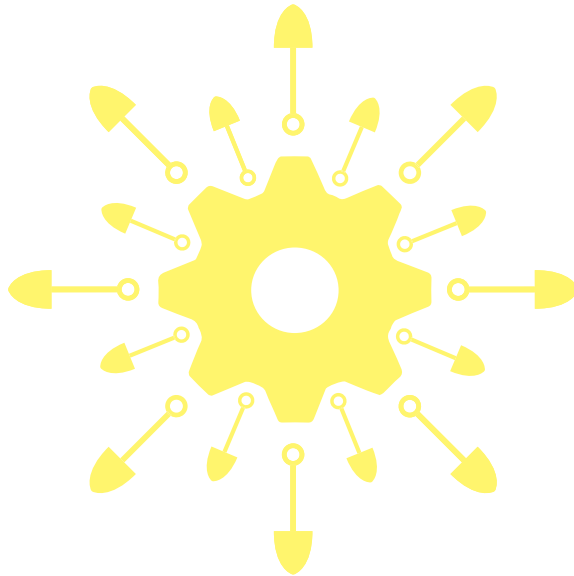


GLOBAL BUSINESS REPORTS

# ARMIN

2017

ARMINERA OFFICIAL INVESTMENT GUIDE





# DESAFÍO CAEM 20/21

POR UNA ARGENTINA PRODUCTIVA Y FEDERAL  
**U\$S 20.000 MILLONES**  
DE INVERSIÓN DE LA INDUSTRIA  
MINERA AL AÑO 2021.



**Lo invitamos a conocer más sobre el Desafío CAEM 20/21**

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Cámara Argentina de Empresarios Mineros (CAEM)

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# Dear Reader,

Through game-changing macroeconomic reforms that have put an end to an extended period of economic uncertainty, Argentina's mining industry finds itself back in the spotlight of investors, both local and international.

From a mining industry's perspective, creating the conditions that will ensure a stable business climate for the medium-to-long term is essential. Modern mining is a relatively new activity in Argentina, but the experience worldwide shows that mining investments can create wealth and opportunities for the future. This requires a predictable regulatory framework to allow for long-term planning.

It is equally crucial for the provincial governments and the wider society to understand the benefits that the mining industry can bring to many of the less developed parts of the country.

In the context of its commitment to transparency and to the development of a responsible and sustainable industry, the Argentine Chamber of Mining Companies (CAEM) signed an agreement with the Mining Association of Canada (MAC) to implement the TSM initiative *-Towards Sustainable Mining*, that sets international quality and control standards. For its importance, this program is one of the main themes in this year's ArMinera edition.

Besides, the mining industry has set a goal to attract \$20 billion worth of mining investment to the country by 2021. This would result in the creation of 40,000 new jobs, on top of 90,000 already in place, as well as the establishment of 8,000 new small-to-medium size enterprises (SMEs), that would have a multiplying effect over the local economy and the value chain.

As part of an effort to promote Argentina as a mining investment destination, CAEM and Global Business Reports have teamed up to gather the latest information about the sector in time for ArMinera 2017, the main industry event organized by the Chamber and held every two years in Buenos Aires.

This guide has been produced after several months of research and interviews with the main authorities and industry leaders. We hope that the insights included in the following pages provide valuable information about a country that offers world-class geological potential and tremendous opportunities as the global demand for commodities continues to increase.



**Marcelo Álvarez**  
President  
CAEM



**Katya Koryakovtseva**  
General Manager  
Global Business Reports (GBR)

# Exclusive Interviews

Leading industry and government figures from Argentina's mining industry discuss trends and opportunities as well as the obstacles that they face.



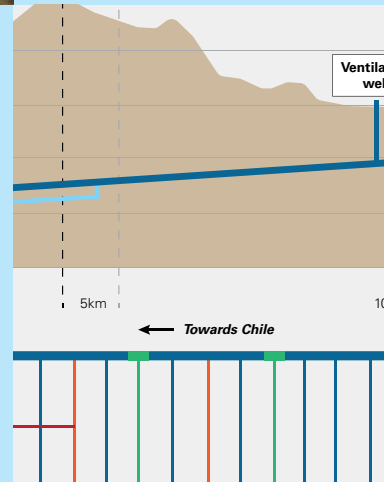
# Editorial Analysis

Global Business Reports provides our unique insights into all aspects of Argentina's mining industry after having spent months researching all across the vast country meeting all mining shareholders.



# Quantitative Data and Maps

Maps and infographics help to clarify trends across the supply chain.



# Future Outlook

The future is being built with the decisions of today as Argentina seeks to reintegrate in the global economy and exploit its tremendous resource potential.



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PERU

BOLIVIA

PARAGUAY

BRAZIL

URUGUAY

South Pacific Ocean

South Atlantic Ocean



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Industry Explorations  
Global Business Reports

**Area**

- Total 2,780,400 km<sup>2</sup> (\*)

Considering 1,084,386 km<sup>2</sup> of the Exclusive Economic Zone area, Argentina is 3,939,463 km<sup>2</sup>. In this figure the areas claimed are not included. 8th largest country

- Water (%) 1.57

**Population**

- 2015 estimate 43,431,886
- Density 14.4/km<sup>2</sup>

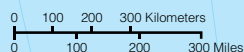
(\*)Area does not include territorial claims in Antarctica (965,597 km<sup>2</sup>, including the South Orkney Islands), the Falkland Islands (11,410 km<sup>2</sup>), the South Georgia (3,580 km<sup>2</sup>) and the South Sandwich Islands (307 km<sup>2</sup>)

# Argentina

- International Boundary
- - - Province Boundary
- ★ National Capital
- Province Capital

Falkland Islands  
Islas Malvinas  
administered by U.K.,  
claimed by Argentina

TIERRA DEL FUEGO, ANTARTIDA E  
ISLAS DEL ATLANTICO SUR



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# INTRODUCTION TO ARGENTINA



“One of the main obstacle we face in this process is that the public does not trust the State or the private companies. If we can find credible institutions, local or international, that can help us build trust and we will start generating a more positive public perception as an industry.”

- Marcelo Alvarez, President of CAEM,  
the Argentine Chamber of Mining Companies

## UPCOMING MINES MAP

Source: ABECEB



# Reintegrating Argentina for Business

Argentina is under new rule, and the elected businessmen in Buenos Aires tasked with increasing competitiveness and reducing inflation see mining as one of the greatest opportunities to attract much needed FDI. President Mauricio Macri's administration is working to unify the country in sustainably re-introducing mining as an encouraging catalyst for regional economic development. His team is filled with private sector executives—including the former president of Shell Argentina, Juan José Aranguren, as the acting Energy and Mining Minister and co-founder of APL Economía and JP Morgan alumna, Alfonso de Prat Gay, serving as the Minister of Economy—and the new President himself is the first to take office with a civil engineering background. “There is a new generation of politicians,” commented Alberto Carlocchia, mining coordinator for the Argentina-Canadian Chamber of Commerce. “The world needs new open markets, and Argentina has opened to the world.”

Some of Macri's action plans include: working towards a Sistema Unico de Informacion Minera (an open data portal to enable complete public access to geological information, statistics and cadastral systems); the optimization of energy and infrastructure; and the creation of the Nuevo Acuerdo Federal Minero, an agreement to homogenize mining regulations across provinces to improve clarity for investors and stakeholders.

“The global economy is somehow depressed, with mining companies focusing on increasing their assets' productivity rather than finding new assets,” noted Marcelo Alvarez, president of CAEM, the Argentine Chamber of Mining Companies. “This affects the short-term prospects of Argentina, but it is actually good for the country, because we have some time to adjust the macroeconomic variables, such as inflation, exchange rate and tax reform, and we can also adjust the rules of the game for mining investment with the different provinces. In other words, we still have some time to tidy up the house and modernize the mining legislation from the 1990s to make Argentina much more competitive.”

The geological potential of Chile's eastern neighbor is unquestioned, but there are many factors contributing to why Argentina's underexplored terrain has remained unattract-



## Daniel Meilán

Secretary of Mining  
**GOVERNMENT OF ARGENTINA**

“

At a national level, we want to have a new federal agreement. There are seven laws in seven provinces that make it very difficult to develop mining projects, so we want to define a clear system moving forward. Argentina being a federal country, investors need to know very clearly what to expect from each province.

”

### What importance does the current government accord to the mining industry?

Mining is a very important industry to strike a balance in wealth distribution and economic development among the different provinces. Argentina's infrastructure is concentrated on the east of the country, where European migrants populated all the areas around the Río de la Plata. 65% of the population, 70% of the country's GDP, 72% of the exports and 82% of the agricultural production is concentrated in just 18% of the territory. Thus this government has a great opportunity for the development of metallic mining projects, located in the west and northwest of the country, as well as in Patagonia. These areas, with low population density, require new economic activities.

Argentina is still in the very early stages of this process. Since mining activities started to develop in the 1990s, we have put together a portfolio of 435 metallic projects, 90% of which are in the early stage or, in some cases, in the moderately advanced exploration stage. 5.7% of the projects are in an advanced exploration or pre-feasibility stage, and only 3.8% of projects are in production. In other words, about 95% of our portfolio consists of projects, not mines. We want to develop all sizes of projects, from small to large. We are looking for the investors that want to undertake risky exploration activities, and these investors are foreign. Argentinean investments are mostly focused on non-metallic activities. Today, large mining operators have a lower profile than before and are not investing in large projects, but this could change soon. In lithium, for instance, there are 23 new companies looking for resources in the country, in Salta, Jujuy and Catamarca.

### What macroeconomic policies has this government undertaken to attract investors?

Investors were worried by the last administration due to the export duties, the currency exchange clamp and the restrictions on sending dividends abroad. In 2011-12, as the Argentinean economy became less open, exploratory activities also went down and investors stopped coming to the country. This government has changed this very quickly, and we have sent a strong message

to investors around the world. Meanwhile, at a national level, we want to have a new federal agreement. There are seven laws in seven provinces that make it very difficult to develop mining projects, so we want to define a clear system moving forward. Argentina being a federal country, investors need to know very clearly what to expect from each province.

### Exploration is key to get the industry going. Are exploratory activities picking up already?

Exploration expenditures decreased significantly over the last three years. At some point we had over \$300 million worth of meters drilled annually. The levels we need to develop the industry sit between \$300 million and \$400 million annually in drilling. Lately, we have only had \$50 million, which is very low. This was partly a result of the global fall of exploration expenditures, but Argentina was also affected by its restrictive economic policies.

### Lithium has raised lots of interest. Will that also mean developing the whole industrial value chain associated to it?

Most of the companies that come to Argentina are related to the mining segment of the value chain. Argentina can become one of the top two or three largest lithium producers in the world in five years time, with 120,000 to 140,000 mt/y. This way we could account for more than a third of the world's lithium production. However, a plant producing batteries may only need 400 mt/y, so thinking of the value chain is important, but we need to be realistic because the real levels of consumption that one or two factories may have locally are low. Having said this, we are working with investors on how to develop opportunities in this respect.

### How can the industry overcome the opposition to large mining investments?

Anti-mining activists always associate the words 'mega-mining', 'cyanide' and 'open pit' to pollution and even death. The word 'mega-mining' just refers to large mining operations and should not be associated to such negative ideas. If the State has all the controls in place, in the same way that it does for any other industrial activity, everything is going to work fine. —





# Marcelo Álvarez

President  
CAEM

“

The global economy is somehow depressed, with mining companies focusing on increasing their assets' productivity rather than finding new assets. This affects the short-term prospects of Argentina, but it is actually good for the country, because we have some time to adjust the macroeconomic variables, such as inflation, exchange rate and tax reform, and we can also adjust the rules of the game for mining investment with the different provinces. In other words, we still have some time to tidy up the house and modernize the mining legislation from the 1990s, to make Argentina much more competitive.

”

## What is the vision of CAEM's new leadership team?

The main challenge for the mining industry is to build trust. In this context, we need to involve all actors in this dialogue, and build a more technical and professional CAEM that can reach all levels of society, and relate with the public in a different manner. Besides, we are working on a Code of Ethics for all companies, and we are advocating for the establishment of a private body to control mining companies across three main levels: transparency, regional development and environmental care. This way, any new project that wants the green light in Argentina will have to be strictly controlled both by the State and this private body. One of the main obstacle we face in this process is that the public does not trust the State or the private companies. If we can find credible institutions, local or international, that can help us build trust and we will start generating a more positive public perception as an industry.

## With some mines shutting down over the next two or three years, what is the challenge to persuade people that mining can create lasting economic opportunities?

There may be a gap between the closure of mines and the opening of new projects. In some instances, perhaps those mines that are going to close did not create enough economic opportunities beyond their mine life, however this is also the responsibility of the State. No matter how well we do a mine closure, there will always be people saying that the mine did not leave enough wealth in the communities around it. It is an issue we have to face very honestly, working with the communities to find new projects.

## Do you think the CAEM's goal of investing \$20 billion in mining projects until 2021 will become a reality?

Argentina has turned the table over the last year with macroeconomic changes to open up to investors. However, the global economy is somehow depressed, with mining companies focusing on increasing their assets' productivity rather than finding new

assets. This affects the short-term prospects of Argentina, but it is actually good for the country, because we have some time to adjust the macroeconomic variables, such as inflation, exchange rate and tax reform, and we can also adjust the rules of the game for mining investment with the different provinces. In other words, we still have some time to tidy up the house and modernize the mining legislation from the 1990s, to make Argentina much more competitive. Today, we still have high costs for supplies and labor.

With regard to our plan, in 2017, we expect to generate a strong pipeline of exploration projects. The bulk of the investments should happen in 2018 and 2019.

## Can the puzzle of pro-mining and anti-mining provinces be solved?

Back in the 1990s, there already was a federal agreement for mining development. In Argentina, the provinces are the owners of the resources, so we need to listen to them all. A key point is the distribution of the income, and here we need to deconstruct the myth that mining companies do not leave anything behind.

## Mining companies have complained in the past that they cannot source everything they need in Argentina. How can the country develop a good base of providers?

An item on the agenda for CAEM and the government is the development of local providers, to define what can be done in Argentina and what has to be imported, and thus to avoid the discussion about having to source everything in Argentina. We need to find a balance. Mining providers need to be competitive, and that is where the State has a key responsibility to assure that these companies, SMEs for the most part, have the conditions to become competitive. Again, providers cannot rely solely on their contracts with mining companies, because when mines shut down, we have a big problem. They need to diversify their offering. Argentinean providers should join forces with foreign players to be able to export to other countries, generating positive interactions in the region. —

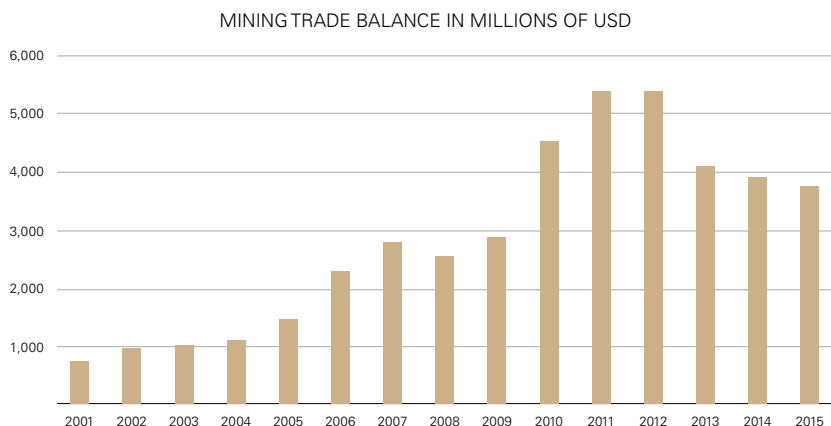
◀ 7

ive for investors until recently. In 2010, when the rest of the world was reaping the benefits of favorable commodity prices, Argentina imposed a 5% export tax. Exports after 2011 drastically dropped, and exploration followed this downward trend. Leaving behind the self-inflicted nationalistic economic policies of Cristina Fernandez de Kirchner, President Macri has a bottom-line approach to development. The country is in need of \$400 million in exploration annually, and major change is necessary for this number to see fruition. Within his first year of presidency, Macri reversed many decisions of his predecessor that held back investment, including the elimination of both export restrictions and deceptive currency controls. After retentions were removed, four businesses that had announced their closing, decided to extend their time and continue production. The most emblematic case is the Bajo La Alumbrera mine in Catamarca, which extended its operations until December 2018. Additional financial reframing came in the form of facilitating access to imports and international credit, free dividends distribution, and standardizing capital inflows.

The federal government is set on normalizing and, after recognizing the peso's true value, settlements were reached with bondholders affected by the default of the previous administration. Argentina is the world's 25th largest economy and the second largest in South America, but it has been greatly stigmatized internationally by its tendency towards defaults. "When the Macri government came into office, the new team eliminated the barriers that had been in place which made doing business more difficult, such as the limitations to send foreign currency abroad, the exchange rate 'clamp' and the impossibility to import the necessary mining equipment, including for exploration," explained Julio Ríos Gómez, president of SEGEMAR.

Globally, investment in exploration has dropped significantly, but Argentina has suffered considerably worse in comparison to other active mining countries. When comparing exploration budgets of 2012 with 2015, total spending decreased 66% in Argentina. Neighboring country Chile decreased their spending by 38%, while Peru's dropped by 47%.

Argentina has \$500 billion of documented reserves underneath its surface that are currently not seeing development. Over 10,000 million metric tons (mt) of mineral resources have been identified across 42 active projects; this tonnage calculation equals the summation



of 52 billion pounds (lb) of copper, 79 million ounces (oz) of gold, 1.7 billion oz of silver, and 1.42 million lb of ancillary resources such as molybdenum, zinc, lead, iron ore, lithium and uranium. According to Argentina's federal Ministry of Mines, only 3% of the total 465 identified projects are in operation at present.

### The Plan Moving Forward:

#### *A Federal Mining Code*

After many months of intense negotiations with the provinces, the federal government finalized the details of a plan to re-launch mining activity throughout the country. The intention of the Casa Rosada is to multiply the projects and double the investments in the sector so that Argentina becomes a regional mining powerhouse.

Somewhat similar to what the previous government established to stimulate oil activity, the central tool of this initiative is a bill to establish a new Federal Mining Agreement. It aims to homogenize national and provincial legislation in order to give investors tax stability, avoid conflicts with local governments, and gain the support of the local communities. The agreement states that the provinces cannot charge royalties taxes at a rate higher than 3% of a company's income. This percentage would be fixed every two years by the Ministry of Mining.

President Macri aims to solidify \$25 billion in investment over the next eight years and, though this is more than double the \$10 billion recorded between 2007 and 2015, it is much less than what was invested during that time span in Chile (\$80 billion) and Peru (\$52 billion). If this is achieved, the Argentine Chamber of Mining Companies (CAEM) is expecting an additional 130,000 mining related jobs

by 2021.

With Argentina's mining industry principally developing in tandem with consumer trends of the 21st century, citizens have a very negative connotation in regards to mining's environmental impact, resulting in unfavorable mining restrictions in some provinces. Herein lies the major obstacle to a national accord: mining continues advancing within areas protected by the law of glaciers. In fact, 44 planned projects underway from now until 2024 are for ventures located "near cryogenic bodies." The government is preparing a study concerning zonification and re-interpreting the definition of the periglacial environment to best engineer a more flexible solution. The Ministry of Mining intends that only those glaciers that have a "statistically significant" water contribution be considered as strategic reserves of water resources, and therefore protected after conducting a "water significance study." Some areas that are in potential conflict with the glacier law under conservative interpretation include Altar, Lama-Pascua, Los Azules, el Pachón, Agua Rica, Del Carmen and Constellation. These ventures have projected investments of more than \$16 billion, almost two-thirds of the total investments planned for the next eight years.

Some provinces, such as Chubut, are still firmly resistant against a new federal agreement, however it has already been approved by the Federal Mining Council COFEMIN, which is made up of government representatives from each district. After a final round of negotiations with the provincial governors, the legislation will be sent to Congress.

Important premises within the agreement include "greater benefits for the communities within mining zones" where the mining projects are developed, "greater participation in the revenues to the provinces" and "high

standards of environmental management and control."

The clause concerning community development proposes a program that will enable residents to proactively prepare for the needs of existing and impending mining companies, both in terms of recruitment and contracting services. There is a section concerning local content, but no minimum quotas are established in correspondence with previously established laws of private investment. Provisions are written in a way that pushes for "adopting promotional measures designed to make employers recruit" indigenous workers. Regarding local suppliers, it is established that "in equal conditions, in prices and terms, local entities will have preference."

### Infrastructural Advancements

By nature of extractive industries, the government must also mobilize efforts towards bettering foundational conditions. Argentina has seen little improvement in its infrastructure over the past decade, as previous populist Kirchner Presidents kept public service and energy prices among the lowest in the world during their terms in office. There is little federal money to invest given the current deficit and borrowing costs remain high, which is why President Macri is looking to incentivize the private sector with tax amnesty. There is an expected investment of \$26 billion in infrastructure projects over the coming four years—with merely a small percentage provided by the public sector—including a new nuclear power plant, tunnels through the Andes linking goods to Chile's ports, railway lines and roads in the north, and additional gas pipelines. Macri's Interior Minister, Rogelio Frigerio, announced last year that infrastructure investment must reach at least 6% of GDP for the economy to grow above 4% in the coming years, but the Argentina Chamber of Construction estimates that Frigerio's numbers are unrealistically low. Even still, this would be the government's most ambitious infrastructure plan in history.

One of the grandest projects will be the creation of the international Agua Negra tunnel, connecting western Argentina with Chile. Two parallel tunnels will cross 14 km through the Andes Mountains at the height of 3,800 m above sea level, connecting mining production to the ports of the Pacific. Prior rhetoric of unifying both countries' efforts toward further economic development is now see-

ing fruition with concrete steps such as construction bidding and qualification clearance. Both countries have already obtained funding from the Inter-American Development Bank (IDB), which has pledged \$80 million, and the groundwork will begin at the start of 2018. Dr. Alejandro Sfriso of SRK Consulting Argentina noted that this will be a "challenging and expensive" venture, considering their previous experience with projects of this scale. SRK is responsible for successfully completing the transnational Pascua Lama Tunnel for Barrick Gold, despite the unique technical difficulties that coincide with working at such altitude.

Argentina has also begun renewing the Belgrano Cargo Railway, which links Buenos Aires with northern Argentina. Once completed, the line will ease logistical costs for those operations in Jujuy and Salta, facilitating export via the Atlantic. "Road routes are overpopulated because there are not very many forms of transportation," said Roberto Mikalonis, president of International Cargo. "All industries need safety and lowered prices. Companies compete for trucks and trailers, but trains are optimal."

This project is part of the Argentinian government's \$ 4.4 billion program of investment in the country's rail freight network from now until 2023.

### Powering Projects and Energy Consciousness

The Argentinian mining chamber is tackling growth via energy efficiency. Major international mining companies are focused on technological and product innovation, but industry analysts state there are few examples of companies that have actually bettered energy management and processes to date. YPF, Argentina's most prominent energy company, plans to help fill this gap as well as operate within Argentina's current means by putting systems in place that make efficiency more sustainable. "Of course, there are issues: the mining sector needs energy in remote areas, as well as high-quality providers. YPF is working with CAEM to create an energy committee to discuss new ways of ensuring efficiency along the value chain," explained Federico Veller, industry business manager for YPF.

More than half of mining energy consumption can be attributed to hauling, crushing, grinding and processing, and changing conventional ways of expelling that energy can help reduce consumption, lower production costs and

decrease emissions. Decreasing mining's carbon footprint is a mutually beneficial solution for the producers and Argentina's strong environmental activists attempting to hinder the industry's growth. As of right now, CAEM's principal focus is adopting the Mining Association of Canada's Towards Sustainable Mining (TSM) commitment—which is focused on accountability, transparency and credibility—as a framework for energy and environmental consciousness.

Since oil prices have declined, energy spending, particularly for gold mining, which is one of Argentina's focal minerals, has decreased. Energy intensity, however, (measured in GJ/tonne) has remained the same, signifying a lack of efficiency. A study conducted by Deloitte in 2015 shows that the publicly listed mining companies with the highest returns to their shareholders were the entities that exhibited the lowest energy intensity over the years, and this direct correlation was found across all participants. Optimizing the electricity consumption and renewable energy integration are highly economic in both Argentina and neighboring Chile even at the current prices. CAEM is pushing for these ideas to be adopted by the private sector, while the public sector is occupied with diversifying the energy mix.

In September 2016, the government-sponsored program, RenovAr, was launched in conjunction with plans for the energy matrix to be 4.5% renewable by 2018. The government called for an auction, and the bidders submitted projects for over 1000 MW. To diversify the natural gas dependency, major solar, wind and hydropower projects are pipelined for the coming years. "We are in the process of designing a huge hydropower station in the South of Argentina called the Nestor Kirchner and Jorge Cepernic hydroelectric project, which is one of the biggest hydropower projects in the country," explained Sebastián Risso Patrón, country manager of MWH Argentina. "We expect that our designs will be completed in 2018, and in 2021, the first turbines will be put onto the grid. The total input into the grid will be approximately 8%."

In the past, many contractors operating in Argentina incurred losses due to the financial crisis. To eliminate payment uncertainty, the World Bank has agreed to financially back the projects.

The grander goal, of course, is to increase investor confidence in the country by showcasing the functionality of Argentina's healthier business ecosystem. —



# Federico Veller

Industry Business Manager  
YPF

“

Metal prices are recovering, the government has eliminated export duties, and a new consensus is emerging about mining being a key pillar of development. Of course, there are issues: the mining sector needs energy in remote areas, as well as high-quality providers. YPF is working with CAEM to create a committee of energy efficiency within the Chamber to discuss new ways of ensuring efficiency along the value chain.

”

## How does YPF serve the different industrial segments in Argentina?

The Industry Business segment of YPF breaks down into five subdivisions: mining, oil and gas, aviation, transportation and general industries, which include other smaller segments like cement and food and beverage. We have a tailored offering for each of them and a goal to provide solutions that improve efficiency across the value chain. This means minimizing downtime, saving fuel usage and providing advice on the best maintenance strategies.

Looking at the big picture, we believe that the country's development will have three main pillars: oil and gas, mining and agriculture. Argentina currently produces 100 million mt of grains, with capacity to double this figure in the coming years. In terms of oil and gas, YPF produces 40% of the country's crude oil, and with that experience we created a business area to serve the oil and gas industry. Finally, Argentina also offers an excellent growth potential in mining. As these three industries develop, they will have a positive knock-on effect on other economic segments, such as land and air transportation and infrastructure development.

