مجلس الأعمال السعودي الأمريكي
U.S.-Saudi Arabian Business Council

The Saudi Arabian Mining Sector: Ongoing Investments Propel Long-term Growth

SECTOR REPORT

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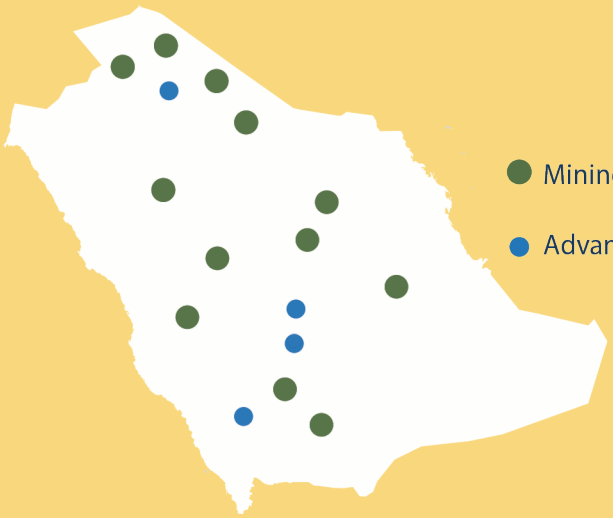
Mining Sector Overview



$1.3 trillion
Worth of Mineral Endowments*

5,574
Mineral Sites

Licenses Issued
2,045

19 Ongoing Projects Worth
$14 billion

Needed Investment for Exploratory Mining
$13 billion

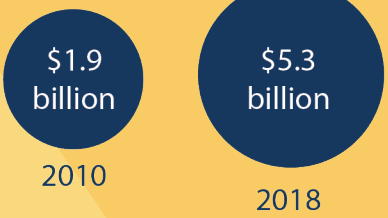
Copper Production	Gold Production	Ammonium Phosphate Fertilizer Production	Aluminum Production
2018:	2018:	2018:	2018:
70K Metric Tons	11K Kilograms	3.2M Metric Tons	932K Metric Tons




Saudi Arabia is the 9th largest producer of aluminum and the 7th largest producer of phosphate fertilizer.

Top growing mineral production includes copper at 60% CAGR, gold at 11.7% CAGR and zinc at 23.5% CAGR 2010-2018.

Exports of base metals grew at a 14% CAGR 2010-2018:



*According to the Ministry of Energy, Industry and Mineral Resources

EXECUTIVE SUMMARY:

- The Kingdom currently and in the future will maintain long-term large and growing domestic demand to go along with the abundance of mineral resources and competitive energy costs.
- Vision 2030 envisages structural reforms driven by the private sector to intensify exploration, the development of an exhaustive database of the Kingdom's natural resources, improved licensing for extraction, capital injections into infrastructure related projects, and the creation of numerous funding mechanisms to assist in the development of the sector.
- Mining activities as a proportion of mining and quarrying grew at a compounded annual growth rate (CAGR) of 4.74 percent between 2010 and 2018.
- According to the Saudi Geological Survey (SGS), a total of 5,574 metallic and non-metallic mineral sites have been discovered by the end of 2018. The breakdown indicates 3,041 discovered sites for non-metallic minerals and 2,533 discovered sites for metallic minerals.
- The total weight of all extracted mineral ores reached 512 million tons in 2018. Crushed stone represented approximately 75 percent of that total, followed by limestone with 14 percent, and sand with 5 percent. Extracted phosphates accounted for nearly 6.1 million tons in 2018.
- Kingdom wide, gold production grew at a CAGR of 11.7 percent between 2010 and 2018. Copper production grew at a CAGR of 60 percent while zinc production grew at a CAGR of 23.5 percent.
- Of the top five import values by category, only base metals and articles of base metals witnessed declines as its contribution dipped from 12.4 percent in 2010 to 8.6 percent in 2018, a CAGR of -1.62 percent.
- Export of base metals represented the third largest category by value in 2018 as exports grew from 5.6 percent of total non-oil exports in 2010 to 8.7 percent in 2018. Furthermore, exports of base metals grew by a CAGR of 13.9 percent versus 7.3 percent for total non-oil exports during the same period.
- According to the latest data available from the General Authority for Statistics (GaStat), of the 98,435 total employees in the mining and quarrying category, approximately 36,000 are employed within mining while the remainder fall under the extraction of crude petroleum and natural gas.
- By the end of 2018, Ma'aden's Gold and Base Metals Company produced a total of 415,000 ounces of gold, which was an increase of 25 percent over 2017. Furthermore, the company's gold production has increased at a CAGR of 12.5 percent between 2010 and 2018.
- Ma'aden produced 3,170 thousand metric tons of ammonium phosphate fertilizer in 2018 and 2,274 thousand metric tons of ammonia.
- Ma'aden produced 932,000 metric tons of primary aluminum in 2018, accounting for 1.6 percent of world production. This represents a 1.5 percent increase in aluminum production over 2017, during which it produced 916,000 metric tons.
- Demand for low-grade bauxite (LGB) is likely to grow by 2020 as demand for cement (contains LGB) increases. Cement is a critical building material for the construction of upcoming projects.
- While Saudi Arabia is not a major producer of copper, it has increased its production after the Jabal Sayid mine was commissioned. The Ma'aden Barrick Copper Company (MBCC) produced 50 metric tons of copper in 2018.

- The current mining code allows the granting of mining rights to other corporations and individuals and the transfer of those rights to other corporations with technical and financial competence. The revised mining investment code aims to build a comprehensive database of its mineral resources, intensify exploration and develop new funding methods for projects.
- To achieve the government's aspirations of growth in copper, gold, and zinc mining output through 2035, the Kingdom would need to spend over SAR28 billion ($7.4 billion) on mineral exploration including SAR21.4 billion ($5.7 billion) on prospect level exploration pursued by private sector participants.
- When gauging bank credit by economic activity, the mining and quarrying category lags behind all other categories except for agriculture and fishing. While banks have been active participants in the funding of mining projects, there is room for banks to further their lending reach.
- Sector financing is sourced from syndicated loans and consortiums from domestic and international banks, the Saudi Industrial Development Fund (SIDF), Public Investment Fund, and several Economic Cities Authorities.
- The Kingdom has taken steps to develop areas of focus by developing specialized entities that will oversee the proliferation of the mining sector. These entities include the National Industrial Development Program (NIDLP), the Industrial Clusters, and the Saudi Arabia Industrial Investments Company, also referred to as Dussur.
- While some estimates ambitiously indicate that the Kingdom has approximately SAR5 trillion ($1.33 trillion) worth of mineral endowments, especially in precious and base metals, Saudi Arabia represents a growth market opportunity where strategic partners can make a significant positive impact on the economy.
- The sector's outlook is very favorable as the magnitude of investments directed at future exploration, sustainability, and profitability are key areas that are expected to grow. Ma'aden's participation as a national leader across the mining value chain places it in the driver's seat of future development.

INTRODUCTION

Hailed as Saudi Arabia's third pillar after oil & gas and petrochemicals, the mining sector is undergoing significant investments as the government aims to boost the sector's contribution to GDP, provide numerous employment opportunities, enhance localization competencies, and become a global leader in exploration and extraction capabilities. Recent shifts to strategically focus on the mining sector coincide with the Kingdom's vast and relatively untapped mineral resource base. Consequently, the economic and industrial development of the mining sector will play a major role in Saudi Arabia's quest to shift away from oil dependency and diversify its non-oil economy.

In previous years, the mining sector received consideration under the Kingdom's 5-year Economic Development Plans and in the annual budget expenditure plans. In the case of the most recent 10th Economic Development Plan, the mining sector was expected to grow at an annual growth rate of 5.98 percent in 2014 to 8.56 percent in 2019. The Plan also earmarked approximately SAR7.19 billion ($1.91 billion) in targeted investments for the non-oil mining and quarrying sector. While these projected investments did represent higher growth forecasts compared to previous Economic Development Plans, the mining sector represented only 0.2 percent of overall investments. This fell relatively short of the level of investments needed in order to allow the mining sector to become a major contributor to the Kingdom's economy.

However, the introduction of Vision 2030 in 2016 represents a significant opportunity not only for the overall economy, but for non-oil sectors in particular. The ambitious plans laid out in Vision 2030 encompasses sweeping economic changes to enhance industry capabilities through significant investments, improved localization and privatization schemes, provide needed employment opportunities, as well as placing the private sector in a position to be the driving force of change.

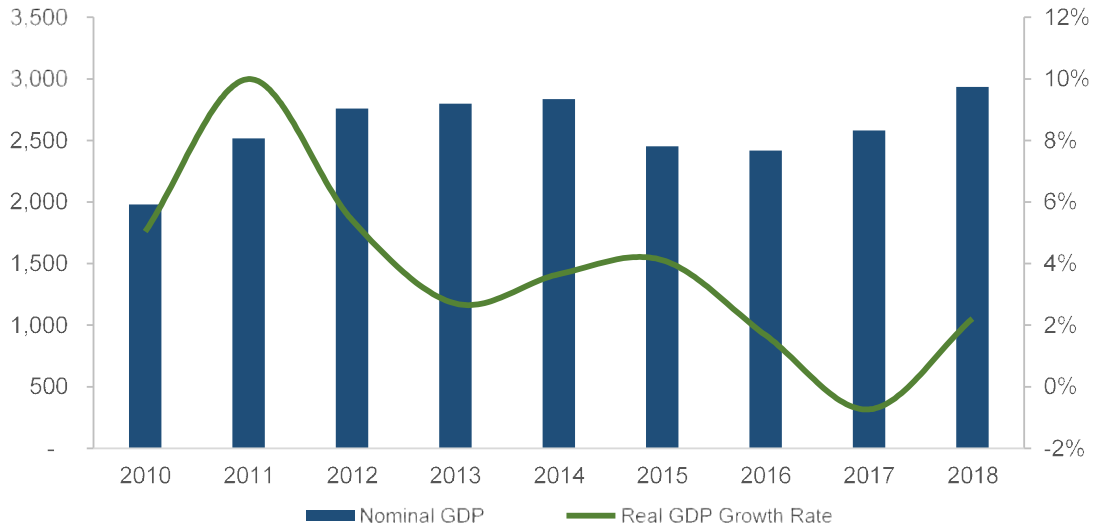
Vision 2030 lays out a clear strategy for the mining sector. It envisages structural reforms driven by the private sector to intensify exploration, the development of an exhaustive database of the Kingdom's natural resources, improved licensing for extraction, capital injections into infrastructure related projects, and the creation of numerous funding mechanisms to assist in the development of the sector.

Furthermore, a recent royal decree was issued to separate the Ministry of Energy, Industry, and Mineral Resources (MEIMR) into two separate ministries– the Ministry of Energy which will focus on the oil sector and the Ministry of Industry and Mineral Resources which will allow for greater focus being given to mining and industry as part of long-term economic goals. In tandem with Vision 2030, the Ministry of Industry and Mineral Resources seeks to increase mining's contribution to GDP from a stated SAR64 billion ($17 billion) currently to SAR240 billion ($64 billion) by 2030.

MINING SECTOR'S IMPACT ON THE ECONOMY

The downturn in oil prices that began in 2014 jump started new strategic plans by the Saudi Arabian Government to pursue economic diversification initiatives to ensure economic stability over the long-term. Prior to the downturn, the price per barrel of Brent crude averaged as high as $111 in 2012 (U.S. Energy Information Administration (EIA)), spurring an economic boom in the Kingdom. High oil prices coincided with significant investments in building and construction as well as the improvement of physical infrastructure capabilities. While the Kingdom still maintained sizeable state budgets to continue investments in these areas, the decrease in oil revenues put heavy strains on the funding of large projects. Furthermore, the economy experienced a contraction of -0.74 percent in real terms in 2017, the first annual contraction since 2009.

