



**PAKISTAN  
MINERALS  
INVESTMENT  
FORUM 2026**

Endorsed By



# MINERALS RESOURCES OF SINDH

Mines & Minerals Development  
Government of Sindh

Exploring the Province's  
Mineral Resources  
And Potential

# MINES AND MINERALS DEVELOPMENT DEPARTMENT GOVERNMENT OF SINDH



# MINERAL RESOURCES OF SINDH

- Based on available information and as a consequence of intensive and extensive geological research and mineral exploration, country's more than 6,00,000 sq km outcrop area demonstrates varied geological potential of metallic and non-metallic mineral deposits.
- Exploration by government agencies as well as by multinational mining companies presents ample evidence of the occurrences of sizeable minerals deposits in Sindh.
- Sindh is located in the southern part of Pakistan. From east to west, it is comprised of three main geological zones, namely the Thar Desert, the Indus Plain and Delta, and the Khirthar Mountains.
- Sindh produces a variety of commercial clays, including Fuller's Earth, China Clay, Fire Clay, Ball Clay and Bentonite. It has large deposits of Gypsum, Sodium Carbonate and Trona. It is endowed with large and extensive deposits of dimension stones, such as Granite, Marble, Travertine, Dolomite, and Limestone.
- Sindh has also a large base for industrial minerals. There is vast potential for precious and dimension stones in Tharparkar, Dadu and Thatta of the Sindh province.

# LIST OF MINERALS FOUND ACROSS SINDH

1. BALL CLAY
2. BAUXITE
3. BENTONITE
4. CELESTITE
5. CHALK
6. CHINA CLAY
7. CLAY
8. COAL
9. DOLOMITE
10. FIRE CLAY
11. FULLER'S EARTH
12. GRAVEL
13. GYPSUM
14. IRON ORE
15. LAKE SALT
16. LATERITE
17. LIME STONE
18. MARBLE
19. QUARTZITE/SAND STONE
20. RED OCHRE
21. SHALE CLAY
22. SILICA SAND
23. TRONA

## 1. BALL CLAY



1.	<b>Location:</b>	Thatta
2.	<b>Estimated Reserves:</b>	Not estimated
3.	<b>Composition:</b>	Main composition is the same as that of china clay that is kaolinite mineral $Al_2Si_2O_5(OH)_4$ , the impurities affect the behavior of clays which categories the clay with different name like, shale clay, ball clay, china clay, bauxitic clay, fire clay etc. shale clay have moderately high iron oxide, silica. likewise, fire clay have low percentage of iron oxide, lime, magnesia and alkalis so that it come stand temperature up to 1500 CO and even higher
4.	<b>Uses:</b>	Ceramics building material

## 2. BAUXITE



1.	<b>Location:</b>	Thatta
2.	<b>Estimated Reserves:</b>	Un-estimated
3.	<b>Composition:</b>	Bauxite's chemical formula is $AL_2O_3 \cdot 2H_2O$
4.	<b>Uses:</b>	Chemical industry, refractory, abrasive, cement, steel, and petrol industry amongst others. In chemicals, bauxite along with alumina is used in the manufacturing of aluminum chemicals.

### 3. BENTONITE



1.	<b>Location:</b>	Karachi, thatta, dadu and jamshoro.
2.	<b>Reserves:</b>	Un-estimated
3.	<b>Composition:</b>	<p>chiefly composed of montmorillonite clay,  <math>(Ca, Mg) 0. Al_2 O_{3.5} SiO.NH_2O</math>  <b>TYPE</b></p> <p>1) Swelling type.  na-bentonite, it absorbs water up to 8 times and swells up to 15 times its volume and makes gel lime dispersion.</p> <p>2) Non-swelling type.  ca-bentonite that breaks to granular mass in water, settles down and has strong absorptive property and has breaching potential.</p>
4.	<b>Uses:</b>	<p>1) Swelling type.</p> <p>a) Oil well drilling muds, grounding of foundation, polishing material grinding paste.</p> <p>b) Used in cosmetics, pharmacy, fungicide, insecticide spray etc.</p> <p>2) Non-swelling type.</p> <p>a) Activated for bleaching oil, honey, sugar.</p> <p>b) Foundry moldings, are briquetting, white ware body's pottery glazes, insulation, textile etc.</p> <p>c) Mud of oil drilling, oil filtering.</p>

## 4. CELESTITE



1.	<b>Location:</b>	Dadu & Jamshoro
2.	<b>Estimated Reserves:</b>	0.214 Million tonnes
3.	<b>Composition:</b>	SR SO <sub>4</sub> , SRO 56.4%.
4.	<b>Uses:</b>	Glass, ceramics, paint, and rubber, colour t.v, rubber, signaling white pigment for paint, military uses, signals, flares, rockets, tracer bullets, railway signals, pyrotechnic optical glasses, luminous material, medicine, pharmacy. it is a mineral that is also used for jewelry.