## Could you outline your value proposition for the mining sector?

We have a history of 15 years working with the mining industry in Argentina, our greatest experience being our relationship with the Veladero mine. We started with fuel supply and then we added other services. We have great expertise in logistics management, so we started to handle the transportation of Veladero's fuel, relocating the supply to a site at 4,000 meters above sea level. Then, five years ago, we joined the select group of providers that work right at the mine. Today, there are YPF personnel ensuring the highest levels of efficiency in the usage of fuel and lubricants at the operation. We run Veladero's three fuel plants, we operate the lube trucks, we monitor the performance of the lubricants and we undertake maintenance activities. All of these initiatives translate into more gold ounces at the end of the process.

We have developed this same model at Yamana's Gualcamayo and we are working at similar developments in Patagonia for other clients. Thanks to our experience in San Juan, we now have mining distribution centers in Salta and Santa Cruz as well.

## What particular challenges do mining operators have in terms of fuel efficiency?

We have actually developed a specific type of fuel to operate at high altitude. It does not freeze at temperatures as extreme as minus 30 degrees Celsius. The same applies to specialty lubricants.

On an operational level, if you do not seal the tanks properly and you have dust mixing with the product, you have serious issues. This actually happens in world-class mining companies, because their focus is not handling the fuel, but producing minerals. In this context, we can provide the right technology and advice to operate the tanks efficiently. Moreover, planning is key: when you have 2,000 people working at high altitude, fuel is needed not only for the operation, but also for the camp. If you have a climatic occurrence, it is essential to have contingency storage locations, especially considering that mining fuel is not the one you can find at any gas station.

## How do you expect the industry to grow and what general obstacles do you see facing the sector?

CAEM estimates that mining will see investments worth \$20 billion until 2021. Metal prices are recovering, the government has eliminated export duties, and a new consensus is emerging about mining being a key pillar of development. Of course, there are issues: the mining sector needs energy in remote areas, as well as high-quality providers. YPF is working with CAEM to create a committee of energy efficiency within the Chamber to discuss new ways of ensuring efficiency along the value chain. Argentina has a long way to go in terms of its transportation infrastructure. The country's rail infrastructure, for instance, is not very well kept, and as a result is being underused. This affects not only the mining sector but the other industries as well. —

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# Julio Ríos Gómez

President  
SEGEMAR

14

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In previous years we had a combination of low commodity prices and bad government policies. Lindero, for instance, was a project that ran out of financing when Argentina entered technical default, because the investors did not want to risk their money under those circumstances. That was corrected, and all of a sudden there was a company with Peruvian and British investors, Fortuna Silver, that decided to acquire the project. This was a big boost of confidence for Argentina's mining industry.

”

## What are the main goals of SEGEMAR under the new administration?

When the Macri government came into office, the new team eliminated the barriers that had been in place which made doing business more difficult, such as the limitation to send foreign currency abroad, the exchange rate “clamp” and the impossibility to import the necessary mining equipment, including for exploration. Argentina is a relatively new country in the mining segment, surrounded by jurisdictions with a strong history in the business, so we had to make Argentina competitive again. My role as head of SEGEMAR is to restore the reputation of this institution as a leader in South America in terms of geological mapping and digital cartographic surveying of the different regions of the country. Our work results in many different products of interest for the development of mining and infrastructure projects. Over the last years, SEGEMAR had also incorporated the environmental data and the geological risk data—including volcanic, flood and landslide risks—and we also have a geothermal department, so the scope of our work is very large. For that, we have to modernize an institution consisting of 450 employees. While Argentina has always had good geological information available (much more than Brazil, for instance), today we are reevaluating all the information we have in different databases to make it all available online, in real time.

## You chaired the Exploration Association (GEMERA) for several years. Is exploration picking up again in the country?

In 2011, Argentina had 1.1 million meters drilled in the country, and after that, all of a sudden, there was no data from the government, because there was a dramatic fall in investment. Also, it needs to be said that nearly 70% of those meters drilled were devoted to brownfield activities, so there was only 350,000 meters of pure greenfield exploration.

In previous years we had a combination of low commodity prices and bad government policies. Lindero, for instance, was a project that ran out of financing when Ar-

gentina entered technical default, because the investors did not want to risk their money under those circumstances. That was corrected, and all of a sudden there was a company with Peruvian and British investors, Fortuna Silver, that decided to acquire the project. This was a big boost of confidence for Argentina's mining industry. Recently, we also had the process for Andacollo, where an Australian company committed to invest \$150 million. In San Juan, a project like Los Azules is being reactivated, as well as the Constellation project by NGEX. All this means investment for the first part of 2017. Equally, in the south of the country there are companies that are going to restart their exploration activities, such as Patagonia Gold. Goldcorp, who had stopped their exploration six years ago, is going to explore again. First Quantum is also working in Taca Taca in Salta, and there are other projects in the pipeline. All this is going to boost the levels of investment, and for 2017 we also expect to have more new companies doing work in the country.

## Lithium is seeing great interest from investors worldwide. Is SEGEMAR involved in lithium studies?

SEGEMAR did not participate in lithium exploration and this was a big mistake. Private companies did a great job exploring for lithium resources. As SEGEMAR we also need to work on this segment. We are late, so we need to talk to the companies involved to obtain all the data that is not confidential.

Secondly, we need to undertake an exploration program to evaluate all the salars in Argentina, not just those in the plateau. Salars do not only have lithium, but also magnesium, sodium, potassium and other elements. Furthermore, we also need to work on how we can produce lithium by-products other than lithium carbonate, such as lithium hydroxide or even metallic lithium. The use of lithium for car batteries will be very limited, so we need to explore other applications, such as the production of energy accumulators for intermittent renewable energy plants. —



## CHAPTER 2

# SALTA

"Salta is favored because it is a reliable province to do mining. That is the result of a mining policy that this and previous governments had. That policy is going to continue because it is established within our Provincial Constitution."

- Lic. Ricardo José Salas,  
Secretary of Mines Salta

# Mike Parker & Jorge Benavides Kolind-Hansen

MP: General Manager Projects Latin America

JBKH: Manager Corporate Affairs

## FIRST QUANTUM MINERALS



MP



JBKH

### Could you provide an overview about First Quantum's operations?

MP: We have two big advanced exploration projects in Latin America: Haquira in Peru and Taca Taca in Argentina. Both are copper, molybdenum and gold projects. Taca Taca can produce between 200,000 and 250,000 mt/y of copper. We are working on the Environmental Impact Assessment and, once we obtain the approvals hopefully in 2018, we can evaluate a construction decision on which project is more appropriate to go ahead first.

### How did you decide to enter Argentina with the Taca Taca acquisition?

MP: Taca Taca is a very good project with a large resource base. It offers a scale that we understand, very similar to Cobre Panama and Haquira. Salta has always been pro-investment and they are promoting mining now. Infrastructure is surprisingly good.

JBKH: The project is located on barren land where it is impossible to develop any economic activity other than tourism in some specific areas, so mining offers a great opportunity for development. Another advantage is the existing railway line that goes next to the project and down to the port of Mejillones, in Antofagasta, Chile. Exporting the copper concentrates through Chile would be a straightforward process.

### What is your opinion of the changes implemented by the Macri administration at a federal level?

MP: There was a series of things that made Argentina very uncompetitive in terms of world mining investments. In just one year, they have caught up a lot. An issue that needs to be addressed now is that in Argentina the tax regime is quite burdensome for companies with low profitability. It would be better to have a system like the ones in Chile and Peru, which tax proportionally higher when profits are higher. —

# Jorge Ganoza

President and CEO

## FORTUNA SILVER MINES



### How does the Lindero acquisition fit into Fortuna Silver's company strategy?

The acquisition of another project was something we had been planning for several years, because we saw we were reaching the limits of organic growth. We evaluated projects in different countries, and finally we closed the acquisition of Lindero in Argentina mid-2016. Back in 2010, the project caught our attention but we decided not to enter Argentina due to the political situation. The final transaction was C\$129 million, which was paid with Fortuna Silver shares.

### How advanced is the Lindero project?

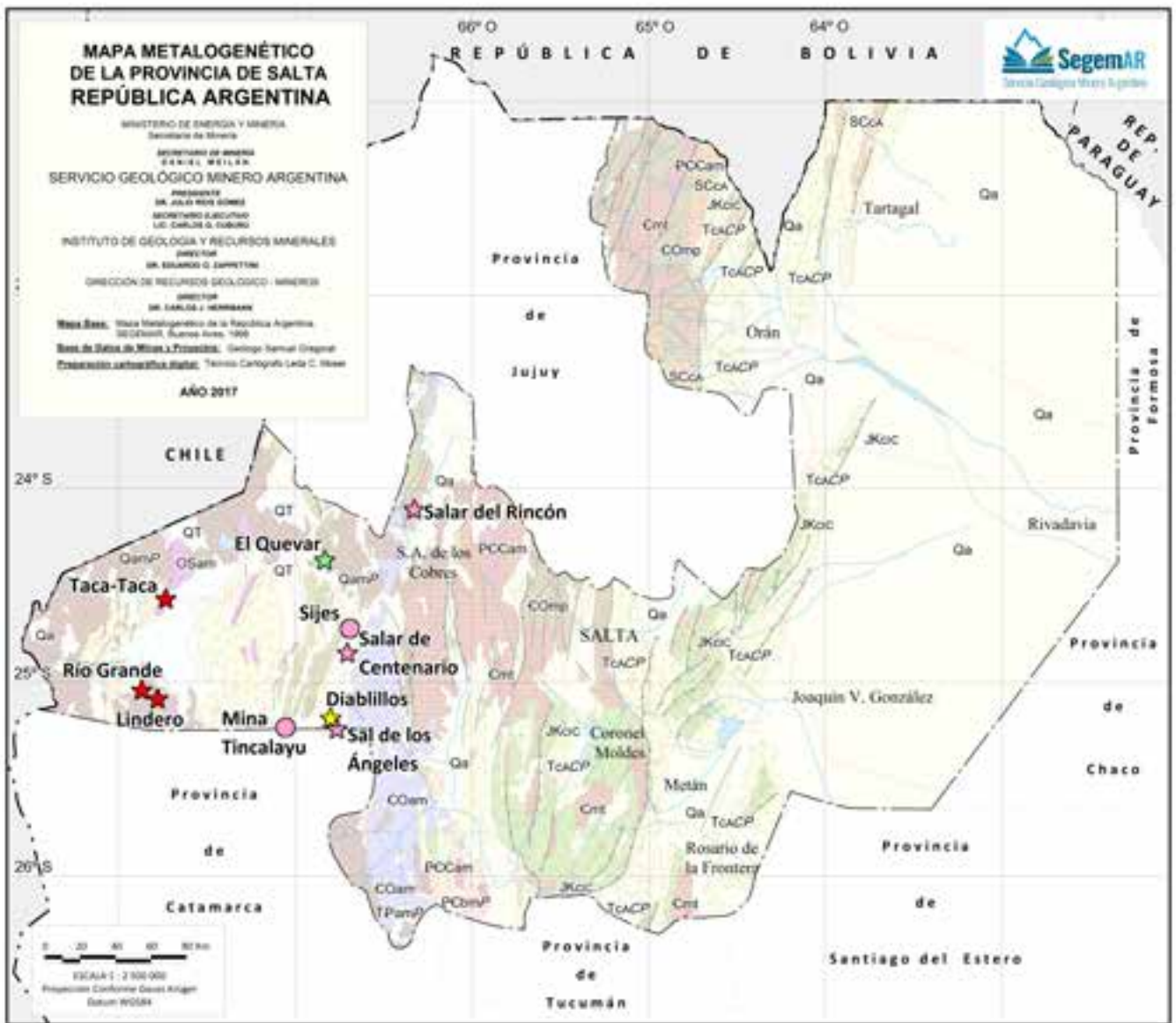
Lindero is an open pit, heap leach gold project with a completed 2016 feasibility study that had been granted all environmental and other major permits necessary for development prior to our acquisition.

This study includes around 2 million oz of gold in resources and estimated production figures ranging from 100,000 to 140,000 oz/y gold (LOM production [years 1-9] = 108 koz Au @ LOM AISC = US\$715/oz Au) for 12 years (reserve life). We are now revising that feasibility study, as we identified certain risk areas during the due diligence process, especially on the metallurgical processing side. Our aim is to make a construction decision in Q2 2017 / and mine commissioning expected in H2 2018.

### Argentina's mining legislation is very different depending on the province. How is Salta treating you?

We like Salta very much. From our perspective, there was no better province to start working in Argentina. Salta authorities have a very consistent dialogue and they support that in their actions. —





**PRINCIPALES PROYECTOS MINEROS**

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- OSam. Arco Magmático (Puna Occidental). Ordovícico-Silúrico
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- CComp. Margen Pasivo. Cámbrico-Ordovícico
- Cmt. Margen Transicional (Pasivo hasta Activo) Cámbrico
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- PCbmP. Basamento Metamórfico. Proterozoico



## Ricardo José Salas

Secretary of Mines  
**SALTA**

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Our policies concerning international investment will not change any time soon because the system we currently have in place works extremely well. Due to the judicial system we have in place in Salta, business does not depend on executive power, but judicial power. This is something that gives peace of mind to investors. We are going to strengthen the sector because businesses that come to Salta know they will follow these established norms of doing business.

”

### Can you give a brief overview of Salta's business environment?

We believe that public entities should generate business rather than enter into it and make sure that, over time, more investment is brought into the sector. We draw up legislation, present it to interested parties, evaluate the conditions of business, and then assign an investigation zone. All of this is done under the umbrella of the mining code. Then an investment process for exploration happens immediately, and then companies have two years to go through the process.

### One attractive characteristic of Salta is its legal and political stability. How do you see policies concerning incoming investment changing in the near future?

Our policies concerning international investment will not change any time soon because the system we currently have in place works extremely well. Due to the judicial system we have in place in Salta, business does not depend on executive power, but judicial power. This is something that gives peace of mind to investors. We are going to strengthen the sector because businesses that come to Salta know they will follow these established norms of doing business.

### Historically speaking, have any mining accidents occurred in Salta?

There have been some machinery failures, but we act immediately so there is no severe risk at the mine. We provide training courses in several areas so people are not at risk and know what norms should be applied and how to fix any problem which may arise. People need to recognize that if there is an accident, they need to be prepared to report it.

### What would you say to other provinces that are closing their doors to the mining industry?

The mining industry is directed by the federal mining code. I would respect their position, but I do not think it follows the federal law, due to the fact that a province prohibiting mining is essentially changing federal policies. If the province wants to protect a certain area for tourism, that is respected, but an activity should not be generally prohibited. Industries need to strive to take care of the resources that each activity needs.

### It has been said that investors in the mining industry need infrastructure first then investment will grow. What plans are in place to make this better?

Salta has plans to establish a solar plant which will generate 100 megawatts. Additionally, we are making plans to pave Route 51 which is an important point of growth that will help various industries.

### What are your expectations for exploration in Salta in the upcoming years?

We expect a strong uptake in exploration activities in the coming year. We need to drill quite a lot to obtain more data to see what the focus of investment will be and how long it will last. There are companies drilling, and by next year we will know which projects can start.

### Do you have high expectations for the evolution of all of this activity in the coming year?

Very high. Businesses are moving and asking for information. We just need to solidify projects so they can start producing and have companies feel comfortable with every link in the supply chain. We are working with other departments of the government to ensure that mining businesses can operate as smoothly as possible. From the very early stages, we will be able to take a census and use that information to see how we can help communities, especially those in remote areas. Sensationalism is useless, but training is necessary to have in case of an emergency, and it helps them in their wellbeing, as training cannot be taken away.

### Can you provide a final message for our readers?

Argentina is friendly to businesses' needs. Salta is no exception. It has judicial power in the mining concession to realize investments without delays. It also has the authority of the Secretary of Mining, who gives businesses concessions and ensures that they follow environmental standards. This makes the image of both businesses and Salta stronger. We are not protagonists, but a public entity. We need to make sure environmental care is taken into account and that companies respect the regulations we have adopted. —

# Salta

## Argentina's Most Mining Friendly Province

Salta is continually highly ranked by the Fraiser Institute as the top mining destination within Argentina, and 2017 is expected to be no different. Salta is already littered with mining investments, and interest from foreign investors is growing due to its significant geological potential and extractive friendly government. According to the Salta Mining Secretary, Ricardo Salas, the province expects to receive a total of \$5.720 million in the coming years due to the reactivation of Taca Taca, Lindero, and Salar del Rincón among other mining projects. The active mining concessions within Salta cover 29,000 square kilometers of the territory, which represents 19% of the province's total land, and 35% of the available mining area, which is 85,000 square kilometers. Fortuna Silver's newest acquisition, the Lindero gold project, is igniting positivity into the local value chain. Their aim is to com-

mence construction in 2017 and begin production in 2018. "From 2017 on, there will be a lot of mining movement," explained Adolfo Mimessi, general manager of INCOVI, a heavy equipment provider in Salta. "Almost every 15 to 20 days, people come in from abroad to discuss projects, which is an incredibly positive sign of what is to come."

Lindero will be the first metals mine in operation in the province. "We feel that it was a smart move to enter Argentina early," noted Jorge Ganoza, president and CEO of Fortuna Silver Mines. "We took our decision to buy Lindero in February 2016, when Macri had barely been in government for three months. At the end of the day, it is a risk trade-off: some investors tell me that Argentina's recent history has been very volatile, and I cannot convince them that this is not the case, but Macri is moving in the right direction."

This gold project is expected to begin producing at 105,000 oz/y within the first few years.

The Taca Taca project, carried out by First Quantum, is still completing its baseline analyses, including its environmental, power generation and water availability studies. "First Quantum's colossal Taca Taca copper project is bringing \$5 billion in investment and requires three or four years of construction in an environment of legal security and long-term stability," explained Facundo Huidobro, president of the Salta Chamber of Mines. "The political idea of mining in Salta is that mining activities should be private. The government is not to be involved directly in the business of a private company," he continued, which is why many mining

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projects within his province are soon to come online.

Taca Taca is predicted to produce 244,000 metric tonnes per year (mt/y) of copper concentrate, 110,000 ounces per year (oz/y) of gold and 4,100 mt/y of molybdenum.

Aside from these major projects, more investment dollars are expected considering the differentially favorable regulatory environment that Salta offers. "Salta is favored because it is a reliable province to do mining," said Ricardo Salas, Salta's mining secretary. "That is the result of a mining policy that this and previous governments had. That policy is going to continue because it is established within our Provincial Constitution."

Some have even expressed their hope that the federal mining code will better align itself with the way Salta does business.

"Regulus Resources has projects in three provinces of Argentina: Catamarca, Salta and Jujuy. However, we are mainly focused on Salta, and it is a great province to be working in considering the local government has been supportive throughout the entire process," explained Javier Robeto, country manager of Regulus Resources Argentina.

Regulus, like many other mining entities, had problems with some of the federal government's decisions. "Now the provincial strategy aligns with the federal perspective, and this is certainly more favorable," stated Robeto.

"The permitting process in Salta is efficient, and my understanding is that it is better than other provinces in Argentina – upon completing all necessary aspects from the start, companies know what to expect," said Rafael Argañaraz Olivero,

partner at Argañaraz&Asociados, a local Salteño law firm.

Expatriates seem to agree, but there is a common consensus that there is room for improvement to reach a sturdier level when making a global comparison. Salta differs from its neighbor Jujuy, which operates via an administrative judge appointed by the ruling party. "This can create some uncertainty into the permitting process, because decisions can be dependent on political will," stated Agustín Frezze Durand, partner at Estudio Perez Alsina-Frezze Durand.

Salta has historically stood out as a global borates distributor—Orocobre's Borax Argentina sits on some of the largest borate reserves in the world—but today the province is preparing itself to fulfil the world's demand for lithium. Many lithium projects are advancing in their brine studies, and all companies are focused on maximizing volume. The local government is expecting over a billion dollars in lithium investments; Secretary Salas says that there has been a significant uptake in lithium information requests over the past year, and currently all 18 salars that exist as mining concessions are taken. There is every type and size of company working in lithium in Salta, and some would argue that any small or medium sized company trying to get involved at this point is too late. Juniors are now being bought out by larger corporations. According to local expert and professor Ricardo Alonso, the Altiplano-Puna Volcanic complex is underlain by an extensive magma chamber four to eight kilometers below the surface. "It seems likely that this could be the ultimate source of the anomalously high values of lithium in the area," Alonso proposed.

Argentina is situated within the lithium triangle, a geographic zone that encompasses northern Argentina, northern Chile and southern Bolivia, constituting 65% of the world's total lithium reserves. Argentina alone accounts for almost 10% of that total, and the demand hype for this soft silver-white metal has refocused the world's

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attention towards investing in greenfield projects and bringing more lithium operations online. Uncertainty about true demand, however, makes creating price margins difficult.

“There is constant discussion amongst market analysts over whether the market will become oversupplied or whether the shortage will remain for the next five to 10 years. I am more inclined to believe the latter, because from exploration it takes roughly three years to get substantial amounts of new production into the market,” noted a representative from Galaxy Resources.

“Argentina can become one of the top largest lithium producers in the world in five years’ time, with 120,000 to 140,000 mt/y. This way we could account for more than a third of the world’s lithium production. However, a plant producing batteries may only need 400 mt/y, so thinking of the value chain is important... We are working with investors on how to develop opportunities in this respect,” said Daniel Meilán, Argentina’s Mining Secretary. Conservative linear projections state that the world will need about 350,000 mt/y by 2020. By that benchmark, Argentina is hoping to be producing 140,000 mt/y given the rough estimates given by the Puna region’s main lithium players—including Orocobre, FMC, Enirgi Group, Eramine, International Lithium, SQM and Lithium Americas’ investment in Minera Exar, Millennial Lithium, Lithium-X, Neolithium and Galaxy Resources. “The market is very tight, and this is an advantage. Prices are very high, and I anticipate them to stay high for some years,” said Iain Scarr, vice president of development and exploration for Millennial Lithium.

Scarr has worked with a handful of the world’s most prominent mining players across metals and minerals, including Rio Tinto, Lithium One, Galaxy Resources, and Enirgi Group. Finding and maintaining turnkey talent is critical in Argentina, as the already young mining country has even less of a specialization in the complexities of lithium chemistry and engineering. Knowledge development is equally critical in the public sector, and there are continual talks of regulatory amendments being added to provincial codes that cater to the needs of liquid brine management. Nothing has solidified, and most are not confident anything definitive will be presented in the short term.

Scarr’s accumulation of experiences has brought him to spearhead Millennial Lithium’s Pastos Grandes project, where he is pushing to initiate production within three and a half years. “After the initial drilling phase at Pastos Grandes we will move immediately into developing other strategic projects. Our ambition is to introduce a sensible amount of product into the market that matches global growth, and multiple operating sites in order to maintain flexibility. We need to do it quickly using existing technologies, at least at first,” added Scarr.

PLASA, comprised equally of Lithium-X and Aberdeen, has managed to capture 99% of the highly prospective Salar de Diablillos located in the south of Salta. They are soon to publish a

feasibility study and complete further drilling to collect the final missing informational pieces. “We had a couple of rough years when there was not much mining activity, forcing the sale of properties to stay alive. Now there is much more money available for an advanced project like ours and we are now incredibly busy again,” stated Jesse Randall, country manager of PLASA.

Their salary is fairly small, and as they strategize production costs, the aim is to produce 2,500 mt Li carbonate equivalent (LCE) in concentrated brine from a pilot plant. “Most new companies report back to Canada on an area basis, which is not really an accurate assessment of advantage,” said Randall. “It is important to take into account the salar’s depth, and who owns the rest of the shared area.”

The Canadian company Enirgi Group is one of many trying to make themselves the next big producer in the international market. Enirgi Group announced the construction of the world’s largest (500,000 mt/y) lithium carbonate processing plant to be built in their Salar del Rincón. While many are utilizing the traditional solar pond evaporation method, Enirgi Group is testing pilot plants with entirely alternative processes. “Along with studying and understanding our resource we created solutions to handle

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Image courtesy of Millennial Lithium



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and measure the lithium within the complex brine,” said Carlos Galli, operations manager of Enirgi Group Argentina. “The newly implemented technologies allow us to obtain the lithium product directly from the brine, without the need of evaporation systems in the main line of lithium production.”

### Salar del Rincon

This new means of processing separates the lithium ion from the brine at an earlier stage, precipitating a higher quality product with less contaminants involved in their solutions. The needed chemicals involved in this system are also minimized, as the production process creates its own reagents. A principal downside to this shift in methodology is the high quantity of energy required. “It is important to come in to every situation with an open mind and an analysis of what is best with the available resources,” justified Anthony Kovacs, chief operations officer of International Lithium. “In this case, we are aiming to concentrate our brine through the natural solar energy process.”

International Lithium Corp has pledged a \$300 million investment in the Mariana project and holds a strategic partnership with Ganfeng Lithium, a vertically integrated lithium product producer that is keen on supplying to the Chinese market, whose government is making bold moves towards normalizing electric vehicles. The World Bank estimates that air pollution is costing China close to \$300 billion annually when calculating health bills and productivity loss. Their government has a target of 5 million “new-

Image courtesy of International Lithium



energy” vehicles on its roads by 2020 and cut electric car charging station rates by 30%.

Combined efforts achieved by consumers and the government have increased electric car purchases in this country alone by 300% from 2014 to 2015. With these numbers in mind, it is easier to understand the drastic spike in lithium prices on the market. Many analysts are surprised at the price held throughout 2016 as it stabilizes towards a new normal. Though there are lithium projects with impending start-up dates, no one is predicting a drop in price.

Secretary Salas believes that investors should be thinking beyond the applications of lithium that are most commonly talked about in the media. “It is not a minor topic, as it will not only be the automotive industry looking our way, but also the renewable energy sector. Medical and other applications are other contributors,” said Salas.

Encouraging lithium investment has a great economic impact as it is produced with added value; this means that through the extended manufacturing process lithium carbonate creates value that remains in the province and in the country.

Not only is beneficiation a geographically contained economic stimulant, but in the case of lithium it is a necessary challenge. “Many of the new lithium companies will need to refine their concentrates to a saleable lithium product (like lithium carbonate or lithium hydroxide for example in the case of batteries) in order to sell to a manufacturer, resulting in higher CAPEX and a more complicated mining/processing scenario,” explained Kovacs. “Furthermore, to determine feasibility, they will be required to conduct market studies, which may become outdated by the time they reach a production decision. Regardless they will need to secure off-take agreements with manufacturers like Ganfeng. All of these issues will affect their profitability and they will be subjected to global price swings in the lithium marketplace for their specific product.”

Companies with the greatest comprehension of their brines, swiftly realistic production schedules, and the most connected means to the market are likely the ones to prevail.

### Other projects in the Puna

Diablillos, Silver Standard completed the exploratory phases with drilling on which reserves were estimated for 88,451,000 ounces of silver and 747,000 ounces of gold. In El Quévar, a silver-lead project, Silex Argentina carried out similar studies that yielded silver reserves for 60 million oz.