Chart 1: Nominal GDP and Real Growth Rates (SAR Billions)

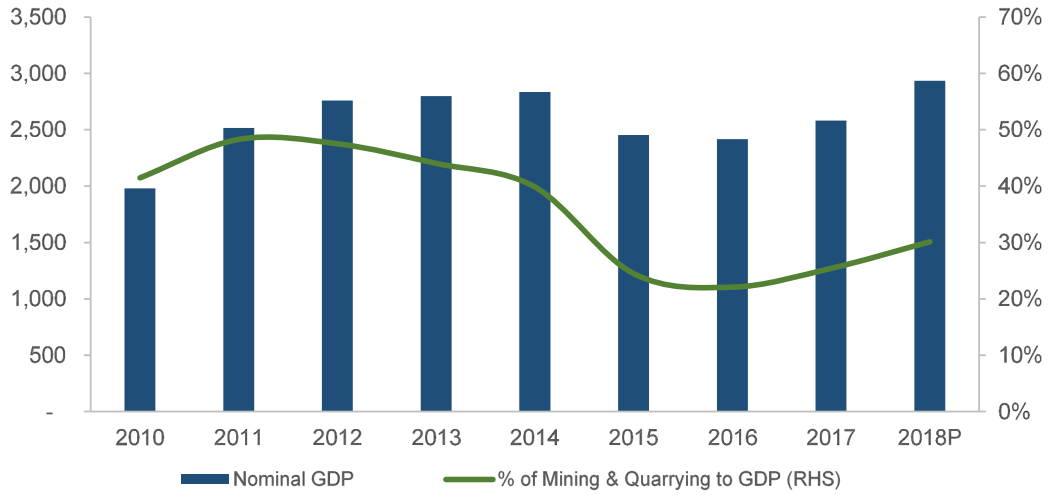


Source: GaStat

The mining & quarrying category by kind of economic activity accounts for the largest contribution to nominal GDP as it entails two categories, 'crude petroleum & natural gas' and 'other.' The mining and quarrying category accounted for 41.6 percent of nominal GDP in 2010 but slipped to 30.11 percent in 2018 due to the decrease in global oil prices. Naturally, the 'crude petroleum & natural gas' accounts for nearly all the contribution to the mining & quarrying category.

A closer look at the mining & quarrying category of 'other' indicates that mining specific activities fall under this category. Judging from the disproportion of crude petroleum & natural gas contribution versus specific mining contribution, the Kingdom's focus on the mining sector has lagged significantly behind that of crude & natural gas. More specifically, mining's contribution to nominal GDP in 2010 was a marginal 0.43 percent. However, mining's contribution to the mining & quarrying GDP stood at 1.42 percent in 2018. Although not a significant contributor, mining activities as a proportion of mining & quarrying did grow at a compounded annual growth rate (CAGR) of 4.74 percent between 2010 and 2018. These figures indicate that substantial growth opportunities exist in the Kingdom but have yet to be tapped as a growing contributor to the economy.

Chart 2: Mining & Quarrying Contribution to GDP (SAR Billions)



Source: GaStat

One way of initiating significant investments into the mining sector is through the Kingdom's 2019 budget allocation of expenditures. Capital injections into the mining sector by the government has consistently increased over the last few years as portions of the "Infrastructure and Transportation" sector is dedicated to the development of Ras Al-Khair Mining and its supporting transportation needs. The "Infrastructure and Transportation" sector grew from SAR35 billion ($9.3 billion) in 2017 to a budgeted SAR70 billion ($18.7 billion) in 2019, marking a 100 percent increase.

Chart 3: Mining Contribution to GDP (SAR Billions)

Source: GaStat

MARKET DRIVERS

Saudi Arabia is endowed with significant mineral deposits that are widespread across many types, ranging from gold to lightweight aggregate. According to the Saudi Geological Survey (SGS), the bulk of metallic mineral resources are contained in Precambrian rocks of the Arabian Shield, in the western part of the Kingdom. The SGS also indicates that non-metallic resources reside in both Precambrian rocks and Phanerozoic rocks that overlie the Arabian Shield in the central and northern parts of the Kingdom.

According to the SGS, a total of 5,574 metallic and non-metallic mineral sites have been discovered by the end of 2018. The breakdown indicates 2,919 discovered sites for non-metallic minerals and 2,533 discovered sites for metallic minerals. [1]

The SGS identifies the following chief mineral resources in the Kingdom:

FIGURE 1: Mineral Deposits in Saudi Arabia

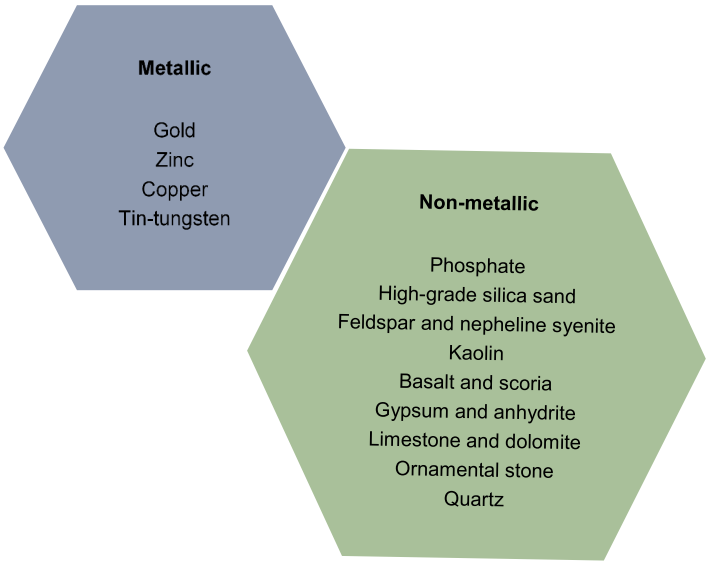
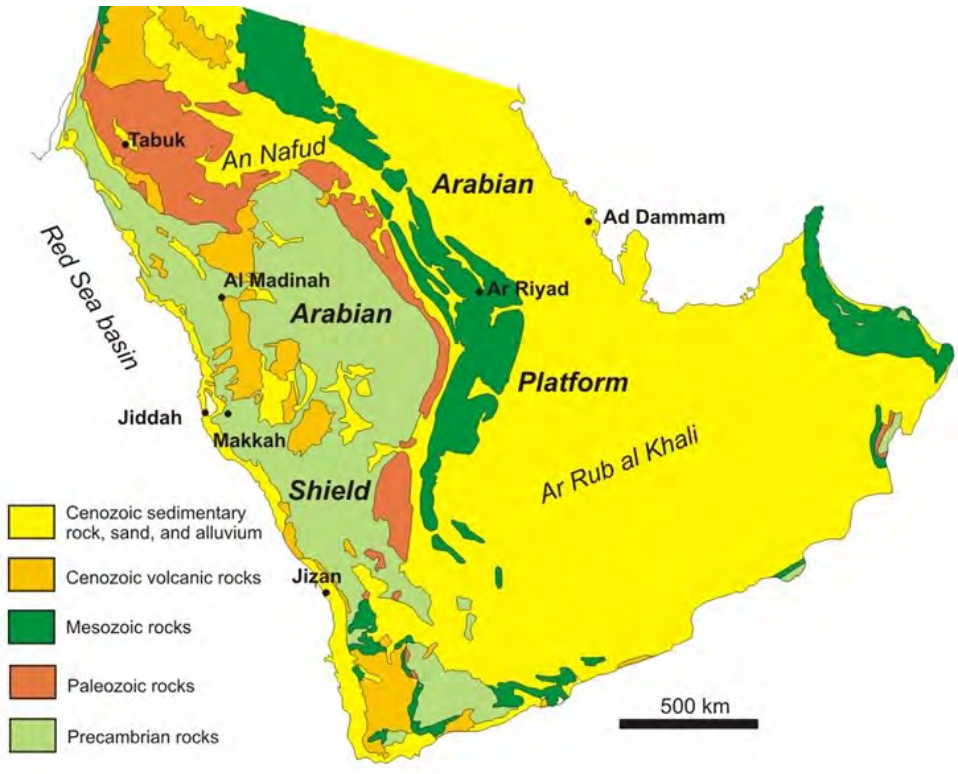


FIGURE 2: Geographical Mineral Composition in Saudi Arabia



Source: SGS

[1] See Appendix for full list

Table 1: Mineral Deposits

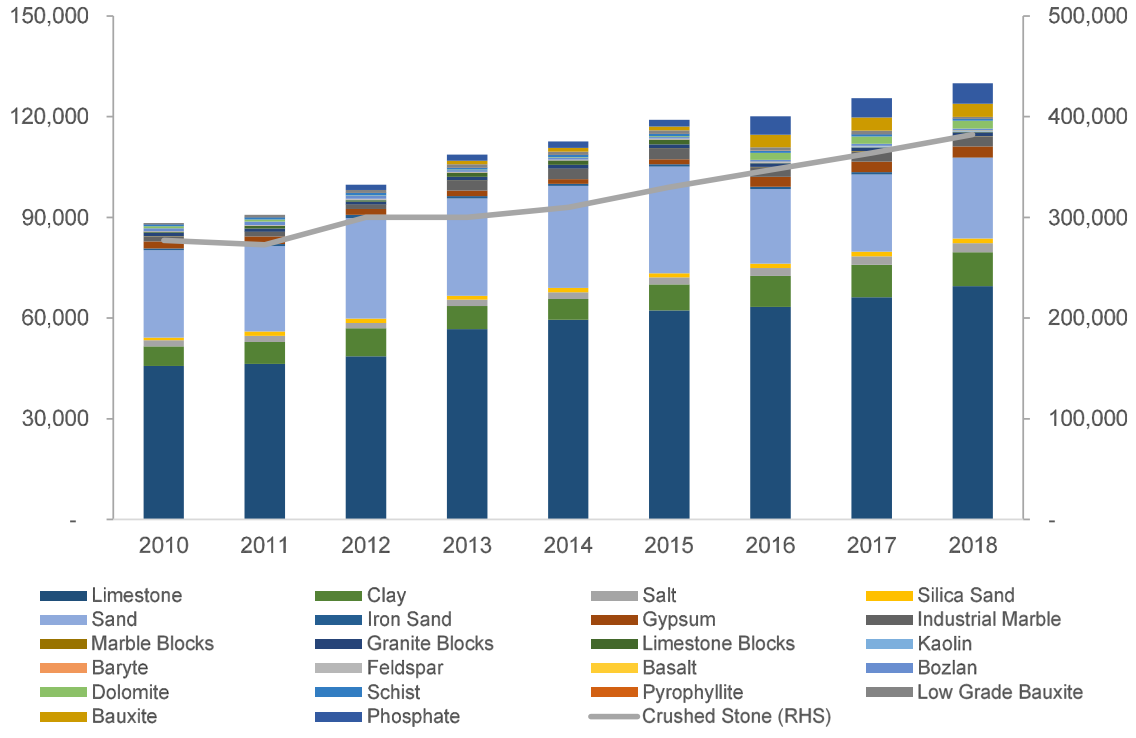
Non-Metallic Mineral Sites		Metallic Mineral Sites	
Ore	**Number**	**Ore**	**Number**
Limestone	546	Gold	849
Clay	363	Copper	594
Aggregate	327	Silver	258
Sand & Gravel	180	Gossan	183
Granite	166	Iron	163
Sand & Gravel	160	Chromium	111
Sandstone	145	Zinc	85
Others	1,154	Others	290
Total	**3,041**	**Total**	**2,533**

Source: SGS

Metal Extraction

Saudi Arabia contains some of the largest mineral deposits in the world. Its phosphate reserves in particular are considered to be one of the highest. According to MEIMR, the total weight of all extracted mineral ores reached 512 million tons in 2018. Crushed stone represented approximately 75 percent of that total, followed by limestone with 14 percent, and sand with 5 percent. Extracted phosphates accounted for nearly 6.1 million tons in 2018.

Chart 4: Extracted Mineral Ores (Thousand Tons)*



*Crushed stone alone accounted for 75% of all extracted mineral ores in 2018 and is depicted separately in the chart above.

