

Sector Profile
Mines and Minerals



BOARD OF INVESTMENT & TRADE
GOVERNMENT OF BALOCHISTAN



Preface

The sector profiling exercise aims to capture the current state of the sector, map related regulations and identify areas of reform. It highlights basic value propositions for the selected sectors, as revealed by stakeholder interviews and the consultant's business knowledge.



Balochistan Board of Investment and Trade

The Balochistan Board of Investment and Trade (BBoIT) is Balochistan's premier investment promotion body, responsible for attracting, facilitating and promoting both local and foreign investment for speedy capitalization of projects in all sectors of economy in Balochistan. BBoIT is established with broad based responsibilities of promotion of investment in all sectors of economy; facilitation of local and foreign investors for speedy

materialization of their projects and to enhance the province regional competitiveness and contribute to economic and social development. BBoIT is seeking to develop a conducive environment for private sector. As an input to this process, a sector profiling exercise is required to capture the current state of the sector, map related regulations and identify areas of reform. For this purpose, BBoIT has engaged EY Ford Rhodes to develop sector profiles for designated sectors.



Governance and Policy Project (GPP) for Balochistan

The project is expected to help Balochistan increase its own source revenues, thereby reducing the province's dependence on federal transfers and expanding fiscal space for financing public services. The Project Development Objective (PDO) is to strengthen the capacity for Sales Tax on Services collection, and improve accountability in public financial management and public service delivery in the education and irrigation sectors in Balochistan.

*This sector profile has been prepared through technical assistance from **M/s EY Ford Rhodes**, which is a member firm of Ernst & Young Global Limited (EYGL), providing professional services to its clients, both globally and in Pakistan.*

Mines and Minerals Sector in Balochistan



Balochistan is Pakistan's largest and most mineral rich province

The province alone accounts for 55% of the total National outcrop area and harbors reserves of more than half of the discovered as well as exploited metallic and non metallic minerals. It also host to the world's fifth largest Gold deposit at Reko Diq.



2.38% GDP contribution

In Fy2021, Mines and Mineral sector accounted for of the GDP²

Balochistan is the most mineral rich province having



Of the Total National Outcrop Area



Of the Total National Exploited Minerals



Of the Total National Discovered Minerals

Pakistan has been endowed with precious minerals spread across the entire country. With the national outcrop area equaling 600,000 sq km. Pakistan has 92 known minerals out of which 52 are commercially exploited. These include copper, gold, marble, mineral salt and chromite amongst others.¹

Around 50 different minerals have been discovered in Balochistan out of which 39 are being commercially exploited under 1610 licenses. With 9 of the minerals accounting for about 95% of the total volume of extracted minerals. Balochistan leads in the production of coal, copper, lead-zinc barite and chromite³.

Balochistan remains geological greatly unexplored serving as a lucrative attraction for future investors. The province is home to more than half of the national prospective geology.



Government Support for

Mining Industry

Dedicated EPZs, Marble cities, joint ventures, Exploration companies



Sanidak and Duddar Export Processing Zones

dedicated to Copper & Gold and Lead & Zinc mining projects respectively. A marble city is also operational in Hub.

Gold, Copper Marble, Oynx, Iron, Chromite, Coal, Barite Sulfur, Lead & Zinc

Key Minerals

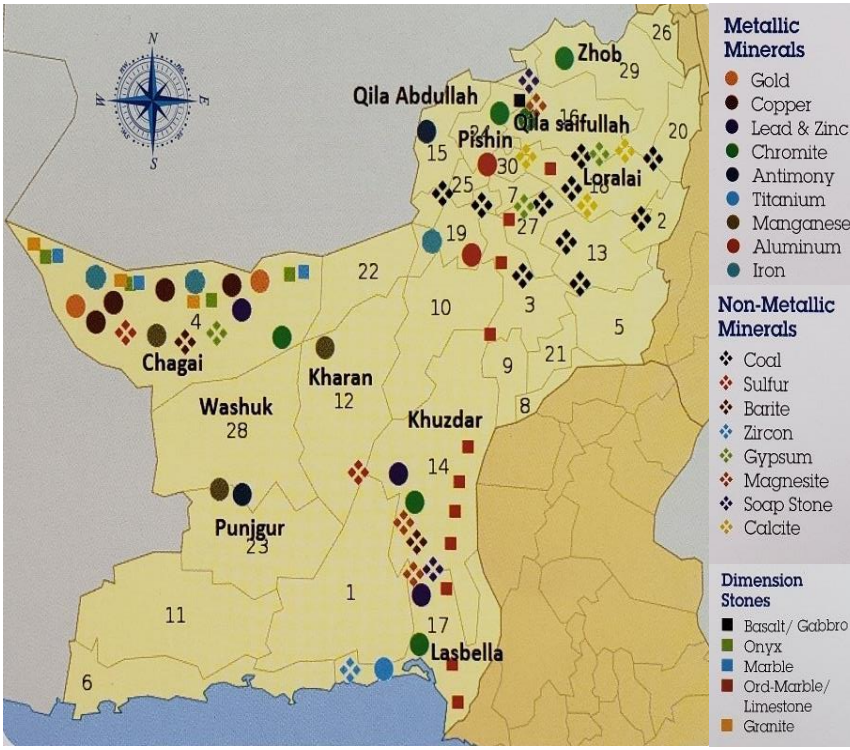


Balochistan hosts World's 5th largest Gold reserve

Overview of Reserves



Detailed Mineral Map of Balochistan



Balochistan has a total **outcrop area of 335,360** square kilometers or 524 toposheets



108,800 square kilometers or 170 toposheets have been mapped to facilitate the investors



The **Geological survey plans** to complete 1:50,000 level **mapping of 50 of the remaining toposheets**. This would help in mineral exploration, soil surveys, sample collection, mineral evaluation, research in stratigraphy⁵.