### Infrastructure

Roads and railways throughout the Puna region have been less than favorable for many years. Federal Route 51, an indispensable asset for supply and production, only had 14 kilometers

paved during all of 2015. Out of the 100 kilometers of total paved road in the province, 30 km were swept away when the Rio Toro flooded. Additionally, the C-14 tracks prevent rail flow with Northern Chile due to a lack of safety conditions, making rail shipment possibilities unfeasible. The Northwestern Belgrano Plan was announced containing three stages of railway development for cargo:

*The first - 530 kilometers in Santa Fe, Chaco and Santiago del Estero.*

*The second - 354 kilometers in Santa Fe and Salta.*

*The third - of 623 kilometers in Santa Fe, Salta, Tucumán and Jujuy.*

There is also a new mega-pipeline project taking form in the north, which will greatly impact the productivity of the area. “We need better infrastructure because we are growing at very fast rates,” stated Huidobro.

“Our mining sites are in remote locations in the Puna region and connected by road to natural ports in Chile and northern Argentina. These roads will require upgrading given the new projects that have started in the area. The gas pipeline for Tincalayu is also being built which will improve our cost of operations.” Ivan Gomez Marquez, general manager, Orocobre’s Borax Argentina. —

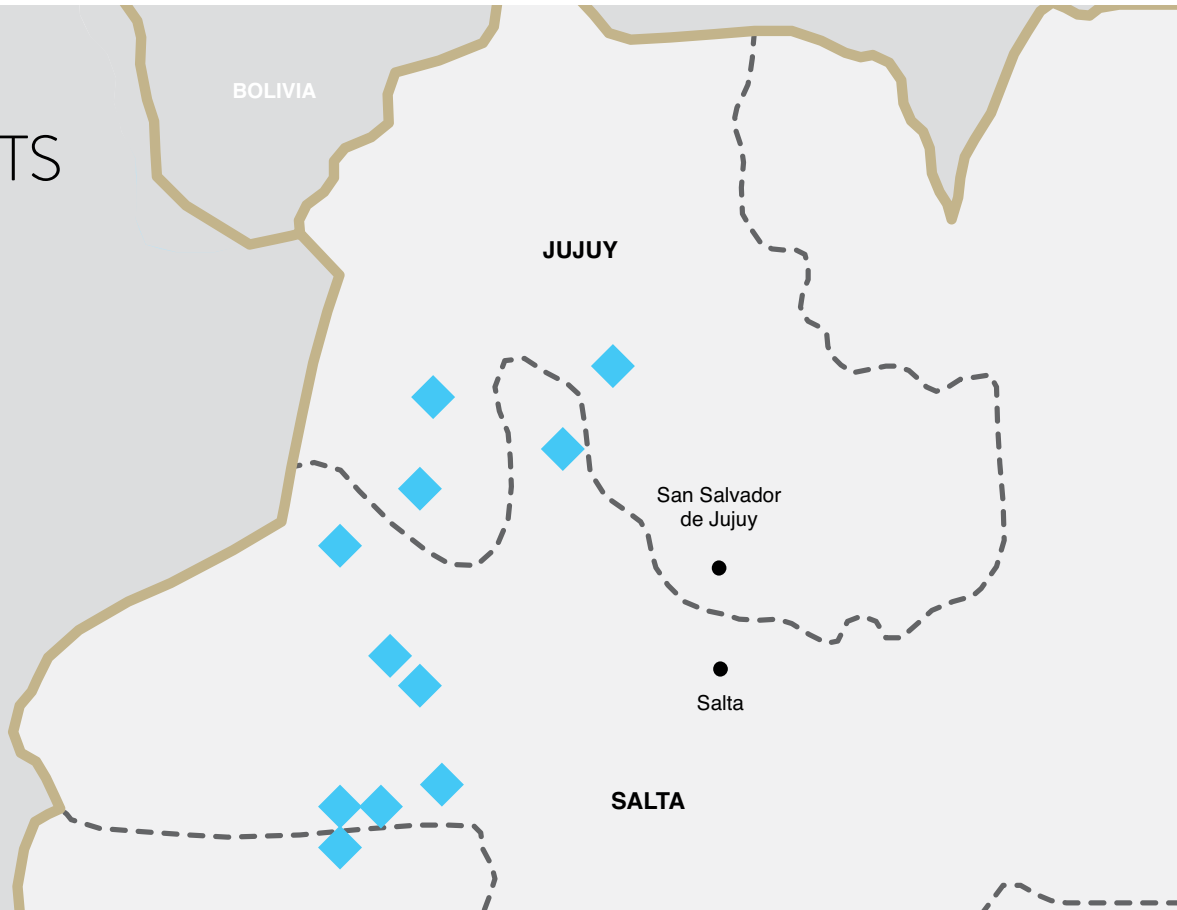


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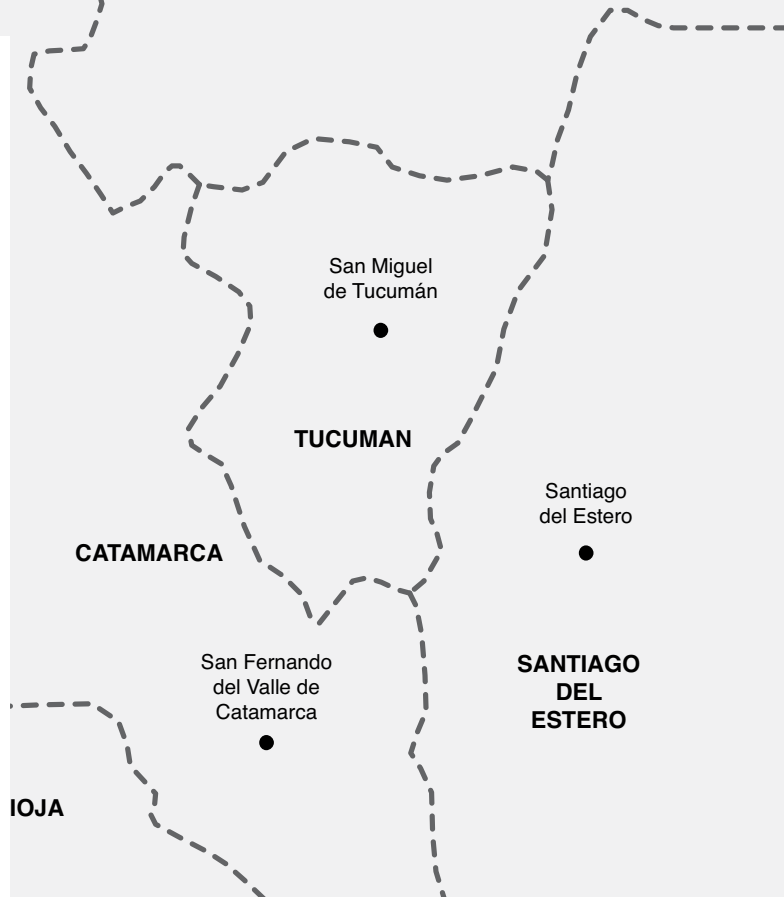
# ◆ LITHIUM PROJECTS



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# Willem Fuchter & Eugenio Ponte

Managing Directors  
**ABRAPLATA RESOURCE CORP.**



**Please provide a brief background concerning AbraPlata?**

AbraPlata Resource Corp is an Argentine-Canadian company listed on the Toronto Venture Exchange, and was specifically set-up to take advantage of the improving economic and political environment in Argentina since the change of Administration in December 2015. The company was set-up with capital from Argentina, Australia, Canada, and the US, and is the resulting issuer from the RTO of Angel Bioventures by Huayra Minerals. These assets comprised the Cerro Amarillo project in Mendoza and the Samenta project in Salta. Huayra subsequently acquired Silver Standard Resources' Diablillos project in Salta in 2016 as well as the Aguas Perdidas project in Chubut province. In late 2016, Huayra and Angel signed a merger agreement and proceeded with the process of having the merger approved by the TSX-V.

An Argentine-Canadian company has distinct competitive advantages over foreign-owned mining companies, particularly in view of the prevalence of "resource nationalism" in Argentina. The "junior mining" model needs to make considerable adjustments to gain national and local community acceptance.

**What was the rationale behind your strategic provincial choices within Argentina?**

First of all, Argentina is in the early stages of a new political cycle with an administration that has rapidly moved to make the country more business friendly and integrated with the global economy. Secondly, the mineral endowment of Argentina is not in doubt, and the first generation of mines, which were developed from the 1990s on-

wards, are being followed by a number of advanced projects which resulted from exploration over the last 20 years. Finally, the mining industry is recovering after a long down turn and investors seem to have renewed, albeit cautious, enthusiasm for the sector.

**What are the next steps, and within what timeline is AbraPlata operating?**

The company is concentrating on Diablillos in Salta. A short drilling campaign will be initiated in April 2017 in order to fix the parameters for the updating of the Preliminary Economic Assessment.

At the same time, AbraPlata is looking for partners to help with the further development of the two porphyry projects, Cerro Amarillo and Samenta. Later in 2017, the company will start on a drilling campaign at Aguas Perdidas.

In addition, AbraPlata is looking at a number of acquisition opportunities.

**How would you assess the infrastructural strength of your operating environment?**

Diablillos is located in a rapidly developing mineral district in northwestern Argentina that includes TacaTaca (First Quantum), Lindero and Arizaro (Fortuna), Rio Grande (Regulus), and Samenta (AbraPlata). The area is accessible by good roads and a serviceable airstrip. Sufficient subterranean water is available on and near to the project. A natural gas pipeline is located 34 km from project. There is a railway station at Pocitos on the currently abandoned line between Salta and the Chilean port of Antofagasta. The few local communities that reside in the Argentine "puna" (altiplano) have a long tradition of working in mining and provide a ready source of labour. —



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# Insights to Lithium Investment in Salta

“Now, with the lithium hype, we are considering various opportunities. I am also interested in Jujuy and Catamarca, but Salta is the right place to be at the moment. In particular, its provincial government is much more transparent and investing here is much easier.”

- Jesse Randall, Country Manager, P.L.A.S.A. Lithium-X

“Once the lithium market began to ignite we immediately looked at Argentina as the place to be.”

- Graham Harris, Director, Millennial Lithium

“Pastos Grandes is strategically located within the Argentine portion of the "Lithium Triangle", which is the host to a large part of the world's lithium resources. We have already begun drilling, as our project has developed quickly with the help of the local authorities, and we have better results than anticipated.”

- Ian Scarr, Vice President of Development & Exploration, Millennial Lithium

“Our process is to use natural solar energy to concentrate the brine. If we are not further refining the brine then we should be able to operate utilizing a small solar power plant. International Lithium is investigating the best solution for a fully “green” mining situation.”

- Anthony Kovacs, Operational Team at International Lithium Corp.

“Argentina has a huge lithium potential as a great deal of lithium brines are in Argentina, Bolivia, and Chile. The challenge is that, to avoid the speculation raised by the recent booming in the lithium market, you have to find knowledgeable companies or investors to actually develop a project. We would like to be involved in some other lithium projects, but we will aim to engage experienced companies and people which have knowledge of the lithium business.”

- Hernan Miguel Zaballa, Partner, Zaballa Carchio Abogados

“We also need to work on how we can produce lithium by-products other than lithium carbonate, such as lithium hydroxide or even metallic lithium. The use of lithium for car batteries will be very limited, so we need to explore other applications, such as the production of energy accumulators for intermittent renewable energy plants.”

- Julio Ríos Gómez, President, SEGEMAR

“For the next three to four years, prices are going to be higher and once there is more production the price will stabilize. China is going to start producing two million electric cars with lithium batteries by 2020. Lithium is a good business in the long term.”

- Diego Pestaña,  
President AGV Group

“Right now, we are conducting environmental work for a large lithium project in Puna, which is proving to be a very strong venture.”

- Lic. Fernando Valdovino, General Manager,  
Estudios y Servicios Ambientales SRL (EySA)

“Argentina is a land of opportunity. Now is the time to invest and establish here especially with the movement that is being seen in lithium and the exploration in the south. Inflation will calm, and the industry is better now than in the past. There are great expectations.”

- Marcelo Tejada, General Manager,  
Alex Stewart Argentina S.A.

“Argentina has the resources required to meet any increase in global demand and SRK is currently involved in assisting a variety of lithium projects which are in a number of different stages—one of which exported its first lithium a few months ago.”

- Alejo O. Sfriso, Managing Director & Principal Geotechnics Consultant, SRK Consulting Argentina



# Facundo Huidobro

President

**SALTA MINING CHAMBER  
(CMS)**

“

Salta is preparing for a completely new era in terms of mining. While this province has always been pro-mining from the start, there have been problems with laws that put barriers on mining activity.

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## Can you give a brief overview of the mining environment in Salta?

Salta is preparing for a completely new era in terms of mining. While this province has always been pro-mining from the start, there have been problems with laws that put barriers on mining activity. Before Macri was elected in December, Argentina was the country with the highest tax rates in Latin America. Naturally, this was an issue that affected mines and exploration. In the last five years, Salta did not have enough exploration activity going on—with the exception of lithium mining encouraged by rising international prices—and we are paying for that now because investors are looking for projects that are more advanced, and therefore we have a gap in terms of exploration activity.

When it comes to Linderó, we have a strong gold project with good numbers, which will begin construction soon and in a very environmentally sound place. A construction decision will be definitively determined in Q2 of 2017, based on corporate decision makers. The reason we could not advance to the construction stage sooner was because of a lack of investors. However, once complete, it will be the first metallic gold mine in Salta, which is important for our economy.

We have a strong mining chamber in Salta because it facilitates relationships between the national government and the mining companies, and additionally the chamber is also connected with its provincial mining chamber counterparts (CAPEMISA) and relevant mining unions. Salta also has an effective justice system which is efficient and transparent and puts people at ease when working with them.

## With your new role as president of the chamber, what are your goals as to how you hope to see this sector start developing?

Having transparency with communities, the government, and stakeholders is my goal. This comes through communication. I will try to attain this for all companies—with companies that are just now starting and those working on advanced projects.

## Are a variety of different international

## companies interested in working with the chamber?

Yes, because they see how we work. Being a member means you have a good relationship with the government and that you have direct connections in case of problems. We also share the cost of community relations, which is not cheap. They collaborate by dividing up money and time according to the capacities of the individual companies. We work in education, infrastructure, health and safety, and learn a lot from each other. We also work together to find good providers and recommend companies.

## What is your assessment on the lithium situation and who the new wave of investors will be?

Lately, there has been a lot of interest in lithium in Argentina and especially in Salta. We know that in Chile lithium is a strategic mineral with a special disposition. We hear that the Chilean State, through CODELCO or ENAMI, are interested on working in lithium. There is a desire to bring up stocks in companies to make quick money. That has been a problem for both Salta and the market. It has made properties with lithium very expensive, but over time it should stabilize. The government has been forcing people with lithium properties to work them, but if you do not have enough investment to work, you could lose the property.

## In your opinion, which laws most effectively encourage investment in Salta?

This question touches upon investments, but also the concepts of maintenance and environmental impact. It is not easy to maintain a property in Salta. If people do not keep up with their reports, they lose their properties immediately. This is slower in other provinces. Salta has a website where you can see property status live, which has been developed in the past two years. The government's goal is the same goal as ours—transparency. This tool will help.

We have a need to better infrastructure to make Salta even more efficient. The government is working on this so it is not a problem for investors. Infrastructure comes first, and projects are created as a result. We need better infrastructure because we are growing at very fast rates. —

# Jerko Zuvela

Managing Director

**ARGOSY MINERALS LTD**



28

**Fast-Tracking Development  
in the World's Most Prolific Lithium Region**

Argosy Minerals Ltd (ASX:AGY) is focused on its flagship Rincon Lithium Project in Argentina - with a fast-track development strategy toward production of LCE product. Argosy is committed to building a sustainable lithium production Company, highly leveraged to the forecast growth in the lithium-ion battery sector.

**Contact:** Jerko Zuvela - Managing Director  
**Tel:** +61 8 9226 4500 **Email:** admin@argosyminerals.com.au  
**Website:** www.argosyminerals.com.au

## **What was the strategy that led Argosy Minerals to focus its operations on lithium in South America, and how does the company intend to fund its project there?**

Up until about 15 months ago, it was difficult in the mineral sector to gain interest and funding. As a smaller company, we were therefore compelled to follow the current market interests in lithium. There is a considerable amount of hard rock lithium in Australia, however, we felt at the time that better opportunities were present in Argentina. Given the significance of the recent presidential election in Argentina, we found it a very attractive proposition to consider, and we identified some good lithium opportunities in the region and managed to attract investment for our strategy. Our most recent capital raising brought in A\$3 million in late October, which is being used for our Stage 1 development plan to produce up to 100-150 mt of lithium carbonate and to construct a small-scale laboratory pilot plant at the Rincon Project. We are therefore funded for stage one, which takes us through 2017.

## **What role does Argosy Minerals see the rapid growth of the Chinese market playing in the lithium landscape?**

The substantial jump in price demonstrates the worldwide trend towards lithium, but when we visited China recently, we were struck by the magnitude of the opportunity there as well. We spoke to several different parties that are not necessarily interested specifically in lithium, but that are very interested in battery manufacturing and lithium conversion. Plants are being constructed that do not have adequate supply or off-take arrangements, however the support provided by the Chinese government for electrical vehicles all contribute to the sense that there is a tidal wave of interest in the sector. Argosy Minerals therefore feels that we are on the right path with our strategy of fast-track development at our Rincon Project, and we aim to benefit from this interest.

## **How many people do you have currently working on the ground, and how do you source this skilled labor?**

We are working with our principal chemical engineer and industrial engineer who have extensive production experience in the lithium industry and have the expertise to successfully develop our operation. Given that the process of producing lithium carbonate is very sensitive, we feel it is important to maintain our IP and expert knowledge in-house to keep our competitive advantage. We also have local geologists, administrative personnel, marketing people, and a team of lawyers and accountants mostly working as consultants at this stage. In total, around 15- 20 people in Salta and Buenos Aires ensure that our business can progress on a day-to-day basis. —



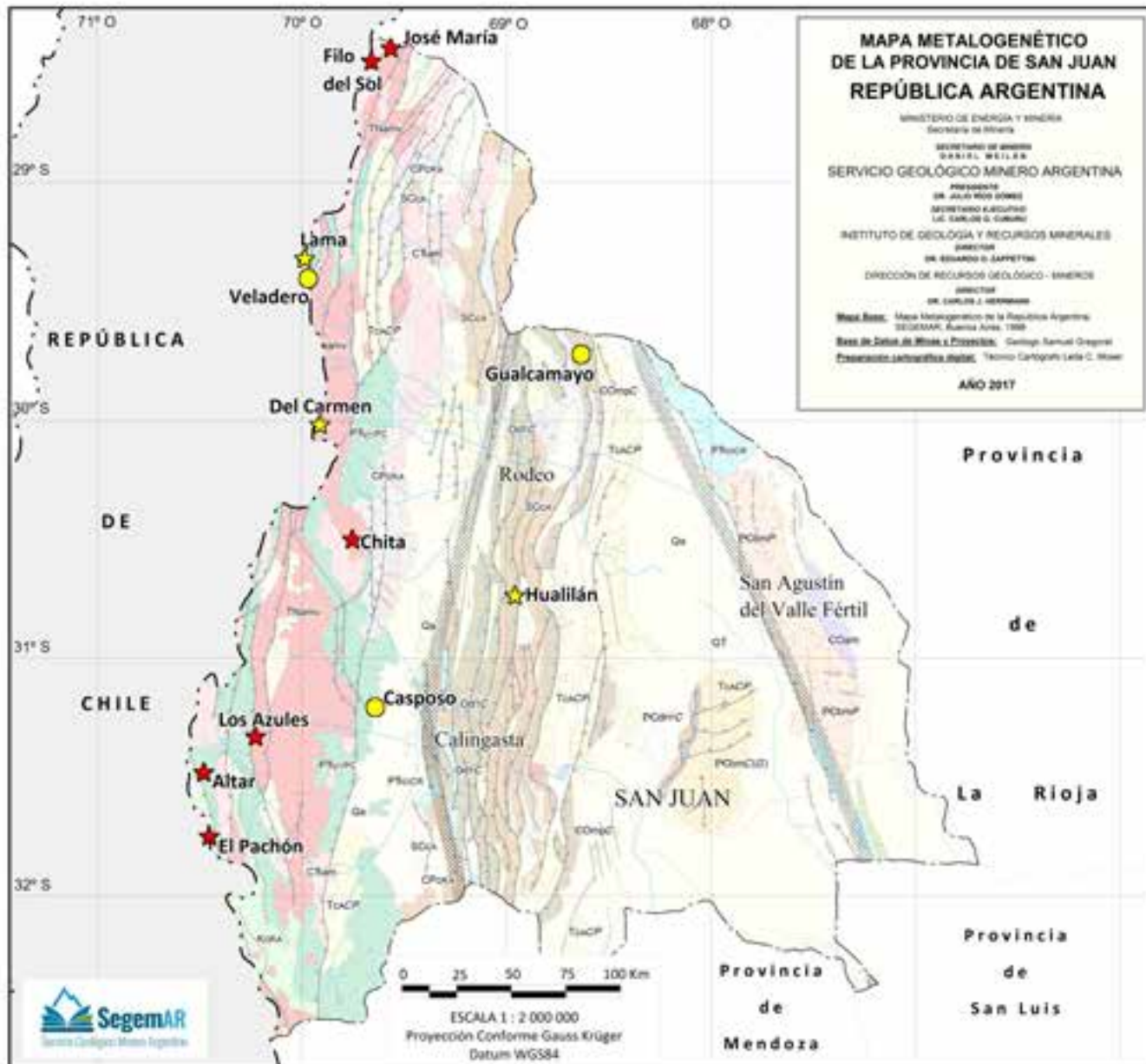
# CHAPTER 3

# SAN JUAN



“San Juan has been the province with the most foreign direct investment in the region thanks to the mining industry, and our objective is to consolidate the project pipeline so investments keep coming. This is because the minerals in San Juan are some of the purest in the country. Besides, our province presents competitive advantages such as great fiscal stability and no labor conflicts.”

Miguel Fabian Ejarque,  
Director of the San Juan Development Agency (ASJDI)



**MAPA METALOGÉNICO DE LA PROVINCIA DE SAN JUAN REPÚBLICA ARGENTINA**

MINISTERIO DE ENERGÍA Y MINERÍA  
Secretaría de Minería

SECRETARÍA DE MINERÍA  
SERVICIO GEOLÓGICO MINERO ARGENTINA

PRESENTE DE JUAN JOSÉ BARRERA  
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**Nota:** Mapa Metalogénico de la República Argentina  
SEGEMAR, Buenos Aires, 1998

**Base de Datos de Minas y Proyectos:** Gerardo Samuel Gregorio  
Presentación: Antonella María López, Tereza Carballo Lata C. Muser

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- TNamv. Arco Magmático Neógeno Volcánico. Mioceno-Plioceno
- TcACP. Cuenca de Antepaís. Oligoceno-Plioceno
- KcRA. Cuenca de Retroarco. Cretácico
- P<sup>R</sup>cICR. Cuencas Intracratónica (Rift). Pérmico-Triásico
- C<sup>R</sup>am. Arco Magmático. Carbonífero-Triásico
- CPcRA. Cuenca de Retroarco. Carbonífero-Pérmico
- SCCA. Cuenca de Antepaís. Silúrico-Carbonífero
- OdTC. Depósitos de Talud. Ordovícico
- cOmpC. Margen Pasivo. Cámbrico-Ordovícico
- PCdPFC. Depósitos de Plataforma. Proterozoico
- PCbm<sup>P</sup>. Basamento Igneo-Metamórfico (Pampia). Proterozoico
- PCbm<sup>C</sup>. Basamento Metamórfico (Grenvilliano). Proterozoico



# Alberto Hensel

Minister of Mines  
SAN JUAN PROVINCE

## Can you give a brief overview of the San Juan province and its role in the mining industry?

We have been in the nonferrous mining industry for more than 100 years, and we are the main exporter of minerals in Argentina at 1.2 billion mt/y. 50% of what we extract goes to the external market, Chile being our main destination. We are newer to metal mining, which has developed here during that last 15 years. A big difference can be seen in San Juan due to the development of metal mining on a larger scale. Through mining, we had the opportunity to diversify our economy, allowing us to satisfy the demands of our growing community. We started putting forth an effort in gold, silver, and copper. This has encouraged the government to work under responsible, serious, coherent, and consistent policies, eventually making San Juan into the exporter of 62% of metals nationwide. These metals are mainly exported to Canada, one of the main protagonists in our mining development. Although there are investors from other countries, Canada is the main one helping us establish a strong sector of providers and services. Mining encompasses around 50% of the province's GDP. A few of the factors that make the province of San Juan an investor's destination is that we have few labor conflicts and a stabilized fiscal situation. We have a lot of invest-

“

Through mining, we had the opportunity to diversify our economy, allowing us to satisfy the demands of our growing community. We started putting forth an effort in gold, silver, and copper. This has encouraged the government to work under responsible, serious, coherent, and consistent policies, eventually making San Juan into the exporter of 62% of metals nationwide.

”

ment in infrastructure, as we believe the state needs to come alongside the private sector to support their efforts. Our value is reflected in the 800,000 oz/y of gold being produced in the province.

## How are you facilitating the process of establishing business in San Juan?

We have transparency, especially when it comes to acquiring areas to mine. We run on hospitality and we receive others at any time to listen to their needs. We are open and always come alongside the private sector, pushing the economy forward.

## Please provide a final message to our readers and the international mining community.

From 2006 to now, 46 million oz of silver and 16 million oz of gold have been extracted in San Juan, keeping in mind that it was all produced by just three projects up and running. San Juan is one of the provinces with the best geological mining potential in Argentina. If we developed all the areas with mining potential, we could grow to exponential heights. However, we must develop a social license for mining activity with the businesses that comes alongside it. Objectively speaking, we have been given many resources by nature and we are enthusiastic about the mining activity in San Juan. —

# San Juan

## *Rediscovering its Appetite for Mining*

The province of San Juan is ranked closely behind Salta on the scale of investor attractiveness. The previous governor of San Juan, Jose Luis Gioja, had been instrumental in establishing Argentina's mining laws. During his first years as governor, from 2003 to 2007, mines opened drastically transforming the province, with about a third of the population employed in the industry. San Juan was formerly the mining powerhouse of the country, but some environmental conflicts and transparency issues have halted production, and now many citizens and local businesses feel burnt by the industry.

