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GLOBAL BUSINESS REPORTS

Mining in Democratic Republic of Congo

A Journey to Africa's Mineral Heartland

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This report was researched and prepared by Global Business Reports (www.gbreports.com) for Engineering & Mining Journal.

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Cover photo: Copper at Tiger Mines located in the proximity of Lubumbashi. Photo by Jolanta Ksiezniak, courtesy of Tiger Mines.

A REPORT BY GBR FOR E&MJ

JANUARY 2013

Democratic Republic of Congo: An Overview

A new opportunity based on a growing economy.

With an estimated $24 trillion worth of untapped mineral wealth in the ground at today's prices, the Democratic Republic of Congo (DRC) has the potential to become rich beyond imagination. The country's mineral resources include cobalt (world's largest reserves, holding more than 45% of overall reserves), copper (world's second largest reserves after Chile, at 70 million metric tons), diamonds, gold, zinc, uranium, tin, silver, coal, manganese, tungsten, cadmium and crude oil. Yet, over the past 20 years, average gross domestic product (GDP) growth has lagged below that of its eight neighbors, while total GDP is below that of its smaller neighbors Angola, Tanzania, Uganda or Zambia. Today, as always, the country's true economic salvation seems to depend, to a large extent, on the successful exploitation of its vast mineral resources.

The enactment of Law No. 007/2002 of July 11, 2002 relating to the Mining Code (Mining Code) was aimed principally at attracting investments in the country's vast mineral resources. More recently, the presidential and legislative elections in November 2011 dominated the political scene, with incumbent, Joseph Kabila, winning a second mandate. Despite the continued challenges of operating from the DRC, including the physical and institutional infrastructure of the country and continued civil unrests in the eastern Kivu provinces, recently there have also been positive signs. GDP in 2011 reached 6.5% (a slight drop from the 7.2% figure of 2010) marking 10 years of positive GDP growth, something that has never been recorded before. President Joseph Kabila is implementing reforms and the effects are obvious: inflation fell from 46.2% in 2009 to 23.1% in 2010, and again to 17% in 2011.

The DRC must be analyzed cautiously and patiently by those wishing to invest in the country. "Always expect the unexpected. You must be ready to adapt your plans constantly and you must be flexible. It can be anything, from airline schedule changes to bridges dropping on your route. Understanding the challenges and above all understanding the people who you are doing business with is paramount," said Alex van Hoeken, president and CEO of Kilo Goldmines, a gold exploration and development company with operations in the DRC.

Democratic Republic of Congo and its Regions

Mining Today

According to the Metals Economics Group, Africa as a whole claimed 15% of planned global non-ferrous exploration budgets in 2011. The DRC ranked first in Africa in 2010, only to slip to second place behind South Africa in 2011. Given the difficulties of operating in the country (the DRC is ranked 18th from bottom in the Fraser Institute Annual Survey of Mining Companies 2011/2012), this is a significant testament to the mineral potential the country has.

The government has yet to produce reliable data regarding production levels of the various minerals. According to the U.S. Geological Survey Yearbook, the mining and mineral processing sectors accounted for an estimated 13.4% of GDP in 2008 (more recently in 2011, the French Ministry of Foreign Affairs concluded that the mining sector in the DRC represented almost 28% of GDP, up from 25% in 2010).

Mineral exports were estimated to be about $6.59 billion in 2008 and mineral imports, $6.71 billion. Cobalt accounted for 38% of the total value of exports; copper 35%, crude petroleum 12% and diamonds 11%. Other notable minerals exports included gold, tantalum, tin and tungsten. In 2009, the production of refined copper in the DRC increased by an estimated 247%, refined cobalt by 106% and mined copper by an estimated 24%. Tin production instead decreased by an estimated 19%, and diamond by 13%.

Qualifying the DRC as potentially one of the richest mining countries in Africa, analysts forecast that, driven by increased copper production and the development of world class deposits, the country's mining sector by 2015 will double from 2010 levels.

Much of the copper mining related activity in the DRC developed around the towns of Likasi, Kolwezi and Lubumbashi along the fabled copper belt in the southern province of Katanga. Tenke Fungurume Mining (TFM), a copper and cobalt mine in the Katanga province, is perhaps the project most readily associated with the copper and cobalt industry in the country. TFM produced 127,367 mt/y of copper and 11,182 mt/y of cobalt in 2011, while the operating partner, Freeport-McMoRan Copper & Gold

GECAMINES

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The Democratic Republic of Congo is home to an extensive wealth of natural resources.

Gécamines, the largest Congolese company operating across industrial sectors for several decades, through new management and restructuring, has ambition to become the largest mining company in the country, and to be amongst the top 5 in the next 5 years.

With sustainability at its core, local knowledge, transparency and strong community relations, Gécamines is your partner of choice in the DRC and together we can exploit the country's mineral potential.

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was expecting 2012 sales to reach approximately 131,500 mt of copper and 11,300 mt of cobalt.

Also in the premier league, Glencore operations throughout the country continue through two joint ventures, Kamoto Copper Co. and DRC Copper and Cobalt project. Current production levels are at 130,000 mt/y of copper and 8,000 mt/y of cobalt with expansion to 310,000 mt/y of copper and 30,000 mt/y of cobalt planned within 2015.

Despite the general slowdown of business caused by the electoral process, a number of transactions caught the attention of the mining community lately. Metorex was acquired by Jinchuan Group in a $1.1 billion acquisition which saw the flagship Ruashi copper-cobalt project move into Chinese hands.

The deal was announced early in 2011, when Jinchuan, China's dominant nickel producer, added almost 22% to Brazilian Vale's previous offer. The Ruashi mine comprises three open pits and a modern Solvent Extraction Electro-winning (SX-EW) plant. Other assets owned by Meteorex in the DRC included the existing Kisenda mine, the Dilala east and the Lubembe deposit greenfield sites, all located in the Katanga province.

Following in Jinchuan's footsteps, Chinese metal and mineral-trading company Minmetals Resources recently concluded the $1.3 billion acquisition of Anvil Mining. Anvil also mined copper and cobalt at Kinsevere in the Katanga province and undertook copper exploration in the region.

First Quantum Minerals instead was working on a project to extract copper and cobalt from tailings of older operations around Kolwezi. It was expected to produce around 70,000 mt/y of copper and around 14,000 mt/y of cobalt per year and had spent $750 million on acquiring and developing the property there. In August 2009, the government in the DRC revoked First Quantum's license due to a dispute over renegotiating the terms of the contract. Later in 2012, First Quantum disposed of its residual assets in the DRC to Eurasian Natural Resources and settled all claims related to its DRC operations.

After half a century of unrealized potential, the DRC's gold sector is now also on the verge of rapid growth. Banro's Twangiza mine, became the first producing gold mine in the country after 50 years when its first gold pour took place in October 2011. Estimated production levels of 120,000 oz/y are forecast. In June 2012, gold production averaged approximately 60% of the rated capacity of the plant. Banro aims to achieve an annualized gold production rate of 200,000 oz/y by the end of 2013.

The Kibali gold project in the Orientale province is 90% owned by a joint venture between Anglogold Ashanti and Randgold Resources, each holding a 45% stake in the project. Covering an area of 1,836 sq km, the Kibali mine is considered the largest underdeveloped gold deposit on the African continent.

An important addition to the mining industry is the role of artisanal and small-scale mining in the DRC. While the nature of artisanal mining makes it very difficult to obtain reliable information, it is estimated that almost 90% of mineral production comes from artisanal miners. Estimates vary on the number of artisanal miners in the DRC: 500,000 to 2 million diggers (creseurs) are thought to be actively involved in extraction of minerals. "Article 5 of the Mining Code allows Congolese nationals to engage in artisanal mining provided they hold an artisanal miner card issued or granted by the relevant government entities. The province therefore witnessed increased artisanal mining in the last decade and not only for gold operations like it used to be," said the Provincial Minister of Mines in Katanga, Barthélemy Mumba Gama.

DRC: The Country of the Future?

At African-focused business conferences the excitement of businessmen and investors is invariably focused on Nigeria and Mozambique. Yet the DRC, a country of larger land area and comparable resource wealth (even if this wealth comes in different forms), is often ignored. This can largely be explained by the business environment, which is considered by many to be among the worst in the world (ranked 176th out of 183 countries in the World Bank's Doing Business 2012 rankings and 172nd out of 179 countries according to the Heritage Institute's Index of Economic Freedom).

The result of the global financial crisis was severe on the mining industry and the overall economy of the DRC. The decline in commodity prices caused drastic job losses. According to a World Bank report, between 2008 and 2009, almost 300,000 employees lost their jobs in Katanga alone. In the town of Likasi, it was estimated that nearly 60 mining companies had closed their doors in the first three months of 2009.

However in 2010, the DRC economy was already projecting sustained periods of strong growth, with national GDP back at 7.2% in 2010 and more recently in 2011 the country's economy recorded a 6.9% growth.

As explained by the Overseas Development Institute in the UK, recovery in 2010 involved the same transmission channels as during the crisis, but in the opposite direction. World commodity prices rose again in 2009 and mining companies in the DRC responded favorably, although the pace of recovery has been uneven. Hopefully this recovery will produce substantial benefit streams to the country's overall economy going forward. It is an established fact that minerals have historically been the driver of economic growth in the DRC.

