

Peruvian Mining

Already a major producer in precious and base metals, Peru is capitalizing on its mining friendly environment to treble copper production over the next coming years.

A REPORT BY GBR FOR E&MJ

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A Proven Mining Country, an Emerging Copper Giant

Peru's extraordinary mineral wealth and political stability ensure the country remains one of the world's favorite mining destinations



Barrick operates two gold mines in Peru, Lagunas Norte (pictured) and Pierina, with combined production of about 1 million oz gold last year. (Photo courtesy of Barrick)

A brief study of the history of Peru's fascinating civilizations reveals how linked mining has been to the country's developments. Over 1,000 years before the Spaniards killed Inca Emperor Atahualpa after robbing him of his gold and silver, the Señor de Sipán, a leader of the Moche culture, was buried with a number of precious objects including a famous necklace, half of gold and half of silver, symbolizing the equilibrium between the two main gods, the Sun and the Moon. Nearly a millennium before this, the Chavín culture had already mastered the art of jewelry as well. The raw materials were always mined.

In today's Peru, mining continues to be a central activity. The country hosts a rapidly-growing economy that has expanded uninterrupted for the last 12 years and boasts tremendous optimism toward the future. Peru is currently attracting a wave of investments in agribusiness, power generation, oil and gas and, of course, mining. The latter leads the way. The announced construction of Las Bambas, a mega copper project by Xstrata, will be the largest ever single investment in the country, with a planned expenditure of \$4.2 billion. Copper production is expected to nearly treble with the upcoming investments, moving from the current 1.25 million metric tons (mt) of fine copper to 3.5 million mt six to seven years from now.

The economic and legal stability that Peru has enjoyed since terrorism was thwarted in the 1990s, is such that this year's presidential election is not even perceived as posing the traditional political risk common in Latin America. The three candidates leading the polls (Alejandro Toledo, president from 2001 to 2006; Luis Castañeda, a former mayor of Lima; and Keiko Fujimori, the daughter of former president Alberto Fujimori, now in jail) are expected to follow the same macroeconomic recipes that have boosted development so far. GDP has increased by an average of 5.6% annually between 2001 and 2010, according to IMF data. Even Ollanta Humala, a long shot contender perceived as a replica of Venezuela's Hugo Chávez, has significantly moderated his views.

According to the Peruvian Ministry of Energy and Mines, the mining sector has a project portfolio worth \$41 billion; \$28 billion of which will be directed toward copper projects. While critics argue this figure may be overoptimistic as it does not take into account the social conflicts that are delaying some projects, such as Southern Copper's Tía María or Anglo American's Quellaveco, the perceived attractiveness of Peru as a mining-friendly country is at historically high levels. At the middle of the economic crisis, global exploration expen-

diture contracted dramatically (-42% in 2009), however in Peru it only decreased by 18%. Peru was indeed the third largest recipient worldwide for exploration expenditure that year; only Canada and Australia could boast more.

The Super-cycle

"I have never seen a cycle like this in my 52 years in the industry," said Richard Graeme, senior vice president and general manager of Lumina Copper SAC, a Chinese-owned company working on the Galeno copper project in northern Peru.

The metal prices bonanza and the closeness to the presidential elections have prompted the demand by certain politicians for higher taxation of mining profits. But leaders in the industry fret this could seriously jeopardize the country's ability to attract new investments. "We are in the good part of the cycle and both companies and countries need to take advantage of that," said Luis Carlos Rodrigo Prado, lawyer at Rodrigo, Elías & Medrano law firm and president of the Canada-Peru Chamber of Commerce. "However, you cannot just create new taxes that would not work in a slightly different environment. Right now the regional and local governments have millions in their bank accounts that cannot be invested, therefore at this point in time it does not make sense to give them more money. Besides, it is more beneficial for the country to attract huge new investments than to raise the taxes."

For Hans Flury, until very recently president of the National Society of Mining, Oil and Energy (SNMPE). "We need to be competitive. Our neighbors have similar geography and rich resources so legal stability is key to attracting investment. The higher the taxes, the less attractive the country becomes."

Along with the natural resistance of any business to pay more taxes comes the frustration of mining companies that see that the money they pay does not translate into much needed investments in health, education and infrastructure. A big proportion

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of the so-called *mining canon* (50% of the income tax which goes directly to the regional and local authorities of the areas where producers operate) is still waiting to be spent due to the inability of the different public bodies to develop projects. Furthermore, some of this money is eventually dedicated to populist ventures such as the erection of grandiose monuments or the construction of bullrings in the same areas that may not even have sewage systems.

Hence the success of voluntary contribution, an agreement reached between President Alan García and the main mining players, according to which producers contribute a further 3.75% of their net profits for development projects. In this instance it is mining companies themselves who decide how to spend this money in collaboration with multilateral bodies and NGOs. According to many leaders surveyed, the scheme has proven highly successful and it should be renewed once it expires at the end of this year, yet the presidential candidates may want to present their own alternatives if elected.

"The infrastructure is so much better than in 1999 when I arrived in Peru," said Darrell Wagner, general manager, Barrick.



In 2010, Antamina produced 325,000 mt of copper, 427,000 mt of zinc, 14.9 million oz silver, 6,100 mt of lead and 3,400 mt of molybdenum. The operation is undergoing a \$1.3 billion expansion. (Photo courtesy of Antamina)

"There could be more roads, clinics and schools, but the country is making a lot of progress. Poverty is reducing and the levels of nutrition and education have increased. I am inclined to believe that mining has been a key factor in that change."

A Commodity-based Economy

The boom of the mining industry has not been accompanied by the development of

the related industries that can add value to the minerals extracted. When the global financial crisis hit in 2009, Doe Run, a company operating a very large metallurgical complex in the Andean city of La Oroya, suspended activities in the middle of a dispute with the Peruvian government over the implementation of various environmental projects. For many years, La Oroya's sad fame was for being one of the most polluted cities in the world. In the middle of the dispute, the SNMPE expelled Doe Run from the association for its reluctance to fulfill its environmental commitments. The closure has left Southern Copper and Votorantim as the main producers of refined metals in Peruvian soil.

"The closure of Doe Run is a step back for the processing industry, but I am sure the space they have left will be taken by new investors," Flury said. "I believe we will move toward more value-added production with the help of the free-trade agreements the country has been signing in recent years."

A similar situation applies to hydrocarbons. The rich gas fields in Camisea have completely changed the country's energy matrix, while a quantity of this gas is also exported. The current plans for petrochemical sites are the logical step forward. Transforming a raw materials economy into an industry-based economy will not be achieved overnight.

"There is a limit to the manufacturing of final products Peru can manage because you need to be close to the destination markets," Flury said. Concentrates will continue to play an essential role."

Laurence Stefan, managing director of Macusani Yellowcake, a Canadian compa-

Vena Resources INC. is a multi-commodity Canadian mining company focused on the exploration and development of Peru's mineral potential.

URANIUM

- Minergia S.A.C. joint venture Vena 75% / Cameco 25%
- 28,000 m drilled to date
- Preliminary 43-101 resource calculation: Indicated 8.3 M lbs U3O8; Inferred 14.2 M lbs U3O8
- 3rd drill campaign to start in Jan. 2011

ZINC/ MANGANESE

Azulcocha Mine

- Underground rehabilitation/ plant design/ tailings impoundment
- Underground drilling to expand and define resources
- Metallurgical testing of tailings and ore to improve recoveries
- Property and regional exploration to identify additional sources of mill feed

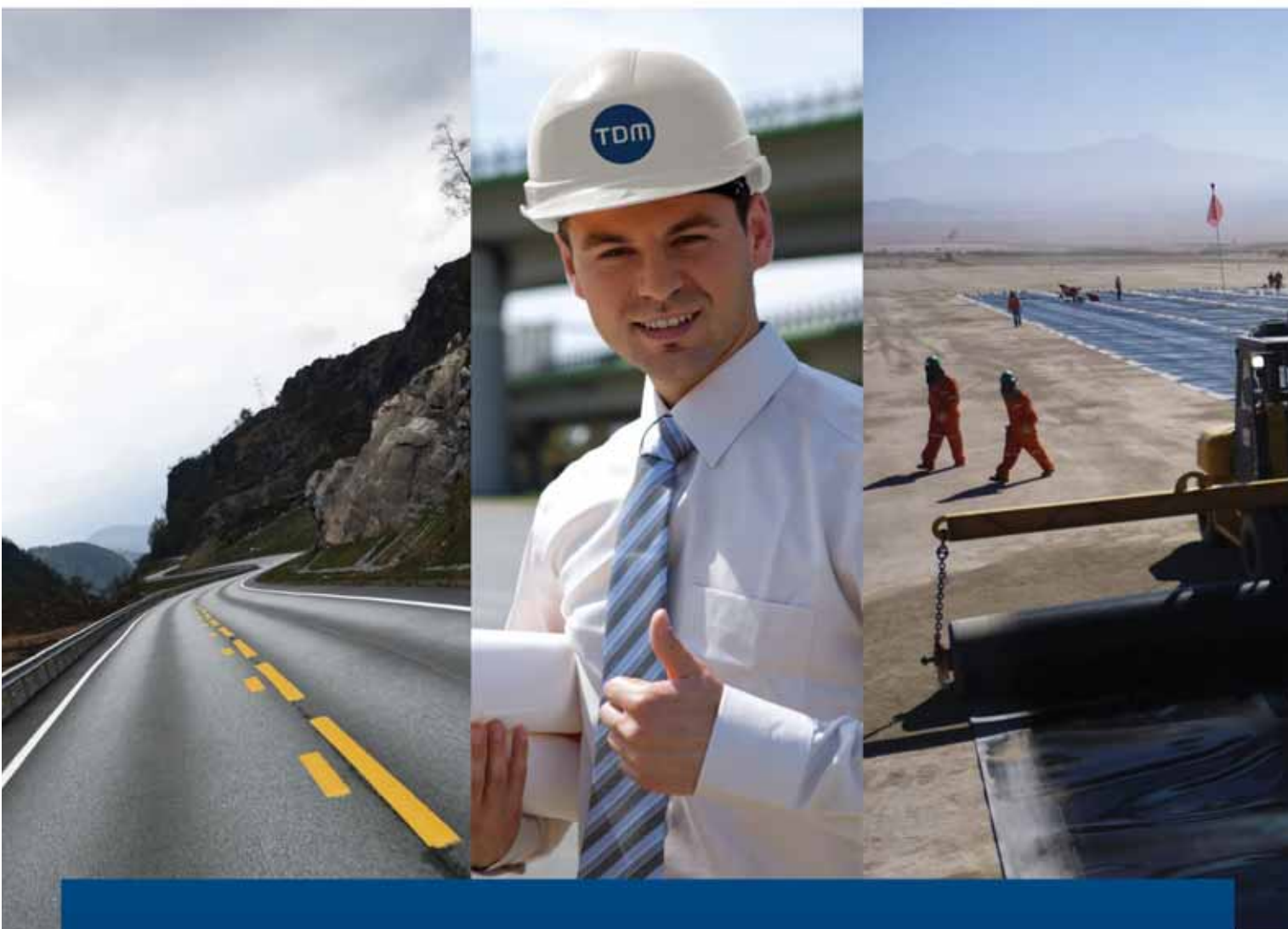
POLYMETALLIC

- Esquilache - 2550 M drilled to date
- Detailed mapping and sampling of high grade Au/Ag veins and potential multi-element porphyry deposit
- 2nd drill campaign in 2011
- Pukara - Detailed Sampling of mineralized structures
- Targeting potential large buried porphyry system
- Drill campaign in early 2011

GOLD

- Amantina - JV with Gold Fields exploring for diatreme breccias related gold deposits on 14,000 Ha. - located north of the recently discovered Chucapaca multi-million oz. Au deposit (Buenaventura/ - Goldfields, 2009)
- Inca Gold - systematic exploration of 5 Au projects located in central-north Peru

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Tecnología de Materiales

ny exploring for uranium in the Peruvian highlands at more than 4,000 m above sea level, said. "We try to explain to the locals that mining is part of their future because it is the easiest way to generate jobs. Toyota will never set up a plant in Macusani and start producing cars there. The first industrial stage in any society is mining."

Raising the Bar

Safety will always be an issue for mining operators. Last year an extraordinary rescue operation in Chile grabbed the world's attention and ended when 33 trapped miners returned safely home. The sad reality, however, is fatalities are commonplace in the industry, as shown by the recent accidents in coal mines in Colombia.

The number of people killed in Peru's mining sector increased from 56 in 2009 to 64 last year according to the statistics of the Ministry of Energy and Mines. That is over one fatality every week, which is a figure far from satisfying. Generally speaking though, the standards in Peru have improved dramatically over the past few years, thanks mainly to the initiatives of multinationals and the larger national pro-

ducers. "To work in Antamina, any worker needs to have two weeks of training with 14 different courses. The standards are extremely high," said Walter Piazza, managing director of COSAPI, a large Peruvian engineering and construction firm.

The problem is not all companies in Peru are Antaminas and Barricks. The country's mining industry is highly atomized, with many small operations, some of whom may not necessarily play by the same rules. "Most of the incidents happen in companies that take shortcuts when it comes to applying the different health and safety regulations," Flury said. "They take advantage of the local population to expose their workers to risks that are unacceptable. As an industry we need to work toward having zero fatalities, even though we know that is very difficult because sometimes it is individuals who take unnecessary risks."

Peru has many narrow-veined underground operations which present their own safety challenges. "The risks in underground mines are bigger than in open-pit mining, especially with regard to rock falling," said Ignacio Bustamante, CEO of Hochschild Mining, a Peruvian silver pro-

ducer listed in London. "We have halved our accident rate in the last three years, but we need to continue improving. We are implementing the DNV safety system and we have already completed level 6 at our Arcata and Pallancata mines. This is positioning us among the safest underground mine operators in South America."

The challenges do not only originate from the operational side. With a number of mega-projects in the pipeline that will be developed nearly simultaneously over the next two to three years, the construction phase of the new sites will have to be seriously taken care of. These projects will involve the participation of thousands of workers. The expected shortage of labor as a result of this boom will mean that many of these workers will not have previous experience, thus increasing the risks of accidents.

"We are convinced we can reduce the incident rate to zero. Some people believe it is impossible, but we believe it can be achieved," said Hernando Graña, executive vice president of Graña y Montero, Peru's largest engineering and construction group. "You need to give the responsibility of safety to every single worker."

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Productive Highlands



Barrick congratulates the Productive Highlands Program and the Institute for an Agricultural Alternative for achieving second place in the World Challenge 2010, a global competition organized by the BBC and Newsweek magazine. The competition is designed to recognize projects and small businesses from around the world that have shown enterprise and innovation at a grassroots level. Barrick is proud to support the Productive Highlands program as part of the company's commitment to social and economic development in the highlands of La Libertad, Peru, where Barrick operates the Lagunas Norte mine.