"The Mining Chamber was telling Gioja that, with the eyes of the world on Argentina, he needed to improve transparency. After the problems with Pascua-Lama and the regulatory changes, the whole industry collapsed," explained Ricardo Martinez, president of the Grupo de Empresas Mineras de Exploracion de La Republica Argentina (GEMERA). "Now, many of the people who used to work in mining are either employed in other industries, on much lower salaries, or unemployed. People are asking where the money went – sustainability is one of the problems in San Juan." However, only 10% of the territory has been exploited thus far, so the potential is still very promising and people wait eagerly for mining to start moving again. For mining to be a sustainable activity, the government is facing challenges related to its social and environmental impact, and thus has been working on the implementation of effective control systems and increasing the reach of corporate social responsibility. "San Juan has been the province with the most foreign direct investment in the region thanks to the mining industry, and our



objective is to consolidate the investment projects so investments keep coming," said Miguel Fabian Ejarque, director of the San Juan Development Agency (AS-JDI). "This is because the minerals in San Juan are some of the purest in the country. Besides, our province presents competitive advantages such as great fiscal stability and no labor conflicts."

In the past decade, San Juan as seen the most growth in all of Argentina, and residents offer mining as the reason for this without hesitation. San Juan's principal

metal ores include gold, silver, copper, molybdenum, lead, zinc, arsenic and bismuth and, at the moment, the exploitation rests on three projects capable of production: Veladero, Gualcamayo and Casposo. Pascua Lama is the only project under construction, while three are in their pre-feasibility phase: Pachón, Los Azules and Constelación. Approximately 37 more are in some stage of exploration. Mining accounts for around 75% of the province's exports.

**Gold**



Image courtesy of Yamana



San Juan was the first producer and exporter of gold in Argentina, but the temporary suspension of Barrick's Veladero mine, as a result of a 224,000 litre cyanide solution spill, has greatly impacted both gold output and Argentinian acceptance of mining in general. The general public has very openly scrutinized the impermanence of job security for mining affiliated jobs along with the unwanted permanence of alterations to the land's ecosystems. Particularly in regard to Barrick Gold, many

activists have protested against their projects stating the conditions of the water and rivers are not as nature left them. Barrick's Pascua Lama team has thus been releasing many water quantity and quality studies showcasing that the conditions are in compliance with regulations.

Barrick's Pascua Lama project is a multinational venture operating in conjunction with the Argentina-Chile Economic Complementation Agreement. The bilateral mining treaty was signed by both parliaments in 1997, as a result of years of lobbying by many of the majors operating in Argentina. Chile and Argentina have specially established border controls for mining companies operating within concessions that cross country lines, granting special access to privileges including water, immigration exemptions, health necessities, labor and materials. "Our workforce is mixed between Argentines and Chileans and price determines which country we buy from: rigs are generally cheaper in Chile, whereas dozers are cheaper in Argentina," explained Martin Rode, South America exploration manager, Filo del Sol, NGEX, Deprominsa. "Under the previous government we had problems making orders in Chile because there were limits on how many dollars we could send across the border; this situation is now more clear."

Barrick Gold is now initiating pre-feasibility investigations to evaluate exploitation possibilities of bringing Pascua Lama underground. Barrick has also submitted an offer to the Provincial Institute of Mining Exploration and Exploitation (IPEEM) for a tender near their Veladero and Pascua Lama mines in the Los Amarillos area. The submission requires that Barrick invests \$7.7 million in exploration within the period of five years. This job creation catalyst is a positive step forward for Barrick, as the company greatly needs to regain the trust of the San Juanino people.

Yamana Gold's Gualcamayo project has been producing since 2008, and their current exploration program aims to extend its life. Since 2015, the company has been drilling to develop new oxide ounces ame-

nable to their current heap leach processing facilities. They found positive results in two areas adjacent to their current mine, and plans are underway to best utilize their findings for further production. "In Gualcamayo, for example, over 90% of our employees are from the San Juan province," explained Mario Hernandez, vice president of YAMANA Argentina, "Before we began the commercial production in Gualcamayo, we developed an intensive training program for local people in order to have workers from the close communities. That was an extraordinary experience because we found highly engaged workers, most of whom are still with us, and some of the others could later found jobs in other mines around the country."

The Casposo gold-silver mine, which has recently been partially acquired by Austral Gold, is being re-commissioned. Having purchased 51% of the project from Troy Resources, Austral intends to restart the mine, which has proven mineral reserves totalling 972,000 mt—at 2.53 g/mt gold and 231 g/mt silver. Casposo is expected to produce about 84,000 oz of gold and 1.7 million oz of silver over the next four years, and the ores are to be shipped to Ontario for processing.

"Troy Resources left us a solid foundation, but the philosophy has changed to involve even more locals," stated Jose de Castro, the general manager for the Casposo project. "We are buying twice the amount of materials from local suppliers than before. We have even helped a local business start producing products locally, as opposed to importing and distributing. We are fully integrating the local value chain, which gives us a good base for the future."

## Copper

According to an analysis conducted by BNamericas, Argentina has approximately \$13.77 billion worth of copper projects waiting for more favorable conditions, most of which reside within the province of San Juan, including Josemaría, Los Azules, Altar, Chita, and El Pachón.

Glencore announced that it will invest \$3 billion to double its copper production within Argentina over the coming years, which would be a much needed boost so San Juan's semi-stalled mining activity.

The impending El Pachón project is located within San Juan on the Chilean border, at a height of 3,600-4,200 meters in the Andes mountains. This, too, is a binational project that will be developed under the supervision of Xstrata Copper. Environmental baselines have been finalized, and it is in the final stage of feasibility studies for an open pit operation. The resources of the deposit reach 1,790 million mt, with an average grade of 0.51% of copper. It is estimated that its processing plant will have a capacity of 160,000 mt/day.

Late 2016, however, Glencore found itself in a conflict with the Luksic Group, which is owned by one of the richest families in Chile. The Luksic group, through the Antofagasta firm, has operated the Los Pelambres mine in Chile since 1999, bound to the Argentine border at the height of the province of San Juan. As reported in the complaint, as of 2007, Los Pelambres built a heap leach of about 60 hectares crossing the border on San Juan soil, without permits. Waste had been pouring over into the Pachón territory for years, to the extent that now removal of the dumped debris would require \$200 million. The afflicted area already contains approximately 50 million mt of material and about 500 used tires and, according to Glencore, it is still difficult to know what environmental damages have already been caused, as well as the

consequences that will have on the Pachón project and its start date for construction. "Chile throwing inert material into Argentina is a really delicate and worrying problem. It is not only a contamination problem, but also a chancellery's issue. As a violation of the borders, they need to take it out of our country," commented Jaime Bergé, president of the mining chamber of San Juan. "Companies have the responsibility to restore the situation and reverse the environmental impact."

The new copper-gold-silver Filo del Sol project, which in 2016 was spun-off by the well-established operators of NGEX and DEPROMINSA, also straddles the Chile-Argentina border with three quarters of the area within Argentinian territory. "Not many companies have the capacity to work across the two countries like this; there have only ever been five projects with cross-border protocols," explained Martin Rode, South American exploration manager for Filo del Sol.

Rode is hopeful that they will be able to better manage their project, considering they are operating on both sides of the Andes mountains. "We have spent the last twelve years working in that area, with José María on the Argentinian side and, 15 km away in Chile, Los Helados," explained Alfredo Vitaller, managing director of NGEX Argentina.

NGEX has now combined all of its assets in the area to be clustered under one title of Project Constellation, as they conduct drilling campaigns between them to unify the concession. "Filo del Sol is a little more geologically complex than the other two copper-gold-pore-free systems – we still don't know exactly what we have, but there is mineralization of gold, copper, silver, lead and zinc," added Vitaller.

On January 7 2016, NGEX published the results of the Integrated PEA for Constellation, which contemplates the combined development of the Los Helados and Josemaría deposits, whereby material from both deposits would be processed at a centralized processing plant located in Argentina.

Los Azules, owned by McEwen Mining, is another project worthy of investor attention. Located north of El Pachón, Los Azules is an advanced-stage porphyry copper project, and its subsidiary Andes Corporación Minera will be finalizing the multi-million dollar investment's trajectory forward in 2017. The PEA is being updated since 2013, and a McEwen spokesperson mentioned that "due to the elimination of tax withholdings on mining exports set at the beginning of 2016, it will not be necessary to produce copper cathodes to make the project profitable, only copper concentrate."

Additionally, McEwen cited new process technologies, a new design for the development of the mine, additional plants, and new logistical and freight alternatives as means of accumulating savings of up to \$500 million.

### Infrastructural Changes

There are a few principal infrastructural changes that the government is working towards to make San Juan more easily operational. These include liquid purification plants, a dam to generate hydraulic energy sitting, and a highway that will connect San Juan

# Cradle to cradle



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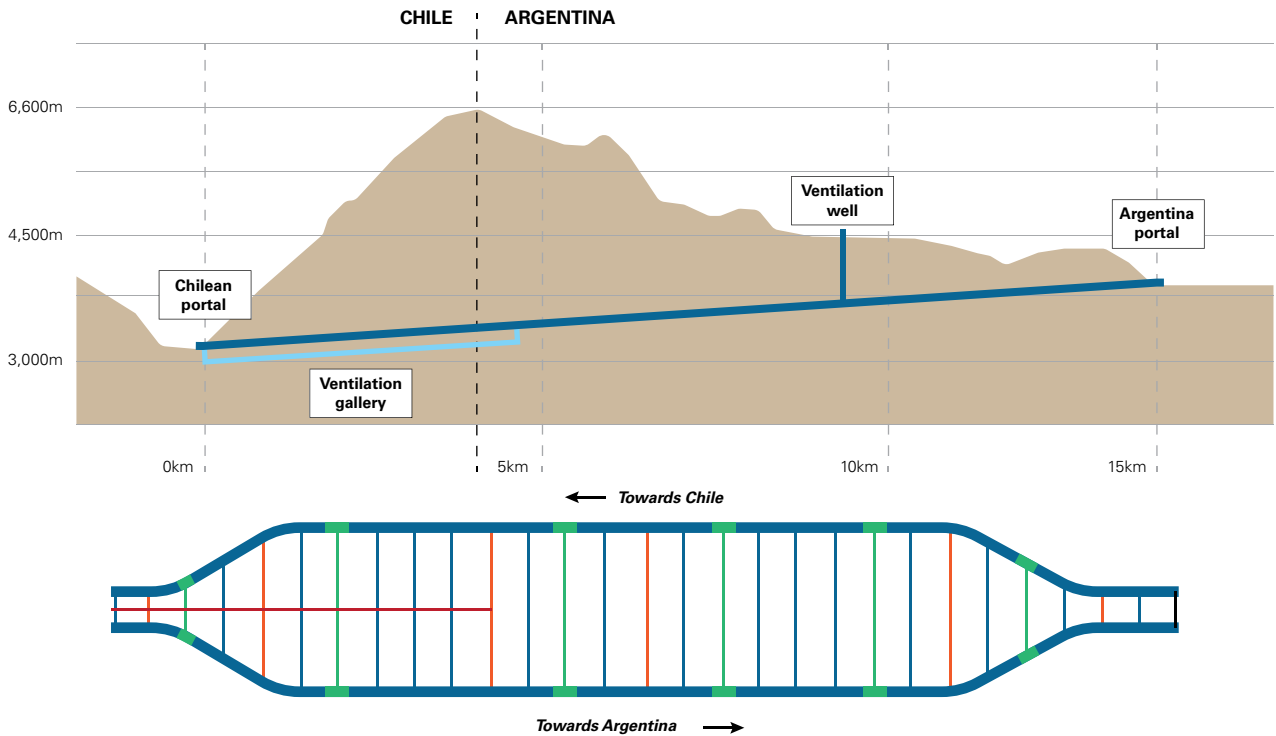
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## AGUA NEGRA TUNNEL



to Mendoza. This will be useful for product transportation as it connects the west of Argentina to the East.

The most important infrastructure project is the establishment of a tunnel, which is a project that has cost \$1.7 billion. The Agua Negra tunnel grants San Juan's products access to the Asian markets, and it will be the highest border crossing between Chile and Argentina.

Geologists and engineers have identified the three main fault lines that will affect the path of the tunnel, and the proximity of the lines will determine the design of excavation and drilling and blasting methods. As explained by a World Highways report, technicians "have selected nine distinct classes of supports for the project, so as to cope with non-fractured rocks or rocks with varying grades of discontinuity as well as the actual fault sections featuring varying degrees of fracturing. Each section will use appropriate support elements such as bolts, self-tapping bolts, shotcrete and metal trusses. Geo-structural surveys will be carried out prior to the excavation of each section so as to identify what kind of rock conditions exist and allow the most suitable support method to be used."

### Recent Changes in Regulation

In December 2016, an agreement was signed for the establishment of the Interministerial Management Committee for the Mining Industry, an initiative oriented towards the promotion, development and execution of local mining production. Observing the supply and demand in relation to the sector is the principal focus of this initiative, set to generate policies that contribute to produce employment and strengthen local companies and suppliers. A framework agreement was then signed for the development of local capacities in the mining value chain, with the participation of Barrick and Aramark, the latter being the principal food supplier to the mining industry in the country. This agreement will initiate a task force for the development of local suppliers, particularly the production of vegetables that Aramark will buy to incorporate it to its services of catering. This initiative, according to San Juan mining secretary, Alberto Hensel, falls within the realm of corporate social responsibility. This is one of many ways the government hopes to reignite confidence in the citizens of San Juan that mining is a viable option for growth. "Before, there was a lack

of information, but now, the government has changed considerably," said Andrés Baldi, director of local services company Grupo RAB and Servicio Argentino de Alimento, Limpieza y Comida (SERALICO). "The current administration is working towards controlled and sustainable mining, as it sees the push-back from our neighbors concerning a contaminating mining industry." Governor Sergio Uñac leads the province with the slogan of 'irresponsible mining no, responsible mining yes.' The governor commented that "Mining development is something we take very seriously... In Argentina, San Juan is responsible for 62% of all mining exports."

"San Juan has incalculable mining capital. 80% of our territory is mountainous, and our geographical location obliges us to see mining as our main source of development and source of genuine wealth," concluded Andrea Polizzotto, director of Radio Estacion Minera and community mediation lawyer in San Juan, "Local communities need us to be close by. They need the companies to go up to them, introduce themselves, commit, meet their people, and learn their names and customs now that they are going to be neighbors." —

# Mario Hernández

Vice President  
YAMANA GOLD



“

President Macri seems to be making important incremental changes and the prudent pace of these changes supports the view that they will be durable and withstand any potential future swings in sentiment. We believe, as a long-term investor, that it is important to keep an eye on the longer-term trend, which has been positive for a number of years. We expect that trend to continue in the foreseeable future.

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■

**Please provide a brief history concerning YAMANA’s presence in Argentina and how it has evolved over the years?**

We have been proudly exploring, operating and investing in Argentina since 2006, and have many high quality assets in country. We started with the Gualcamayo property that we took through the final phase of development and began production in 2008. We have continually invested in the operation over the past decade as we continue to see exploration success demonstrating the potential to extend the life of this asset. The large scale, multi metal Agua Rica project was added in 2007 and continues to offer significant potential to surface value for Yamana. It is not a project that fits our portfolio on our own but with the right partners it could create a lot of value, especially as we’d like to keep an interest in the potential gold production. Finally, the Cerro Moro project, a very high grade gold and silver project, was added in 2012 and is currently in development with production expected to begin in 2018. We think this mine will be one of our cornerstone operations once it ramps up to full production.

■

**With production operations across the Americas, how important is Argentina to YAMANA’s portfolio?**

Yamana is focused on jurisdictions in the Americas with mining pedigree and we are happy with the relative contribution we get from Argentina at this point, which this year is roughly 15% of Yamana’s consolidated gold production. This contribution is expected to increase with the addition of production from our Cerro Moro mine. We are encouraged by improvements to the business and socio-economic environment that have been happening and expect Argentina to continue to be an important part of the overall Yamana portfolio.

■

**Potenciales, Cerro Condor and Las Vacas have been identified as exploration targets for the Gualcamayo property. What is YAMANA’s projected timeline for a mine life extension?**

Gualcamayo Potenciales, Cerro Condor and Las Vacas are all recent discoveries that appear amenable to the current heap leach process at Gualcamayo. Potenciales and Cerro Condor offer exciting potential in the near term as they are adjacent to the existing QDD main pit. The exploration team is continuing their evaluation, and as that advances we will have a better sense of what we are looking at in terms of production potential and timing.



Image courtesy of Yamana

**How have provincial management differences influenced investment in the Suyai, Agua Rica, and Cerro Moro projects?**

As with all countries, there can be important differences across provincial legislation which impacts how projects are advanced. In all cases, we've undertaken collaborative approaches to work with government authorities at federal, provincial and municipal levels to support our projects and ensure the potential benefits and any impacts to local communities are clearly understood.

**How has the rise in gold prices and presidential election of Donald Trump influenced YAMANA investors?**

We focus on operational execution, efficiency and margins so that regardless of gold prices we are in a position to generate cash flow. I think we are seeing a lot of volatility in markets and inflation expectations are beginning to increase, which is often good for the gold price. In terms of our investors, they are looking for us to meet our operational objectives including delivering on production guidance, generate robust cash flow, show cost and capital discipline, and ultimately to create value regardless of the gold price. I do not think that has changed because of the movements in the gold price over the past few months.

**How confident are you in the durability of President Macri's investor friendly macroeconomic changes?**

President Macri seems to be making important incremental changes and the prudent pace of these changes supports the view that they will be durable and with-

stand any potential future swings in sentiment. We believe, as a long-term investor, that it is important to keep an eye on the longer-term trend, which has been positive for a number of years. We expect that trend to continue in the foreseeable future.

**Given the fact that mining in Argentina is still a young industry, how would you assess the local suppliers market and value chain?**

The local suppliers have been maturing at the same time as the mining industry in Argentina. We are proud to say that we have helped many small companies from the communities close to our projects to develop their business and to become solid suppliers, not only for mining, but for many industries. With all our suppliers, we do annual training in our code of conduct to ensure we have the same standard in the way we do business together, respecting the local laws, the employees, the environment, and the communities.

**In what ways is YAMANA working with local communities to develop talent and sustainable economic stimulation?**

Sustainable development approaches are at the core of how Yamana operates, which includes hiring local staff as much as possible. On average, across all of Yamana, approximately 75% of our mine site staff comes from the regions in which we operate. In Gualcamayo, for example, over 90% of our employees are from the San Juan province, and we have more or less the same average in Cerro Moro. In our Agua Rica project, all the employees are from Catamarca province. Before we began the commercial production in Gualcamayo, we developed an intensive train-

ing program for local people in order to have workers from the close communities. That was an extraordinary experience because we found highly engaged workers, most of whom are still with us, and some of the others could later find jobs in other mines around the country. We are going to develop the same strategy in Cerro Moro where we have put a program in place to retrain employees who work on the project in the exploration stage so that they can continue to contribute and be employed as we develop the project and it comes into production.

**What strategic goals does YAMANA have for the development of Argentina's mining sector?**

Yamana is working with other members of the Argentinean Mining Industry Chamber to monitor the development of the recently announced federal mining agreement, in which we believe there should be opportunities to reduce total burden and increase the competitiveness of the country in attracting investments.

**Please provide a final message to our readers, the international mining community.**

Argentina has a tremendous geological potential. Actually, the mining sector represents only \$4 billion annually in exports, but it can grow up to at least ten times that. We have the resources, we also have a qualified workforce, and during the last 10 or 15 years, we have acquired the experience to develop world-class projects. Of course, we still have things to correct or to improve, but I'm confident we are on the right track to generate much more mining activity all over the country. —

# The Glacier Protection Debate

“There are minor conflicts between pro-mining and anti-mining provinces, and the glacier law is a problem at the moment. The international market does not seem to see the country as particularly attractive. It is hard for projects to raise billions of dollars when there is a lack of certainty in international markets and particularly about countries like Argentina.”

- Ricardo Martinez,  
President,  
Grupo de Empresas Mineras de Exploracion  
de La Republica Argentina (GEMERA)

“There are specific environmental precautions that are taken in Argentina, given the country’s diverse landscape. No one will approve in damaging a glacier or having a negative impact on the natural environment, but the key focus in environmental precautions is the social aspect of mining. If our clients are not “awarded” a social license to operate by the community, there will be some issues. We need to help the communities understand the importance of mining and we have tools to help our clients obtain social licenses.”

- Sebastián Risso Patrón,  
Country Manager,  
MWH Argentina

“We do not mine glaciers. In fact, Barrick has already implemented a comprehensive range of measures to protect them, as well as other sensitive environmental areas around both the Veladero mine and the Pascua-Lama project,”

- Rod Jimenez,  
Corporate Affairs Vice-President,  
Barrick

“Preserving and protecting glaciers from harm is essential to the work we do every day at Pascua-Lama. That is why Barrick worked with leading independent experts and glaciologists to develop and implement one of the most rigorous glacier monitoring programs anywhere in the world. We are pleased that the court has confirmed what the technical and scientific evidence demonstrates; that these ice bodies have not been damaged by activities at the Pascua-Lama project.”

- Eduardo Flores,  
Executive Director for Chile,  
Barrick

“[The Glacier Protection Law] is an important moment for glacier protection and cryoactivism —the protection of our frozen environment. Projects like Famatina, which have been the target of companies like Barrick Gold and Osisko, are now off limits to mining.”

- Jorge Daniel Taillant,  
Director of the Florida-based  
Center for Human Rights and Environment (CHRE)

# José de Castro

General Manager  
**AUSTRAL GOLD'S  
 CASPOSO PROJECT**

“

Working as a mining manager requires an open mind, and this is one of the characteristics companies coming to Latin America must have.

Multinationals must put the same value on communities and politics as technical matters.

”

—  
**Please provide a brief history of your experience thus far in the mining industry.**

Over the past six years, I was in charge of Sales de Jujuy's lithium project, and served as the project manager for Orocobre since last November. Today, I am working with Austral Gold, whose owner is a well-known Argentinian who started in the mining sector with a small company in Chile. In December, our group bought a gold project that was previously controlled by Troy Resources of San Juan. Since March of 2016, our group has been redesigning the business to not only include technical factors, but also focus on management, community relationships, and political relationships. Working as a mining manager requires an open mind, and this is one of the characteristics companies coming to Latin America must have. Multinationals must put the same value on communities and politics as technical matters.

Austral Gold is changing our priorities in a way that emphasizes personal interconnection. In our case, managers must now focus on fostering good relationships.

**How was the concession left when Austral Gold purchased Casposo from Troy Resources?**

Austral has since developed a great relationship with the local community. Troy Resources left us a solid foundation, but the philosophy has changed to involve even more locals. We are buying twice the amount of materials from local suppliers than before. We have even helped a local business start producing locally, as opposed to importing and distributing. He started to sell to other companies as well. Not only were we able to obtain lower costs and acquisition times, but we built an impactful relationship that will directly serve the local economy. We are fully integrating the local value chain, which gives us a good base for the future.

**Is the availability of suppliers and the lengthier mining history of San Juan one of the reasons why you chose this province?**

Yes, in the mining industry a big expectation of skills was created for this region. There is a lot of knowledge within San Juan. San

Juaninos might be more informal in some aspects, but the skills are some of the best in Latin America. We have to keep in mind, though, the importance of good communication.

**What can we look forward to in the coming years from Austral Gold and Casposo?**

We are steadfastly concentrating on people development, which includes the psychological well being of the people, coaching and training, risk management, education on environmental issues, safety and health, and sharing value with others. It is important for us to follow up with suppliers and have good communication with our neighbors. We look for the root cause of problems, not only when there are accidents but also when having conflicts with communities.

**In terms of risk analysis, where else is Austral Gold looking to expand?**

Austral Gold has always had the philosophy to look for businesses with successful operators. We are not explorers. We are looking for opportunities generally throughout both Argentina and Chile.

**On the operations side, what developments can we expect to see within the Casposo operation?**

We started out with no reserves, but we now have four years worth of measured resources. We are starting exploration at the moment, and we think we can add three more years to the project, which brings us to a total of seven years of production. We have a budget for around 50,000 oz of silver in the next year, and perhaps the following year we will produce up to 75,000 oz with 22,000 mt of mineral. We are involved with another mining site called Wanaco in Chile where 75,000 oz are projected. That is our short term plan as we continue to look for other opportunities if possible.

**Please provide a final message to the international investors who are interested in Argentina.**

I would encourage them to have an open mind and to establish quality personal relationships. Argentina is a good opportunity for investment. —







# CHAPTER 4

# JUJUY



“Everybody wants the regulatory environment to improve. All participants in the industry have made their view on this clear. With an intelligent, proactive and careful government, lithium in Argentina can be very successful.”

- Cristian Saavedra, General Manager,  
Sales de Jujuy, Orocobre



22° S

23° S

24° S

25° S

REPÚBLICA  
DE  
CHILE

Provincia de Salta

SAN SALVADOR  
DE JUJUY

0 15 30 45 60 75 Km

ESCALA 1 : 1 500 000










Proyección Conforme Gauss-Krüger

Datum WGS84

### PRINCIPALES PROYECTOS MINEROS

-  Minas en operación
-  Proyectos mineros con exploración avanzada / construcción
-  Ag-Sn
-  Ag-Pb-Zn
-  Ag-Cu
-  Li/K, B

### UNIDADES TECTONOESTRATIGRÁFICAS

-  Qa. Depósitos aluviales, coluviales y otros. Holoceno
-  QamP. Arco Magmático. Pleistoceno-Holoceno
-  QT. Salares. Plioceno-Holoceno
-  TCACP. Cuenca de Antepaís (Retroarco). Oligoceno-Plioceno
-  KyE. Granitoides Extensionales. Cretácico
-  SCCA. Cuenca de Antepaís. Silúrico-Carbonífero
-  OdT. Depósitos de Talud. Ordovícico
-  OdiA. Depósitos de Intra-arco. (Volcanoclasticas) Ordovícico
-  CComp. Margen Pasivo. Cámbrico-Ordovícico



## Miguel Soler

Secretary of Mining and Hydrocarbons  
**JUJUY PROVINCE**

“

In the past years, there has not been a lot of trust from the communities in regards to the honesty of the government. If we have a good system of field control, this can be solved. From there, we plan to work with businesses to be current on policies as we go with them into the field to get licensing, which has been difficult in the past.

”

### How much has changed in the investment scene and how significant is mining going to be in the near future for Jujuy?

Since the governmental change in 2015, we have begun to work on transparency, order of information, and having more field presence as mining authorities. Here in Jujuy, we had an internal problem because databases were deleted during the political transition. We are now making it available online so there is more transparency.

### Everyone is saying that with the new government in place it is a favorable time to invest in Argentina, but what does Jujuy specifically have to offer to investors?