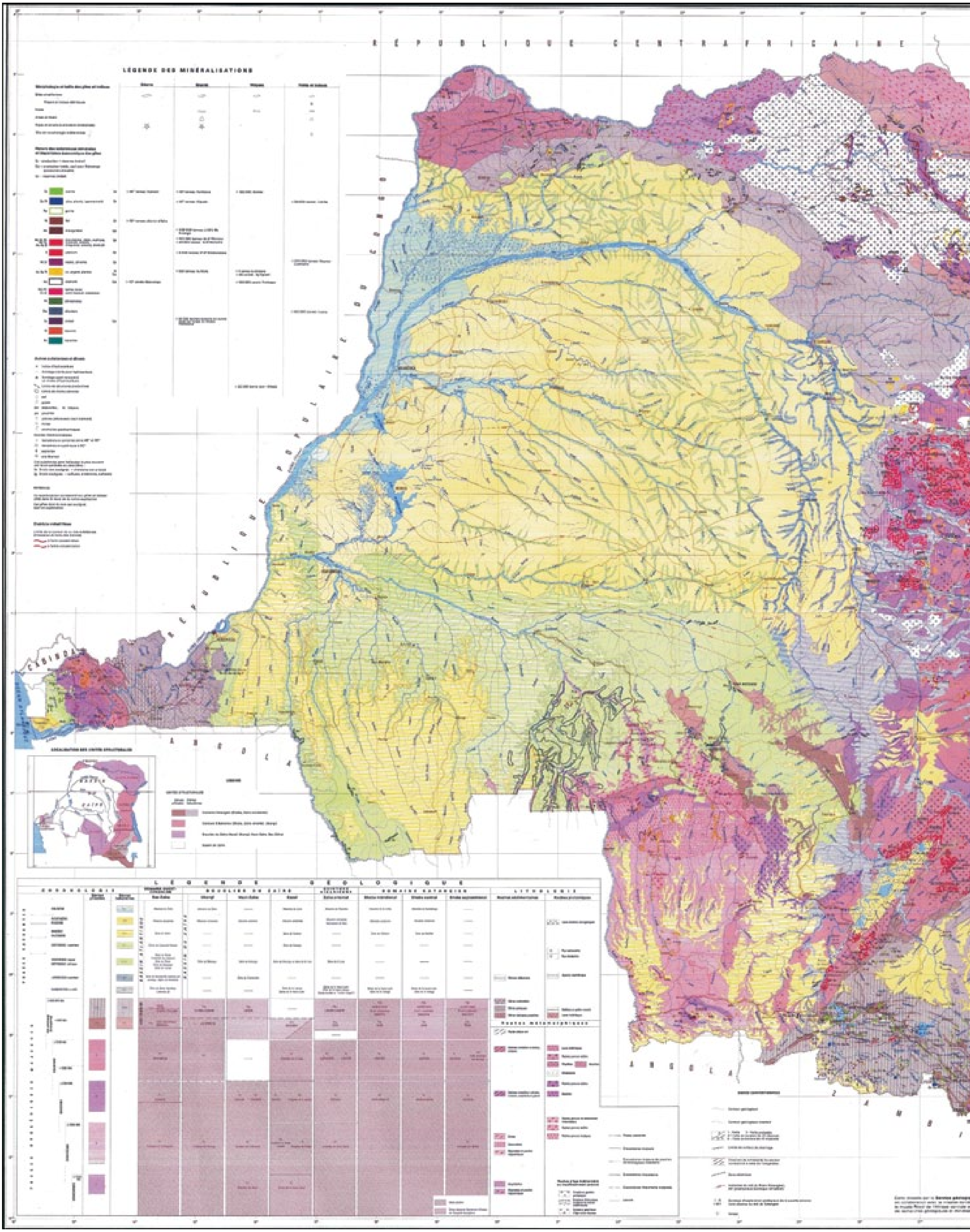
Nevertheless, as argued by the World Bank, there is still an urgent need for an enabling environment, strengthening supervisory institutions and good governance in order to attract further private investments to the sector. Unfortunately, the country is still perceived by international investors as a lawless state plagued by war where doing business is almost impossible. However, while the situation in the eastern Kivu provinces remains tense, with active militias focusing on extracting minerals illegally and controlling parts of the territory, the reality is that the rest of the DRC is today largely at peace.*

In terms of infrastructure, the DRC faces one of the biggest challenges on the African continent. Following years of conflict, transport networks have been damaged or left to deteriorate and about half of the existing infrastructure assets are in need of repair. The country's vast geography, low population density and extensive forestlands make the situation even more complicated.

Nonetheless, for many of the country's international investors the development potential in the DRC remains extraordinary. While some choose other mining destinations with lower political risks, most of those that enter the country appreciate that working in a sustainable manner is actually possible. Furthermore, the country's vast resource wealth and huge energy potential represented by the Inga dams, a series of hydroelectric dams located on the Congo river in Inga, are all indicative of the fact that the country can finally become a popular mining destination.

From a purely mining perspective, its vast resource base combined with today's commodity prices render the DRC a very interesting, yet challenging, proposition for any potential investor.

*Since the writing of this report, militia activity by rebel group M23 has further damaged the DRC's reputation. Nonetheless, it must be noted that this activity is still largely confined to the Kivu region."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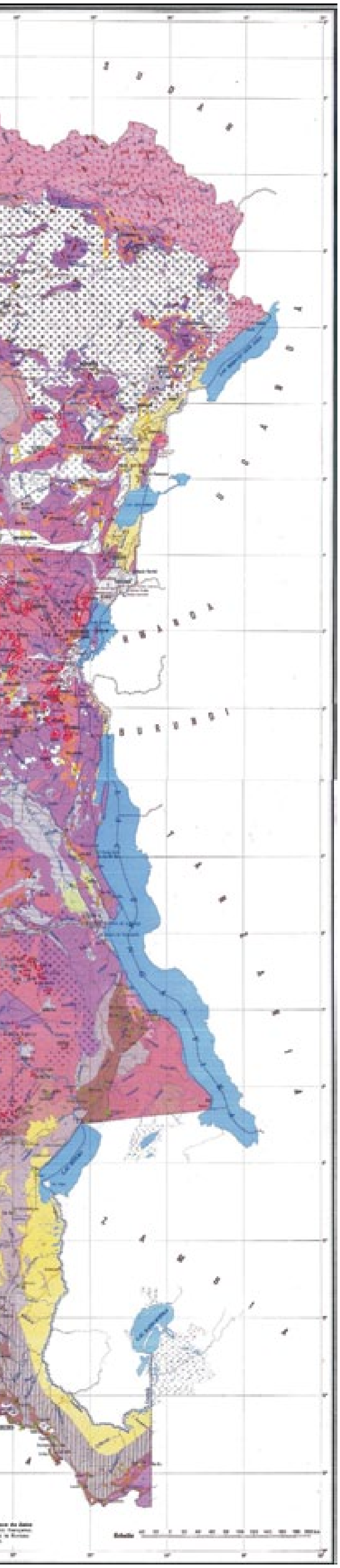
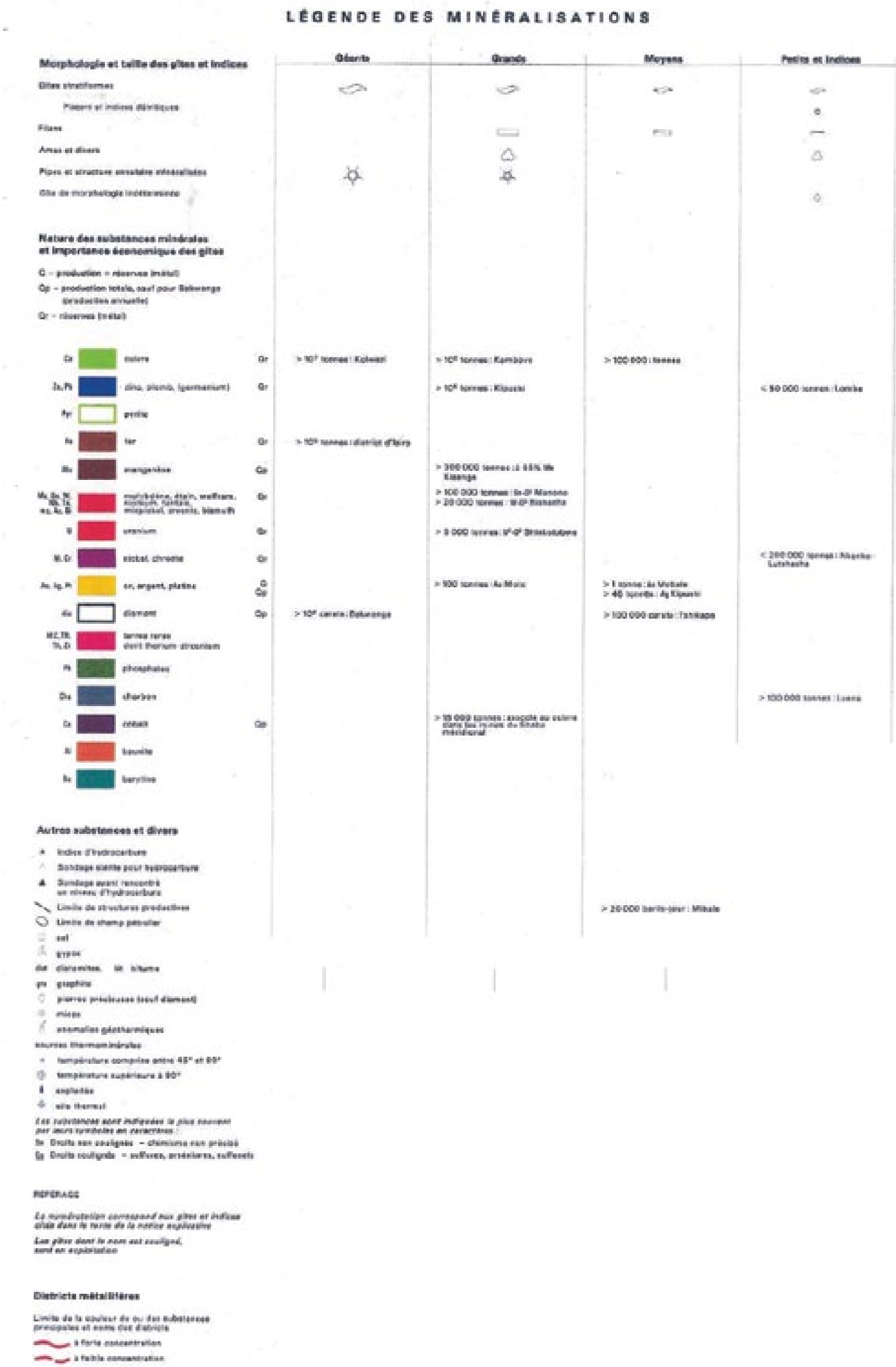
DRC Metals and Minerals





Regulations

A period of transition for the mining sector regulators.

Current mining operations are focused on higher grade reserves at Kipoi Central, producing 35,000 mt/y of copper. Photo courtesy of Tiger Resources.

Like any post-conflict country, the DRC will need time to build an internationally competitive enabling environment. Throughout this process, the government will have to ensure the enforcement of those laws, regulations and tax requirements applicable to the sector while mining companies will have to uphold the principles of good governance.

The picture that emerges is that the country has so far been successful in formulating the laws and regulations needed for the sector but less successful in ensuring the respect of them. The principles of good governance are not uniformly observed by many mining players. Jean-Luc Seguin, director and company secretary of Group Forrest International SA (GFI), a group of companies and stakes owned by the Forrest family that has been operating in the DRC for 90 years, said: "To attract further investments the country needs a real secure legal environment and a proper climate in which to do business. There is goodwill towards achieving this, but a lack of realization. A lot of the decisions made here are still arbitrary."

Mining Market Structure

Throughout most of the 1990's, the government in the DRC maintained majority ownership of the productive sector of the mining economy. Gécamines produced most of the country's copper, cobalt, coal and zinc. The diamond industry was controlled by state owned MIBA, producing approximately 25% of industrial diamond output from the Kasaï Occidental and Kasaï Oriental provinces.

