economic challenges) is now seen as very good, leaving little scope for improvement, as a method for attracting further investment. The onus must therefore be in improving the mineral potential of the country. Improving the geological database of the country would help substantially.

7. References


APPENDIX 1
Application for Mineral Properties in Guyana

(Adapted from the Guyana Geology & Mines Commission)

The Mining Act, 1989 allows for four scales of operation:

1. A Small Scale Claim has dimensions of 1500 ft x 800 ft whilst a river claim consists of one mile of a navigable river.
2. Medium Scale Prospecting and Mining Permits. These cover between 150 and 1200 acres each.
3. Prospecting Licences for areas between 500 and 12,800 acres.
4. Permission for Geological and Geophysical Surveys for reconnaissance surveys over large acreages with the objective of applying for Prospecting Licences over favourable ground selected on the basis of results obtained from the reconnaissance aerial and field surveys.

Small and medium scale property titles (items 1 and 2 above) are restricted to Guyanese, however, foreigners have been entering into joint-venture arrangements whereby the two parties jointly develop the property. This is strictly by private contract. In 2003 there were 2513 Medium Scale Prospecting Permits and 18 Prospecting Licences in existence.

Foreign companies may apply for Prospecting Licences and Permission for reconnaissance surveys.

PROSPECTING LICENCE
Who can apply?
- An individual who is a citizen of Guyana and an adult
- A company within the meaning of the companies Act
- A public Corporation
- A co-operative society registered under the Co-operative Societies Act
- Any other corporate body incorporated in or outside Guyana, including a company established outside Guyana
- Any organization established by Government or by or under written law in Guyana and authorized to carry on mining operations

Application Procedure
1. Fill out the prescribed 5D Form.
2. Pay of US$100 application fee.
3. Work Program and Budget for first year activities.
4. Submit a map on Terra Survey 1:50,000 sheet.
5. Cartographic description of area.

After satisfactory submission of the required documents the application is processed and, if recommended will be sent to the official gazette for publication. If there are no objections to the grant then ministerial approval is sought. When this is obtained the licence becomes available on payment of the first year's rental and submission of an acceptable Performance Bond. Rental rates are: US$0.50 acre for first year; US$0.60 for second year and US$1.00 for third year. Performance Bond is equivalent to 10% of the approved budget for the respective year. However since 1998 there has been a 50% rebate on rental rates, which in effect have halved rentals.

The term of the Prospecting Licence is for three years, with two rights of renewal of one year each. The Mining Act 1989 stipulates that three months prior to each anniversary date of licence, a Work Program and Budget for the following year must be presented for approval for the work to be undertaken during the following year.
The Obligations of the licensee include quarterly technical reports on its activities and an audited financial statement to be submitted by June 30 of the following year for the previous year’s expenditure. Should the licensee relinquish part or all of the Prospecting Licence area then he is required to submit an evaluation report on the work undertaken therein. Prospecting Licence properties are subject to ad hoc monitoring visits by technical staff of the GGMC. It is the applicant’s ONUS to select the area of interest, this will be based, principally, on availability and good geological prospectivity.

At any time during the Prospecting Licence, and for any part or all of the Prospecting Licence area, the licensee may apply for a Mining Licence. This application will consist of a Positive Feasibility Study, Mine Plan, an Environmental Impact Statement and an Environmental Management Plan. Rental for a Mining Licence is currently fixed at US$5.00 per acre per year and the licence is usually granted for twenty years or the life of the deposit, whichever is shorter; renewals are possible.

APPLICATION PROCEDURE FOR MINING LICENCE

1. The holder of a prospecting licence may, within the period of one year specified in section 40 (2) or within such further period as may be allowed by the Commission under the proviso thereto, apply under this subsection for the grant of a mining licence in respect of any discovery parcel or parcels, which following appraisal, can be shown to contain any mineral to which the licence relates.
2. Any person, notwithstanding that he does not hold a prospecting licence in respect of any parcel or parcels, and on the Commission being satisfied on data supplied by that person or otherwise that a mineral is located therein, may apply under this subsection for the grant of a mining licence in respect of that parcel or parcels.
3. An application under subsection (1) or (2):-
   o shall be made to the Commission;
   o shall be accompanied by such reports, analysis and data resulting from the investigations and studies carried out under section 42 or otherwise;
   o shall be accompanied by detailed proposals by the applicant for the construction, establishment and operation of all facilities and services for and incidental to the recovery, processing, storage and transportation of the mineral from the proposed mining area; and
   o shall be accompanied by such other particulars as may be prescribed;
4. Where an application is duly made under section 43(1) by the holder of a prospecting licence, the Commission shall grant the mining licence applied for on such conditions as are necessary to give effect to the application and the requirements of this Act; and
5. Where an application is duly made under section 43(2), the Commission may grant on such conditions as it determines, or refuse to grant, the mining licence applied for.
## APPENDIX 2

### Status of Gold Production, Development and Exploration Projects in Guyana

<table>
<thead>
<tr>
<th>Operation/Owner</th>
<th>Status</th>
<th>Production</th>
<th>Resources</th>
<th>Mining</th>
<th>Processing</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karouni/Troy Resources</td>
<td>Prelim. Econ. Assessment</td>
<td>Projected 7-year mine life with annual gold production of 90,000oz (first 12 months = 102,000oz).</td>
<td>As at 21/1/2014: The PEA assumes a total of 5.2Mt with an average grade of 4.13g/t with recovered gold production of 0.633Moz over a 7 year mine life.</td>
<td>The Project will be developed initially as an open cut operation at Smarts and Hicks followed by underground mining at Smarts.</td>
<td>The proposed method of gold recovery is via a conventional Carbon in Leach (CIL) gold processing facility. This will involve crushing, grinding, leaching and electrowinning.</td>
<td>Troy Resources website. Accessed at: <a href="http://www.troyes.com.au/operations/guyana/preliminary-economic-assessment.html">http://www.troyes.com.au/operations/guyana/preliminary-economic-assessment.html</a>. Retrieved 17 March 2015.</td>
</tr>
<tr>
<td>Eagle Mountain/Goldsource Mines</td>
<td>PEA</td>
<td>Proposed: Phase I = 1,000tpd open pit - gravity plant increasing to 3,000 - 4,000tpd for an 8 year mine life</td>
<td>As at July 2014: Ind. Saprrolite: 1.59Mt @ 1.45g/t = 0.074Moz Ind. Fresh Rock: 2.33Mt @ 1.52g/t = 0.114Moz Inf. Saprrolite: 7.20Mt @ 1.32g/t = 0.306Moz Inf. Fresh Rock: 13.43Mt @ 1.13g/t = 0.486Moz</td>
<td>Conventional open cut mining of soft weathered rock (gold mineralized saprolite) is proposed using a team of excavators, bulldozers and wheel-loaders</td>
<td></td>
<td>Goldsource Mines website. Accessed at: [<a href="http://www.goldsource">http://www.goldsource</a> mines.com/proper ties/eaglemountain/](<a href="http://www.goldsource">http://www.goldsource</a> mines.com/proper ties/eaglemountain/). Retrieved 17 March 2015.</td>
</tr>
<tr>
<td>Toroparu/Sandspring Resources</td>
<td>Constr.</td>
<td>Initial throughput of 19,000tpd and increase to 22,500tpd in its Year 4.</td>
<td>As at March 2013: Prov. &amp; Prob. Res. = 127Mt @ 1.08g/t = 4.1Moz Meas. &amp; Ind. Res. = 240Mt @ 0.89g/t = 6.9Moz Inf. Res. = 129Mt @ 0.74g/t = 3.1Moz Combined total of 0.451Moz</td>
<td>Conventional open-pit mine with saprolite and fresh-rock ore types</td>
<td>Flotation and leaching to produce gold-bearing copper concentrates for shipment to a smelter, and gold doré bars that will be poured on-site.</td>
<td>Sandspring Resources website. Accessed at: <a href="http://www.sandspringresources.com/s/toroparu-gold.asp">http://www.sandspringresources.com/s/toroparu-gold.asp</a>. Retrieved 17 March 2015.</td>
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</table>
Summary

