ISLAMIC REPUBLIC OF AFGHANISTAN

Ministry of Mines and Petroleum

momp.gov.af

INVESTMENT OPPORTUNITIES IN THE EXTRACTIVE INDUSTRY OF AFGHANISTAN

April 2019

Introduction

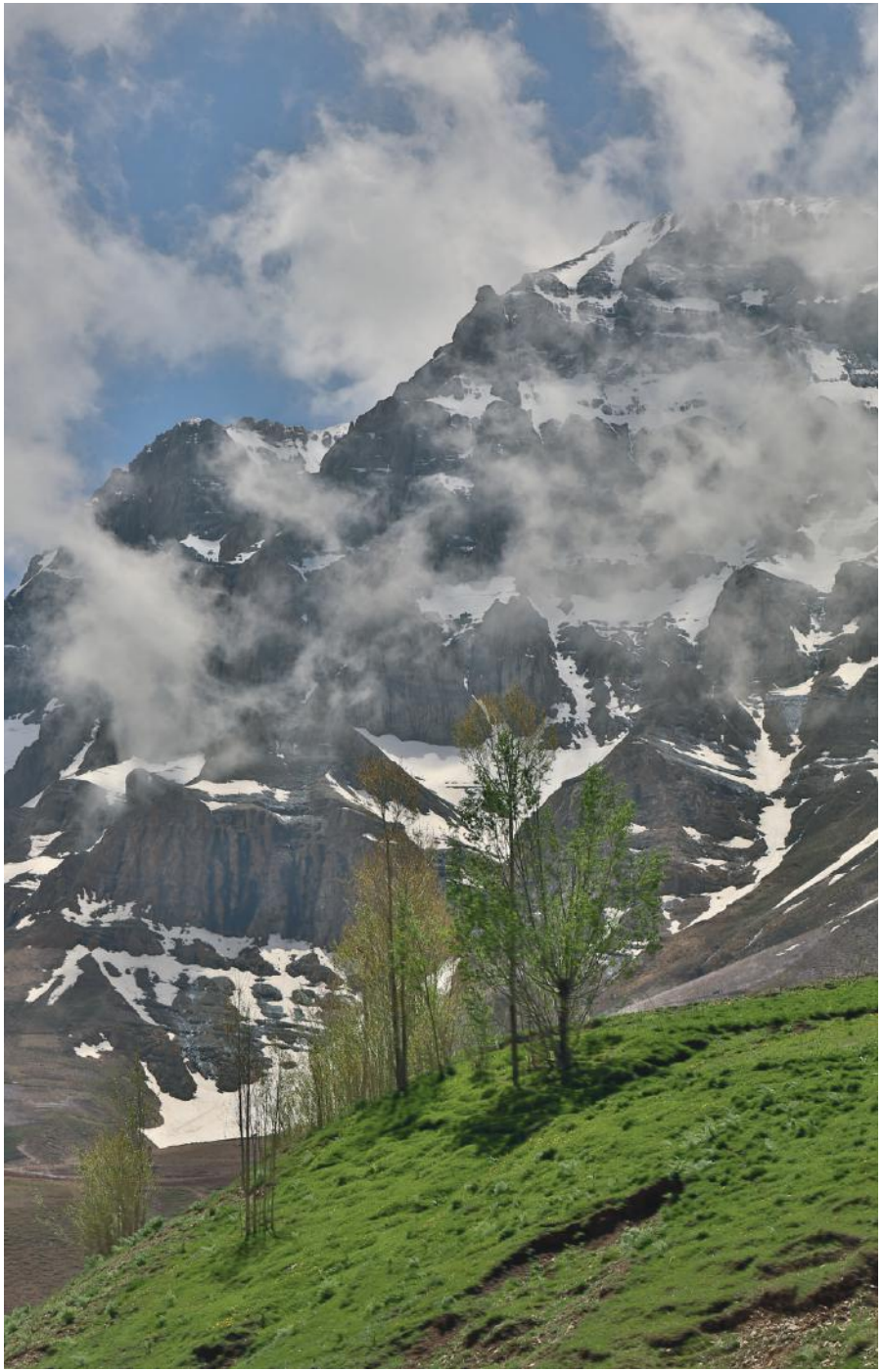
Afghanistan is endowed with abundant natural resources that remain largely untapped. The US Geological Survey found that Afghanistan holds more than US$1 trillion worth of mineral deposits. The country has world-class deposits of iron ore, copper, gold, rare-earth minerals, and a host of other natural resources.

Bulk metals, such as iron ore, copper, aluminum, tin, lead and zinc, are located in multiple areas of the country. And, gemstones, rare-earth metals, sulfur, talc, gypsum and chromite, are predominant across Central Afghanistan, Baghlan, Kunduz, Logar, Khost, among other places. Afghanistan's mineral deposits include more than 2.2 billion metric tons (MTs) of iron ore, 1.3 billion MTs of marble, almost 30 million MTs of copper, 1.4 million MTs of rare-earth minerals, and 2,700 kg of gold.

The National Unity Government (NUG) sees Afghanistan's vast mineral resources as catalyst of long-term economic growth. The sector has a promising potential of creating jobs, generating revenue, and transitioning the country from aid-dependency towards self-reliance. Thus, the Ministry of Mines and Petroleum (MoMP) designed several consequential documents in the years 2017/18, including the Mining Sector Roadmap and a comprehensive reform strategy to operationalize the Roadmap, and a new minerals law, as part of its commitments to open the mining sector for private investments.

The Ministry has, furthermore, taken concrete steps to develop a strong infrastructural foundation, as well as it has made significant policy changes to create an enabling business environment for the private sector to thrive. The Ministry is rigorously focused on attracting domestic and foreign investors to exploit Afghanistan's plethora of mineral resources. Consequently, several domestic and foreign companies have recently shown immense interest in investing in copper, cement, gold, and gemstone projects.

Thus, the High Economic Council and the Cabinet have approved 38 new small- and large-scale mining areas, which are now available for tendering. These mining areas were chosen taking into consideration the quality of infrastructure, and availability of power and industrial parks that are pre-requisite for processing the marble, talc, travertine, and precious and semi-precious stones.