In an attempt to revitalize mining operations and attract foreign investments, Gécamines entered into a number of joint venture agreements with foreign investors. Typically, foreign entities acquired an interest in a concession with Gécamines retaining majority ownership and today these arrangements characterize the local mining industry. "You see these types of private-public partnerships (PPP's) all over the world, especially in Africa. The father of the current CEO, George Arthur Forrest, promoted the first PPP in the DRC, and you can see that all mines in the DRC are now run this way. I think it is a financial model that is working, although we do face challenges," said Seguin of GFI.

According to Datamonitor 360, in 2011, at least 25 international mining companies were present in the country. Canadian based mining companies had the highest presence, with nine in total. An increased level of investor confidence is also reflected by an escalating number of mergers and acquisitions as well as joint venture transactions involving world-class miners who strive to gain access to the DRC's rich mineral resources.

George Arthur Forrest, chairman, GFI.

The Mining Code

The Mining Code was developed with the support of the World Bank and is based on best practice examples from other mineral rich countries like Chile and Zambia. Today, it provides a transparent framework for the exploration, development and mining of mineral ore resources. However, as noted by Simon Tuma-Waku, former chairman of Kamoto Copper Co. and vice president of the chamber of mines there are still enforceability issues throughout the country. "The Mining Code that came in place in 2002 is a very good code but it was not introduced in all provinces and there are therefore some problems when it comes to applying the code in those areas," he said.

At the time of writing, a ministerial taskforce is carrying out a review of the Mining Code legislation. The review is still in its consultation stages and should have been completed during December 2012. The taskforce should then report to the national assembly before forwarding amendments to the country's cabinet for ratification.

There are several speculations on the type of amendments being put forward and the consequences for the mining industry in the DRC. Stevel De Backer, director at

South African law firm Webber Wentzel commented: “Nothing has been disclosed yet, we can only guess, but from what is happening in other countries it is likely to be about free carry, tax increases and increased state ownership.”

Perhaps, amendments in this sense should come as no surprise. The provisions of the Mining Code were implemented to encourage a number of mining companies to invest in the country and are very investor friendly. However, this approach also brought significant losses in terms of revenue. “Now 10 years after its enforcement the code is currently being revised. It is very favorable for mining companies and the fallout for the country in terms of financial revenues is not justifiable. Currently, an investor has the right to an exemption of taxes on its imports and its exports. The Mining Code simply requires the mining operator to repatriate 40% of the exports revenue with the remaining 60% remaining outside the country. The country is never a winner,” said the Provincial Minister of Mines in Katanga, Barthélemy Mumba Gama.

Under the Mining Code, ownership title to mineral resources in the soil and subsoil is reserved for the state and surface rights holders do not own the mineral resources within their surface right area. The code also provides for two types of mining rights: research (exploration) and exploitation (operation).

The granting of mining rights are based on a ‘first-come, first-served basis’ with the granting of the corresponding mining right entered in chronological order of their filing. With research permits, mining companies must commence exploration within six months from the date the title is granted. On the other hand, with exploitation permits development and construction works must commence within three years. Exploitation permits are granted to holders of research permits who are able to demonstrate the existence of an economically exploitable deposit.

The Mining Code does not make any distinction between mining rights that may be acquired by foreign parties and those that may be acquired by domestic parties, except for the requirement that a foreign company must incorporate a local company before it can apply for an exploitation permit. It is a further condition that companies wishing to obtain exploitation permits must transfer a 5% non-dilutable share of their capital to the state with the transfer being made for free.

In the DRC foreign companies are therefore free to apply for a non-artisanal exploration or exploitation permit relating to one or more specific minerals. Artisanal mining operations are instead reserved for Congolese nationals in special areas designated by the minister of mines outside areas covered by other mining rights. As regards the management of foreign companies, specific limitations exist which provide for a maximum rate of foreign employees and specific positions that are reserved to Congolese nationals.

The Tax and Royalties Regime

The Mining Code provides for a self-contained tax regime, which means that only those taxes and custom duties provided by the Mining Code apply to the holders of mining rights. This principle, however, does not prevent the tax agencies from often claiming additional taxes.

Various tax advantages and incentives are available to private parties carrying on mining activities. The profit-based tax for instance is set at the preferential rate of 30% (as opposed to the 40% corporate tax rate) and is levied on the net profits from exploitation. Mining royalties instead are currently set at 0.5% for iron or ferrous metals; 2% for non-ferrous metals and 2.5% for precious metals.

Recently, the government (with the assistance of the International Monetary Fund) also introduced a value added tax (VAT) regime at the standard rate of 16%. The move was seen as part of a continuous effort to improve the country’s fiscal regime. Sebastien Duchateau, area manager of BIA Congo commented: “Thanks to new regulations companies now have to declare what they earn. The newly introduced VAT system is really instrumental to this success.”

The current speculation regarding the government’s plans to impose export duties (and increase the general level of tax rates) are also seen as part of a plan to require mining companies to develop downstream capacity.

Already in 2010, the Governor of the Katanga province, Moïse Katumbi Chapwe, by enforcing a rule of the Mining Code that establishes that raw ore should only be exported when it cannot be processed domestically, suspended cobalt concentrate exports from the country’s mineral heartland. The ban was seen as part of an effort to force companies to produce value-added processed products inside the DRC. Today, with the amendment of the Mining Code, the main concern throughout the industry is that the authorities will see this as an opportunity to increase the general level of tax rates.

"Cultural differences can be overcome"

Interview with Natacha Latere Van-Hoeken, partner, Etude Kabinda

Could you provide us with an overview of Etude Kabinda in the DRC?
Etude Kabinda has five lawyers in Kinshasa and has recently gained a third practitioner in its office in Lubumbashi. Although most of the work relates to Katanga, we really need the Kinshasa office because paperwork has to be filed there.

Having a local presence in Lubumbashi is also important, it is always better to communicate with clients in person rather than on the phone or by email. The two offices are closely connected and I tend to travel at least once every ten days between offices. 70-80% of the business at Etude Kabinda is mining-driven.

Last year we did several due diligence projects; mostly these were for corporate acquisitions, although we sometimes work on due diligence for intended financings. Our second most important business division is labor law, an area that is also important for mining companies.

In your opinion, what are the most challenging aspects facing foreign investors looking to work in the DRC?
Until very recently the DRC was neglected by the international investors community. Today, in accordance with our revitalized business climate this is changing considerably and people are beginning to look at the DRC with interest.

Several investors come from Anglophone countries and therefore have different cultural backgrounds. This change in mentality and approach sometimes causes problems; cultural and language barriers can lead to misunderstandings between investors and locals.

Also the lack of education in the DRC coupled with the difficult economic situation creates it own problems. Education is a key to development in our world today. Because of the lack of education in the country not all children are considered to be literate and this is something that the country should change going forward.

Most of the other challenges facing foreign investors in the country are tax related. The bad interpretation of what is an already complicated tax regime means that international companies are some-

times fined from local authorities and this is most unfortunate.

Labor law in the DRC is also a source of confusion. It is difficult to dismiss an employee – you need a very good cause, which must be documented. You cannot dismiss people for being incompetent, but must explain how and why he or she was not competent. Failing this employers pay up to three years on the last salary, plus all due benefits. That is a considerable imposition for companies, and really something that investors do not expect when coming to the DRC.

Companies that want to reorganize their workforce have to take into account that they are operating under a civil law system and that their may be differences in our legal requirements.

Can hiring competent local lawyers overcome the cultural challenge and is Etude Kabinda looking to enter into partnerships with international law firms?
Certainly, cultural differences can be overcome by hiring competent local advisors. It would be great if international investors relied more on local firms. Sometimes, clients ask us to register finished work and we have to explain that it was not done properly. As locals, we are aware of the weaknesses in our legislation and related problems when it comes to its interpretation.

Etude Kabinda is not looking for partnerships but international law firms have approached the firm in the past. Partnerships are great to attract foreign investment, but we also have to judge on a case-by-case basis whether they are in the firm's best interest. Furthermore, mining related investments in the DRC can be substantial; it is therefore understandable if international mining companies still do not want to rely on local lawyers, especially in a country that has had all the problems of the DRC. However, hopefully this will change going forward.

How well has the mining code been implemented?
The mining code was fully implemented. After 10 years now, people working in the mining industry do understand its provisions. However, the code has also its weaknesses. Some points are unclear, and some situations are not covered. At the beginning it was difficult, because people had their own interpretation of the law.

Today, we realize that if parliamentary working documents were available this would have helped with the interpretation of some of the code's provisions.

How do you ensure that you are the law firm of choice for international investors?
Language skills are of paramount importance. Most investors are coming from Anglophone countries like Australia, Canada, the U.S.A., England and South Africa. Being able to communicate with your clients gives you a competitive advantage over other law firms.

At Etude Kabinda we ensure that our recruits have the language skills and we ask them to draft in English from the outset of their professional experience. We are also discussing sending our trainees on secondment so they can experience new international working environments. However, being able to communicate with our clients does not only mean speaking perfect English and French: it is also means understanding perfectly their needs.

Do you have a final message for the readers of the Engineering and Mining Journal?
Congolese are open and friendly people. I strongly encourage investors to try and understand the peoples' culture when first entering the DRC.

Exploration and Production

Key minerals, companies and projects.

Copper is extracted predominantly from open-pit mines in the Katanga Province. Photo courtesy of Gécamines.

The 2.3 million sq km of the DRC make up one of the most geologically variable countries in the world. It is believed that the national territory in the DRC may contain more than 1,100 different mineral substances and it perhaps should come as no surprise that, despite the various challenges, mining companies are drawn to the country.

The most active regions for mining activities are the Katanga province (copper and cobalt mainly), East Kasai (diamond), Ituri in the Oriental Province (gold) and the Kivu's gold, tin and Colombo-tantalite (coltan). Most of the extraction is still carried out by small operations known as "Artisanal and Small Scale Mining" (ASM).

Mining activities in the DRC have unfortunately also been linked to serious problems. Copper and cobalt operations from the southern Katanga province can be carried out safely, but the situation in the north-eastern provinces remains problematic. In September 2010, the government banned mining in the north-east in an attempt to crack down on illegal organizations and corruption. "GFI is currently drawing a business plan to open an engineering office in the north-east of the country. We believe there is a lot of business to be done there, although of course it is a difficult environment that needs stabilization. I will not send teams there if I do not feel it is safe," said Seguin of GFI.