Estimated Mineral Reserves located in Balochistan for selected Minerals

Metallic Minerals

Gold 
50 M OUNCE

Copper Ore 
7 B TONS


Chromite Ore 
500 M TONS


Iron Ore 
400 M TONS


Lead & Zinc 
50 M TONS


Non-Metallic Minerals

Onyx, Marble, Granite 
100 B TONS

Coal 
01 B TONS

Gypsum & Anhydrite 
14.5 B TONS

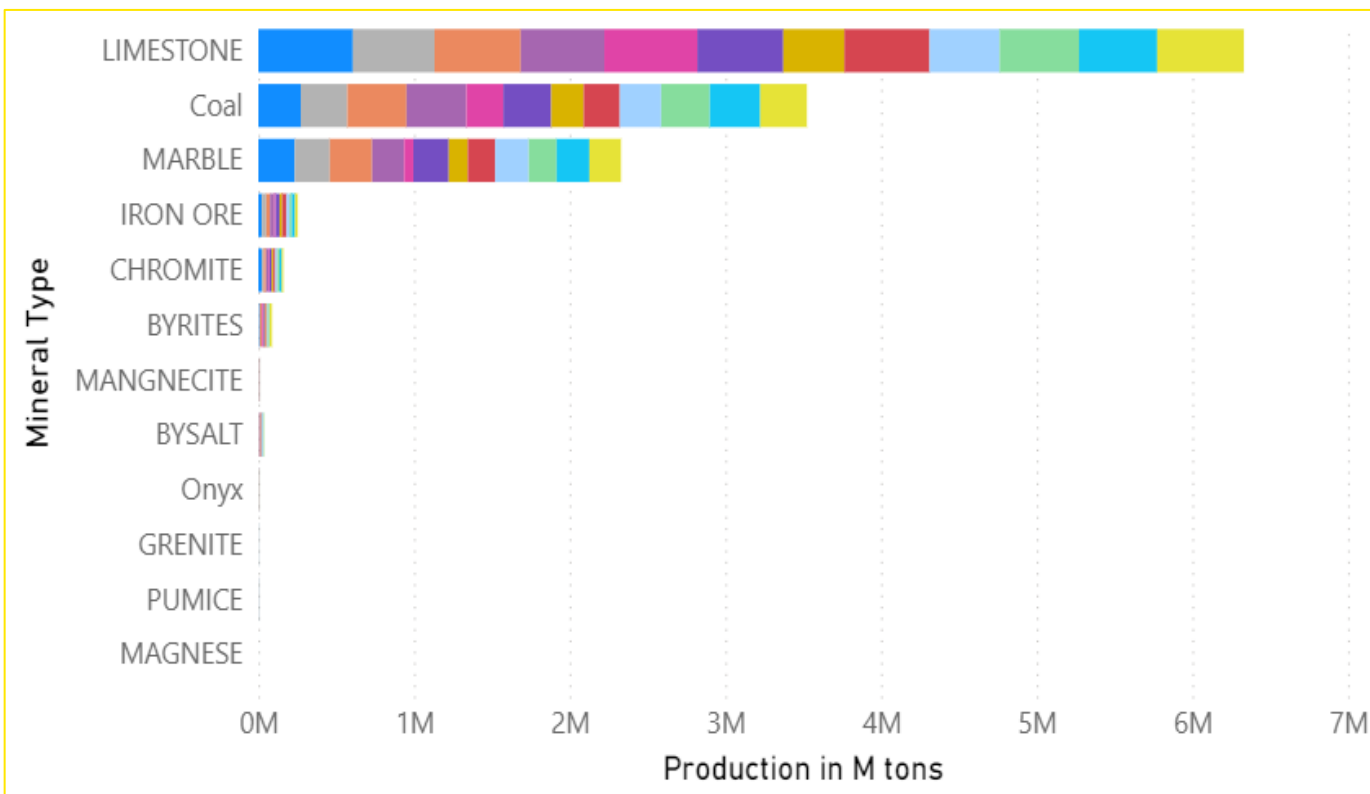
Sulphur 
50 M TONS

Barite 
30 M TONS

Key Stats of Mining Industry



Mineral Production Mix in Balochistan from Jan to Dec 2021³⁰



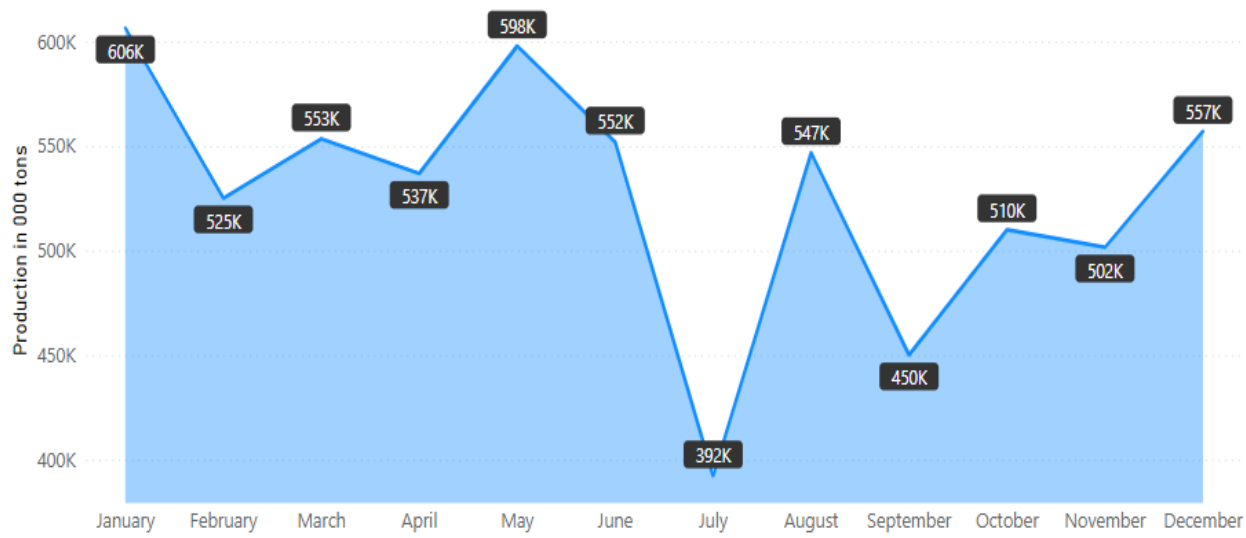
Mineral	Total Production in 000 tons
Limestone	6,330,349
Coal	3,523,524
Marble	2,329,499
Iron Ore	253,235
Chromite	161,050
Byrites	87,406
Magnecite	9,315
Bysalt	36,730
Onyx	6,537
Grenite	3,891
Pumice	5,004
Magnese	90