## 5. CHALK



1.	<b>Location:</b>	Dadu, jamshoro & thatta
2.	<b>Estimated Reserves:</b>	5 Million tonnes
3.	<b>Composition:</b>	Fine grained white earthy limestone (CA CO3) with low iron
4.	<b>Uses:</b>	For poultry grit, filler, white washing, quick and white cement manufacturing etc.  Paint, glass making & rubber filling

## 6. CHINA CLAY



1.	<b>Location:</b>	Tharparkar
2.	<b>Reserves:</b>	5 Million tonnes
3.	<b>Physical Features:</b>	Plain ground of the mining area
4.	<b>Transportation:</b>	Metallic road is available and passing nearby mining area
5.	<b>Quality:</b>	White or nearly white in color, pure kaolin or china clay is classified in color.
6.	<b>Geology:</b>	Reserves are available in sub surface and exposed to the surface.
7.	<b>Places of available:</b>	Deh vero, lakhi, vira wah, sangha, talaw, sothar, sehrio, sankar, kharki, bnda, kapuri, ranji very, wahdary, dungri, judh, vandi, paro dhoro.
8.	<b>Composition:</b>	Chiefly kaolinite mineral $Al_2 Si_2 O_5 (OH)_4$ impurities i.e. quartz, silica, iron oxide, feldspar and lime stone.
9.	<b>Washing:</b>	It is washed as to remove undesirable particles and preparation of fine material.
10.	<b>Uses</b>	Ceramics porcelain, glazes, electrical insulators, paint industry, pencils, pigments, white cement, refractory, medicine, cosmetic and plastics.

## 7. CLAY



1.	<b>Location:</b>	Thatta, jamshoro & dadu, karachi
2.	<b>Estimated Reserves:</b>	Not estimated
3.	<b>Composition:</b>	Clay is a type of fine-grained natural soil material containing clay minerals (Hydrous aluminum phyllosilicates, e.g. Kaolinite, $Al_2Si_2O_5(OH)_4$ ).
4.	<b>Uses:</b>	Clays are used for making pottery, both utilitarian and decorative, and construction products, such as bricks, walls, and floor tiles. Different types of clay, when used with different minerals and firing conditions are used to produce earthenware, stoneware, and porcelain

## 8. COAL



1.	<b>Location:</b>	Jamshoro, thatta, badin and tharparkar
2.	<b>Reserves:</b>	185 Billion tons
3.	<b>Type:</b>	Ignite
4.	<b>Composition:</b>	Carbon, Hydrogen, oxygen, nitrogen and impurities as sulphur, ash (Residual matter, containing silt, clay and silica etc).
5.	<b>Chemical Analysis:</b>	Moisture 46.77%, volatile matter 23.42%, fixed carbon 16.66%, ash 6.24%, sulphur 1.16%, calorific value (BTU/LB) 5,774 and rank lignite A to B.

## Uses of Coal

- Coal has a very long and varied history. Some historians believe that coal was first used commercially in China. There are reports that a mine in northeastern China provided coal for smelting copper and for casting coins around 1000 BC. One of the earliest known references to coal was made by the Greek philosopher and scientist Aristotle, who referred to a charcoal like rock.
- It was during the Industrial Revolution in the 18th and 19th centuries that demand for coal surged. The great improvement of the steam engine by James Watt, patented in 1769, was largely responsible for the growth in coal use.
- With the development of electric power in the 19th century, coal's future became closely tied to electricity generation. The first practical coal-fired electric generating station, developed by Thomas Edison, went into operation in New York City in 1882, supplying electricity for household lights
- Coal was used to produce gas for gas lights in many cities, which was called 'town gas'. This process of coal gasification saw the growth in gas lights across metropolitan areas at the beginning of the 19th century, particularly in London. The use of coal gas in street lighting was eventually replaced with the emergence of the modern electric era.
- With the huge rise in the transportation sector, oil finally overtook coal as the largest source of primary energy in the 1960s. Coal still plays a vital role in the world's primary energy mix, providing 25% of global primary energy needs in 2005 and 40% of the world's electricity, more than double the next largest source.
- With the huge rise in the transportation sector, oil finally overtook coal as the largest source of primary energy in the 1960s. Coal still plays a vital role in the world's primary.