In the United States, the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank) requires electronic companies to track and publish the amount of conflict minerals such as coltan, cassiterite, tungsten and gold sourced from eastern DRC. The effect of the law had a severe impact on the export of tin from eastern DRC that was shipped through neighboring countries such as Rwanda or Burundi, to processing plants in eastern Asia. Latest official figures show a little over 1,000 mt/y of cassiterite – 600 to 650 mt/y of tin being shipped from Goma, North Kivu's capital (in eastern DRC) between January and April 2011, well below the levels recorded for the same period in 2010.

Despite these challenges, the DRC will continue to play an increasingly significant role in the world production of cobalt and copper, and to a lesser extent, diamonds, tin and tantalum. According to a U.S. Geological Survey in 2009, the country's share of the world's cobalt production amounted to 40%, industrial diamonds 31%, gem quality diamonds 6%, tantalum 9%, tin 4% and copper 2%.

Copper and Cobalt

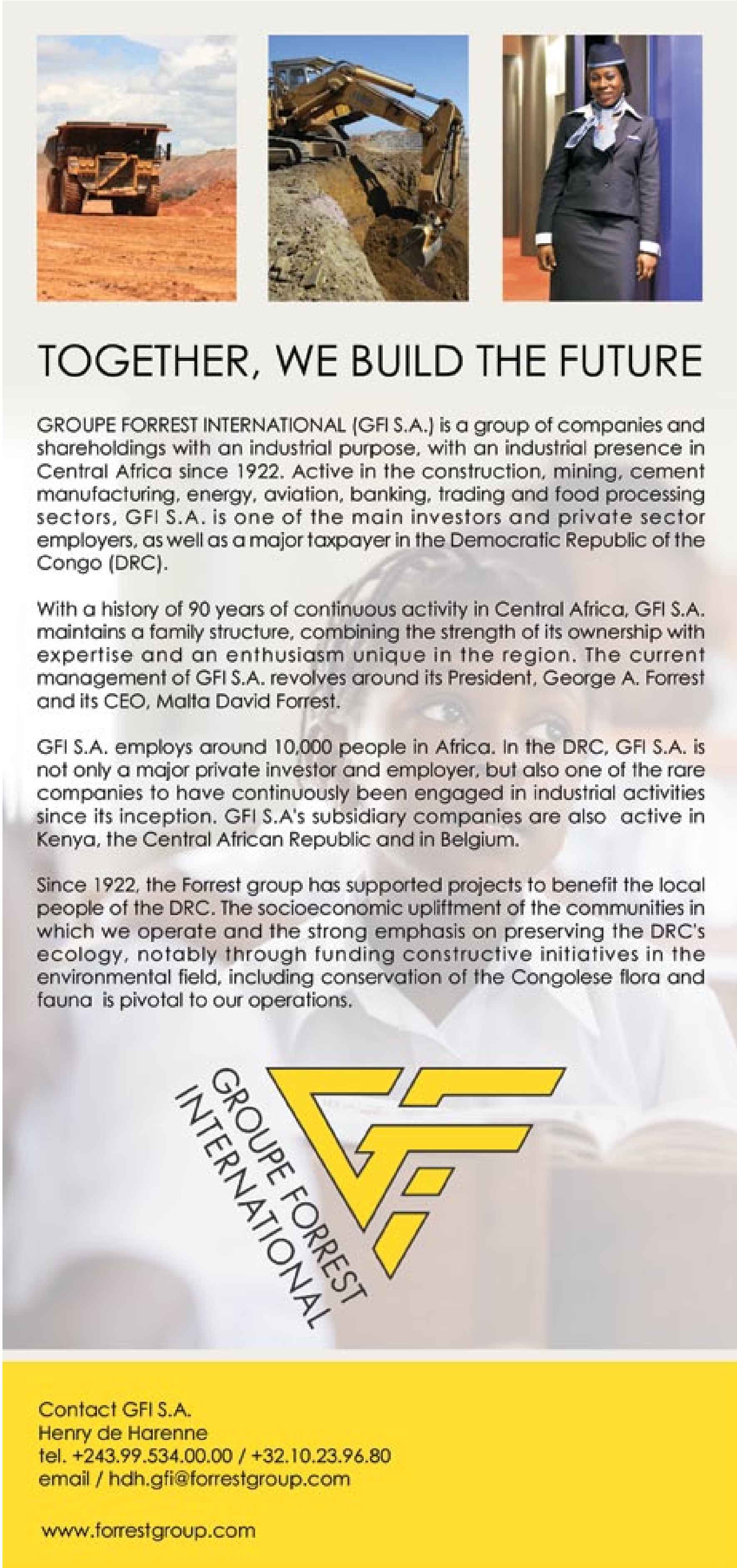
Many of the most important mining operations in the DRC consist in copper and cobalt production taking place in the copper belt region of the southern Katanga province. The belt stretches for 250 km between Kolwezi and Lubumbashi. Industrial copper production started in 1911 with the Union Minière du Haut Katanga (what eventually became Gécamines).

TFM is one of two major copper-cobalt operations in the Katanga province, involving an open pit mining operation and an initial 40-year mine plan has been developed based on current proven and probable reserves.

In October 2010, the government of the DRC announced the conclusion of the review of TFM's mining contracts. Following the review, ownership in TFM was set at 56% for Freeport McMoRan, 24% for Ludin Mining Corp. and 20% for Gécamines. The Kamoto Copper Co., the other large-scale concern, is a joint venture between Katanga Mining Ltd., a company listed on the Toronto Stock Exchange, and Gécamines.

"Tenke Fungurume and Kamoto Copper Company are the flagships of the country. The first one is the largest by production, producing approximately 112,000 mt/y of copper cathodes in 2011. Kamoto Copper Company produced approximately 65,000 mt/y of copper cathodes in the same year," said Simon Tuma Waku, former chairman of Kamoto Copper Company and vice president of the chamber of mines.

Gécamines also sits on a number of concessions in the Katanga province. Its production levels peaked at 476,000 mt/y in 1986 when the company employed 33,000 people. However, in 2011, production levels were of only 17,000 mt/y of copper. Commenting on the fall in production Kalej Nkand, CEO of Gécamines said: "The main reason for this fall in production was the collapse in 1990 of the main mine, Kamoto, located in Kolwezi. At the time the country was also facing a financial embargo from Western nations and that placed Gécamines in an uncomfortable situation, un-



Kalej Nkand, CEO of Gécamines.

able to renew its infrastructure or continue the exploration program. The closure of the mine cut almost 25% of the company's activities and affected its revenues."

Today, the company's $1.5 billion debt and drop in production levels are being addressed through a strategic plan aimed at returning the company to profit through increased production and audits of its joint ventures. More than 80% of Gécamines concessions are tied up in joint ventures with various mining companies and Gécamines is currently looking to audit its agreements in an attempt to mobilize revenues.

"Gécamines was hoping to generate enough money for its own activities and this was unsuccessful. The initial idea was to create only two or three joint ventures; we now have 29 but still did not reach our goal. We have to audit every operation to see that commercial activities have been properly organized and everything done according to what was agreed. Each joint venture expressly provides for the right to audit, so that should not be a problem going forward," said Nkand.

Also operating in the Katanga province, Tiger Resources entered the DRC in 2006 after taking over an exploration permit at Kipoi from a local company that was in joint venture with Gécamines. Today, Tiger owns 60% of the venture with Gécamines owning the remaining 40%.

"Tiger operates from the Kipoi region, along the Likasi road and is currently undertaking studies to upgrade from a DMS ["densa media separation"] concentrator to a SX-EW plant. During exploration, Tiger certainly had its challenges but was able to overcome them and has rapidly progressed over the past five years from first exploration to production", said Charles Brown chief operating officer of Tiger Congo.

"Tiger is currently producing a 25-28% Cu DMS concentrate and 20-22% Cu spirals concentrate from a feed grade of 4.5-8.5% Cu. The company is stockpiling anything below 3.25% Cu for our Stage Two SX-EW operation as well as stockpiling our tailings, which would be a very good feed grade for most mines. This will form the core feed for the next stage of the operation. Tiger hopes to start construction on the second phase between the end of this year and early next year, with the hope to go into operation in 2014. This will initially be a 25,000 mt/y electro-winning plant going up to 50,000 mt/y once the company has the feed for it. All production will be sold on the international market."

GFI, through a number of partnerships, also remains very active within the copper and cobalt sector in Katanga: "In terms of turnover, the Forrest Group's mining activities are still the most important. The mining companies in which the Forrest Group holds a stake produce nearly 10,000 mt/y of cobalt, one sixth of the world production," said Seguin of GFI.

Groupement du Terril de Lubumbashi (GTL) is one of the partnerships owned by the Forrest Group. The joint venture was created in 1997 between OM Group (55%), the Forrest Group (25%) and Gécamines (20%) while Société pour le Traitement du Terril de Lubumabshi (STL) manages the operating and technical aspects of the agreement. Through its furnace, STL processes the slag from Lubumbashi's hill. The furnace is the second largest in the world for this kind of metallurgic activity producing 5,000 mt/y of cobalt, 1/12 of the world's production and 3,000 mt/y of copper.

Compagnie Miniere du Sud Katanga ('CMSK'), is also a partnership owned by the Forrest Group (60%) and Gécamines (40%). CMSK owns a mining license on the Luiswishi's open pit mine and a concentrator in Kipushi where it processes the ores. CMSK produces around 4,000 mt/y of cobalt and 10,000 mt/y of copper.

"The Forrest Group has become an undeniable pillar of the Congolese economy and is one of the main tax-payers in the DRC (more than $55 million in 2008) as well as a major source of income for several state companies such as the Gécamines and [the "Societe Nationale d'Electricite"], SNEL" said Seguin of GFI.

Somika (Société Minière du Katanga) instead entered the mining industry in 2001, when the Mining Code came in effect. "Somika started producing in 2003 with an annual capacity of 300 mt/y of cobalt, which was expanded tenfold by 2009. For copper, we also began at 300 mt/y, but now have annual capacity of 20,000 mt/y, 12,000 of which are copper cathodes and the rest is copper blister. Somika also commissioned the latest cobalt hydroxide filtration system and continuous drier, and has developed a high-tech copper electrowinning plant. Currently Somika is starting to look into cobalt metal and better cobalt hydroxide for the finished markets and has a couple of very good projects where we already started producing copper concentrates. One is the Kisanfu project, a joint venture with Gécamines, where we have successfully started a DMS plant that converts 2% ore grades into 20%. Somika aims to sustain the current expansion at the Lubumbashi plant; by 2015 we would like to increase production to 50,000 mt/y of copper. It could be in different forms, with some element of copper concentrates, but most in cathodes and blister," said Chetan Chug, CEO of Somika.