Key Stats of Mines and Minerals Sector

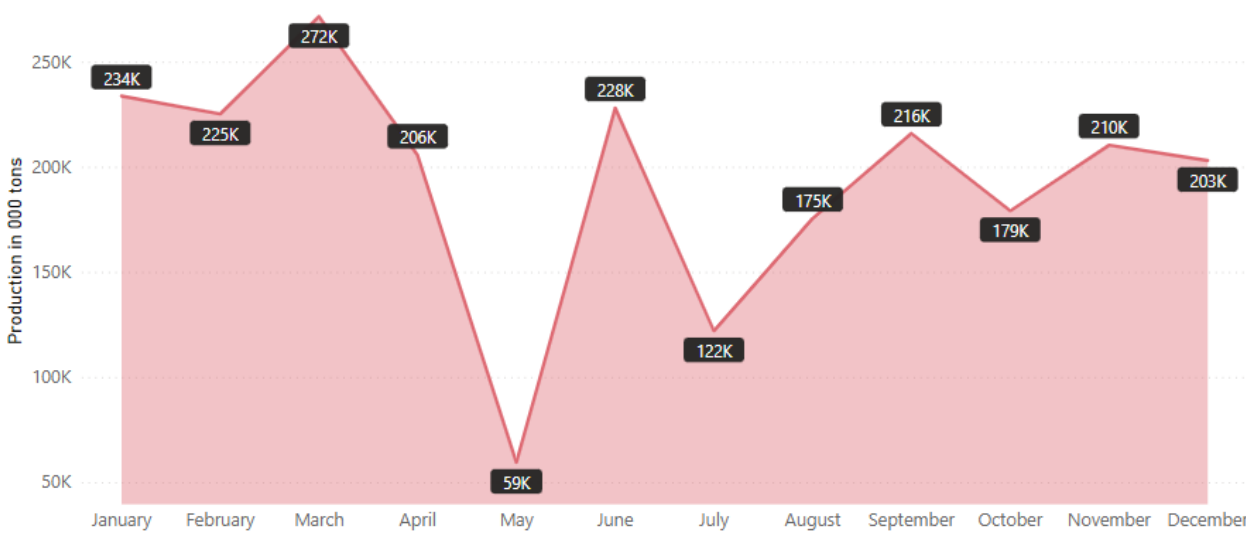


Production of Selected Minerals in Balochistan by year from Jan to Dec 2021* 30

**Limestone
2021**



**Marble
2021**



**Iron Ore
2021**

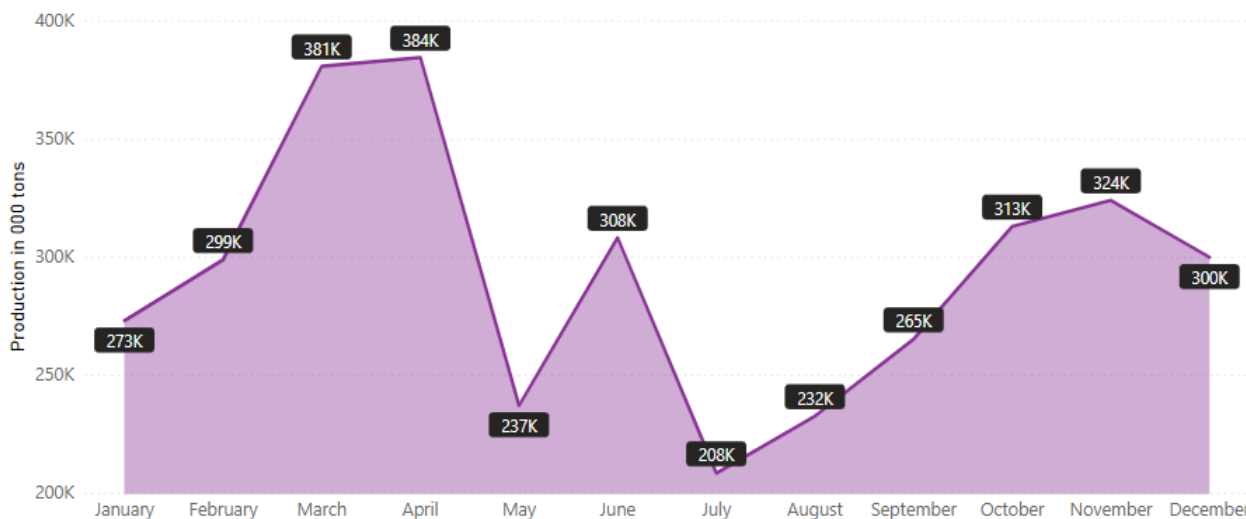


Key Stats of Mines and Minerals Sector

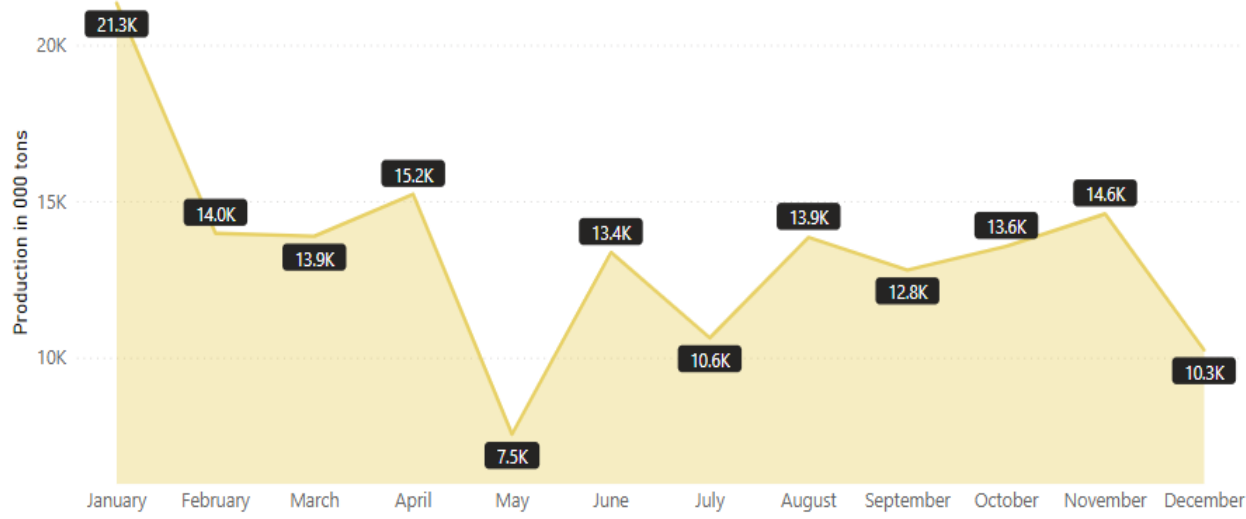


Production of Selected Minerals in Balochistan by year from Jan to Dec 2021* 30

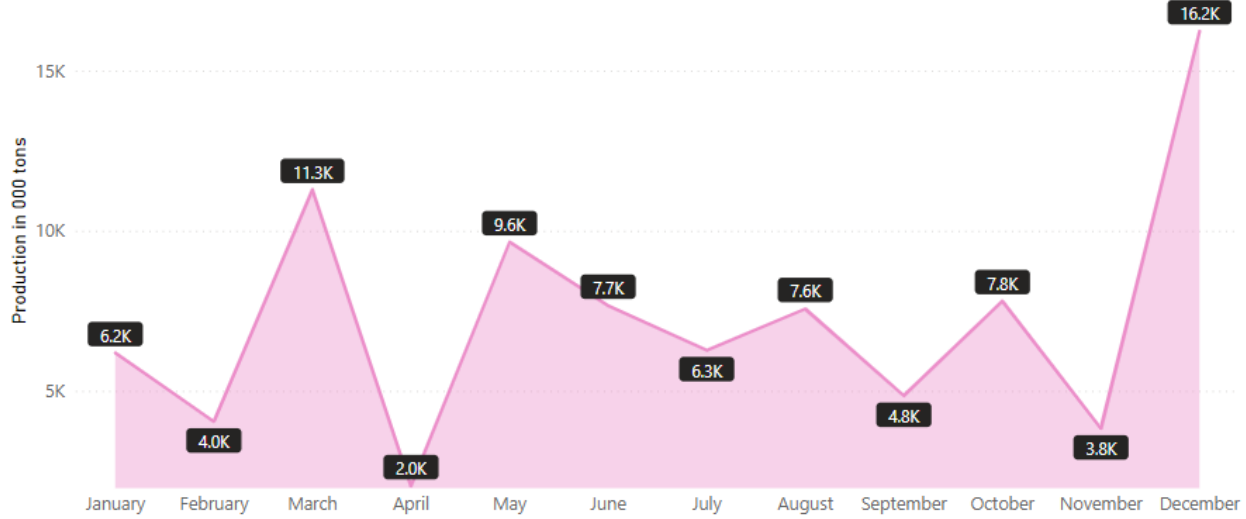
Coal
2021



Chromite
2021



Byrites
2021

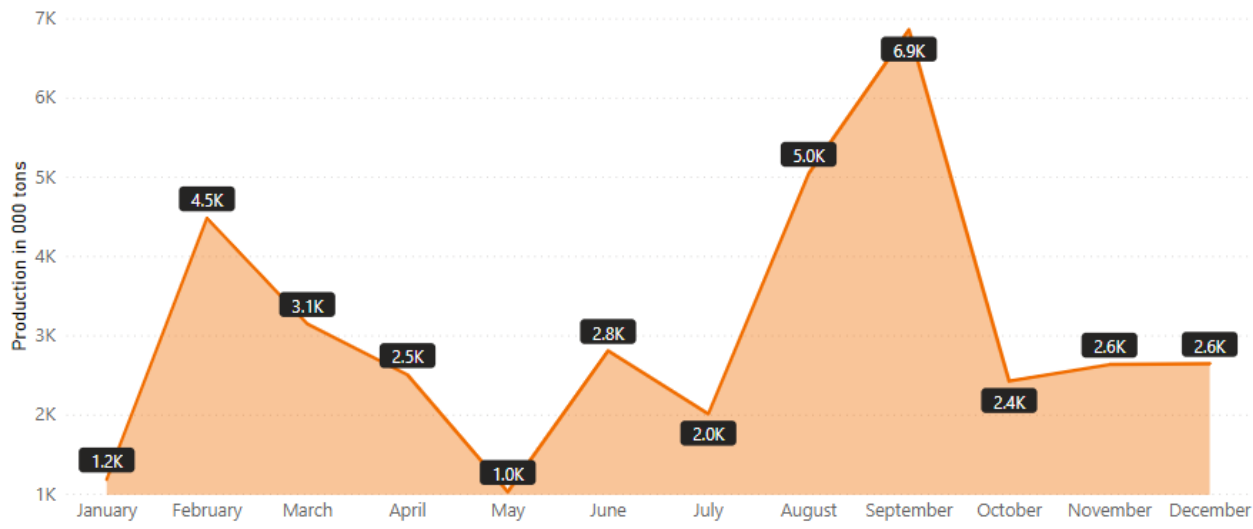


Key Stats of Mines and Minerals Sector

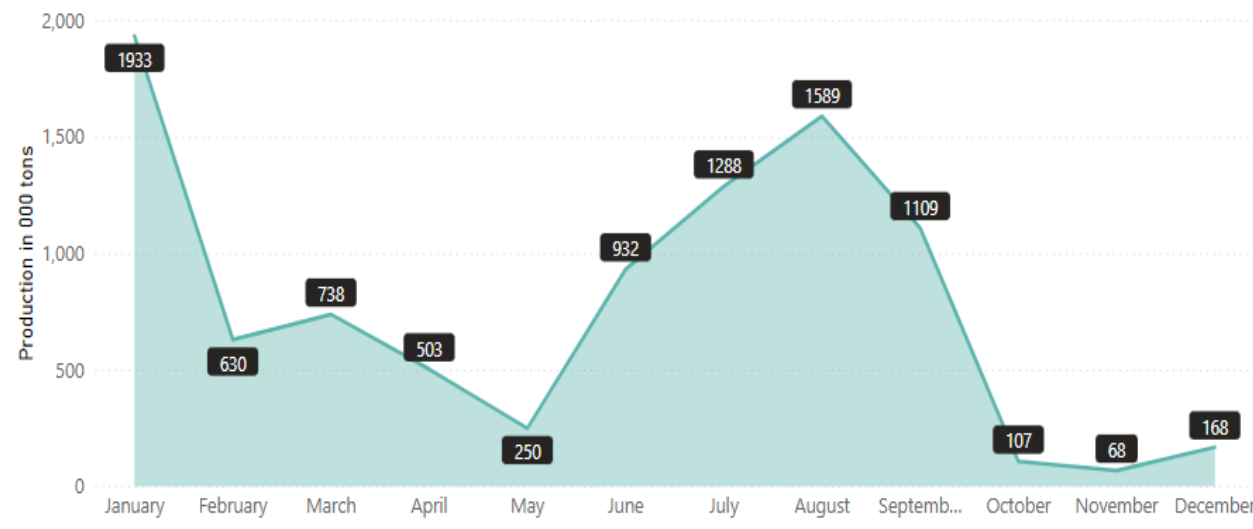


Production of Selected Minerals in Balochistan by year from Jan to Dec 2021* 30

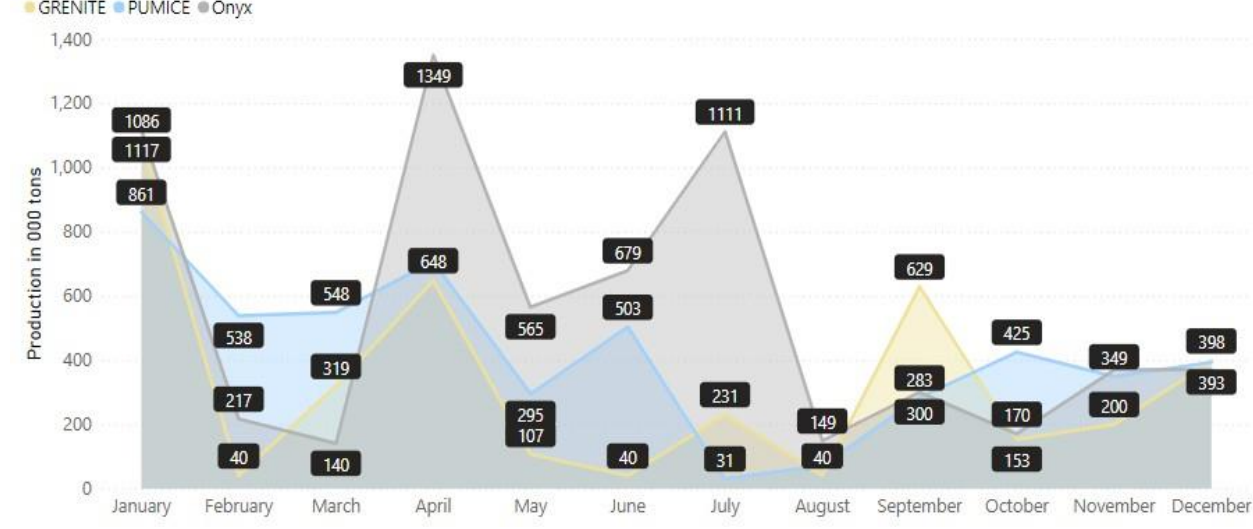
**Bysalt
2021**



**Magnetite
2021**



**Grenite, Pumice, Onyx
2021**





National Mineral Policy - 2013

Determines the institutional arrangements, regulatory framework, fiscal programme and the developmental tractor of the sector.

Mines and Mineral Department of Balochistan is Responsible for issuance of concessions, licenses and overall development of the sector.

