Some relevant issues for the mining sector in 2018

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A change in trend

In the last two years, there has been a recovery in international prices, which has triggered an upturn in the sector. Lithium reserves attract global investors given the rising demand. Expectations have been created by the mining regulation reform and the new federal agreement with provinces.

Introduction

By the end of the first half of the term of the current administration, which has strengthened its position after mid-term elections, it is necessary to analyze in detail the performance of production sectors affected by the measures adopted in the last two years, mainly, primary sectors, such as mining, which was facing a considerable slowdown.

Mining is an outstanding industry within the national production system. In terms of its contribution to the performance of the economy, this sector accounts for around 3% of the GDP[1] (*Exploitation of Mines and Quarries*, including oil and gas) and 6% of total national exports (*Mining and Fuels*). In addition, although its contribution to domestic employment is not significant[2], the *Input-Output Matrix* (IOM, 1997) prepared by the Argentine Institute of Statistics and Census (INDEC) shows that mining is one of the largest generators of indirect employment (around three indirect positions per direct position created by the sector)[3], whereas its products are highly demanded as supplies of productive and industrial processes of other economic activities[4]. For example, while metallic minerals (such as iron, aluminum, copper, zinc and platinum) are used intensively in the automobile and electronics industry, stones for construction such as limestone, sandstone, concrete and crushed stone are highly demanded in the construction sector.

Independently of its potential, mining is facing a period of stagnation due to a combination of various factors. If the external situation is analyzed, the fall in the prices of the main mining and energy commodities has posed a serious obstacle for investments in exploration and extraction, both globally and locally. In fact, the figures for the last ten years show that except for lithium (which went from USD/Tn. 3500[5] in 2007 to around USD/Tn. 7500 in 2016), gold, silver, copper, lead, zinc and aluminum have evidenced an important decrease in their prices. For example, the World Bank's statistics show that between 2012 and 2016 the price of gold went down by 25%, the price of silver

[1] This figure is related to its share in the GDP in US dollars.

[2] According to statistics available at the Argentine Ministry of Labor, Employment and Social Security (MTEySS), mining directly employs more than 22,000 people (considering the registered employment in the private sector, without taking into account the oil and gas industry), the majority of which are employed by the metallic mining sector.

[3] Well over the average which, according to this source, would account for around 1.7 additional positions per direct position.

[4] According to the IOM, approximately 70% of the gross production value (GPV) of *Exploitation of Mines and Quarries* (including oil and gas) is allocated as a supply for the production of other assets.

[5] In US dollars per ton of lithium carbonate equivalent (LCE).

decreased by 45% and the price of copper fell by 40%. Although there are some signs of certain upturn in this sense (as the prices of gold and silver, among others, have recovered during 2017), the flow of investments in the national mining sector would not take place until this trend is confirmed and, at the same time, certain domestic items are adjusted.

In fact, in addition to the fall in international prices starting at the beginning of the decade, other off-market aspects were faced, which discouraged investments and had an effect on the local production of minerals for many years (even during the period of increases in foreign prices, when although the sector evidenced certain recovery, this opportunity was lost due to internal issues). Some of these aspects were the following: i) the export duties imposed on a sector where most of production is placed abroad, ii) the macroeconomic problems seen in inflation in prices and costs, iii) the impossibility of remitting profits abroad, together with the so-called "cepo cambiario" (exchange restrictions), iv) the conflicts derived from environmental sustainability issues and v) the uneven behavior of investment (primarily of foreign direct investment or FDI) which, as a consequence of the previous aspects, showed a downward trend in the 2012-2016 period. As a matter of fact, as per the figures disclosed by ABECEB[6], the total mining investment went from USD 21.5 billion in 2012 to approximately USD 8 billion in 2016, accounting for a 64% fall in US dollars (although most of this fall is explained by the collapse in international prices, rather than internal factors).

All these measures, such as the elimination of most of these restrictions, primarily the "*cepo cambiario*" and restrictions relating to foreign transfers (either to pay for liabilities, investments or to remit profits abroad), together with the elimination of export duties imposed on certain commodities and finished products, the tax benefits applicable to the import of capital assets and the removal of the obligation to locally settle the foreign currency resulting from the exports of hydrocarbons and mining products are intended to promote investment and production in every sector of the economy. These changes were added to other more general changes[7] which had the same objective. In spite of the changes implemented, most of the sectors that benefited from these measures evidenced, during 2016 and in the first months of 2017, an uneven performance which was unable to change the trend noted until 2015.