As part of the company's philosophy of Responsible Mining, Barrick is committed to supporting the sustainable development of its neighboring communities.

They all need to feel they are part of the structure. Moreover, to maintain good safety levels, clients need to be reasonable with the timings. Luckily the mining industry understands this."

The Problem of Informality

One of the greatest problems that the industry faces in Peru is informal mining which is causing environmental damage in parts of the Amazon jungle. The negative impact of this activity goes far beyond the deforestation and pollution produced locally, according to Percy Arhuata, general manager of Inmet (currently in the process of merging with Lundin). "Informal miners are the biggest polluters and they do not implement the right environmental standards. This is a problem for the industry as a whole and affects formal companies because irresponsible mining generates bad press among the farming communities. As a result there are social conflicts."

For Miguel Cardozo, president of the Association of Explorers of Peru (AEPE) and president and CEO of Alturas Minerals, "Informal miners should not exist: they damage the environment and put their lives at risk. However, how can you stop them?"



Hans Flury, legal director of Southern Copper and president of the SNMPE 2009-2010.



Mariela García de Fabbri, general manager of Ferreyros.



Ignacio Bustamante, CEO of Hochschild Mining.

You can try to formalize them but it does not work; as long as metal prices are high, you will have informal miners."

The paradox of informal mining is that it would be easy to track down how the informal production is channeled toward the formal market, Rodrigo Prado explained. "For the first time the government has started to take a strong stand against informal mining in the area of Madre de Dios and it now faces social problems," he said. "Even NGOs act differently against illegal miners than they do against big mining companies because this is perceived as a social issue."

Looking on the Bright Side

The good news is the wave of investments in the extractive industries and the great performance of the Peruvian economy over the past years have helped reduce poverty rates significantly. The middle classes have expanded and although the country still has an enormous infrastructure deficit, the panorama on this front has improved as well. The mining sector, as the engine of the economy, needs to continue playing a key role in this success story.

"Investment is driving economic growth and generating new opportunities for Peruvians. When I was a student in university the GDP per capita was \$1,000; it is more than \$5,000 today, so we are on the path to development," said Mariela García de Fabbri, general manager of Ferreyros, the distributor of Caterpillar in Peru.

Alberto Arispe, general manager of Kallpa Securities, a broker that sponsors junior companies' listings in the Lima Stock Exchange, gives an idea of the magnitude of this evolution. "As little as 20 years ago, Peru was in a state of pessimism. Between 1988 and 1990, GDP was down 25%, inflation was 30% per month, there were bombs in the streets nearly every day and the people had no hope in their country. Many just wanted to leave and work abroad. Today the economy is solid. We are signing free-trade agreements with many countries, foreign direct investments continue to increase and the poverty rate has decreased from 65% in 2000 to about 33% today."

This happy period, coupled with Peru's geological richness, has promoted the country to be the largest or second largest producer in Latin America for gold, copper, silver, zinc, lead and tin. Peru also produces iron ore, tungsten and molybdenum. In spite of its already world-class

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production figures, Peru's exploration potential is still huge in each of these metals, while the country also offers very interesting uranium opportunities. Gold production, however, is set to decrease over the next years unless new sizeable reserves are found. Gold output in 2010 was 5.25 million oz according to official data, an 11% decrease on 2009.

However Fernando Gala, vice minister of Mines, believes the country's position in gold reserves is actually very positive if compared to other large producers such as China (see interview) and judging for the record levels of expenditure in gold and copper exploration, the industry firmly believes there is still a lot to be found. "Peru is a powerhouse of metals. I believe we have not yet seen the true potential this country has, even in metals no one has thought of before, such as nickel. The country is just starting," said Jorge Benavides, president and CEO of zinc-focused Zincore Metals.

On the other hand, Lima is becoming a financial hub in South America for risk-hungry investors willing to put their dollars in exploration ventures. The announced integration of the Lima stock exchange (including its successful junior segment) with those of Santiago in Chile and Bogotá in Colombia will only provide a better vehicle for investors across the region to fund new, promising projects.

In this context, it is of no surprise that industry leaders have a great feeling about the future of the mining sector and for the country as a whole. "Our economy is growing really fast. At 8% GDP growth the expectations are high. I would invite people to come and work in Peru," said Enrique Ramírez, general manager of Pan American Silver.

"Peru is mining-friendly. The country has an experienced workforce and good service providers in place. In addition to this, it is a well-established democracy and is on sound financial footing—Peru has an investment grade. Peru is just a fantastic mining country," said Damon Barber, CEO of Hong Kong-based CST Mining, who last year acquired Chariot Resources and its Mina Justa copper project in Peru.

Provided the next administration follows similar economic policies and invests in infrastructure and education to cope with this growth, the love affair between Peru and miners from around the world is set to go on for at least another decade.



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Fernando Gala Interview

Fernando Gala, vice minister of Mines of Peru, insists the government is doing its best to speed up the approval of environmental impact assessments and points out that Peru has to invest in education to feed the market with all the professionals needed

What is the importance of mining for the Peruvian economy?

Mining is extremely important for Peru. The taxes obtained from mining represent about 40% of the country's total income tax and nearly 25% of the total taxes raised by the country. A second factor is the generation of currency: 60% of the country's total exports come from mining activities. A third aspect is employment; some argue mining does not generate many jobs. Indeed 126,000 direct employees does not seem a big figure; however we need to consider indirect jobs which are five times as many. That means more than 700,000 people depend on mining to make a living. A further 1.9 million are supported by the wages earned by these workers. Besides, the salaries paid by the mining sector are higher than in other industries.

A fourth aspect is the purchases made by the mining sector to national companies. Finally, the mining companies, often in remote areas, develop important social responsibility initiatives. In some way they replace the state because the state does not have the resources to reach all areas.

What is the attractiveness of Peru for mining investments? Will tax stability agreements continue to be granted in the years to come?

Peru offers a highly favorable framework for mining investment. First, we have great geological potential with a diversity of resources. Second, we have had a solid economy for the last years and we have achieved investment grade. Third, the legal framework is attractive to foreign investment.

Peru respects the norms for the long term. However the tax stability agreements started in 1992 at a time where Peru was just leaving behind a very bad



period; a way of attracting investments was to guarantee these tax agreements. Today, nearly two decades later, Peru has gained the trust of investors so I do not think mining companies really need that as it comes at a cost anyways: two percentage points more in income tax.

How can you improve the time needed for the approval of environmental impact assessments (EIAs)?

The Ministry of Energy and Mines evaluates and approves the EIAs, but is not in charge of monitoring them. Lately we have had a wave of studies and we have had to hire external experts to deal with them. We are trying to reduce the timings while we increase the quality of the evaluation process. In order to have good projects, these need to be carefully evaluated.

Can the country offset the declining trend in gold production?

Gold is a precious and expensive metal. I was asked why we only have gold reserves for 11 years. The truth is the world's largest gold producer (China) only has

reserves for six years. We have interesting projects, like Conga, that will compensate for Yanacocha's decline in production. We will not grow in gold as we are going to do in copper, but we have resources to maintain production levels for a few years.

Now that mining is again in a high cycle, there are voices asking for higher taxation on the industry. In Peru, the sector is responding by donating money to the voluntary fund. Will the current agreement be renewed?

The voluntary donation program expires at the end of this year and there is a proposal for renewal for five more years, until 2015. As a government we do not want to take long-term measures with regard to taxation because this would tie the hands of the next administration, which may want to explore other ways of raising the income from mining activities without damaging the competitiveness of the country.

Critics argue Peru should move down the value chain instead of just exporting raw materials.

We have to look at more added value in the medium term. Right now Peru needs to take advantage of the avalanche of investments to reduce poverty rates, generate sustainable development and promote the growth of the industry. This will be achieved mainly through the trebling of our copper production in the next years. Once we achieve that, we can think of the next stage: to add more value to our production. By then we will already be a more developed country and we will be in a better position to undertake that change. All of the countries that are

developed today started producing raw materials initially.

Companies complain the Peruvian state leaves them with the burden of developing the infrastructure in the country.

The state only raises money through taxes. The bigger the production, the more money we raise. In a country like ours the state has to prioritize the investments in health, education, electrification and other basic needs. Infrastructure is definitely a challenge. In a developed country, the infrastructure is already given. But despite our infrastructure shortages, the country is still competitive to attract investments.

How is the industry going to cope with the shortage of professionals?

We have to be prepared to absorb all of the investments that are coming in mining and other sectors. In our country the universities have not traditionally worked closely with the private sector;

we need to increase the collaboration between industry and academia.

What is the potential in other metals?

From an economic point of view, gold and copper amount to 78% of the total value of our exports. Yet we also are a world power in silver, a metal being used in new applications, and we have lead, tin, zinc, indium and selenium.

How do you think the industry can improve its community relations on sensitive issues such as water usage?

Community relations in Peru are a delicate matter because there are local populations spread around the country and education levels in remote areas are pretty low in Peru if compared to other countries. Therefore we need to make a strong effort in communication, to tell the local communities about how modern mining operates and what they can expect from mining companies. Every actor should make a stronger effort in communication, not only min-

ing companies: also universities, media and service providers.

According to the Water National Authority, mining only accounts for 2% of the total water consumption, yet the perception of the population is that agriculture will suffer from mining usage. In the case of the Tía María project, for instance, the authority stated very clearly that the underground water was going directly to the sea, therefore Southern could use it without affecting agriculture. Yet the locals opposed the idea. Now, Tía María is going for the seawater option. Quellaveco is also looking at alternatives for water usage.

Would you like to add a final message for the readers of *E&MJ*?

Peru offers a favorable climate for investment thanks to its diverse resources, its legal stability, its solid economy and the country's competitiveness in many aspects. We invite investors to come and develop modern mining in Peru and to make a commitment to the communities' sustainable development.



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Peru's Large Precious Metals and Copper Producers

The country's major players are investing large sums of money to keep up production numbers in gold and massively expand Peru's copper output



On top of its Tintaya operation (pictured) and its participation in Antamina, Xstrata is investing \$5.7 billion in the new Antapaccay and Las Bambas copper projects. (Photo courtesy of Xstrata)

Peru is currently the sixth largest gold producer worldwide. In 2005, output peaked at 6.7 million oz; last year it fell significantly from 2009's 5.92 million oz to 5.25 million oz, mainly because of lower production figures from the country's largest gold mine, Yanacocha. The site, located in Cajamarca (northern Peru) is a joint venture made up of Newmont (51.35%, operator), Buenaventura (43.65%) and the International Finance Corp. (5%). It produced 1.46 million oz of gold last year, about 500,000 oz less than in 2009, due to lower grades in the increasingly mature unit, a problem expected to be mitigated with Yanacocha's Minas Conga project.

"The main deposit is essentially running out of oxides and the grades are decreasing," said Roque Benavides, president and CEO, Compañía de Minas Buenaventura. "Going further we expect to maintain 2010's level of production or increase it slightly."

Conga is a gold-copper porphyry deposit located in the Cajamarca region with reserves of 11.8 million oz of gold and 3.2 billion lb of copper. The environmental impact assessment (EIA) has already been approved by the Peruvian government and a final thumbs-up to move the project into production is expected during 2011. The

required investment will be in the region of \$3 billion. Preliminary production figures for Conga, whose startup would be in 2014 or 2015, are 585,000 oz of gold and 72,000 tons of copper per year.

Through Buenaventura's own operations and its stakes in other ventures, the company stands as Peru's most important player in precious metals with a consolidated production of about 1 million oz of gold and 13.7 million oz of silver in 2010. The NYSE-listed Peruvian company's latest production unit is La Zanja (53% Buenaventura; 47% Newmont) which started production in September and will yield 100,000 oz gold annually at cash costs of around \$400/oz. "La Zanja is an emblematic project for us: it is the startup of a mine in Cajamarca, where we have had lots of social issues. The fact that we have been able to reverse the situation is very important," said Benavides. Buenaventura also holds a 40% interest in the Tantahuatay gold and silver project, currently under construction, that should produce up to 100,000 oz gold and 426,000 oz silver annually starting during the second half of this year.

Peru's second largest gold mine is Barrick's Lagunas Norte, whose production was 807,000 oz gold in 2010. The

mine is one of Barrick's treasures as it offers very low production costs. "For two consecutive years, Lagunas Norte has been Barrick's most profitable operation. Capital costs in this mine have been low because the ore was right at the surface. It is a low-cost heap leach operation; infrastructure was not bad and Peruvian wages are competitive," said Darrell Wagner, general manager in Peru for the Toronto-based company.

Barrick has a second operation in the country, Pierina, that reached 191,000 oz gold last year. It is a mine that was initially planned to shut down in 2009, but whose life has been extended until 2014. "We do brownfield exploration every year in both mines. Certainly Lagunas Norte offers more potential since there is more land to explore, while Pierina has been in operation for longer and is maturing," Wagner said. Both Lagunas Norte and Pierina are 100%-owned by Barrick, although in the former case the company pays a 2.5% royalty to the Peruvian state.

Together with Newmont and Barrick, the other main multinational active on the gold front is Gold Fields of South Africa, which runs the Cerro Corona gold-copper mine in Cajamarca. The operation, started in 2008, reached full production in 2009 and finished last year with 160,000 oz of gold and 43,000 tons of copper produced.

"Peru has been our first step into South America," said Diego Ortega, head of legal and corporate affairs at the corporation's Peruvian subsidiary, Gold Fields La Cima. "Gold Fields focuses on gold deposits and Cerro Corona is the first operation where we also have copper production. Last year we managed to place Cerro Corona as the best operation of the group and we are proud to have consolidated our production levels and our relationship with the locals, through transparent information and participatory work."

Cerro Corona has reserves of 5.5 million oz (gold equivalent) and further resources of 2.5 million oz. Moreover, the Gold Fields group controls the Chucapaca project



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VOTORANTIM METAIS: NO BORDERS, JUST LIKE BRAZIL.

Votorantim Metais is a Brazilian company. More importantly, it is a global company, part of Latin America's largest private-sector conglomerate. Votorantim Metais is the leading aluminum producer in Brazil, one of the world's three largest zinc producers and the largest electrolytic nickel producer in Latin America.





Pan American Silver produced 7 million oz silver in Peru in 2010. (Photo: Huarón mine, courtesy of Pan American Silver)

(southern Peru) where a discovery was announced in May 2010 at the Canahuire gold-silver-copper deposit, with inferred resources of 5.6 million oz gold equivalent. The joint venture company in charge of the project is 51% owned by Gold Fields and 49% by Buenaventura. According to current calculations, the project could be put into production by 2015, and would demand an investment similar to Cerro Corona, in the region of \$750 million.

As well as Buenaventura and the main foreign players, there are a number of other national producers with sizeable gold assets. These include Consorcio Minero Horizonte (193,000 oz in 2010) and the three mines run by Guido del Castillo (Aruntani, Arasi and Anabi; 320,000 oz among the three). Finally, we cannot ignore all the gold from small miners and informal operators. In the jungle area of Madre de Dios in south-eastern Peru, pro-

duction is estimated to have reached 610,000 oz last year.