To regulate mining industry in Pakistan and Balochistan and facilitate investment in the mining and mineral sector, the policy prescribes formation of the following authorities/bodies have been prescribed⁹:

- ❖ **Mineral Investment Facilitation Authority:** Formed at both federal and provincial levels to oversee activities of respective jurisdictions.
- ❖ **Mineral Investment Board:** Consultative form for investment opportunities with representatives from provincial and federal governments.
- ❖ **Geo-data Centre of Pakistan:** Tasked with maintaining central data repository.
- ❖ **Licensing Division:** Established in federal and provincial Directorates of Mines and Minerals to streamline the license issuance process.
- ❖ **Exploration & Coordination Directorate:** At federal and Provincial levels to enhance exploratory activities and coordination.



Balochistan Board of Investment and Trade (BBoIT):

Focused towards **facilitating and guiding investors** in order to help realize Balochistan's maximum potential.

Houses a specialized wing dealing in the mineral sector of Balochistan.

[Contact Us – Board of Investment & Trade \(bboit.gov.pk\)](http://bboit.gov.pk)

Concessions Stated in Mineral Policy - 2013

No custom duty and sales tax on import of equipment and materials for mineral exploration and extraction companies

5% customs duty ad-valorem and no sales tax on import of machinery for mine construction or extraction phase

10% customs duty and 15% sales tax on raw material for local manufacturers of mining machinery and equipment

Value Chain in Mines and Minerals Sector

Explore-to-Market Value Chain of Mining Industry

1. Exploration



The objective of this phase is to locate and evaluate potential reserves. Activities performed in this phase includes mapping of the outcrop area, field surveys, sample testing, drilling and preparation of feasibility studies, etc.

2. Mining



This phase involves extraction of resources from the mine. There are four types of mining: underground, open surface mining (pit), placer and in-situ. Mining techniques are determined based on various factors including the depth and type of the mineral.

3. Processing



After the mineral has been extracted, it is processed to be used in other industries or as a final product. These processes include those of beneficiation such as washing and filtering and those relating to refinement of the product such as cutting and polishing.

4. Market



This phase involves identifying the market place and selling the processed products to the identified customers.

Explore-to-Market Value Chain in Balochistan

1. Exploration activities are regulated and investors are required to obtain licenses from Balochistan's Mines and Minerals Department. Licenses are issued to domestic as well foreign companies/investors. Balochistan remains largely unexplored and thus full of untapped potential. The Geological Survey of Pakistan is dedicated to improving the state of mineral mapping and exploration in Balochistan through improved technology. This would further help investors identify hitherto unexploited areas and reduce investor's risk related to mineral identification.

2. Mining activities are also regulated and in order to operate this activity in Balochistan, investors are required to seek license from the from Balochistan's Mines and Minerals Department. Licenses can be issued to local and international investors.

Balochistan, despite being the country's most mineral rich province, has an abundance of unexploited minerals. Extraction of minerals within the province can be exponentially increased by exploring and investing in these reserves of opportunity through adoption of modern technology¹⁰.

Currently, most of the mining activities in Balochistan are carried out by small scale organizations/businesses. These small scale businesses are unable to deploy capital intensive technologies and techniques because they do not experience any economies of scale and they are relying on Labour intensive techniques and conventional methods of mining such as blasting, room and pillar mining, open-pit mining.

Deployment of these outdated methods also in certain cases limit the mineral exploitation capability e.g. may not allow minerals tucked deep down or in complex spots to be reached and often cause damages to mineral shape and structure resulting in reduction of market value.

As such, there exists an opportunity to upgrade mining techniques within the sector to extract minerals of better quality and in greater quantity from unexplored outcrop area. The workforce of the mining industry in Balochistan is intimately acquainted with the mineral landscape.

Explore-to-Market Value Chain in Balochistan (Cont'd)

Provision of high end mining technology would further enhance their capabilities and offer improved results. Technologies such as rib bolting and roof screens can significantly decrease fatality rates in mines and improve productivity.

3. Processing

Mineral processing industry in Balochistan does not commensurate the quantity abundance of minerals in the province. Currently, majority of the mined minerals are shipped to other provinces for further refinement and processing resulting in increased supply chain costs.

Majority of the minerals are sent to Karachi for processing given the city's close proximity to the province, industrial infrastructure and shipping port. Some, such as marble, are also transported to areas in Punjab. Pakistan does not have end-to-end mine processing units for all mined minerals. For few minerals processing facility is limited to initial crushing and rudimentary process. For example, Chromite is one of the minerals for which Pakistan does not have any processing facility and all the extracted chromite is exported to other countries in raw material form and then, processed chromite is re-imported at much higher price to meet domestic demands/ needs.

Investors can seize this gap in the processing segment of the supply chain and invest in value-added processes by setting up modern, high-tech processing units that make use of latest machinery and methods to produce refined products that meet international standards of quality.

Government of Balochistan has taken multiple steps including taxes and duty concessions, creation of marble cities and establishment of export processing zones solely dedicated to the minerals sector to attract investment in mining sectors.

4. Market

Market for minerals extracted in Balochistan is mainly concentrated outside the province. Most of the minerals are used as raw materials in industries such as cement, steel, marble and tiles production.

Sufficient proportion of the extracted minerals are also exported to other countries mostly as raw materials or semifinished products.

Geo-strategic position of Balochistan makes it most attractive location for investment as its location provides access to different global markets. Balochistan is located along the long coastal belt from the Middle East toward the Indian-sub-Continent. Balochistan shares borders with two international borders (Iran, Afghanistan) and rest of the three provinces (KPK, Punjab and Sindh). Pak-Iran (Taftan) border provides connectivity to South Asian Countries and Europe, and Pak- Afghanistan connects Pakistan to Central Asian States of Uzbekistan, Turkmenistan, Tajikistan and Kyrgyzstan¹¹.



In Balochistan, mining and processing segments offer the most lucrative investment opportunities within the Minerals supply chain. Potential investment opportunities in value chain for selected minerals have been provided later in this document.

Investment Reasons and Key Areas to Invest



01 Market Demand

Domestic and global demand of Pakistani minerals most of which are found in Balochistan as rare Onyx marbles, Gold, Chromite. Refined Pakistani minerals are widely used as raw materials as well as finished products.

There are greater profit margins for on refined products especially with economies of scales making the it a strong, sustainable investment.

02 Abundance of Minerals and Labor

Balochistan has an abundance of undiscovered and unexploited high quality minerals spread across the province. The province promises mineral sector investors easy access to top quality raw material for their industry. The province also offers trained miners that are

well acquainted with the region ensuring a dependable supply of workforce

What makes Balochistan's mineral sector most attractive place for investment?

Government is supporting investors by providing them tax deductions, creation of marble cities and by streamlining its regulatory framework. To setup industry, government provides incentives such as no custom duty and sales tax is charged on import of equipment and Special Purpose Vehicles have been set up (SPVs) to facilitate investors.

Balochistan's geostrategic position provides it access to local and global markets in middle east through coastal belt, Central

Asian States through border with Afghanistan and South Asian countries and Europe through Pak-Iran border. Infrastructure: 3 major International Airports, 5000 km highway network, **1000 Km railway network¹²**.

04 Government Support

03 Geo-Strategic Location

Minerals to Invest In

Balochistan is endowed with a rich mix of minerals making the province highly significant for the country's overall mining and mineral sector. However, the extent of the mining activity does not commensurate the high demand of some of the top-of-the-line variants of minerals. Balochistan's mineral landscape remains largely unexplored and unutilized. The mineral sector along it's entire value chain starting from mining to processing and curation of the final product has immense potential for profitable investment.

As such, the four minerals that carry the highest potential along their lifecycle given the current global and domestic market trends are:

1. Marble
2. Coal
3. Chromite
4. Iron Ore



Key Area to Invest

Marble



100 billion tons ¹³
of marble and onyx reserves
in Balochistan



6.3 million tons ¹⁴
of marble produced in 2021 by
Balochistan



Construction Industry
major consumer

Balochistan is endowed with marble reserves of the highest quality including the globally coveted green marble Onyx that is used in luxury marble products.

There's national as well as international market for Pakistan's marble that is burgeoning with the growing construction industry (CAGR 4.2%) and Asia pacific being the fastest growing market for marble. Balochistan contributes 90% to Pakistan's marble exports to 52 countries. China tops Pakistan's import charts with \$15 million worth of marble export in 2020. Gulf and M.E states, Korea and European countries remain top importers of Pakistan's marble.

Balochistan Marble Concession ¹⁵

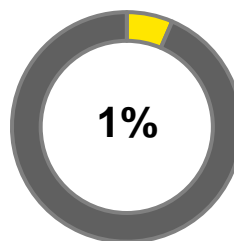
Concession Type	Number of active concessions granted		Total Acreage (Acres)
	Last 3 years	Total	
Prospecting license	5	74	95,886
Mining Lease	11	90	80,430

Pakistan's top 3 export destinations ¹⁶

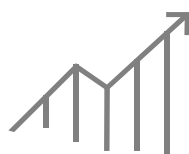
1	China	
2	Republic of Korea	
3	Italy	



6th largest extractor
of marble globally¹⁹



USD 17 million ¹⁷
Pakistan's share in
Global exports



4.5% CAGR ²⁰
Global marble industry
growth.



\$4.7 million
Pakistan's import in
FY 2020 ¹⁸

However, Pakistan's share in world export is incredibly low compared to its potential given there exist large reserves of premium quality stone, especially in Balochistan. Despite being the sixth largest extractor of Marble, Pakistan's share of global exports rests at around a mere 1%.

Dependence on conventional mining techniques, such as blasting, and lack of processing units are restraining Pakistan's success in the global marble market.

Marble

Current State and Gap



Mining

Given that marble's value is dependent on the size and pattern of the stone, the mining processes becomes immensely significant in deciding the fate of the marble industry.