However, the potential of this sector towards the national economic development is worth noting. In addition to the contribution of mining to the GDP, employment and national exports (which in 2016 were over USD 3.3 billion), this sector makes a considerable contribution to the public budget that cannot remain unnoticed (according to the figures provided by the Argentine Chamber of Mining Business -CAEM- in 2016, the tax contribution of mining was around ARS15 billion in connection with royalties, income tax, turnover tax, social security withholdings and contributions, value added tax, provincial rates, rentals, among others) as well as the productive potential derived from the considerable natural resources within the country which, compared with other countries of

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[6] "*La minería en Argentina. Incrementar competitividad para aprovechar su potencial*". ABECEB-CAEM, January 2017.

[7] These changes include: i) the restructuring of tariffs of utilities and the progressive elimination of subsidies to gas and electricity (seeking to adjust market prices and encourage investment in the production of oil and, mainly, gas); ii) the *Plan Gas* and the program of subsidized prices for the production of unconventional gas (*Programa Estímulo a la Producción de Gas No Convencional 2018-2021*); iii) various programs to encourage employment (union agreements, primarily in terms of payment of hours incurred in travelling to the workplace (*horas taxi*), peripheral work, working days and tax matters); and iv) laws on the access to public information (No. 27275) and public-private partnerships (No. 27328).

the region, has not been exploited yet, either due to external (low prices) or internal (obstacles to investment) restrictions.

Moreover, as from 2017, production and investment figures seem to have started to show certain changes compared with prior years. According to the information gathered by the INDEC, until the second quarter of 2017, the production value of mining might be changing its trend, which would imply a better performance in 2018 and subsequent years. In terms of investments, lithium, the new mineral of the moment, might be helping change the uneven behavior noted up to 2016, with important news for the sector, such as the announcement made by the Canadian Enirgi Group (ADY Resources), which will invest around USD 720 million to build a lithium processing plant in Salta that will become the biggest worldwide (and would be operating by 2019)[8]; the decision of Sales de Jujuy (owned by Orocobre Group) to disburse USD 200 million for the construction of a new lithium plant in Jujuy; or the news that the mining company Exar will invest ARS 500 million in the lithium project of the salt pan Caucharí-Olaroz[9]. Furthermore, there has been an increase in the demand for stone for construction in response to the growth in the investment in public works, which will surely bring investments to the sector.

Given this situation, the changes shown in the mining sector from now on, both locally and internationally, and the difficulties faced in 2018, will be key to understand the future of the sector. Therefore, this report is intended to describe some of the items of the mining sector's agenda for 2018, emphasizing, for the purposes of analyzing its development, how external prices of the main minerals and the performance variables of the sector will change. To this end, the following matters are discussed: i) the Federal Mining Agreement (FMA) as the new regulatory framework for the sector development, ii) the behavior of prices and their impact, iii) the most recent performance of the national mining production and, finally, iv) the social license to operate and the environmental impact.

1. Federal Mining Agreement and new regulatory framework for the development of mining at a national level

In 2016, the government began to take various measures to reactivate production and promote investments in sectors which had been neglected and restricted for many years, basically, through tariff (withholdings) and para-tariff (quotas, non-automatic licenses, administrative restrictions, etc.) systems applied to the exports of the agribusiness, mining and industrial sectors (particularly to the production of oils). The elimination of export duties in these sectors was the first step, as, according to the government, such duties had a negative effect on the profitability of companies and increased operating costs, with the resulting effect on production, employment and investment.

In the case of mining, Decree No. 349/2016 eliminated those duties arguing, among other reasons, the negative impact on profit margins of companies and their investments, the competitiveness loss compared with other producers (due to the increase in costs entailed by withholdings on a purely exportable product), the fall in the level of direct employment (and the indirect generation of positions in other sectors), the fall/stagnation of prices of most of mineral

[8] "*Litio: Enirgi Group (ADY) anuncia plan de inversiones en Salta*". EnerNews, September 16, 2017.

[9] "*Hablemos de Minería. Información sobre la industria que hace crecer al país*". CAEM, June 19, 2017.

commodities in the period 2011-2015 (except for lithium) and the impossibility, in the previous context, of establishing a fair tax regime to maximize the benefits of mining in the regions under operation (as the duty or withholding was not a tax falling within the scope of the Tax Sharing System). Although the elimination of withholdings on the mining sector (as well as on the agribusiness and the industry) implied a significant loss of fiscal revenues during 2016, future profits are estimated to be higher given the expected increase in employment, exports and production, which will also contribute to raise the treasury's coffers based on the nominal increase to be experienced by the taxes payable by the companies (for example, income tax and turnover tax).

This measure was accompanied by the so-called Federal Mining Agreement, an agreement signed by most of the mining provinces (La Pampa and Chubut did not adhere because they did not accept the exploitation of mineral resources in their jurisdictions) and approved by the national government in June 2017. This agreement is intended to renew the regulatory framework effective up to now (i.e. the Mining Activity Law No. 24196 of 1993) and promote the development of national mining.