The question on the table is whether Peru will be able to maintain its gold production levels. For Guido del Castillo, president of Aruntani, there is still much to be found. "Looking at the size of the industry it is very difficult to say the exploration of gold will stop," del Castillo said. "The Eastern Andes region is totally unexplored. Work in this area is more expensive because the rocks are covered by vegetation but there is tremendous potential."

"Of the \$41 billion that will be invested in mining projects, 28% will be directed to gold projects, moreover Peru has very low production costs, which is a key factor. The prospects are very positive for precious metals," said Miguel Carrizales, president, Institute of Mining Engineers of Peru.

And yet, the rising star in Peru is not gold, but copper. Production of the red metal was down by 2% in 2010, but this is nothing to worry about considering a number of mega-projects are going to give an enormous boost to the business.

Peru, the Next Chile?

Peru's total production of copper in 2010 was 1.25 million mt, the major share of



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which came from Southern Copper's Toquepala and Cuajone units (334,000 mt altogether), Antamina (325,000 mt), Cerro Verde (operated by Freeport McMoRan, 312,000 mt) and Xstrata's Tintaya (93,000 mt). Over the next few years, the country is expected to receive a truly substantial investment in copper.

Grupo México-owned Southern Copper plans to spend nearly \$900 million this year in the expansion of its operations in Toquepala, Cuajone and the Ilo metallurgical complex (smelter and refinery). Furthermore, the company is waiting to receive approval for the EIA of the Tía María project, one of Southern's priorities, which is facing strong opposition from anti-mining groups, even though the project would be run using desalinated seawater. Provided these problems are solved, the \$934 million project is expected to produce 120,000 mt/yr of copper cathode. Beyond this, the company has another copper project called Los Chancas at the feasibility stage.

Antamina, a BHP/Xstrata/Teck/Mitsubishi joint venture, is a massive operation in both copper and zinc (427,000 mt of the latter last year) that is undergoing a \$1.3 billion expansion. The new investment will increase throughput from 94,000 mt/d to 130,000 mt/d by the end of 2011, following a 77% expansion of the reserves back in 2008. Just before he finished his term as president and CEO of Antamina at the end of 2010, Ian Kilgour gave us more details.

"The expansion expenditure is divided between an increase in the mine fleet and more plant capacity," Kilgour said. "We are doubling our truck fleet from 54 to 118 over the next three years. We are going from four to seven shovels and we are adding three new large loaders, plus we are debottlenecking the crusher, acquiring a second SAG mill and a fourth ball mill and duplicating the power line among other aspects.

"We are increasing the life of the mine by six years to 2029," Kilgour said. "We are confident that we will continue to increase reserves in the future so we need to think of an efficient operation as it will get bigger. Our copper grade is more or less stable (between 0.9% and 1% until the end of the mine life) but our zinc grade varies greatly depending on the area we are mining."

Another expansion that can potentially have a great impact is at Cerro Verde, 53.56%-owned by Freeport McMoRan. The joint venture company, that produces copper as well as molybdenum, has



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Guido del Castillo, president of Aruntani, a gold producer.



Richard Graeme, senior VP and general manager of Lumina Copper SAC.



Enrique Ramírez, general manager of Pan American Silver Peru.

already spent \$50 million to increase throughput from 108,000 mt/d to 120,000 mt/d and is currently evaluating a major investment.

"From an economic standpoint, Cerro Verde has worked very well. Cash cost is around \$0.95/lb," said Benavides. "We are in the process of developing the feasibility for expanding the operation. It is a huge deposit with reserves for three decades. It is the type of mine that deserves to undergo expansion." Buenaventura owns 19.3% of Cerro Verde.

A Record-breaker

For its size, Xstrata's Las Bambas is the star of Peru's copper boom. The \$4.2 billion investment, already approved by the company, is only waiting for regulatory approvals for construction to be started (probably in the third quarter of this year). It consists of three open-pit mines and a 140,000 mt/d concentrator that will allow for an initial output of 400,000 mt of copper annually. If all goes according to the company's plan, it will reach full capacity by the end of 2014.

In parallel to this, the company is expanding its Tintaya operation through a \$1.47 billion investment to put Antapaccay, a satellite deposit, into production. The expanded Tintaya will increase its production to 160,000 mt/y (including concentrate and cathodes), moreover mine life will increase by 20 years. "Since 2004 Xstrata has developed an integrated strategy in Peru, from the start of Las Bambas as a greenfield project to the acquisition of Tintaya and the 33.75% participation in Antamina in 2006, and finally the corporate approvals for the construction of Antapaccay and Las Bambas nearly simultaneously," said José Marín, COO of Xstrata Copper's Southern Peru division. "The framework of economic and social stability and the respect for

the rules of the game have been a key element for these decisions."

Another large copper project expected to kick off soon is Toromocho, one of the various copper assets acquired by Chinese investors in the last five years in Peru. The owner is the Aluminum Corp. of China (Chinalco) who took over Peru Copper, a Canadian junior, back in 2008 for \$762 million. Toromocho, whose EIA was approved by the Peruvian government just before Christmas, is a \$2.2 billion project that will process 117,200 mt/d to produce about 178,000 mt of copper, 10,000 mt of molybdenum oxide and 4 million oz of silver annually. Mine life will be 36 years.

For this large venture to go ahead, a town of 5,000 people will have to be moved. The company is doing its best to show that a Chinese company can mine responsibly. "Chinese companies do not necessarily have the best image in Peru. Yet in our case we are perceived differently than other foreign companies, not only Chinese," said Armando Arrieta, vice president of legal and corporate affairs, Chinalco Perú.

"We will use thickened paste technology in our tailings to avoid big accidents like the one that happened in Hungary; besides there will be no big draining problems. Also, you will probably find no one in Peru investing \$44 million in a high density sludge water treatment plant to deal with an 80-year old problem that was not caused by Chinalco at all."

Arrieta refers to the plant that will treat acid waters coming through the Kingsmill tunnel, built in the 1930s by the Cerro de Pasco Copper Corp., which is one of the many environmental liabilities Peru suffers from past mining operations.

Other copper projects in Asian hands include Río Blanco in northern Peru, controlled by the Zijin Group; Galeno, owned by Lumina Copper SAC, a consortium of Minmetals and Jiangxi Copper; and Mina

Justa, the main asset of Chariot Resources that was taken over last year by CST Mining of Hong Kong. While Río Blanco is reported to be on hold as a result of Zijin's environmental disaster in China a few months ago, there should be mining in both Galeno and Mina Justa in the next three to five years.

Size-wise, Galeno's operation will be similar to Toromocho. Lumina Copper's senior vice president and general manager, Richard Graeme, gives more detailed information. "Based on the scoping study, we are in the range of a \$2 billion investment, but the bankable feasibility study will give more accurate numbers," Graeme said. "The project is at an elevation of about 3,800 m, close to Yanacocha and Cerro Corona. The deposit has important molybdenum content, a bit of gold and silver and also rhenium, which is a rare earth that can also be recovered. The throughput is expected to be 110,000 mt/d. We are anticipating at least a 20-year mine life, but that could expand, depending on copper prices."

Galeno will require a 260-km pipeline to take the concentrates to the port; a logistics challenge that is commonplace in Peru, where most of the mines are up in the Andes.

Due to its closeness to the sea, CST Mining will not face this issue at Mina Justa. The company, a recent startup with a focus on copper assets in the Asia-Pacific area, already has one operational unit, the Lady Annie mine in Australia, while in Peru the EIA of Mina Justa (70%-owned) has already received the green light from the Peruvian government. Construction should start in mid-2011.

Damon Barber, CEO of CST Mining explains the rationale behind the \$250 million acquisition. "Mina Justa was a late-stage development with a completed feasibility study," Barber said. "We just needed to provide the capital investment. We love the location, there are no altitude issues and it is close to the sea and the Pan American highway. There is access to power and water, plus we are in a mining area as there has been an iron ore mine next to us for the last 50 years."

Estimated capex for Mina Justa is \$745 million, for an expected production of 110,000 mt/y of copper (50,000 mt of which as copper cathodes). This mine should be just the starting point of the company's relationship with Peru, Barber explained. "Last year we raised \$600 million in equity; it was a very successful

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Company-wise, Southern Copper is Peru's largest copper producer. (Photo: Toquepala mine, courtesy of Bucyrus)

financing and it showed that investors are very comfortable putting their money into Peru's mining industry," Barber said. "We are building a new exploration team locally and we plan to invest \$15 million to \$20 million in exploration. Also, I would be surprised if we did not buy another asset in South America within the next months."

The list of large mining operators aiming to start producing in Peru does not end there. Anglo American and Rio Tinto also have advanced copper projects. The latter company is working on its La Granja asset in Cajamarca, described as one of the world's largest undeveloped copper deposits, with inferred resources of

2.8 billion mt at 0.51% copper and 0.1% zinc. Meanwhile Anglo American is trying to advance its large Quellaveco project into production, where it is facing social issues on the ground regarding water usage. Quellaveco, already at the feasibility stage, could produce 225,000 mt/y of copper; capex could be more than \$2.5 billion. The company also has another project in Peru, Michiquillay, where community relations are also causing significant delays.

Finally, another copper project on route to production is Quechua, owned by Pan Pacific Copper of Japan and expected to produce 75,000 mt of copper by 2014 (capex would be \$970 million).

Silver

Silver production in Peru last year was 128 million oz, 10 million oz less than in 2009. The country's largest producer of silver is Volcan, one of Peru's major national companies, which is listed in Peru, Chile and Spain and is also a large player in lead (Peru's largest producer) and zinc (second largest after Antamina). Silver output for the company was 19.5 million oz last year, which is very significant considering the company does not position itself as a precious metals producer. "Silver is a very important part of our sales if compared to other base metals companies," said Juan José Herrera, general manager, Volcan.

One of the main operations of Volcan, which invested an overall \$226 million last year, is within the historic mining district of Cerro de Pasco. Its contribution to the company's total production has been decreasing in recent years due to lower grades, while the Yauli and Chungar mines have grown to become Volcan's most important sites. However, Cerro de Pasco still has significant reserves and could be in operation for the next couple of decades, provided a solution is found to relocate the town of Cerro de Pasco.

"Cerro de Pasco has a lot of potential still," Herrera said. "The mine is now going underground and we are doing exploration to the north and south of the operation. One of the walls of the pit is also being considered for exploitation. Our reserves at Cerro de Pasco currently stand at 95.3 million mt and our resources are 28.6 million mt. Right now, the underground mine is the one supplying the ore. We have at least 20 years of life left but we are reviewing the planning and the setup of the mine."

After Volcan, the main silver players in Peru are Hochschild (14.9 million oz), Antamina (14.9 million oz), Buenaventura (13.7 million oz) and Pan American Silver (7 million oz).

Hochschild, a company that also has gold production and operations in Mexico and Argentina, is investing heavily in exploration (\$50 million last year according to company sources; 2011 budget should be similar). Ignacio Bustamante, CEO, explains how the company wants to move to the next level after its successful IPO in 2007.

"In the past, the organization has focused on 'company maintainers,' narrow-vein epithermal low-sulphidation deposits that can produce 5 to 10 million oz/y each. We will continue focusing on these, but we are also looking for what we call 'company makers.' These are deposits that once one of them is in operation we can double our production. With the knowledge we have accumulated over the years, we believe we are well positioned to find high-sulphidation deposits and gold-copper porphyries."

Right now the most advanced projects under Hochschild in Peru are Azuca and Inmaculada, both of which have their scoping studies completed.



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With regard to Pan American Silver, the Vancouver-based company has three operating mines in Peru: Quiruvilca, Huarón and Morococha. Following the corporation's acquisition of Aquiline in 2009 (by which it took control of the Navidad project in Argentina, the world's largest undeveloped silver deposit) Pan American Silver also got hold of the Pico Machay gold project in Peru, on which work is being undertaken to define the ore body.

"In order to grow, the best strategy is to always be active in all fronts: exploration, construction and production. Looking at the future, both Morococha and Huarón have long-lasting resources," said Enrique Ramírez, general manager, Pan American Silver in Peru.

Ramírez underlines the importance of efficiency for the long term. "Our growth defines very well what Pan American Silver is," Ramírez said. "We have had 15 years of uninterrupted expansion since the company was created. Other companies have their ups and downs, but not consistent growth. Every year we are fast-tracking new projects into production. When we make promises to the market, we always deliver. At current prices, anyone can put a silver mine into operation, but if prices decrease again, many companies will be out of the business. Not us. We are a low cash-cost silver producer, which is very important."

Finally, another primary silver player, Silver Standard, is advancing its San Luis project with the aim of having production in Peru soon. The feasibility study for the project estimates a capex of \$90 million and production rates of 78,000 oz of gold and 1.86 million oz of silver over a 3.5-year mine life. San Luis is 70%-owned by Silver Standard, the remaining 30% being with Esperanza Resources.

Looking at Exploration

While Peru has attracted a number of world-class operators in the last couple of decades, a few more are following the developments of the country very closely and are even conducting their own exploration programs. These include Peñoles, Teck, Iamgold and Inmet Mining among others.

As the M&A market is becoming more expensive, some companies are increasingly moving back to where it all begins: generative work. "With gold at \$1,300/oz, people think twice before selling anything. Yet, I have not seen many companies support early stage exploration like Iamgold does, because of the lag time in the discovery process," said Louis Gariépy, exploration manager, Iamgold. "We look for properties with the potential of hosting at least 2 million oz of gold and can produce 150,000 to 200,000 oz/y."

Inmet Mining, a copper and zinc producer that is in the process of merging with Lundin to form a new company called Symterra, has also had an active exploration office in Peru in the last years. Percy Arhuata, general manager, believes there is still a lot of space for new discoveries. "There is great potential around the known world-class copper projects to do brownfield exploration," Arhuata said. "There are old districts that were explored for zinc and lead and where today geologists are finding gold. We could enter old districts with new geological ideas. Finally, many areas in Peru are very difficult to access, which means that not much work has been done there."

Peru therefore combines the excellence of a proven mining jurisdiction with the excitement of a still highly under-explored geology. In this context, major companies from around the world will surely view the country as one of their premiere destinations for new mining opportunities.

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Peru's Mid-Tier and Junior Companies

In 2009, Peru overtook the U.S. in exploration expenditure to rank as the third largest destination for prospectors. The country's stability has fostered a number of success stories as juniors have become producers, mainly in gold and silver.



Alpacas grazing near Caylloma's underground mine. (Photo courtesy of Fortuna Silver)

The panorama for exploration has changed dramatically for the better over the past few years. Not that long ago, venturing into some areas in the Andes was a dangerous activity. Miguel Cardozo, president, Association of Explorers of Peru (AEPE) and former head of the Newmont team that discovered Yanacocha, recalls how it was to work in the 1980s. "We were exploring when no one wanted to do business in Peru," Cardozo said. "These were times of very high inflation, bad governments, terrorism...during many of these years Newmont was the only foreign mining company exploring in Peru. The reward for that good decision was Yanacocha."