Finally, Chemaf operates as a subsidiary of Shalina Resources at the Etoile open pit mine and Usoke mineral processing plant near Lubumbashi. In 2003, the company

Rich copper oxides (seen above) can be found throughout Katanga's copper belt. Photo courtesy of Tiger Resources.

was producing approximately 400 mt/y of copper carbonate and 200 mt/y of cobalt carbonate. By 2011, Chemaf had increased its production capacity to over 20,000 mt/y of copper cathodes and 2,000 mt/y of cobalt hydroxide.

Grant Dempsey, CEO of Chemaf, said: "The long-term objective of the company is to expand its presence in the DRC and become the principle producer of copper and cobalt by reinforcing its vertical integration and expanding further its production capacity. Between 2012 and 2016, Chemaf aims to produce 50,000 mt/y of copper and 6,000 mt/y of cobalt. In efforts to apply sustainable measures the company has engaged in several initiatives. In 2008 for instance, Chemaf upgraded the Usoke plant to enable copper cathode production through solvent extraction and electro winning (SX–EW) extraction methods which increases output and quality while reducing costs. The circuit for this process was installed in 2007 when Shalina Resources bought the Mount Gordon Cu SX-EX plant in Australia and re-assembled it at the Usoke site. The installation of the SX-EW plant and the application of these methods highlight the company's commitment to reducing its footprint and are intended to produce higher grade copper. These measures significantly increased the reclamation of copper and improved the plant's overall efficiency. This evolution has been an important step in Chemaf's vertical integration and long-term objectives to be a leading player in the DRC. The integration of the entire production process provides synergies to produce lower cost cathodes by capturing additional value in the production chain. "

Gold

Rich deposits of gold have been exploited in the districts of Kilo and Moto, both located in the Ituri region of the Oriental province. The other major deposits are found in the Twangiza-Namoya gold belt in Kivu province, also in the east of the country. Recent gold exploration has also focused on Katanga province in the southeast.

Apart from the operations by AngloGold and Banro, operating from the Ituri region of the Oriental province, Kilo Goldmines Ltd. (Kilo) holds mineral rights under eight separate exploitation licenses. "The DRC is still largely unexplored and this is what attracted Kilo to the country in the first place. Our Somituri project covers part of the Ngayu greenstone belt. When compared to Tanzania's Geita, Ngayu is four times larger and Geita is already very famous for having big mines. However, the Ngayu belt still has lots of artisanal mining being carried out with no formal mines, so the geological potential of Ngayu is similar to Geita. Kilo covers part of that greenstone belt and within the belt we are working on the Adumbi project which is where we hold our principal license. We also hold seven other licenses and the potential for extraction is very good. These are considered to be the blue sky of the company as they are in addition to what we already have. In the north of the Ngayu greenstone belt we also have a joint venture with Rio Tinto. Rio Tinto is specifically targeting large tonnage iron resources while Kilo is maintaining non-iron rights. We announced our results in January 2012, with very good intercepts, up to 100 meters thick and with percentages going up to 66%. Overall it is a very good and promising mineralization project," said Alex van Hoeken of Kilo Goldmines.

The Kilo-Moto greenstone belt represents a significant opportunity, as it is the largest greenstone belt to be explored with the aid of modern exploration techniques. According to a report by the World Bank, the Moto district has approximately 500 mt of gold. In the Kilo district resources are difficult to estimate but are assumed to be of much higher grades than those in the Moto district. Gold was first discovered in the

Angola river by two Australian researchers who named the area after the local chief, Kilo. Shortly thereafter a similar discovery was made at the Moto river, hence the name Kilo-Moto. Sporadic small-scale mining began in 1905 and mainly artisanal mining has been carried out since then.

Diamonds

Diamonds are located mainly at Kasaï Occidental and Kasaï Oriental, Katanga, Kivu as well as in the North of the country. With approximately 150 million carats, the DRC is believed to have the world's largest reserves of diamonds. However, in terms of value, DRC's deposits come after Botswana's and Russia's as only a relatively small proportion of the country's diamonds reserves (6%) are of gem quality.

Most of DRC's production is within the informal sector. In the eastern Kasaï region, rebel forces hold most of the traditional diamond producing areas. The Miniere de Bakwange (MIBA) is a state controlled entity controlling about 25% of diamond production in the DRC. MIBA's production amounted to about 100,000 carats per month in 2008. The company closed at the end of 2008 in an attempt to restructure its operations and as a result diamond production shifted to the artisanal sector. Recently, however, MIBA was reported as being close to securing new loans from South African state lenders.

Between 1996 and 2003, diamond production in the DRC unfortunately contributed to the funding of the country's numerous civil wars. Progress was made in 2003 when international certification procedures for diamonds were introduced. However, the DRC still lacks a reliable set of internal controls to ensure that it can track all diamonds from the mine to the point of export and broader reforms have been slow and lacked the strong political will to see them go through.

Other Minerals

According to the U.S. Geological Survey (2010), the DRC also ranks as the world's fifth largest producer of coltan and tin (cassiterite) but was not amongst the world largest producers of tungsten. The Bisie mines in the Walikale territory in the eastern Kivu region were the largest cassiterite mines in the DRC producing approximately 7,300 mt in 2008.

The rare earth element potential of the DRC also holds substantial potential; while the 2009 and 2010 excitement over rare earths has undeniably cooled, prices (especially for heavy rare earths) have settled to below their mid-2011 high, but well above their pre-hype levels. However, these minerals are mined predominately in conditions of armed conflict and human rights abuses by the Congolese National Army and various armed rebel groups, including the Democratic Forces for the Liberation of Rwanda and the National Congress for the Defense of the People, a Rwandan militia group.

In addition, the complexities of rare earth element mining and the fact that these minerals are often found in conjunction with radioactive or other dangerous materials, which creates an added level of concern with health and environmental issues. With the overwhelming majority of rare earth exploitation in the DRC being carried out illegally, best industry practices regarding these matters are nowhere to be found.

In an attempt to crack down on the illicit trade of these conflict minerals, recent regulations introduced by the U.S. Securities and Exchange Commission in December 2010 require U.S. and certain foreign companies to report and make public to the SEC each year on whether they use tantalum, tin, tungsten and gold from the DRC (including certain adjoining countries).

Katanga Province

A copper ore giant.

Building up infrastructure in the Katanga Province. Photo courtesy of Forrest Group.

For one hundred years Katanga's economic growth was based almost exclusively on copper mining operations. The province was known as Shaba, the local Swahili word for the metal. Today, at least 72 economic deposits of copper and cobalt and four large mining centers continue to drive local mining operations.

Between 1911 and 2010 approximately 19 million mt of copper were produced in the region. Cobalt is also present comprising almost 34% of the world's cobalt reserves.

In July 1960, with the support of Belgian business interests and 6,000 Belgian troops, the province declared independence as the State of Katanga under the leadership of Moise Tshombe. Tshombe was known to be close to the Belgian industrial companies that mined the resource-rich province. Without Katanga, the DRC would lose a large part of its mineral assets and consequently government income. In defense of the decision of secession, Tshombe argued that Katanga was "seceding from chaos." However, Tshombe's dream of secession ended in December 1962 when U.N. troops began wide scale operations to disarm the Katanga forces throughout the province.

Katanga was the most developed province in the nation and its prosperity was being held back by the country's continuous troubles.

Today, better management by the provincial government relative to anywhere else in the DRC and an intelligent use of funds has improved the state of the infrastructure considerably. Katanga's copper deposits have reserve grades as high as 5% and this is increasingly attracting international investors. In addition to Gécamines, 11 foreign mining companies are involved in the copper and cobalt sector in the region.

"Katanga is open for business"

Interview with Moïse Katumbi Chapwe, governor, Katanga province.

Katanga is today one of the most developed provinces in terms of infrastructure and level of business activities in the DRC. What steps have you adopted to achieve this growth during your mandate?

As a businessman I was only too aware of what investors had to experience when coming to the DRC; corruption and blackmail were normal routines prior to my appointment. My aim was to regain the trust and confidence of the international community, but persuading people that the province was worth investing in has been no easy task. I was able to achieve this by fighting against corruption from the outset of my mandate. Investors who were not investing in a socially responsible manner were also a problem. In some cases mining companies adapted their way of doing business in the DRC and in others they were asked to leave.

Can we discuss your key initiatives to overcome some of the mining industry's key challenges like the lack of infrastructure and education in the province?

Lubumbashi was entirely built by Gécamines and was better than Johannesburg back in the day. Following the years of war when I was elected my work had to be orientated towards rebuilding the province. The refurbishment of the Inga Dams has also been a priority and not only. Going forward the role played by banks will be pivotal to the re-birth of province and the country as a whole.

Regarding education, in the 1960s the level of education was good in the country and bad governance from the previous regime changed that. Prior to my appointment, children in schools were sitting on the ground and had no desks. Our policy has been orientated towards investing in our future generations by giving them a proper education. This is the best form of investment that the province is making. Mineral resources will finish one day and educating our citizens will be important for the future success of the province and the country. The mining sector can help with the renovation of schools, hospitals and also the launch of agriculture. Just a few years ago 25 kg of maize were being sold at $40 while today

people spend only $11. The majority of our citizens are eating three times a day rather than only once like they used to. Generally, the province and mining companies are doing a very good job.

The work of a single province cannot be enough to support the economy of a country the size of Western Europe. The DRC is still failing in the World Bank's Doing Business indicators. What do you think the government should do to improve the current situation and what is your advice to investors wishing to invest in the DRC?

The newly elected prime minister is making important changes: salaries of ministers have been reduced and the country is collaborating with several international organizations. The international community should have more trust in the future good governance of the DRC. The government's role should simply be aimed at regaining investors' confidence.

Katanga can clearly be instrumental to the re-birth of the DRC. The Bureau du Governorate in Lubumbashi is open 24 hours a day, seven days a week and investors should come and see with their own eyes the work that we are doing.

Be confident and come and judge us on the field. Investors should not be persuaded by the stories of other investors already present in the country. We have companies who have been here for a decade advising not to invest in the DRC and I am having trouble understanding their reasons. Perhaps these investors do not want to face competition from the international community. We have international banks opening branches here and newly built roads. We also just finished renovating the Gran Karavia, an excellent five-star hotel in the heart of Lubumbashi. Agriculture will also be important going forward. The DRC has excellent rainy seasons and 14 million hectares of fertile land.

What are the main forecasts for the mining industry in the short term?