Based on the promotion of general welfare (i.e. environmental sustainability), the creation of a regulatory framework fostering public-private investment and giving back to the provinces –the original owners of the natural resources therein found– a higher share in profits from mining exploitation, and acknowledging that, if responsibly and sustainably carried out, mining has a potential for the significant contribution to the economic development of the country, the FMA seeks the following (to achieve such objectives): i) set general criteria to determine the royalties paid by extraction industries, at 3% of the gross sales value, II) set an additional tax of 1.5% of that value to create a provincial fund aimed at financing and developing waters and environmental control works (known as *Provincial Infrastructure Fund*), iii) establish the bases for reaching regional agreements intended to encourage investments, and iv) establish that concessions shall be effective as long as there is mineral to be extracted at deposits and the agreed tax conditions are maintained for a period of 30 years (pursuant to Law No. 24196). Finally, v) the FMA stipulates the creation of a *land survey body* for mining and vi) it broadens sanctions imposed on companies breaching environmental guidelines, providing for a maximum of three infringements of this kind before the mine is closed and the concessionaire loses its right to exploit the deposit.

Accordingly, the FMA establishes that, with the exception of Santa Cruz[10], the provinces cannot demand investors a payment over 4.5% of the amount invoiced. Moreover, pursuant to the Argentine Mining Code (CMN) [11], the provinces can establish the regime applicable to the management of revenues from royalties earned (or to be earned), provided any such regime observes the equity, transparency and fairness principles and seeks that those revenues be assigned on a priority basis to the development of production projects or associated services, social

[10] The *Infrastructure Fund* of that province has already been assigned a maximum of 2% and has decided to preserve this right.

[11] The Argentine Mining Code (AMC), the original text of which was drafted in 1887, serves as a basis for the Argentine mining legislation. This code adopted, in principle, the royalty-based theory by which the subsoil and its wealth were owned by the State, and private exploitation was enabled. The AMC was amended in the 50's (to include fuel and nuclear minerals), in the 80's (by Law 22259 on incentives to private investment) and in the 90´s, by Laws 21382 (on foreign investments), 24196 (on mining activity), and 24498 (which amended the AMC and transferred ownership of natural resources to the provinces, enabling the creation of state-provincial mining companies). Furthermore, it is governed by Law 24585 of 1995 (on environmental protection for the mining activity), 25161 of 1999 (on mineral pithead price), 25429 of 2001 (which amended Law 24196) and 25675 of 2002 (General Environmental Law).

infrastructure works, environmental education, training and/or control, and that the areas near the mining project giving rise to those revenues be prioritized.

However, the agreement faces two significant obstacles: the environmental factor[12] and its discussion and approval by the Argentine Congress. In the first place, environmentalist organizations are concerned about the effects that the new regulation may have on the delimitation of forbidden areas for mining exploitation and the potential conflict that might derive from the glacier protection law[13] (Law 26418). On the other hand, the Government sustains that the FMA will be aimed at protecting the environment and bring economic benefits to the country upon a potential boom of mining (mainly to the areas directly involved), which will have a positive impact on employment, production, exports and inflow of foreign currency. In the second place, it is essential that the agreement be approved by the Argentine Congress and then confirmed by signing provinces. Taking into account the environmental factor, the fact that certain provinces refused to sign the agreement and the fact that the CAEM has proposed certain changes to some sections (mainly in terms of how to determine royalties, where the chamber proposes a progressive scheme supporting the development of investments under a variable system based on the generation of earnings by each mining project and not on its sales; as well as in terms of the absence of other matters related to competitiveness, such as labor production and logistics costs)[14], the FMA has many obstacles to be solved, for which it may be subject to changes in Congress, in line with the sector's demands and the regulations required for its development.

2. The behavior of prices

The negative trend shown by the prices of most of mining products in the period following the cycle of increases beginning in 2003, which in the case of minerals lasted until 2011, seems to have changed since 2016 (see Figure 1). Except for lithium, the price of which has kept on growing since 2005, from USD/Tn. 1460 to an average of USD/Tn. 7470 in 2016 and USD/Tn. 9100 in the first months of 2017, the price of the other mining commodities (gold, silver, zinc, lead, copper and aluminum) started to recover in 2016, and confirmed the trend in 2017. Even though the prices of gold and silver, for example, grew by 8% and 9%, respectively, in 2016 (compared with 2015), in December 2016 and September 2017, they increased by 14% and 6%, respectively. Similar cases were seen for zinc and lead, which had a recovery of 17% and 7%, respectively, in the same period, and for copper, which although suffered a 12% fall in 2016, recovered by 18% in the first half of 2017.