Today, the map of mining concessions is obviously more crowded than back then, but the country still offers very interesting opportunities. Some companies that started from scratch in Peru have grown to become medium-sized companies with producing assets. A case in point is Minera IRL, established a few years ago as a small junior and which has generated about \$100

million in gold sales since it put its Corihuarmi mine into operation in mid-2008.

Today, Minera IRL is listed in Lima and on the TSX as well as in London and has a development pipeline which includes Ollachea, its largest project in Peru, and Don Nicolás in the Argentinean Patagonia, following the company's acquisition of Hidefield Gold in late 2009. The company's exploration budget was \$10 million in 2010.

"We can see Corihuarmi running until late 2014/early 2015. We have generated more ore, we have got an extra 55,000 oz gold and we are expanding our throughput, which will allow us to maintain our annual production of 30,000 oz gold," said Courtney Chamberlain, executive chairman and CEO, Minera IRL.

With regard to Ollachea, currently in pre-feasibility, it is a bigger project than Corihuarmi, Chamberlain said. "The scoping study contemplates a production of roughly 117,000 oz/y gold for nine years. We have 1.3 mil-

lion oz in inferred resource. It is a company maker, it is the jewel of our crown. We expect to have pre-feasibility completed in March-April 2011, and to be in production by 2014. Before that, in 2012, we expect to have Don Nicolás in Argentina with 60,000 oz gold annually."

Similarly, about to join the ranks of Peru's gold producers is Rio Alto Mining, developers of the La Arena project. The deposit will be exploited in two phases; the first one is the extraction of 634,000 oz of gold during a seven-year period starting in 2011; the second one, expected for 2015, will see the exploitation of the sulphides, containing gold, copper and molybdenum for 21 years. The total resource of the deposit, 43-101 compliant, is 4.1 million oz of gold and 2.9 billion lb of copper.

"Junior companies with big copper resources would love to have a gold operation to start with," said Alex Black, president and COO, Rio Alto Mining. "In our case, the initial capex is quite low, about \$51 million. Then we will use the cash flow to build the second stage of the project (flotation-concentration), which will cost about \$300 million. Still, \$300 million is not a lot compared to other projects that require investments in the region of \$1 billion to \$2 billion."

While it is true that no new deposits the size of Yanacocha have been found during the last couple of decades, companies continue to harvest the results of the dollars put in exploration. Sulliden Gold, a Canadian company, announced last month the latest figures for its Shahuindo epithermal gold-silver project where it completed 40,000 m of drilling in 2009-10 and plans to drill a further 70,000 m this year. The current resource stands at 1.34 million oz gold and 33.3 million oz silver. The targets for the feasibility study, expected the second quarter of this year, are 150,000 oz gold equivalent annually at

a cash cost of \$400/oz, for a 10-year mine life. "In terms of infrastructure, it is a very simple project, very efficient," said Javier Fernández-Concha, general manager, Sulliden in Peru, who believes that after the dispute over the ownership of the deposit, which was solved in early 2009, the locals are highly supportive of the company.

Shopping for Copper

While high metal prices are encouraging juniors to become mining operators, sizeable copper projects with their high capital expenditures continue to be tricky for small companies. Those talented and lucky enough to find a very good copper asset normally end up finding a buyer that will put it into production.

The Peruvian mining sector has witnessed a number of those transactions in recent months, such as First Quantum's acquisition of Antares Minerals and its Haquira project for \$453 million. Haquira, located in Southern Peru, has measured and indicated resources of 3.7 million mt copper equivalent (measured and indicated) and 2.4 million mt (inferred).

More recently, HudBay Minerals' has acquired Norsemont Mining and its Constancia copper deposit in a deal valued at \$520 million. Constancia is a highly-advanced project with the environmental and social impact assessment already approved and where a feasibility study optimization (FSO) has just been completed. The in-pit reserves have been increased as a result of higher metal prices and the life of the mine has also been expanded to 16 years.

"We are pleased with the results of the FSO. They have provided for an increase in average annual concentrate production by 28%," said Bob Baxter, president and COO, Norsemont. The operation is expected to process an average of 70,000 mt/d, producing copper and molybdenum concentrates, as well as gold and silver as by-products. Initial capex will be \$920 million.

Before the HudBay Minerals offer was made, Norsemont increased its land package to prevent the operation from conflicting with the locals' interests. "We completed the acquisition of more than 4,000 hectares, which means that approximately 80% of our

infrastructure is on our private land. That includes the tailings facility, the plant site and the bulk of our open-pit. The fact the tailings dam sits in our property minimizes the risk of local opposition," Baxter said.

Another project where a transaction might happen is Candente Copper's Cañariaco Norte, a porphyry containing 9 billion lb of copper (10.3 billion lb of copper equivalent). According to the latest pre-feasibility data released in January, the project will yield 119,000 mt/y of copper, plus 39,000 oz of gold and 911,000 oz of silver, for 22 years. According to Candente Copper, the project also has very good expansion potential at the Cañariaco Sur and Quebrada Verde areas. The estimated capex to put it into production is \$1.4 billion, a figure usually beyond the means of a junior company.

Finally, another copper project worth keeping an eye on is Los Calatos, owned by Metminco of Australia, that had not generated much attention until last year when the company announced resources of 4.7 million mt of copper equivalent (it has significant molybdenum). A 50,000-m diamond drilling program to confirm the resources (most of which are still inferred) and test new targets is currently under way.

Silver Opportunities

One junior that has made a 180° shift is Bear Creek Mining. From being a pure exploration company intending to sell its assets, Corani and Santa Ana (with combined reserves and resources of more than 500 million oz of silver, plus 300 million oz of silver equivalent in lead and zinc), Bear Creek has now become a development company with a vision to produce 15 to 20 million oz of silver in Peru by 2014.

"When we saw the size of the assets we had, it was clear we had to build them. We have been bringing in different skills to the company to handle the fact that we are transitioning from an exploration company to a developer of two important mines in Peru," said Andrew Swarthout, CEO, Bear Creek.

"Santa Ana is the project that is going to emerge more quickly. Our view is to be in production in mid-2012. Corani is probably two years behind because it is a more complicated project that requires more capital and a

longer permitting time. We have just started the feasibility study so realistically Corani will not see production before 2014," said Swarthout.

Capital expenditure for Santa Ana will be \$69 million, while Corani will require an investment in the region of \$400 million. The company is optimistic it will become one of Peru's largest silver producers in the medium term: "If we produce between 15 and 20 million oz/y of silver, we will be part of the big list. It is achievable," said Elsiario Antúnez de Mayolo, vice president of operations, Bear Creek.

Another company in the silver business is Fortuna Silver, who produced 1.9 million oz of silver at its Caylloma unit last year (more than 4 million oz silver equivalent counting the gold, copper, lead and zinc), and expect silver production to boost with the construction of its new San José mine in Mexico.

Jorge Ganoza, president and CEO, Fortuna Silver Mines, emphasizes that Fortuna has had a zero-fatality record since the beginning. "We have been aggressively expanding the throughput at our Peruvian operation, going from 500 mt/d to the current 1,250 mt/d," Ganoza said. "We have been funding the construction of our second mine in Mexico: we started construction activities in April 2010 and we are set to commission that mine in August 2011. We have consolidated our status as producers with a medium-sized underground operation, and next year we will have two operating assets in the two largest silver producing countries in the world."

While the Mexican unit will add 5 million oz silver to Fortuna's portfolio, the company is actively looking for what would be a third operation. According to Ganoza, Mexico and Peru are the places to be. "We are solely focused on Latin America," Ganoza said. "We have been to countries like Argentina, Chile and Ecuador on several occasions, but we will have to see compelling opportunities for us to establish operations in these countries."

Exploration Focus

Peru is populated by dozens of juniors hoping to replicate previous success stories. The country offers very interesting opportunities in terms of small and medium-sized precious metals produc-



Keith Laskowski, president of Estrella Gold.



André Gauthier, president of Lara Exploration.



Andrew Swarthout, president and CEO of Bear Creek Mining.

tion units on which companies could leverage for future growth.

Esperanza Resources, discoverers of the San Luis gold-silver project which is now operated by Silver Standard, will retain a 20% interest if the latter company builds the mine and starts production. The cash flow generated will allow for higher exploration budgets. In addition to Peru, where it has 12 properties (Pucarana and Colqui Orcco being the main areas of focus at the moment), the company has interests in Mexico and Slovakia.

Juniors currently defining gold assets include Estrella Gold, who has Colpayoc (144,600 oz gold, 43-101) and Trol (located in Chile); Calgary-based Sienna Gold, whose Igor property has a 43-101 compliant resource of 202,000 oz gold (indicated and inferred); and AM Gold at its Pinaya gold-copper project.

Pinaya, a 20,000 hectare land package, hosts a resource of 666,000 oz of gold and 384 million lb of copper (indicated and inferred). "AM Gold was able to acquire the property between 2004

and 2008," said Gerald Aberle, president and COO, AM Gold. "I think it would be all but impossible for a junior to assemble a quality land package like Pinaya today given the extraordinary level of mining and exploration activity in the Tintaya belt and the fact that gold and copper prices are now at all-time highs. While AM Gold has invested more than \$15 million in Pinaya over the years, less than 2% of the total Pinaya land package has been explored to this point."

Aberle expects the company to be drilling by the second quarter of this year, in both the resource area and at new targets. "If we continue to build oxide gold resources it will obviously be a different development scenario than we would have with a large copper porphyry system. And, at Pinaya it could very well be both," Aberle said.

With regard to Estrella Gold, its President Keith Laskowski explained the company's two-pronged strategy. "Having an asset with a measured resource is the best way to add value to the shareholders, while the grassroots exploration side is the gambling side," Laskowski said. "Colpayoc (144,600



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Recently announced inferred resource estimate for Red Mountain property in Yukon Territory, Canada

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- Open in all directions laterally and at depth.

PINAYA, PERU

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Up to 10,000 metre drill program planned

Large land position of over 20,000 hectares

Just barely over 1% of land package explored to date

Resource Estimate:

- Indicated Resource: 1,245,000 oz Au Eq. **
- Inferred Resource: 487,000 oz Au Eq.***

* (79.3 m tonnes @ 0.52 g/t Au)

**Indicated Resource: 498,000 oz Au; 269M lbs Cu (29.13 Mt @ 0.53 g/t Au and 0.42% Cu)

***Inferred Resource: 188,000 oz Au and 115 M lbs of Cu (12.72 Mt @ 0.41 g/t Au and 0.41% Cu)

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Reliability at work



HudBay Minerals has recently acquired Norsemont Mining and its Constancia copper project. (Photo courtesy of Norsemont)

oz) has the potential to rapidly increase the number of ounces with a small amount of work. We are currently a small company, so if we could add 1 million oz as an asset that would be great for our shareholders."

Laskowski warns that juniors need to decide very carefully where to spend

their money when it comes to grassroots exploration. "Generative work is a double-edge sword," Laskowski said. "You can waste a lot of money if you do not know what you are doing. On the other hand, you can also be fabulously successful. The trick is to carefully manage it so as to position yourself in a likely

spot for a good discovery. I always put the example of Arequipa Gold, who after spending a relatively small amount of money on exploration with limited drilling were able to sell the company to Barrick for hundreds of millions." Last year Estrella staked out five new gold-silver properties in Peru and hopes to find joint venture partners.

Exploration is the embryo of the industry, and major players frequently join forces with junior companies to promote the generation of new discovery opportunities. Examples of this include Vena Resources, who counts Gold Fields and Cameco, the uranium giant, as its partners; and Solitario Exploration and Royalty, who has strategic alliances with Votorantim of Brazil and Newmont.

"As part of our alliance with Newmont, by which they now own about 9% of Solitario, we have two projects of interest: La Promesa and Cerro Azul, both in Central Peru," said Christopher Herald, CEO, Solitario. "La Promesa is a silver-lead-zinc-indium deposit with very high grades at surface, of well above 1,000 grams of silver per mt.



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Further information is available at Estrella Gold's website: www.estrellagold.com

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Cerro Azul is a gold-silver-base metals project, also consisting of veins and good grades at surface. We own 100% of both projects right now, but after we drill 4,000 m, Newmont can earn-in 75% by taking them through the construction.”

Some exploration companies specializing in generative work have a strategy to look for joint venture partners in properties they see as promising. “The way we operate is to share the risk. We spend the first money, which is the creative money, to bring projects to the drilling phase. Drilling is not rocket science, but defining the targets for the drill-holes requires creativity,” said André Gauthier, president, Lara Exploration, a junior with properties in Peru, Chile, Brazil and China.

In Peru, the company already has joint ventures for its Lara (copper) and Corina (gold), as well as a portfolio of five other gold/copper projects open for earn-in agreements. Sharing risk in the mining business makes sense, assures Gauthier. “The exploration projects that statistically will become mines are just one in a 1,000,” Gauthier said. “This shows the high risk associated to mining exploration. As a company, we want to add value to our shareholders by making discoveries, not by playing with shares.”

Joseph Grosso, president and CEO, Golden Alliance Resources, agrees. “Mining exploration is fuelled financially by risk capital, especially at the very early stages,” Grosso said. “The statistics of how many early-exploration ventures go on to become a project show that exploration is a risky business. The average is not good at all.”

Golden Alliance, a spinoff from Golden Arrow, now stands as the Grosso Group’s Peru-focused exploration company. Its main projects are Cocha, a copper-silver-gold property where a new drilling campaign started late last year, and the Río Tabaconas gold project.

The Grosso Group, present in Peru since 1995, continues to see many opportunities in the country. “Peru still has tremendous potential, maintained partly by its challenging geography and difficult access,” said David Terry, vice president of exploration, Golden Alliance Resources. “It takes time and lots of perseverance. There is still so much to be learned.”

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Peru's Pros and Cons

Enough has been said about Peru's geological potential, but how about the practical aspects? Things like, the availability of geological information, the administrative procedures, the permits and even the access to funds locally?

"We have one of the best concession systems in the world, similar to the one used in Canada. We actually use Canadian technology. The system works online and it is always up-to-date. In Chile, they have a judicial system managed by lawyers, which is not ideal because you pay less for the property itself but the administration costs are much higher. In Peru, it is \$3 per hectare," said Miguel Cardozo of AEPE and Alturas Minerals.

"The framework is fairly good," said Owen Miller, exploration manager, Sienna Gold. "The level of geological information with digital access is very good. The land is priced at a reasonable level. 10 years ago it was too cheap so companies sat on millions of hectares. Now people have to turn over land. Peru is better than Chile."

"The information on properties is excellent, transparent to the maximum," said Stevens Zuker, senior vice president, Esperanza Resources. "In Mexico, it is much more difficult to find who owns the mineral rights and what has happened in the past in that property."