Cement

As Afghanistan undergoes a process of reconstruction and rehabilitation, so there is a high demand for cement in the country. Despite abundance of raw materials for cement manufacturing across the country — such as high-quality limestone, gypsum and coal — Afghanistan annually imports about 5 to 6 million tons of cement from the neighboring countries. Most of the raw materials for producing cements remain untouched.

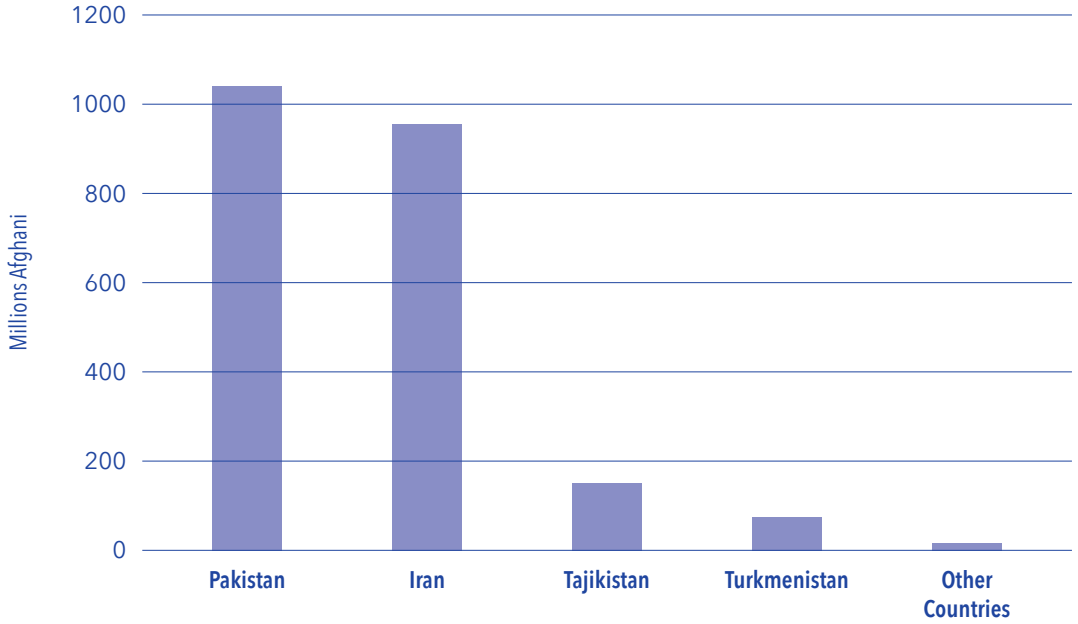
Afghanistan produces the lowest quantity of cement in the world. The annual production of cement in the country remains merely 2 kg/capita, significantly lower when compared to 92 kg/capita in Pakistan and 200 kg/per capita in the UK. The country is importing 96% of its cement needs from the neighboring countries, whereas only 4% of the market demand is fulfilled by the domestic production.

During the last decade, Afghanistan, on average, produced 80,000 metric tons of cement per year. The country produced less than 20 percent of its maximum capacity during the years 2007 to 2017. On the other hand, according the Central Statistics Office (*CSO*), on average, Afghanistan spent over 4 million metric tons of cement (*production + import*) annually.

In 2016, over 96 percent of the demanded cement in Afghanistan was imported from Pakistan, Iran and Tajikistan, as shown in the adjacent graph. Pakistan remained the biggest exporter of cement to Afghanistan with over 1 million MTs of cement being imported from the country. Researches conducted by *Box International* in 2006 and *TBSFO* in 2013 estimated the annual demand for cement in Afghanistan to be around 7 million tons. Considering the international price for cement, it could be estimated that the cement industry in Afghanistan is worth approximately US$700 million in a year.

Ghori Phase 3 in Pul-e-Khumri (*Baghlan*) remains the most promising area for cement production. There are also cement production opportunities in Parwan, Herat and Kandahar. The Herat site has vast amount of limestone, and power needs could be met by either the nearby Sabzak coal area or natural gas once the TAPI pipeline reaches the city.

Import of Cement
by Country – 2017/18



SOURCE: CSO AFGHANISTAN

Province	Location	Coal	Clay	Gypsum	Limestone	License
Kandahar	Shorandam	Enough	Uknown	Unknown	Unknown	Exploration/Exploitation
Baghlan	Puli-Khumri/ Third phase of Ghori Cement	Enough	Enough	6.3 million ton	112 million ton	Exploration/Exploitation
Herat	Zendajan	Enough	Enough	4 million ton	1327 million ton	Retendering

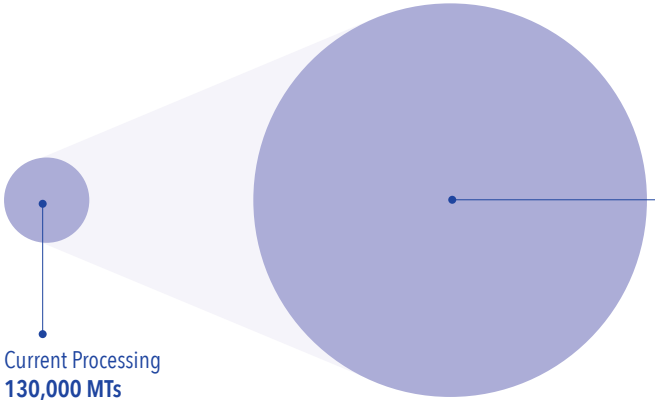
Marble

Marble sector is the most dynamic manufacturing exports sector in Afghanistan. The comparative advantage of Marble sector in the country stems from the availability of huge deposits of high quality marble spread throughout the country. The U.S. Geological Survey estimates that Afghanistan's marble resources are approximately 1.3 billion tons with an estimated value of US$150 billion. The strong growth of the global market for marble and an increasing demand in most regions of the world, offer an excellent investment opportunity for producing and exporting marble from Afghanistan.