Mining activities are carried out mainly by small scale companies that use conventional methods of mining- specifically blasting.

Blasting technique reduces the size and thereby value of the extracted marble. Blasting causes up to 75% raw material wastegate in comparison to the 45% international ²¹.

average resulting in low quality, small sized slabs that are not desirable for the market and are used in tile processing or handicrafts. Rock extracted through blasting is also more susceptible to cracks and breakage during transportation which reduces its worth.

Lack of modern technology also limits the depth of extraction allowing only surface mining . This prevents complete exhaustion of reserves and limits access/discovery of marble.

The mining sector is laden with small scale industries that do not have the financial muscle and support to invest in modern technologies.

Processing

The country, especially Balochistan, has a dearth of large marble processing units that produce marble products of international standards and quality. Blocks and slabs account for approx. 66% of Pakistan's exports. whereas, globally this segment has only 15% share in total exports of dimension stone ²². Often the refined marble exported by Europe and China is sourced from Pakistan.

Similarly, major players in the local market prefer to use imported marble because of better end product quality and consistency²³.

The thickness varies by 3-4 mm against the 0.5 mm as per global standards. Uncalibrated cutting using local machines does not offer the level of quality required domestically as well as internationally ²⁴.

The existing processing units are predominantly small-scale organizations that make use of machinery such as bridge cutters and vertical mills and polish the marble manually. Additionally, Majority of the marble is transported to other provinces for processing as Balochistan which increase transportation cost as well as risks.

Quarry

Escavator
Diamond-saw cutting machine

Sawmill 1

Mono-blade Gangsaw
Block Cutters
Multi-blade Gangsaw

Sawmill 2

Edge Polishing Machine
Slabs Polishing Machine

Investment Potential in
Marble Value Chain

Mining

With reserves numerous reserves of marble yet to be mined and exploited to their full potential, mining sector within the marble industry offers great investment opportunity to high-scale, technologically advanced mining enterprises.

Use of technology such as precise block cutters will significantly increase Balochistan's value and share in the market by ensuring that there is minimal damage to the stone in the process and bringing consistency in the value chain

Countries such as China, Italy and Spain are using technologies that can detect the depth of the rock and help discern if it can be mined out much wastage ²⁵. Introduction and adoption of these techniques will result in larger blocks being extracted whose demand- even raw material- will be much higher and for a better price.

Moreover, dependence on technology would minimize human error and bring consistency and sustainability within the value chain, thereby attracting domestic and international customers.

Bodies such as Pakistan stone development company have rental equipment pools that make access to technology easier and affordable ²⁶.

Processing

Given the low number of processing units vis-à-vis the marble reserves in Balochistan and the consequent demand, the province promises high market share to those who grasp at the opportunity.

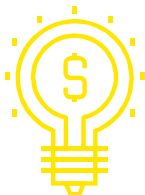
A modern, technologically advanced processing unit can be a real game changer for Pakistan's marble industry. The industry's low share in the international market can be increased manifold by introducing value added processes that adhere to international standards ²⁷.

To achieve this, it is imperative to make use of high-end technology that cuts the marble with precision and includes high quality automated polishing. Local machinery used does not offer this level of output making imported equipment a necessity. The investment opportunity is therefore most lucrative for large scale businesses that can invest sufficiently in the sector.

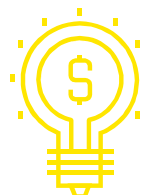
Moreover, the processing sector currently does not focus much on utilizing marble slurry production of bricks. Innovative uses and niche markets of marble can further be explored to maximize opportunities and widen the market

- High in demand locally and globally. International marble market is projected to reach 90 billion USD by 2030 ²⁸.
- Recognized as a priority sub-sector for investment by the Balochistan government. Development of 3 new marble cities with dedicated markets and required infrastructure in addition to the existing one at Hub.
- CPEC opens up further opportunities in terms of trades routes and market demand

Conducive environment



Investment in processing increases profits by manifolds by producing and exporting refined products that are currently imported at higher price differential



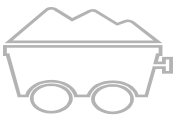
Mechanized and technologically advanced mining helps reduce wastegate and damage to the rock, thereby, improving the quantity and quality of output

Key Area to Invest

Chromite



500 million tons²⁹
of chromite reserves in
Balochistan



161 thousand tons¹⁴
of chromite produced in 2021
by Balochistan



**Stainless Steel
industry**
major consumer

Chromite was first discovered and mined in Muslimgah, Blochistan in 1903. Since then the province has been leading in the production of Chromite with around 20,000 tons being produced annually every year.

Reserves of chromite within the province are estimated at 500 million tones are found in Muslimgah, Pishin, Kila Saifullah, Lasebela, Khuzdar and Zhob districts.

Chromite produced in Pakistan is of both metrological and refractory grades with the former accounting for 95% of the consumption.

Different grades of chromite have different uses across industry, for example the lowest grade is used in leather tanning, metal finishing and wood preservatives whereas the highest grade is used in steel production.

Balochistan Chromite Concession

Concession Type	Number of active concessions granted		Total Acreage (Acres)
	Last 3 years	Total	
Prospecting license	2	25	26,246
Mining Lease	2	48	40,279

Pakistan's top 3 export destinations³²

1	China	
2	Japan	
3	Russia	

The major industry, however, remains the global steel industry where the mineral is used to produce ferrochrome- an alloy used in the making of stainless steel. Pakistan, however, does not produce its own ferrochrome and depends entirely on imports. Chromite, is also utilized by the refractory industry to produce plastics, foundry sand and shapes.

As such, Majority of the extracted ore is exported to other countries, China being the biggest importer, after rudimentary processing for further refinement. Thus, the supply of chromite is dictated by global demand. Pakistan's share of global chromite export rested at 2.6% in 2020 indicating space for growth in the industry given the country's, especially Balochistan's reserves of chromite.

Most of the chromite (approx. 95%) is used in ferrochrome furnaces to produce an alloy for making metallurgical tools or to fulfill requirement by the steel industry. Chrome helps to smelt special alloys with elements like cobalt, nickel, and tungsten which are crucial materials utilized in the aerospace, automotive, shipbuilding, and defense industries. Steel industry is the main determinant of demand for chromium as approx. 78% of the total consumption of chromite is consumed in industry. Despite significant demand, ferrochrome production units are non-existent in the country. The presence of abundant deposits of Chrome (about 500 million tons) in Balochistan can help to establish Ferro Chrome Industry. It will assist the steel industry in sourcing its key ingredient from the local market in bulk quantities and at a lower cost (as compared to imported ferrochrome).⁶

100%

Imported

USD 301 thousand³⁴
Ferrochrome import in 2020

5.3% CAGR³⁵

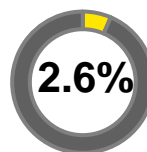
Global chromite industry growth.



2.6%

USD 53.3 million³³

Pakistan's share in global exports, 2020



Key Area to Invest

Current State and Gap



Mining

Chromite is extracted rigorously in Balochistan through both surface mining, such as the open pit technique, and underground methods. The chromite mining industry as it currently stands is neither systematic nor scientific. It is populated by small scale industries that operate on a trial and error technique whereby they use blasting to create an entrance for the underground mine and use donkeys at large to carry out the extracted ore.

When deciding the location of the mine, the grade of the chrome present or the size and depth of the block and are not known. Often, direction of the blast is not based on any scientific calculations but more on the acquired knowledge of the locals hired to guide the process. Once created, the cavity is supported by wooden harnesses and the extracted mineral brought out on donkeys. Some of the more progressive ones used trolleys to carry chromite ore out of the mine, however, due to economic efficiency, majority still continue to use donkey backs.

Dependence on conventional methods and the ad hoc nature of the mining process makes it unsustainable and prevents complete exhaustion of chromite reserves. As such, technological advancement can help improve results of chromite mining

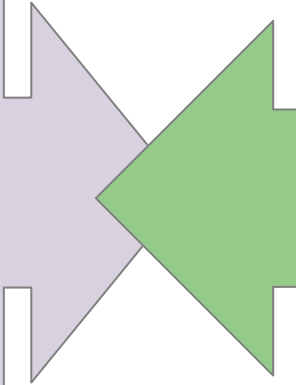
Processing

The country overall and Balochistan specifically lack state of the art processing units that not only meet the global but local needs as well.

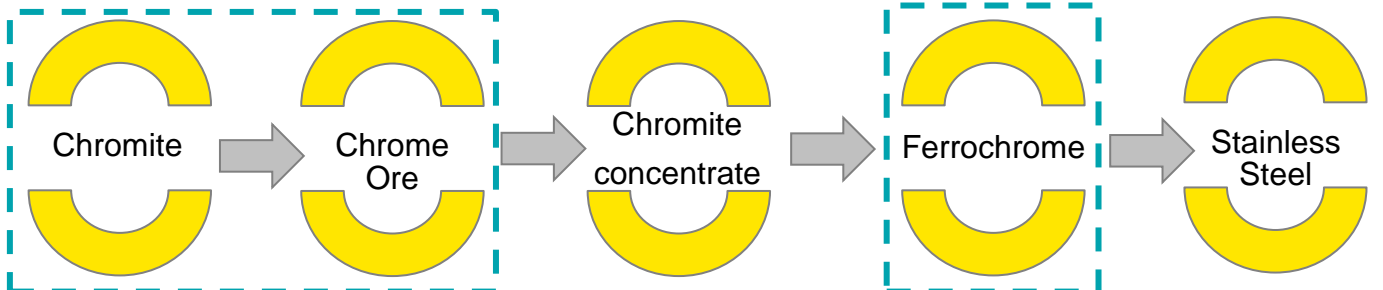
Chromite ore extracted in different areas of Balochistan is all transported to Karachi for further processing since the province does not have any processing units. This increases the transportation cost as the ore carries with it impurities that add to the weight.