The main reasons for the behavior evidenced in the prices of minerals for the last years are explained by the growth in the demand for production supplies and factors of emerging countries (intensively used, they were one of the main drivers of the increases in the prices of commodities in the period 2003-2014 –mainly China–), the subsequent oversupply (when China started to decelerate its growth and ceased to exert pressure on the international demand, thus giving rise to a surplus in the supply of commodities and a decline in prices); and, finally, the fact that prices began to grow again as from 2016 which, however, is expected to reach a limit given by the remaining oversupply of mining products and by the demand from China, whose growth is less

[12] This item is discussed in detail in the fourth section.

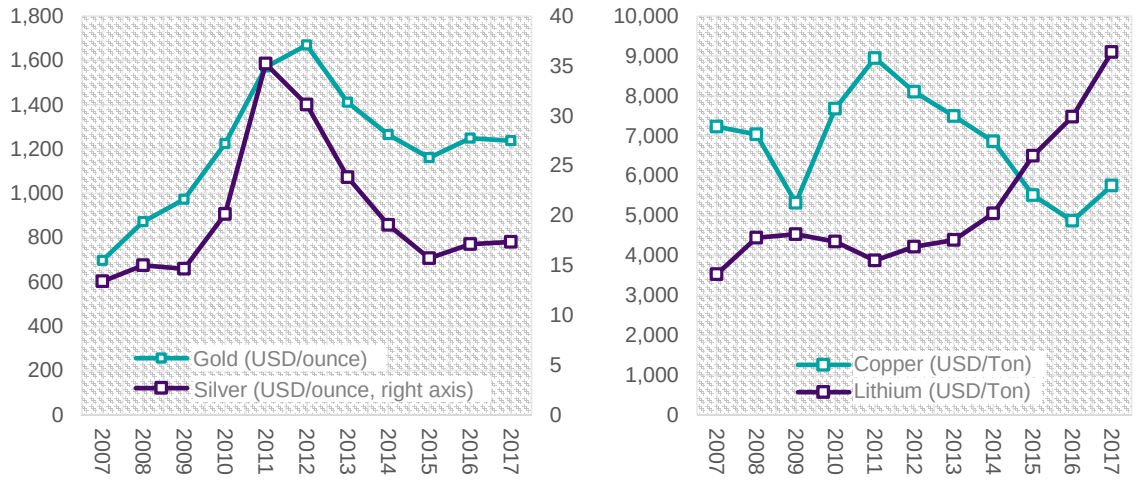
[13] "*El gobierno apuesta a duplicar la inversión en minería*", La Nación, January 30, 2017.

[14] "*El gobierno firma un nuevo Acuerdo Federal Minero*", TELAM, June 2017.

intensive[15] and which is gradually shifting to an economy based on consumption (with a stable demand for commodities and a rise in the demand for more finished products), as well as the demand from other countries which have started to recover.

Logically, as a result of the 6-year period of deceleration in prices, global investment flows were aimed at other productive sectors and/or other less risky assets. Consequently, mining projects already started up lost resources, and other potential projects that were under the preexecution stage changed expectations, as their technical-financial feasibility became outdated, since it was based on projected, overestimated prices (and values ended up being much lower than projected). However, as a result of the upturn of prices in 2016 and 2017, mining might reverse its course and improve mid-term prospects, though it will depend on the effective recovery in prices in the next months; still far away from the levels reached in 2011-2012.

Figure No. 1
Changes in the main (metallic) minerals
Period 2007-2017
(USD per ton/ounce)



Note: the series of prices disclosed in the previous figure results from the average of monthly figures. For 2017, the average for the first half of that year was taken into account
Source: Prepared by KPMG based on World Bank data, 2017.

In Argentina, in addition to the consequences of international prices, other local factors were experienced, primarily tariff restrictions and the considerable lack of incentives, which the Government intends to solve with the elimination of tariffs, the execution of a federal agreement among mining provinces and the changes in laws applicable to the activity. However, the role that lithium is currently playing within the production system of Argentine mining is worth mentioning. Argentina, which together with Chile and Bolivia (whose reserves are still not being exploited) is part of the so-called “lithium triangle", has important deposits of this mineral (around 128 million tonnes

[15] According to the International Monetary Fund (IMF), growth projections of the Asian giant have become stable at around 6% annually through 2022, which necessarily implies a stabilization in its demand for supplies.