In the year 2016, Afghanistan exported 17,000 tons of marble worth US$50 million to Iran, China, Pakistan, UAE, Italy, India, Canada and Iraq. Out of the total exported volume of marble, only 27% were processed products. As almost half of the world's marble output is consumed in the Middle East, Far East and in European countries, there is enough potential for investors to invest in the marble processing sector and export the finished products to regional countries. The Minerals Law 2018 is supporting the processed products by charging lower royalties for the process goods- royalty for minerals processing will be 2.5% as compared to the unprocessed 7%.

Below graph shows the current and potential capacity for processing of marble.

Current Processing vs Capacity



Marble Projects Ready for Bidding

Approved by HEC and the Cabinet

#	Province	Commodity	Area (km²)	Possible Deposit (Ton)
1	Kapisa	Marble white	0.407	132,024,816
		Marble (Silver and red)	0.335	110,283,120
		Marble (Silver and red)	0.696	175,329,360
		Marble (Silver and Striated)	31.177	1,199,545,200
		Marble (White and Silver)	0.362	70,426,260
2	Parwan	Gray marble	0.0261	1,696,500
		White and gray marble	0.0279	1,696,500
		Marble silver color	0.0351	24,640,200
		Marble silver color	1.0584	605,691,580.4
		Marble silver color	0.071635	271,317.65
3	Ghazni	White marble	0.162	33,548,588
4	Herat	White Marble	4.595	31,360,875
		White Marble	0.636	43,543,500
		White Marble	0.789	53,849,250
		White Marble	1.722	117,526,500
5	Daikundi	Marble (White and Silver)	0.4919	113,761,865
		Marble (White and Silver)	0.4331	163,539621.8
		Marble (White and Silver)	0.0732	1,268,089
		Marble (Silver and Striated)	0.7029	195,956,208.8
6	Kabul	White and green marble	0.2769	59,756,580
7	Kunar	-	14.13	4,144,125,847
8	Nangarhar	-	-	-

Among the above designated areas, Parwan, Kabul, Herat and Nangarhar have industrial parks.

Talc

Talc, a soft stone mineral used in many industries such as pharmaceuticals, cosmetics, rubber and oil production, is mined in a number of Afghan provinces with the largest resources located in Nangarhar province. In Afghanistan, talc is now used only in the PVC painting and manufacturing industries, however, there are no precise figures of the consumption volume of this mineral in the above industries.

Talc has been discovered in the provinces of Nangarhar, Kabul, Parwan, Kapisa, Logar, Ghazni, and Kandahar, Maidan Wardak, Kunar and Baghlan provinces. Based on the early studies, the Nangarhar province has the best quality talc in the world. According to a recent survey by Ministry of Mines and Petroleum, there are currently 32 companies involved in the extraction and processing of talc. Amongst these, 18 companies are doing processing, 10 companies are involved in extraction and the remaining are simultaneously involved in extraction and processing.

The industry provides direct and indirect job opportunity for 7,500 people. A recently conducted value chain study of talc found that the total investment in this sector has reached up to US$30 million. However, despite offering enormous opportunities for investment, only two companies in Sheikh Mesri Industrial park have the machinery to convert talc into powder form. The annual processing capacity of each factory is about 130 thousand tons and can grind the talc from 45-5 microns. The minimum investment requirement to set up such a company is US$3.5 million.

In 2016 the global production of talc was 7.31 million tons and it is expected that in 2022 world production will reach up to 8.77 million tons. Afghanistan and Pakistan have the largest share (14.62%) of bulk talc production. Afghanistan is exporting its unprocessed talc to Pakistan and China.

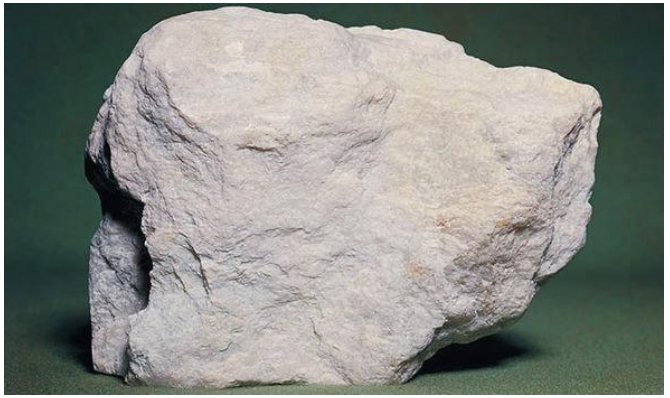
While China produces about a third of the world's talc, the presence of strong and growing actors in Europe, India, Brazil, and the United States has prevented the formation of a single dominant producer in the talc market. Huge resources of talc in Afghanistan can place the country among the world's largest producers in the upcoming decades.

The average price per ton of talc in the world market in 2016 was US$155 and the most expensive talc was recorded at a price of US$214 per ton from Italy. Most Afghan companies sell talc to Pakistani intermediary firms at an average price of US$60/ton which Pakistani companies may sell Afghan talc under their own label at around US$129 per ton.

The value of global talc production was estimated to reach US$2.34 billion in 2018. The market studied is anticipated to reach US$2.97 billion by 2023, registering a CAGR of about 4.9% over the period 2018-2023.

In response to a steadily growing global demand for talc, Afghan companies have recently started exporting talc powder to Jordan, Iraq, UAE, India and Russia. The Ministry of Mines and Petroleum has conducted a survey of the following locations and are ready to begin the tendering process for investment.

#	Province	Location	Area (km²)	License
1	**Nangarhar**	District Achin	171.94	Exploration
2	**Kapisa**	Afghania Valley District Nijrab	1.2 (with estimated reserve 434311.2)	Exploration



Travertine

Travertine is a form of limestone deposited by mineral springs, especially hot springs. It is formed by minerals dissolved in ground water, which are then deposited on the earth's surface by rivers and natural springs. Travertine is characterized by pitted holes and troughs in its surface implying that that it has a concentric texture and porous surface. The mineral is most commonly available in tile and pavers for floor installations.