- For many centuries, coal was burned in small stoves to produce heat in homes and factories. Today, the most important use of coal, both directly and indirectly, is still as a fuel. The largest single consumer of coal as a fuel is the electrical power industry. The combustion of coal in power generating plants is used to make steam which, in turn, operates turbines and generators.
- It is the most abundant economically recoverable coal globally and the main fuel burned in steam turbine-powered electric generating plants
- Some bituminous coals, known as metallurgical or coking coals, have properties that make them suitable for conversion to coke used in steelmaking.
- Its destructive distillation (carbonization) produces hydrocarbon gases and coal tar, from which chemists have synthesized drugs, dyes, plastics, solvents, and numerous other organic chemicals.
- High pressure coal hydrogenation or liquefaction and the indirect liquefaction of coal using Fischer–Tropsch syntheses are also potential sources of clean-burning liquid fuels and lubricants.
- Coal is no longer widely used to heat homes and buildings, as was the case a half century ago, but it is still used in industries such as paper production, cement and ceramic manufacture, iron and steel production, and chemical manufacture for heating and for steam generation.
- Another use for coal is in the manufacture of coke. Coke is nearly pure carbon produced when soft coal is heated in the absence of air. In most cases, one ton of coal will produce 0.7 ton of coke in this process. Coke is of value in industry because it has a heat value higher than any form of natural coal. It is widely used in steel making and in certain chemical processes.

- OAK RIDGE, Tenn., June 21, 1995 – Researchers at the Department of Energy's (DOE) Oak Ridge National Laboratory (ORNL) have developed a technique to convert sulfur dioxide – a pollutant from coal-fired steam plants that causes acid rain – into a useful product – sulfur. Their biological process could save energy while reducing pollution and waste.
- De Pere, WI -- MEGTEC Systems, a unit of Sequa Corporation, announces the first power plant in the world to use MEGTEC's innovative technology to generate electrical power by using coal mine ventilation air methane (VAM) as primary fuel. The power plant is now in full operation in Australia at the West Cliff Colliery of BHP Billiton (NYSE:BHP), the world's largest diversified mining and resources company. The date of the official opening of the world's first VAM Power Plant was Friday September 14, 2007. Conducting the inauguration was the Honorable Morris Iemma, the Premier of NSW, Australia.
- Coal has four major markets: electric utilities, industrial/retail users, the steel industry and exports.
- Electric utilities use more than 86 percent of the coal produced in the United States. Upon close examination, it is clear that price has been a major deciding factor in coal's increased use. More than 57 percent of the electricity generated in the United States comes from coal.
- In an electric power plant, coal, like oil and natural gas, is burned to produce heat. The heat is used to change water into steam. The steam then turns the blades of a turbine, spinning the generator, producing electricity. Before the coal is burned it is crushed and pulverized to the consistency of face powder.
- Coal's second largest market is industrial and retail users. Among the industries using coal, the largest consumers are chemical manufacturers, users of stone, clay and glass, paper mills, primary metal industries and the food industry. Industry uses coal as a chemical feedstock to make dyes, insecticides, fertilizers, explosives, synthetic fibers, food preservatives, ammonia, synthetic rubber, fingernail polish, medicines, etc.

- The third largest market is the iron and steel industry, where coal is used to make into coke. Coke is derived from bituminous coal through heating in airtight ovens. The lack of air prevents the coal from burning and converts some of the solids to gases leaving coke.
- The fourth market segment is exports. The top five foreign markets are Canada, Japan, Italy, Netherlands and Brazil. U.S. coal distributed to foreign countries in 1988 totaled 95 million short tons (76 million to overseas destinations and 19 million to Canada). Major reasons for the decline in United State's coal exports from the all-time high of 112.5 million tons in 1981 are stiff competition in the international marketplace and worldwide economic conditions.

## 9. DOLOMITE



1.	<b>Location:</b>	Thatta and jamshoro
2.	<b>Estimated Reserves:</b>	8 Million tonnes
3.	<b>Composition:</b>	CA MG (CO3)2, CAO 30.4%, MGO 21.7% CO2 47.9%.
4.	<b>Uses:</b>	Steel mill, glass making refractories, bricks, metallurgical flux, chrome dolomite refractory, building stones, monumental stones, road metal and ballast, pigments, paints, abrasive, sold's cement, glass, ceramics, fertilizer.