Before the beginning of my mandate the DRC was exporting different commodities such as copper and cobalt ores. The day of my election I stopped 552 trucks at the border and only two had the governmental authorizations to export. Today, we are containing illegal exports of ores; people are processing locally and are therefore producing locally. This is important news. It means that after years of civil war and the near collapse of the state, the rule of law is being enforced in Katanga and the DRC. We exported raw ore for years and have earned very little. The country was not benefiting from this trade and only importers were. Mining companies must now process the minerals on site and deliver a finished product. Today, with this measure, we are contributing to the stabilization of metal prices on international markets and we are creating jobs for the local community as well as adding value to our resources. Since my decision to enforce the rule of law mining sector operators have invested substantially locally. In 2013, production levels of copper cathodes should reach 1 million mt/y and in 2015 we should reach 1.5 million mt/y. Going forward, the DRC will clearly become one of the world's largest producers of copper cathodes.

Have you got a final message for the readers of Engineering and Mining Journal?

The readers of E&MJ should trust the magazine because E&MJ is here to see with its own eyes the new DRC. As I already mentioned, our office is always open. The country has unexplored mining resources, massive agricultural potential, and a population of more than 60 million inhabitants. I thank you and wish to tell your readers that the time has come to come and see the new DRC.

Ritchie Callaghan, managing director of Malabar Group.

The DRC's future infrastructure investment needs will not be met by highway tolls. Photo courtesy of Katanga Province.

Between 2007 and 2010, the demand for cobalt from China's fast growing economy brought investors to focus on the region's rich cobalt reserves, including some of the world's largest cobalt operations.

Reductive smelting produces cobalt's free element and Fondaf (les Fonderies Africaines) is a smelter that has been operating in Katanga since 1942. Since its creation, the company has been smelting cobalt primarily for Gécamines. Following Gécamines fall in production, Fondaf has been manufacturing anything in steel, stainless steel and iron.

In response to the surge in demand for copper and cobalt, global production of these metals has continued to increase exponentially in the region and more specifically for copper, from 343,000 mt/y in 2010 to 440,000 mt/y in 2011. In 2010, the province produced 94,000 mt/y of cobalt.

While the authorities in the DRC continue to try and attract investors to build on-site facilities for the processing of raw ores, it is estimated that the equivalent of over 21,400 mt/y of cobalt were imported as raw ores or concentrates into China in 2008. In an attempt to compel mining companies to establish mineral processing facilities, including metallurgic plants, to add value to copper and cobalt concentrates, in 2010 the province banned the export of unprocessed mineral concentrates.

"Today, we are containing illegal exports of ores; people are processing locally and are therefore producing locally. In 2013, production levels of copper cathodes should reach 1 million mt/y and in 2015 we should reach 1.5 million mt/y. Going forward, the DRC will clearly become one of the world's largest producers of copper cathodes", said Moïse Katumbi.

The increase in mining activities in the province is now also working as a development catalyst for other sectors, including companies that strive to provide an all-round service for people that operate within the region. Malabar Group is an example of a company providing such an all-round service. "Initially Malabar's business grew in cross-border transport and warehousing functions, one of the elements of which was obviously to secure goods in transit. We then noticed a general growth trend in the Katanga province and decided to set up Malabar Business Travel to assist people visiting the area," said Ritchie Callaghan, managing director of Malabar Group.

Initiatives, opportunities and challenges

Interview with Barthélemy Mumba Gama, provincial minister of mines.

What are the main highlights and key initiatives under your mandate?
This is my second mandate as Provincial Minister of Mines. During my first mandate, we ensured the respect of Law No. 007/2002 of July 11, 2002 relating to the Mining Code (Mining Code). The Mining Code benefited the international investors' community substantially, especially in the Katanga province. The mines here used to belong to state owned companies like Gécamines. After the Mining Code came into force new privately held companies came to the country. State owned companies entered into joint ventures and investors began operating on Gécamines former mineral deposits. There are now several joint ventures in the province.

The exportation of raw minerals has recently been prohibited. The country was not benefiting from this trade and only importers were. Mining companies must now process the minerals on site and deliver a finished product. Furthermore, mining companies were also asked to invest in community development initiatives. This can be achieved by building roads, schools and properties around the mines. We organized a forum where each mining company presented its community development plan. Gécamines is providing electricity to several towns, has built most of our hydroelectric systems in Katanga and is building large schools. We would like to reproduce this model through all our joint ventures. Our idea is that around each mine there are always ways to create a pole of community development initiatives.

What are the main opportunities for the mining industry in Katanga?
Katanga is known for its copper and cobalt reserves. These minerals are most popular with the international community and today's market prices will ensure their popularity for the foreseeable future. Today, there is however an influx of investors also interested in other minerals. For example, new investors are developing our uranium reserves. The province has large reserves of uranium currently not operated. Our new partnerships could guarantee the security of our sites and the export of uranium going forward. We also have other minerals growing in value such as cassiterite and tantalite found in the north of the province and presently op-

erated only by artisanal mining. Wolframite has also become valuable and we expect our coal deposits in Kalernie and Luena to lessen our current energy deficit. The international community is increasingly aware of the province's potential. New evidence indicates that we may also have oil deposits. Katanga is a peaceful province and this is important for the overall well being of the business environment in the region.

Energy remains a challenge in the province, what are you doing to address this issues?
Energy remains a problem because of the Inga Dams system. These dams have capacity to supply energy to the whole of Africa but general maintenance work was neglected by the previous regime and today they have a low output. The government must intervene. The situation in Katanga is however very different. The province has its own dams: the Nzilo, N'seke, Banza, Mwadingusha, Bendera and Mpiana Mwanga are plants that feed the province. These facilities have also been neglected to some extent but they are still able to provide energy. Mining companies should not to wait until the authorities find money. Rather, they should invest in their maintenance and increase their output capacity. Tenke-Fungurume today is investing on the N'seke dam. Sicomines is coming to the province and has already included in its investment plan the construction of a new dam next to Busanga. The Nzilo dam is also being rehabilitated. Our priority going forward will be to strengthen the capacity of these dams with investments from the government and the mining sector.

Mining is not a sustainable business and mineral reserves will eventually run out. What is the province doing to deal with this reality?
Mining is not a sustainable business and we are very conscious of the fact that our mineral reserves will eventually run out. To deal with this reality we are enforcing measures to build a prosperous future for Katanga independent of the mining industry. The province is asking companies to adopt new technologies to treat mineral waste. Today, there are companies like Gitem that can treat the mountains of waste left by Gécamines and recover zinc, germanium, copper and cobalt. We are now trying to process low-grade ores. Gitem was set up for the processing of mineral waste, a technology that greatly extends mine resources.

Agriculture and mining are now under the same ministry to simply the government's vision. Instead of re-investing the profits generated locally abroad we would need to invest in our agricultural sector to prepare and ensure our future.

Ensuring that mining companies respect the Mining Code's provision is also important. Now 10 years after its enactment, the Mining Code is currently being revised. It is very favorable to mining companies and the fallout for the country in financial terms is not right.

Finally, we must ensure the mining companies that were exporting raw minerals are now processing those minerals locally and are exporting the finished product only.

Have you got a final message for the readers of Engineering and Mining Journal?
Having mineral resources is important but the province must also promote its revitalized image to attract foreign investment. Our country has experienced difficult times politically and many investors around the world are apprehensive. Today, we are committed to building investor confidence by promoting our rich mineral resources and friendly business environment. Investors should come and see with their own eyes, we are committed to supporting the mining industry. By investing in Katanga, investors will be rewarded with significant returns and will positively contribute to our economy and our country.

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Katanga Province creates extraordinary opportunities for investment in the following sectors:
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Challenges

The country's current infrastructure deficit and the common misconceptions.

A flatbed hauls an articulated haul truck across a bridge constructed from freight containers. Photo courtesy of Congo Equipment.

The DRC still bears the scars of civil conflict, political instability and economic neglect and operating from the DRC presents multiple challenges to the country's investors' community. Of the two most important challenges, the one presented by the state of the country's infrastructure is the most tangible, while the common misconceptions held by foreign investors, though less tangible, is arguably equally important.

Infrastructure

The DRC represents one of the largest commitments for the World Bank in Africa. Four projects were commissioned in 2011 for a total of $410 million. As emphasized in a report of the International Bank for Reconstruction and Development, $5.3 billion a year will be needed over the next decade to rebuild the country. The DRC's recent infrastructure spending of $700 million/y, even though representing 10% of GDP, falls far below the level needed to make an impact over the next decade. At this rate, more than a century would be needed to re-address the country's infrastructure deficit, an outcome that is clearly unacceptable to the mining community and the country as a whole. Nonetheless, according to Josh Foster, general manager of Bell Equipment DRC: "If you come to the DRC with a mindset of self-sufficiency and are really organized, it is certainly possible to be successful."

The country operates two rail systems: Chemin de Fer Matadi-Kinshasa (CFMK) and the Société Nationale des Chemins de Fer du Congo ("SNCC"). CFMK's network is 366-km long and links Kinshasa to the port of Matadi. The network is only 30 years old and is in reasonably good conditions. SSNC, on the other hand, operates an extensive network 2,641-km long and works as the natural transport mode for copper exports leaving the continent through the port of Durban in South Africa.

The 1970s was the best period for SNCC, achieving annually more than 3 billion traffic units (a traffic unit is 1 mt transported over 1 km). Today SSNC is achieving only 200 million traffic units, which is around 17 times less than in the 1970s. "The reduction in traffic units started with the closure of the Lobito railway, in Angola (western corridor with a distance of 1,870 km from Kolwezi to the Port of Lobito), where 50% of SSNC's exports were directed, with the remaining 50% going to Matadi through the national corridor. The political issues of the 1990s and the collapse of the Kamoto mine of Gécamines further reduced SSNC traffic units. A slight increase in traffic units was realized from 1995 to 1997 with a private operator, but since then traffic units were reduced to the current level. Today SSNC faces huge operational challenges with a deficit of rolling stock and bad condition of the stock preventing SSNC to respond to current demands," said Nicolas Gregoir, president of the board of directors at SSNC.

In 2009, with the support of the World Bank the DRC launched an investment program known as the Multimodal Transport Projects (MTP). One of the development objectives of the MTP was the restoration of

SSNC's financial and operational capability. The financing agreement was entered into in April 2011.

Total program costs directed to SSNC amounted to $617 million, out of which $244 million came from the World Bank, $200 million from the government via a Chinese Fund and $173 million from the government's own budget.

However, as emphasized by Brown of Tiger: "With new international mining companies entering the market the pressure on infrastructure, electricity and transport to support mining in the DRC is likely to become even greater. The World Bank is providing [...] funding to improve the DRC's SNCC rail line. This is good but that is only scratching the surface. SNCC needs a huge investment so that rail transport can be a viable and practical alternative to transport via road," he said.

Extending the discussion to logistics providers, Polytra Transport Engineering and Consulting acknowledges the challenges of operating from the DRC. Polytra is an international logistics and engineering company with almost 40 years of experience of operating in the DRC; the company provides an example of the lengths logistics companies have to go to overcome the challenges posed by the country's infrastructure. "In the case of the DRC there is always a variable and that is where Polytra comes in the picture," said Geert Van Gansbeke, area manager for Africa at Polytra. Our work involves more than organizing transport; it entails arranging every aspect of logistics, including customs clearing, warehousing and packaging."