• In 2013 Peru produced 182 tonnes of gold ranking it as the 5th highest in the world, whilst its gold reserves ranked 8th, hosting around 2,200 tonnes.
• Peru hosts a mature gold (and other) mining sector, with many of its ‘gold’ mines part of multi-commodity mines such as Iron Oxide Copper Gold (IOCG) deposits and porphyry copper-gold deposits.
• These deposits aside, however, the largest and lowest cost gold deposits are the ‘acid-sulphate’ or ‘high sulphidation’ deposits of the Tertiary volcanic rocks in the high cordillera (3800 - 5,200m), which are amenable to heap leach extraction thereby reducing treatment costs substantially.
• The mineral potential of Peru is well recognised and its ranks amongst foreign investors top targets for minerals investment. Peru is politically and economically stable and actively encourages foreign investment.
• However despite these factors the popularity of Peru as a minerals investment destination mainly stems from its world class minerals potential. Its minerals policy climate is less attractive.
• Foreign investors see Peru as one of the countries with the largest scope for improvement; in narrowing the gap between its mineral potential and the actual situation of mining in the country. Making such improvements could help the Peruvian mining sector rival the neighbouring Chilean mining sector.
• The main problems with Peru’s mining sector arise at a local level, rather than a national level. Land claims, protected areas, and local community agreements are all sources of uncertainty. Artisanal mining and persistent poverty exacerbate these issues. Peru is infamous for local social conflict surrounding mining and exploration operations.
• Labour regulations in Peru could also be improved.
• Insecurity also remains a problem, particularly in relation to the drugs trade, as with much of South America.
• Substantial improvements in Peru’s minerals investment climate have been made over recent decades, if progress more recently has been modest. The country now hosts a skilled mining workforce; good quality geological database; and reasonable legal system. Mining and environmental regulations are now fairly clear, and bureaucracy reasonably efficient.
• The taxation regime is viewed fairly positively, despite increases in royalty rates in 2011.
• Opinions about Peru’s infrastructure vary from excellent to modest. It is perhaps the comparator that matters. In comparison to other developing countries and much of South America it is probably fairly good, but it is not yet up to developed world standards.
• In summary the main opportunity for increasing foreign investment into Peru’s mining sector is in resolving the many local land disputes and local community disagreements.
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Table 1: The position of Peru in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).
1. Location, Physiography and Climate

Peru is the 20th largest country in the world and the 3rd largest in South America, after Brazil and Argentina. It is located on the west coast of South America between Chile and Ecuador, and spread over 1.285Mkm².

Peru has four natural geographic regions: the coastal zone (costa); the highlands (Andes or sierra); the eastern hills, and the jungle lowlands (selva). The costa, sierra, and selva each comprising a different and sharply contrasting environment, form the major terrestrial regions of the country.

Peru has three main climatic zones: the tropical Amazon jungle to the east; the arid coastal desert to the west; and the Andes Mountains and high plateau in the middle of the country. The climate of the Andes Mountains varies from temperate to frigid.

Figure 1: Geography of Peru

2. Infrastructure

Latinvex (2013) considers that Peru has the second best infrastructure in South America after Chile. The report looked at a large number of factors in order to compile the ranking: quality of ports, air transport, railway and roads; cost, time and documents required to export and import containers; efficiency of customs and border management clearance, ease of arranging competitively priced shipments, competence and quality of logistics services, ability to track and trace consignments, frequency with which shipments reach consignees within scheduled or expected delivery times and percent of paved roads and airport runways.

Rising container costs and less-than-impressive logistics and tracking services were highlighted for criticism.
Peru has an extensive system of roads that cross most of the mountain and coastal regions. Of the 72,887km of roads, 8,698km are paved. The government dedicated a significant number of resources to building and rebuilding the highway system throughout the 1990s. The principal roads are the Pan-American Highway, which runs the length of the country down the coast; the Central Highway, which connects the capital, Lima, to the Andean highlands; and the Marginal Highway, which penetrates deep into the northeastern jungle region. The nation’s rail system, which was privatized in 2000, services highland mining operations. Passenger service on the rail system is limited to certain areas and services the tourist trade between the highland states of Puno, Cusco, and Arequipa.

Peru has 234 airports, but the majority are simple airfields serving small, private planes. The principal airport is the Jorge Chavez International Airport located in Lima, with other modern airfields in the major cities. Of the total number of airports, 44 have paved runways.

Peru has a series of excellent, deep-water ports. The largest port facility is in Callao, the port city adjacent to Lima. In addition to Pacific Ocean ports, the country also has 3 large river ports: Iquitos, Pucallpa, and Yurimaguas. Iquitos is located on the Amazon River, while the other 2 ports are located on major tributaries. Peru has 8,598km of navigable riverways.

A mix of private and public companies generates electricity, the bulk of which is hydroelectric (74.79%). The Peruvian government began privatizing electricity generation, transmission, and supply in the mid-1990s and is continuing the process which produces 18.28B kWh per year. Major natural gas reserves, which should be available to the market by 2003-04, will help diversify dependence on hydroelectricity. Telecommunications services have improved dramatically since the state-owned telephone service was privatized in 1993.
3. **Geology**

3.1 **Regional Geology**

As illustrated in Figures 3 and 4, the economic geology of Peru is dominated by a series of NW-SE-trending belts each associated with specific mineralisation styles. From a gold perspective, the most important are the Epithermal Gold Belts (Yanacocha, Pierina and Southern Peru, the Mesothermal Gold Belts (Pataz Batholith, Ananea and Coastal Batholith) and the Porphyry Belts where gold is a by-product of copper mining.

![MINERALIZED BELTS](image)

**Figure 3: Mineralised belts of Peru**

3.2 **Gold Mineralisation and Major Deposits**

Peru hosts a large number of gold mining operations, many of which are multi-commodity mines such as IOCG deposits and porphyry copper gold deposits. However, the largest and lowest cost deposits are the ‘acid-sulphate' or 'high sulphidation' deposits of the Tertiary volcanic rocks in the high cordillera (3800 - 5,200m).

Acid sulphate gold deposits in the Andes are especially attractive due to the deep oxidation normally present, caused by the extreme uplifting of the Andes, which ultimately changes the original sulfidic 'refractory' nature (requiring crushing, milling, and concentrating at great capital and processing costs) of the deposits into oxidized, porous rock with free gold grains that can easily be recovered by cyanide heap leaching. Due to the natural high
porosity, the ore is amenable to heap leach extraction where crushing is not an imperative thereby reducing treatment costs substantially.

Some of the major producing mines and development projects are summarised below. For detailed figures regarding production, reserves and resources and mining and processing methods – refer to Appendix 2.

3.2.1 Yanacocha (Newmont, Minas Buenaventura and international Finance Corporation)

Yanacocha is South America’s largest gold mine, located in the province and department of Cajamarca, approximately 800km northeast of Lima, Peru. Operations are situated 3,500 - 4,100m above sea level with development activities in four primary basins. The operation is a joint venture between Newmont (51.35%), Minas Buenaventura (43.65%) and the International Finance Corporation (5%).

The Yanacocha gold district is a 10x4km zone of altered rocks within a belt of tertiary volcanics that extends the whole length of Peru. Andesitic domes and dome complexes have been silicified and leached by epithermal gold-bearing solutions in at least nine distinct deposits. The mineralised sequences, which can also contain significant amounts of silver, are flanked by extensive argillitic alteration, and subsequent events have created siliceous breccia pipes with localised high gold grades.
3.2.2 Laguna Norte (Barrick)

Laguna Norte is located on the Alto Chicama property in north-central Peru, 140km east of the coastal city of Trujillo, and 175km north of Barrick's Pierina mine. The property lies on the western flank of the Peruvian Andes and is at an elevation of 4,000 - 4,260m above sea level. The Laguna Norte mine is an open-pit, crush, valley-fill heap leach operation. Laguna Norte produced 582,000 ounces of gold in 2014 at all-in sustaining costs of $543 per ounce. Production in 2015 is anticipated to be 600,000-650,000 ounces of gold at all-in sustaining costs of $675-$725 per ounce.