On the negative side, exploration managers complain the permitting processes are increasingly tiresome. While companies understand environmental protection needs to be at the core of responsible mining activities, some believe the requirements are too stringent. "Today it takes more time to obtain a drilling permit than it did 15 years ago, and this contributes to a slower rate of progress. We would like to drill four to five projects a year, but the permitting process is slowing us down," said Keith Laskowski of Estrella Gold.

Esperanza Resources faces the same issue. "Getting the permits is becoming increasingly complex and this is delaying our progress," said Julio Mendoza, exploration manager, Esperanza Resources.

Developing the Stock Markets

With regard to access to funding, Peru is providing pleasant surprises for junior companies. The Lima Stock Ex-

change (BVL) is the only one in South America that has a junior segment, similar to those in Toronto or London. A number of companies, such as Vena, Bear Creek, Zincore, Rio Alto, Minera IRL and Candente, among others, have already seen the advantage of listing locally. Putting together the juniors and the producers in BVL's main board, mining represents 60% of the total market capitalization, which makes Lima a mining exchange and a potential regional hub for mining companies from abroad. Last year Amerigo Resources, a Canadian company with assets in Chile, also listed in Peru.

André Gauthier of Lara Exploration, one of the promoters of the creation of BVL Venture Exchange, insists it made sense to be in Lima for this type of enterprise. "In order to make a stock exchange run well you need money, but you need the people too: lawyers, investor relations managers, geologists that can act as qualified persons, qualified laboratories etc. Compared to other Latin American countries like Chile, where Big Mining controls 60% to 70% of the land; or Brazil, where there is not a tradition of publicly traded mining companies, Peru appeared as an advantaged location. Listing a company in Canada costs anywhere between \$400,000 and \$800,000 a year. The same thing in Lima costs you \$150,000 per year."

"To have an exchange here supporting us is very important," said Courtney Chamberlain, executive chairman and CEO, Minera IRL. "One third of our equity and 80% of our shareholders are Peruvian. Liquidity has happened in Lima and we will never walk away of this stock exchange."

The integration of the Lima exchange with those of Santiago and Bogotá is set to create further opportunities regionally. Alberto Arispe, general manager of Kallpa Securities, a brokerage house, announced that his firm is forming alliances with Chilean and Colombian brokers to trade Peruvian stocks in these markets.

"The merger with Santiago and Bogotá stock exchanges will bring lots of new products into the three markets and there will be more liquidity. Integration is going to be very positive," said Diego Benavides, president of Minera IRL's Peruvian subsidiary.



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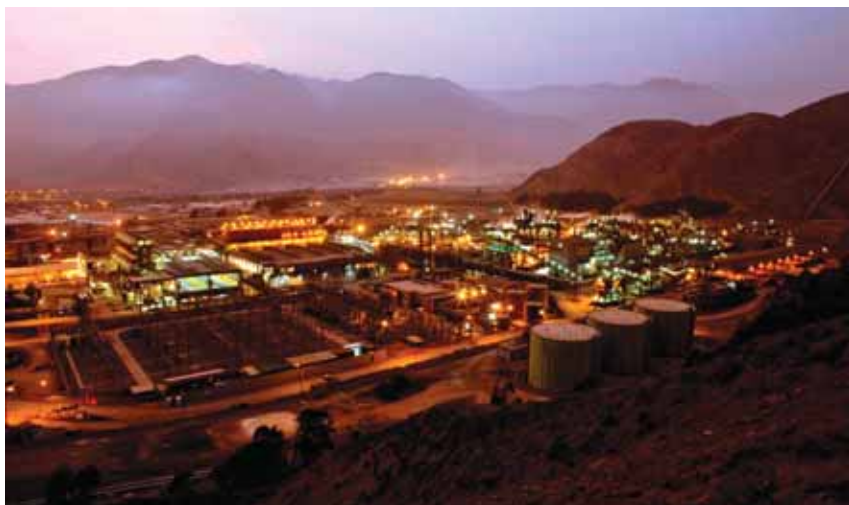
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Peru's Other Hidden Treasures

Media attention normally focuses on copper, gold and silver, but Peru is much more than this: the country is among the world's largest producers of zinc, lead, tin and molybdenum, while uranium and iron ore also offer great opportunities



Votorantim Metals has invested \$500 million to expand production capacity of its Cajamarquilla refinery to 320,000 mt of refined zinc. (Photo courtesy of Votorantim)

According to U.S. Geological Survey data, Peru ranks as the world's second largest zinc producer, only after China; it is the third largest in tin, thanks to national producer Minsur; and the fourth largest in lead and molybdenum.

Volcan stands as the country's leader in lead with 71,000 mt, followed by many medium-sized and smaller producers, whereas the production of molybdenum is concentrated in three players: Southern Copper (10,100 mt), Cerro Verde (3,500 mt) and Antamina (3,400 mt).

Zinc-wise, the main producers are Antamina (427,000 mt), Volcan (357,000 mt), Votorantim-controlled Milpo and Glencore's Los Quenuales. On top of the zinc from the mines, Votorantim Metals has a refinery in Cajamarquilla which has been expanded recently. Through an investment of \$500 million, production capacity has doubled to reach 320,000 mt of refined zinc from 2011; output in 2010 was 224,000 mt, 60% more than in 2009. On top of that, the Cajamarquilla refinery produces indium as a by-product, a mineral used in appliances such as flat-screen televisions.

Votorantim clearly sees Peru as a good country in which to invest. Between the purchase of Cajamarquilla and its expansion, and the acquisition of a controlling stake in Milpo, the Brazilian company has spent \$1.5 billion since its arrival in Peru in 2004. Exploration is also very significant for the company at two main projects: Bongará and Shalipayco, and a third one less advanced called Puagianca. According to João Bosco, CEO of Votorantim Metals, Peru could become the world's most competitive zinc producer: Bongará and Shalipayco could add 200,000 mt of zinc in concentrates to the company's production portfolio by 2014.

Demand for zinc is expected to increase sharply in the coming years. "For 2013-2014 most analysts are predicting a massive zinc deficit," said Jorge Benavides, president and CEO of zinc-focused Zincore Metals. "There is excess capacity on the refining side but as the Western economies recover the demand for zinc will not be met by the mining production."

Benavides believes efficiency and cost-control will be the keys to survive the price cycles. In these areas he sees

Peru as having significant advantages. "Peru has great potential for zinc," Benavides said. "The country already has two of the world's largest producers (Antamina and Volcan). In China, production comes from thousands of little mines and with time these operations could run into problems due to low competitiveness, especially if there are pressures on price."

Following the financial crisis, Zincore adjusted its strategy to advance its zinc assets toward production. The idea now is to look at the Accha zinc district as one single operation, considering not only Accha and Yanque, which already have resources, but also nine other prospects. The company is also considering using a Waelz kiln for pyrometallurgical processing to produce zinc metal and lead concentrate.

"The distances in the Accha district are not too long to transport the ore to a single plant," Benavides said. "It is still early days, but we anticipate a new pre-feasibility study would probably look at production figures of about 65,000 mt of zinc metal and lead concentrate per year to start with. Our emphasis is on high grade rather than high tonnage in order to survive the low cycles. If the in-fill drilling we are presently conducting is successful, we believe this district could be producing in these numbers for 30 years. In this scenario, the total capex could be about \$300 million."

Current resources at the Accha deposit include 1.1 billion lb of zinc and 120 million lb of lead (including reserves of 725 million lb Zn and 75 million lb Pb), while Yanque currently contains 1.2 billion lb Zn and 1.2 billion lb Pb (inferred). The company expects to release new 43-101 figures in both areas during 2011 with the idea of starting pre-feasibility, and be in production by 2013-14. Furthermore, Zincore also has two copper projects: Dolores, a copper-gold porphyry, and Minasccasa, a zinc-copper skarn.

Vena Resources, a company with a diversified exploration portfolio, is also looking at zinc to create value. In partnership with Trafigura, it is advancing the reopening of the old Azulcocha mine. "The crisis impacted us deeply and we had to rethink our strategy," said Enrique Winkelried, general manager, Vena Resources. "We decided to concentrate on developing this mine that will generate a cash flow to fund further exploration activities."

"We are looking at an expenditure of \$15 million to put it into operation," Winkelried said. "Without having to change the environmental studies, we could expand the initial 500 mt/d plant to 750 mt/d. Then, by 2012 we should have a bigger processing plant, of 1,500 to 2,000 mt/d. The Trafigura group will be contributing part of the investment and, depending on how much they spend, they will be able to earn-in up to 51% in the joint venture company that will operate Azulcocha."

Next to Votorantim's large exploration project in northern Peru, another junior focusing on zinc is Rio Cristal Resources, holders of the Bongará project for which

they are eager to find a partner. "What we are looking for in Bongará are Mississippi Valley type deposits. These deposits tend to be small in tonnage but with very high grade. Our expectation is to have multiple MVT deposits, within the 18,000 Ha that we control," said Thomas Findley, president and CEO, Rio Cristal.

One of the challenges at Bongará is it is located in high-mountain jungle. "Our next steps are to improve the access into our project in order to use portable rigs, which will reduce the costs tremendously. After that we will establish our resource of zinc oxides and analyze the different options for processing," Findley said. Besides Bongará, the flagship project, the company has two other projects in gold (Cristal) and copper (La Cumbre) located in southern Peru.


Improving the Statistics

While Peru's production in the major metals declined last year, other commodities are showing more positive figures. These are molybdenum, iron ore and tungsten.

In the case of molybdenum, total production was just below 17,000 mt, a

38% increase year-on-year. While production is concentrated in three major players, other smaller companies are looking at opportunities in this metal. Nevada-based Golden Phoenix, a company that positions itself as a royalty mining player, is planning to produce molybdenum this year from the stockpiles of an old mining operation called El Porvenir. "The Porvenir property was mined in the 1960s. At the time it was a tungsten-molybdenum mine but the molybdenum was not exploited due to low prices," said Thomas Klein, CEO, Golden Phoenix. "We will be starting production in the first quarter of 2011. The sales of that molybdenum will be 100% reinvested into Peru, initially in another gold property. Our plan is to process 100 to 150 mt/d for the next 12 months from the stockpiles. We have also initiated the reopening of the old tungsten-molybdenum mine where we have to assess the remaining resource."

As in zinc or uranium, the demand for tungsten is also set to increase significantly in the years to come. The metal is currently traded at prices higher than pre-crisis and, being relatively rare, large



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Laurence Stefan, managing director of Macusani Yellowcake.



Ken Hellsten, managing director of Strike Resources.



Jorge Benavides, president and CEO of Zincore Metals.

end-users are trying to secure the supply. The main tungsten mine in the region is Pasto Bueno, operated by Canadian company Malaga (there is significant production in Bolivia, but mainly from artisanal miners).

Following an expansion program in 2009, production at Pasto Bueno increased last year by 13.6% to 719 mt. The mine is an old producing district but executives at Malaga believe it still has enormous expansion potential. "We have recently expanded our plant from 300 to 500 mt/d," said Alonso Sánchez, chief

geologist, Malaga. "At Pasto Bueno we have more than 78 veins, only seven of which have been exploited. We hope to find 6 million mt in our mine."

"The processing of tungsten is very simple," Sánchez said. "It is very heavy and, through the use of gravity, the tungsten separates from the quartz. Magnetism is used to separate other metals. It is not only simple but clean as well. Chemicals are not needed." According to Sánchez, tungsten in Pasto Bueno is notable for its excellent quality. "The concentrate is considerably pure

with 75% content of WO_3 . Many companies are recycling the tungsten, but in order to improve the quality, they also need pure tungsten itself."

Iron Ore

Currently the only iron ore producer in Peru is Chinese company Shougang, with an operation by the coast in central-southern Peru that yielded around 6 million mt last year (37% more than in 2009). The company is implementing a \$1 billion expansion plan to reach production of 10 million mt annually.

On top of Shougang's expansion, the main iron ore projects in the pipeline are the Apurimac project by Australia's Strike Resources and the Pampa de Pongo Project that Chinese company Nanjinzha acquired in 2008 from Cardero Resources for \$100 million. Preliminary data indicates Nanjinzha could produce between 10 and 15 million mt annually from 2015, following a multi-billion investment. Pampa de Pongo has reserves of approximately 1.2 billion mt at 43.6% iron, plus some gold and copper. On a smaller scale, Canadian junior Cuervo Resources has the Cerro Ccopane project, with a 43-101 compliant resource of 56 million mt at 45.7% Fe (measured and indicated) and 51 million mt at 43.7% Fe (inferred).

Meanwhile Strike Resources, who controls the Apurimac Ferrum joint venture with a 44% interest, is strengthening its local presence in Peru to move its Apurimac and Cusco iron ore projects forward. The company is building on the previous Apurimac pre-feasibility data with a strong exploration focus and a budget of \$35 million over the next 24 to 30 months, \$10 million of which would be dedicated to a new detailed pre-feasibility study if exploration results are good. The short-term goal is to increase the resource at the Apurimac project from the current 270 million mt at 57.5% Fe (indicated and inferred) to at least 500 million mt.

"The previous study considered taking the whole of the ore and producing a concentrate through magnetic separation, then grinding the concentrate, putting it into a slurry pipeline and sending it to the coast," said Ken Hellsten, managing director, Strike Resources, and president, Apurimac Ferrum. "Now we see that the ore body is made up of two

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components: one is a mix of hematite and magnetite, close to direct-shipping ore grades; the other one is the magnetite material. Treating these two separately offers the potential to lower the costs of the project."

The project being in the Andes, one of the crucial aspects is to find the best way to transport the mineral to the port terminal. The railway option seems to have been ruled out due to the high capital costs, leaving the slurry pipeline as the preferred alternative and the rope conveyor system of 288 km as an option for both product transport and ore transport from satellite deposits.

Hellsten is persuaded that in a market controlled by three main producers (Vale, Rio Tinto and BHP Billiton), the arrival of new suppliers of iron ore would be welcome. "There are opportunities for smaller players in the business as long as we produce a good quality product and are attractive to steel producers, mostly from Asia," Hellsten said. "We believe there is room for everybody, but we need to be a low-cost operation. Iron ore is not always going to be at \$150/mt. Apurimac would have costs of around \$20 per mt, which is

very competitive. With the weakening U.S. dollar and the rising cost of labor and key inputs, the cash costs of the big producers are moving northward."

Uranium Potential

In recent times the area of Macusani, not far from Lake Titicaca in southeastern Peru, has attracted a lot of interest for uranium development. Emerging as a potential producer, this has not gone unnoticed by the major uranium producers worldwide. One of whom, Cameco, has already entered the country through a joint venture agreement with Vena Resources. Other important uranium explorers are Macusani Yellowcake and Southern Andes Energy.

Vena and Cameco have formed a joint venture company called Minergia, currently operated by Vena. Cameco can earn up to 50% by investing \$10 million over four years; 60% by completing a feasibility study, and 70% by bringing the project into operation. Minergia already holds a resource of 8.3 million lb of uranium (indicated) and 14.2 million lb (inferred), Tantamaco being the most important prospect.