Source: Ministry of Energy, Industry, and Mineral Resources, GaStat

Metal Production

In terms of precious metals, Saudi Arabia produced approximately 10,850 kilograms of gold and 5,322 kilograms of silver in 2018. Gold production grew by an impressive CAGR of 11.7 percent between 2010 and 2018. As for base metals, copper and zinc production witnessed significant increases between 2010 and 2018. Copper production grew at a CAGR of 60 percent while zinc production grew at a CAGR of 23.5 percent.

Table 2: Metal Production by Weight:

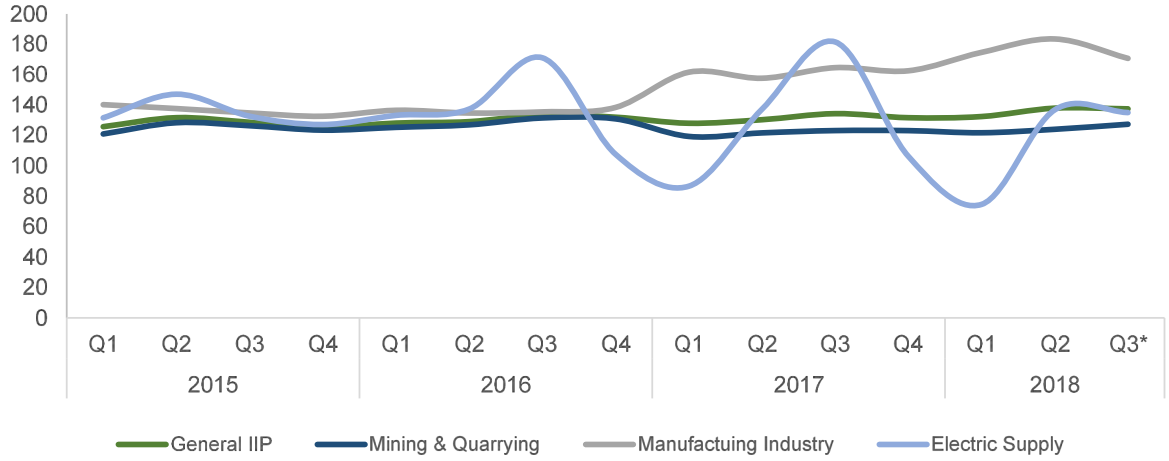
Metal Type	2010	2011	2012	2013	2014	2015	2016	2017	2018	CAGR
Gold (KG)	4,477	4,612	5,215	4,158	4,366	5,078	6,946	10,333	10,850	11.7%
Silver (KG)	7,670	5,839	5,212	4,655	4,888	4,500	4,710	5,069	5,322	-4.5%
Copper (Metric Tons)	1,603	1,954	17,639	41,332	43,390	46,253	110,000	67,097	70,450	60.5%
Zinc (Metric Tons)	4,218	4,934	21,213	39,813	41,804	39,000	41,610	21,677	22,760	23.5%
Lead (Metric Tons)	543	396	-	-	-	-	-	-	-	-

Source: Ministry of Energy, Industry, and Mineral Resources

Industrial Production

The measure of the Kingdom's Industrial Production Index, which tracks the output of the industrial sector indicates a 2.34 percent increase during the third quarter of 2018 compared to the third quarter of 2017. More importantly, the mining and quarrying sector grew by 3.39 percent year on year. The manufacturing and electrical supply categories witnessed declines of 3.71 percent and 25.62 percent, respectively. The mining and quarrying sector category has remained relatively stable over the last several years.

Chart 5: General IIP vs. Mining and Quarrying

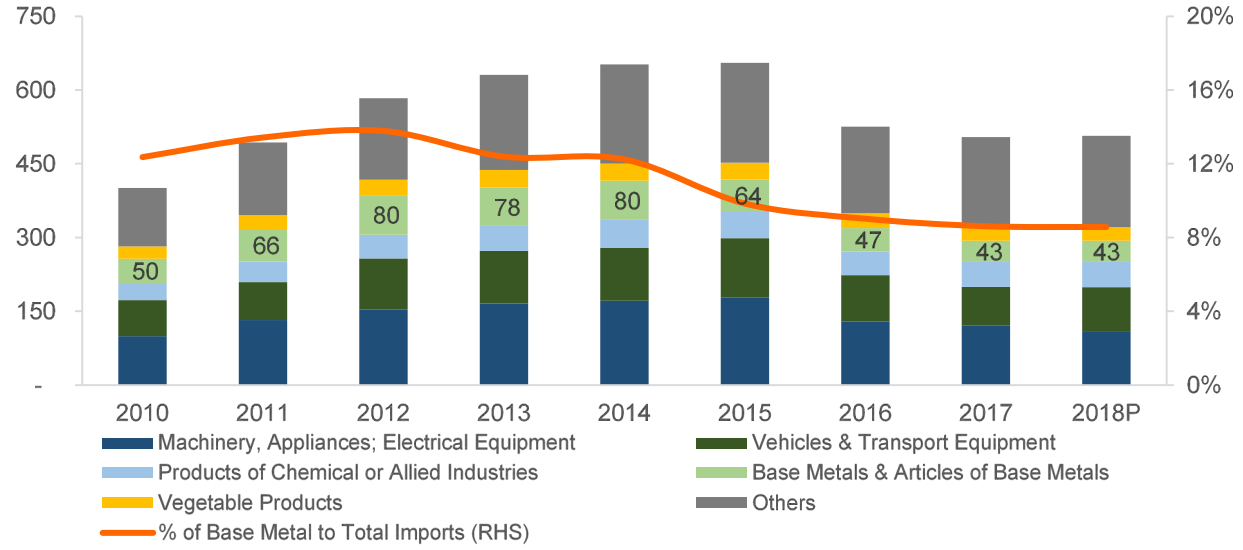


*Latest data available; Source: GaStat

Metal Imports/Exports

As base metal production continues to increase, the import of base metals and articles of base metals continues to decrease. However, Saudi Arabia remains a net-importer of mineral products. Of the top five import values by category, only base metals and articles of base metals witnessed declines as its contribution dipped from 12.4 percent in 2010 to 8.6 percent in 2018, a CAGR of -1.62 percent. The decrease is attributed to the slowdown in construction activities as a result of lower oil revenues, which dampened demand for copper (an integral building material) and aluminum.

Chart 6: Composition of Top 5 Imports vs. Base Metals (SAR Billions)

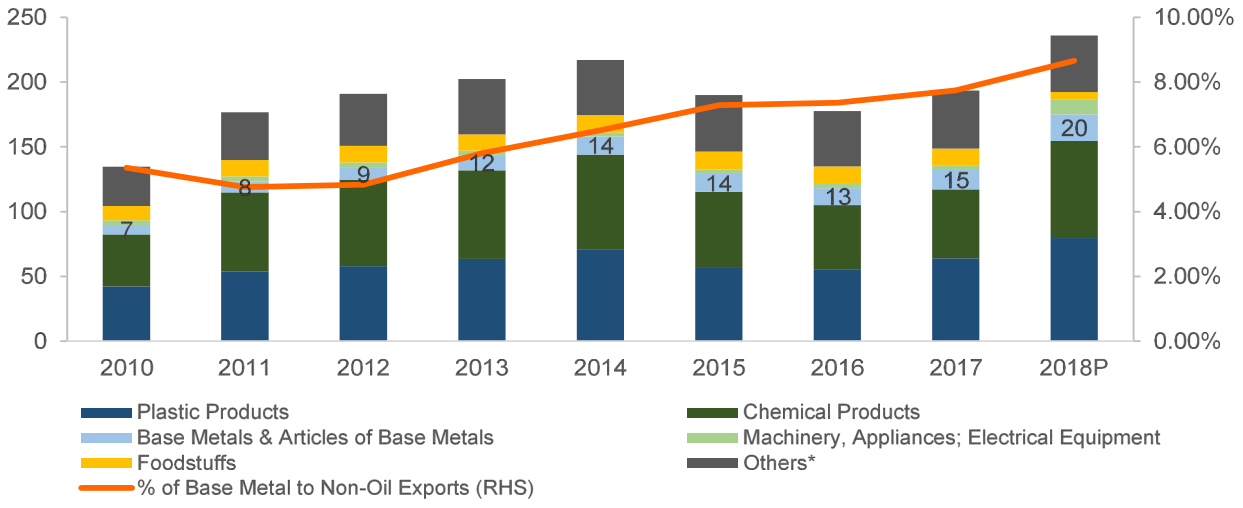


Source: Ministry of Energy, Industry, and Mineral Resources, GaStat

Another factor was the number of new exploration, extraction and processing projects within the Kingdom that began to accommodate growing local demand and the export of base metals to its partners. An encouraging development has been the growth of base metals exports. Export of base metals represented the third largest category by value in 2018 as exports grew from 5.6 percent of total non-oil exports in 2010 to 8.7 percent in 2018. Furthermore, exports of base metals grew by a CAGR of 13.9 percent versus 7.3 percent for total non-oil exports during the same period.

Only the machinery, appliances, electrical equipment category grew at faster rate of 15.4 percent during the period. Based on these growth rates, exports are expected to surpass imports by 2023.

Chart 7: Composition of Top 5 Imports vs. Base Metals (SAR Billions)



Source: Ministry of Energy, Industry, and Mineral Resources, GaStat

Labor Market

The mining sector's labor size has remained relatively flat over the last few years compared to other private sector categories. According to the latest data available from the General Authority for Statistics (GaStat), of the 98,435 total employees in the mining and quarrying category, approximately 36,000 are employed within mining while the remainder fall under extraction of crude petroleum and natural gas. [2]

The mining sector's total contribution to the Kingdom's 6.5 million private sector jobs stands at only 0.55 percent. Unlike the crude petroleum and natural gas category, which boasts an 85 percent Saudi labor force, the mining sector's Saudization rate is far lower, standing at 35 percent. There are several reasons why the mining sector attracts a low number of Saudi workers. Challenging working conditions, low wages, and less than optimal workplace safety measures are main reasons why Saudis shy away from looking for employment opportunities in mining. However, looking at Saudi Arabia's largest mining operator in the Kingdom, the Saudi Arabian Mining Company (Ma'aden) has a 65.94 percent Saudization rate as of 2018.

GaStat does not provide a breakdown of salaries for the mining sector but combines several related sectors into the "Industrial Sector". According to GaStat the industrial sector pays on average, SAR16,989 ($4,530) to Saudis and SAR6,292 ($1,678) to foreigners per month. This reflects a significant increase over the Kingdom's average of SAR7,372 ($1,700) for Saudis and SAR2,731 ($728) for foreigners. However, the oil & gas sector is largely responsible for the higher salaries as the mining sector's wages fall well below that.

MARKET SIZE

Role of Ma'aden in the Mining Sector

To accurately gauge the market size of the mining sector in Saudi Arabia, we use Ma'aden as a proxy as it is the single largest operator in the Kingdom. Ma'aden was formed by Royal Decree in 1997 and wholly owned by the Saudi Government until 2008 when 50% of the company's shares were floated on the Saudi Stock Exchange (Tadawul). The Saudi Government, through the Public Investment Fund (PIF) still retains a 65 percent ownership stake. Today, Ma'aden is ranked among the top 10 global mining companies based on market capitalization. The main area of focus for Ma'aden has been gold, phosphate, aluminum, industrial minerals, and copper.

One of Vision 2030's priorities is to develop the mining sector into a global leader. Ma'aden has taken further steps to ensure the success of the mining sector by implementing its own '2025 strategy.' This strategy, which was introduced in 2016, envisions Ma'aden to be a 'sustainable mining champion' that will be built on three strategic pillars[3]:

Operational, capital, and commercial excellence

a. Competitive cost position

b. Profitability and returns in line with international peers

National mining champion

a. Growth in Saudi phosphate, aluminum, gold, and base metals

b. Growth in Saudi selected industrial minerals

c. Champion the development of the Saudi mining sector

Global presence

a. Leverage world-class selected Saudi deposits to be a global leader

b. Grow globally in selected commodities

[2] Employment classification categories for mining are 'Mining of metal ores,' 'Other mining and quarrying,' and 'Mining support service activities.'