The regional geology is dominated by a thick sequence of Mesozoic marine clastic and carbonate sedimentary rocks, which are bounded to the west by the Mesozoic to Early Tertiary Coastal Batholith and to the east by the Precambrian metamorphic rocks of the Marañón Complex. The Mesozoic sequence has been affected by at least one and possibly two stages of deformation during the Andean Orogeny. The volcanic rocks of the Tertiary Calipuy Group unconformably overlie the Mesozoic rocks.

Mineralization is the result of multiple volcanic and hydrothermal events. It occurs in the southeast portion of the Alto Chicama property and is hosted in both the Tertiary volcanics of the Calipuy Group and the underlying Cretaceous sedimentary rocks of the Chimú Formation. The deposit is locally faulted by relatively steeply dipping structures and is primarily controlled by stratigraphy and lithologic contacts. The mineralization within the present pit extends for approximately 2km in the NNW direction by approximately 2km in the ENE direction and for more than 200m vertically. Most of the mineralization (75%) occurs as oxide material, with approximately 25% occurring as sulphides.
3.2.3 Orcopampa (Buenaventura)

The Orcopampa Mine is located in the province of Castilla in the department of Arequipa, approximately 1,350 km SE of Lima at an altitude of 3,800 - 4,500 m above sea level. The type of operation is underground in the mines of Nazareno, Prometida, Lucy Piso and Prosperidad.

The Calera vein and its splits comprise a complex multistage epithermal fissure vein system of early Miocene age hosted by slightly older silicic and intermediate volcanic rocks. The Calera vein system is the largest and economically most important yet discovered in the district. Produced ore and reserves contain over 40 Moz of silver and 0.4 Moz of gold. Five paragenetic stages as well as multiple episodes of fracturing, faulting, and hydrothermal brecciation are recognized.

Ore shoots typically occur in zones of intense fracturing indicated by abundant stockwork veins and vein splits. Based on the form and zoning of the west-plunging main ore shoot, ore-forming fluids appear to have moved diagonally upward.

Mineralization throughout the district is very similar. The bonanza stage, however, has been identified only in the Calera vein.
3.2.4 Serra Pelada (Colossus Minerals 75%, COOMIGASP 25%)
La Arena is located 480km NNW of Lima in the Huamachuco District. The project is situated in the eastern slope of the Western Cordillera at an average altitude of 3,400m above sea level. The region displays a particularly rich endowment of metals (Cu-Au-Ag) occurring in porphyry and epithermal settings, including the Lagunas Norte mine at Alto Chicama, the Comarsa mine, La Virgen mine, Shahuindo exploration project and Tres Cruces development project.

The La Arena oxide mineralization is predominantly of epithermal high sulphidation style, hosted in oxidized sandstone-breccia within the Chimú Formation.

The Cu-Au-(Mo) sulphide mineralization is a porphyry type, which is hosted in a multi-stage porphyry intrusion. The intrusive rocks vary from dacitic to andesitic and are differentiated by texture and composition.

The sulphide pit will be operated as an extension of the current oxide operation.
Figure 8: Regional geology of the Rio Alto area and mining properties
3.2.5  Shahuindo (Rio Alto)
Shahuindo (Rio Alto) is located 30km north of La Arena mine and currently in advanced stages of permitting. The feasibility study completed in September 2012 describes a shallow, open-pit heap leach mine producing 0.90 Moz annually at a LOM average gold grade of 0.84 g/t and average silver grade of 9.50 g/t. Project start-up is scheduled for January 2016. The mineral resource estimate completed in September 2012 provided the following:
- Measured & indicated oxide gold mineral resources of 2.438 Moz
- Inferred gold mineral resources of 1,628 Moz
Figure 10: Resource drilling at Shahuindo

The Shahuindo property is located in the regional flexure of a thrust-and-fold belt, which contains a large-scale epithermal gold and silver system that extends over an area of 8 x 4km and vertically to a depth of at least 400m. The current oxide mineral resource outcrops on the surface and extends to an average depth of 150m along a 3.8km strike length of one of these fault systems, named the Central Corridor. The oxide mineralisation in the Central Corridor is followed by a thin transition layer, with non-oxidised material continuing below it at depth. Good gold grades continue to depth, but, owing to the non-oxidised nature of the mineralisation, a different processing method will be required.

3.2.6 Cerro Corona (Goldfields)

The deposit is located 1.5km WNW of the village of Hualgayoc, some 80km north of the departmental capital of Cajamarca, and approximately 600km NNW Lima. The Cerro Corona copper-gold deposit is typical of porphyry style mineralisation comprising stock work quartz-pyrite-marcasite-chalcopyrite ± bornite ± hematite ± magnetite veining, hosted by intensely altered intrusive lithologies of diorite to dacitic composition.

Preliminary deep drilling beneath the existing pit has intersected porphyry-style copper-gold mineralisation – although initial assay results show decreasing copper and gold grades at depth, beyond the current life-of-mine (LOM) pit. Future work will be focused on increasing the confidence in lithology contact definition.

Planned production at Cerro Corona is estimated at around 290,000 eq oz or of 140,000 gold-only ounces.
3.2.7 Crespo (Hochschild)
Crespo is located in the Company’s existing operating cluster in southern Peru, approximately 145km SW of Cuzco and 587km SE of Lima. Crespo is a high sulphidation epithermal deposit and will be mined utilizing open pit methods with an average daily production of 6,850t and a stripping ratio of 1.15:1.

In addition, there is further geological potential to the north of the current feasibility study resource base at the Queshca gold target where a drilling gap exists and encouraging geological evidence would suggest further potential for economic mineralisation.

3.2.8 Inmaculada (Hochschild)
Inmaculada is located in Hochschild’s southern Peru cluster, approximately 210km SW southwest of Cuzco and 530km SE of Lima. Inmaculada is 112km from Hochschild’s Pallancata operation.

The property consists of 40 mining concessions and is characterised by both low and high sulphidation epithermal mineralised systems, hosted by veins, breccias and disseminations within tertiary volcanics.

The Inmaculada project has considerable geological upside. The main Angela vein remains open, with significant additional upside potential in several other structures within the property - current project economics do not factor in almost 5 million tonnes of inferred resource containing over 60 million silver equivalent ounces which could almost double life-of-mine, as well as further geological potential from a number of veins known in the district.

3.2.9 AntaKori (Regulus Resources)
The AntaKori Project is located some 800 km to the north of Lima, in the Yanacocha-Hualgayoc mining district in the prolifically mineralized region of central Cajamarca, northern Peru.

Mineralization in the AntaKori property consists of several types; (a) epithermal high-sulphidation mineralization associated with structures within the Tertiary volcanic rocks, (b) retrograde and prograde skarns and associated massive sulphide bodies developed within the Cretaceous aged sedimentary rocks and older intrusive rocks, and (c) porphyry style mineralization and associated hydrothermal breccias.

3.2.10 Conga (Newmont 51.35%, Buenaventure – 43.65%, IFC – 5%)
The Conga project is a copper-gold porphyry located 24km NE of Newmont’s Yanacocha gold mine and is roughly 3,700m above sea level.

The mine, originally scheduled to begin production in 2015, has been a source of controversy. Although the government openly supports the mine, at US$5B the largest ever single private investment in Peru, opponents are worried it will pollute and drain local water supplies. According to Seeking Alpha (15 October 2014), the copper and gold project could remain halted another four years.

Currently, Newmont is taking a gradual approach to developing Conga by focusing on the construction of reservoirs for downstream communities. Should construction move forward, Newmont and its partners, Compania de Minas Buenaventura and the International Finance Corporation, plan to leverage existing operations at Yanacocha to develop Conga’s potential within a world-class mining district. The project has the potential to generate up to 0.35Moz of gold and 120Mlb of copper a year, during its 19-year life.