"Tantamaco is an exciting project for us," said David Bent, vice president of exploration, Vena Resources. "Our last 12,400-m drilling campaign gave better results than expected, so we are coming up with a new drilling campaign to expand the uranium resource there."

Macusani Yellowcake is the other uranium player with a defined resource. Between its Corachapi and Colibri Nos. 2 and 3 prospects, the company has 10.4 million lb of uranium (indicated) and 17 million lb (inferred), while it expects positive results from its drilling campaign at the Kihitian target. "At Kihitian we intercepted something highly unusual for the Macusani plateau. The area is known for low-grade, large uranium ore bodies. Yet at Kihitian we have intercepted areas with grades of 1% uranium which is in the first quartile worldwide," said Laurence Stefan, managing director, Macusani Yellowcake.

Stefan believes Peru is going to be set to become a hot uranium player. "Usually in the uranium industry there is a threshold of 40 to 50 million lb before one may have an area of economic interest," Stefan said. "Between Macusani Yellow-

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Chilloroya

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cake and Vena Resources there are close to 50 million lb of U_3O_8 in the ground. Once the Macusani plateau will reach the threshold of 100 million lb, you will see not only Cameco taking a more aggressive approach, but probably other major players such as Areva, as well as Russian or Asian groups. We believe the plateau has potential for 300 to 500 million lb of uranium."

Based on a preliminary economic assessment at Colibri Nos. 2 and 3, Macusani Yellowcake would have to spend \$150 million as capex for a mine-life of 12 years and output of 1.2/1.3 million lb annually, at a cost just above \$20/lb. "Including the new ore body, we believe we can go as low as \$18/lb to 19/lb," Stefan said.

As uranium is something new in Peru, active players would like a quicker development of the relevant regulatory framework in order to be ready to start production as soon as possible. "The whole Macusani plateau offers great potential but uranium mines take a long time to be developed. We are coordinating our efforts with the local community and regulatory bodies to ensure all of the stakeholders follow the progress toward the

goal of producing uranium in Peru," said Bent of Vena Resources.

Stefan also points out Peru lacks a nuclear policy. "The country should quickly develop a comprehensive framework from exploration to production," Stefan said. "Since we are very close to doing a major feasibility study we would like to be in production in a couple of years."

Seeing how well Peru has done in promoting the development of many other minerals, one would think the prospects for uranium in Peru are indeed very positive. "There will be a deficit in the uranium market by 2013-15 which could push the price up well over \$100/lb. The industry will probably start regulating itself after a period of good prices. Countries like Kazakhstan and Namibia will perform very well, and new producers like Peru will be highly welcome by the market," Stefan said.

More to Come: Non-metallic Mining

Last year, Vale of Brazil inaugurated a phosphate mine in Bayóvar, northern Peru, after spending \$566 million to bring it into production. Vale holds a 40% interest in the operation, while

Mosaic has 35% and Mitsui of Japan has 25%. The plant currently has a production capacity of 3.9 million mt/y and is set to expand to 5.9 million mt through a further \$300 million expenditure. If Vale can secure the natural gas required, the company would like to implement a second phase of the project to produce fertilizers within Peru.

Vale is not the only player interested in phosphate rock. Cementos Pacasmayo, part of the Hochschild Group, is reported to be willing to invest around \$300 million in its own phosphate rock mine and production plant, close to Vale's unit.

The level of these investments and the impact in employment (1,300 people were hired during the construction phase of Vale's unit) are more evidence that Peru's development is tightly linked to the mining sector, under all its forms. As mentioned before, Peru is much more than gold and copper. The current high price cycle should help elevate and push forward many projects in all the commodities mentioned in this article, thus providing an extraordinary complement to Peru's already blessed position in the main metals.

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Lima, a Hot Spot for Engineering and Construction Firms



E&C companies will benefit from new mining projects as well as from the development of the needed infrastructure. (Photo: Ilo thermal plant that powers Southern Copper's operations. Courtesy of CIC)

Not very long ago, all of the engineering for a large processing plant would be done by one of the large engineering, procurement and construction management (EPCM) players based in the Chilean capital, Santiago, or else in North America. Over the past couple of years, many large multinationals are ramping up their operational offices in Lima as the amount of projected work makes it sensible to have a strong local presence.

Canadian-based Hatch, for example, only had a representational office in Peru until 2009. In the last year and a half, however, the company has decided to boost its local presence. "Polymetallic ores are typically very complex and they are common in Peru," said Doris Hiam-Gálvez, general manager, Hatch. "We have many experts in this area and we are trying to build our world center of excellence for polymetallic ores and precious metals here in Lima."

Peru offers other challenges to engineers, such as seismic risk and very high altitudes. "Our technologies are very good for South America as we can provide great efficiency for complex ores at high altitudes while minimizing carbon emissions. We are also leaders in high pressure leaching, a technology we are implementing for Barrick in the Dominican Republic," said Hiam-Gálvez, who believes her company is very well positioned to grow in Peru. "Peruvian engineers are technically very good."

Aker Solutions and SNC Lavalin have also been enlarging their local team. Aker, whose process and construction division has been recently acquired by Jacobs, is busy with the expansion of Antamina and Chinalco's Toromochito project, although the design for these projects has been undertaken in Chile and the U.S. While there is a strong focus to attract the best talent in Peru, having worldwide expertise is key to support local growth.

"The Lima office has experienced significant growth, and we are supported by our global expertise in processing plant design. In silver and gold we have great know-how in Toronto, in zinc it is Montreal, if it is iron ore we have our Brazilian office...We do the engineering from here but get support in particular areas if needed," said Enrique Valdivia, general manager, SNC Lavalin.

One of the most recent arrivals to Peru's EPCM market is TWP of South Africa (part of the Basil Read Group), who have chosen Lima as their opening gateway to the South American region. They believe Peru offers challenges that fit perfectly with the company's long-standing expertise in the South African mining sector. "There is a lot of underground mining in Peru and we are one of the leading companies worldwide in underground infrastructure like vertical shafts, refrigeration facilities and others. There is a limit to

open-pit mining, perhaps 400 to 900 m depth. We see many open-pits are going to move underground, both in Peru and Chile," said Héctor Paredes Tarazona, managing director, TWP Sudamérica.

Ryan Illingworth, technical director, TWP, anticipates underground mining will change dramatically in Peru. "Peru has a lot of underground mines but they are not as deep as in South Africa, and the shafts are generally quite small in diameter or cross-section. In the future these shafts are going to be bigger; they are going to go from rectangular to round, which is easier to sink; they are going to go deeper and they are going to shift from wood to steel. With steel shafts you can move ore and people much faster: from the 6 m/s you currently see in Peru, conveyances could move at 15 m/s to 16 m/s."

Engineering and Environmental Consultancies

Lima also offers a wide range of engineering and environmental consultancies that can take care of the design of the mining operation and of the vital environmental impact assessments. Ausenco Vector, Golder Associates and Knight Piésold have sizeable offices in Lima, and all are boasting significant growth rates as the demand from the mining sector in Peru continues to expand.

Scott Elfen, regional manager South America, Ausenco Vector, explains his company's sales increased even in 2009 due to the major role of precious metals in Peru which were not impacted by the crisis. Formerly Vector Engineering, the company is now finalizing its integration into the Ausenco group who acquired it back in 2008, together with PSI (who specialize in tailings transport systems) and Sandwell (experts in materials transportation). "A big advantage for Vector is the depth of the Ausenco Group itself. Before, we were a boutique consulting company," said Elfen.

Ausenco Vector is now becoming the environment and sustainability branch of the group. Peru offers very interesting challenges on this front due to the difficult geography. One of Ausenco Vector's greatest achievements, Elfen said, was the design of the heap leach facilities for Barrick's Pierina mine. "Some people said Pierina could not



Héctor Paredes (managing director, right) and Ryan Illingworth of TWP.



Doris Hiam-Gálvez, general manager of Hatch.



Enrique Valdivia, general manager of SNC Lavalin.

have been built because of the challenging location and terrain, yet it is an industry model for heap leach technology.”

Elfen believes environmental aspects need to be carefully evaluated from the design all the way to mine closure to prevent accidents. “Accidents do occur because of poor engineering, time-constraining pressures and poor management. Environmental factors need to be incorporated into the design, to ensure a sustainable future for the mine and the surrounding community.”

Rafael Dávila, managing director, Golder Associates, agrees. “Society will not accept any project that has not taken care

of its waste,” Dávila said. “In a large gold or copper operation, more than 97% to 99% of the rock extracted becomes waste. We firmly believe we have helped our clients over the past decades to be more efficient in their mine waste management. We have worked in Antamina, which has one of the world’s largest tailings dams and one of the safest too.”

Employing 320 people, Golder Associates’ Peru office is the company’s largest in Latin America. According to Dávila, it is also Golder’s center of excellence for thickened tailings and it has a great record doing EIAs to very tight dead-

lines. “EIAs in Peru are not an easy business because they entail the proper participation of the communities, but we have been able to work with very aggressive schedules. Xstrata congratulated us for the EIAs of Las Bambas and Antapaccay; the latter one was approved within six months after submittal. We also did the EIA for the expansion of Lagunas Norte, and are now in charge of the EIA for the Chucapaca project.”

One of the main issues right now on the engineering side of the business is the shortage of specialized professionals to cope with the current demand. “Our own staff is at risk of being hired by mining companies



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because they are able to offer better salary packages. We try to instill the fact that we provide our workers with a more stable family environment and better career opportunities," said Elfen of Ausenco Vector.

South American Players

Levels of demand are currently so high that new players in the business are increasingly welcome, especially as certain specialists are difficult to find. "Peru is going to see a large amount of very big projects, therefore the multinational engineering firms are not going to be able to cope with this demand and maintain good quality in all the areas. They have weaknesses in some fields in which we can be a great complement," said Juan Rayo, founder, JRI, a large Chilean family-owned engineering firm, although he points out his company should increasingly compete with EPCM multinationals, rather than work for them in smaller assignments.

JRI had to resort to some of its 300 people based in Santiago to work on the new truck shop at Antamina, a project worth 60,000 man-hours of detailed engineering. "Initially we thought we could do it in Peru, but after a few weeks we realized we could not find enough specialized draftsmen to do

the detailed design. We sent some people from Peru to work in Santiago, which was easier than the other way round," said Rayo. In spite of this issue, Peru is set to become an important profit center for the company which already generates 20% of its sales from outside Chile.

Buenaventura Ingenieros (BISA) is an important local engineering outfit. The company, a subsidiary of the Buenaventura group, supports its mother company in engineering services and also serves third party clients including the large EPCM multinationals. With extensive experience locally and more than 400 people, BISA is in a great position to capitalize on the current boom. In 2009, the company's sales grew by 25%, and in 2010, by a further 50%. The company is involved in projects including Tía María, Quellaveco and Conga.

José Vizquerra, general manager, BISA, emphasizes that in the current scenario, it is essential to continuously bring in new talent. "We are very proud of our professionals," Vizquerra said. "It is very important to grow every day and to give opportunities to new students who want to have a good career in Peru."

"Peru is living a unique period and the locals must be given the opportunity to


participate in this party," said BISA's Commercial Manager Carlos Alarco.

Construction Firms

Peru's largest engineering and construction player is Graña y Montero (GyM), a firm that has a long tradition in the mining sector going back to the Toquepala development in the 1940s. The group has more than 5,000 employees, including 1,700 engineers, and has participated in the construction of more than 10 large concentrators in Peru, as well as projects elsewhere in Latin America.

Hernando Graña, executive vice president, Graña y Montero, believes the country should capitalize on its extensive mining experience to create more value for the economy. "We still depend too much on mineral exports," Graña said. "Instead, we should promote the creation of industrial clusters. The mining services industry is not recognized as a cluster internationally, but it is a cluster indeed. The best proof of this is that Peruvian service providers are increasingly exporting their services."



After GyM, Peru's most important construction player in the mining industry is COSAPI, with revenues of \$250 million in 2010 (40% in mining). For 2011, the



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company expects to reach \$350 million. "There are many projects on the table, and not that many companies that can develop them with the standards that mining companies require," said Walter Piazza, managing director, COSAPI and president, Peruvian Chamber of Construction (Capeco). "We are involved in the start-up of the mining projects, from the feasibility studies to the construction of the facilities and the infrastructure associated to it. We build roads, transmission lines, concentrator plants, smelters and all the industrial facilities."

Piazza believes Peruvian contractors have developed world-class services. "Peruvian companies have an excellent record in complying with safety, environmental protection, costs and schedules in very large projects," Piazza said. "Project management has been very successful thanks to the quality of the local contractors."

In this context it is not surprising that big mining companies are asking Peruvian contractors to support them abroad. Both GyM and COSAPI, together with Haug, a Peruvian electro-mechanical company, are working for Barrick at the Pueblo Viejo project in the Dominican Republic. But how can companies expand in other countries when the demand at home cannot be met? The expected needs of the mining sector have indeed awakened the interest of major engineering and construction groups worldwide, such as TWP, SalfaCorp, Techint and Mota-Engil among others.

SalfaCorp, Chile's main E&C group, acquired local construction firm HV Contratistas in 2008 and now operates under the Salfa Montajes name, while it also owns Revesol, a company dedicated to mill maintenance equipment and parts for material handling. Guillermo Vega, general manager, Salfa Montajes, explains that the firm wants to leverage on its experience in Chile to aggressively expand in the local mining industry. "SalfaCorp has sales of \$1.3 billion in Chile, \$550 million of which come from mining through Salfa Montajes," Vega said. "In three years half of our revenues in Peru should come from the mining industry."

Salfa Montajes' main expertise is in civil construction and erection works, although in certain areas they can also include engineering for EPC jobs, as in Xstrata's Antapaccay project. Guillermo Vega explains that his company is intensively training people. "Big mining projects are going to be built simultaneously in Peru and this is going to create a stress in the market; this is why we believe that our previous work in Chile's mining sector is going to be key to win contracts. We have Peruvian staff currently being trained at our mining projects in Chile."

Pablo Videla, general manager, Techint E&C, a multinational firm, is similarly optimistic about the market opportunities Peru offers. "Out of our expected revenues of \$250 million annually, we would like to see 30% of it coming from mining services," Videla said. "Currently there is not enough engineering and construction capacity to handle the investments that are coming. There is going to be room for everyone."

The Mota-Engil group, a multinational headquartered in Portugal, has already had a presence in Peru through Translei, a subsidiary rebranded now as Mota-Engil Perú. In the last years the company has done mostly earth-moving and contract mining for many of Peru's mining players, including Yanacocha; however the idea is to gain engineering and construction projects of a larger scope, such as the EPC of the port of Paita (northern Peru) developed by the company. Elsewhere, Mota-Engil also has built the facilities for a uranium operation in Malawi.

"We are 100%-owned by a European company with revenues of more than \$2.8 billion in 2009. We have 25 years of experience



Rafael Dávila, managing director of Golder Associates.