Afghanistan Yellow Travertine is one of the predominant types of travertine quarried in the country. This stone is especially good for building stone, countertops, sinks, monuments, pool coping, sills, ornamental stone, interior, exterior and other design projects. It is also named as Afghan Yellow Travertine, Afghanistan Gold Travertine and Malistan Travertine. Afghanistan Yellow can be processed into honed, aged, polished, sawn cut, sanded, rock faced, sandblasted, bush hammered, tumbled and so on. Helmand, Ghazni, Bamyan, Wardak and Parwan have some of the highest quality travertine reserves in abundance.

Travertine has been used as a building material for thousands of years, which helps solidify its classic and timeless feel. Travertine doesn't absorb heat, even on the hottest days. This makes travertine an ideal choice for tiling around swimming pools. Travertine also has a non-slippery texture, making it safe to use around the pools. This material eliminates injuries from walking or running on it with wet feet.

In Afghanistan, travertine is widely used as decoration piece in construction, especially for the exterior design. Many people prefer travertine because it can add value and is much more affordable than marble. High quality travertine generally cost between US$15 and US$30 per square foot, depending on the overall quality of the stone itself.

Increasing urban construction & demand for the architectural aesthetics by consumers is anticipated to drive the demand for the travertine market in the future. Infrastructure projects in the emerging economies drive a huge opportunity for the travertine market. In China and India, the construction industry is growing at a rapid pace, and hence, Asia Pacific is projected to be an emerging region for the travertine market. Among the 38 large and small scale projects approved by the High Economic Council, below are the travertine areas which are ready for tendering for the interested investors.

#	Province	Location	Estimated Deposit (ton)	Area (km^2)
1	**Wardak**	Dasht Reza, Shanbe, Qol-e-Khish, Behsood	26,460,381	0.837
		Kakhana, Qol-e-Khish	18,013,648	1.322
		Qol-e-Khish	14,103,679.8	0.592071
		Sabzab, Qol-e-Khish	11,519,595.26	0.452902
2	**Ghazni**	Koraleh, Nahoor	127,605,900	0.543
3	**Bamyan**	Kholankash, Markaz	579,855	0.456
4	**Parwan**	Dastarzan, Sorkhparsa	2,035,040	0.08

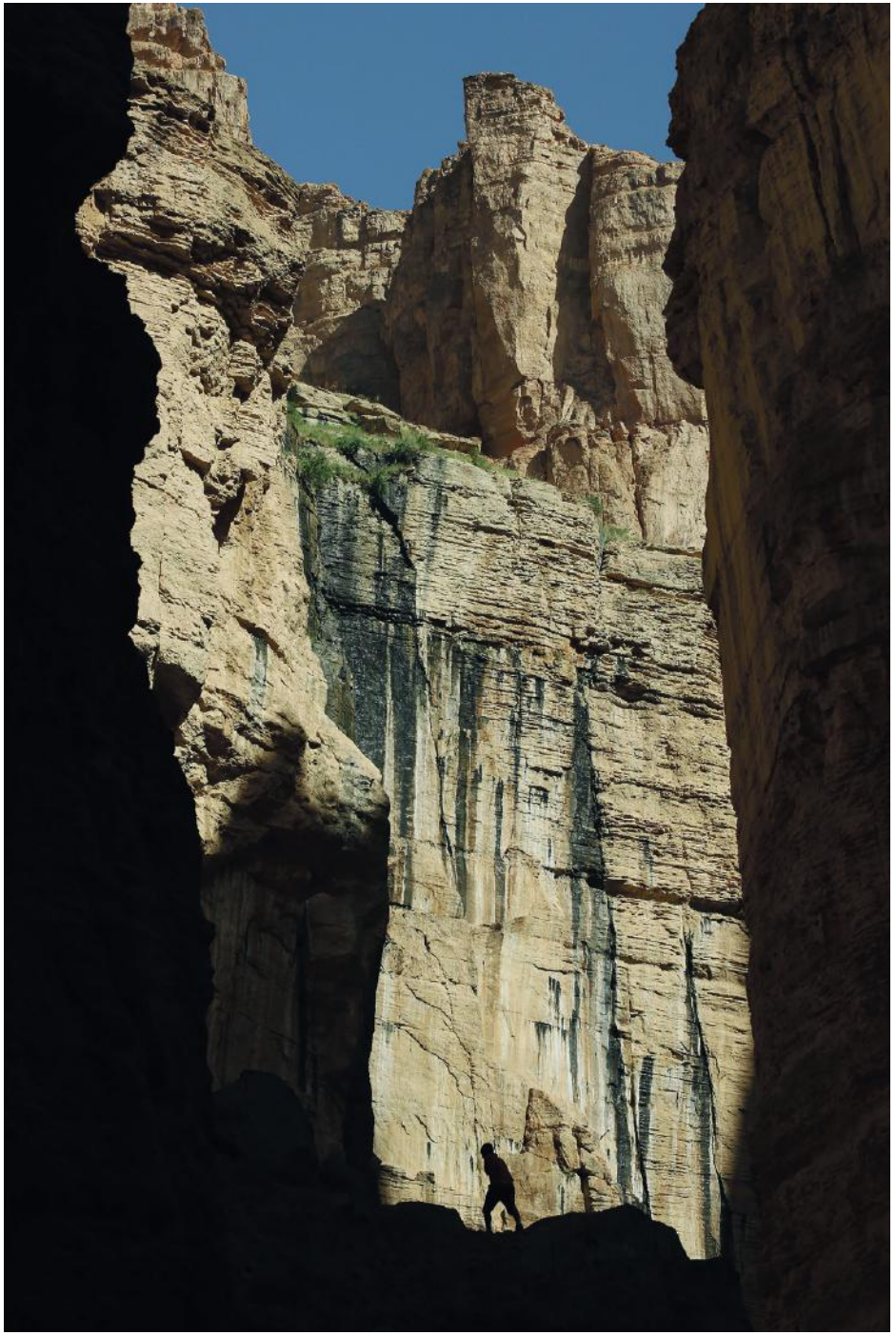
Gypsum

Gypsum is one of the non-metallic minerals associated with varying amount of carbonates, clays and other impurities. Naturally it can be found in many forms such as: selenite, satin spar (*fibrous*), gypsite and massive gypsum. Gypsum is used mainly for cement, ceramics industries and building construction. Afghanistan has large deposits of gypsum in Baghlan, Takhar, Samangan, Herat, Bamayan, Ghor and Helmand provinces and are considered the most important locality for gypsum occurrences. The quality of gypsum depends on percentage of SO_3 and CaO content. According to the geochemistry analysis, Afghanistan's gypsum is of superior quality. The leading use of gypsum, worldwide, is in the manufacturing of cement and concrete, accounting for 50% to 60% of all consumption. In the developing countries, especially in the Middle East and Asia, mostly gypsum is used in the production of cement or as a plaster product.