The processing units present in Karachi also only offer very basic levels of processing. The final products that roll out of these processing units include lumps, concentrates and fine which are then exported to other countries for value addition processes units that upgrade chrome and produce Ferrochrome ³⁶.

Although the currently existing processing plants are cleaning the ore and turning low grade chromite ore into high-grade ore, they are lacking in their efficiency and quality as compared to international best practices.



Investment Potential in Chromite value Chain



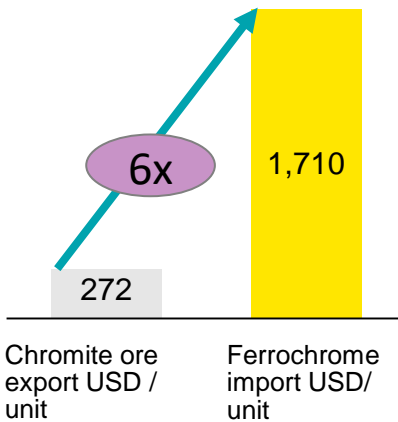
Chromite Investment Potential



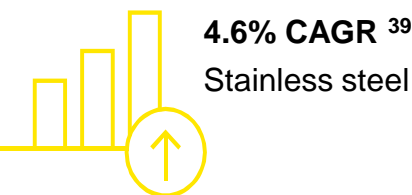
Mining

Adoption of technology promises greater produce of the highest quality through exploration of previously unexplored or unreachable mines. Brining certainty to the mining process by using technology advanced techniques that help locate the mineral and describe it's characteristics pre-mining in order to establish the utility of conducting a mining operation in the chosen area. Dependency on conventional wisdom needs to be reduced in order to bring efficiency into the mining process. Additionally, depending on the nature of composition of the mines, more safe and reliable methods of mining need to be adopted that ensure miner's safety and allow them to reach deep, complicated pockets that are otherwise difficult to grasp.

Capture the massive potential by processing chromite



Expanding market of Stainless Steel and Chromite



Processing

Every year Pakistan produces tones of chromite ore that is imported by other countries to produce more refined and value added products that Pakistan then imports for its domestic use. This cycle bears a very heavy price and the absence of value adding processing units stunts the profits industry's profits as well as limit the market for Pakistan's chromite to only raw and semi-finished products. **The most lucrative investment opportunity, however, lies in the production of ferrochrome.** Most of the mineral exported by Pakistan is used in the production of Ferrochrome which is then used in the production of stainless-steel. Ferrochrome is found towards the end of the chromite processing chain thereby presenting chromite in its most value added form. By setting up a ferrochrome plant, entire local demand and a significant section of the global chromite demand can be catered to from within the country that produces the chromite ore.⁶

On average, chromite ore is exported from Pakistan at around 272 USD per ton, however, the end product is imported for 1,710 USD per ton³⁷. The difference between these two amounts is indicative of the highly rewarding opportunities in the chromite industry. Thus, the hitherto unexplored yet most profitable segment of the value chain i.e. processing of chromite into Ferrochrome, needs to be captured seriously by local and foreign investors. Ferrochrome units can be established in Bostan and Lasbela Special Economic Zones as these are close to chromite producing areas including Muslim Bagh, Khanozai, Nasai, Gawal, Wadh and Sonaro. Bostan and Lasbela SEZs are connected with CPEC routes which facilitate transportation and improve ease of access to local steel market.

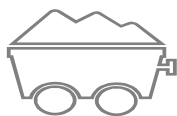
Conducive Environment

- Access to high quality chromite ore.
- Global stainless steel industry growing at CAGR 4.6%³⁸.
- In addition to the blooming market, infrastructure development under CPEC also facilitates the chromite mining and processing industry by reducing transport cost, offering better living standards amidst other benefits.

Key Area to Invest Coal



1 billion tons⁴⁰
of coal reserves in Balochistan



3.5 million tons¹⁴
tons produced in 2021 in Balochistan



Power Generation
major consume

Balochistan has 1 Billion tons of coal reserves with 5 developed coalfields:

1. Mach
2. Shahrag
3. Duki
4. Chamalang
5. Quetta

Pakistan produces 4.5 million tons of coal annually with Balochistan contributing 58% to the national production.

Majority of the Balochistan coal is graded as sub-bituminous to bituminous which is considered suitable for furnace combustion in industries and power generation after it is processed.

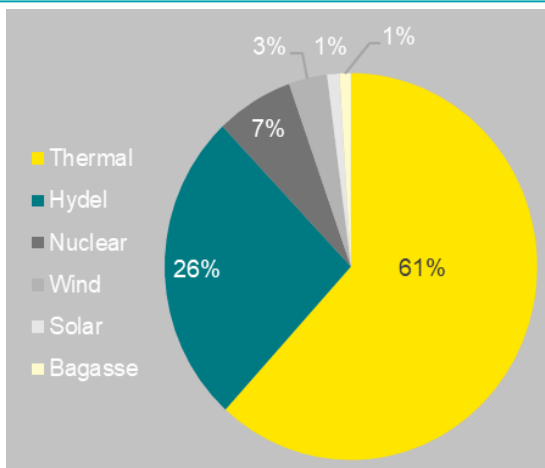
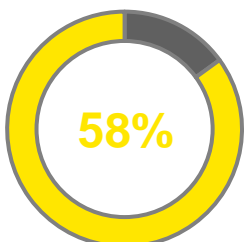
Balochistan Coal Concession⁴²

Concession Type	Number of active concessions granted		Total Acreage (Acres)
	Last 3 years	total	
Prospecting license	57	104	133,910
Mining Lease	20	329	218,568

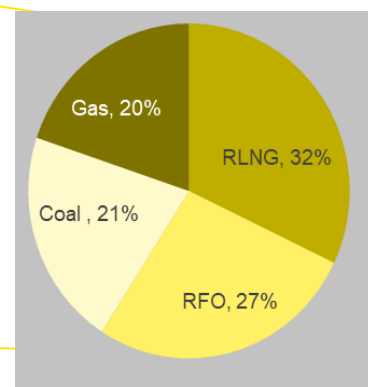
Pakistan's import in FY 2020⁴³



Imported Coal
proportion of the total coal used for energy production⁴⁴



Pakistan's Energy Mix FY2021⁴⁵



Coal is used in multiple industries as either fuel for an integral ingredient (cement, metal). However, the power industry is by far greatest consumer of coal, especially in Pakistan where there has been a surge in use of coal for power generation. Many of the industries also only recently shifted from using oil to using coal to power their factories.

Pakistan relies heavily on imported coal with Balochistan being the smallest supplier in Pakistan's coal consumption.

Mining

Coal is abundantly present in Balochistan and is extracted ostentatiously as well. Albeit the ample mining, coal that reaches from the quarry to processing units/market is only a fraction of what was mined. Use of conventional mining methods results in loss of coal during extraction and transportation. Moreover, these techniques do not offer access to more complex underground areas where the minerals has materialized. Dependence on manual mining methods results in a flaky supply chain that deters commercial consumers from relying on Balochistan's coal.

Currently, Pakistan also faces an acute problem of poor health and safety conditions for the miner working these conditions ⁴⁶. Most of the enterprises are small scale and thus can neither afford adoption of high-tech machinery nor offer safety equipment to all their employees. While the leading countries in the industry have moved towards automated extraction, Pakistan still relies on sending its miner down in the quarry amidst highly volatile and harmful conditions. Due to budget constraints of these small companies, investment in more reliable and safer forms of extraction is limited.

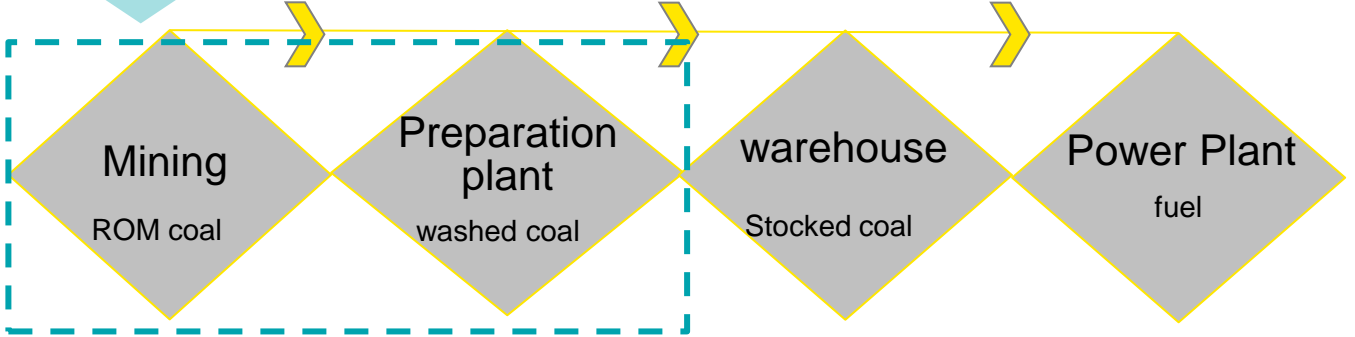
Processing

Although Balochistan's coal is considered suitable for power generation and use in other industries, 90% of the coal is dispatched to other provinces and mostly used in brick kilns. This is because the freshly extracted coal has high sulfur content which can only be used in industry only after it undergoes further processes ⁴⁷.