Environmental studies are important, but here in Argentina there can be trouble getting them approved. In Jujuy we aim to approve environmental impact studies in less than six months. Also, we are working on modifying regulations so we can work more efficiently. We are working on, first, the cadastre, second, the studies that international businesses need so work does not get stopped, third, exploration permits, and fourth, transparency for the sake of community relations. In the past years, there has not been a lot of trust from the communities in regards to the honesty of the government. If we have a good system of field control, this can be solved. From there, we plan to work with businesses to be current on policies as we go with them into the field to get licensing, which has been difficult in the past.

### How can you go about solving any issues that may arise between foreign companies and local communities?

Regarding local communities, Jujuy has created a secretary of indigenous peoples. With the previous administration there was an abandonment by the government regarding this matter, and the people justifiably started to complain.

### After all of the domestic and economic changes that have taken place, do you

### feel that there are more people arriving here to bring business and investment?

When it comes to mining, we have had a lot of people asking for more information, and around 90% are asking about lithium. In the past 15 years, less than 30-40% of exploration permits were approved. This means we have a lot of potential because a lot of land has yet to be explored. We need serious businesses, and we have to work towards getting permits for them. Businesses also need to work on the properties that they currently have.

### Are there any new rules that need to be made to help resolve the conflicts that may arise due to the fact that lithium is liquid?

We are getting together with Salta and Catamarca to move forward in the regulation process together. The problem is that the authorities do not have technical capacities to analyze this kind of information. Since lithium is liquid, found in places that are ecologically sensitive, and because there is not much knowledge about it, unfortunately no one knows how much the environment will be affected in the long term. In 2012, the government declared lithium a strategic mineral, not just because of the potential it has in battery manufacturing, but also because of the care that is needed to extract it. From its state-owned company JEMSE, Jujuy participates in two current lithium projects, where part of the commitments is to sell up to 5% of production in the province. This adds value to investors in the province. If the province asks for lithium from here, it has to be sold in the province at international prices. This practice is, as far as I know, only here. This is good because it is guaranteed that lithium will be available here to manufacturers. The mining code ensures that the businesses that acquire properties take care of them. Many just want to rise the added value, but we want to make sure that it is explored well and taken care of. What is speculated needs to be more serious, not just to get money together, but to establish a mine. —

# Jujuy

## *Lithium in the Salt Flats*

The first mention of lithium in the salt flats of the Argentine Puna comes from the chemist and geologist Luciano R. Catalano. Between 1923 and 1927, Catalano trekked across the Puna in all directions, in long campaigns that each lasted up to six months, categorizing its geology, exploring its salares and writing out descriptions for its mineral deposits. In 1964, while serving as Secretary of Mining for Argentina, he published a book titled *Boro, Beryllium and Lithium. A New Natural Source of Energy*. Over 50 years later, this vision is truer than ever before.

It wasn't until around 2000 that the world started paying attention to Argentina's lithium potential, and to date Toyota, Mitsubishi and Posco have all been actively present in the province of Jujuy, which borders Chile and Bolivia. Chile is known for its grand impact on the global lithium markets, but it is no longer granting new concessions, and Bolivia has suspended lithium mining due to opposition from its residents, even though it sits on an incredibly vast resource. As lithium mining takes on more relevance, the government of Jujuy hopes that more multinationals look towards their province for future development.

Jujuy does not have many advanced projects to offer investors, as outside of the principally producing project Sales de Jujuy, mostly exploration is still underway.

“Our challenge is to start mining projects that are competitive in price and wages. The remaining lithium under the ground is the same brine as FMC and Orocobre, but we have no other major producers in our province yet,” explained Miguel Soler, the mining secretary of Jujuy.

To fully capitalize on the potential, the provincial energy company JEMSE is in the advanced stages of building a battery cell plant within the province's borders, having secured investment and knowledge partners.

La Universidad Nacional de Jujuy and Y-TEC, YPF's technology branch, have both signed an agreement with the governor of Jujuy, Eduardo Fellner, to create a public-private company that will launch the first lithium-ion battery cell factory in the city of Palpalá in the province of Jujuy. Y-TEC will be responsible for delivering the turn-key plant, including its commissioning and training for operation and maintenance. Similarly, YPF will play an active and permanent role of technical assistance, research and development for the updating and technological improvement of the products to be elaborated in the plant. The plant, focused on energy storage for electric vehicles and mobile devices, will require an investment of \$60 million.

Uniquely to operating in Jujuy, there is a plan in place to ensure that the province has access to the lithium it needs for value

added business. “From its state-owned company JEMSE, Jujuy participates in two current lithium projects, where part of the commitments is to sell up to 5% of production in the province,” said Miguel Soler. “This adds value to investors in the province. If the province asks for lithium from here, it has to be sold in the province at international prices.”

The Jujuy government launched a new online cadastre system in November 2016, eliminating any confusion of provincial lines or potential duplicate land purchases. In addition, a great deal of information was deleted during the recent political transition—a common issue across both local and federal departments. Transparency was practically non-existent, and due to the vanished files it is hard to say there will be a concrete answer as to what exactly occurred. Soler hopes that publishing everything online will make both locals and international investors more confident in how the government is attempting to develop the industry. “There was a general nationwide manipulation of statistics and means of administering resources, and they started to view mining assets in a personally beneficial venture rather than something that can work for the interest of everyone,” said Nilo Carrion, president of the Jujuy mining chamber. “Some took information and manipulated it. Others made it disappear.”



Image: Orocobre



45

“The government is in the process of learning about salars and brines. The learning curve is steep and they do not yet have the full capabilities to help, meaning any and all expertise lies with the mining companies,” explained Franco Mignacco, president of Minera Exar. “Private entities have more information about this than the public governing body at this point.”

The government is taking a vigilant approach to granting permits, as it has approved less than 30% of exploration permits over the past six years. The local government is getting harsher on environmental impact assessment monitoring and results, and is only looking for “serious business” according to Soler: “This means

we have a lot of potential because a lot of land has yet to be explored.”

“Argentina has a lot of exploration to do. After the experience of the past years, we can say now that we have very attractive conditions for receiving foreign investment,” stated Nicolas Galli, general manager of SMG. “The national and the local governments are working to assure very clear rules, and we not only have nice mineral resources, but also very good human resources and infrastructure compared to the rest of the region.”

SMG is a mining service company oriented towards lithium development in the region, having a fully equipped laboratory for testing and analyzing samples as well

as geochemical, environmental analysis and consulting services.

Construction has just begun on the Caucharí-Olaroz plant, a project that falls within the purview of Lithium Americas Corp which holds a 50% stake in Minera Exar. Production plans are set at 25,000 mt of lithium carbonate in 2019. Once running, however, Mignacco assures that the operation will last for 40 years with a production of 50,000 mt/y. Chilean Sociedad Química y Minera (SQM) holds a stake in the other half of Minera Exar, giving the operation connections and facilitated access to the port in Chile. “We started working with SQM not only for technical reasons, but they also have a lot of global commercial

data. They have more than 100 subsidiaries around the world, and they know their customers,” stated Mignacco. “SQM also has a very well-known port in Chile, and it takes many years to enter the market and to develop logistics, which is why we are extremely lucky to work alongside SQM.” According to calculations by Lithium Americas, the initiative to enter an operational phase will require around \$314 million.

As for the big names already involved in lithium production, Orocobre is one of two in Argentina. In conjunction with the Toyota Tsusho Corporation, the Salar de Olaroz commenced lithium production in 2014. Toyota Tsusho acquired 100% sales rights to the lithium carbonate produced at the plant and aims to build a complete lithium supply chain ranging from upstream to downstream processes, in order to meet the company’s needs for its automotive business and other group companies. Toyota signed a definitive shareholders agreement on the Olaroz project in 2012, granting Toyota a 25% interest in the project and prioritized purchasing rights. Production is now working towards nameplate capacity of 17,500 mt/y of lithium carbonate. The environmental conditions have been optimal for Olaroz’s success, given the flat plain, dependable winds and permanent radiation from the sun. “As of three months ago, our focus is now on improving efficiency. We are adjusting our costs relating to insurance and recovery, trying to improve our competitiveness by producing more from the same input. Currently, our costs are very competitive—just over \$3,000 /mt, and our goal is to reach less than \$2,500 /mt,” explained Cristian Saavedra, general manager of Sales de Jujuy. The company is also now building a new processing plant, which will act as a long-term cost saver over the operation’s 50-year lifespan.

Orocobre has also announced its intent to acquire 31% of Advantage Lithium, the exploration company currently assessing the Cauchari project, which lies between

Orocobre’s Olaroz lithium facility and the Cauchari-Olaroz project of Lithium Americas and SQM. Advantage Lithium’s Cauchari hosts a shallow, inferred resource containing about 470,000 mt of lithium carbonate equivalent (LCE) and 1.62 million mt of potash (KCL). It will require \$7 million over the next three years to push the project into the feasibility stage.

Posco, a Korean company and the world’s fifth largest steel maker, announced its intentions to build a lithium extraction plant in Pozuelos in Jujuy. However, the LOI signed between Lithea Inc. and POSCO one year ago is no longer valid. Therefore, POSCO does not have any right over Pozuelos tenements, and at present the Lithium S Corporation has an exclusive right to acquire the outstanding shares of Lithea for six months, and therefore, over all the mining properties.

### Metal Mining

Aside from lithium, Jujuy has two advanced projects for metals mining; the Chinchilla mine (of Golden Arrow Resources) and the Providencia mine (of Meryllion Resource Corporation). Chinchillas is expected to have an investment of close to \$100 million, which would result in more than 800 direct jobs. Due to the Pirquitas mine closure process, the province has only 1,800 direct jobs in mining activity.

Mina Aguilar, owned by Glencore, is producing lead and zinc that are both treated within Argentinian borders before export. At the close of 2016, the Minister of Economic Development and Production, Juan Carlos Abud Robles, toured Mina El Aguilar facilities and analyzed the company’s production challenges on the ground. “Private tasks do not affect the protection zones that were set in the province,” stated Robles.

He also mentioned that the government is in support of their continual exploration work and dedication to social development, and pushed for the installation of a

solar power plant for the operation of the factory. Mina Aguilar is rich in silver, lead and zinc, and mining is universally viewed as important for the province’s economic development over the coming years in the eyes of the public sector and involved locals. “Five or six years back, we did a study to measure the economic impact mining has on the province, and we are now in the process of updating it,” stated Carrion. “The study surprised us because we found that the mining sector has basically the same impact as the other productive sectors of sugar and tobacco.”

### Additional Investment

Given the benefits identified with mining development, there is a great need for adapting the industry to Jujuy’s characteristics. The altitude of the Puna provides interesting challenges for multinationals and large scale operations, requiring the logistical and adaptive expertise of the local Argentinian people. “We have 15 years of research in overcoming obstacles in high altitudes, difficult geography, and diverse climates under our belt, which is why we have grown to become the largest and principal telecommunications provider in the north and west of Argentina,” explained Emanuel Salinas, managing partner of local provider Integradata Solutions.

In the rural areas of the country, the majority of inhabitants are still not connected. “The government has been giving credits to providers to expand their services and in three years, 100% of the population in Salta, Catamarca, and Jujuy will have internet access,” said Salinas. “We see a country with a lot of thirst for investment, with clear rules and more judicial security which is stronger now than it has been for the past 20 years,” he continued.

With the government in favor of transparency and collaboration between public and private ventures, Jujuy is expected to experience significant growth in the years to come. —

# Cristian Saavedra

General Manager  
SALES DE JUJUY



## What are the latest advancements concerning Sales de Jujuy's Olaroz project?

Sales de Jujuy is making great progress developing its own process for the brine. The process is very robust, and will allow us to reach nameplate capacity. We are currently ensuring our work is of a high quality, evaluating our lithium carbonate product, and running a scoping study to increase capacity. Sales de Jujuy is thinking to increase our capacity, which we have the opportunity to do; partnering with Toyota Tsusho Corporation makes us strategically strong. Various possibilities are under consideration, but the main one currently is doubling production as soon as possible – perhaps within two years.

## What is Sales de Jujuy's strategy for keeping community relations positive?

Our relationships with the local communities are very strong. Sales de Jujuy has agreed to source, where possible, almost 100%

of common requirements from the local communities. We have partnered with a local university to produce educational documents, which are used to train our previously unskilled employees. We fund the same training to the communities and it is a good way for us to find potential employees, guaranteeing that we will not overlook them when positions become available.

## What is your view on the regulatory environment in Jujuy?

Everybody wants the regulatory environment to improve. Every participant in the industry has made their view on this clear. With an intelligent, proactive and careful government, lithium in Argentina can be very successful. Sales de Jujuy is a partner of the provincial government, which owns 8.5% of the company. —

# Nilo Carrion

President  
JUJUY MINING CHAMBER



## Can you give a brief overview of the chamber's goals?

The objectives are to work so the projects that are in operation can continue and to start new projects. Right when we started having more widespread presence and investments, groups against mining popped up. During the past years, we try to inform, be transparent, address the public sector, and promote an activity that is vital for the province.

Five or six years back, we did a study to measure the economic impact mining has on the province, and we are now in the process of updating it. The study surprised us because we found that the mining sector has basically the same impact as the other productive sectors of sugar and tobacco. Jujuy has become specialized in agriculture, but it does not have a lot of potential for growth because of geography characteristics. Lithium came up as a valuable resource, which is great for Argentina's young mining industry.

Our relationship with the communities is very important. We do not want to limit rights, but want to change the attitude people have of wanting to deter potential projects. As communities become more powerful, the companies have a hard time getting a social license. We are seeing how government agencies need to be stronger about this.

## What is your final message for our international readers?

Argentina, and Jujuy in particular, has a lot of possibilities for those that want to come and invest in mining activities. There are things to correct, which we are doing, but we believe that this is the sector that can solve a lot of our problems to generate jobs and better conditions in Jujuy. There is still a lot to do. The chamber hopes to stimulate interest in exploration. —



## CHAPTER 5

# SANTA CRUZ

“The province of Santa Cruz has lifted the previous administration's tax on reserves, which basically punished a company for exploring. This removes a strong negative incentive.”

- Michael Harvey,  
Regional Director of Corporate Affairs at Goldcorp





### PRINCIPALES PROYECTOS MINEROS

- Minas en operación
- Proyectos mineros con exploración avanzada / construcción
- Ag-Au
- Au-Ag
- Carbón

### UNIDADES TECTONOESTRATIGRÁFICAS

- Qa. Depósitos aluviales, coluviales y otros. Holoceno
- QβTT. Basaltos Transensionales. Pleistoceno-Holoceno
- TPβRA. Basaltos de Retroarco. Mioceno
- TmpPA. Margen Pasivo. Oligoceno
- TNβRA. Basaltos de Retroarco. Eoceno
- TcRA. Cuenca de Retroarco. Paleoceno-Plioceno
- KcRA. Cuenca de Retroarco. Cretácico
- KdsPA. Depósitos de Subsidencia Térmica. Cretácico
- Jdr. Depósitos de Rift. Jurásico
- Jam. Arco Magmático. Jurásico
- PRCR. Cuenca Intracratónica (Rift). Pérmico-Triásico
- SDpaPA. Prisma de Acreción. Silúrico-Devónico
- PCbmPA. Basamento Metamórfico Proterozoico

# Santa Cruz

## *Gold and Silver in Patagonia*

Santa Cruz is located in Patagonian region and is the second largest province in the country. It is also one of the least diversified economies within Argentina, being heavily reliant on the extractive sector—particularly gold and silver mining. Over the past 15 years, six mines have been constructed in Santa Cruz, including world-class projects such as Cerro Vanguardia and Cerro Negro, making it a prolific precious metals province. The provincial government has now reframed its mind-set towards mining restrictions, easing up on what some would say are unreasonable regulations. Previously, in 2013, the local legislative branch passed amendments to the Provincial Tax Code, classifying mining properties within the same category as real estate. This meant that mining companies must pay 1% of the value of the mine reserves (that are technically and economically exploitable) based on the national or interna-

tional market, whichever is higher. “The province of Santa Cruz has lifted the previous administration’s tax on reserves, which basically punished a company for exploring. This removes a strong negative incentive,” said Michael Harvey, regional director of corporate affairs at Goldcorp.

Goldcorp began commercial production at their Cerro Negro mine in Santa Cruz in 2015, after the law was changed and President Macri was elected. Goldcorp expects to remain a strong producer within Argentina honing in on more investment for Cerro Negro, which offered positive drilling results from its Silica Cap target. Results include 19.28 g/mt Au over 2.95 m from 152 m, and 10.6 g/mt Au over 4.05 m from 274 m.

### **Gold and Silver Projects**

Cerro Moro and Don Nicolas are the two most talked about initiatives within Santa Cruz as they move forward with construction. The gold price increase has helped producers such as Yamana Gold further develop the projects within their pipeline, and Cerro

Image: Manantial Espejo mine, courtesy of Pan American Silver



Moro is ahead of schedule with the first gold pour expected in early 2018.

Reactions to the productivity of the gold-silver project Don Nicolas have been mixed. Don Nicolas' new owner has remained relatively under the radar with minimal announcements, but operators and service suppliers working on the project have evidence of signed contracts for the coming year to confirm progress. "We finished construction on a lab for Don Nicolas, and it will be fully operational towards the beginning of 2017," noted Marcelo Tejada, managing director of Alex Stewart Argentina.

M3 Argentina, an engineering and consulting firm, has begun providing the project with assistance in logistics and engineering staff. In 2013, CIMINAS agreed to completely finance the project in conjunction with Minera IRL, but in 2014 they acquired all remaining shareholdings for \$11.5 million. "The Cerro Morro and Don Nicholas mines have invested significantly and are also making good underway," said Brad Dormer of All Pumps Argentina, a supplier to the mine.

According to Minera IRL, the mine's previous owner, the last feasibility study reported reserves of 1.2 million mt grading 5.1 g/mt of gold and 10.4 g/mt of silver, containing about 197,000 oz of gold and 400,000 oz of silver, at a 1.6 g/mt Au cut-off.

The exploration team responsible for discovering the Don Nicholas deposit is now involved in bringing the Josefina gold-silver project to life. Hunt Mining's La Josefina is also very advanced, as their local subsidiary Cerro Cazador is in the process of transitioning from a mineral exploration company to a producer. In 2016, the company strategically acquired the Martha mine, which lies within close range of their concessions. "We are currently re-commissioning the flotation mill of the Martha mine, as well as complimentary exploration to add more mineral resources to the company portfolio. We expect the mill to be operational by January 2017," explained Danilo Silva, president of Cerro Cazador.

Logistical plans include utilizing the refurbished flotation mill of the Martha mine for processing ore across internal projects. Cerro Cazador has completed 62,000 m of drilling which includes more than 500 core holes, and metallurgical results yielded a recovery of 96% gold and 72% silver at La Josefina.

Patagonia Gold was also producing at their Lomada Leiva mine, in conjunction with the state owned entity Formicruz, but they have since closed down to commence heap-leaching operations. "It is a very small heap-leach operation, in the order of 100,000 oz," said Christopher van Tienhoven, CEO of Patagonia Gold. "It was, however, a difficult time to construct and operate mines given the economic context: increasing inflation, import restrictions and overvalued currency."

Patagonia Gold is now ramping up production in another heap-leach project, Cap-Oeste, about 250 km further south. Considering the overall environment for mining has improved, van Tienhoven is very optimistic about Cap-Oeste's financial feasibility. For ex-

ample, Patagonia Gold has been able to import used trucks on competitive terms, given that there is a surplus of used equipment available given the downturn in the mining sector worldwide. "Argentina still has huge mining potential – this is why I am here. In contrast to many jurisdictions around the world, there are still many world-class projects to be found here," said van Tienhoven. "We know this from what has been found over the border as along the cordillera on the side of the border there are a large number of world class projects and on the side of Argentina these are yet to be discovered."

Austral Gold expanded its mining profile in Argentina with the acquisition of the Argentex Mining Corporation in August 2016. With that, Argentinian run Austral Gold now oversees 37 properties of land, many of which are in Santa Cruz, including the Pingüino project. This silver-gold-lead-zinc project is in an advanced stage of development and lies along a similar vein to that of Cerro Vanguardia. As of late 2015, the exclusive mineral resources at Cerro Vanguardia were estimated at 25.5 million mt, grading 2.71 g/mt of gold.

Cerro Vanguardia consists of several open-pit and additional underground mines located within the Deseado Massif, which is one of the most extensive volcanic complexes in Argentine Patagonia. The Deseado Massif is an extensive middle-to-upper Jurassic rhyolite province, deposited on a basement of Paleozoic metamorphic rocks. This mine is the only operation held by AngloGold Ashanti in Argentina, and has been in production since 1998.

Expansion of this project to increase underground production continues, however, Cerro Vanguardia S.A., the local subsidiary of AngloGold, announced its termination of the Exploration and Option Joint-Venture agreement previously held with Mirasol Resources for the Claudia gold-silver project. The Claudia project lies along the southern border of the Cerro Vanguardia mining operation. According to Mirasol Resources, they will remain vigilant in advancing the project and acquiring new partners after additional exploration drilling.

McEwen Mining and Hochschild Mining's San José mine also lies within the Deseado Massif, and continues to be one of the most promising operations in the province as its mine life is extended. "We are not planning to increase capacity, however we plan to increase the production of doré as opposed to concentrates. Today, the breakdown is 50-50 between doré and concentrate, and we plan to have 70% doré and 30% concentrate," explained Rovertto Cacciola, general manager of Minera Santa Cruz, the local subsidiary that has been involved with the San José mine since 2008. "We are already working on defining new exploration targets, focused on the Santa Cruz province right now, but we keep our eyes open for opportunities elsewhere in Argentina," Cacciola continued.

Pan American Silver holds 100% ownership over the producing silver-gold Manantial Espejo mine, and executives are pushing for increased throughput from stockpiles to compensate for the

# HUNT

MINING CORP

## Martha Mine Becomes Argentina's Newest Silver and Gold Producer

[www.huntmining.com](http://www.huntmining.com)



## Hunt Mining Enters Production

SANTA CRUZ, ARGENTINA – Hunt Mining's President & CEO, Tim Hunt announces production operations at the Martha Mine began in January 2017. "Recommissioning of the facilities at the Martha Mine completed, we are excited to have transitioned from exploration and development to Argentina's newest gold & silver producer! The acquisition of Martha and its mechanical infrastructure made it possible for our company to commence milling our ore, initially from local ore, but soon from La Josefina and La Valenciana to build a bright future in Santa Cruz."

TSXV:HMX

ARGENTINA MINING 2017

Global Business Reports

reduced feed coming from the open pit portion of the operation. "Under the assumption that the devaluation of the Argentine peso will keep pace with local inflation rates during 2016, we expect that production costs will decrease from productivity improvements and the decommissioning of open pit mining activities," noted a Pan American Silver communications official. Pan American Silver acquired the Joaquín project at the start of 2017, with the aim of giving an additional value to Manantial Espejo. Joaquín is a gold and silver reserve located 145 km from Manantial Espejo, on which they have begun to work in technical studies to determine what amount of material can be processed.

### Conflict

Over the past couple of years, the mining industry within Santa Cruz has suffered from many labor conflicts, including at Manantial Espejo. In 2016, the company was at risk of not achieving its full-year production forecast due to union discontent. Cerro Moro employees have also been actively striking for higher wages and better conditions citing the following: repeated breaches of safety and hygiene, lack of heating, insufficient tools for getting their tasks completed, a lack of security in the areas of work and minimal coherence between management shifts—a problem considering managers have changed five times over the past four years. Executives at Cerro Vanguardia, too, faced this internal challenge, and in February 2017 they solidified a wage agreement of a 16% increase in pay to workers, confirming that the mining company is responsive to the needs and voices of the province of Santa Cruz.

Considering how critical mining is to the Santa Cruz economy, the private and public sectors need to best incorporate the essential variable of local workforce needs into their production equations. The climate for promotion of mining investments is much more favorable given recent labor resolutions, and given the positive context of how successful mining operations have been in Santa Cruz, so that the undisputable resources should offer more investment incentive than ever before. —

Global Business Reports

# Roberto Cacciola

General Manager

**MINERA SANTA CRUZ**  
(SUBSIDIARY OF HOCHSCHILD MINING)



## What has been the evolution of the San José mine?

Minera Santa Cruz started operations in 2008. We have a consolidated operation, with a strong focus on improvement processes, better recovery rates and efficiency. Thanks to this we now produce about 13 million oz of silver equivalent per year, 51% of which is attributable to Hochschild Mining; the remaining 49% is with McEwen Mining.

## What are the main highlights for 2016-17?

The challenge right now is to extend the mine life, expanding the deposit and also incorporating new areas that belong to the com-

pany where we could find new material for our Argentinean operation. We also have some confidentiality agreements with some juniors to have a look at potential opportunities in Santa Cruz.

## What are the prospects for Minera Santa Cruz in Argentina?

Minera Santa Cruz has an outstanding opportunity in Argentina right now, because it has generated great capacities over the last years, both in exploration and production. We are already working on defining new exploration targets, focused on the Santa Cruz province right now, but we keep our eyes open for opportunities elsewhere in Argentina. —

# Danilo Patricio Silva

President

**CERRO CAZADOR SA,**  
SUBSIDIARY OF HUNT MINING CORP.



## Can you provide a brief introduction to Cerro Cazador?

Cerro Cazador was established in Argentina in 2006 as a subsidiary of Hunt Mining Corp. We are dedicated to the precious metal exploration and development of mineral properties in Argentina, focusing all our investment in the Deseado Massif district, Santa Cruz province. The Deseado Massif district does not have a long history of mining. For example, we were doing regional exploration on our La Valenciana project last year and we found a vein outcropping with visible gold on the surface and no hammer tracks. Evidence that humankind never prospected in this country until the last few decades.

## What is Cerro Cazador's principle focus for the Martha mine and La Josefina project?

We are currently in the transition from being a mineral exploration company to becoming a producer. In 2015, we decided it was time to start producing. We identified Martha mine, which we acquired from Coeur Mining in May 2016. We are planning to deliver ore from the La Josefina project to the Martha mine flotation mill.

## Can you elaborate on Cerro Cazador's operations at the La Valenciana project?

Cerro Cazador is also advancing the La Valenciana project. Currently we have a five-year production plan to combine the mineral reserves of the Martha mine and the La Josefina project. To expand production for longer than five years, we expect to have the La Valenciana project in the pipeline, ready for production. —



# Brent Bergeron

Executive VP,  
Corporate Affairs and Sustainability  
**GOLDCORP**

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Cerro Negro will have a longer mine life than president Macri's term, so we hope that we can continue to help the country, provide more investment, and make sure that Argentina does not go back to the state it was in before Macri came to power.

”

**The president of Argentina's Mining Chamber (CAEM) is a Goldcorp executive. How are you supporting the industry in Argentina through CAEM?**

In some ways, Argentina and Canada are very similar countries. They are both rich in resources and they are both run with a federal system. Overall, CAEM's mandate is to do two main things: to link the federal government with the provinces, and to sit at the table with the authorities to shape the discussion in terms of how to attract further investment to the country.