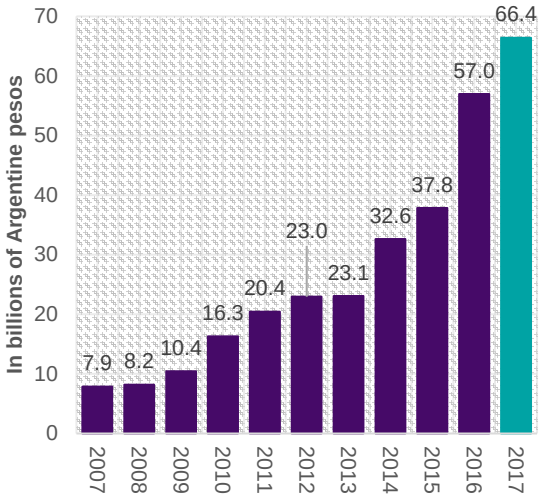
of lithium carbonate equivalent (LCE), mainly in the provinces of Jujuy, Salta and Catamarca; this figure represents from 10% to 15% of the total global amount). Thanks to the increase in its price during the last years (and to the upward trend estimated by World Bank statistics), in a short time, the country may become one of the main players of a market nowadays controlled by the supply from Chile and Australia, and the demand from China, Japan and South Korea.

3. The most recent performance of the national mining production

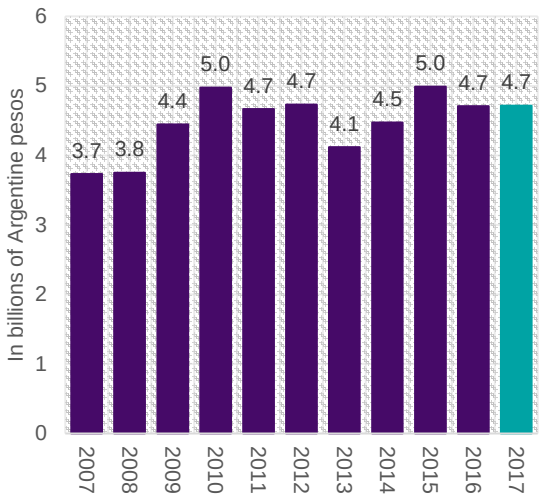
Although the trend of international prices impacted the performance of the on-going mining projects, the operating costs, which did not follow the same trend[16], resulted in an additional problem for the sector. Accordingly, during the downward period, the sector was bound to refocus the business to improve the productivity and return expected from investments boosted by strategies aimed at reducing production costs and assigning available resources and capital more efficiently. Additionally, considering that upon the increase in the price of commodities, the mining companies became financially indebted to support their projects, the subsequent period of price collapse impaired their financial position. This kind of attitude or reaction by the mining companies to mitigate the impact of the drop in prices (as a result of the oversupply of minerals) affected investments and on-going projects at a global level as well as the national mining sector as a whole, which, as mentioned, depends heavily on foreign investments.

Figure No. 2
Changes in the gross value added (GVA) of mining production

In billions of Argentine pesos



In billions of constant Argentine pesos (real values 2004=100)



[16] Mainly in connection with labor, energy, equipment and supplies costs.

Note: i) the amounts of GVA of mining production (*extraction of metallic minerals and exploitation of mines and quarries not previously classified*) were provided by INDEC; ii) the amount of GVA for 2017 is an estimate, as it arises from the average of the first two quarters of such year; the only information available at the moment of writing this paper.
Source: Prepared by KPMG based on the INDEC's data.

The first bar chart of Figure No. 2 proposes an estimate of the gross value added (GVA) of mining production (i.e. estimates of extraction of metallic minerals and exploitation of mines and quarries not previously classified) during the period 2007-2017. As noted, the changes in this variable have evidenced an upward trend in the period under analysis with an annual nominal growth rate of 30% on average. It is estimated that 50% of the national mining production value corresponds to metallic mining, while the remaining 50% is divided between *stones for construction* (41%) and *nonmetallic* minerals (9%). During the growth period of the last two years, mainly in years 2016 and 2017, the effect of the *stones for construction* has been decisive, particularly, to boost public works and, consequently, the demand for minerals from this subsector (sandstone for construction, limestone, concrete, etc.)

As the nominal figures are usually subject to the effect of inflation, a more realistic version of the changes in the mining GVA can be evidenced by considering the series stated at constant prices (in this case, at 2004 prices). As displayed in the second bar chart of the same figure, the behavior of the series stated at 2004 prices has been more cyclical than that observed in the first bar chart, which shows a real growth more in line with the production in physical units (i.e. total tonnes of production of such sector), once the series is netted from the impact of prices. Actually, while the first version of GVA, stated in current values, shows an increase over 600% from the production amount recorded in 2007 (ARS 8 billion) to that of 2016 (ARS 57 billion), the version stated in *real* values shows a mere 26% increase (from ARS 3.7 billion in 2010 to almost ARS 4.7 billion in 2016). Additionally, taking the real production value of mining as a reference over the first two quarters of 2017 (the only information available at the moment of writing this paper), it can be said that the sector shows a positive trend that may continue in the future.