Currently, Pakistan does not have the required processing units that could refine Balochistan's coal and make it fit for industry. Thus, the coal which is tested to be usable for power generation is treated as low grade and used only in brick kilns.

As such, despite having a coal as a significant part of the country's energy mix, barely any of the locally extracted coal is used in power generation. Coal for thermal power stations is imported from other countries which increases the cost of the plant and electricity overall.

Investment Potential in Coal value chain




Mining

There exists a gap between the (indigenous) supply and demand of coal within the country. **Increased extraction and production of coal can reduce the share of imported coal transferring the market shared to local coal producers.**

In order to fully exploit the mineral at the quarry, modern techniques of mining need to be adopted. To extract the mineral from deep underground, non-conventional methods are required. Moreover, following in China's footsteps, conveyor belts can be installed from the quarry to the unit. The belt will help reduce wastage at the quarry.

Introduction and adoption of modern mining methods will be welcomed by the global community including human rights watchmen as it would safeguard miners' health and safety.



Import Substitution
can be achieved by
establishing coal washing
units in Balochistan

Processing

Pakistan's domestic market presents itself as a great opportunity for investment in coal preparation facility. Indigenous coal can diminish Pakistan's dependence on imported coal by going through layers of refining processes.

A coal preparation plant is a facility that washes coal of soil and rock, crushes it into graded size chunks, and stockpiles grades, preparing it for transport to market. High demand and low supply of coal preparation plants – of which coal washing is the most important step- create an opportunity for investment.

Washing increases coal's efficiency and quality, therefore increasing its price ⁴⁸. The preparation facility would decrease ash and sulfur content. The value added product generates more demand at higher levels of production as washed coal can then be used for power generation and industrial purposes.

Washing also decreases the transportation cost per unit of heat ⁴⁹.

Coal washing can also help to reduce emissions from burning making coal based power generation more acceptable and aligned with the country's environmental agenda.

Conducive Environment

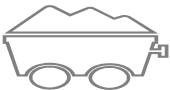
- Easy access to raw material reducing transport and storage costs.
- Investments in coal washing plants are highly encouraged and supported by the government.
- 770 KM coastline of Balochistan complements establishment of coal washing plant
- Proliferation of powerplants under CPEC offer a great market.
- Coal is also used in cement industries. Expanding construction and infrastructure sector especially under CPEC offer a burgeoning market.

Key Area to Invest

Iron Ore



400 million tons
of Iron reserves in Balochistan



253 thousand tons ¹⁴
Of Iron was produced in 2020
by Balochistan



Steel industry
major consumer

Iron Ore has long been a valuable factor for a country's economic growth and success. In today's age where infrastructural projects are heavily dependent on the provision of steel, Iron retains its importance as the major ingredient in steel production. Globally, around 98% of the extracted Iron ore is used in the production of Steel ⁵⁶.

Balochistan is endowed with reserves of Iron ore of varying grades that can be used across industries in the production of steel, ferrochrome, auto parts, etc.

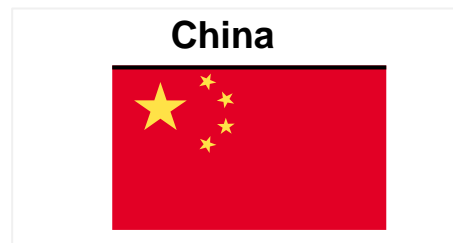
In line with global trends, Pakistan Steel Mill is the largest consumer of Iron ore within the country. The plant has the capacity to produce 1.1 million tons of steel per annum for which 1.8 million tons of Steel is required. Most of this Iron is imported ⁵⁷.

District	Reserves (000 000 tons)	Grade (Fe%)
Dilband	200	35-40%
Nokkundi	45	35-49%
Chigedik	05	20-60%
Chilgazi	23	10-55%

Balochistan Iron Ore Concession ⁵⁴

Concession Type	Number of active concessions granted		Total Acreage (Acres)
	Last 3 years	total	
Prospecting license	1	16	226824
Mining Lease	-	19	39829

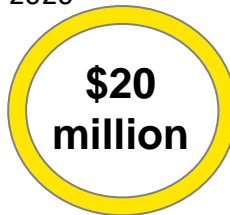
Pakistan's main export destination ⁵⁵



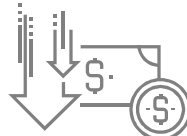
Despite having deposits of Iron ore across the country, Pakistan continues to import Iron and Steel scrap for the production of Steel due to dearth of ore beneficiation or iron processing units. Pakistan Steel Mill has the only two Iron ore based blast furnaces in the country. There has been some encouragement at the governmental level for the use of indigenous Iron ore. From 2008-2017, Pakistan Steel Mill produced 719,985 MTN of local iron ore. However, this quantity remains negligible given the Mill's magnanimous requirement to produce up to its capacity.

Pakistan's Iron Ore export

in FY 2020 ⁵⁸



- 3, 073 million USD
Iron and Steel trade balance
in FY 2020 ⁶⁰



Pakistan's Iron Ore import

in FY 2020 ⁵⁹



2.9% CAGR
Global Steel industry growth. ⁶¹



Mining

Although Iron ore is being mined in Balochistan, the scale of mining does not do justice to the mineral potential of the province. Iron ore deposits are small in size but are amply distributed across the province with Dilband having the highest quantity of reserves ⁶². Due to scanty geological exploration and mapping within the province, there has been dearth of information on the exact location, type and depth of the deposits which are critical for successful exploitation of the mineral.

Traditional methods of mining are used to extract iron ore reduce reach to higher grades of coal and compromise efficiency of the process. These methods include open mining carried by blasting the site of the deposits, the mineral excavated using shovels and loaded onto trucks for transport. Using these methods, it is difficult to reach deeper deposits with potentially better iron ore of better grade.

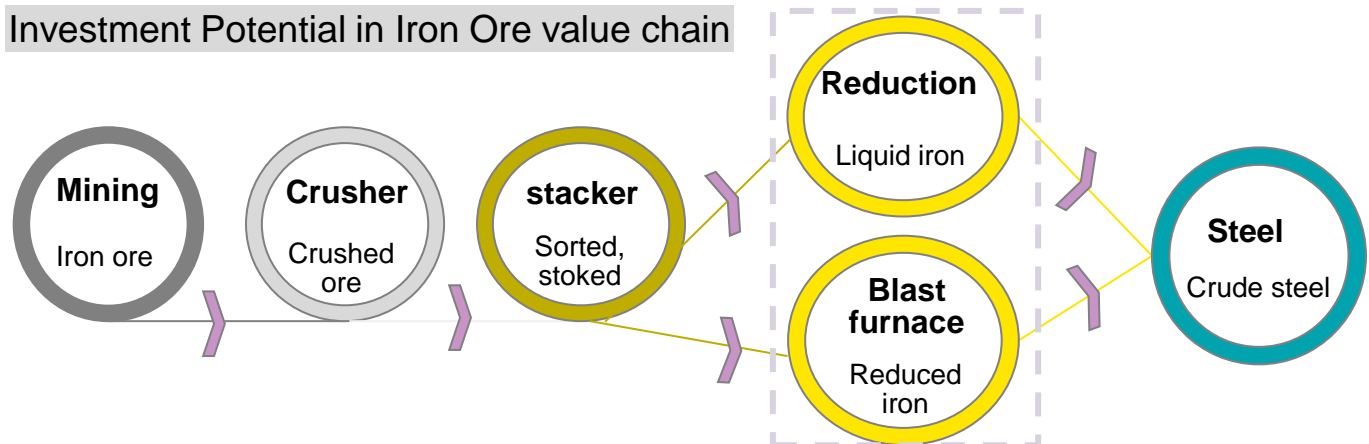
Processing

Iron ore is used in industries as a raw material after it has been refined to remove impurities. The more critical process, however, for the production of steel involves reduction of iron oxides to produce liquid Steel. As such, iron ore is required in adequate amount to produce the Steel.

Currently, Pakistan is dependent on imported iron ore for the production of steel which increases the price of steel and its products. There are only two major iron ore based blast furnaces, operated by Pakistan Steel Mill, in the country which limits the usage of iron ore in production of steel. Most of the small scale industries thus rely on imported scrap steel which melted and processed to produce steel⁶³.

Moreover, dependence on imported iron is also attributed to low grade iron ore found within the country as well as Balochistan has. Most of the known deposits in Balochistan having Fe content below 60% making it unusable for production of steel. There are no mechanism in place to improve the quality of extracted Iron.

Investment Potential in Iron Ore value chain



Mining

Increased supply of iron ore is crucial to reduce woes of imports and lower the current average price of iron within the country. Innovation in exploratory and mining technology can significantly improve the quantity and quality of the iron ore mined.

More meticulous and accurate mapping that details the composition and position of the ore can help mitigate the risks involved in mining and thus attract more investors. Once the ongoing mapping of the outcrop area is completed, there will be more accuracy in terms of the location of mines and potential mining techniques to be used.

Moreover, through introduction of mechanized techniques, deeper and more complex mines can be explored.

Processing

Dependence on imported iron can be reduced substantially by further refining and processing Balochistan's iron ore. A major reason for dependence on imported ore is the low Iron quotient (<60%) of the local ore. This can easily be remedied by introducing low-cost, rudimentary refining processes for beneficiation of the mineral. These could include very basic equipment such as ultra-fine screens, production of innovative jigs, efficient cyclones. Such low capital, high yielding advances and adoption in technology related to mineral beneficiation can result in significant increase in the utilization of the mineral ⁶⁴.