**How important is your Argentinean mine, Cerro Negro, within the company's portfolio?**

Cerro Negro is going to be a world-class mine. It is extremely rich in resources, our land package is significant, and at different sites throughout the property the veins are incredibly high grade and with easy access, very close to the surface. Cerro Negro will be one of the significant engines of economic value to Goldcorp in the future.

**Cerro Negro is an underground operation. What are the challenges there in terms of safety?**

Late last year, we signed an agreement between the Mining Association of Canada and the CAEM to bring the Canadian standard of sustainable mining to Argentina. That addresses aspects of safety, tailings facilities, crisis management, operations, etc. We are also trying to work with the unions to implement all of the safety procedures that we have in other jurisdictions, but also hear their voices and are open to implementing better ways for all of the workers' safety.

**Anti-mining sentiments are strong in parts of Argentina. What can be done to change perceptions?**

In Argentina, some provinces welcome mining, and there are other provinces where mining is banned. We have to do a better job at making people understand mining processes. We need to explain the standards we use, such as TSM (Towards Sustainable Mining), and also communicate about how we respond to incidents. At Goldcorp, our vision is 'safe enough for our families'. We have to reach the general public through our ambassadors, who are our workers: they need to feel safe.

**The Macri administration has implemented drastic changes to improve the business climate. What else could be done in this respect?**

Changing the institutional way of how we pay taxes and how we repatriate money to the country will have long-term effects, ensuring that the country will have a stronger multiplying effect of benefits for both foreign investors and in-country, to build on this new momentum for the next governments that come in. Political uncertainty is always a risk –we could always have a new government elected that chooses to move in a different direction.

President Macri is trying to change the institutions. Now, I can see that the different ministries and departments are actually working together, whereas before that was not the case. He is also improving the openness and transparency of these institutions, and is placing Argentina as a player in the world economy. Cerro Negro will have a longer mine life than president Macri's term, so we hope that we can continue to help the country, provide more investment into the country, and make sure that Argentina does not go back to the state it was in before Macri came to power.

**One issue in Argentina is the restriction to import goods and expertise. How difficult is it to build local capacity that can serve the industry competitively?**

Developing local providers is always a challenge, in any jurisdiction. We have worked extremely hard over the last years to do two things. At the federal level we have had roundtable discussions with the different ministries that look at import restrictions. We want to develop local capacity in-country, but that capacity needs to provide the products we need in a competitive manner. I cannot be buying a product locally if it is not as safe as the imported product and it costs 50% more.

At the local level, in Santa Cruz, we have been working with local providers and we have made great progress in terms of ensuring that they comply with the standards we need. The population of Santa Cruz is only 300,000 people, so the businesses we need do not necessarily exist yet, but we are getting there. —



## Steve Busby

COO

PAN AMERICAN SILVER

“

The federal government has been supportive of the role of responsible mining development in growing the economy and creating jobs. Recently, they introduced a new mining agreement to harmonize legislation across the different provinces.

”

### Could you summarize the main 2016 highlights for Pan American Silver from an operational perspective?

2016 was a fantastic year for operational performance. We produced 25.4 million ounces (oz) of silver in 2016 and 183,900 oz gold at a cash cost of \$6.29/oz silver, which is 35% lower than the year before. All-in sustaining cost (AISC) was \$10.17, a 32% reduction over 2015's figures. We benefited from four factors: first, roughly 45% of our savings came from productivity enhancement, particularly in Peru, thanks to the mechanization programs that we put in place at some of the larger ore bodies. About 30% of our cost savings came from currency exchange fluctuation, as the currencies of Mexico, Peru and Argentina weakened against the U.S. dollar. That's a more unique circumstance, when relatively strong precious metal prices coincide with weaker currencies in the countries where we operate. Another 10% of savings came from energy, reagents and supplies; and finally, the remainder came from the higher prices for our by-products, namely zinc, copper, lead, and gold.

### How is your Argentinean operation doing, and what are your strategies to extend the mine life there?

2016 was a remarkable year for Manantial Espejo following a very difficult period with importation and currency exchange restrictions in Argentina. Managing liquidity locally was incredibly challenging between 2014 and even early 2016. Mid-2016, we mined into some of the higher grade materials in the Concepción open pit, which coincided with improved metal prices and with the Macri administration's elimination of tariffs on mining exports. All those things came together with the devaluation of the currency, resulting in cash costs of \$4.28/oz of silver net of by-product credits. This was sufficient to eliminate the debt we had accumulated to survive during the tough period.

Unfortunately, our current geologic resources at Manantial Espejo are quite limited. We plan to close open pit mining this year, and from then on, we are really focused underground. We are extending the María vein to the east, while we see potential to go underground below the Concepción pit and the

Karina/Unión pit. We know that, moving forward, the development of Manantial Espejo will be based on the smaller veins that do not produce high tonnages as compared to the open pit mines we have developed over the last 8 years. Over the years of open pit mining, we were able to stockpile several million metric tons of lower grade ores, and we will blend these with the higher grade coming from underground. This should continue for another three or so years as we continue exploration efforts on the site.

### What is the impact of the acquisition of Coeur Mining's Joaquín deposit?

We saw an opportunity to find higher-grade ores in the satellite deposits of the Deseado Massif in Santa Cruz that could supplement our lower underground production rates to feed our milling circuit at Manantial Espejo. Coeur was looking at a grassroots development for Joaquín, which was difficult due to the high logistical costs associated with building a new processing plant in the remote parts of southern Argentina. We are working on a study right now, but it looks quite favorable to enabling us to extend Manantial Espejo's life by supplementing additional high grade ores mined at Joaquín. We believe there should be similar opportunities elsewhere in the region moving forwards.

### Do you think you will be able to develop Navidad at some point?

Navidad is our prize: this project in itself can virtually double the size of our company. We believe it is the largest single undeveloped primary silver deposit worldwide, with very high-grade silver mineralization occurring right near the surface. We continue to work with the national and local governments to advance this project. The federal government has been supportive of the role of responsible mining development in growing the economy and creating jobs. Recently, they introduced a new mining agreement to harmonize legislation across the different provinces. Currently, the province of Chabut, where Navidad is located, restricts the development of a mine and a change in a provincial law is required before Navidad could be developed. —







## CHAPTER 6

# CATAMARCA



“Our province has several deposits, of lithium, copper and gold. Our geology in the bordering zone with Chile is equal to that of the neighboring country, but our resources are intact. Today there is a huge opportunity boosted by the bi-national political decision to activate the "Paso Internacional San Francisco" gateway to the Pacific Ocean. Therefore, we are willing to encourage the implementation of bi-national projects.”

- Lucía Corpacci,  
Governor of the Province of Catamarca

# MAPA METALOGENÉTICO DE LA PROVINCIA DE CATAMARCA REPÚBLICA ARGENTINA

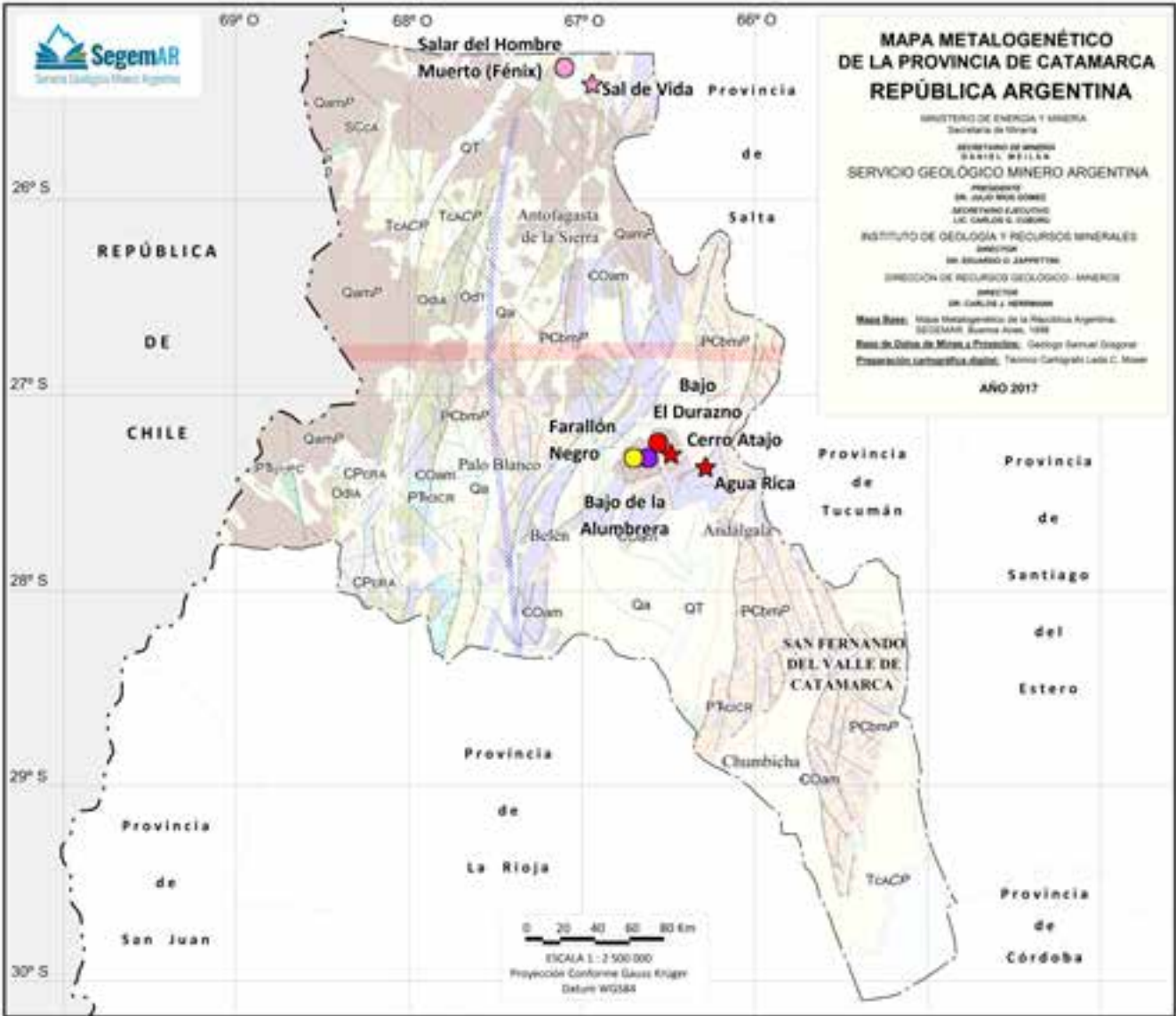
MINISTERIO DE ENERGÍA Y MINERÍA  
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SECRETARÍA DE MINERÍA  
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DIRECCIÓN DE RECURSOS GEOLOGICOS - MINERÍA  
DIRECTOR  
DR. CARLOS G. FUGAZO

Mesa Base: Hojas Metalogenéticas de la República Argentina.  
SEGEMAR, Buenos Aires, 1989  
Base de Datos de Minas y Proyecciones: Geólogo General Orogénico  
Proyección: UTM, Datum: Catamarca, Zona: C, Meters

AÑO 2017



## PRINCIPALES PROYECTOS MINEROS

-  Minas en operación
-  Proyectos mineros con exploración avanzada / construcción
-  Cu
-  Cu Au
-  Li
-  Au

## UNIDADES TECTOESTRATIGRÁFICAS

-  Qa. Depósitos aluviales, coluviales y otros. Holoceno
-  QamP. Arco Magmático. Pleistoceno-Holoceno
-  QT. Salares. Plioceno-Holoceno
-  TcACP. Cuenca de Antepais. Oligoceno-Plioceno
-  P<sup>TR</sup>icR. Cuenca Intracratónica (Rift). Pérmico-Triásico
-  SCCA. Cuenca de Antepais. Silúrico-Carbonífero
-  T<sup>RP</sup>PC. Plateau Riolfítico y Granitoides Post-collisionales. Triásico
-  CPCRA. Cuenca de Retroarco. Carbonífero-Pérmico
-  OSam. Arco Magmático (Puna Occidental). Ordovícico-Silúrico
-  OdT. Depósitos de Talud. Ordovícico
-  Oda. Depósitos de Intraarco (Volcanoclasticas). Ordovícico
-  COam. Arco Magmático (Famatiniano). Cámbrico-Ordovícico
-  PCbmP. Basamento Ígneo-Metamórfico (Pampia). Proterozoico



# Lucía Corpacci

Governor

PROVINCE OF CATAMARCA

“

We will continue to strengthen the policy we have developed in recent years with optimism because the new measures of the national government are very encouraging for the legal stability that is offered to investors. Catamarca, which chairs COFEMIN (“Consejo Federal de Minería”), is working on the new “Acuerdo Federal Minero”, which is a proposal of the national government so that the provinces agree on the guidelines of mining policy in a consensual way.

”

## **Please provide your insight into how you will best promote the mining sector.**

The province of Catamarca developed mining in recent years with a real state policy, which is right now in full harmony with the vision and objectives of the national government. We aim to responsibly manage the mining resources of the province, promoting a competitive productive development within a framework of social and environmental sustainability, fostering a predictable productive development, linking the implementation of projects in the region over time, and promoting an adequate geographic dispersion of them to have a harmonious development of the activity in the province.

We want to advance in the positioning of the mining sector as one of the pillars of the socio-economic development of the province, generating new opportunities for employment in the private sector and growth for small and medium-sized local businesses related to the sector. We have achieved several achievements in this regard, through research and knowledge of our mineral resources, the implementation of transparency policies, community development, and participation in national and international mining trade shows.

## **How strategically important is mining for the Catamarca economy?**

In economic matters, it has a vital impact, since it represents 60% of the gross regional product. Catamarca is the country's first exporter of minerals, and from the impact of this activity ranks ninth in the ranking of total exports of Argentina.

## **Please explain recent developments with Agua Rica and its copper, gold, silver and molybdenum deposits.**

Agua Rica is a world-class site and naturally the province is very interested in developing it. We hope that it will soon be in operation, which will depend on various factors such as the international context, commodity prices and the business poli-

cies of the interested parties. We actively promote the dialogue of these interested parties for an early agreement. We are not only observers, we are active participants and the province is deeply involved.

## **How does the government of Catamarca plan to support the growth of the mining sector in the next year?**

We will continue to strengthen the policy we have developed in recent years with optimism because the new measures of the national government are very encouraging for the legal stability that is offered to investors. Catamarca, which chairs COFEMIN (“Consejo Federal de Minería”), is working on the new “Acuerdo Federal Minero”, which is a proposal of the national government so that the provinces agree on the guidelines of mining policy in a consensual way. Establishing these bases will clearly benefit the mining sector and the provinces, because it will gain competitiveness both globally and with respect to our neighboring countries.

## **What is the mining growth capacity of Catamarca?**

Catamarca is a mountainous area rich in minerals, and a large part of its territory still remains unexplored. We have world-class deposits, to which we add great geological knowledge. To this potential we add the support of competitive mining promotion policies and a lot of transparency and agility in the mining procedures with the participation of the communities. Our province has several deposits, of lithium, copper and gold. Our geology in the bordering zone with Chile is equal to that of the neighboring country, but our resources are intact. Today there is a huge opportunity boosted by the binational political decision to activate the "Paso Internacional San Francisco" gateway to the Pacific Ocean. Therefore, we are willing to encourage the implementation of binational projects. —

# Catamarca

## Requiring Reform

Catamarca has a rich orography with its most advanced projects concentrated around two regions—the lithium rich area in the north, and the copper and gold deposits near Tucumán—however, there are developing concessions littered across the entire province, with the provincial government hoping for mining to play a greater role in the Catamarcan economy than ever before. “We want to advance the positioning of the mining sector to become one of the pillars of the socio-economic development of the province, generating new opportunities for employment in the private sector and growth for small and medium-sized local businesses related to the sector,” explained Lucía Corpacci, the governor of Catamarca.

Mining already contributes to 60% of the province's GDP. More than 20 foreign mining companies are operating in the province, meaning that the presence of large companies in Catamarca represents 35% of the mining companies currently working in Argentina.

The most prominent metal operations include Agua Rica, a copper, gold and molybdenum deposit; Cerro Atajo, copper and silver; Vallecito, containing gold and silver; Futuro, a reserve of copper and gold and the gold and silver project Volcano of Antofalla.

The reason why Catamarca sits as the fifth most attractive destination in Argentina—dropping three places since 2012—largely concerns its misaligned governance between municipality and province and federal legislation. There have been land disputes in the north concerning whether or not the concessions belong to Catamarca or Salta, leaving investors wary of losing their rights or having to abide by different sets of rules while working on the same project. Additionally, one of Catamarca's most prospective projects, Agua Rica, has been put on hold due to a municipalities' discontent with the sector.

The Agua Rica project is located at the southern end of the Sierra de Aconquija, and the value of the minerals of Agua Rica is considered to be vast. The Andalgalá Deliberative Council banned opencast mining, a clear sign of rejection of the mega-project that would be the continuation of Agua Rica, which still awaits the approval of the Catamarca Ministry of Mines. Both the mining company Yamana Gold and the provincial government went to the Court of Justice to oppose the measure. The Court rejected the presentation of Yamana on formal issues and agreed to refer to the declaration of unconstitutionality requested by the State Attorney. So far, there has not been a resolution and local sources say there isn't expected to be one any time soon.



Image: Galaxy Resources

To combat the pushback, the provincial senate approved a controversial bill of "Coherencia Minera", by which it does not include in the distribution of royalties the municipalities that prohibit mining activity, instigated as a political reaction to the rejection of the Andalgalian court. “The large scale, multi metal Agua Rica project was added in 2007 and continues to offer significant potential to surface value for Yamana – It is not a project that fits our portfolio on our own but with the right partners it could create a lot of value, especially as we'd like to keep an interest in the potential gold production,” commented Mario Hernandez, vice president of Yamana Gold Argentina.

Farallon Negro, Bajo el Durazno and Bajo de la Alumbrera have been contributing to the local economy for years, all under the responsibility of YMAD (Yacimientos Mineros Aguas de Dionisio). The Farallón Negro-Alto La Blenda set has veins bearing manganese with gold and silver, located within the large volcanic complex. Bajo el Durazno, situated very close by, is operated by the Swiss firm Glencore (50% of the shares) and the Canadian companies Goldcorp (37.5%) and Yamana Gold (12.5%). YMAD has been developing the area since 1978.

Largely due to the production from Bajo la Alumbrera, Argentina ranked ninth in the world as a producer of copper and fourteenth as a producer of gold. In 1997, Australian and Canadian companies started production in agreement with YMAD, which owns the mining rights to the area. The production of Bajo La Alumbrera is 730,000 mt of concentrate containing 190,000 mt of fine copper. This process recovers 710,000 thousand oz of gold, due to the treatment of 80,000 mt/day of ore containing 0.51% copper and 0.64 g/mt gold. The mine is on its way into closure, so YMAD is interested in altering its strategic goals. “Now we must balance the operations in Farallón Negro, investing in the beneficiation

plant and developing new deposits,” stated Dr. Santiago Albarracin, president of YMAD. “We must start the reprocessing project of tailings in the plant; and participate in a new mining alternative project that could give the utility that the Minera Alumbrera was providing before its closure.”

This is Argentina’s largest open-pit operation, and it will continue to produce until the end of 2018.

## Lithium

In the early 1990’s, the company FMC-Minera del Altiplano was established in the Salar del Hombre Muerto, the main current producer of lithium products in Argentina and is the world’s second largest producer of lithium in brine. Many of FMC’s competitors do not want to be left behind in the race for lithium extraction, and Sal de Vida, Tres Quebradas, Salar de Antofalla and Ancasti are also seeking investors’ interest. According to local sources, the Tres Quebradas (3Q) venture will enter its exploratory phase in the coming weeks and, according to the preliminary studies, it offers the lowest amount of combined impurities of sulfate and magnesium in the world, requiring less processing. According to Tomás de Pablos, president of Liex, the company is authorized to begin exploring. “At the moment we are making the project feasible in order to know how and for how long we can work,” he said. Albemarle Corporation - of Rockwood Lithium - announced the signing of an agreement with Bolland Minera that contemplates the exclusive rights of exploration and acquisition of Salar de Antofalla. Albemarle Corporation, which now controls most of

lithium exports from Chile, will invest between \$8-12 million annually in Argentina. The company signed an agreement to obtain exploration and acquisition rights for the salar, which according to estimates has the potential to be one of the most promising in Argentina. Albemarle has said that its aim in the medium term is to have 50% of the world’s production of lithium, and is currently making concrete steps and purchases around the world to obtain that goal.

Sal de la Vida, owned by Galaxy Lithium, is a more advanced project, and construction is expected to start sometime in 2017, but the timeline will really depend on the progress at Mt Cattlin, their Australian lithium concession. “Our project features brine of very high quality, and the site has good access after more than 15 years of FMC operations nearby,” noted a Galaxy Resources executive based in Argentina. “The project will of course be challenging because machines and people do not work at the same pace at 4,000m altitude – but Galaxy will not have to face anything different from our peers.”

Unanimously, however, lithium investors agree that the struggles will be worth the headache. Even if the increase in usage of lithium announcements are that of an over optimistic politician, demand will still increase at a measurable extent. Within the Puna region overall, many potential producers have been challenged by access to finance and logistical difficulties since the initial wave of interest in the early 2000s. Of the initial seven lithium companies, only a select few have remained and been able to expand. Once a consensus is reached across the multiple layers of government that influence Catamarca’s accessibility, its lithium output surely has the potential to influence the global market. —



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## Santiago Albarracín

President

**YACIMIENTOS MINEROS DE AGUA DE DIONISIO (YMAD)**

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“

YMAD has started a new path, based on a different context. We now highlight the good will of employees and the authorities who see our work as vital for the Catamarca province's development as well as for overall mining in Argentina.

”

### Could you please provide an update on YMAD's recent developments and accomplishments?

On March 2016, the company began a new stage of its evolution. While new YMAD management actions took place, the Minera Alumbraera mine closed its operations at the same time, showing the necessity of designing a different strategy and with new development options. This year we faced the urgent and difficult task of balancing the company's incomes and outcomes, developing an action plan to continue and extend our own production in the Industrial Mining Complex Farallón Negro. During this first ten months, YMAD improved the production levels of its own operation of gold and silver by 20%. Additionally, we provide training practices and assist universities in the shaping of future mining generations around the country.

### After the security audits of Farallón Negro, how will the gold/silver mine be best equipped for production?

YMAD promotes and implements continuous optimization measures on productive processes, accompanying its undeniable commitment to the security and health of all its employees. Since the external audit took place in the Industrial Mining Complex Farallón Negro, we are starting an integral security management program contributing to production optimization.

### How do YMAD's operational standards promote energy efficiency and create value?

The mining department has planned a new method of exploitation. With the incorporation of new equipment, there will be a decrease in costs and a more efficient use of energy, resulting in production benefits and process safety optimization.

### What are the intentions and exploration plans for YMAD?

YMAD seeks to generate new projects, and it counts on geological places inside the mining concession with development potential.

### Could you please tell us about YMAD's relationship with academic institutions?

This year, we have continued bringing integral formation to the future mining generations. Geology students and mining engineers from the Universidad de Buenos Aires (UBA), Universidad Nacional de Catamarca (UNCA), and Universidad Nacional de Salta visited the Farallón Negro Mining Complex and shared activities with technicians and YMAD specialized personnel, enhancing their theoretical knowledge.

Also, students from technical schools, like the Escuela EPET N° 2 de Belén and the Escuela de Minería Bernardo Houssay, both from Catamarca and also the Escuela Minera de San Juan and the Escuela de Minería de Unquillo de Córdoba, learned the operative and productive processes of all the parts of a mine and a campsite.

The Ministry of Education, Science, and Technology (Ministerio de Educación, Ciencia y Tecnología) of Catamarca province, gave a recognition to YMAD this year for the intentions and collaboration it has on the students formation. Additionally, we recently received a special distinction on behalf of the Universidad Nacional de Salta, for providing supervised professional practices to its students.

YMAD is a place for learning and developing professionals and mining workers. Therefore, Farallón Negro has earned the recognition of a “School Mine”.

### What is the final message YMAD can provide to our readers and the international mining community?

YMAD has started a new path, based on a different context. We now highlight the good will of employees and the authorities who see our work as vital for the Catamarca province's development as well as for overall mining in Argentina. We will search for strategic partners to provide us with capital and technology. We have interesting projects in exploration, industrial development and the chance of partnering with a new mining project. This will further promote our work and increase mining progress for the province of Catamarca for the coming years. —



# CHAPTER 7

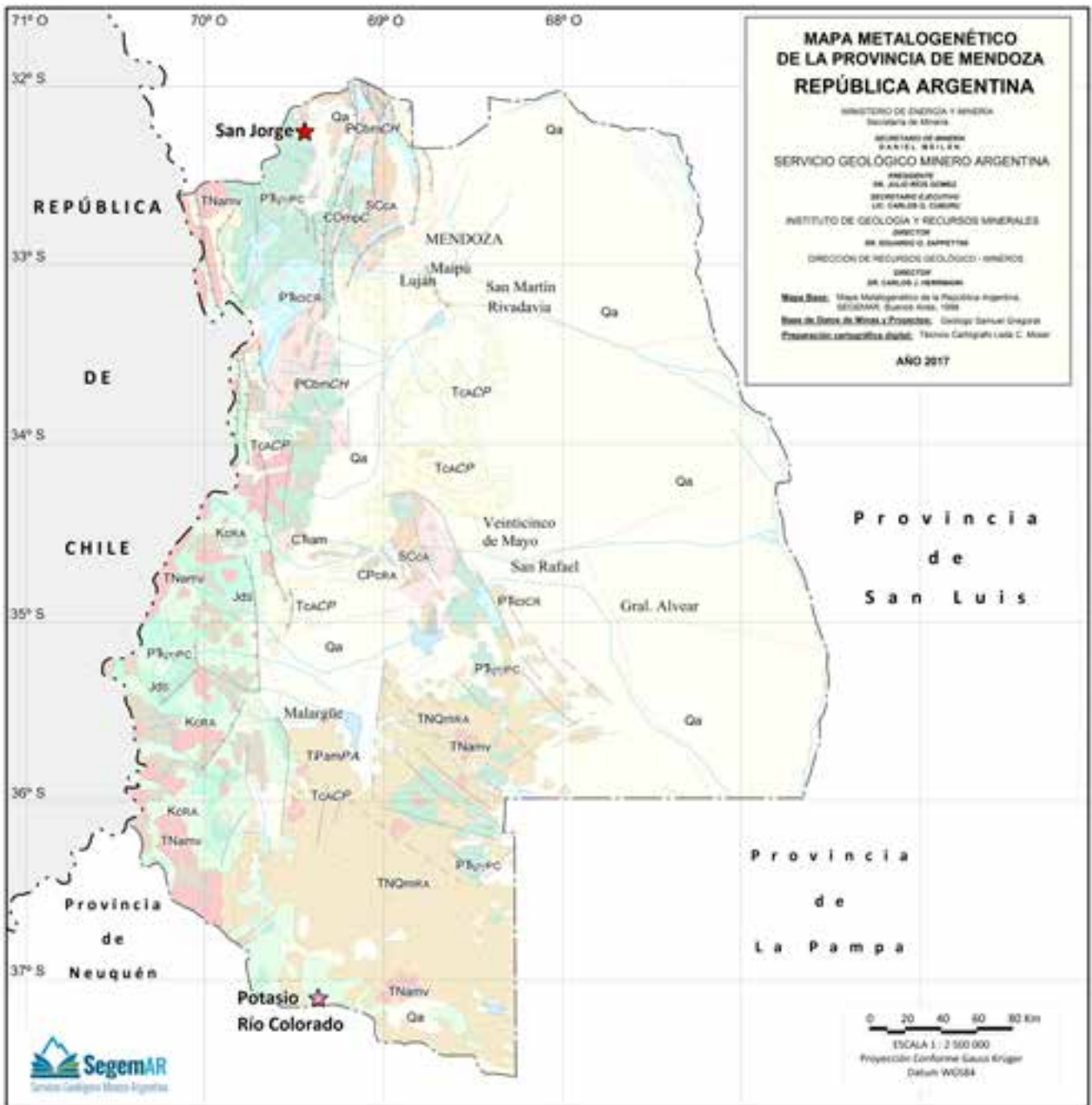
# MENDOZA & CHUBUT

“We seek to hear the voices for and against, from NGOs to business chambers. We want to create a space where everyone is heard in the same conditions. In this way, we will be able to define the bases for a state policy that allows us to recreate a dynamic, transparent and harmonious mining sector with the rest of the productive activities of the region.”