Regarding *real* production (tonnes of production), the main metallic minerals extracted from the Argentine soil (gold, silver, lead, zinc, copper, lithium and aluminum) increased significantly over the last ten years (2007-2016). In the case of gold and silver, during this period, their outputs increased more than 200% (from 300 tonnes in 2007 to slightly more than 900 tonnes in 2016); or in the case of other minerals, such copper, lithium, zinc, lead and aluminum, a 9% growth was recorded in the same period (from 535,000 tonnes in 2007 to an estimate of 582,000 tonnes in 2016). While the stones for construction had evidenced a 40% growth from 2007 to 2014 (from 106 million tonnes to 148 million tonnes a year), their production levels have been significantly rising over the last years as a result of the recent boost to investments in public works. Actually, according to CAEM statistics, due to the investments made by the producers of crashed stone of the Province of Buenos Aires[17] (for the purpose of increasing demand), it is estimated that the monthly delivery of these minerals grew by 37% in 2017, from 1.2 million tonnes to 1.65 million tonnes[18]. Although

[17] CAEM estimates that the amount of approximately ARS 850 million was invested to support the recent growth of demand for stones for construction.

[18] In 2018, however, this figure is expected to reach 2.15 million tonnes a month (or 25.8 million tonnes delivered in the year).

these growth figures only show the end-to-end percentage variation of production in physical units over a period of ten years, the series conceal maximum outputs and changes in trends that cannot be displayed in an analysis of these characteristics. For instance, total production of copper, lithium, zinc, lead and aluminum exceeded 630,000 tonnes in 2014 (undoubtedly driven by the previous price-raising cycle) but also dropped considerably in 2015 (571,000 tonnes) and grew again in 2016. Something similar occurred with the production of gold and silver. The production of these two important minerals showed a positive behavior up to 2015, when the series exceeded 1100 tonnes to become stagnated in 2016 and fall by 22% up to an estimate of 900 tonnes. However, this amount exceeds the average production of gold and silver for the last ten years estimated at 730 tonnes.

The new mineral of the moment: lithium

Although the production value of metals such as gold, silver and aluminum explains the behavior and changes in the production value of mining, over the last years, lithium has been significantly increasing its contribution to the production value of this sector, from 1% in 2011 to an estimate of 6% in 2016. Actually, if the trend in the production of this mineral is confirmed in the future, that is, within a scenario of high prices and investments made, a considerable growth of this subsector is quite probable, supported by an increased flow of investments within a scenario in which other minerals, such as gold, silver or copper are not showing consistent growth trends in the mid-term.

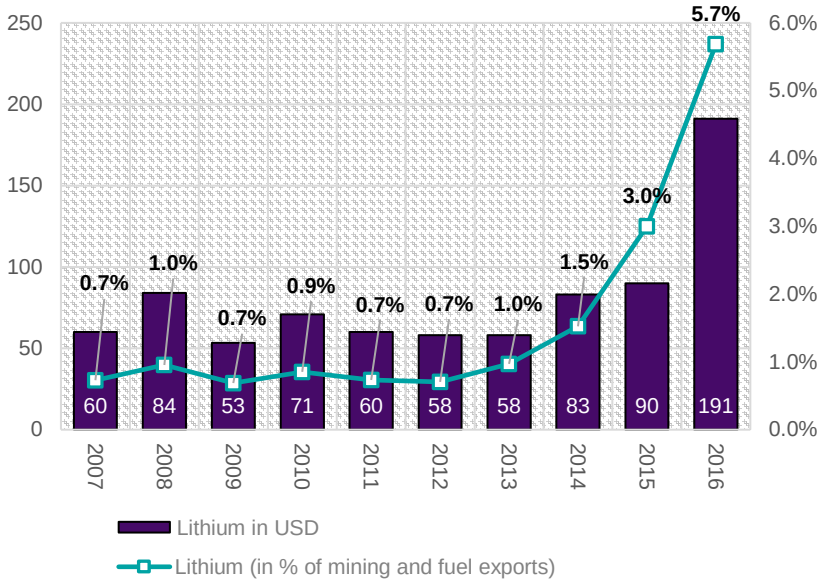
In this new context, lithium appears to grow in importance within the national production of minerals[19]. As commented, Argentina has significant reserves of this mineral and, over the last years, based on the rise in its price at the foreign markets (from 112% in US dollars, if a period of ten years from 2007 to 2016 is considered), the investments for the exploitation of this mineral started to flow. Argentina became one of the major supply landmarks, as it has about 30% of lithium potential extraction resources within the so-called “lithium triangle” (Argentina, Chile and Bolivia)[20]. Thus, Argentina ranks as one of the countries with the highest potential in this market.