[3] 2018 Ma'aden Annual Report

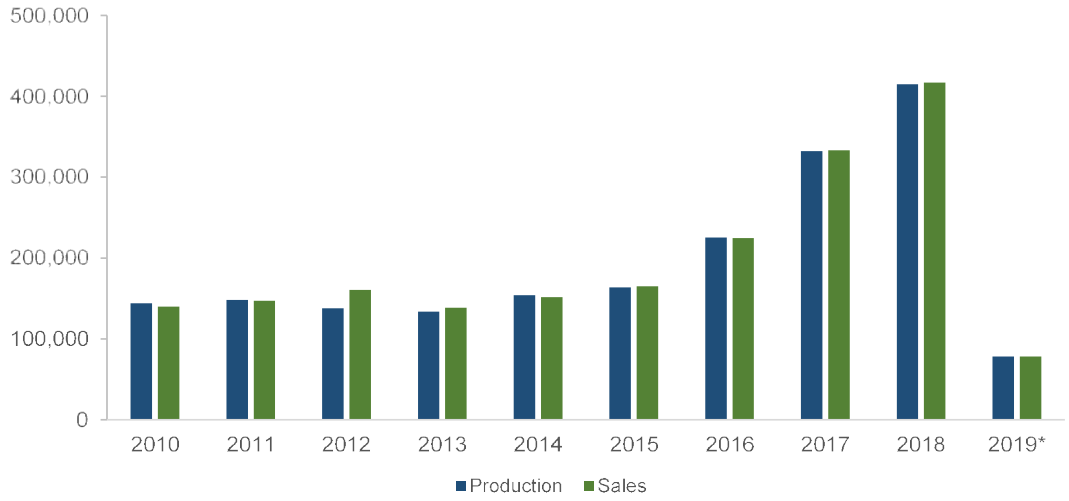
Ma'aden's Gold Production

Ma'aden's Gold and Base Metals Company (MGBM) manages the production and sale of gold, copper, silver and zinc. Gold accounts for MGBM's largest share by revenue. Gold deposits are located throughout the Central Arabian Gold Region, which extends from the Red Sea coast to the middle of the country. MGBM operates six gold mines:

- Ad Duwayhi
- Mahd Ad Dhahab
- Al Amar
- Bulghah
- Sukhaybarat
- As Suq

MGBM also operates the Jabal Sayid copper mine.

Chart 8: MGBM Gold (Ounces)



*Through Q1'19; Source: Ma'aden

As part of Ma'aden's 2025 Strategy, gold production is expected to climb to one million ounces annually. This will require concerted efforts to expand gold reserve bases and investing in exploration efforts to create enhanced geological prospects and increase the pipeline of projects. By the end of 2018, MGBM produced a total of 415,000 ounces of gold, which was an increase of 25 percent over 2017. Furthermore, gold production has increased at a CAGR of 12.5 percent between 2010 and 2018.

At this rate of growth, MGBM should achieve its goal of producing one million ounces by 2025. According to Ma'aden, by reaching its goal of producing 1 million ounces annually, Saudi Arabia will transition from a fringe gold producer to a top-20 supplier of gold.

According to the U.S. Geological Survey (USGS), China was the global leader in gold production in 2018 with 400 metric tons, followed by Australia with 310 metric tons, Russia with 295 metric tons, and the U.S. with 210 metric tons.

Table 3: World Gold Production, 2018 (Metric Tons)

Country	Mine Production
China	400
Australia	310
Russia	295
United States	210
Canada	185
Peru	145
Ghana	130
Mexico	125
South Africa	120
Uzbekistan	105
Indonesia	85
Kazakhstan	85
Brazil	81
Papua New Guinea	65
Other countries	920
Total	**3,261**

Source: USGS estimates

Ongoing exploration works for gold will allow further production sites to come online. To date, Ma'aden has identified three new gold sites in Makkah province that will provide new pipelines of production:

- **Mansourah**
  - ◊ Comprises two separate neighboring sites that contain gold dioxide and gold-bearing sulphides.
- **Massarah**
  - ◊ Two separate neighboring sites that contain gold dioxide and gold-bearing sulphides.
- **Al-Rajoum**
  - ◊ Exploration works for two independent and neighboring sites in the Makkah region.

Most recently, MGBM awarded a SAR2.3 billion ($613 million) contract to a consortium of Outotec and Larsen & Toubro for the development of the Mansourah and Massarah mines. The project includes engineering, procurement, construction, pre-commissioning, and commissioning. The project is expected to be MGBM's largest gold project, producing an average of 250,000 ounces of gold per year over the life of the mine. Total investment in the mine is forecasted to reach SAR3.3 billion ($880 million). Initial production is estimated to begin in the second quarter of 2022.

Ma'aden's Phosphate Production

Phosphate exploration and production represents a priority for Ma'aden given growing global demand. The demand for phosphate fertilizer is expected to increase on the back of growing agricultural practices relying on fertilizer use, the increase in food consumption in-line with global population growth projections, and the lack suitable substitutes in agriculture. Moreover, Ma'aden's 2025 strategy places significant importance on increasing phosphate fertilizers to achieve its ambitious potential to catapult from the 7th largest producer and exporter today to 3rd by the time the third phosphate mega-project is completed.[4]

According to the USGS, world mine production of phosphates rated capacity was projected to increase to 169 million tons in 2022 from 148 million tons in 2018, excluding official capacity data for China. Production of marketable phosphate rock in China was believed to be between 80 to 85 million tons per year, compared with official production statistics that included some crude ore production, according to industry analysts. The USGS estimates that most of the increases are planned for Africa and the Middle East, where expansion projects are in progress in Saudi Arabia, Egypt, Jordan, Morocco, and South Africa.

Ma'aden processes phosphate rock into diammonium phosphate (DAP) and monoammonium phosphate (MAP), the most widely used phosphate fertilizers in modern agriculture. Ma'aden created two mega-projects which are led by two companies, Ma'aden Phosphate Company (MPC) and Ma'aden Wa'ad Al Shamal Phosphate Company (MWSPC). Work on a third mega-project was recently initiated to build the first plant in the company's third large-scale phosphate complex, known as 'Phosphate 3.'

[4] U.S. Geological Survey, Mineral Commodity Summaries, February 2019

MPC was created as a SAR21 billion ($5.6 billion) joint-venture between Ma'aden (70 percent) and Saudi Basic Industries Corporation (SABIC) (30 percent) to operate two primary sites: Al Jalamid in the Northern Borders of Saudi Arabia, home to the phosphate mine and beneficiation plant; and the Eastern Province's Ras Al-Khair, where the integrated chemical and fertilizer facility is located. In addition to DAP and MAP, MPC also produces sulphuric acid, phosphoric acid, ammonia, and nitrogen-phosphoric fertilizer.

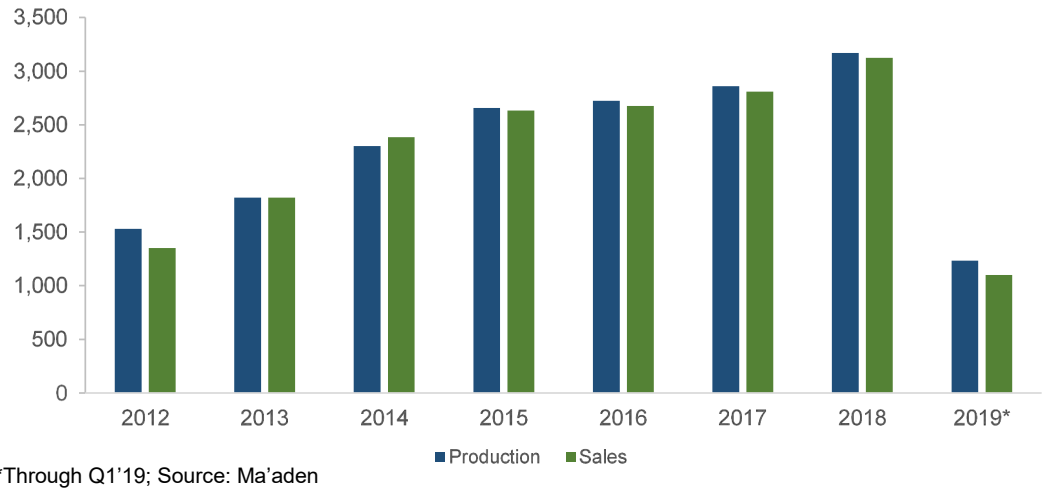
According to Ma'aden, Al Jalamid mine produces approximately 11.6 million metric tons per year of ore, and the beneficiation facilities up to 5 million metric tons per year. Concentrated rock is then taken by rail to Ras Al Khair for processing in Ma'aden's network of facilities including phosphoric acid, sulphuric acid, ammonia, DAP granulation and desalination plants. At full capacity, MPC can produce 3 million metric tons of DAP annually. DAP production is then sold to international clients in South Asia, Far East, Oceania, East Africa, and North & South America.

MWSPC represents Ma'aden's second phosphate project albeit significantly larger than MPC. MWSPC oversees seven large world-class plants and associated facilities, making it one of the largest phosphate facilities in the world. It was created under a joint venture agreement between Ma'aden (60 percent), Sabic (15 percent), and U.S. company Mosaic (25 percent).

Approximately SAR31 billion ($8 billion) worth of investments have been injected into the complex. According to Ma'aden, total production capacity is approximately 16 million metric tons per year including 3 million metric tons of finished products, as well as 440,000 metric tons of downstream products (purified phosphoric acid used in food industries, sodium tripolyphosphate used in detergents, and dicalcium phosphate and monocalcium phosphate used to produce animal feed). U.S.-based Fluor was awarded all program management services, and along with U.S.-based Jacobs, which handled Front-End Engineering Design (FEED).

Wa'ad Al Shamal has and continues to develop into an independent industrial city beyond that of relevance to phosphates. In late 2018, King Salman inaugurated Phase One of Wa'ad Al Shamal, which is expected to garner more than SAR85 billion ($23 billion) worth of investments as part of ongoing diversification plans. Some estimates indicate that Wa'ad Al Shamal will generate SAR24 billion ($6.4 billion) from non-oil sectors and contribute 3 percent to the Kingdom's GDP. Furthermore, an estimated 30,000 jobs are expected to be created for Saudi nationals especially those in the Northern Borders region.

Chart 9: Ammonium Phosphate Fertilizer (Thousand Metric Tons)



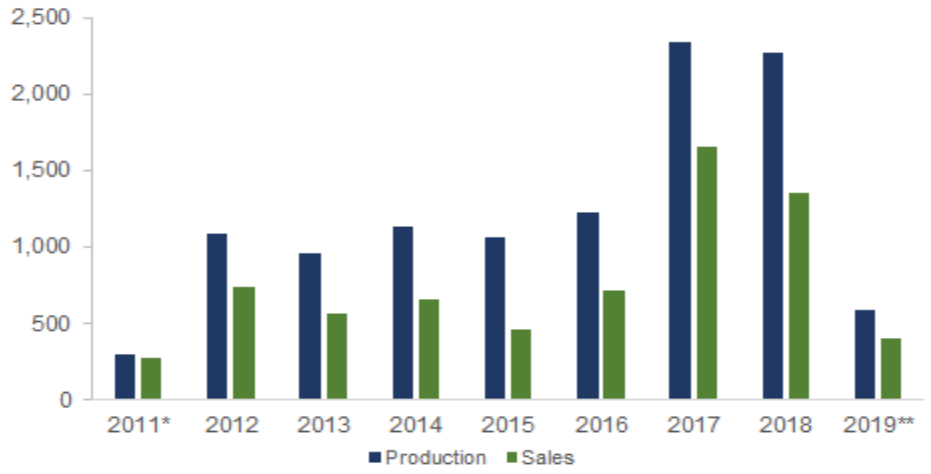
*Through Q1'19; Source: Ma'aden

Secondary industries are expected to benefit from the extensive investment in Wa'ad Al Shamal such as glass manufacturing, glass fibers, plastics, and solar panels. Saudi Aramco has an increasing stake as well, as one of its key long-term strategies to increase gas supply in support of the Kingdom's economic diversification programs to generate growth in new sectors will be realized. Saudi Aramco is embarking on a SAR10 billion ($2.67 billion) investment to supply the required energy feedstock to the city and its projects, an inconceivable idea just a few years ago given the terrain and geography of the region.