3.2.11 La Zanja (Buenaventure – 53%, Newmont – 57%)
La Zanja is an open-pit gold mine located approximately 107km NW of the city of Cajamarca at an altitude of 3,500m above sea level. Production in 2014 was 0.144Moz from open-pit operation followed by cyanide heap-leaching. Mining is set to continue underground in 2015.
4. The Economy and Gold

Peru is endowed with valuable natural resources. It is the world’s 2nd largest producer of copper, after Chile, and holds the 2nd largest known copper reserves. Peru is also the 2nd largest producer of silver in the world, and the 6th largest global producer of gold. The country also has significant reserves of coal, iron ore, silver, tin, sulphur and zinc. Mineral exports account for about 60% of Peru’s total shipments abroad.

Given its strong mining potential, Peru has been attracting the world’s major mining companies to expand activities in the country. In 2013, the Peruvian Mines and Energy Ministry estimates the production of copper will soon reach 1.57Mt, an 18% increase over 2012 that stemmed from a 7.8% increase the year before. Foreign direct investment (FDI) is pouring into the country, of which the mining sector contributes over 13%. The current value of mining investment is in the neighbourhood of $US10 billion. Since investment activity in Peru has been driven by the private sector in recent years, the country is displaying a growing commitment to become a good place for doing business.

The estimated overall investment portfolio in mining for the next ten years is nearly $60 billion and comprises 47 main projects in various phases of mine expansion, advanced exploration and projects with an approved environmental impact assessment. Approximately 60% of the portfolio is comprised of copper projects, 16% of gold projects, 1.5% of silver projects and 12% of iron projects.

Peru is expected to have one of the lowest inflation levels in the region, at 2.8% for 2014 and its GDP is expected at 5.7% for 2014. The country’s strong macroeconomic performance during the last decade is the result of a well-managed monetary, trade and fiscal policy, the independence of the central bank, its success in attracting foreign direct investment, and the maximization of revenues from the country’s wealth in natural resources. However, Peru still faces a number of challenges that can hamper its competitiveness potential. These include improving its institutional environment, upgrading the country’s infrastructure and improving educational standards. Peru’s overdependence on minerals and metals subjects the economy to fluctuations in world prices.

Peru has continued to address certain issues that have negatively impacted the mining industry during the last several years. For example, poverty levels, income and regional inequalities have continued to cause social unrest in the country. The frequent social protests against large-scale mining operations based on predominant unsupported claims of detrimental environmental impacts to a project’s area of influence remain an unsolved problem. Adding to the social unrest are the government’s efforts to formalise the informal mining sector by 2016, in an attempt to place restrictions on an activity that has cost the country millions in lost fees and severely damaged the environment. In 2012 Peru launched a program to incorporate informal miners into the regulated mining system by April 2014, requiring registration of compliance commitments with the new regulations; certification of property rights; exploitation agreements including provisions authorizing the use of surface land; water permits and environmental corrective plans. Unfortunately, about half of the roughly 110,000 informal miners ignored the deadline to legalize their status, evading government efforts to bring them into the formal economy and adding to the social conflict surrounding mining. Further, the Prior Consultation Law discussed in detail below, has further complicated the social conflicts in the country but has also caused delays in permit approvals.

In spite of these concerns, there are approximately 50 principal mining projects ongoing in 2014, maintaining Peru’s status as one of the world’s principal destinations for mining investment.

4.1 Perception of Mineral Policy

Peru rates as one of the most attractive options for investment in mining and exploration in both South America and globally, however this is based on its particularly high mineral potential (Table 1), rather much slower developing policy climate for mining (Figure 11). Foreign investors still see Peru as one of the countries with the
most room for improvement in closing the gap between its inherent mineral potential and the actuality of operating in the country (Table 1). Such improvements could unlock an even larger mining industry in the country, perhaps rivaling its neighbour Chile.

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</table>

1. Includes countries from South America, Central America, Caribbean Basin and the separate states of Argentina.
2. Known fully as the ‘Best Practices Mineral Potential Index’ which ranks countries by attractiveness if all countries applied Best Practice mineral policy i.e. if only geological prospectivity mattered.
3. Known fully as the ‘Uncertainty Concerning the Administration, Interpretation and Enforcement of Existing Regulations’ index.
4. Known fully as the ‘Socioeconomic Agreements / Community Development Conditions’ index.

Table 1: The position of Peru in the various indices of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).

The mining sector in Peru is now quite mature, so unlike many developing countries it does not face the same problems in the availability of skilled labour, or in possessing a good geological database. Similarly, Peru is now politically stable and hosts an improved legal system.

The main areas of concern for the mining industry in Peru, surround disputes over land claims; uncertainty over protected areas; and problems with socioeconomic and local community agreements (Table 1). Peru is now a common case study for local community conflict in relation to mining. Labour regulations in Peru could also be improved. Like much of South America, insecurity remains a problem, especially in relation to the drugs trade.

Not all aspects of Peru’s mining policy environment are problematic though, particularly in comparison to often troubled South American neighbours. Mining and environmental regulations are fairly clear; the bureaucracy reasonably efficient; and the taxation regime is perceived to be not too onerous.
The major challenge facing Peru’s mining industry is therefore in resolving the myriad land disputes and local community disagreements.

![Performance of Peru in Fraser Institute Survey of Mining Companies Rankings over time](image)

Figure 11: The changing position over time of Peru in the three main indices (Investment Attractiveness, Policy Perception and Mineral Potential) of the Fraser Institute’s Annual Survey of Mining Companies 2014 (Green and Jackson, 2015).

### 5. Geopolitical Assessment and Sovereign Risk

#### 5.1 Stability

Since 2001 Peru’s economy has been strong, with growth due mostly to the export of natural resources. High economic growth, along with social programs, has helped to lower Peru’s overall poverty rates. Nonetheless, in some jungle, mountain, and rural areas of the country, over 60% of the population continue to live in poverty. The income distribution gap remains quite large as well. This economic disparity has contributed to rising social unrest. President Humala submitted, and the legislature approved, a bill increasing royalties mining companies must pay. The government estimates the royalties will generate about US$1 billion a year, which it will use to finance social development initiatives, intended to narrow both the social divide and the economic distribution gap.

The first law Humala signed was a prior consultation law, requiring mining, energy, and logging companies to consult with indigenous and rural communities about projects planned in their communities, which had been the source of much social conflict. Former President Alan García had vetoed a similar law, and violent conflicts over land use continued throughout his term. The law brings Peru into compliance with the International Labor
Organization’s Convention on Indigenous Peoples, which Peru ratified in 1993. The convention requires that companies consult indigenous groups before entering their ancestral territories to exploit natural resources. Implementing regulations went into effect on April 4, 2012. No prior consultations had been carried out as of May 2013.

As a complement to the new law, the Humala administration also created an office of conflict prevention. As part of that effort, the ministers’ council released its first report on social conflict in December 2012, saying that 15 mining conflicts were under the auspices of state conflict prevention measures such as early alert mechanisms and communication strategies.

Because the prior consultation law does not grant local communities veto power over investments in their area, however, and does not require consultation for government coca eradication efforts, tensions have continued and are likely to remain an issue. Some businesses worry that the new consultation process could add bureaucratic impediments to their projects. And some conflicts have political or other roots besides land use issues. Although the government said it hoped to reduce the number of conflicts by increasing dialogue among communities, investors, and the state, major conflicts have continued, and some critics say not much has changed. The Humala government has declared states of emergency in the northern Cajamarca region of Peru, but protests against mining efforts there have continued, often turning violent.

In the southeastern region of Madre de Dios, the government is contending with illegal mining, which has also led to violence, pollution, and destruction of the Amazonian rainforest. Estimating there to be up to 50,000 small-scale miners in the area, the government decreed stricter penalties for illegal mining in February 2012, has removed thousands of miners, and plan to remove all illegal miners working near national parks.