Afghanistan has an annual demand of 140,000 MTs of gypsum per year. Despite having vast gypsum reserves, Afghanistan still imports around 80,000 MTs annually from Pakistan, China, Iran and Turkey to offset the shortfall in domestic production. Additionally, around 1,6m m^2 of gypsum board is also imported from the above mentioned countries that are used in the construction projects. Afghanistan has enough reserves of gypsum and the investment opportunity is open for both domestic and international investors to invest in the extraction and processing of the mineral to meet the domestic demand.

Global gypsum market is valued at US$1.49 billion in 2016, equivalent to 252 million tones, with 33.3% and 60.9% being consumed in the plasterboard and cement industries, respectively. According to Smithers Apex, the gypsum market is forecasted to grow at a CAGR of 9.9% to reach nearly US$2.4 billion by 2018 and US$3.8 billion by 2026. China, produced more than five times the amount produced in the United States, is the world's fourth ranked producer. Iran is ranked second and supplied much of the gypsum needed for construction in the Middle East.
Following is the large scale mining area of gypsum in Baghlan province approved by the High Economic Council for bidding.

#	Province	Location	Estimated Deposit	Area (km^2)	License
1	**Baghlan**	Tala Barfak	Unknown	Unknown	Exploration



Precious and Semi-Precious Stones

Afghanistan is blessed with vast resources of gemstones in different parts of the country; however, gemstones have not been comprehensively explored and mapped. In order to unlock their potential for investment, the government of Afghanistan has developed a new Minerals law which favors the investors in terms of royalty. According to the Article 51 of the 2018 Minerals Law, the royalty considered for gemstones of unprocessed, semi-processed and fully processed are 7.5%, 5% and 2.5% respectively. The government has recognized the importance of fully- processed minerals, which can be a powerful instrument to generate inclusive growth from a sector that otherwise, might be an enclave of isolated activities. Gemstone mining in Afghanistan is typically done on an artisanal level, carried out by people living in villages surrounding the mines. Tunnels are excavated and gems are extracted by hand using drills, dynamite and often high explosives recycled from ordnance. These techniques result in considerable waste and damage to the gemstones.

Most of the gemstones mined in Afghanistan leave the country illicitly, 90-95% of them going to Peshawar in Pakistan, where they are sorted for quality. The low-value stones are cut for the domestic Pakistan market and the medium- and high-quality stones are sent around the world for cutting and polishing for the western markets. This pattern of trade ensures that Afghanistan gains little value from its gemstones, and makes the value of the annual production difficult to estimate.

To halt this illicit trade of gemstones, the Government has decided to incentivize the mineral sector by levying lower royalties on processed products. Before the introduction of 2018 Minerals Law, the Afghan gem industry was operating in a legal and regulatory vacuum. The new Mineral law will open new vistas of domestic and foreign investment in the gemstones sector.
At a time when Afghanistan seeks to increase its domestic revenues and create diverse but sustainable job opportunities, gem mining makes strong economic, social and political sense. Opportunities for gem mining are present in virtually every part of the country and initial support from the Government to facilitate a market-based sector is evident.

There are four main gemstone producing areas: the Panjshir Valley producing emeralds; the Jegdalek area producing rubies and a range of fancy colored and blue sapphires; Badakhshan producing the world-famous and most recognized of Afghan gems, lapis lazuli; and Nuristan producing a wide range of semi-precious gems such as tourmaline, kunzite, aquamarine, spodumene and beryl.

CREDIT: Gemstone Afghanistan/Facebook

Emerald

Emeralds, a saturated green and the most precious form of beryl, are found in the Panjshir province at elevations of 3000-4000m, in an area 16 km long by 3 km wide. Emeralds are green color and occur in crystals up to 100 carats in weight whose clarity often rivals the more famous Columbian emeralds. Gem quality crystals are often up to 10 mm to 15mm long, 2-3mm thick, and very occasionally up to 50 mm long and 2mm wide. Estimates of current production are speculative, but before the civil war productions was said to be in the US$8-10 million range (*UNDP 2005*). Also, on the eastern side of the Panjsher River, 70 miles northeast of Kabul, there are other emerald deposits located in a range from 7,000-14,000 feet. The estimated area of emerald deposits are approximately 150 sq. miles *(400 km²).*

[1] The global gemstone market is valued at approximately US$23 billion. Prices, which have been increasing steadily in the last decade, could continue to soar with demand. The price of emeralds, for example, has increased by 500 percent since 2010, according to *Gemfields PLC*. At a market level, demands are shifting away from diamonds towards colored gems. From a mere US$2 billion, if trends continue and strengthened, colored gems could displace diamond's market share and reach US$10 billion in the next decade.

Moreover, 60 percent of the world's emeralds is cut and polished in India-which consumes 20-25 percent of the world's emeralds. Thus, India continues to be a very important market.

Following are the retail price range of (*quality grade low to high*) for 1.0 carat emerald; however, the prices vary according to the market demand.