Ma'aden's recent awarding of an engineering, procurement, and construction contract to develop the first plant in the company's third large-scale phosphate complex 'Phosphate 3' marks another push to become a global leader in the production and export of phosphates. According to Ma'aden, the complex will increase its phosphate production to 9 million metric tons annually while increasing its capacity to supply phosphate fertilizer to global markets by 3 million metric tons per year. 'Phosphate 3' is expected to garner close to SAR24 billion ($6.4 billion) worth of investments, while generating approximately 7,000 direct and indirect jobs.

Ma'aden has also entered into foreign acquisitions to bolster its logistical capabilities as well as build its knowledge base. Ma'aden initiated completed the acquisition of an 85 percent stake in the Mauritius-based Meridian Group in an all cash deal that will provide one the region's largest phosphate producers with 3,000 staff and a network of operations across southern Africa. Ma'aden is expected to purchase the remaining 15 percent over the next four years. This represents the first of potentially many acquisitions as the Meridian Group deal will give Ma'aden wide-ranging access to distribution, blending, and product development capabilities.

Chart 10: Ammonia (Thousand Metric Tons)



* The ammonia plant started commercial production on October 1, 2011; **Through Q1'19; Source: Ma'aden

Ma'aden's Aluminum Production

Recognizing the impact and versatility aluminum has on the global market led Ma'aden to develop its own 'mine-to-metal' project. Given aluminum's marketability as the most widely used non-ferrous metal, Ma'aden sought to build its own capabilities locally to supply its domestic needs along with being a global supplier. To implement these grand plans, Ma'aden developed a joint venture in 2009 with U.S. based Alcoa, a global aluminum producer, to develop one of the world's most efficiently integrated aluminum project in Saudi Arabia. Together, Ma'aden and Alcoa created three companies with an ownership structure of 74.9 percent to Ma'aden and 25.1 percent to Alcoa. The three companies consist of Ma'aden Bauxite and Alumina Company (MBAC), Ma'aden Aluminum Company (MAC), and Ma'aden Rolling Company (MRC). Through these companies, Ma'aden manages the full value-chain by owning all aspects of its production.

The Ma'aden-Alcoa joint venture has brought SAR40 billion ($10.8 billion) to develop the mine-to-metal network in Al Ba'itha in Qassim province and build an integrated aluminum complex on Ras Al Khair Industrial City. The project was completed in 2014 and represents the first bauxite mine in the Middle East, and the first refinery in the Gulf region. The feedstock comes from large bauxite deposits in Al Ba'itha, including the mine and ore-crushing and handling facilities.

According to Ma'aden, the mine's estimated production is 4.6 million metric tons of bauxite per year. Production from Al Ba'itha is the transported via the North-South railway line to Ras Al-Khair.

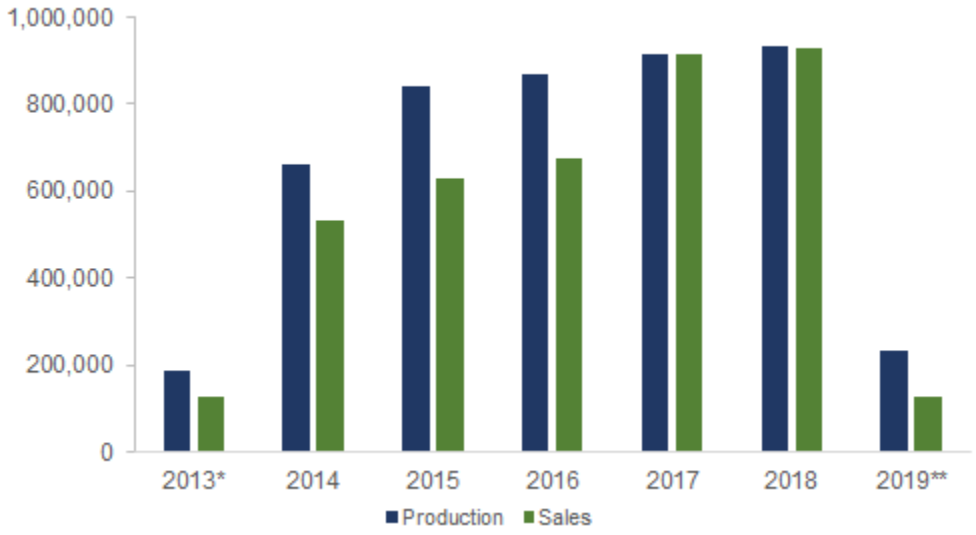
While Saudi Arabia is not as endowed with aluminum as it is with phosphates, Ma'aden still produced 932,000 metric tons of primary aluminum in 2018, accounting for 1.6 percent of world production[5]. This represents a 1.5 percent increase in aluminum production over 2017, which produced 916,000 metric tons.

Table 4: World Aluminum Production, 2018 (Thousand Metric Tons)

Country	Production
China	33,000
India	3,700
Russia	3,700
Canada	2,900
United Arab Emirates	2,600
Australia	1,600
Norway	1,300
Bahrain	1,000
Saudi Arabia	930
United States	890
Iceland	870
Brazil	660
Other countries	7,800
Total	**60,950**

Source: USGS estimates, Ma'aden

Chart 11: Primary Aluminum Production (Metric Tons)



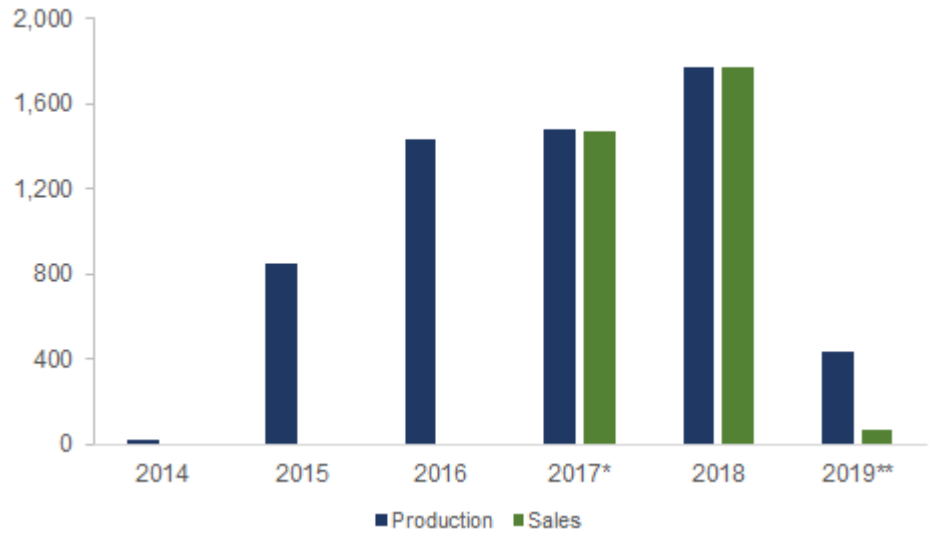
*MAC started production at its Ras Al Khair smelter in December 2012; **Through Q1'19; Source: Ma'aden

[5] The USGS estimates world production of aluminum in 2018 at 60,950 metric tons

In 2017, MAC's bauxite mine in Ba'itha produced 3,708 thousand metric tons of bauxite, of which 1,484 thousand metric tons of alumina was produced by the refinery. MAC's smelter was able to produce 762 thousand metric tons of aluminum from the alumina that was produced. The rolling mill produced 153 thousand metric tons of flat rolled products. The rolling mill came into commercial operation in December 2018 after producing 101 metric tons and 152 metric tons in 2016 and 2017, respectively. According to Ma'aden, the rolling mill has a capacity of 460 thousand metric tons of flat rolled products. The rolling mills' can recycling unit has capacity to recycle 130 thousand metric tons per year .

Ma'aden has also embarked on an important 50:50 joint venture with Sahara Petrochemicals in 2011 with a shared capital of SAR900 million ($240 million) to create SAMAPCO. SAMAPCO was created out of the need to provide caustic soda, an important feedstock, for the alumina refinery, and ethylene dichloride, a key feedstock for the production of plastics. More specifically, SAMAPCO was incorporated to design, construct, commission, own and operate and integrated chlor-alkali plant capable of producing 227,000 metric tons of chlorine and 250,000 metric tons of caustic soda per year. It is also responsible for producing 300,000 metric tons of ethylene dichloride per year along with associated utilities and support facilities.

Chart 12: Alumina Production (Metric Tons)



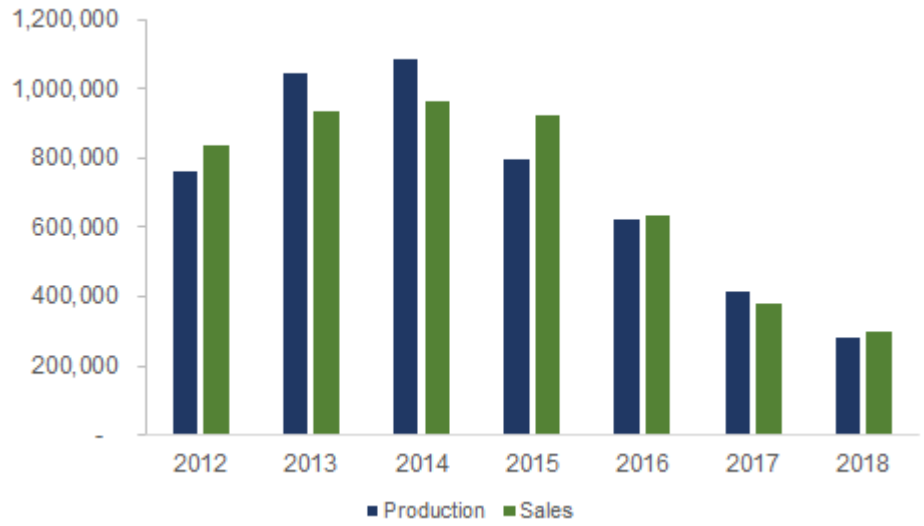
*Commercial sales began in 2017; **Through Q1'19; Source: Ma'aden

Ma'aden's Industrial Minerals Production

Beyond its abundance of oil & gas and metallic minerals, Saudi Arabia has sizeable industrial minerals. Ma'aden established the Ma'aden Industrial Minerals Company (MIMC) in 2009 as a wholly owned subsidiary to oversee the Kingdom's industrial minerals production. MIMC's chief industrial mineral production includes low grade bauxites (LGB), kaolin, caustic calcined magnesite (CCM), and dead burned magnesia (DBM). The industrial minerals are channeled for Ma'aden's needs while remaining output is supplied to local and regional trade partners. MIMC operates two industrial mineral mines as well as a processing plant. Az Zabirah mine deposit in Hail province contains kaolin and LGB while the Al Ghazalah deposit contains a high-grade magnesite mine. The processing plant is located in Madinah.

Az Zabirah mine operations began in 2008 for bauxite while kaolin was supplied to the phosphates industry for the production of phosphoric acid in 2011. Demand for LGB, a component in the production of cement, declined in recent years on the back of a slowdown in the construction industry. Production of LGB declined by 32 percent in 2018 to reach 283 thousand metric tons after witnessing the production of 417 thousand metric tons in 2017.