5.2 Peruvian Mining Law
(For a detailed description of Peruvian Mining Law – refer to Appendix 1)

Under Peruvian law, the Peruvian State is the owner of all mineral resources in the ground. Rights over such mineral resources are granted by means of the "Concession System". The Concession System provides for the existence of four (4) different types of concessions for the mining industry, which grant the titleholder the right to perform different activities related to the mining industry, as follows:

- Mining Concessions, which grant their titleholder the right to explore and exploit the mineral resources located within the boundaries of said concession;
- Processing Concessions, which grant their titleholder the right to extract or concentrate the valuable part of an aggregate of minerals extracted or to smelt, purify or refine metals;
- General Work Concessions, which grant their titleholder the right to provide ancillary services to two or more mining concessions; and
- Mining Transport Concessions, which grant their titleholder the right to install and operate non-conventional continuous transportation systems for mineral products between one or several mining centres and a port or processing plant, or a refinery or one or more stretches of these routes.

Mining concessions are considered immovable assets and are therefore subject to being transferred, optioned, leased and/or granted as collateral (mortgaged) and, in general, may be subject to any transaction or contract not specifically forbidden by law. Mining concessions may be privately owned and no minimum state participation is required. Buildings and other permanent structures used in a mining operation are considered real property accessories to the concession on which they are situated.

Royalties
In September 2011 mining taxes and royalties were increased by the Peruvian Government. Miners now pay royalties ranging from 1% to 12% of operating profits, along with a windfall profits tax ranging from 2% to 8.4% of...
net profits aimed at increasing tax revenues during mining boom years. The windfall profits tax applies to mining companies that do not have legal stability contracts. Payment is on a quarterly basis.

Taxation & Foreign Exchange Controls
Corporate net income is taxed at a rate of 30% of annual net income, subject to an additional 4.1% withholding tax at the time profits are distributed to shareholders. There are currently no restrictions on the ability of a company operating in Peru to transfer dividends, interest, royalties or foreign currency to or from Peru or to convert Peruvian currency into foreign currency. Congress has approved a Temporary Net Assets Tax, which applies to companies subject to the General Income Tax Regime. Net assets are taxed at a rate of 0.5% on the value exceeding Nuevo Sol 1,000,000 (approximately US$300,000).

Stability Agreements
The General Mining Law provides to holders of mining rights the option of signing stability agreements with the Peruvian Government in connection with investments made to commence new mining operations or expand existing mining operations. Mining companies can obtain two complementary regimes (generally it is suitable that one company/operation have both regimes) of legal stability, the "General Legal Stability Agreement", which is signed with PROINVERSION, a government agency to encourage private investments; and the "Mining Guarantee Agreement", that is specific for mining companies.

6. Conclusions

- In 2013 Peru produced 182 tonnes of gold ranking it as the 5th highest in the world. In addition, Peru’s gold reserves and resources are estimated at around 2,200 tonnes (8th worldwide)
- Many of Peru’s gold mining operations are part of multi-commodity mines such as IOCG deposits and porphyry copper gold deposits.
- The largest and lowest cost gold deposits are the ‘acid-sulphate’ or ‘high sulphidation’ deposits of the Tertiary volcanic rocks in the high cordillera (3800 - 5,200m). Acid sulphate gold deposits provide ore which is amenable to heap leach extraction thereby reducing treatment costs substantially.
- Peru ranks as one of the most attractive locations for minerals investment worldwide, though this is more due to its world class mineral potential, than because of its policy environment, which is rated less favourably.
- Despite the fact that Peru is politically and economically stable and actively encourages foreign investment in mining, it is still seen by foreign investors as one of the countries with the most scope for improvement in closing the gap between minerals potential and policy climate. Making such improvements could help Peru elevate its mining sector to that seen in neighbour, Chile.
- The main problems facing Peru’s mining sector relate to land claims, protected areas and agreements with local communities. Social issues relating to artisanal mining and poverty persist despite remedial efforts by the government. Peru is also notorious for conflict with local communities in relation to mining.
- Labour regulations in Peru could also be improved.
- In addition, along with many South American countries, insecurity remains a problem, particularly in relation to the drugs trade.
- More positively, Peru’s fairly mature mining industry now hosts a reasonably well skilled workforce and good quality geological database. Opinions about infrastructure vary, but it is perhaps the case that it excellent in comparison to other developing and South American countries, but still fairly weak on a global scale.
- Similarly, Peru hosts a good legal system; mining and environmental regulations are fairly clear; the bureaucracy reasonably efficient; and the taxation regime is perceived to be not too onerous. This comes despite recent (2011) increases in royalty rates.
- Ultimately, the main challenge facing Peru’s mining sector is resolving the myriad land disputes and local community disagreements.
7. References


APPENDIX 1
An overview of the mining industry in Peru. The significance of mining as a component of the national economy

(Sandra Orihuela & Orihuela Abogados. Published in Latin Lawyer on Thursday, 24 April 2014)

1 The legal and regulatory framework.
Mining in Peru is primarily regulated by national laws and regulations enacted by the Peruvian Congress and the executive branch of government. The principal legal framework on mining is set forth in the 1992 General Mining Law and its amendments. The mining sector is regulated by its Law and Regulations on Organisation and Functions, pursuant to which the Ministry of Energy of Mines (MEM) was created. It is the principal government entity that, together with its various offices, departments and agencies, is responsible for the mining sector in Peru. The MEM is a member of the executive branch of government, and is responsible for putting in place specific policies and rules governing the matters in its jurisdiction, namely energy, hydrocarbon and mining activities.

The MEM is not the only authority enacting mining-related regulation; there are in fact several government bodies with authority over specific matters that are relevant to the mining industry.

These are as follows:

Environmental:
- the Environmental Evaluation and Supervisory Authority (OEFA)
- the MEM;
- the Ministry of the Environment (MINAM);
- the Agency for the Supervision of Investments in Energy and Mining (OSINERGMIN);
- the Ministry of Agriculture (MINAG);
- the National Service of Protected Areas (SERNANP);
- the General Directorate of Coastguards (DICAPI);
- the National Institute for the Development of Andean, Amazonian and Afro-Peruvian (INDEPA);
- the National Authority of Water (ANA), and the local governments.

Tax:
- the MEM;
- the National Tax Authority (SUNAT);
- the Ministry of Finance (MEF).

Administrative:
- the MEM;
- the Mining and Metallurgical Geological Institute (INGEMMET);
- the Ministry of Transport and Communications (MTC);
- Ministry of Culture (MC);
- National Port Authority (APN);
- DICAPI; General Directorate of Arms, Ammunition and Explosives (DICSCAMEC);
- the Public Registry (SUNARP).

Labour:
- the Ministry of Labour (MINTRA).
- Safety and Security:
- OSINERGMIN;
- APN;
- MINTRA;
• the National Institute of Civil Defence (INDECI);
• the General Directorate of Environmental Health (DIGESA).

The MEM is also responsible for decentralising and transferring some of its responsibilities to the local governments. Local governments may put in place rules regarding mining to be applicable in their respective jurisdiction, so long as such rules and local laws do not conflict with MEM rules or other laws and regulations.

2 The investment regime (specifically or generally) applicable to foreign company involvement in mining projects.

Foreign investors in Peru have the same rights and obligations as Peruvian investors. There are generally no restrictions on the involvement of foreign investors in any business activities, including mining. However, the Peruvian Constitution provides that no foreign person may directly or indirectly acquire or otherwise possess, among other things, land or mining properties within 50km of Peru’s national borders without obtaining express, prior governmental authorisation in the form of a Supreme Decree.

In addition, Peru offers legal stability agreements that can be entered into by private investors with the Peruvian government for 10 or 15-year terms to protect their investments and enjoy a number of benefits. Mining investors with stability agreements will benefit from tax stability (including income, export, labour and certain tax exemptions), free disposition of currency generated by exports, non-discrimination with respect to the exchange rate, accelerated depreciation for certain assets and the option of maintaining accounting in a foreign currency. Also, mining concession title-holders that have projects in the exploration stage may apply to have the right of early recovery of sales tax paid during the exploration phase.