Juan Rayo, founder of Chilean engineering firm JRI.



Rui Guimaraes, managing director of Mota-Engil Perú.



Walter Piazza, managing director of COSAPI.

working with the local communities in Peru. This is a great combination. The challenge we have is that most clients see us mainly as earthmovers and we can do much more than that," said Rui Guimaraes, managing director, Mota-Engil Perú.

The sales of Mota-Engil Perú were \$40 million in 2009 and \$70 million in 2010, with a goal of reaching \$150 million this year. To support this growth, the company is obtaining ISO 14001 certification (it already has ISO 9001 and OHSAS 18001) and is hiring 60 new engineers, half from universities and half from the market.

Other industrial construction players include SSK Montajes e Instalaciones, 50%-owned by Sigdo Koppers E&C of Chile, who have been working at Yanacocha for many years and are doing the EPC for the new truck shop at Antamina; and Corporación de Ingeniería Civil (CIC), a Peruvian company with strong experience in cement and gas plants and now looking to engage in projects in the mining sector.

Igor Aguirre, executive director, CIC, explains the 65-year old company has traditionally stayed away from the earthmoving business. "Earthmoving is highly capital intensive," Aguirre said. "Today, there are leasing options and access to financing, but 20 years ago, you either had cash or you could do nothing."

Instead, the company has focused on industrial construction and the development of civil works that require high precision. "We do difficult things, not everyday things. For Cementos Lima, for instance, we dug a 6-km tunnel for a conveyor belt in the middle of the city," Aguirre said. "We were given a circle of 3 centimeters of diameter from which the center of the tunnel could not deviate. Getting that kind of precision in the middle of a trench inside the city was very difficult."

In the current environment of high demand from mining, CIC expects the technical expertise gained in other industries will allow the company to win important jobs in the sector.

Mining Works

All Graña y Montero, COSAPI and Mota-Engil offer contract mining and earthmoving together with their E&C services, however there are other players that concentrate on this business, such as San Martín Contratistas, Stracon, Constructores y Mineros (CyM), Pevoex and Montali, the latter one specialized in underground development.

Stracon, a company active in Peru and New Zealand and looking to expand in Colombia, has made the most of the growing trend towards contract mining. The company has a joint venture with Graña y Montero invoicing \$120 million annually, and has expanded at an average rate of 68% annually between 2008 and 2011, mocking the crisis. Peru currently accounts for 60% of Stracon's sales.

Although Stracon undertakes significant earthmoving projects (it has the main earthmoving contract in Toromocho in a joint venture with Mota-Engil Perú), the company's CEO Steve Dixon likes to position his company as an expert player in contract mining. "We want to focus on that because these are long-term contracts and it is the business that we understand the most," Dixon said. "It allows for better planning with equipment and people."

Civil works do require a partner in drilling and blasting. Pevoex Contratistas, a local company specialized in this field, regularly works with Graña y Montero and has been working with final clients such as Antamina, Cerro Verde, Milpo and Minas Conga. The founder and General Manager of the company is Rómulo Mucho Mamani,

former president of Ingemmet, Peru's governmental geological body, and former vice minister of Mines.

Mucho explains Pevoex is investing \$3 million in new equipment with an aim of boosting revenue to \$10 million annually, and prides his company for having an excellent safety record. "As Pevoex we have not suffered any incidents or accidents," Mucho said. "We have good policies in safety. That way we are well sought for by the clients. For instance, we are Barrick's preferred partner in blasting. You may work well for 20 years, but if you have one single accident, this will ruin everything. In explosives, the first error is also the last one. You don't have a margin of error."

As mentioned earlier, demand is also going to increase in underground works. Montali, a contractor specialized in underground development using the Alimak system, is currently working for precious metals producers Buenaventura and Poderosa. "The Alimak technology saves time and increases productivity but requires high standards and specialization," said Yran Ludeña, general manager, Montali. "We can do much more than raises. We want to be seen as a specialized contractor in underground development."

Ludeña affirms that although Peru has a great pool of talented engineers, Montali's work is so specialized the company's recruits need to undergo a six-month training program. Montali, also present in Canada's mining sector with an office in Val-d'Or, Québec, expects Peru to become an increasingly important profit center. "Peru is a millenary country where the mining sector has always been present. We have always lived with mining," Ludeña said. She explained Peru has world-class professionals and it can take advantage of its rich diversity to grow.

An Ever-Increasing Range of Providers

The range of equipment and services available is steadily expanding. The constant arrival of new suppliers enhances cost competitiveness as well as the quality of the services provided.



Mining trucks at Yanacocha, Peru's largest gold mine. (Photo courtesy of Ferreyros)

Peru's mining sector is too big, and its potential for expansion too significant, to be ignored. Take security services, for instance: the business, previously controlled by local companies, has seen the arrival of large multinationals (Securitas and Prosegur) via acquisitions; or explosives, where the arrival of global players such as Orica and Maxam will certainly raise questions for the main Peruvian manufacturers who have traditionally been the leaders in this segment. As the market is increasing, so is the number of providers.

On the equipment side, all of the relevant multinationals are putting Peru at the forefront. The recent move by Komatsu to buy a 40% stake in their local distributor is a good example of this. The market is not negligible, as shown by the figures given by Mariela García de Fabbri, general manager, Ferreyros, a Cat distributor. "We started in the 1990s with four mining trucks and to date we have sold 350 of them," García de Fabbri said. "These trucks work 24/7, therefore they generate a flow of revenues in parts and services. Roughly 42% of our sales come from product support."

Ferreyros, which also represents Cat in Guatemala, El Salvador and Belize, had revenues of more than \$1 billion in 2010,

\$952 million of which were generated within Peru. About half of that figure comes from mining.

The company has recently introduced the Cat 797 ultra class haul truck, whose first customer in Peru will be Chinalco at Toromocho. García de Fabbri notes delivery times have deteriorated as a result of booming demand, but the company is investing heavily to keep pace with the market. "As Ferreyros, we anticipate the needs of the local market," García de Fabbri said. "We have already placed orders worth \$500 million just for the mining industry, on top of the regular inventory worth \$120 million. We have \$60 million dollars in parts so we can respond immediately to our clients."

Late last year Caterpillar announced its \$8.6 billion acquisition of Bucyrus, another large player in mining equipment, which in turn had acquired the mining business of Terex earlier in 2010. Bucyrus expects dramatic growth in the coming years in Peru. "We now have 10 electric shovels in operation and by 2015 we are prospecting 40. Regarding large drills, we now have 18 and anticipate having 70 by 2015. We currently have 15 hydraulic excavators, but there is the potential to double this in the

next five years. These are our estimates considering the most probable projects," said Rafael Ponce de León, general manager, Bucyrus Peru, who adds "these are very large machines so it is not a question of price, but reliability and trust."

Clients in the country include Antamina, Southern Copper, Chinalco and Xstrata. "Bucyrus has spotted Peru and Brazil as two of the fastest-growing opportunities in the near-term. We anticipate a great increase in copper production here and we have adapted our planning to cope with that growth. We have invested more than \$300 million to expand the capacity of our Milwaukee factory, with a vision of satisfying the upcoming demand," said Kristina Harrington, executive director, Bucyrus.

Swedish-based Sandvik and Atlas Copco are also benefitting from the improving business environment. Sandvik sold \$100 million last year (65% of this in underground equipment) and expects \$136 million in 2011. The company's general manager in Peru, Hans Neumann, announced that Sandvik is seeking to target to more aggressively the surface mining side as well as material handling areas such as conveyor belts in difficult terrains, in which Peru offers interesting opportunities.

Meanwhile, Atlas Copco's sales in 2010 were \$120 million (a 40% increase year-on-year), with a strong focus on underground equipment such as blasthole drilling rigs and low profile loaders and trucks. The company's rotary drilling machines for open-pit mining are also selling well.

Francisco Menéndez, general manager, Atlas Copco, advises mining companies to plan well in advance to ensure they will have the needed equipment and supplies in a timely manner. "There is no way the current installed capacity in the industry can match with the growing demand," Menéndez said. "The sentence 'I want this machine for yesterday' has become ridiculous in today's environment. This applies to accessories and spare parts as well. If the sector does not want to stop production, there is a need for better planning and larger inventories."

Anthony Davis, managing director, Metso, agrees. "Those mining projects who take longer to get their orders in will get longer deliveries, so their project will take longer to start operating. It is a race," Davis said.

The large multinationals that focus on equipment and solutions for minerals processing, such as FLSmidth, Weir Minerals, Metso and Outotec, are all present in Peru, developing solutions locally and also providing after-sales service for imported equipment. The abundance of small and medium-sized operations in the country also makes room for players specialized in smaller processing units, such as Ajani, a local company specialized in low-cost Merrill Crowe plants, and Tecpromin, a company originally from Chile.

Víctor Briceño, general manager, Tecpromin Peru, explained that working with medium-sized operations requires a lot of networking and a strong sales effort. "In Chile, 90% of the business comes through five or six big engineering houses, but Chile does not have a strong medium-sized mining sector," Briceño said. "In Peru, we have about 50-60 medium-sized mines and projects and you need to contact these clients directly."

Manufacturing Locally

Considering the size of the industry, the competitive costs of labor in Peru and the mining experience gathered over the years, an increasing number of providers have begun manufacturing on Peruvian soil. Ingetrol, a Chilean manufacturer of portable drilling rigs, and Tumi, a producer of raise boring machines, are good examples of this.

"We are very happy with the quality we obtain in our Peruvian plant," said Luis Silva, president and CEO, Ingetrol. "The skills of our people here are excellent, and the commitment and loyalty of the Peruvian workforce is fantastic. Very often, when I need to send people to visit our clients worldwide, I send Peruvian mechanics."

The company could nearly double its production in Peru to reach 40 drilling rigs this year. "In our Peruvian plant we are concentrating on the lighter, more portable machines. This is due to the conditions of the business in Peru, where portability is paramount. Access can be very difficult and there is a need to minimize the impact on the environment and the local communities. We have our niche in the market, which is early exploration," said Silva, who explains the company would like to expand

its range of products to geotechnical rigs and even blasting equipment.

Tumi Contratistas was established in Peru as a raise boring contractor, but five years ago it started producing machines locally for the export markets using the technology developed by Stu Blattner in the U.S. This has dramatically impacted upon the company's revenue breakdown, as equipment exports are now nearly half of the sales. As contractors, Tumi has eight machines in Peru, while as manufacturers they expect to sell five to six machines annually.

Elizabeth Armendáriz, general manager sales and operations, described the particularities of Tumi's machines. "Our machines are easy to operate but they are very powerful," Armendáriz said. "The smaller the machine, the less the mine has to blast for its operation, which makes our equipment very cost-efficient for mine development."

"Raise boring is the safest way to do ventilation, ore passages, man ways, service and waste passages," said Marc Blattner, deputy manager, Tumi. "It is also a very clean technology. We have recently created a machine called the SBM 450, which is the first of its kind. We can transform a raise bore machine into a boxhole machine in just an hour 'underground,' while others



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Christopher Varas, general manager of Grupo Vivargo.



Pierantonio Giacchetti, managing director of TDM.

take over a day. This saves the customers time and money." Tumi is currently setting up a new larger manufacturing facility in the outskirts of Lima as the foundations for future growth.

Another relevant manufacturer serving the industry is Tecnología de Materiales (TDM), Peru's leading geosynthetics player. The company, established in 1992, has three plants in Peru, two of which are joint ventures: one makes HDPE geomembranes, one produces gavions and the third does emulsions and asphalt modification.

The company has offices in Chile and Brazil and also represents a number of foreign brands with products such as geogrids and corrugated pipes. Besides manufacturing, TDM also provides installation services. In Chile, for instance, it is taking care of 4 million square meters of geomembrane for Freeport McMoRan's El Abra operation. "In almost all of the products we sell and in the services we offer, we were pioneers in the Peruvian market," said Pierantonio Giacchetti, managing director, TDM.

Giacchetti stresses the importance of using the best materials in leaching pads. "Perhaps a mining company can save money in other areas, but not on the leach pad," Giacchetti said. "The quality control is very meticulous. When we serve our clients, we provide the relevant quality certifications and perform proper field tests during the installation process." Sales at the TDM group were \$140 million last year and for the medium term the company would like Brazil and Chile to increase its share in the revenue breakdown.

Getting Strong in Mining

Over the last few years, service providers initially served other industries are increasingly targeting the mining sector. Tecsur, a company providing turnkey solutions in electrical infrastructure, counts on mining to become a very strong source of revenue for the future. The company, previously focused on the distribution business, has entered the industry with a \$7.5 million transmission line project for Trevali Resources, a Canadian company.

"In the last years we have focused on serving the electricity companies. Now we have changed our vision because we can see enormous potential in the mining industry," said Jorge Güimac, commercial manager, Tecsur. "In 2011, mining is expected to account for at least 50% of the projects division thanks to our work with Trevali Resources at the Santander mine. "In our strategic plan we want to develop new areas, in transmission and generation, and enter aggressively into the mining sector."

Güimac affirms Tecsur, as a company owned by American shareholders, puts a strong focus on safety. "Our main competi-

tive advantage to work with the mining sector is that we speak their same language when it comes to safety," Gúímac said. "We are not the cheapest option, but we are the safest one."

Grupo Vivargo, a Peruvian family owned company, active since the 1940s doing international freight road transport, has evolved to specialize in the oversize transportation needs of the mining sector, as well as other related services such as lifting and erection. The company currently works on three fronts: the rental of equipment (trucks, platforms, cranes, lifts and other related equipment); the representation of JLG, an American brand producing scissor lifts and telehandlers among others; and the management of storehouses, a service provided on-site at new mining

projects or expansion ventures, with final clients such Southern Copper.

"Last year was an important year for us in terms of decisions. The crisis caused a halt in mining investments for a few months, but now we have decided to put all our trust in Peru," said Cristopher Varas, general manager, Grupo Vivargo.

The company is a great example of the levels of growth that the mining sector is experiencing. Sales have rocketed from \$400,000 in 2005 to \$4.2 million last year. For 2011, the aim is \$7 million as a result of fresh investments in new equipment. "The mining industry has the highest standards, really different from other industries. This is why we are investing in the latest technology so as to always be up-to-date with the market's developments"

said Víctor Varas, president of the board, Grupo Vivargo.

Vivargo originated in Arequipa, but has opened an office in Lima to serve the mining operations in the center and north of the country. Geographical coverage is indeed a key aspect for providers in Peru, especially in emergency situations where stopping an operation can cost the mining company a fortune.

Opertec, a Peruvian company dedicated to multi-brand installation and maintenance of conveyor belts, knows very well about this. About 30% of the company's revenue comes from emergency stops; being at the mine as quick as possible is essential, explained Fernando Barrio, general manager, Opertec. "Peru is a very large country with a very difficult geography. We need to develop a strategy of immediate response, with a presence close to the mining operations, and still be profitable," Barrio said. "Right now, our advantage is that we can deal with five fronts simultaneously, but we want to take maintenance to the next level, implementing a holistic, preventive approach, with a permanent presence in the mining sites."