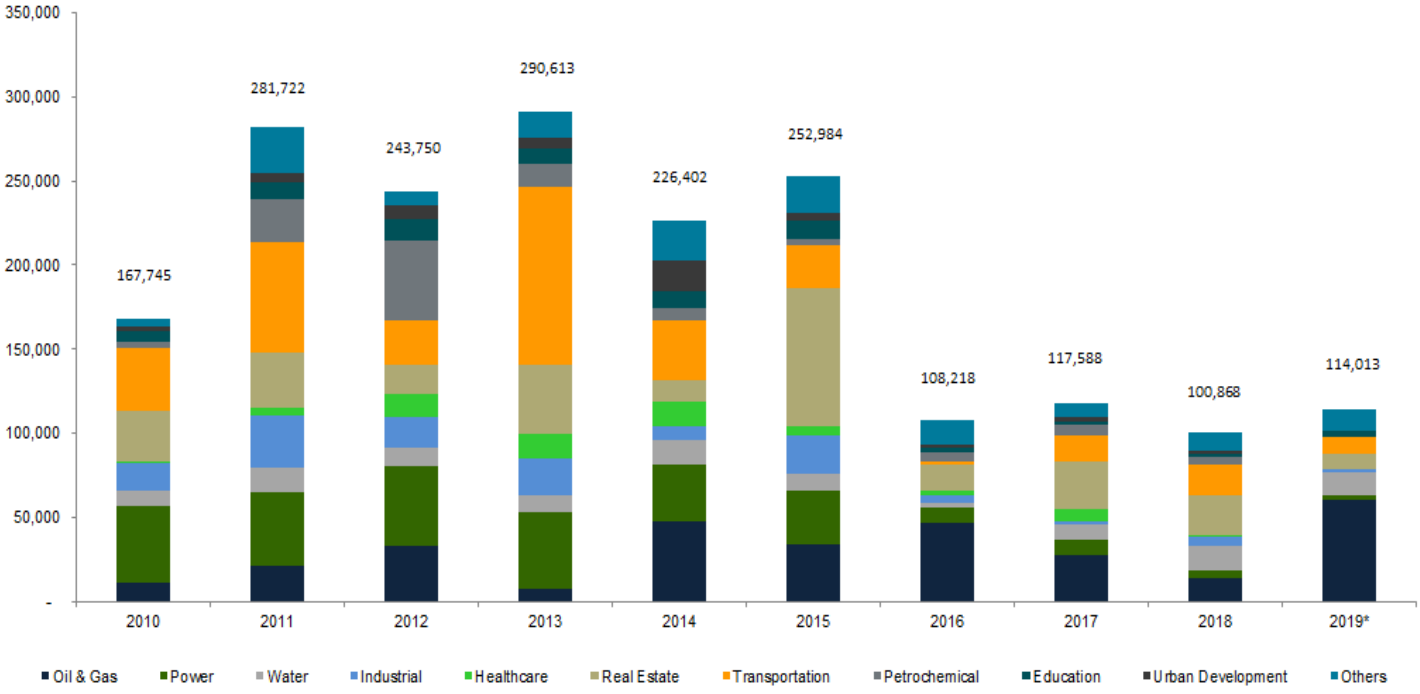
Chart 13: Low-Grade Bauxite Production (Metric Tons)



Source: Ma'aden

Production of LGB witnessed two consecutive years of 33 percent and 32 percent declines, respectively. However, the number of mega-projects across all sectors has significantly increased in the first half of 2019 as the value of awarded contracts reached SAR114 billion ($30 billion), marking the highest value of contract awards since 2015. Consequently, demand for LGB is likely to be strong by 2020 as cement is a critical building material for the construction of upcoming projects .

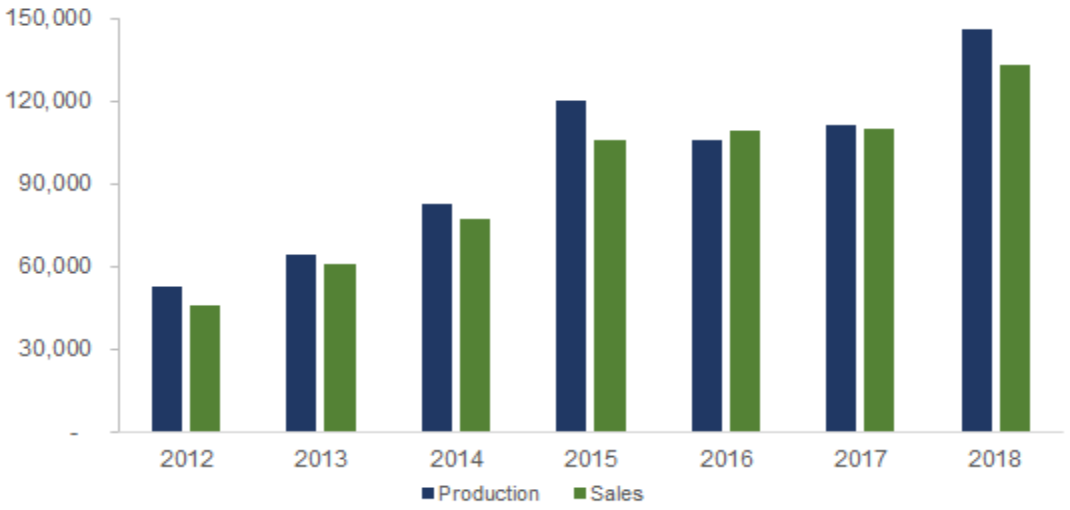
Chart 14: Value of Awarded Contracts by Year (SAR Millions)



Source: Various sources, USSABC *Through Q2 2019

Kaolin has witness growth over the last years, with production climbing by 32 percent in 2018 compared to 2017. Ma'aden's total mineral resources of kaolin at the mine is estimated at 1,020 thousand metric tons and its proven and probable reserves are 2,700 thousand metric tons.

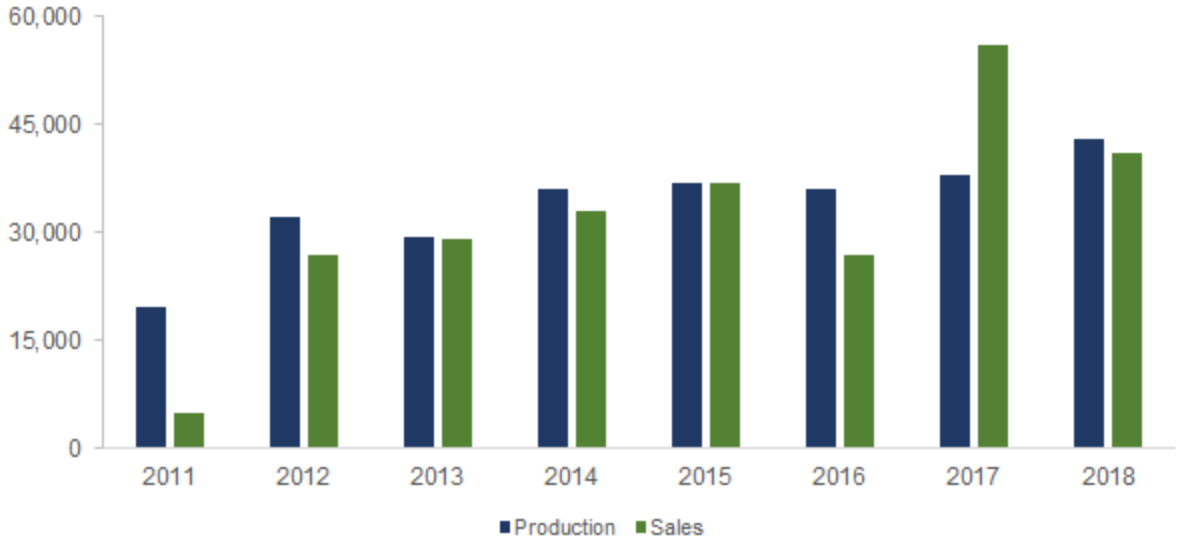
Chart 15: Kaolin Production (Metric Tons)



Source: Ma'aden

The high-grade magnesite that is produced at Al Ghazalah is sent to the processing plant at Madinah Industrial City which has a processing plant containing a Multiple Hearth Furnace (MHF) to produce CCM, a processing line with a vertical shaft kiln to produce DBM, and a processing line for the production of monolithic refractories. According to Ma'aden, the MHF line has a design capacity of 39 thousand metric tons per year of CCM. CCM is used in the metallurgical industry and for animal feed, fertilizer, and wastewater treatment. Production of CCM reached 43 thousand metric tons while sales reached 41 thousand metric tons in 2018.

Chart 16: Caustic Calcined Magnesite Production (Metric Tons)



Source: Ma'aden

Ma'aden's Copper Production

Ma'aden's copper mining activities are centered around the Jabal Sayid Mine in the province of Madinah. In order to enhance the efficiency and productivity of the Jabal Sayid mine, Ma'aden established a 50:50 joint venture with Barrick Gold Corporation in 2014 to create the Ma'aden Barrick Copper Company (MBCC). MBCC developed and constructed the new copper mine at Jabal Sayid and began selling copper concentrate in January 2016 as pre-commercial sales. Commissioning of the mine started in September 2015. According to Ma'aden, Jabal Sayid has a mine life of 14 years with proven and probable reserves of 23.7 million metric tons at 2.40 percent grade.

The world's production and consumption of copper has increased dramatically over the last 30 years. Copper sales is typically used as a health barometer of the global construction industry given its wide range of applications across numerous industries. MBCC sells concentrate to smelters that produce copper cathodes and continuous copper rods for the manufacture of diverse electrical products. As the following table indicates, a majority of copper production occurred in Chile followed by Peru and China.

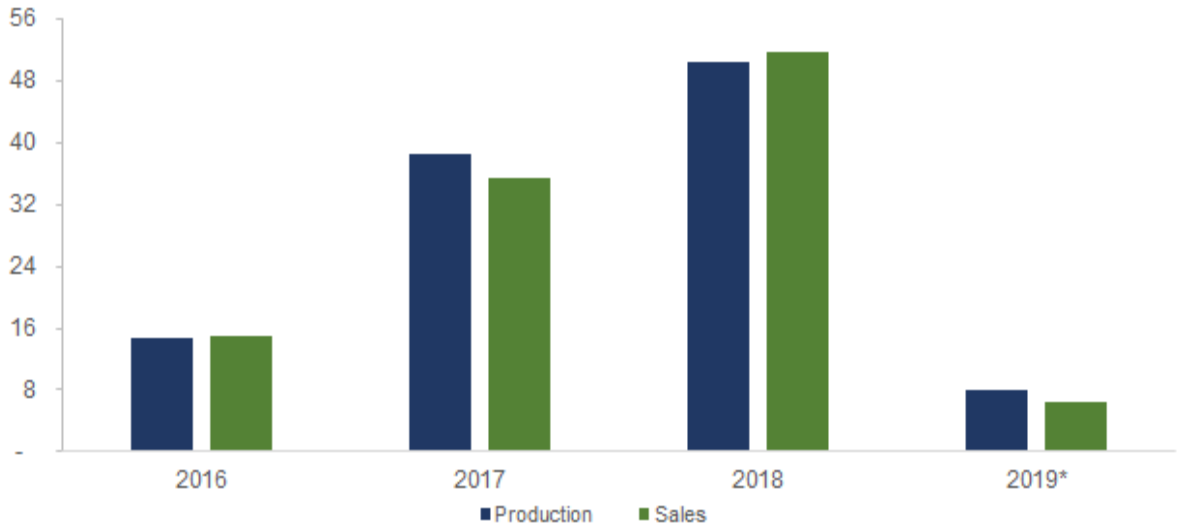
Table 5: World Copper Production, 2018 (Metric Tons)

Country	Production
Chile	5,800
Peru	2,400
China	1,600
Congo	1,200
United States	1,200
Australia	950
Zambia	870
Indonesia	780
Mexico	760
Russia	710
Other countries	4,400
Total	**20,670**

Source: USGS estimates

Saudi Arabia on the other hand is not a major producer of copper but has increased its production after the Jabal Sayid mine was commissioned. MBCC produced 50 metric tons of copper in 2018. MBCC also signed agreements for the off-take of copper concentrates. Approximately 40 percent of MBCC's product was exported to China and around 60 percent to India.

Chart 17: Copper Production (Metric Tons)



*Through Q1'19; Source: Ma'aden

Ma'aden's Infrastructure Development

Ma'aden created the Ma'aden Infrastructure Company (MIC) to provide internal services to its businesses. The main activities MIC has been involved in is establishing improved railway, port, power and water, and common infrastructure capabilities. One of the most important development was the establishment of the 1,500-km long North-South railway line. The railway line is owned and operated by Saudi Arabian Railways (SAR) and links the phosphate mine at Al Jalamid and the bauxite mine site at Al Ba'itha to the mineral industries complex at Ras Al Khair. The North-South railway line completed its first journey between Al Jalamid to Ras Al-Khair in May 2011.