Quality	Low	High
Commercial	US$30	US$525
Good	US$525	US$1,125
Fine	US$1,125	US$2,900

1 https://www.prnewswire.com/news-releases/a-new-gemstone-boom-right-around-the-corner-670506243.html

Ruby

Ruby, known as the 'King of Precious Stones', is a precious gemstone form of corundum. Rubies are mined at Jegdalek Gandamak in Kabul Province, where they occur in a Proterozoic calcite-dolomite marble bed 500 to 2,000m thick within a regionally metamorphosed marble cut by Oligocene granitic intrusions. The Jegdalek rubies range from nearly colorless to deep red and purplish red, and display strong fluorescence in ultraviolet radiation. True rubies form 15% of the production at Jegdalek, along with pink sapphires (75%) and blue sapphire (5%), the remaining 5% consists of mixed blue and red-to-pink corundum (Bowersox, 1990). Clean faceting quality rubies are rare, but those that are found are of excellent quality and are said to match those from the very best source of rubies in the world.

Prices of rubies like other precious stones are dependent on origin, color, size, and clarity: from a low of US$100 to as much as US$15,000/ct. The vast majority of rubies are "native cut" in their country of origin. High-value ruby rough is tightly controlled and rarely makes its way to custom cutters.

CREDIT: Gemstone Afghanistan/Facebook

Lapis Lazuli

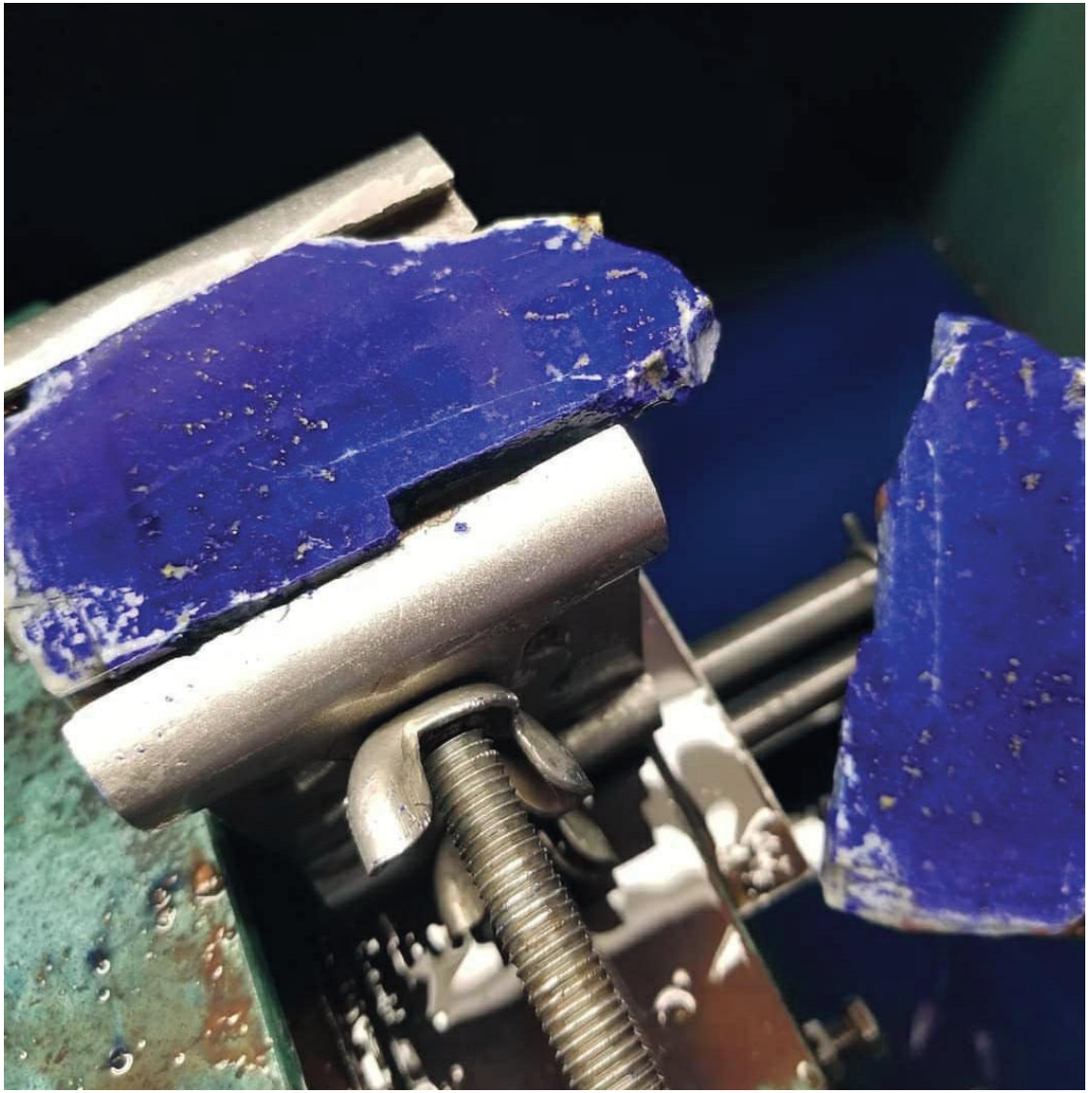
Lapis lazuli from Badakhshan is still regarded as the world's premier source in terms of quantity and quality. Its name is derived from the Latin 'lapis', meaning 'stone' and the Persian 'lazhward' meaning 'blue'. It is used to make beds, boxes and other decorative articles, is often carved into figurines and is popular for men's jewelry.

Lapis is mined in an area known as the *Blue Mountain* on the right bank of the Kokcha River in Badakhshan where it occurs as skarn lenses 1-4 m thick in marble. There were formerly seven mines extracting lapis lazuli but today there is only one, the Sary-Sang deposit. The mine lies at an elevation of around 3,500 meters where, on account of low winter temperatures, it is worked only between June and September. A speculative estimate of the reserves is 1,300 tons.

The original locality for lapis lazuli is the Sary-Sang deposit in Afghanistan's remote Badakhshan district. This mine is one of the oldest in the world, produced continuously for over 7000 years. While other deposits of lapis are known, none are of importance when compared with Afghanistan. Lapis lazuli is not an expensive stone, but truly fine material is still rare. Lower grades may sell for less than US$1 per carat, while the superfine material may reach US$100–150/ct. Lapis lazuli may occur in multi-kilogram sized pieces, but top-grade lapis of even 10–20 carats cut is rare. Its value is determined almost exclusively by color. A deep, intense, blue with violet tones would be at the apex. Fine grained, uniform specimens can attain a smooth, highly polished surface not seen in lower grades.