3 International investment treaties applicable to mining projects undertaken or sponsored by foreign companies

Peru has entered into treaties and agreements with various countries, some of which relate directly to mining, and others which relate to foreign investment, dispute resolution, double taxation and inter-country relations, all of which are relevant in the ambit of mining in Peru. Generally, these do not change the role of the local government authorities in mining transactions, nor do they require any direct relationship between the investor and the government.

Specifically, Peru has entered into FTAs with China, the US, Canada, Chile, Mexico, Nicaragua, Costa Rica, Japan, Panama, Thailand, the EFTA States (Iceland, Liechtenstein, Norway and Switzerland), the European Union, South Korea, Venezuela and Singapore. It has entered into BITs for the reciprocal protection and promotion of foreign investment with Australia, the UK, Ecuador, Argentina, Bolivia and Colombia, among others, thereby establishing a solid legal framework that provides for the protection of investment and guarantees national treatment for foreign investors from those countries. The bilateral conventions Peru has entered into with Canada, Chile and Brazil, as well as with the Andean Community prevent double taxation. Peru is also a signatory to certain environmental treaties relevant to mining, and the convention and agreements it has entered into with Ecuador facilitate cross-border mining projects in their common border areas.

Peru is a also member of the World Trade Organization, the Multilateral Investment Guarantee Agency, the Andean Community and the UN Convention on the Recognition and Enforcement of Foreign Judgments, all of which have relevance with respect to foreign investment in mining in Peru, and Peru is committed to the arbitration of investment disputes under the World Bank’s International Centre for the Settlement of Investment Disputes.

4 Mining exploration and exploitation permit or concession regime.
The Mining and Metallurgy Geological Institute (INGEMMET) grants title to mining concessions.

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6 Water rights
The Law on Water Resources governs the management of water in Peru. The law defines water as a delicate renewable natural resource that is vital to human life and of strategic importance for sustainable development, the maintenance of natural systems and cycles, and the safety of the country. There is no private ownership of water bodies in Peru as these belong solely to the government and are part of the country’s national heritage. Local offices of the National Water Authority grant water rights which are independent from land or mining concession rights. There are generally three types of water rights: (i) permits and (ii) licences, both of which are granted for an indeterminate period of time; and (iii) authorisations, granted for no longer than a two-year period and renewable once for an equal term. The party granted the water rights has various obligations, such as to consume only the amount of water permitted and to pay the corresponding consideration for the volume of water used, and may be subject to fines or loss of the water rights. Given that water rights are separate from the land and concession rights, they cannot be mortgaged together with those rights.

Mining companies usually utilise water from rivers, underground wells or rainwater. Companies are becoming more creative with respect to alternative techniques and activities to address water use, recycling and conservation, including building shared water dams and reservoirs for the storage of water during the rainy season.

7 Surface rights regime
Obtaining title to mining concessions does not ensure permission to use surface lands. Permits for surface land use must be obtained from the individual landowners via agreements entered into between the concession title-holder and the landowner. In the event that the owner is a peasant community, such communities are recognised by the Peruvian government as legal entities, so the agreement must be approved by a minimum vote of the assembly of the members of the community, as further provided in specific legislation on the matter. A concession title-holder can also petition the MEM via an administrative process for an easement to be imposed on the landowner. The application requires a valuation of the land and a payment of compensation to the landowner. Also relevant with respect to the use of surface land is the existence, since September 2011, of the Prior Consultation to Indigenous or Original Communities Law, which based on the provisions of Convention 169 of the International Labor Organization, gives prior consultation rights to indigenous communities over developments in their lands.

Furthermore, easements over surface land are usually used for access routes or to benefit the mining concessions located under the surface. When a surface land easement is granted to benefit a specific mining concession, such easement is usually perpetual and runs with the land, meaning that the right is inseparable from the rights of the mining concession and continues to exist for the benefit of subsequent owners of the mining concessions.

In addition, in 2014 Peru approved the Environmental Quality Standards (“ECAs”) guidelines applicable to soil, requiring the identification of contaminated soil and the implementation of mandatory land decontamination plans. The regulation applies to all activities involving potential contamination risks in target lands and their surrounding areas of influence, including mining. Thereby, concession title-holders are obliged to produce a detailed report in accordance with the guidelines, which includes soil sampling, in order to identify toxicological and ecotoxicological substances as well as relevant historical and technical information affecting soil. Said report shall be prepared by certified independent laboratories and presented no later than April 2015 before the Ministry of the Environment and the MEM. Should the soil exceed the applicable ECAs, the concession title-holders shall implement strategic and corrective measures in compliance with the approved ECA remediation plan and the guidelines.

8 Availability of power for remote mining facilities
The Interconnected National Electric System (SEIN) is the national network through which electricity is provided to the majority of Peru via generators, transmitters and distributors of electricity, which are all connected to the network. Mining companies can have electric power supplied from the SEIN, if available, depending on the location of the mining projects and the power required. To do so, they can contract directly with electricity generating companies or electricity transmitting companies that are part of the SEIN to obtain power for their facilities, in each case negotiating the price for the services.
Mining companies can also elect to generate their own electric power. This is usually more costly than utilising SEIN power, but this may be the only option for companies with projects where SEIN electricity is not an option. In such cases, the company must apply with the appropriate administrative authorities to obtain a concession or the appropriate approvals for electricity generation, and must be in compliance with all of the legal and administrative requirements before approval will be granted.

9 Termination of rights

Mining Rights:
Mining concessions can terminate by automatic expiration; abandonment; cancellation; annulment; or renunciation. Concessions expire automatically after certain set periods of time when the title-holder fails to pay annual fees, reach minimum production, pay penalties or make certain financial investments, as explained in question 6.

Concessions are abandoned when, in the process of applying for the concession, the party does not fulfill all of the application requirements. Concessions are cancelled when the right sought cannot actually be located or when there are priority rights of third parties already in existence. Concessions may be voided when requested by persons disqualified by law. Further, a title-holder can renounce his rights in the concession or any part thereof via a specific request to the granting authority. Any challenge to the granting of mining concessions must first be made via an administrative process and once such means have been exhausted, a claim can be brought before the judiciary.

Surface Rights:
Given that surface rights are independent and separate from mining concession rights, these must be acquired separately from the land surface owner, and termination thereof will depend on the private agreement providing for such rights.

Water Rights:
Water use rights can be terminated by: the title-holder renouncing his rights; the voiding of the administrative approval in which such use was granted; expiration; revocation; or pursuant to a final judicial decree calling for the termination of such rights.

Water rights may expire under the following circumstances:
- the death of the title-holder;
- the expiry of the term for which the use of water was granted;
- the termination of the purpose for which the right was granted; or
- the failure to use the right during a two-year period.

Water rights may be revoked under the following circumstances:
- failure to make two consecutive required payments for the use, the fee or any other financial obligation;
- when, without authorisation from the Water Authority, the water is used for a different purpose than that for which it was granted;
- when the title-holder to the right has been sanctioned twice due to serious violations; or
- due to water scarcity or quality problems, as declared by the governing authority, which prevent its use.

Power Rights:
An electricity concession can be terminated by a voluntary declaration of the title-holder. The power concession can also be cancelled if the title-holder:
- fails to register the concession agreement in the corresponding registry within a specified deadline;
- does not comply with the infrastructure as required in its approved application, unless due to force majeure determined by the MEM;
- shuts down its facilities for a cumulative period of 876 hours, without justifiable cause;
• lowers the quality of the generator or transmission and, after being sanctioned, does not operate its facilities pursuant to applicable norms;
• lowers the quality of distribution and, after being sanctioned, does not have valid contracts with generator companies, or does not render services according to standards agreed upon contractually;
• lowers the quality of the distribution, does not accredit its provision guarantee during 24 months, unless it has called for a public bid, and has not received any bids to cover all of its requirements; or
• repeatedly fails to pay generators for the provision of energy, provided such payment is not the subject of controversy.