Callaghan, of Malabar, a group focused on providing general services to the mining community, said: "With so much fluctuation in the market, the amount of products to be moved varies according to the circumstances; for example, at the moment there are energy issues, so there is less production coming from the mines to be transported into Zambia."

From an energy perspective, due to the immense hydropower resources associated with the Inga Falls on the River Congo, it is believed that the DRC could potentially produce an estimated 100,000 MW of power (by comparison, the entire installed capacity of Sub-Saharan Africa today is only 48,000 MW).

The World Bank estimates that a mere 2,400 MW of the 100,000 MW potential has actually been developed. As a result, power supply in the country is heavily constrained and subject to blackouts, placing major limitations on mining activities. "If we want to attract investments to the country, our priorities must be infrastructure and energy. The DRC has the capacity to provide enough electricity for the whole of Africa," said Jean-Sylvere Duga, general manager of Aden Services.

To avoid incurring the frequent production losses caused by power interruptions, several firms operate their own backstop generators. Peter Malley, general manager of Congo Equipment, said: "Numerous mines are looking at supplementing standby generators for power. This is another of Congo Equipment's major product lines as we supply and service at CAT and Perkins generator packages."

To re-address the problems created by energy shortages, substantial investments in new generation and transmission capacity are needed. As emphasized by a report of the World Bank, just meeting the national power demand calls for the refurbishment of the entire existing generator stock, plus a 35% expansion of installed generation capacity to reach about 3,000 MW overall. Developing the DRC's export potential instead would require the installation of a further 7,600 MW and that would entail an investment of $750 million a year over the next decade, tying up a further 8.8% of the country's GDP.

Plans are currently underway to rehabilitate the country's two hydroelectric dams on the Inga Falls, currently operating at low output. There are also plans for two larger hydroelectric stations, the Inga III and Grand Inga, which now have the potential to dramatically change the DRC's and Central Africa's energy supply situation. Projections indicate that Inga III would generate 4,500 MW while it is believed that Grand Inga could generate a staggering 39,000 MW of electricity.The environment impact assessment study of the project have shown that there would be no major impact neither on the ecosystem nor on the human factor. Commenting on the country's hydropower resources, Philippe Goffart, general manager of Promines S.p.r.l., a sand and gravel producer which assists with the development of the mining industry in the DRC, said: "Development of the country's hydro-power industry is long overdue; it is a fashionable clean power source and international money is available for it, but everything depends on the politics of the Kinshasa government."

Confirming the government's intention to proceed with this project, in a recent interview, cabinet director at the DRC's energy ministry Vika di Panzu said a pre-feasibility study on the $8-to-$10 billion Inga 3 plant, as well as a separate 40,000MW Grand Inga project, is underway.

"The top priority is Inga 3, because we are in a hurry now due to internal demand. The increase in internal demand is such that we need Inga 3 before 2020. We are planning to have it in operation by 2017. By 2014/15 we can start construction and I think three to four years later we can start supplying from Inga 3," he said.

Unwanted legacy and common misconceptions

The DRC is no stranger to violent and protracted conflict. Large-scale fighting ended in 2003 with the establishment of a transitional government, but rebel activities continue in the eastern part of the country. The protracted nature of the conflicts induced several investors to leave throughout the years and severely impeded the development of the mining industry in some of the provinces.

President Joseph Kabila on his visit to Goma on September 9, 2010 announced verbally a ban on mining activities that was formalized by Ministerial decree 11 days later. The official reason for the ban was the existence of links between illegal exploitation and illicit trade in mineral resources with the proliferation of and traffic of weapons by armed mafia groups in the provinces of Maniema, Noth-Kivu and South-Kivu. The ban was also supposed to put an end to the 'interference of agents and people external to the services recognized by the Mining Code in the mineral substances operating and trading circuit.'

However, news about African conflicts is often not reported in its entirety by western media outlets and their real causes remain misunderstood or ignored.

The conflicts over minerals in Kivu, for example, are not a new phenomenon that began in the 1990's. Rather, the current situation seems to be a continuation of historical patterns of exploitation that began under King Leopold II and continued via foreign control of resources and politics since independence in the 1960's.

Historical references aside, today the misconceptions about the DRC held by foreign investors are based on several factors. The international community perceives the country, as a lawless state plagued by war where doing business is almost impossible. However, the reality is that apart from the north Kivu provinces where militias are still active, the DRC is today largely at peace. Like any post-conflict country, the DRC needs time to rebuild itself and regain investors' confidence. "Certainly, there have been significant improvements in the last 10 years, notwithstanding some of the realities of internal conflict in the DRC. I have noticed a sea-change across the industry in the profile of international clients coming into the country – it is now attracting the large mining houses, which regard it as being in a post-war transition," said Callaghan of Malabar.


Roger Dixon, chairman and corporate consultant of SRK Consulting.

Nkand of Gécamines echoed Callaghan's words: "The worldwide perception of business in the DRC is very wrong. If it was so bad, important global investors would not be present here. It is quite safe to do business in the DRC and the international community should come and see with its own eyes the work that we are doing".

Van Gansbeke of Polytra added "It is very important that those who want to invest find the means to come and see the country themselves. Many people base decisions on the information they get from others and this does not work for the DRC."

For Roger Dixon, chairman and corporate consultant of SRK Consulting: "Historically, people have come into Africa and colonized and plundered, but that cannot happen anymore. As South Africans, we have a better understanding than the Australians or Canadians of what this continent needs, and this also gives us a competitive edge in the market. Our experience with various legal regimes throughout Africa allows us to be flexible and adaptive so that we are able to not only meet but exceed the international stipulations and national requirements. This combination of global expertise and local knowledge is crucial," he said.

As aforementioned, the country's infrastructure has been largely destroyed during the civil wars and communication networks seriously damaged or left to deteriorate. However, since the general return of peace in 2003 there have been promising signs. Privately funded telephone networks provide signals to a large part of the

Supporting local hospitals is a part of Gécamines' CSR activities. Photo courtesy of Gécamines.

population at reasonable costs. Already in 2003, some 16 private operators had been granted mobile telephony licences and the subscriber base was growing at triple digits per year. At the time though the proliferation of smaller networks caused frequency spectrum shortages, interferences and compatibility problems. As a result, the mobile sector consolidated and now has four major players. "Today the penetration rate of the telecommunications industry in the DRC is around 20%. Vodacom has [more than] 6 million customers, but in a country of [more than] 68 million people the potential for expansion is huge," said Rene' Monzambe, senior executive head of southern region at Vodacom Congo RDC.

Development of the DRC's Internet and broadband market has also been held back by poorly developed national infrastructure. However, today improvements are slow but noticeable as the country is striving to gain access to low-cost, high quality international band through a submarine fibre optic cable while the national operator, OTCP, is busy rolling out a fibre optic backbone network with support from China.

For Duga of Aden "With the new government, the country is moving in the right direction but there is still plenty to be done. The government should not focus on mining only, but seek to boost the field of health, education, agriculture, and tourism and have a clear development plan for the country."

Dunga of Aden makes a good point. The DRC has a vast unrealized agricultural capacity. Straddling the equator and spinning two tropical zones the country's climate favors the cultivation of a wide range of tropical and even Mediterranean crops. More than half of the DRC's land is arable and suitable for farming.

However, it is estimated that only 1%-2% of the nation's farmable territory has so far been under cultivation at any one time. As regards tourism the government is already giving priority to the development of the local tourism industry so that the country can win its share of the millions of visitors each year from around the world that want to experience firsthand some of the very special places on the African continent.

The tourism industry currently consists of both local and international operators and the capital city, Kinshasa, is already served by international airlines.

On-going conflicts in Kivu have negatively impacted on the development of the mining sector. Nonetheless, going forward investors should consider that the DRC is a country almost one quarter the size of the U.S.A. The peaceful and rich Katanga province in the south of the country is situated miles from the areas where the militias are still active and is already working as a safe point of access for many of the country's international investors. Today, it is the most developed province in terms of infrastructure and general level of business activities in the DRC.

Moïse Katumbi, Governor of Katanga, desires to return the province to its former glories, as he explained: "The Katanga province can clearly be instrumental to the re-birth of the DRC. The Bureau du Governorate in Lubumbashi is open 24 hours a day, seven days a week and investors should come and see with their own eyes the work we are doing. Be confident and come and judge us on the field. The readers of E&MJ should trust the magazine because E&MJ is here to see, with its own eyes, the new DRC."

Services and equipment supply chain

The nation's abundant mineral resources and its revitalized business climate are drawing investors, but lack of infrastructure and staffing are hindering development.

SRK on site in the DRC conducting a bulk sampling exercise on a kimberlite pipe. Photo courtesy of SRK Consulting.

Until the turn of the century, the DRC was neglected as a market by mining equipment suppliers. Today, in parallel with the DRC's revitalized business climate, especially in the Katanga province where large mining companies are beginning to enter, service providers are also starting to look at the country with interest. "Big brands certainly dominate in the DRC, but as in other countries they operate largely through dealerships. The DRC lacks formalized market research, so it is difficult to quantify the market size," said Foster of Bell Equipment. "We are well aware of what we are doing, and some of the things done by our competitors, but it is such a vast country that there are probably things happening that we do not know about. It is not the biggest market in the world at the moment, but it is certainly one of the more bullish."

The familiar themes of DRC's deficits in qualified labor and infrastructure are some of the main inhibiting factors on market growth. "There is really a generation in the DRC that has not had access to a solid educational base, which is probably the root of several problems in the country. I am not only talking about primary education, but universities and workplace training. A problem for many of the companies entering the DRC is finding quality people," said Callaghan of Malabar.

For Bertrand Moins, regional director at SMT R.D. Congo "There is absolutely no doubt that the mineral potential in the DRC is huge and could grow further if the government invested even more in infrastructure."

Andre Bester, general manager of AEL Mining Services, a manufacturer and supplier of commercial explosives with offices in Lubumbashi, an approved emulsion plant and a number of strategically placed sites in the Katanga province also describes the challenges of operating in the DRC: "Some of the greatest challenges we have overcome is understanding how to do business in a country like the DRC and understanding the business laws of the country. The authorities are strict and penalties for non-compliance can be very costly. There are no short cuts. Border controls are time consuming and require concise planning in order for us to make sure we have sufficient stock for our customers. Also, having explosives in a war-risk area presents additional challenges in terms of moving around different areas which requires one to have military escort services at all times. As well, finding skilled employees is a challenge and we had to embark on structured training programs to expose our employees to new and contemporary technologies that AEL uses. The DRC mining regulations are from 1955 which we comply with in conjunction with South African explosives regulations, therefore raising the standards under which we operate."