Where to invest

#	Gemstones	Province	Mine Location	Amount/Extent	License
1	**Emerald**	Panjsher	Khenj	0.130954 – East 0.342488 - West	Exploration
	Ruby	Kabul	Jadalek	500-1000 Meter	Exploration
3	**Lapis Lazuli**	Badakhshan	Sarsang, Badakhshan	1300	Exploration



CREDIT: Gemstone Afghanistan/Facebook

Iron Ores

The geology of Afghanistan is complex due to the junction position between the Indo-Pakistan and Asian crustal plates (*Chapman and Hall, 1997*). Tectonically it is composed of a series of narrow terranes that broke away from the main Gondwanaland supercontinent before becoming accreted onto the southern margin of the Eurasian plate. The accretionary events started in the Cretaceous, around 140 million years ago, and have continued until recent times. In the early Cretaceous there is evidence of a collision of one of these blocks, the Farad block, with the Eurasian plate, along the Herat fault zone. Shortly afterwards, the Helmand block collided with the Farad block. The well-known iron ore deposits are found from western Afghanistan along the Herat fault system through central Afghanistan and north-ward to the Panjshir valley and possibly into Badakhshan. The best-known sedimentary Hajigak and Syadara iron deposits are locating in the same belt, hosted by Neo-Proterozoic metamorphic rocks that represent the basement rocks of the Gondwanaland continent. At Syadara, the basement rocks are sandwich between Herat and Gagharnaw faults, represent the final closing of the Paleotethys Ocean (*USGS GIS, Peters et al., 2007*). Syadara iron ore is discussed first with mention of and other iron occurrences to indicate the potential for further discoveries.

Iron Ore in Panjsher

A geological survey of the ore has been conducted in order to determine the existence of hematite and any other iron elements in Panjshir province. The AGS team have found two areas, which are (1) Noor Khana Iron Mine, and (2) Toll Valley Iron Mine.

# of iron elements	% of iron (max.)	% of iron (average)	% of iron (min.)	Depth of iron (forecast)	Quantity in MTs
49	55.91%	47.6%	34.38%	25m	34,388,529.2 ton
				50m	68,777,058.4 ton
				100m	137,554,116 ton

Noqra Khana Iron (Hematite) Mine

Noqra Khana iron ore mine is located in Parian district of Panjshir province with a distance of 65 km from Gulbahar and 180 km from Kabul province. A geological and mapping survey has been conducted for 20 km^2 on the specified mine area, as well as a sampling has been done to determine presence of any other elements in iron ore in the mentioned area. The survey confirms existence of 49 elements of hematite which belong to Paleozoic, Mesozoic and fourth eras/period. The table below shows details of hematite in Noqra Khana mine of Panjshir province:

# of iron elements	% of iron (max.)	% of iron (average)	% of iron (min.)	Depth of iron (forecast)	Quantity in MTs
54	59.98%	47.56%	33.53%	25m	17,204,564.04 ton
				50m	34,409,128.08 ton
				100m	68,818,256.16 ton

Tol Valley Iron (Hematite) Mine

Tol Valley iron ore (*hematite*) mine is located in Tol Valley of Parian district of Panjshir province with a distance of 60 km from center of province and 180 km from Kabul province. A geological and mapping survey has been conducted on the specified mine area, as well as a sampling has been done to determine presence of other elements in iron ore. The total area of iron mine reaches 284701 square meter. The survey confirms existence of 54 elements of hematite (*including silver, Dion, silver carbon, etc.*), and belong to Paleozoic era/period. The table below shows details of hematite in Tol Valley mine of Panjshir province:

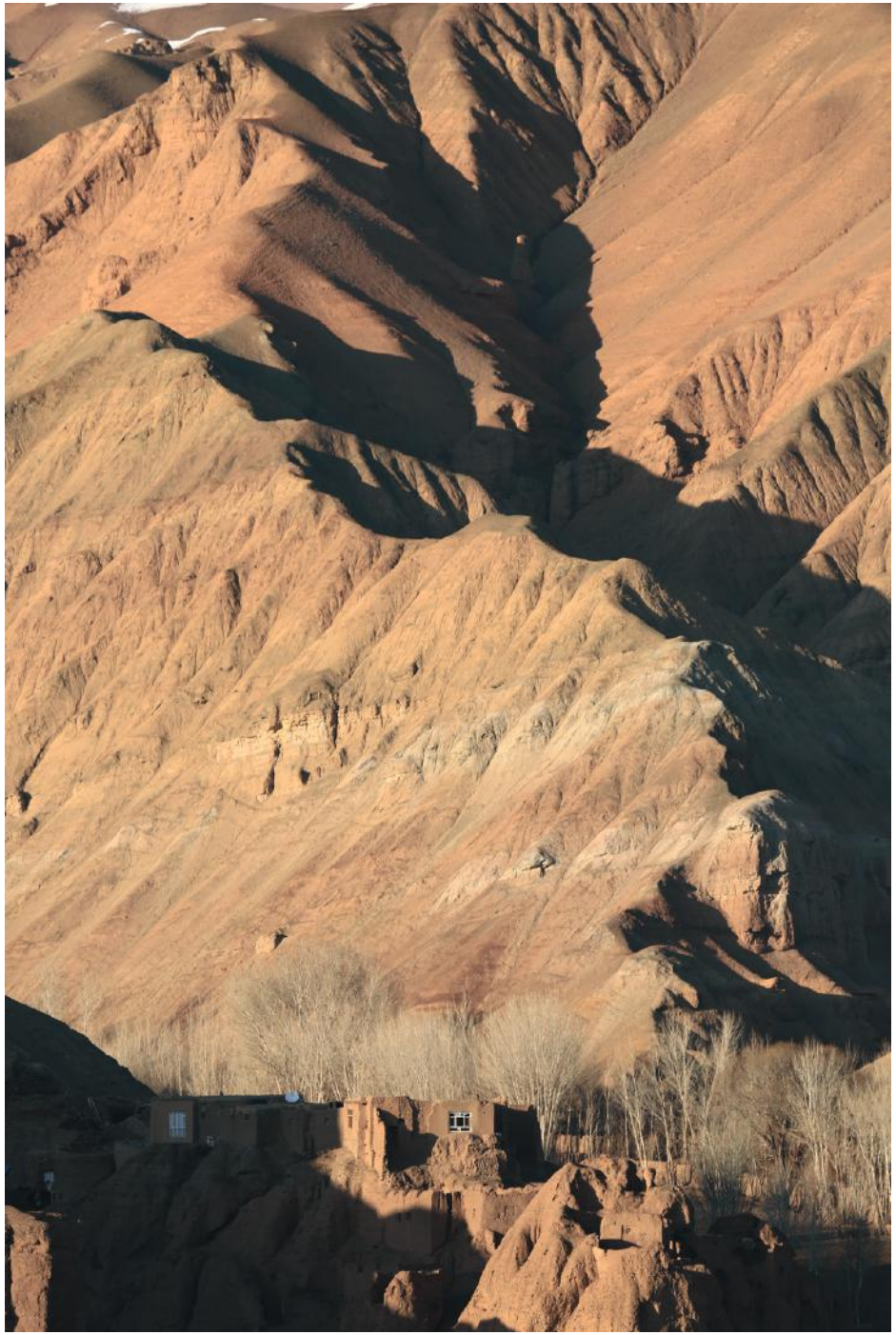
Copper and Gold

Zarkashan Gold & Mineral Deposits
The first reconnaissance survey of the mining area was conducted by German Geological team in the mid-1960's. The Soviets and the Afghanistan Geological Survey (*AGS*) conducted exploration in the late 1960's and early 1970's. Recently the USGS completed its assessment of the mineral potential in Afghanistan. USGS work included: (1) Ongoing compilation of historic German and Soviet mapping, geophysics data, drilling and sampling data, and incorporation into a GIS database using ESRI products, (2) Airborne gravity, radiometric and magnetic surveys and analysis, and (3) Remote sensing: Hyperspectral, ASTER, Landsat.

There are many ancient open pit and underground workings that show that this area has been mined in the past. The grades obtained by the Soviet and AGS exploration team show that the skarn mineralisation has a core of relatively high gold grades with a halo of lower gold and copper grades.

#	Province	Location	Estimated Deposit	Area (km²)	License
1	**Ghazni**	225km SSW of Kabul in the Ghazni Province	7.7 tons of gold	484	Exploration

Samti and Nooraba Gold
The Noraba and Samti gold mine is located in north-east province of Takhar with a distance of 30 km from Cha'ab district. The Noraba and Samti mining area are estimated to be 14 km² out of which 10 km² belongs to Samti gold mining area and the remaining 4 skm belongs to Noraba gold mining area. The estimated reserves of the Samti and Nooraba gold mine is estimated to be around 550 kg.



Hydrocarbons

SOURCE: USGS

Petroleum resources are important for the redevelopment of Afghanistan's infrastructure. One of the results of more than two decades of strife in Afghanistan is a shortage or absence of energy required to improve living conditions. The presence of petroleum resources has long been known in Afghanistan but these resources were exploited only to a limited extent.

Much of the petroleum resource potential of Afghanistan and all of the known crude oil and natural gas reserves are in northern Afghanistan, located in parts of two petroliferous geologic basins — the Amu Darya Basin to the west and the Afghan-Tajik Basin to the east. Improved living and economic conditions in Afghanistan require increasing the availability of energy, particularly by exploitation of Afghanistan's petroleum resources.

Using a geology-based assessment methodology, the U.S. Geological Survey–Afghanistan Ministry of Mines and Industry Joint Oil and Gas Resource Assessment Team estimated mean volumes of undiscovered petroleum in northern Afghanistan; the resulting estimates are 1.6 billion barrels (0.2 billion metric tons) of crude oil, 16 trillion cubic feet (0.4 trillion cubic meters) of natural gas, and 0.5 billion barrels (0.8 billion metric tons) of natural gas liquids. Most of the undiscovered crude oil is in the Afghan-Tajik Basin and most of the undiscovered natural gas is in the Amu Darya Basin.

Toti Maidan

The Amu Darya Basin contains known accumulations of hydrocarbons in the Paleogene, Cretaceous and Jurassic horizons. It is a part of a relatively un-deformed rift sag basin with Early Jurassic to present deposition of marine to terrestrial sedimentary rocks. Traps are primarily subsalt Jurassic reefs and pinnacles. Proven or potential basin reservoir rocks in the Totimaidan Block include Jurassic subsalt carbonates and possibly lower to upper Cretaceous alluvial and deltaic sandstones. Known source rocks are subsalt Jurassic shales and coals.

In neighboring Turkmenistan and Uzbekistan, exploration wells have discovered commercial quantities of hydrocarbons in all horizons, including world class discoveries of gas in the pre-salt Jurassic horizons. Turkmenistan and Uzbekistan are currently producing gas from the Jurassic reservoirs and oil from the Cretaceous reservoirs.

Within the Afghanistan portion of the Amu Darya Basin there has been limited exploration to date. However, past Soviet efforts did result in the discovery of seven known gas fields, two of which are in the Totimaidan Block (Juma and Bashikurd, totaling 28 billion cubic meters of reserves).

The Juma and Bashikurd fields have been discovered and tested but have not yet been placed into production. Re-entry, drilling, testing and well-completion work is currently being undertaken on the Juma and Bashikurd fields to confirm their estimated reserves and deliverability. Gravity, magnetic and seismic data have located more than 50 proven and prospective structures wholly or partially contained in the Totimaidan Block.

In addition, approximately 162km of 2D seismic data was acquired in the summer of 2012 over many of the prospective structures. Processed and brute stack data from those seismic surveys, data from 1,935 km of Soviet seismic surveys, and other relevant information was made available to the Qualified Bidders.