- Enrique Guñazú,  
Undersecretary of Energy and Mining for Mendoza.







### PRINCIPALES PROYECTOS MINEROS

- ☆ Proyectos mineros con exploración avanzada / construcción
- Cu - Au
- K

### UNIDADES TECTOESTRATIGRÁFICAS

- |   |  |
|---|--|
| ■ Qa. Depósitos aluviales, coluviales y otros. Holoceno     | ■ P <sup>RCiCR</sup> . Cuencas Intracratónica (Rift). Pérmico-Triásico             |
| ■ TNQmRA. Magmatismo de Retroarco. Pleistoceno              | ■ P <sup>TPyPC</sup> . Plateau Riolitico y Granitoides Post-colisionales. Triásico |
| ■ TNamv. Arco Magmático Neógeno Volcánico. Mioceno-Plioceno | ■ C <sup>Ram</sup> . Arco Magmático. Carbonífero-Triásico                          |
| ■ TcACP. Cuenca de Antepaís. Oligoceno-Plioceno             | ■ CPcRA. Cuenca de Retroarco. Carbonífero-Pérmico                                  |
| ■ TPamPA. Arco Magmático Paleógeno. Paleoceno               | ■ SCCA. Cuenca de Antepaís. Silúrico-Carbonífero                                   |
| ■ KcRA. Cuenca de Retroarco. Cretácico                      | ■ C <sup>0mpC</sup> . Margen Pasivo. Cámbrico-Ordovícico                           |
| ■ Jds. Depósitos de Subsidencia Térmica. Jurásico           | ■ PCbmCH. Basamento Metamórfico. Proterozoico                                      |



## Emilio Guñazú

Minister of Energy and Mining  
MENDOZA PROVINCE

66

“

In the past, the sector has been misused by politicians, who only support it when it is convenient. We need to implement policies to isolate the activity from the agendas of certain politicians who allow slanted information to get to the people. As a result of the misinformation, the mining industry is perceived negatively. We need to change the negative opinion and leverage factual information to reduce risks and environmental impact.

”

**Mendoza has a \$350 billion potential in mining. What is the government's plan to overcome the barriers and issues of the past?**

There has been a lack of direction to develop the mining industry in Mendoza and an absence of the state in an activity requiring government involvement to build long-term infrastructure. Environmental, social, and economic factors need to be looked at from a different perspective. We take into account communities and social interest groups to find a balance in the difference of opinions. However, we are not working for the benefit of these groups, but for the 90% of the people who need work and opportunities. We have to accommodate and find a balance between creating employment and respecting the environment.

**Public opinion in Mendoza and Chubut demonstrates a strong dislike of mining. How is the current government countering the stigma?**

In the past, the sector has been misused by politicians, who only support it when it is convenient. We need to implement policies to isolate the activity from the agendas of certain politicians who allow slanted information to get to the people. As a result of the misinformation, the mining industry is perceived negatively. We need to change the negative opinion and leverage factual information to reduce risks and environmental impact. Once government policies are in place, rules can be enforced to regulate projects as companies carry out their strategies built on information.

We are prepared to reduce royalties and create more costly projects to make environmental protection a priority. We can help support companies as they follow the policies. We strive to reach a middle ground with the people and the mining industry as well as receive support from all political sectors.

**There are increasingly more restrictions and regulations. What is the economic feasibility of following through with the changes?**

We are aware of costs increasing with regulations, but we are not willing to trade certain aspects of the environment for money. We need to make sure every step is secure.

**How is the government of Mendoza working with Vale?**

We have been in conversation with Vale for the last eight months, and the project will be moving forward. They have invested more than \$2 billion on the project and for different reasons the project stopped. They are considering selling the project and we are helping them build a competitive project. I am confident we can reach an agreement within the next two years for the new buyer to get the project up and running. We are being careful in order to seize the opportunity of the project, which will be the largest one to date.

**Could you highlight recent developments regarding sourcing and hiring local contractors?**

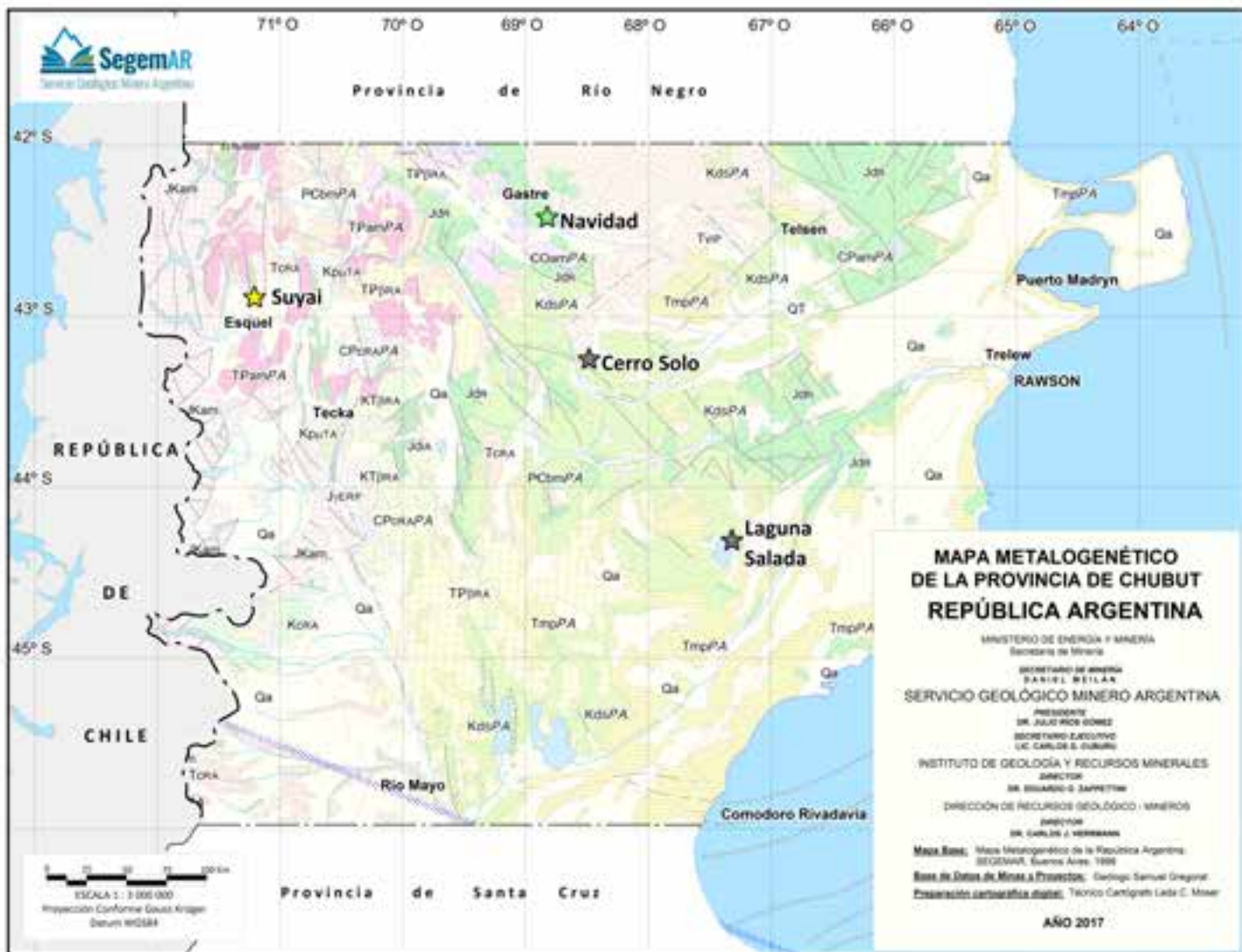
We are currently in discussion with the federal government with regards to this topic, trying to find a balance between the needs of the communities and the required competitiveness. We are in a reasonable situation and companies coming to invest in Mendoza will have no problem finding a talented workforce as well as local companies and services for hire. We are competitive enough for our companies to attain a piece of the project. We will work to level the ground for the national companies to compete with the international companies, as SMEs cannot compete with large corporations. At the end of the day, our goal in Mendoza is to improve people's lives—not to alter the world's balance sheet.

**What are your goals for future mining projects in Mendoza?**

We are working hard to solve the issues with Potasio Rio Colorado because we have more than 60% of the investment as well as social license. Therefore, we must solve the economic problem to secure the rest of the investment and move forward with the project. Mining is a long-term commitment and we understand that projects can take years to come to life. I am not working for tomorrow, but for the next 20 years.

**Please provide a final message for potential investors in Mendoza.**

Investors will need to be patient, as we will not sell what we do not have. Still, Mendoza is the best destination for investments in mining. —



### PRINCIPALES PROYECTOS MINEROS

- Minas en operación
- Proyectos mineros con exploración avanzada / construcción
- Au
- Ag
- U

### UNIDADES TECTONOESTRATIGRÁFICAS

- Qa. Depósitos aluviales, coluviales y otros. Holoceno
- QT. Salares. Plioceno-Holoceno
- TPβRA. Basaltos de Retroarco. Mioceno
- TviP. Volcánicas de Intraplaca. Paleógeno-Mioceno
- TmpPA. Margen Pasivo. Cretácico-Plioceno
- TcRA. Cuenca de Retroarco. Plioceno
- TPamPA. Arco Magmático Paleógeno. Paleoceno-Eoceno
- KpμTA. Rocas Máficas de Trasarco. Cretácico
- KTβRA. Basaltos de Retroarco. Cretácico-Paleoceno
- JKam. Arco Magmático. Cretácico-Jurásico
- KcRA. Cuenca de Retroarco. Cretácico
- KdsPA. Depósitos de Subsistencia Térmica. Cretácico
- Jdr. Depósitos de Rift. Jurásico
- JdiA. Depósitos de Intra-Arco. Jurásico



Image: Potrerillos Dam, Mendoza. Gabor Kovacs

# Mendoza & Chubut

*Unexplored and Unfriendly*

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Market insecurity and irregularities in price cycles have hampered mining investment globally, but Argentina's particular operational concern is its political fragmentation and provincial discrepancies. Due to an unclear and unjustified distribution of mining related tax revenue, some provinces have taken it upon themselves to effectively seize an inflow of cash from the mining operations taking place within their borders. Something President Macri is working to change is the small percentage of earnings that is redistributed to the local governments. It is the public's understanding that some mining unfriendly provinces merely do not view managing the industry as worth the hassle. Other provinces see it as being contrary to the public's demand for environmental consciousness and preservation. "Provinces have not banned mining from a formal perspective, however, they have elevated the environmental requirements to such levels, with norms that prohibit doing open pit mining, using cyanide and other chemicals, that they make mining economically impossible," explained Ignacio Celorrio, partner at Quevedo Abogados. "From my perspective, all these regulations are unconstitutional, but some provincial courts, such as Mendoza, have sanctioned them as constitutional. Some provincial authorities are scared of the social reaction to mining projects, and also you can see that people really do not know about how the mining industry works."

Mendoza and Chubut are the top examples of unexploited provinces, both with mining related bans that are keeping some of Argentina's richest provinces underexplored and underdeveloped. Both provinces abide by Law 5.001, which establishes certain prohibitions to mining, and Law 7.722, which prevents the use of cyanide and other pollutants in the industry. In addition, social organizations with strong anti-mining positions are actively involved in the debate concerning mining's future. Meanwhile, many multinationals remain waiting for a concrete resolution.

Pan American Silver, for example, has announced it would commit to an investment of more than \$1 billion to start mining one of the world's largest silver deposits, but the province of Chubut remains strictly anti-open pit, making the project unfeasible. Mendoza is undoubtedly the most mineral-endowed province, and mining in Mendoza could add additional export revenue of \$1.2 billion to the province, nearly doubling its output. Copper is its most prominent resource, but uranium is also teasingly available. The state government is appraising the situation and seeing how the state might benefit. According to Mario Chabert, head of the Cámara de Empresarios Mineros (the Mendoza Chamber of Mining): "As a chamber we are going to present scientific arguments about what mining leaves, the use of water, substances, and so on." "We seek to hear the voices for and against, from NGOs to business chambers. We want to create a space where everyone is heard in the same conditions. In this way, we will be able to define the

bases for a state policy that allows us to recreate a dynamic, transparent and harmonious mining sector with the rest of the productive activities of the region," said Enrique Guñazú, Undersecretary of Energy and Mining for Mendoza.

"We are looking for this sector to become an economic hub and generate jobs, as well as to look for investments with a serious policy," said Humberto Mingorance, Secretary of Environment for Mendoza.

### Uranium – The Power of Perception

Argentina is currently importing about 250 mt/y of uranium to satisfy demand for nuclear power generation, and there is enough uranium in the Mendoza and Chubut provinces to feed national consumption for the next century. Unfortunately, however, these are the provinces notoriously least friendly towards mining.

The Canadian uranium mining company U308 formerly owned concessions in Mendoza pre-2007 anti-mining legislation, but has since revamped its project portfolio in the equally challenging province of Chubut. U308 is the first mining company to enter into a partnership with a resource company that is owned by the Chubut provincial government. Open-pit mining and cyanide use are prohibited, and U308 has a method of surface extraction without generating a mine or using corrosive chemicals at all. Laguna Salada is a flat deposit in a semi-desert area, and the uranium extraction is quite simple. One must gather the gravel, screen out the pebbles, and then mix the uranium-vanadium component of the gravel with water, pumped to a plant, processed with baking soda, and the uranium is separated. "We must take care of the natural resources that we use as if we were working in our own garden, hence our use of environmentally sound mining methods," explained Richard Spencer, president and CEO of U308. "Hardy shrubs form the backbone of the Patagonian steppe environment, providing protection for smaller plants against the wind. These shrubs are the only thing preventing full scale desertification – and therefore our mining method ensures that the shrubs are removed ahead of mining and are immediately replanted in the gravel that has just been replaced after mining so that we maintain this first line of defence against the desertification that is prevalent in Patagonia."

The delicacy of the method paired with the government's push for domestically sourcing its uranium has shifted the way the public and private sector are categorizing this activity. Moving away from the somewhat negatively connoted term 'mining,' this process is being reframed as a necessary step in sustainable 'power production.' The Macri administration has a newly created Undersecretary of Nuclear Energy position, with the intent of creating many public-private partnerships for the honorable goal of energy self-sufficiency. At present, there are only three nuclear small modular reactors (SMR) being built—in China, Russia, and Argentina—which are the most advanced in nuclear production design, given the lesser up-front capital requirement and quicker cash flow returns. "The marketing strategy of the Argentine nuclear sector may be to offer a package that includes reactor design,

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construction, fuel and spent nuclear fuel storage. As it stands at the moment the only thing that they lack in this plan is the necessary fuel,” explained Spencer.

The shift in public opinion concerning uranium mining may also be achieved by crafting this type of ‘power production’ as a part of Argentine identity. “Agrochemicals and oil and gas have a type of tradition in Argentina. They have the big names, wealthy families and societal integration,” explained Ernesto Cussianovich, associate director of Poliarquia Consultores. “In mining this is not the case, as there are no national mining companies or producers.”

Argentines have shown they would rather invest in oil and gas or agriculture because they are more familiar. According to a study conducted by Poliarquia Consultores, YPF is a prime example of how patriotism can play into the success of an extractive industry. After the announcement of YPF’s nationalization, 64% of the population said they approved of YPF. Only one month later, that percentage had increased to 72%.

UrAmerica, an entirely Argentinian owned uranium company operating in Chubut, is helping to infuse uranium into Argentina’s story. Poll results show that Argentinians would like to have more nationals involved in mining, and Omar Adra, CEO of UrAmerica, is possibly a figurehead of this holistic strategy. “Uranium is not a free disposal mineral, so we are working very closely with the government in two ways,” said Adra. “Firstly, with the Ministry of Energy and Mining to sort out the energy deficit in Argentina. Secondly, with the Ministry of Science and Technology because

we are applying certain methods of production for the first time in Latin America.”

Once Argentines see mining as something of their own creation for their own benefit, this extractive business will be an easier venture, comparable to oil and gas. Multinationals, however, need to rise to the challenge of making this activity something environmental advocates and unemployed citizens alike can stand behind, by incorporating new sustainable technologies and replacing the stereotypical variables to the mining equation. “We see Argentina as a country with huge potential for renewable power due to the abundance of wind and solar resources and we want to play our part in using renewable power sources where they make economic sense,” said Spencer, who is incorporating solar power into his operational energy mix. “Wind is an incredibly powerful natural resource here in Patagonia, which is why we are also considering the development of a wind farm to provide renewable power for the project, but that also could be left behind for the people in the area to generate income after the mineral resource is depleted and the mine closes,” Spencer added.

Changing negative perceptions and stigma against the industry requires progressive innovation, and as Argentina pushes its mining agenda forward, the public sector should not necessarily be adding more taxes or red tape, but working together to develop sustainable infrastructure, generate more provincial income, and facilitate the development of communities in a clearly beneficial way. —

**Alex Stewart**  
**Argentina S.A.**  
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# Marcelo Tejada

General Manager

**ALEX STEWART ARGENTINA**

72

“

Now is the time to invest and establish themselves here especially with the movement that is being seen in lithium and the exploration in the south. Inflation will calm, and the industry is better now than in the past. There are great expectations.

”

## Can you please provide a brief history of Alex Stewart Argentina and its portfolio within the mining industry?

Alex Stewart participates in the preparation, as well as in the analysis, of geochemical, environmental, and mining samples. The company has three locations within Argentina; in Santa Cruz, Porto San Julián, and Porto Deseado, which has a minerals inspection office. In May, we established a new lab in Palpala where we prepare and analyze samples, meaning that we are the only lab that does not outsource any sample for analysis outside of Argentina. In addition, we hold at least 70% of the mining industry market in this regard. How has Alex Stewart achieved this impressive market share?

Alex Stewart is strategically located in close proximity to mining projects, offers a wide range of analyses, provides quality results, and has an excellent response time. For example, we analyze gold and silver samples in Prieto Moreno in just 20 hours. The employees there work 24 hours a day all 365 days of the year.

## How would you assess the ambiance of the mining industry in Santa Cruz, given the mine closures that are soon to take place?

Santa Cruz is like a triangle where there are many projects and explorations taking place. Two weeks ago, we founded a lab in Minado Nicolas. We finished construction and after February it will be operating in the mine. Santa Cruz is important because of the proximity it has to on-going projects and the exploration projects that have been taking place. Once the new mines open, there will be a lot of work in that region.

## What province do you think will give the most work to Alex Stewart in the coming years?

When exploration virtually disappeared a few years ago, our secret was to keep working with the companies that were in the extraction and production stages. Drilling is always going on around the mines. I think regarding metal mining, Santa Cruz is the most important. In regards to lithium, I would say that Jujuy comes first,

then Salta, then Catamarca. San Juan also has a substantial amount of copper. How does Alex Stewart plan to capture the influx of investment arriving in Argentina? In 2010, we became the only lab worldwide that was certified by the 17025 norm. We have the quality that was needed for that and we can assure trustworthy results.

## Should investors be concerned about the availability of technically qualified human capital?

There are good geologists, businesses, technicians, and engineers. Argentina is a country where if you open a business, there are parameters in place to enter the market and grow. Those parameters change; the price of the dollar, inflation, and taxes all make this country complicated, and a few years will have to go by before Argentina becomes more valuable in the eyes of the cautious investor. Argentina is amazing, but it is like a bucking bronco. Alex Stewart has a lot of freedom to grow, but it is difficult to explain to partners abroad the obligatory raises we have had to give out because of complications with unions, etc. Local knowledge is very important while working in Argentina.

## How necessary do you think foreign investment is for Argentina's mining development?

What is important is having Argentines themselves trust the economy. It is not just how the outside world views our situation, but the local perception of the situation within the country also matters. If the end of the year arrives and things look the same, and unemployment keeps growing, the people will not have any confidence to spend money and invest.

## Please provide a final message to the investors who are thinking of coming to Argentina.

Argentina is a land of opportunity. Now is the time to invest and establish themselves here especially with the movement that is being seen in lithium and the exploration in the south. Inflation will calm, and the industry is better now than in the past. There are great expectations. —





# Omar Adra

CEO  
URAMERICA

“

Uranium is not a free disposal mineral, so we are working very closely with the government in two ways. Firstly, with the Ministry of Energy and Mining to sort out the energy deficit in Argentina.

Secondly, with the Ministry of Science and Technology because we are applying certain methods of production for the first time in Latin America.

”

## **Please provide a brief history of UrAmerica.**

UrAmerica was established in June 2007, focusing its efforts on developing the properties it has successfully consolidated in the province of Chubut in Argentina, surrounding known high-grade deposits and historical mines. Despite the accident at the Fukushima Daiichi nuclear power plant and with the decrease in prices in the uranium sector, we received an investment of US\$10,000,000 from Cameco for 19.9% of the company and 18 months later we found one of the biggest uranium deposits in Latin America. The financial cycles were against us, but it is not an impediment to be successful if people have trust in you.

## **What are the key reasons why other companies can trust UrAmerica's vision?**

Cameco, AREVA, and other companies are interested in us because we manage the biggest basin of the region and we have resources. The junior sector has a crisis of trust but we have succeeded because we are not speculators. We are working to find more uranium for the benefits of the company and the country.

## **What are UrAmerica's next steps towards further development?**

Considering that Argentina has had no uranium production since 1997, our current goal is to supply Argentina for the next 25-30 years. We are talking with both international and local players to work together towards the country's energy self-sufficiency goal. Considering that we have discovered 19.1M lbs eU3O8 only drilling on 2.5% of our total area, we have significant exploration upside.

## **What kind of support is UrAmerica receiving from the government?**

Uranium is not a free disposal mineral, so we are working very closely with the government in two ways. Firstly, with the Ministry of Energy and Mining to sort out the energy deficit in Argentina. Secondly, with the Ministry of Science and Technology because we are applying certain methods of production for the first time in Latin America. We are talking with international In-Situ Recovery (ISR) experts and we are already promoting different documents

for the exchange of technology, which is unprecedented in Argentina. Advanced technologies is key for the development of uranium production which can further our positioning within the global nuclear sector, strategically aligning our future supply to China, India and any part of the world.

## **How advanced is Argentina's Small Modular Reactors (SMRs) initiative?**

Russia and Argentina are the most advanced countries in the development of SMRs and this technology is being rushed to be developed all over the world. The government is already committed to continue with this expansion and it is a very pragmatic decision considering all the knowledge of Argentina in the nuclear sector. As part of a long-term plan SMRs could position Argentina as an international reactors leader.

## **What are UrAmerica's expectations for meeting uranium demand for the coming 25-30 years?**

Production is on the horizon. The idea is to work with another company or player who can start providing uranium, pushing towards production in 36-48 months. Gradually, we will cover the supply of Argentina. In no longer than 5-10 years, we will achieve self-sufficiency considering the new reactors working in the country.

## **What is the potential for nuclear energy within Argentina's energy mix?**

Argentina has three nuclear reactors, Atucha I, Atucha II y Embalse, but only two are currently operative, because Embalse reactor is under life extension service. Currently, the nuclear energy share is 10%, but considering the energy demand of the country, the goal is to double this share. Before President Macri finishes his first period, Argentina aims to be producing uranium again. The biggest uranium producers in the world, not taking Canada or Australia into account, are Kazakhstan and African countries like Niger and Namibia. Compared to these countries, Argentina has great conditions for investment and the most important element is that we have domestic demand. You cannot plan mid-term or long-term without the conditions to supply with a right plan and the right partners, and this is a real challenge. It needs patience, courage and resources. —





# CONCLUSION



“Argentina is expected to grow by 3.5% within the next year. Positive changes are being made and, therefore, the market will be able to deal with growing pains and react accordingly over time.”

- Diego Calveti,  
Audit Partner and Head of Oil & Gas and Mining, KPMG  
Argentina.

# Policy stability and unification lead concerns

Consultants are saying that 2017 is the year where investments will clearly begin to arrive more fluidly in Argentina. In the face of a new macroeconomic scenario—following the lifting of trade obstacles and controls of the exchange market—the elimination on the restriction of purchasing dollars inaugurated a positive attitude towards doing business in Argentina, which began to normalize the country's internal market that was previously distorted by imbalances. In 2016, mining activity contracted, considering profits were offset by a drop in production and a slight decline in exports.

According to an IES Consultancy report, last year, the gross value added production of metalliferous minerals registered a continual fall of 6.3% during the first three quarters of the year, while the accumulated production of copper until September 2016 verified an increase by 60% in comparison to the same period of 2015. Due to the depletion of the Mina Pirquitas mine and decreased production from both Pan American Silver's Manantial Espejo and Austral Gold's Casposo, exports of gold and silver have decreased considerably. Four principal

mines producing either gold or silver are likely to close within the next three years.