Opertec was created as a service-focused spinoff of Tecnomina, a long-standing distributor of materials for mineral and aggregates transport systems, as well as processes involving wear abrasion and corrosion. Mariana Barrio, general manager, Tecnomina, believes both Tecnomina and Opertec need to focus on cost reduction. "Other service providers, mostly from Chile, are trying to enter the Peruvian market; however their costs are higher than ours. Before our products were too expensive for medium sized operations, but since last year we have entered that segment providing economic solutions," she said.

Niche Consultancy Services

The increasing regulations regarding the sustainability of the mining sector have raised the demand for highly specialized services in areas that were not seen as a priority a few years ago. Peru is a millenary country with a lot of remains from ancient civilizations. Mining projects, therefore, cannot go ahead without the authorization of the Ministry of Culture regarding archeological aspects. In this context, it is necessary to hire specialists that will develop all the relevant archeological studies.

"Peru has a long history of human settlements, going back 14,000 years," said Humberto Salini, general manager, Asesoría y Servicios Especializados (ASE), an arche-



Ingetrol's Explorer Jr. 36D2 model, doing work in the highlands of Puno. (Photo courtesy of Ingetrol)

ological consultancy. "We actually know very little about our own history. Even at the highest altitudes, there are lots of traces of previous settlements." About 25% of ASE's business currently comes from mining; a figure they want to increase to 40%. The company also does archeological studies for infrastructure projects, such as roads, ports and pipelines.

"When a junior company arrives, normally the first contacts are a law firm and an environmental consultancy," Salini said. "We are trying to pass the message that they can also hire us directly, because we have a very good track record in the Peruvian mining sector already."

Salini advocates that ASE's services should be seen as a bonus to projects, rather than a mere compliance with the country's regulations. "If we are at the project from the early stages, we can become a real added value," Salini said. "We must not forget that in our country there are many archaeological sites with symbolic value to local communities, so if this is not considered and resolved from the beginning, this aspect can create a social conflict."

The existence of communities, together with the legal requirements for public participation (see next article), also requires



Humberto Salini, general manager of ASE.



Francisco Menéndez, general manager of Atlas Copco.



Jorge Güimac, commercial manager of Tecsur.

focused experts to ensure a smooth relationship between the industry and the locals. Óscar Díaz, CEO, Viceversa Consulting, a company qualified to do EIAs and specialized in community relations, assures communication efforts must be adapted to the public. "Local populations are not formed by engineers, therefore you need to explain the basic aspects of the project," Díaz said.

Díaz explained the experience gathered by Peruvian specialists in community relations is already being exported throughout the Americas (Viceversa has done projects in Argentina, Bolivia, Chile and Honduras). "There are two concepts: legality and legit-

imacy," Díaz said. "Legitimacy means that the parties signing a contract believe in that contract. Mining companies often think that with having good lawyers and a signed contract the problem is over. The reality is that the problems start once you have the signature."

Although the levels of investment in specialized consultancy services will be directly proportional to the profits of the mining operations (today at excellent levels), the good news is that, unlike other countries where mining may be less developed, companies can easily hire these sorts of specialists.







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Miners and Communities: Building Long-term Partnerships

While mines always represent an economic boost for the vicinity, the relationship with locals has to be very transparent in order to avoid possible conflicts



Through the voluntary contribution, mining companies in Peru have been developing significant programs to improve the lives of the local communities. (Photo: communities near Pierina mine. Courtesy of Barrick)

Mining operations in Peru coexist with innumerable communities, which means that they have to be in contact with them from the get go. From the exploration stage all the way to closure, it is important to build a long-term relationship. For the mining operator, professionally managing the raised expectations is key, as well as ensuring that the plethora of contractors and providers will follow the same standards. Building trust can take years, but one single mistake can ruin everything.

"Historically, many mining companies have made a mistake in thinking the best way to deal with communities was not getting involved with them. We have understood that we need to face social issues from the very beginning. In this context, information is key. If we make mistakes, we need to be transparent and acknowledge it," said Diego Ortega, head of corporate affairs and legal at Gold Fields La Cima.

While the relationship between the mining company and the communities surrounding the operation is always

unique and depends on external factors that may be applicable only in each particular situation (political interests often being at the forefront), there are a number of issues that are commonplace. These are general environmental matters, questions about the use of water and expectations about employment opportunities.

Water is life and one of the major concerns for local communities has always been whether the mining operation will exhaust the water resources in the area or pollute them. Southern Copper knows about this very well: the company already has three desalinating plants in the region of Ilo, and now it plans to build another one for its Tía María project. Polymetallic producer Milpo, controlled by Votorantim, already has one such plant at its Cerro Lindo operation. "Water is always going to be a priority for mining. There is no doubt that agriculture is an ancestral activity, but it has always coexisted with mining. Indeed mining only consumes 2% of the country's water resources. Today's formal companies apply the strictest environmental standards," said Miguel Carrizales,

president, Institute of Mining Engineers of Peru (IIMP).

Another very sensitive aspect has to do with relocations, when families accept to leave their homes so that the mining operation can take place. These decisions can never be imposed and it is assumed that those who will leave the houses that their families may have occupied for generations will significantly improve their standard of living. In Peru, three mining ventures are prompting the relocation of whole towns. These are Morococha (5,000 people), which lies in the operations area of Chinalco's Toromochito project; Fuerabamba (1,200 people) at Xstrata's Las Bambas project; and perhaps the most impressive case, Cerro de Pasco (70,000 people), home to a historic open-pit mine today operated by Volcan.

At Cerro de Pasco, the old pit continues to get bigger and bigger, while the population also expands and builds houses closer to the mine. "We have been actively acquiring new properties to ensure that we can proceed with the mining operation," said Juan José Herrera, general manager, Volcan. "The people in the area understand that mining provides jobs to many people, but we also need to understand that many people do not want to move from their homes. This issue should not be an exclusive responsibility of Volcan."

In 2009, the Peruvian government passed a decree declaring the relocation of the town of Cerro de Pasco to be a national priority. Pollution, serious health implications and poor living conditions were cited among the reasons backing the construction of a new city. The text suggested the project should be funded jointly by Volcan, by money from the mining canon, and by the central government.

To avoid these situations in the future, mining clients and the regulatory watchdog ensure that everything is carefully planned through detailed environmental and social impact assessments. The industry must provide a relocation solution before any mineral is produced, to safe-



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guard the health and safety of the local populations and to assure the sustainability of the projects in the long run.

Armando Arrieta, vice-president of legal and corporate affairs of Minera Chinalco Peru, provided some facts and figures about the relocation of Morococha, part of the large Toromochu copper project. "We are building a new city in the middle of the highlands, with 1,450 houses over two phases," Arrieta said. "This is a big relocation project so obviously there will always be people who oppose moving, however a large majority are in favor. Where they live now there is no sewage, poor electricity and no permanent running water. Moreover, we are going to provide houses not only to the homeowners but also to tenants.

"We need to persuade them because we do not have any other alternative. There is no way Chinalco can force the people of Morococha out of their town," Arrieta said. "If people decide not to move, there will be no mine and we will all lose. The locals will have no jobs, the government will receive no taxes and Chinalco will have no business here."

Have Your Say

The public participatory processes have developed considerably in Peru over the last years. Companies need to hold a public audience to present their environmental impact assessments where the communities can ask as many questions as they like, as well as raise their objections. It is assumed that a project that does not obtain the so-called "social license" cannot go ahead.

"In Peru, there are about 120 conflicts per month between the latent and the active ones," said Óscar Díaz, CEO, Viceversa Consulting. "Of these 120, more than 90 are related to environmental issues. And within these 90 environmental conflicts, about 80 of them are mining-related," Díaz said. "Therefore, the biggest problem the mining sector faces with regard to the communities is the environmental aspects, and within that, the water issue is highly sensitive."

The challenge, said Díaz, is to inform the locals about the different impacts. The system is very transparent, but at the same time it is not easy to present a highly technical engineering study of hundreds or thousands of pages to people with potentially very low education levels. At the end of the day, the communities need to be informed of the changes, both positive and negative, that the mining operation is going to bring to their lives and the lives of their descendants.

Recently there has been a strong movement for the implementation of Convention 169 of the International Labor Organization, which includes the local communities' right to be consulted on any regulatory change that may affect them. This will probably mean additional participatory processes to the ones already in place. "The regulations in place already incorporate the concept of public participation. The system in the mining industry is a model for other sectors. Convention 169 of the ILO has to be implemented in a very responsible manner," said Cecilia Gonzáles, a lawyer specialized in mining at Estudio Grau law firm. "Letting the people understand the impacts of the mining industry is key, but at the same time the mining industry is the foundation for Peru to keep moving on."

Employment and CSR Programs

The expectations concerning employment opportunities need to be carefully dealt with. The mining operation cannot hire every-

one; however, it can do its best to provide as many jobs to local people as possible. While mining companies may want to bring experts and contractors from elsewhere, they should also provide training and career opportunities locally and not only in low-skilled positions.

"About 85% of our workforce at the Cerro Corona processing plant are locals," said Diego Ortega of Gold Fields. "We developed a unique training program in 2007-08 in order to have a core staff drawn from the local communities. We have demonstrated that all the locals needed was an opportunity to show their dedication and efficiency. They had to learn because previous mining activities in the area were underground, but today they are qualified staff."

According to the Inter-American Development Bank, a multilateral organization, the country's poverty rate could decrease to 30% by the end of this year, however it noted that it will be increasingly difficult to improve the statistic without more focused local strategies. As in many other Latin American economies, inequalities are very high among the population. The harsh living conditions up in the Andes do not help to create sustainable economic growth in the highlands.

"I believe mining is the only activity that can bring good standards of living to regions of Peru that are above 3,000 m, which represents 35% of this country's territory," said Jorge Benavides of Zincore

Metals. "Any other activity you try to develop there would be mere survival."

According to the latest report of the Peruvian National Institute of Statistics and Information Technology (INEI), chronic malnutrition still affects 17.9% of under 5-year-olds (18.3% in 2009). In absolute numbers, that means that more than 500,000 infants are malnourished and condemned to be poor when they will be adults. For the World Health Organization, the figure is actually higher, nearly 700,000.

With these numbers in hand, it is not surprising that many mining companies have developed projects intended to tackle this problem. Antamina, who has contributed to date \$208 million to the voluntary fund since it was created in 2006 and is expected to transfer a further \$45 million by the end of March, has implemented a program called "Ally Micuy" ("good food" in quechua). "More than 36,000 children have participated in the program and we have been able to reduce chronic child malnutrition from 33% to 23% over the past five years," said Pablo de la Flor, vice president corporate affairs for Antamina. "The interesting thing about the project is that it does not distribute food, but socializes best practices that already exist within the country. It gets a significant level of involvement from the women in the communities and builds up capacity at a local level."



Sustainable economic activities will provide sources of income for the local populations once the mining company has left the area. (Photo courtesy of Xstrata)



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Pablo de la Flor, vice president of corporate affairs of Antamina.



Óscar Díaz, chief executive officer of Viceversa Consulting.



Percy Arhuata, general manager of Inmet Mining.

While obviously not all mines can contribute the same money as Antamina, all players can do their bit to improve standards in their area of influence. Pan American Silver, for instance, received an award from the SNMPE last year for its program to improve nutrition. "Compared to what other major companies contribute, our fund is quite small, but still it is significant for the communities surrounding our areas" said Enrique Ramírez, general manager, Pan American Silver. "The future of any country is its children, so we decided to dedicate 80% of the money contributed to child nutrition. We created a separate fund and partnered with Caritas to manage it. The award from the SNMPE gave credit to our work with 1,200 families in Junín."

There are many other areas where mining companies implement corporate social responsibility programs: "Since 2007, for our Lagunas Norte project we have been working with World Vision on an educational program focused on child assimilation," said Darrell Wagner, general manager, Barrick. "We have agreements with the Clinton Giustra Sustainable Growth Initiative and a couple of Peruvian organizations where we are working on large reforestation programs. We also work in alliance with the CIDA (Canadian International Development Agency) and USAID (United States Agency for International Development) in the Lagunas Norte area on a health program. Furthermore, we have our own programs. Our idea is that education and health are what will be sustainable for the community."

Juniors and Communities

Geologists doing exploration work are typically the first ones to arrive in remote

areas and to get involved with the locals. If the area turns out to have a major deposit, it will be much easier to develop it later if the junior company builds a good relationship from the start. "The junior mining companies are in a disadvantaged position with regard to community relations, because we need to become pioneers in explaining what mining exploration is. Our role is very important and it is not always valued by the major mining companies," said Joseph Grosso, president and CEO, Golden Alliance Resources.

"Nowadays there are very few places where you can be the first one to explore an area," said Keith Laskowski of Estrella Gold. "Someone was there before you and whatever they did, the local people remember. In a rural area, people do not know the difference between Estrella and Rio Tinto. All they know is, 'somebody is here.'"

The subprime crisis in 2008-09 caused funding to dry up and as a result many juniors had to restructure and put their exploration work on hold, potentially damaging the relationship with communities who may be expecting projects to develop quicker. "Over the past year, AM Gold has been completely restructured," said Gerry Aberle, president and COO of AM Gold. We have come a long way through the transformation of the company, but have been careful through the process to maintain the strong local management presence we have always had in Peru as it is our view that community relationships cannot be built or rebuilt overnight."

For Alberto Arispe, general manager of brokerage house Kallpa Securities, community relations are actually key to the funding of projects. "You may have great reserves on paper, but if you cannot develop the project on the grounds of social issues, the project

is worth nothing. In Peru, this is a very sensitive issue. No one wants to invest in a place that has problems. Some companies do not want to spend money on community issues because they pay taxes and they believe this is the government's responsibility. In theory this should be true, but in practice it is not."

An innovative approach toward community relations is demonstrated by Minera IRL, who will bring the community as a 5% equity partner at their Ollachea gold project once it goes into production. "This is how you show respect to the historical owners of the land," said Diego Benavides, president of Minera IRL's Peruvian subsidiary. The initiative will also benefit the company as the communities will work toward the development of the mine once aware of the substantial funds at stake.

At the end of the day, it is up to each company to decide the best community relations strategies and to define how much to invest in this area. Yet, one thing is clear: not forging good links with the stakeholders is a recipe for disaster. Peru has already seen cases of failure (such as the one of Manhattan Minerals at Tambogrande a few years ago) and while some projects are undergoing social pressures, industry leaders hope that they will not have to be abandoned.

"We are seeing a conceptual change, from the 'social license' concept to the 'strategic partnership'. This way the communities feel more involved in the mining project and social conflicts, which cause economic losses and even cost lives, are reduced," said Percy Arhuata, general manager of Inmet Mining.

If Peru wants to keep inaugurating new successful projects, this trend will have to continue in the years to come.