Despite its recent development, the lithium worldwide market is deemed to be small. In 2016, the global supply of this mineral approached approximately 200,000 tonnes/ lithium carbonate equivalent (LCE), which accounted for USD 1.4 billion. When compared with other minerals, it is noted that the global production value of lithium accounts for the sixty fourth part of the worldwide production value of aluminum (USD 92 billion in 2016), the sixty fifth of copper (USD 94 billion) or the ninety sixth of gold (USD 138 billion). However, Argentina appears as one of the most dynamic countries in this market, as it has increased its contribution to global production from 8% in 2012 (14,000 tonnes/LCE) to almost 16% in 2016 (30,000 tonnes/LCE); this accounts for a real growth of 100% in five years.

[19] The growth of lithium demand at a global level and the supply thereof that keeps pace with the prices is explained by the use and purposes of this mineral, mainly in the production of batteries. At present, this product consumes about 40% of the lithium demand, while for 2026, such figure is expected to rise to 70% (Argentina’s Department of Energy and Mining).

[20] The lithium triangle accounts for 60% of the worldwide lithium resources.

Figure No. 3
Changes in exports of lithium in Argentina
Period 2007-2016
(In million dollars and in % of mining and fuel exports)



Source: prepared by KPMG based on data published by the World Trade Organization (WTO), COMTRADE and Argentina's Department of Energy and Mining (MINEM).

A similar table shows the local exports of lithium (see Figure No. 3) as a percentage of total exports of minerals and fuels. Over the last years, the sales of lithium abroad rose from USD 60 million in 2007 (which accounted for 1% of mining and fuel exports, or 0.11% of total national exports) to USD 200 million in 2016 (that is, 6% of mining exports or 0.33% of total national exports). This meant a 220% growth in US dollars in that 2007-2016 period (when total national exports grew by mere 3% in the same period); explained by both the rise in the foreign prices – 112% in US dollars from one year to another– and the increase in mineral exported, in excess of 100% of the increase noted in the period 2007 to 2016, from 15,000 tonnes/LCE to almost 30,000 tonnes /LCE exported.

According to MINEN estimates, there are lithium investment projects that may raise the local production capacity from 35,000 tonnes/LCE to 145,000 tonnes/ LCE for year 2022. These projects are mainly the scheduled expansion of the Olaroz salt pan (which may raise its capacity in 20,000 tonnes) and the start-up of Caucharí salt pan (which may contribute 25,000 tonnes) in Jujuy. The start-up of Rincón, Centenario and Ratones salt pans in Salta (which, based on preliminary estimates may add other 40,000 tonnes) and, finally, Sal de Vida in Catamarca (adding 25,000 tonnes). The latter would be added to the salt pans already operating, that is, Hombre Muerto in Catamarca (with a current production capacity of 17,000 tonnes) and Olaroz in Jujuy (17,500 tonnes), which, together, account for the current total output.

The estimated investments for implementing the projects mentioned above may amount to USD 2 billion in 2022[21]. This would also mean a concomitant increase in employment that may account for 4000 direct job positions, if other planned projects are also carried out (that is, some other 2200 positions, as, currently, the sector employs 1800 persons) as well as exports that may be valued at USD 1.6 billion. Accordingly, considering that mining has the ability to multiply indirect job positions (about 3 additional positions per direct job position), the production of lithium may imply or explain the creation of some additional 6600 indirect job positions to total employment within the economic scenario of 2022[22].

4. Social license to operate and environmental impact

Based on its inner essence, mining fuels a distinct environmental-impact perception in contrast with other economic activities. Unlike other industries in which the environmental impact is related to waste or the effect of such waste on increasing the carbon footprints, the mining industry stands out as a result of the broad range of its potential environmental damage, as it may affect both soils and water and the surroundings, particularly, the communities settled near the development site. Additionally, the effect of the mining activity on environment is a cause for concern because it is usually developed in areas with high levels of biodiversity and extremely fragile habitats; for these reasons, it shall evolve within a clear regulatory framework that prioritizes environmental management and the sustainable development of the activity.

Based on the aforementioned, it seems logical that mining be governed by a regulatory framework specifically aimed at protecting the environment. Laws No. 24585/1995 and No. 25675/2002 set forth an environmental policy that mining companies are bound to follow, including procedures and processes to prevent, mitigate and solve any environmental risk. Additionally, the mining activity shall meet other requirement: the acceptance or approval of the communities where the activity is developed, commonly known as social license to operate (SLO). This license is critical to the investment decision by the mining companies (particularly for those not listed on stock exchanges), since not only do they have to quantify the impact of the operating costs and expected return when planning a project but also the inherent opportunity costs.

[21] MINEM estimates that each project with a production capacity of 20,000 tonnes requires investments valued at approximately USD 350 million. According to MINEM, if the five projects already described are to be carried out, then, the estimated investment amounts to the figure indicated above.