Dispute Resolution:
When administrative proceedings for recourse are exhausted, a party may file an appeal before the courts within 30 days after the parties in the dispute have been notified of the decision from the administrative proceedings.

10 Installation or provision of essential infrastructure
Peru’s private investment policies encourage the construction and development of infrastructure projects by private parties with incentives for private investment. In the mining industry, there are benefits for mining companies that invest in infrastructure projects for public use, including for example, income tax deductions and exemptions from revocation or expiration of their mining concessions when they have invested in such infrastructure projects. There are similar incentives for investors in other industries, including the electric and hydrocarbon industries.

11 Collateral security arrangements
The most common collateral security arrangements relating to mining projects in Peru are the mining mortgage, the mining option, and the pledge.

A mining concession can be used as the underlying security to guarantee an obligation by way of a Mining Mortgage Agreement, representing a lien over the concessions during the term of the agreement to secure financing for the concession title-holder or as security for a creditor to whom the title-holder owes a debt. The title remains in the name of the title-holder during the term of the agreement, and the title-holder also remains in actual possession of the mortgaged concessions and can carry out work therein during the term of the mortgage. The mortgage must be registered before the Public Registry.

A mining option contract gives a third party the right to acquire the mining concessions from the title-holder after compliance with certain conditions, generally including payments of certain agreed-upon amounts or investments in exploration or other work at the concessions. The mining option is exclusive, for a maximum period of five years, and can be publicly registered, meaning there is an encumbrance on the mining concession title, thereby serving as collateral security for the party to whom the option is granted.

Finally, a pledge agreement is a security arrangement via which a lien is granted over the assets specified therein. This can include shares in an entity, tangible assets used in mining exploration and exploitation activities, as well as future receivables, bank accounts, dividends and profits, among others.

Generally speaking, these types of agreements can be freely assigned without prior governmental approval, unless otherwise specified by the parties therein. The liens should be registered with the corresponding Public Registry in order to put third parties on notice that the concessions or assets are encumbered by such agreements.

12 Mining project creditors entering into agreements with the mining authority in connection with collateral security interests.
It is not common practice for creditors to enter into an agreement with the mining authority in connection with the creation, perfection or acknowledgement of the collateral security interests granted to them.
However, as previously explained, agreements providing for such security interests can be registered in the mining registry, in which case any such registered encumbrances will be senior to any others that are not registered and of which the general public therefore has not been put on notice. Unregistered agreements can be nonetheless enforceable, but registration does ensure that the lien is made public. The seniority of registered security rights is based on which rights were registered first, notwithstanding the date on which such agreements were entered into.

13 Means of enforcement available to creditors in connection with collateral security interests in mining rights
The execution of a mining mortgage is carried out pursuant to the General Mining Law. The law provides that the concessions must be sold at a public auction in the event the creditor wishes to execute the mortgage, and the proceeds from the sale will be first used to pay the creditor the amount of the debt that was secured by the concessions.

The Law on Guarantees on Tangible Assets governs the execution of a pledge. The procedure set forth thereunder that is most commonly used is a privately run auction to sell the assets covered under such a pledge, although in the event there is any problem with such an auction, the creditor can seek a court-ordered auction. The parties can also agree that the creditor can take over the subject assets in satisfaction of the debt. Certain judicially ordered proceedings may also be available depending on the type of assets secured by the pledge.

14 Insurance
Peruvian legislation provides for the freedom to obtain insurance and reinsurance from outside Peru. There are, however, specific provisions for registration and compliance by insurance providers. Insurance claim payments are to be paid based on the provisions of the subject policies or contracts, and should be paid to local accounts designated for such a purpose.

15 Requirements related to the use of domestic and foreign labour, suppliers and contractors.
The Law on the Employment of Foreigners and its regulations governs the hiring of foreign labour. The law includes restrictions on the hiring of foreign labour and it limits Peruvian entities when hiring foreign labour to a total of 20 per cent of the total number of company employees, the combined compensation of which persons is not allowed to exceed 30 per cent of the total wages paid by the company. There are exceptions for certain skilled workers and for managerial positions. Further, any foreign employee must obtain an appropriate visa permitting the person to work in Peru, the type of which depends on the length of time of the employment agreement, which has an initial period of one year. The employment agreements must be registered with the Ministry of Labour. All workers, whether domestic or foreign, or whether hired as employees, consultants or independent contractors, are also subject to Peru’s tax regime, applicable based on the tax residency of the worker and the type of services being provided.

Workers in Peru may be hired via ‘outsourcing’ companies, but those companies must be registered with the government for the purpose of deciding which personnel will be used. They may only be used for temporary, complementary or specialised work. Under certain circumstances and with respect to certain services to the mining industry, the service provider must be registered with the MEM.

16 Extending liabilities beyond the mining project company to its owners, mortgagees, or creditors
Under Peruvian tax laws, legal representatives and other parties that are granted powers by a legal entity in Peru will be personally liable for taxes and other formal obligations of such entity only when they have wilfully, negligently or in abuse of their powers, caused the company to fail to comply with its tax obligations. In such a case, liability will be joint and several among the company and those parties, and the tax authorities can demand that such debts are paid in full at any of the time and by any or all of such parties. The Tax Code provides definitions for what constitutes wilful misconduct, gross negligence and abuse of powers, and the Peruvian tax administration has the burden of proving such conduct.
Criminal proceedings can be brought against company management for environmental liabilities. Failure to control possible environmental harm or to comply with environmental regulations will result in the imposition of fines and could result in potential criminal charges against the management of a company for crimes related to harming the environment and human health. This means that directors, managers and other legal representatives can be held criminally liable, with possible penalties ranging from very significant fines to imprisonment. The concept of ‘piercing the corporate veil’ does exist in the Peruvian legal system, but it is not codified and is currently based only on legal doctrine. Therefore, its application is still limited, and usually in order for shareholders to be liable for the liabilities of the company, strong evidence to show that the entity was formed solely for the purpose of committing a fraud would be required.

Under Peruvian law, entities are not held criminally liable but may be considered a third party obligor and thus be subject to civil damages, or be charged with accessory administrative sanctions provided that an individual connected to the entity is found guilty of a crime. This may soon to change, however. A draft bill to hold entities criminally liable for bribery related crimes was approved by Peru’s High Level Anti-corruption Commission in December 2013, and is awaiting further approval by the Presidency of the Council of Ministers and Congress. Peru is fast becoming an active participant of international anti-bribery related trends and enforcement, and as a result, the extractive industry will face new challenges ensuing from the enforcement of criminal corporate liability.

17 Other relevant legal considerations related to financing of mining projects.
The BVL Junior of the Lima Stock Exchange (the BVL) is a segment of the BVL that is designed to offer junior mining companies the opportunity for financing for exploration via the Peruvian capital market. National and foreign companies can list, but they must comply with certain requirements, including completing certain minimum exploration work and incurring certain costs and expenses within a mining concessions area (either as direct or indirect title-holder of the concessions, a party to an option or an assignment related to the concessions, or a party to a joint venture related to the concessions) within a period of three years. The high cost of doing business in the mining industry, limited funding for green roots exploration projects, coupled with the drop of commodity prices over the past two years, have had an impact on Peru’s BVL, which is dominated by mining companies. In May 2013, the BVL suffered a 2.48 per cent drop, the lowest level since September 2010. Experts also attributed the drop to a decrease of the BVL’s mining and industrial stocks, and hope for a rebound when international metal prices see an increase.

Due to the strength of the sovereign’s external and fiscal balance sheets, continued growth outperformance and a long track record of macroeconomic and financial stability, the main rating agencies such as Standard & Poor’s and Moody’s have upgraded Peru’s sovereign debt as investment grade, with Fitch upgrading Peru’s rating to A-minus from BBB-plus in October 2013.

18 Future proposals in regards to concession renegotiations, revisited royalty and taxation regimes or legislation introducing significant requirements for projects under ongoing permitting and regulatory processes
In 2011 Peru created two additional levies over mining, the Special Tax on Mining (IEM) and the Levy on Mining (GEM), in addition to amending the manner in which mining royalties are applied. In spite of these changes not being applicable to those miners holding stability agreements with the government, many have decided to voluntarily pay the new taxes. The general perception following the new taxes is that Peru remains competitive as a mining investment destination.