The development of the Ras Al-Khair port, which is owned and operated by the Saudi Ports Authority, has been instrumental in the import and export of Ma'aden mining resources. The port was built to serve more than 80 different industrial projects especially Ma'aden's aluminum and phosphate operations. The first vessel received by the port occurred in February 2011.

Given Ma'aden's substantial need to have power and water services provided to its mines and processing plants, it signed a power conversion agreement with the Saline Water Conversion Company (SWCC) and Saudi Electricity Company (SEC). SWCC built the Ras Al-Khair desalination plant as hybrid desalination plant that implements both the multistage flashing and reverse osmosis technologies. Construction began in 2011 and commissioning occurred in April 2014. It is the largest desalination plant of its kind in the world and is capable of producing 1,036,000 cubic meters per day. The project also includes a 2,650MW combined cycle power plant which comprises five 600 MW combined cycle gas turbine blocks and two 220MW single cycle gas turbine units.

MIC has been responsible for the development of common infrastructure facilities at Ras Al-Khair. The facilities include serviced land, roads, drainage, lighting, employee housing, and a power grid connection as well as power transformation and distribution facilities. MIC has constructed over 2,500 residential units at the Ma'aden Village in Ras Al Khair, with future plans to expand employee housing as development continues.

REGULATORY DEVELOPMENTS

In an effort to boost the local private sector participation as well as grow foreign direct investments into the mining sector, the Ministry of Energy, Industry, and Mineral Resources (MEIMR) developed a Mining Investment Code in 2004. The mining code has undergone additional alterations recently but those changes have not yet been officially released. According to the Minister of MEIMR, the revised mining investment code aims to build a comprehensive database of its mineral resources, intensify exploration and develop new funding methods for projects. More specifically, the Kingdom will create enhanced datasets and other pertinent data including information on licenses available on-line through a world-class National Geological Database. In order to develop a National Geological Database, the Kingdom has earmarked approximately SAR14.3 billion ($3.8 billion), with the aim of making it easier to conduct business and improving data quality to reduce the risks associated with investing in new mining opportunities. Other steps include co-funding future explorations at a project level in partnership with the private sector.

The current mining code allows the granting of mining rights to other corporations and individuals and the transfer of those rights to other corporations with technical and financial competence. The government envisioned the Mining Code to open up the Kingdom's mineral reserves for development by the private sector, lower costs, and simplify procedures for obtaining mining permits. The salient points the Mining Code covered were:

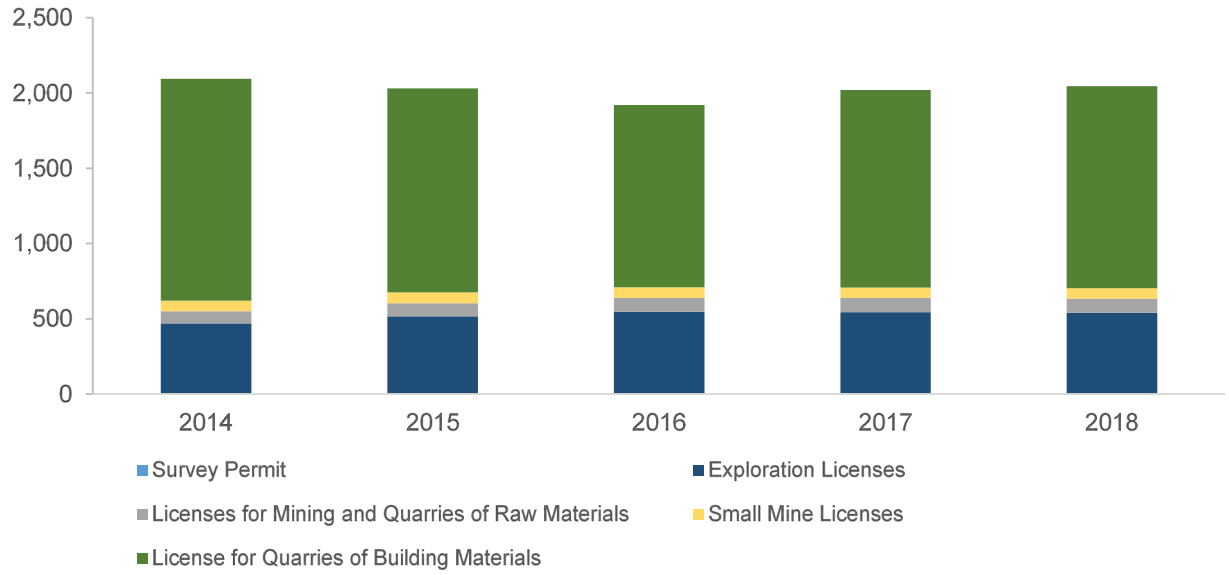
- Reduction of corporate tax liability to 20 percent
- Omission of mineral royalties
- Mining companies would be entitled to tax-free importation of equipment and machinery, as per the Saudi Foreign Investment Act.
- Full ownership of property

Additionally, the Mining Code encouraged entities to obtain licensees that span the full spectrum of the mining value chain. These include reconnaissance, exploration, material collection, and exploitation licenses. However, the number of licenses between 2014 and 2018 decreased by 2.3 percent. The only two licensing categories that increased during this time was 'Exploration Licenses' and 'Licenses for mining and quarries of Raw Materials,' which grew by 15 and 16 percent, respectively. This marks a considerable challenge the Kingdom has faced as the speed of exploration licensing has been significantly lower than global benchmarks.

On the issue of under-exploration, which is the first step in the mineral value chain through which deposits are identified, ample investments have been made over the years but it is still driven by Ma'aden. According to some estimates, to achieve the government's aspirations of growth in copper, gold, and zinc mining output through 2035, the Kingdom would need to spend over SAR28 billion ($7.4 billion) on mineral exploration including SAR21.4 billion ($5.7 billion) on prospect level exploration pursued by private sector participants. This translates to an average of SAR1.2 billion ($317 million) per year whereby this growth would entail an increase of more than 7 times the annual exploration spending relative to a 2015 baseline[6].

Looking ahead, the new Mining Investment Law will provide for a clearer understanding of the sector's governance and institutional enablement through effective and efficient legal frameworks. The focus to streamline and benchmark the issuances of licenses to best in class standards by mandating turnaround times of 30-90 days will provide the reassurance foreign investors seek.

Chart 18: Mining Licenses by Type



Source: Ministry of Energy, Industry, and Mineral Resources, GaStat

[6] Per data from the National Industrial Development & Logistics Program

FINANCING MECHANISMS

The mining sector has and continues to garner significant external lending interest from the following sources: government loans, bank loans, export credit agencies (ECA), and sukuk (Sharia compliant bonds). By the end of 2018, Ma'aden's total long-term borrowings for each of its business segments totaled SAR54.57 billion ($14.6 billion), indicating ample drawdowns on total facilities granted since 2010 of SAR72 billion ($19.2 billion). These long-term borrowings were sourced from syndicated loans and consortiums from domestic and international banks, the Saudi Industrial Development Fund (SIDF), PIF, and several ECA's.

Table 6: Long Term Borrowing, 2018

Ma'aden's Long Term Borrowings (As of 31 December 2018)	
Business Segment	**Amount (SAR)**
Phosphate	29,524,991,096
Aluminum	24,040,406,366
Precious and Base Metals	1,001,090,866
Total	**54,566,488,328**

Source: Ma'aden 2018 consolidated financial statements

The magnitude of financing necessary to develop a number of Ma'aden's projects require numerous lending sources across several packages. There has been no shortage of lending appetite from these sources as Ma'aden's sound financial standing coupled with the mining sectors long-term strategic plan ensure ongoing development and enhancements in the Kingdom. A case in point is the Ras Al-Khair Aluminum Project that necessitated billions of dollars to achieve Ma'aden's plans.

The first phase was the aluminum smelter and rolling projects, which raised approximately SAR26.3 billion ($7 billion) with a majority of lending coming from Saudi banks. The second phase was the development of the bauxite mine and aluminum refinery. This phase required approximately SAR13.5 billion ($3.6 billion) worth of injections as Ma'aden earmarked a 60:40 debt to equity split as SAR8.1 billion ($2.2 billion) would be in the form of debt; SAR3.75 billion ($1 billion) from commercial banks, SAR3.75 billion ($1 billion) direct loans from the PIF, SAR600 million ($160 million) from the SIDF. The remaining SAR5.4 billion ($1.44 billion) was sourced from the project's sponsors. However, Ma'aden received bank commitments that exceeded SAR3.75 billion ($1 billion) that led to an oversubscription of four times the required amount. Ma'aden priced the financing at Saudi interbank offered rate (SIBOR) plus 145 basis points (bps) on the Riyal denominated tranche, and LIBOR plus 185bps on the international commercial bank tranche. International banks such as U.K.'s Standard Chartered and France's BNP Paribas were also lending participants.

The Wa'ad Al Shamal Phosphate Project also garnered significant lending interest. In 2014, Ma'aden signed a SAR18.8 billion ($5 billion) financing deal with commercial banks and the PIF. A total of 16 local and international commercial banks, including Al Rajhi Bank, Bank of Tokyo-Mitsubishi, and BNP Paribas, as well as three export credit agencies signed the agreement. ECA's that expressed interest included Export Development Canada, German Development Bank KFW, and the Export-Import Bank of Korea. Ma'aden has favored Riyal denominated financing over foreign issuances mainly due to the lower financing costs.

Although commercial banks have been keenly interested in lending to Ma'aden, there are inherent risks that commercial banks face with large scale projects that require lengthy tenors. Historically, the nature of long-term loans results in asset-liability mismatches. This usually occurs when banks lend on long-term basis with short-term funding resources, thereby increasing their liquidity risk. Another inherent risk is that sizeable loans needed by Ma'aden may lead to concentration risk for an individual bank as there are legal lending limits banks must adhere to when providing financing to a single borrower.

Hence the syndication and development of consortiums have gained popularity over the years as a means to compete with government sources.

When gauging bank credit by economic activity, the mining and quarrying category lags behind all other categories except for agriculture and fishing. While banks have been active participants in the funding of mining projects, there is room for banks to further their lending reach. However, the mining and quarrying category did rebound in 2018 as it grew by 23 percent over 2017. We expect this category to continually grow over the long-term as commercial banks get more involved in the long-term plans of the mining sector.

More recently, Ma'aden has looked to the sukuk market to provide more liquidity solutions to fund its projects. In 2018, Ma'aden's subsidiary, MPC, successfully completed a sukuk offering for SAR3.5 billion ($933 million). The issuances consisted of 3,500 certificates with a nominal value of SAR1 million ($267 million) each. The sukuk has an expected return of 135 bps over SIBOR with a maturity of seven years payable in one lump sum. Proceeds from the sukuk are mainly used to finance capital investment requirements and refinance existing financial obligations.

Ma'aden is also considering raising up to SAR18.8 billion ($5 billion) in a rights issue in 2019 that would further help it finance potential acquisitions. This issuance might assist Ma'aden with looking for investment opportunities globally that would complement and strengthen its business within the Kingdom. Generally, the issuance of sukuk will enhance Ma'aden's international profile, further facilitating its access to global sources of funding.

In an effort to further bolster financing mechanisms for the export and import of Saudi Arabian industrial and mining goods, the Saudi Export Development Authority established a new EXIM Bank. The EXIM bank will start with a capital injection of SAR30 billion ($8 billion). A further SAR5 billion ($1.3 billion) has been allocated as first installment. The Saudi Export Development Authority envisions the EXIM bank as a funding bridge that will provide financial services to the export and import sector. This area of financing is needed in the Kingdom as a way to stimulate the private sector and provide financing to local exporters and international buyers.