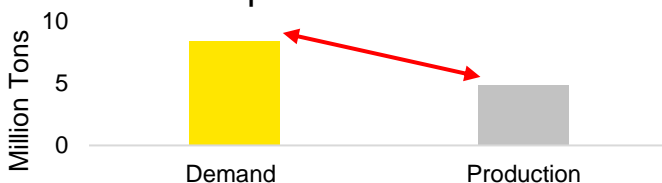
Beneficiation of iron close to the site of mining would also reduce the transportation cost of the mineral by reducing the weight of impurities. Moreover, expanded market for refined indigenous iron would further drive down the cost and thereby, strengthening and encouraging industries downstream especially the Steel production industry.

Upgradation of Balochistan's iron ore in addition to naturally existing high grade iron ore of high makes setting up of a steel mill that either uses a hi-tech iron-based blast furnace, DRI ⁶⁵, or any other innovative method to produce steel. This could be a step towards creating an all in house steel industry .

Conducive environment

- Increased market of steel within Balochistan due to CPEC infrastructural projects.
- Low competition within the sector allowing for more market share.
- Market potential due to differential between current supply and demand of the Pakistan Steel Mill.

Iron and Steel- local demand and production deficit



3.5 Million Tons ⁶⁶

of Iron and Steel are imported to close the local demand-production gap. This can be replaced by local iron

Export Processing Zones

- ▶ To create an enabling environment for investors in order to increase exports and concomitantly improve job opportunities, technology transfer and investment
- ▶ Key Incentives⁶⁷:
 - ▶ land on competitive rates for 30 years
 - ▶ Duty-free import of machinery, equipment and materials
 - ▶ Freedom from national import regulations
 - ▶ No sales tax on input goods including electricity/gas bills
 - ▶ Presumptive tax @ 1%
- ▶ Key facilities⁶⁸:
 - ▶ One-window operation
 - ▶ Availability of facilities like water, technology, technology
 - ▶ High security
- ▶ Gwadar EPZ is under construction and is expected to generate USD 500 million worth of exports per annum Operational minerals sector EPZ⁶⁹:

EPZ	Mineral	Location	Export value 2019-20 (USD)
Saindak EPZ	Gold & Copper	Chagai	55.002 million
Duddar EPZ	Lead & Zinc	Lasbella	30.894 million

Marble cities

- ▶ To create an enabling environment for investors in order to increase exports and concomitantly improve job opportunities, technology transfer and investment.
- ▶ Marble city at Gaddani, Hub has been operational since 2007. It provides necessary infrastructure and market for marble producers. Currently houses around 60 marble small processing units⁷⁰.
- ▶ Based on a similar concept, the government is planning on developing new marble cities Loralai (506 acre), Khuzdar (200 acre) and Dalbandin (500 acre). Infrastructural facilities and market opportunities will be provided to investors ⁷¹.

Government Initiatives

Fast Tracked issuance of licenses/leases



The Balochistan government recently established two autonomous companies in 2020 in order to encourage growth in Balochistan’s mining sector by facilitating investors.



Balochistan Mineral Exploration Company

Balochistan Mineral Resources Company

- ▶ Enhancing ease of business to attract investors by reducing administrative procedures.
- ▶ Companies were established by the Balochistan government in 2020- later made autonomous- in the governments continuous attempts to improve the mining sector within the province.
- ▶ Balochistan government solely owns BMRC whereas it holds 90% of the shares in Balochistan Mineral Exploration Company and the federal government holds the remaining 10%⁷².
- ▶ The companies would streamline and simplify the process of obtaining leases, saving investors time and resources that had previously been spent in seeking bureaucratic approvals.
- ▶ Umbrella leases will be awarded to the two companies who would then enter a joint venture with private investors thereby sub-contracting the leases to third parties. The following leases have already been granted to the companies.

Companies	Minerals
Balochistan Mineral resources Limited (BMRL)	Lead-Zinc, Copper-Gold, Iron ore & Fluorite
Balochistan Mineral Exploration Company (BMEC).	Copper, Gold, Lead Zinc, silver and associate minerals.

- ▶ The government has set aside 3.2 billion as funds for both of the companies to ensure their smooth operation in facilitating investors.

Infrastructural projects and trade routes developed under CPEC will significantly impact the Mining and Mineral sector



Improved trade with China

1

China is one of Pakistan's largest mineral importer, Construction of trade routes under CPEC will make access to the neighboring country far easier. Significantly slashed transportation cost and secure supply chain would facilitate and encourage increased trade between the two countries.

Mou was also signed between the two countries for industrial development in the minerals sector

Increased domestic demand for minerals

2

Various infrastructural projects being developed under the banner of CPEC result in:

- i) Increased demand for minerals used either as end products or as raw materials in the construction such as marble, iron, chromite, coal, limestone.
- ii) Increased demand for coal for the multiple power plants under the initiative

Infrastructural projects as facilitators for the sector

3

Construction of infrastructural projects facilitates the mining industry buy developing supporting socio-economic and architectural structures such as roads, buildings, power and sanitation mechanisms allowing even the remotest areas of the province to be accessed and be livable helping businesses thrive. This would greatly reduce transport cost and attract more skilled workers

References

1. https://www.finance.gov.pk/survey/chapters_21/03-Manufacturing.pdf
2. https://www.pbs.gov.pk/sites/default/files//tables/rename-as-per-table-type/Table_7.pdf
3. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
4. <https://gsp.gov.pk/wp-content/uploads/2021/08/Year-Book-2020-21.docx-12-08-2021.docx-FINAL-converted.pdf>
5. Ibid
6. <https://bboit.gob.pk/wp-content/uploads/2021/03/CHROME-FERROCHROME-PRODUCTION-PLANT.pdf>
7. Ibid
8. Ibid
9. <https://pbbit.punjab.gov.pk/system/files/National%20Mineral%20Policy%2C%202013.pdf>
10. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
11. Balochistan Investment guide book 0.2
12. Ibid
13. Ibid
14. Department of Mines and Minerals, Balochistan
15. Ibid
16. Trade Map (HS code: 2515)
17. Ibid
18. Ibid
19. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
20. MARBLE MARKET, Mordor intelligen
21. <https://www.pc.gov.pk/uploads/report/Stone%20Mining.pdf>
22. <https://www.pc.gov.pk/uploads/report/Stone%20Mining.pdf>
23. https://www.pc.gov.pk/uploads/report/Dimension_Stone_Cluster_Abbottabad.pdf
24. <https://www.dawn.com/news/1369996>
25. https://www.pc.gov.pk/uploads/report/Dimension_Stone_Cluster_Abbottabad.pdf
26. <https://pasdec.org.pk/>
27. <https://pasdec.org.pk/>
28. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
29. Balochistan Investment guide book 0.2
30. Department of Mines and Minerals, Balochistan
31. Ibid
32. Trade Map (HS code: 2610)
33. Ibid
34. Ibid
35. <https://www.marketwatch.com/press-release/chromite-ore-market-size-in-2021-53-cagr-with-top-countries-data-which-region-is-expected-to-lead-the-chromite-ore-industry-latest-90-pages-report-2021-10-21#:~:text=In%202021%2C%20The%20worldwide%20Market,5.3%25%20during%202021%2D2026.&text=This%20report%20categorizes%20the%20market,%2C%20regions%2C%20type%20and%20application.>
36. https://www.pc.gov.pk/uploads/report/Cluster_Study-Chromite_Processing_Trading_Sindh.pdf
37. Trade Map (HS code: 2610)
38. <https://www.prnewswire.com/news-releases/stainless-steel-market-to-reach-usd-171050-by-2027-at-a-cagr-of-4-6--valuates-reports-301433788.html>
39. <https://www.bloomberg.com/press-releases/2021-11-30/stainless-steel-market-to-reach-usd-171050-by-2027-at-a-cagr-of-4-6-valuates-reports>
40. Balochistan Investment guide book 0.2

References

41. Department of Mines and Minerals, Balochistan
42. Ibid
43. Trade Map (HS code: 2701)
44. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
45. http://www.finance.gov.pk/survey/chapters_21/14-Energy.pdf
46. <https://www.dawn.com/news/1659937>
47. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
48. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
49. Ibid
50. <https://www.dawn.com/news/1648716>
51. <https://www.dawn.com/news/1648716>
52. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
53. Department of Mines and Minerals, Balochistan
54. Ibid
55. Trade Map (HS code: 2601)
56. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
57. Ibid
58. Trade Map (HS code: 2601)
59. Ibid
60. Ibid
61. <https://www.marketwatch.com/press-release/iron-and-steel-market-size-in-2021-29-cagr-with-top-countries-data-who-are-the-top-key-players-in-the-global-iron-and-steel-industry-latest-113-pages-report-2021-10-07>
62. http://buildindustrialpakistan.blogspot.com/2013/08/iron-making-department-pakistan-steel_9.html
63. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
64. MINING EQUIPMENT, TECHNOLOGY AND SERVICES, Australian government
65. <https://tribune.com.pk/story/2083757/steel-sector-strategy-without-psm-cannot-work>
66. <http://bboit.gob.pk/InvestmentopportunitiesinBalochistanvol1.pdf>
67. <https://epza.gov.pk/incentives/>
68. Ibid
69. Ibid
70. <http://www.dgicd.gob.pk/marble-cities/>
71. <https://fp.brecorder.com/2007/04/20070414550335/>
72. <https://www.dawn.com/news/1577660>