The 2011 Prior Consultation to Original or Aboriginal Communities Law, which has yet to be fully implemented, is causing significant concerns to the mining industry in Peru. The Prior Consultation provides for the right of the indigenous population to be consulted prior to the adoption of legislative or administrative measures, the development of public or private projects that may have an impact on the population’s physical existence, cultural identity or quality of life. To be implemented, publication of the 52 indigenous populations identified by the Ministry of Intercultural Affairs must take place. The Ministry of Culture has thus far published information about 47 of the 52 indigenous populations that have been identified. While the decision of the indigenous population
over a mining project would not alone determine its development, the legislation is nonetheless an important concern as it is prone to delay and further complicate the social conflicts already affecting the mining industry in the country.
<table>
<thead>
<tr>
<th>Operation/Owner</th>
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<th>Production</th>
<th>Resources</th>
<th>Mining</th>
<th>Processing</th>
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<tr>
<td>Yanacocha/ Newmont</td>
<td>Prod.</td>
<td>2014: 0.498Moz</td>
<td>As at 31/12/2014:</td>
<td>Ore from two open pits (Cerro Yanacocha, 1997 and La Quinua, 2001)</td>
<td>Since the ore is porous, run-of-mine ore can be heap-leached without</td>
<td>Newmont. Reserves and Resources as of 31 December 2014. Accessed at:</td>
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<td>(51.35%) Buenaventure</td>
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<td>Prov. &amp; Res: 193Mt @ 0.78g/t = 2.55Moz Meas. &amp; Ind. Res: 81Mt @ 0.54g/t = 1.42Moz Inf. Res: 198Mt @ 0.81g/t = 5.14Moz</td>
<td>Three pits being reclaimed - Caracucho, Maqui Maqui and San José Sur.</td>
<td>crushing and the solution treated by the Merrill Crowe process</td>
<td><a href="http://www.newmont.com/files/doc_downloads/reserves_and_resources/R">http://www.newmont.com/files/doc_downloads/reserves_and_resources/R</a> reserves-Resources-for-Posting_Final.pdf. Retrieved 6 March 2015</td>
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<td>IFC (5%)</td>
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<td>Prov. &amp; Res: 69.65Mt @ 1.28g/t = 2.833Moz Meas. &amp; Ind. Res: 19.33Mt @ 0.70g/t = 0.429Moz Inf. Res: 1.566Mt @ 0.73g/t = 0.037Moz</td>
<td>Total Min. Resources: 3.98Mt for 0.264Moz</td>
<td>and water discharge treatment plant.</td>
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<td>Orcopampa/</td>
<td>Prod.</td>
<td>2013: 0.44M Mt @ 0.49g/t = 0.225Moz</td>
<td>As at 31/12/2013:</td>
<td>Ore processed by CIL</td>
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<td>Buenaventura Annual Report 2013. Summary of Operations. Accessed at:</td>
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<tr>
<td>Buenaventura</td>
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<td></td>
<td>Total Min, Reserves: 0.74Mt for 0.371Moz</td>
<td>Underground in the mines of Nazarenos, Prometida, Lucy Piso and</td>
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<td><a href="http://extapps.mx.ir/raq/Buenaventura/2013/interna.asp?i=1&amp;p">http://extapps.mx.ir/raq/Buenaventura/2013/interna.asp?i=1&amp;p</a> ag=08&amp;sec=co=1. Retrieved 6 March 2015</td>
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<td>Total Min. Resources: 3.98Mt for 0.264Moz</td>
<td>Prosperidad. Some tailings treatment</td>
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<td>La Arena/</td>
<td>Prod.</td>
<td>2014: 41Mt @ 0.64g/t = 0.845Moz</td>
<td>As at 31/12/2013:</td>
<td>Oxide ore mined from the Calacorco and Ethel pits, with Ethel now exhausted. Conventional drill and blast, load and haul methods in 8m high benches.</td>
<td>Cyanide leaching on each leach pad cell for 60 days followed by adsorption, desorption and refining</td>
<td>Rio Alto Technical Report. Accessed at: <a href="http://www.rioaltominining.com/resources/NI_43_101_REPORT">http://www.rioaltominining.com/resources/NI_43_101_REPORT</a>_ LA_ARENA_DEC31ST14_FILED1-27Feb.pdf. Retrieved 7 March 2015</td>
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<td>Rio Alto</td>
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<td>Total Min, Reserves: 67.1Mt @ 0.34g/t = 2.025Mt Total Min. Resources: 125.3Mt @ 0.82g/t = 3.318Moz</td>
<td>Total Min. Resources: 3.98Mt for 0.264Moz</td>
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<td>Goldfields</td>
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<td>Prov. &amp; Res: 34B Mt @ 0.28g/t = 3.18Moz Meas. &amp; Ind. Res: 62.6Mt @ 0.24g/t = 1.56Moz Inf. Res: 33Mt @ 0.11g/t = 0.14Moz</td>
<td>Total Min. Resources: 3.98Mt for 0.264Moz</td>
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<td>La Zanja/</td>
<td>Prod.</td>
<td>2014: 0.144Moz</td>
<td>As at 31/12/2014:</td>
<td>Open-pit with underground planned for 2015</td>
<td>Cyanide heap-leaching</td>
<td>Newmont. Reserves and Resources as of 31 December 2014. Accessed at:</td>
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<td>Newmont</td>
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<td>Prov. &amp; Res: 11.29Mt @ 0.70g/t = 0.256Mt Meas. &amp; Ind. Res: 1.49M Mt @ 0.24g/t = 0.516Moz Inf. Res: 1.28Mt @ 0.77g/t = 0.043Moz</td>
<td>露天开采计划进行的2015</td>
<td></td>
<td><a href="http://www.newmont.com/files/doc_downloads/reserves_and_resources/R">http://www.newmont.com/files/doc_downloads/reserves_and_resources/R</a> reserves-Resources-for-Posting_Final.pdf. Retrieved 6 March 2015</td>
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<td>(46.94%) Buenaventure</td>
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<td>IFC (5%)</td>
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<td>Prov. &amp; Res: 7.80Mt @ 3.37g/t = 0.843Moz Meas.&amp; Ind. Res: 7.07Mt @ 4.07g/t = 0.930Moz Inf. Res: 4.94M @ 3.91g/t = 0.620Moz</td>
<td>Total Min. Resources: 3.98Mt for 0.264Moz</td>
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<td>Prov. &amp; Res: 37.85Mt @ 0.84 = 1.02Moz Meas.&amp; Ind. Res: 1.147,31Mt @ 0.52g/t = 2.44Moz Inf. Res: 71.00Mt @ 0.71g/t = 1.63Moz</td>
<td>Total Min. Resources: 3.98Mt for 0.264Moz</td>
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| Conga/ Newmont (51.35%) Buenaventure (43.65%) IFC (5%) | Dev. | Development delayed by local protests and legal issues | **As at 31/12/2015:**  
Prob. Res: 536Mt @ 0.73g/t = 12.78Moz  
Ind. Res: 158Mt @ 0.40g/t = 2.00Moz  
Inf. Res: 230Mt @ 0.36g/t = 2.88Moz  
| Crespo/ Hochschild (delayed) | Dev. |  | **As at January 2012:**  
Prov. & Prob. Res: 20.48Mt @ 0.46g/t = 0.305Moz  
Meas. & Ind. Res: 23.39Mt @ 0.45g/t = 0.340Moz  
Inf. Res: 5.17Mt @ 0.35g/t = 0.059Moz  
Open-pit mining at 6,850tpd and a stripping ratio of 1.15:1.  
| AntaKori/ Regulus Resources | Expl. |  | **As at 2/7/2012:**  
Inf. Res: 295Mt @ 0.36g/t = 3.40Moz  