[22] Actually, some specialists ensure that the multiplying effect on employment in the lithium subsector may account for 4 to 5 indirect jobs in relation to jobs taken, which would bring about an even major impact on the employment level of the 2022 economic scenario.

Furthermore, the sector through the International Council on Mining and Metals (ICMM)[23] and its association members (in Argentina, CAEM) has been engaged in breaking down the prejudices held by the communities about the mining activity and its potential environmental and social effects by providing clear information about its operations. Accordingly, in October 2017, CAEM adhered to the international initiative "Towards Sustainable Mining" (TSM). The program was established in 2004 by the Mining Association of Canada as a commitment to responsible mining. It entails a set of tools and indicators to drive performance and ensure that key mining risks are managed responsibly, while fostering sustainability and control by the communities. According to CAEM, the TSM initiative is an essential step to secure the communities' long-claimed confidence and for mining to consistently contribute to the development of the country[24]. Then, from now onwards, adherence to the program will be a necessary condition for the companies willing to become members of this association. Additionally, it should be noted that Argentina is the first Latin American country that adheres to the referred program, which adds a comparative advantage in relation to other countries of the region as to transparency and mining production principles.

Moreover, CAEM has put together a "Board of Energy Efficiency and Innovation" with the involvement of YPF, Pampa Energía, Agrekko, among other companies, for the purpose of raising issues related to the energy efficiency in mining. The Board's efforts are mainly aimed at writing a manual of best practices, advising in energy and improvement opportunities, setting up an energy matrix and cooperating with the implementation of the TSM program[25].

Finally, it is worth mentioning that the government has focused its support on the development of responsible mining as a key milestone for economic growth, and part of this assertion has been reflected in the measures already adopted, such as the boost to the FMA and the recent elimination of export duties. It is also important to mention that the Courts have promptly dealt with cases of environmental contamination appearing over the last years; thus, evidencing the basis for the development of a local mining industry deeply engaged in seeking sustainability and environmental responsibility.

Consequently, within its provisions, the FMA seeks to impose penalties upon those mining companies that, as a result of their activities, may adversely affect the environment. Although this agreement does not entail an integral response to the opposing interests of the parties involved, it is a straightforward and sensible approach.

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[23] Organization gathering the main players of the mining and metallurgic sectors, aimed at enhancing performance through sustainable development and responsible production. It relies on leading principles, such as: i) obtaining and maintaining business through ethical conduct, ii) committing to sustainable development as part of the decision-making process, iii) respecting human rights as well as cultures, customs and values of people with whom our operations interact, iv) implementing strategies to manage risk on a scientific basis, v) continuous improvement of health, safety and environmental matters, vi) seeking to minimize the impact of our operations on the environment and biodiversity, while fostering recycling and disposal of industrial waste; to enhance the economic and social standards of the communities affected by the mining activities, vii) proactively engaging in responsible, open and supporting dialogue.

[24] "*CAEM sets out the basis for XXI century mining*", Clarín, November 30, 2017.

[25] "*Annual Report and Financial Statements* (for the fiscal year ended June 30, 2017)". Cámara Argentina de Empresarios Mineros (CAEM), 2017.

Final Considerations

In Argentina, where mining depends heavily on Direct Foreign Investment (DFI), the removal of export duties and the execution of the Federal Mining Agreement that will amend the regulatory framework applicable to the activity in the short term involve the first governmental initiatives to support the recovery of the sector, after the impact created by the oversupply of minerals and the drop in international prices. Simultaneously, the association that gathers all mining companies (CAEM) seeks to lay down the new mining principles for the future, mostly focused on sustainability and environmental responsibility, and such purpose would be partially met by adhering to the "Towards Sustainable Mining" program.

In this scenario, lithium has become a strategic mineral for Argentina, considering not only the trend in prices and the recent increase in domestic production but also the fact that our country is within the lithium triangle: one of the most important deposits of this mineral at a worldwide level. In fact, if prices maintain their behavior and investments are actually made, this mineral output may amount to 145,000 tonnes by 2022, while employment may rise to 4000 direct positions.

Except for lithium, whose price has displayed a positive trend since 2005, the other mining commodities, such as gold, silver, zinc, lead, copper and aluminum have evidenced a slight recovery since 2016 and a confirmation of this trend since 2017. Although it is estimated that such growth will be limited by the oversupply of the mining products and the demand from China and other countries that are also raising their production, the trend is sufficiently positive so as to allow mining to change its direction, enhancing its mid-term prospects.

Finally, although the performance of these initiatives in terms of investment and output cannot be currently determined, the noticeable improvement of the business environment, considering the economy, in general, and the primary sectors in particular, generates big expectations, which –unless circumstances unrelated to the market (political, institutional and/or environmental) dictate otherwise– will turn into material improvements to the development of the mining industry.

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