Chart 19: Mining & Quarrying Bank Credit (SAR Millions)

Source: Saudi Arabian Monetary Authority (SAMA)

SECTOR OUTLOOK

The Kingdom's ambitious long-term plans for the mining sector will require significant amounts investments in the exploration and mining of current and new sites, to encourage an open market for local and private players to participate on equal footing, and to develop the immense human capital requirements. The Kingdom has already taken steps to develop these areas of focus by developing specialized entities that will oversee the proliferation of the mining sector. These entities include the National Industrial Development Program (NIDLP), the Industrial Clusters, and the Saudi Arabia Industrial Investments Company, also referred to as Dussur. These entities were borne out of Vision 2030 and are expected to be influential participants in the sector.

NIDLP's delivery plan contains specific strategies and solutions across industrial sectors that is believed to be instrumental in developing the Kingdom's development plans. According to NIDLP, it aspires to[7]:

- Transform Saudi Arabia into a leading industries powerhouse and a global logistics hub in promising growth sectors (with focus on Industry 4.0)
- Generate major job opportunities for Saudi citizens
- Improve Saudi Arabian trade balances
- Maximize local talent

NIDLP focuses on four key sectors: industry, mining, energy, and logistics. For mining, NIDLP's aim is to develop the mining sector and increase its contribution to the national economy. The program covers all stages of the value chain from exploration to mining and intermediate industries.

The Industrial Clusters in tandem with Ma'aden aim to expand mining activities and primary materials industries that are produced from the Kingdom's mining resources. Furthermore, it will aid in developing sustainable and globally competitive value-added semi-finished and finished metal industries that support the Kingdom's Vision 2030. Of particular focus is directing efforts towards expanding the aluminum, steel, copper, and phosphate industrial base and creating titanium metal, tantalum, niobium, rare earth elements and quartz/silica industries. This will allow for new investment opportunities for local and foreign investments as well as taking advantage of local mineral content, value chain, and creating sustainable job opportunities.

The establishment of Dussur also provides another contributor to the development of the mining sector. Its main aim is to achieve economic and income diversification by investing in different industrial sectors. According to Dussur, its plan to develop the industrial sector includes:

- Exploitation of natural resources and locally produced materials coming from local corporations in conversion and support industries.
- Investing in strategic economic sectors in order to develop several secondary industries.
- Establishment of conversion industries which is based on petrochemicals, fertilizer, aluminum, steel, and other basic industries.

The level of concentration by the government to raise the mining sector's profile comes at a time where there are inherent risks and challenges that must be tackled. As previously mentioned, the Kingdom is going through successful steps to drive the mining sector towards becoming a global leader, nonetheless the sector is still led by one player, Ma'aden. A vast amount of investments currently being spent on exploration is being deployed by Ma'aden and its foreign partners. According to MEED Projects, Ma'aden is currently involved in the majority of the 19 ongoing mining projects worth SAR53 billion ($14 billion). Furthermore, access to financing, which is a critical enabler of exploration, is essential for businesses given the exorbitant cost of doing business and mitigating the risks involved. Smaller players must compete to obtain the financing required to become profitable contributors to the mining sector and

[7] NIDLP 2018-2020 Delivery Plan

face the lack of a domestic source of funding between suppliers who have capital and those who are in need of capital. The current environment makes small to medium enterprises (SME) involvement more challenging.

Hence, the reliance on state-owned companies for a majority of large ticket investments underscores the limitations of capable private sector players willing to undertake such investments.

Given these obstacles, Saudi Arabia has a competitive advantage in several areas across the mineral value chain. The Kingdom currently and in the future will maintain long-term large and growing domestic demand to go along with the abundance of mineral resources and very competitive energy costs. While some estimates ambitiously indicate that the Kingdom has approximately SAR5 trillion ($1.3 trillion) worth of mineral endowments, especially in precious and base metals, the reality is that Saudi Arabia represents a growth market opportunity where strategic partners can make a significant positive impact on the economy. Ongoing government mandates that accelerate the exploration and development of mines also assist in the enhancement of midstream and downstream segments of the value chain.

According to NIDLP, Saudi Arabia's mining program will also play a key role in infrastructure, talent, and financing. Saudi Arabia will support strategic investments in mining-specific infrastructure including water pipelines, roads, and electricity grid expansion while also incorporating mineral value chain project opportunities into its masterplans for industrial zones. It will also sponsor innovative scholarship programs abroad in mining-specific disciplines while simultaneously expanding the capacity for mining specific education at local universities.

CONCLUSION

The Saudi Arabian mining sector is in the midst of sweeping changes that will propel it as the Kingdom's third pillar. The ongoing development will provide much needed benefits to the government, private sector players, and citizens. The mineral resources the Kingdom is endowed with provides it with numerous opportunities to become a global leader in line with Vision 2030's ambitions. To date, the mining sector's contribution to GDP still lags behind mineral rich economies but represents significant opportunities to raise the level of its contribution. Being a net importer of minerals, albeit at a declining rate indicates the level of ongoing development the Kingdom is in the midst of.

The Kingdom faces many obstacles in its quest to fulfill its mining objectives set in Vision 2030. Spending on exploration has been below global benchmarks and heavy investments are required to reach the level of scale the government envisages. The lack of competing developers besides Ma'aden represent another challenge as the market has yet to develop to accommodate a growing presence of smaller industry players. Furthermore, access to financing for SMEs to achieve the level of participation Vision 2030 stipulates, is an area that is currently being tackled but must continue to expand.

The employment participation levels have room to grow as Saudis do not see the mining sector as a sought-after area to work in. As the development of the sector continues, Saudis will begin to migrate to the mining sector as more opportunities will be available across the value chain.

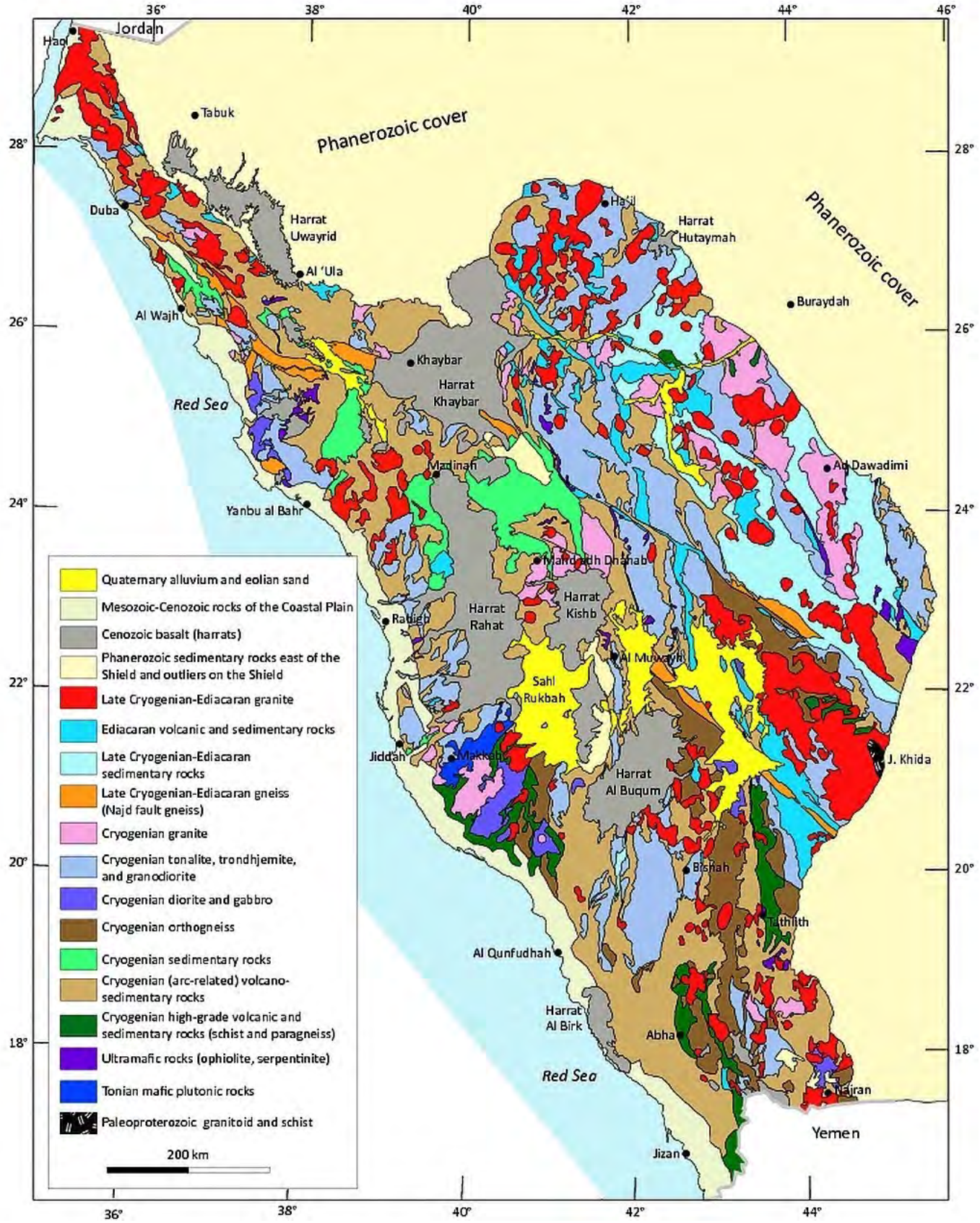
The opportunities for the mining sector are plentiful. The sector's outlook is very favorable as the magnitude of investments directed at future exploration, sustainability, and profitability are key areas that are expected to grow. Ma'aden's participation as a national leader across the mining value chain places it in the driver's seat of future development. It has already invested heavily across the gold and base metals, phosphates, aluminums and industrial minerals areas.

Funding of mega-projects have attracted lenders both locally and abroad across commercial banks, ECAs, sukuk issuances, and government support. This healthy appetite signals strong confidence in the mining sector as an attractive investment environment.

Beyond local and foreign partners, the government is and will continue to be a strong financial supporter as it provides ongoing important debt cushions for funding Ma'aden's needs over the medium to long-term. This level of engagement by all parties adds credence to the mining sector's role as a growing contributor to the Saudi Arabian economy.

APPENDIX

Geological Map of the Arabian Shield:



Source: SGS

Map of Ma’aden’s Mining Operations

Source : Ma’aden

Discovered Mining Sites by 2018:

Non-metallic minerals				Metallic minerals	
Ore	Number of Sites	Ore	Number of Sites	Ore	Number of Sites
Limestone	546	Gabbro	9	Gold	849
Clays	363	Magnesite	9	Copper	594
Aggregate	327	Pyrophyllite	9	Silver	258
Sand and gravels	180	Clay / kaolin	7	Gossan	183
Granite	166	Clay / attapulgite	7	Iron	163
Sand	160	Kyanite	7	Chromium	111
Sandstone	145	Diatomite	7	Zinc	85
Basalt	124	Bauxite	6	Tungsten	47
Lightweight	123	Olivine	6	Lead	44
Marble	103	Clay / laterite	5	Nickel	29
Dolomite	90	Garnets	5	Zirconium	28
Gypsum	78	Trachyte	5	Molybdenum	25
Quartz	65	Anorthosite	4	Thorium	24
Barite	50	Wollastonite	4	Tin	14
Phosphate	46	Silt	4	Uranium	13
Scoria	46	Andesite	3	Manganese	11
Silica sand	38	Anhydrite	3	Niobium	11
Feldspar	34	Sulfur	3	Cerium	10
Fluorite	32	Mica	3	Antimony	7
Shale	29	Boron	2	Beryllium	7
Pyrite	26	Zeolite	2	Rare earth elements	6
Coal	24	Amethyst	1	Titanium	3
Asbestos	22	Andalusite	1	Strontium	2
Gravels	18	Marl	1	Lanthanum	2
Salt	17	Perlite	1	Lithium	2
Black sand	16	Rhyolite	1	Osmium	1
Graphite	15	Nepheline / syenite	1	Arsenic	1
Quartzite	14	Siliceous tuff	1	Cobalt	1
Talc	14			Mercury	1
Clay / bentonite	13			Yttrium	1
Total			3,041		2,533

Source: SGS, GaStat

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