Moins of SMT echoed Bester words: "With regards to mining operations, as an equipment provider SMT needs to ensure that we have technical staff appropriately trained. When we send equipment to a large mining customer we cannot afford to have machines in breakdown for a long time; the most important factors are therefore our after-sales services and the training of our staff. Our local workforce must be trained, as their skills are usually inappropriate. SMT has expat trainers coming from Europe and can also count on trainers coming from Sweden and South Africa to improve the skills of our staff".

Discussing their work with mining clients and summarizing the challenges of operating from the DRC Dunga of Aden concluded: "Energy is more of a direct problem for our clients, because when we work on a site our clients usually provide all the equipment and facilities for electricity. However, we are our clients' business partners and our clients' problems become ours. It is important that goods can be exported from the country; the national railways have been given to a specialized private company for improvements. Regarding education, it is difficult to find well-qualified Congolese employees. It is my wish to have Congolese working for Aden Services at all levels, but I cannot sacrifice the development of the company for this. We are committed to sourcing all our food locally, and have [corporate social responsibility] CSR initiatives where we give seeds and expertise to farmers close to our camps, and try to help develop [small and medium enterprises] SMEs in the DRC."

Heavy industry and capital goods market

The capital goods market in the DRC is expanding and international mining equipment suppliers are entering the market, especially through dealerships.

SMT is the authorized dealer for Volvo's construction equipment. The company established a presence in the DRC in 2005. "We have a complete range of products for after-sales, including servicing equipment, repairs, spare parts, training of technicians and operators and for mining customers we offer local and expat technicians on site that are responsible for our after-sales services," said Moins of SMT.

BIA works as the exclusive Komatsu dealer and re-entered the DRC only recently, in 2011.

"BIA restarted more intensive business activities in the DRC in 2010, generating approximately $2 million. For the time being, in 2012 we have already doubled this figure so we expect further growth. Approximately 80% of BIA's business is reliant on the mining industry. The nature of our business is oriented toward after-sales; we have an engine rebuild workshop in Kolwezi for the old engines to put them back into working conditions and an office in Lubumbashi. BIA provides spare parts, workshops and general onsite maintenance for mining companies," said Duchateau of BIA.

Congo Equipment is a 50:50 joint venture between Barloworld and Tractrafic serving the Katanga province. "Tractrafic has the franchise from Caterpillar to operate in the DRC. The partnership came about as a result of Tractrafic's experience of operating in the DRC and Barloworld's experience on the mining industry," said Malley of Congo Equipment. "Congo Equipment distributes mainly Caterpillar equipment and also rents equipment to mining companies, which pay us an hourly rate. We sell parts, provide service, and a big part of our success comes from our Customer Support Agreements, where we put people on site to maintain equipment. For maintenance, we offer three options: we can either do none, part or all of it, it is really our customer's choice."

Also present on the market is CFAO, which in 2001 acquired CFAO Motors, a company working as exclusive distributor for Toyota, Peugeot, Suzuki and Renault Trucks in the country. Bell Equipment in the DRC actually belongs to the Bell Equipment Group: "Our single biggest national market is still South Africa, where we have about 34 service centers, but our network across Africa is fairly well developed. Our authorized dealers handle most countries in Africa, but the DRC, Zambia, Zimbabwe, Mozambique and Namibia belong to Bell," said Foster of Bell Equipment.

Roymec Technologies (Pty) Ltd. is an equipment supply company based in South Africa. Roymec has mainly been involved in the copper, zinc, nickel and cobalt sectors, working primarily throughout central and southern Africa. "In the DRC we supplied various equipment to Tenke's first phase including flocculant plants, pin-bed clarifiers and solvent extraction filters. We also supplied the solvent extraction filters to their phase 2B. In addition Somika as well as other projects in the country have been supplied with our pin-bed clarifiers and solvent extraction filters. Mumi is another big client that have bought many reagent packages and solvent extraction filters from us," said Alan Fanton, contracts director at Roymec. Fanton assured that Roymec has good expertise, especially when it comes to solvent extraction filters. "The level of South African competition depends on the equipment. For solvent extraction filters there is nobody locally that has the required reference list to interest Tenke Fungurume; we have a licensed technology from US-based Spintek Filtration, which supplies over 70% installation worldwide. For pin-bed clarifiers, there is really only one local and international competitor. Two or three others compete locally with us on reagent packages," he said.

The presence of major international mining equipment suppliers ensures the technological quality of the products on offer. However, for a country where finding good labor and technicians is a challenge, technological innovations can represent a further obstacle. "Our customers have problems in finding good labor and technicians. They are therefore trying to avoid technological innovations; rather they want to keep their machinery simple, user friendly. Companies in the DRC look for good workforce and the availability of parts to hand rather than technological innovations," said Duchateau of BIA Congo.

Goffart of Promines added: "The DRC is ill suited to computerization; I have heard of an on-board computer stopping a truck engine from working because, with all the potholes, it assumed the driver must have left the road."

The picture that emerges is that of a country where the lack of education makes the training of personnel an essential ingredient to the successful outcome of business operations. "The ex-pats are here to impart skills and train locals. There is a shortage of skilled manpower, especially diesel mechanics. The equipment coming out today is technologically advanced, which creates some challenges. We have just employed an ex-pat trainer and built a training center," said Malley of Congo Equipment. "There are various programs we enroll our staff on – it takes between 2 to 8 years to get an individual fully qualified. Employees are individually evaluated and we tailor-make programs for them. A lot of the basic training is done in the DRC, but at higher levels people are sent abroad."

Moins of SMT echoed Malley's words: "Operator skills are a key ingredient to the success for our equipment. On some of our sites we have over 200 machines and trucks altogether. Whenever a new generation of machines arrives from a Volvo series, we have trainers from Volvo in Sweden coming to train the operators of the customers on the new features of the machines. It is paramount that our customers' operators learn how to use technologically advanced machinery efficiently to ensure these are used to their full potential," he said.


AEL Mining Services has an emulsion plant and several distribution centers in the Katanga Province. Photo courtesy of AEL.

Mining consultants

The recent expansion of the mining industry in the DRC has attracted some of the world's largest consultancy firms. SRK, is well established and has been extensively involved in the task of delineating and evaluating the drilling of the copper and copper-cobalt deposits in Katanga since 2010. The focus of the office's work is primarily in two fields: in environmental and social sustainability, and in hydrogeology and hydrology. The environmental processes required for exploration and mining operations are increasingly being recognised as vital to the long-term relationship between mines, communities and governments.

"We opened our office here in May 2010; it was a slow start, but things have progressed very well. We are in a positive cash flow now, which clearly supports our decision to commit to this market. It is important to note that we offer the same type of services that are offered by SRK globally. The key project for us is the Tenke Fungurume Mine, which we consider to be our prime client in the DRC. We are involved in quite a few disciplines on their behalf: environmental, social, geotechnical, and water," said Dixon of SRK.

However, the forecasts of the industry's continued future expansion are now also promoting smaller start-ups. Geological Sciences Consultants for instance, is an example of a company striving to offer a turnkey solution to its clients. "Geological Sciences Consultants primarily offers services in geological exploration, for mapping in the field and geophysical surveying, and we also have mining services. Leonard, our previous managing director, was a mining engineer; he mostly concentrated on mining matters, while I assisted with the geology. We help exploration companies write technical reports and feasibility studies, and support them in all related matters. We work with companies from the early stages of projects, up to the point where they are about to commence mining operations. Writing feasibility study reports is our most popular service, with initial geological investigation also frequently requested", said Abiel Kyamanywa, director of exploration at Geological Sciences Consultants.

CAE Mining provides practical advice for extracting value from existing mining operations and potential projects. As deposits move through explorations stages to production, CAE Mining aims to be recognized as a one-stop-shop for planning and operations technology throughout the DRC. The Johannesburg office of CAE currently serves the DRC where the company is receiving particular interest in short-term planning for open pit operations and strategic underground planning for larger underground copper deposits. "Interactive Short Term Scheduler (ISTS) is primarily geared to the needs of the site-based short term (one day to three months) mine planning engineer and provides the level of detail that is required to produce an operational plan through activity based scheduling,"said Dylan Webb, director of strategic development at CAE Mining. "Mineable Shape Optimiser (MSO) instead defines the optimal size, shape and location of stopes for underground mine design, using an input of block model grades or values. The advantage of MSO is that it can rapidly produce detailed, optimised stope designs based on multiple input parameters including cut-off grade, mining costs, metal prices, dilution, pillars and geotechnical constraints. The stope shape mimics what an engineer would design by manually creating strings section by section, but in a fraction of the time. This automation allows many scenarios to be investigated and ultimately contributes to a robust and well understood mine plan. MSO is available as a module within Studio 3 and Studio 5D Planner (successor to Mine2-4D), the industry-leading underground mine design and scheduling tool", he said.

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Conclusion

A maturing mining market.

The Katanga Province has placed a priority on education, with a new school in Lubumbashi. Photo courtesy of Katanga Province.

The DRC mining market is one of vast potential. A variety of mineral resources are spread across all of the country, the development of which will benefit the whole DRC provided such development is well framed and managed.

The country suffers from mismanagement and corruption, though improvements are slow but noticeable. Debt relief programs from the International Monetary Fund, the World Bank, the African Development Bank and the European Union have certainly been instrumental to the recent achievements of the country in terms of inflation control and GDP growth.

If conditions on the world markets remain favorable, it is likely that the copper and cobalt output from the southern Katanga province will continue to increase significantly in the coming years. However, the outlook for gold, tantalum, tin and tungsten seems to be inextricably linked to the attainment of political stability in the eastern Kivu provinces and the general international concerns about the reported use of minerals to finance military operations in those regions. Nevertheless, the future of the country's mining industry will depend not only on the price of copper, cobalt and other commodities. It will also be inextricably linked to the role adopted by western societies and its investors.

Taking into account the 10-year time frame from initial exploration on a typical base mining project, if investors are to be successful in challenging environments like the DRC, it will be necessary to promote reforms that affect the economic policies of the country.

Promoting reforms will entail engaging policy makers to illustrate what worked in more mature mining markets like Ghana. Responsible investors with solid finances, good political awareness and a wealth of international experience are therefore particularly welcomed. "Investors should understand that working in the DRC is possible. With the right business environment, investors will come for sure. Mineral resources are sitting underground and are just waiting to be grabbed. Infrastructure needs to be improved, but that would follow automatically as it has in countries like Liberia and Cameroon," said Van Gansbeke of Polytra.

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