Exports finished 2016 with a rise of 4.5% by value and a slight decrease of 1% in quantities compared to 2015. Foreign sales totalled \$3.934 million with shipments of 1,831,000 mt of minerals. The value imported was \$1,083 million, equivalent to an inter-annual decline of 26.9%, while volume of foreign purchases fell by 16.8%. Switzerland became Argentina's largest buyer last year, with a 27% share of the sector's total external sales measured in value. In second place was Canada, at 23.8%, followed by the United States, with a share of 11.1%. In fourth and fifth place were Japan and Germany, with 7.6% and 6.2% participation, respectively.

It is hard for projects to raise billions of dollars when there is a lack of certainty in international markets and particularly about countries like Argentina. Countries such as Peru and Chile are reducing royalties and making the environment for mining investors safer, but here some people in the provinces think mining is a cash cow, with free money for everyone. In previous commodity price slumps, there have still been companies spending money in Argentina, in order to be there when things change. That is not the case this time. Exploration risk – finding or failing to find resources – is intrinsic to mining, but investors now seem unwilling to accept any other risks; political or legal instability are out of the question.

Transparency and sustainability are the foundational elements in most need of development. Hesitancy towards confiding in Argentina would be less frequent if the government published its financial details online, perhaps monthly, outlining how much money is received, how much is spent, and what it is spent on. Presently, the amount of money in a province's bank account is a state secret, and the public is not completely aware of the planned and engineered projects in the governmental pipeline. In some states, such as San Juan, a majority of the government's income is related to mining, but the spending for further developing the sector is not necessarily present, or if it is, it is misunderstood.

Before mining majors pump more money into the ground, the overarching question of policy stability and unification seems to be delaying confirmed contracts and concrete agreements. However, many signs point to Argentina moving in the right direction, such as its bump upwards of two spots in the World Bank's 2017 Ease of Doing Business ranking. "Argentina is expected to grow by 3.5% within the next year," stated Diego Calvetti, audit partner and head of oil & gas and mining for KPMG Argentina. "Positive changes are being made and, therefore, the market will be able to deal with growing pains and react accordingly over time." The challenges are not to be ignored, as the development of the activity requires guaranteeing stable game rules before securing competitiveness. Marci's political challengers remain vocal with worrying statements and proposals to reverse the president's movements, including export tax re-introduction. Argentina's internal battle against mining is cultural, and San Juan's mining chamber president Jaime Bergé insisted: "It is necessary to stop installing the demagogical idea that Argentina can survive without mining, because that is a fallacy."

It will likely take a few years of reframing public opinion, more favorable commodities prices, and the effects of Macri's grand policy shifts to reap a notably calculable difference in production, but the hype for Argentina's mining future is charged by lithium and sustained by substantial resource speculation. "Most of our current work is related to gold mines," noted Dr. Alejo Sfriso of SRK Argentina, "and we expect this to continue in the coming years. It might happen that something new, like development of electric cars, acts as a game changer in Argentina." —

QUEVEDO ABOGADOS  
ATTORNEYS-AT-LAW

EXPERIENCE  
PERSONAL ATTENTION  
FOCUS ON COMPLEX  
MINING ISSUES

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# GEOLOGICAL POTENTIAL



## KEY EXPLORATION AREAS

- AREA 1** Santa Cruz
- AREA 2** Rio Negro & Chubut
- AREA 3** Neuquen & Mendoza
- AREA 4** Mendoza, San Juan & La Rioja
- AREA 5** La Rioja & Catamarca
- AREA 6** Catamarca, Salta & Jujuy

*Required exploration investment:  
USD 400 million/year*

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## MINING POTENTIAL

	MINING RIGHT GRANTED	AREAS WITH HIGH MINING POTENTIAL
<b>JUJUY</b>	9,600km <sup>2</sup>	>30,000km <sup>2</sup>
<b>SALTA</b>	5,000km <sup>2</sup>	>65,000km <sup>2</sup>
<b>CATAMARCA</b>	12,000km <sup>2</sup>	>75,000km <sup>2</sup>
<b>LA RIOJA</b>	13,450km <sup>2</sup>	>50,000km <sup>2</sup>
<b>SAN JUAN</b>	32,600km <sup>2</sup>	>60,000km <sup>2</sup>
<b>CORDOBA</b>	3,400km <sup>2</sup>	>40,000km <sup>2</sup>
<b>MENDOZA</b>	56,000km <sup>2</sup>	>75,000km <sup>2</sup>
<b>SAN LUIS</b>	2,200km <sup>2</sup>	>25,000km <sup>2</sup>
<b>NEUQUEN</b>	17,000km <sup>2</sup>	>50,000km <sup>2</sup>
<b>RIO NEGRO</b>	7,000km <sup>2</sup>	>70,000km <sup>2</sup>
<b>CHUBUT</b>	8,000km <sup>2</sup>	>75,000km <sup>2</sup>
<b>SANTA CRUZ</b>	15,070km <sup>2</sup>	>75,000km <sup>2</sup>
<b>TIERRA DEL FUEGO</b>	1,600km <sup>2</sup>	>10,000km <sup>2</sup>
<b>OTHER PROVINCE</b>	-	>50,000km <sup>2</sup>
<b>TOTAL</b>	183,000km <sup>2</sup>	>750,000km <sup>2</sup>

*High potential area pending exploration: 75%*



# Ignacio Celorrio

Partner

**QUEVEDO ABOGADOS**

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The Mining Code is a national law, but all the concessions and permits are granted at a provincial level, so the process might have some particularities depending on where you are. There is a universal trend towards more in-detail regulation, and processes therefore have become longer over the last years. Argentina has a good record in terms of the timelines to obtain exploration permits, but heavily depends on the province where the permit is.

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## **How does Quevedo Abogados work with the mining sector?**

We are a boutique law firm working on public and regulatory law, and within that I am in charge of the natural resources area, which is focused on mining, and which counts two partners and four associates. We are based in Buenos Aires, but we also work very closely with law firms located all around Argentina. When we work on a mining project, we always include in the team a lawyer from the province where the project is located.

Mining is key for Quevedo Abogados, and it represents over one third of the firm's activity. Up until last year, the clients' concerns had to do mostly with regulatory aspects and currency exchange, so our work was more 'defensive'. Now, as the sector is recovering, we have more work related to start-ups, creation of new entities, and the implementation of new exploration campaigns. There has been quite a lot of activity in lithium, but recently we are also seeing more interest in gold silver, zinc and graphite projects.

## **How streamlined are the processes to obtain permits and environmental impact assessment approvals?**

The Mining Code is a national law, but all the concessions and permits are granted at a provincial level, so the process might have some particularities depending on where you are. There is a universal trend towards more in-detail regulation, and processes therefore have become longer over the last years. Argentina has a good record in terms of the timelines to obtain exploration permits, but heavily depends on the province where the permit is. A typical mistake by companies, when they are in a rush to secure an area, is to give priority to the technical side, but then the bureaucratic delays affect the exploration campaigns they would like to run.

## **Do companies have easy access to the geological information?**

SEGEMAR, Argentina's geological service, has geological information about prospective mining areas in different provinces, but in the last years it has not offered the level of service the industry needs. Provinces runs their own mining registry, and San Juan and Salta recently uploaded an online version, but unfortunately we do not have a system like the Peruvian one managed by Ingemmet, where you can handle everything online. The national government is planning to do so soon,

but they will need provincial consent for that move.

## **How can the sector evolve when some provinces are prohibiting mining developments?**

Provinces have not banned mining from a formal perspective. However, they have elevated the environmental requirements to such levels, with norms that prohibit doing open pit mining, using cyanide and other chemicals, that they make mining economically impossible. From my perspective, all these regulations are unconstitutional, but some provincial courts have sanctioned them as constitutional (Córdoba and Mendoza). Some provincial authorities are scared of the social reaction to mining projects, and also you can see that people really do not know about how the mining industry works.

Right now the provinces that have clear limitations to mining development are Mendoza, Chubut, Córdoba, and San Luis to some extent. Then you have provinces that have seen conflicts with specific projects, and that has brought in some restrictions, like La Rioja, Catamarca and Río Negro, but mining can certainly be carried out in these provinces with due care. Two of the main projects facing issues are Suyai and Navidad, both located in Chubut.

## **What would be best strategy to create more trust in the mining industry in Argentina?**

The bottom line is that if there is no trust in the different institutions that connect mining activity with the general population, issues can raise an unnecessary complexity.

## **How have the recent macroeconomic changes improved the attractiveness of the country?**

Last year, the two main issues that worried mining companies were the export taxes, between 5% and 10% on the commodity value, and the existence of two parallel exchange rates. As President Macri took over the government, he solved these issues very quickly –repealing the export tax and setting and honest/market oriented exchange rate. These measures allowed some projects that were about to close because they were not profitable, to continue working. Our mining investment framework remains competitive. We have already seen companies coming in, like Fortuna Silver, who acquired Lindero. —

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## GEOLOGICAL-ECONOMIC INFORMATION OF THE MAIN MINING PROJECTS IN ADVANCED EXPLORATION/ FEASIBILITY STAGE IN THE ARGENTINE REPUBLIC

### JUJUY

#### CHINCHILLAS

Commodity mineral: SILVER - LEAD - ZINC

Measured Resources: 3.6 Mt @ 115 g/t Ag, 0.56% Pb, 0.38% Zn (13.3 Moz Ag).  
Indicated Resources: 30.6 Mt @ 88 g/t Ag, 0.85% Pb, 0.60% Zn (86.7 Moz Ag).  
Inferred Resources: 32.9 Mt @ 42 g/t Ag, 0.44% Pb, 0.76% Zn (44.5 Moz Ag).  
Investing Company: Golden Arrow Resources

#### PROVIDENCIA

Commodity mineral: SILVER - COPPER  
Inferred Resources: 1.01 Mt @ 166 g/t Ag, 0.08% Cu (5.34 Moz Ag)  
Investing Company: Meryllion Resource Corporation

#### MINA AGUILAR

Commodity mineral: SILVER - LEAD - ZINC  
Start of Production: 1936 – present  
Investing Company: Glencore  
Operating Company: Compañía Minera Aguilar S.A.

#### CAUCHARI-OLAROZ

Commodity mineral: LITHIUM - POTASIO  
Tried Reserves: 37000 t Li @ 679 mg/l; 302000 t K @ 5483 mg/l.  
Probable Reserves: 477000 t Li @ 665 mg/l; 3.86 Mt K @ 5395 mg/l.  
Measured Resources: 0.576 Mt Li @ 630 mg/l; 4.71 Mt K @ 5156 mg/l.  
Indicated Resources: 1.65 Mt Li @ 570 mg/l; 13.75 Mt K @ 4753 mg/l.  
Company: Minera Exar SA. (Lithium Americas)

#### MINA OLAROZ

Commodity mineral: Li - K  
Start of Production: 2015 – present  
Operating Company: Sales de Jujuy S.A.  
Investing Company: GOLDCOPPER Limited – Toyota - JEMSE  
Resources: 6.4 Mt Li carbonate eq; 19.3 Mt ClK y 1.85 Mt B (at at least 200 meters deep)

### SALTA

#### TACA TACA

Commodity mineral: COPPER - GOLD - MOLIBDENDUM  
Most Supergenic Primary: cut-off 0,2% Cu Eq.  
Indicated Resources: 2817 Mt @0.38% Cu; 0.011 g/t Mo; 0.07 g/t Au (23.54 Blb Cu; 6.9 Moz Au).  
Inferred Resources: 1396 Mt @0.31% Cu; 0.010 g/t Mo; 0.05 g/t Au (9.46 Blb Cu; 2.4 Moz Au).  
Investing Company: First Quantum Minerals Ltd.

#### DIABILLOS

Commodity mineral: GOLD - SILVER  
Indicated Resources: 0.6 Moz Au Ley 0.9 g/t y 77.1 Moz Ag ley 111 g/t.  
El Oculito:  
Inferred Resources: 0.2 Moz Au ley 0.8 g/t y 6.3 Moz Ag ley 27 g/t.  
Company: Silver Standard Inc.  
Modelo de mineralización: epitermal alta sulfuración.

#### LINDERO

Commodity mineral: GOLD  
Tried Reserves: 26.35 Mt @ 0.78 g/t (0.66 Moz Au).  
Probable Reserves: 56.18 Mt @ 0.57 g/t (1.03 Moz Au).  
Company: Fortuna Silver Inc. (local operator: Mansfield Minera S.A.)

#### EL QUEVAR

Commodity mineral: SILVER  
Indicated Resources: 7.05 Mt @ 141g/t Ag (31.78 Moz Ag).  
Inferred Resources: 6.16 Mt @ 152g/t Ag (30.15 Moz Ag).  
Company: Golden Minerals

#### RIO GRANDE

Commodity mineral: COPPER - GOLD - SILVER  
Indicated Resources: 55 Mt @ 0.342% Cu, 0.359 g/t Au y 4.38 g/t Ag (414 Mlb Cu; 0.635 Moz Au; 7.75 Moz Ag).  
Inferred Resources: 101 Mt @ 0.303% Cu,

0.308 g/t Au y 4.45 g/t Ag (673 Mlb Cu; 1 Moz Au; 14.3 Moz Ag).

Company: Regulus Resources Inc.

#### SALAR CENTENARIO

Commodity mineral: LITHIUM - POTASIO  
Company: Eramine Sudamerica (Eramet)

#### SAL DE LOS ANGELES:

Commodity mineral: LITHIUM - POTASIO  
Measured Resources: 194860 t Li @ 501 mg/l; 2.14 Mt K @ 5512 mg/l; 216807 t B @ 556 mg/l.  
Inferred Resources: 189130 t Li @ 410 mg/l; 2.06 Mt K @ 4489 mg/l; 232601 t B @ 505 mg/l.  
Company: Lithium X

#### SALAR DEL RINCÓN

Commodity mineral: LITHIUM - POTASIO  
Company: Enirgi Group  
Resources y Reserves: 1.2 Mt lithium carbonate eq.(probable reserve). 3.5 Mt lithium carbonate eq. (Measured and indicated Resources).

### CATAMARCA

#### AGUA RICA

Commodity mineral: COPPER - MOLIBDENDUM - GOLD - SILVER  
Measured Resources: 559 Mt @ 0.59% Cu, 295 g/t Mo, 2.99 g/t Ag y 0.25 g/t Au. ( 3.3 Mt Cu; 0.165 M t Mo; 4.5 Moz Au)  
Indicated Resources: 569 Mt @ 0.42% Cu, 328 g/t Mo, 2.58 g/t Ag y 0.16 g/t Au. (2.4 Mt Cu; 0.186 Mt Mo; 2.9 Moz Au)  
Inferred Resources: 290 Mt @ 0.30% Cu, 310 g/t Mo, 1.90 g/t Ag y 0.10 g/t Au. (0.87 Mt Cu; 0.09 Mt Mo; 0.93 Moz Au)  
Investing Company: Yamana Gold

#### CERRO ATAJO

Commodity mineral: GOLD - COPPER  
Company: Yamana Gold - Camyen  
Data mineralization (laws): Vetiform: from 0.6 to 10 g / Au; 1- 2% Cu; Disseminated 0.15% Cu.



**MINA FARALLÓN NEGRO**

Commodity mineral: GOLD – SILVER – (MANGANESO)  
 Start of Production: 1978 – present  
 Operating Company: YMAD (Yacimientos Mineros Agua de Dionisio)

**MINA BAJO DE LA ALUMBRERA**

Commodity mineral: COPPER – GOLD – MOLIBDENUM  
 Start of Production: 1997 – present (life span 1.5 years)  
 Operating Company: Minera Alumbrera Ltd (Glencore – Goldcorp – Yamana)

**MINA BAJO DEL DURAZNO**

Commodity mineral: COPPER - GOLD - MOLIBDENUM  
 Start of Production: 2015 – present  
 Operating Company: Glencore

**SALAR DEL HOMBRE MUERTO (Mina Fénix)**

Commodity mineral: LITHIUM  
 Start of Production: 1995 – present  
 Operating Company: FMC Litium

**SAL DE VIDA**

Commodity mineral: LITHIUM - POTAS-SIUM  
 Tried Reserves: 34000 t Li; 322000 t K.  
 Probable Reserves: 180000 t Li; 2.2 Mt K.  
 Company: Galaxy Resources Limited

**SAN JUAN****LAMA - PASCUA:**

Commodity mineral: GOLD – SILVER – (COPPER)  
 Tried Reserves y Probables: 385 Mt @ 1.4 g/t Au (17.36 Moz Au).  
 Indicated Resources y measured: 210 Mt @ 0.93 g/t Au (6.3 Moz Au).  
 Inferred Resources: 29 Mt @ 1.25 g/t Au (1.17 Moz Au).  
 Company: Barrick Gold

**JOSE MARIA**

Commodity mineral: COPPER - GOLD - SILVER  
 \*Indicated Resources: 1066 Mt @ 0.31% Cu, 0.22 g/t Au y 1.0 g/t Ag (3.3 M t Cu;

7.5 M oz Au; 34 M oz Ag).

\*Inferred Resources: 404 Mt @ 0.24% Cu, 0.15 g/t Au y 0.8 g/t Ag (0.97 M t Cu; 1.9 M oz Au; 10 Moz Ag).

\*José maría + Los Helados  
 Investing Company: NGex Resources Inc.

**LOS AZULES**

Commodity mineral: COPPER - GOLD - SILVER  
 Indicated Resources: 137 Mt @ 0.73% Cu, 0.07 g/t Au y 1.7 g/t Ag (1 Mt Cu; 0.3 M oz Au; 7.5 Moz Ag).  
 Inferred Resources: 900 Mt @ 0.52% Cu, 0.07 g/t Au y 1.7 g/t Ag (4.68 Mt Cu; 2 Moz Au; 49.2 Moz Ag).  
 Investing Company: McEwen Mining

**PACHÓN**

Commodity mineral: COPPER - SILVER  
 Measured Resources: 530 Mt @ 0.67% Cu, 0.013 Mo% y 2.44 g/t Ag. (3.55 Mt Cu, 68.9 kt Mo, 41 Moz Ag)  
 Indicated Resources: 1050 Mt @ 0.49% Cu, 0.011 Mo% y 2.0 g/t Ag. (5.15 Mt Cu, 115 kt Mo, 67 M oz Ag)  
 Inferred Resources: 1700 Mt @ 0.40% Cu, 0.01 Mo% y 2 g/t Ag (6.8 Mt Cu, 108 Moz Ag)  
 Investing Company: Glencore PLC

**ALTAR**

Commodity mineral: COPPER - GOLD - SILVER  
 Measured Resources: 1006 Mt @ 0.354% Cu, 0.092 g/t Au y 0.99 g/t Ag.  
 Indicated Resources: 1051 Mt @ 0.311% Cu, 0.067 g/t Au y 0.91 g/t Ag.  
 Inferred Resources: 556 Mt @ 0.283% Cu, 0.061 g/t Au y 0.88 g/t Ag.  
 Company: Stillwater Mining Company (Operadora: Minera Peregrine Argentina S.A.)

**CHITA**

Commodity mineral: GOLD – SILVER – COPPER - MOLIBDENO  
 Inferred Resources: 31.5 Mt @ 0.45% Cu, 0.07g/t Au, 2.2g/t Ag, 0.017% Mo  
 Company: Minsud Resources Corp.

**DEL CARMEN**

Commodity mineral: GOLD - SILVER  
 Inferred Resources: 31 Mt @ 1.01g/t Au y 11 g/t Ag (1.01 Moz Au; 10.96 Moz Ag)  
 Company: Malbex - Barrick

**FILO DEL SOL**

Commodity mineral: COPPER - GOLD - SILVER  
 Inferred Resources: 381 Mt @ 0.39% Cu, 0.33 g/t Au y 12 g/t Ag (1.48 M t Cu; 4 M oz Au; 147 M oz Ag).  
 Company: NGex Resources Inc (Filo Mining)

**HUALILAN**

Commodity mineral: GOLD  
 Company: La Mancha Resources

**MINA VELADERO**

Commodity mineral: GOLD  
 Start of Production: 2005 – present  
 Operating Company: Barrick

**MINA CASPOSO**

Commodity mineral: GOLD - SILVER  
 Start of Production: 2011 – present  
 Operating Company: Troy Resources

**MINA GUALCAMAYO**

Commodity mineral: GOLD  
 Start of Production: 2009 – present  
 Operating Company: Yamana Gold Inc.

**CHUBUT****NAVIDAD**

Commodity mineral: SILVER – LEAD – (COPPER)  
 Measured Resources: 15.4 Mt @ 137 g/t Ag, 1.44% Pb y 0.10% Cu. (67.5 Moz Ag).  
 Indicated Resources: 139.8 Mt @ 126 g/t Ag, 0.79% Pb y 0.04% Cu (564 Moz Ag)  
 Inferred Resources: 45.9 Mt @ 81 g/t Ag, 0.57% Pb y 0.02% Cu (119 Moz Ag)  
 Investing Company: Pan American Silver Corp.

**SUYAI**

Commodity mineral: GOLD  
 Resources: 4.7 Mt @ 15 g/t Au (2.26 Moz Au)  
 Company: Yamana Gold Inc.

**LAGUNA SALADA**

Commodity mineral: URANIUM - VANADIUM

Indicated Resources: 47.3 Mt @ 60 g/t U3O8, 550 g/t V2O5.  
Inferred Resources: 20.8 Mt @ 85 g/t U3O8, 590 g/t V2O5.  
Company: U3O8

### CERRO SOLO

Commodity mineral: URANIUM  
Company: National Commission of Atomic Energy

## SANTA CRUZ

### JOAQUIN

Commodity mineral: SILVER - GOLD  
Measured Resources: 4.3 Mt @ 5.63 oz/t Ag y 0.03 oz/t Au.  
Indicated Resources: 6 Mt @ 4.59 oz/t Ag y 0.04 oz/t Au.  
Inferred Resources: 0.65 Mt @ 4.17 oz/t Ag y 0.03 oz/t Au.  
Company: Pan American Silver Argentina S.A.

### LA JOSEFINA

Commodity mineral: GOLD - SILVER  
Measured Resources: 5 Mt @ 0.72 g/t Au y 16.60 g/t Ag.  
Indicated Resources: 1.5 Mt @ 0.83 g/t Au y 1.81 g/t Ag.  
Inferred Resources: 0.45 Mt @ 0.45 g/t Au y 1.21 g/t Ag.  
Investing Company: Hunt Mining Corporation

### LAS CALANDRIAS

Commodity mineral: GOLD - SILVER  
Indicated Resources: 11.8 Mt @ 1.29 g/t Au y 17.4 g/t Ag.  
Inferred Resources: 0.87 Mt @ 0.93 g/t Au y 5.2 g/t Ag.  
Calandrias Sur-Norte-Brecha: 0.16 Mt @ 9.35 g/t Au  
Company: Mariana Resources

### CAPITÁN OESTE

Commodity mineral: GOLD - SILVER  
Indicated Resources: 7.79 Mt @ 2.93 g/t Au; 99 g/t Ag. (1.197 Moz AuEq)

Inferred Resources: 2.37 Mt @ 1.52 g/t Au; 52.5 g/t Ag. (0.19 Moz AuEq)  
Company: Patagonia Gold SA

### PINGÜINO

Commodity mineral: GOLD - SILVER  
Indicated Resources: 7.32 Mt @ 169.64 g/t Ag Eq.  
Inferred Resources: 35.4 Mt @ 123.63 g/t Ag Eq.  
Resources (globales): 52.58 Mt @ 84.32 g/t Ag eq (15.1 g/t Ag; 0.148 g/t Au; 0.28% Pb; 0.718% Zn; 6.346 g/t In)  
Company: Austral Gold Ltd.

### VIRGINIA

Commodity mineral: GOLD - SILVER  
Indicated Resources: 1.2 Mt @ 310 g/t Ag (11.9 Moz Ag).  
Inferred Resources: 0.46 Mt @ 207 g/t Ag (3.06 Moz Ag).  
Company: Mirasol Resources

### COSE

Commodity mineral: GOLD - SILVER  
Indicated Resources: 23500 t @ 52 g/t Au; 1665 g/t Ag.  
Inferred Resources: 15600 t @ 52 g/t Au; 1665 g/t Ag.  
Company: Patagonia Gold SA

### LA MANCHURIA

Commodity mineral: GOLD - SILVER  
Indicated Resources: 0.425 Mt @ 2.25 g/t Au; 135 g/t Ag (55684 oz Au Eq).  
Inferred Resources: 1.47 Mt @ 1.53 g/t Au; 49.4 g/t Ag (90682 oz Au Eq).  
Company: Patagonia Gold SA

### EL DORADO – MONSERRAT

Commodity mineral: GOLD – SILVER  
Company: Samco Gold S.A.  
Mineralization (law data): Perforations: selected intercepts of 5.08 m with 11.2 g / t Au and 115.48 g / t Ag, including 2.74 m with 20.2 g / t Au and 8.2 g / t Ag (main vetiform system) between 40.7 m and 46.9 m; And 4.70 m with 5.02 g / t Au and 14.17 g / t Ag (West Montserrat). Surface: Samples in channel with average of 18.45 g / t Au and 417 g / t Ag (intervals of 5-20 m). Samples in trenches up to 13.78 g / t Au and 224.6 g / t Ag.

### MINA CERRO VANGUARDIA

Commodity mineral: GOLD - SILVER  
Start of Production: 1998 – present  
Operating Company: Cerro Vanguardia (AngloGold Ashanti – Fomicruz)

### MINA SAN JOSÉ-HUEVOS VERDES

Commodity mineral: SILVER - GOLD  
Start of Production: 2007 – present  
Company: Hochschild Minnig – McEwen Mining

### MINA MANANTIAL ESPEJO

Commodity mineral: SILVER - GOLD  
Start of Production: 2009 - present  
Operating Company: Pan American Silver Corp.

### MINA CERRO MGOLD

Commodity mineral: GOLD - SILVER  
Start of Construction: 2015 (under construction)  
Operating Company: Yamana Gold Inc.  
Resources – Reserves: 1.49 Moz Au eq (Indicated Resources) y 0.49 Moz Au eq. (Inferred Resources)

### MINA CERRO NEGRO

Commodity mineral: GOLD - SILVER  
Start of Production: 2015 – present  
Investing Company: Goldcorp Inc.

### MINA LOMADA LEIVA

Commodity mineral: GOLD  
Start of Production: 2011 – present  
Company: Patagonia Gold S.A. - Fomicruz

### MINA DON NICOLÁS

Commodity mineral: GOLD – SILVER  
Start of Construction: 2014  
Resources – Reserves: 197.000 oz Au y 400.000 oz Ag  
Investing Company – operadora: Minera Don Nicolás S.A.

### MINA RIO TURBIO:

Commodity mineral: COAL  
Start of Production: 1943  
Operating Company: YCRT Yacimientos Carboníferos Río Turbio.

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