## 10. FIRE CLAY



1.	<b>Location:</b>	Thatta and dadu
2.	<b>Estimated Reserves:</b>	Not estimated
3.	<b>Composition:</b>	The chemical composition of the fireclay fall well within the usually wide percentage limits for fireclays: silica 40-60%, alumina 10-40%, iron oxide 1-5%, alkalis <3%, lime and magnesia <5%, and loss on ignition 5-14%.
4.	<b>Uses:</b>	For brick and refractors

## 11. FULLERS EARTH



1.	<b>Location:</b>	Sukkur, khairpur, dadu, jamshoro & hydrabad
2.	<b>Estimated Reserves:</b>	Fairly large reserves
3.	<b>Composition:</b>	No specific mineralogical composition, non plastic clay like material.
4.	<b>Uses:</b>	Nuclear industry, pharmaceuticals, protective creams, pesticides, fungicides, insecticides, bonding pencils, seed coating, foundry bonding material, cosmetics, face creams, powders, soap, leather, rubber, water purification, catalyst for petroleum products, polystyrene, terrenes, recovery of used lubricating oils, bleaching and removal of impurities from oils, waxes.

## 12. GRAVEL



1.	<b>Location:</b>	Karachi, jamshoro, thatta, dadu, sukkur, khairpur, kambar-shahdadkot
2.	<b>Estimated Reserves:</b>	Un-estimated
3.	<b>Composition:</b>	Quartz is the most common mineral found in gravel, as it is hard, chemically inert, and lacks cleavage planes along which the rock easily splits. most gravel particles consist of multiple mineral grains, since few rocks have mineral grains coarser than about 8 millimeters (0.31 in) in size.
4.	<b>Uses:</b>	Building and road material also used for decoration purpose in gardens

## 13. GYPSUM



1.	<b>Location:</b>	Sanghar, tharparkar, jamshoro & dadu.
2.	<b>Estimated Reserves:</b>	8.0 million tonnes
3.	<b>Composition:</b>	CA SO4.2, H2O, CAC 32.6%, SO3 46.5%.
4.	<b>Uses:</b>	Cement, plaster of paris, soil reclamation soil fertilizer, portland cement, white pigment for cotton, paper, paint flux for nickel ores, absorbent for oil and gas, insulation, acoustics, quick setting cement, plaster boards, sheets construction purpose, plaster of paris, casts, surgical platter, sulphur dioxide, sulphur acid, nitrogenous fertilizers.

## 14. IRON ORE



1.	<b>Location:</b>	Thatta, jamshoro, tharparkar
2.	<b>Estimated reserves:</b>	Un-estimated
3.	<b>Transportation</b>	Metallic road nearby mining area available.
4.	<b>Composition:</b>	Iron ore is primarily composed of iron, usually in the form of iron oxides such as hematite ( $Fe_2O_3$ ), magnetite ( $Fe_3O_4$ ), or goethite ( $FeO(OH)$ ). It may also contain other elements or minerals as impurities, such as silica, alumina, phosphorus, sulfur, and trace elements
5.	<b>Uses:</b>	Used in the manufacturing of steel and iron

## 15. LAKE SALT



1.	<b>Location:</b>	Khairpur, nawabshah, sanghar and tharparkar.
2.	<b>Estimated reserves:</b>	Fairly large
3.	<b>Colour:</b>	Off white and transparent
4.	<b>Transportation:</b>	Metallic road nearby mining area available.
5.	<b>Formation:</b>	Formed through natural process after evaporation of water from surface and leaves of bed of salt up to 3 feet approximately of salt. in fact the salt is farmed due to salty land in its nature from the history due to available of ocean in the past period.
6.	<b>Composition:</b>	Sodium chloride nacl, with minor amount of gang chlorides canamg sulphate, and iron compounds.
7.	<b>Uses:</b>	Human consumption as table salt, fisheries & chemicals industrial production of soda ash, caustic, soda, chlorine, hydrochloric acid, chlorates and related compounds, soap, dyes, textile, leather industries and metallurgy, sodium metal, water treatment, meat fish and food industry.

## 16. LATERITE



1.	<b>Location:</b>	Dadu, jamshoro & thatta.
2.	<b>Estimated reserves:</b>	Huge reserves
3.	<b>Composition:</b>	Low grade iron ore which is a mixture of high grade iron ore (hematite, limonite) & clay.
4.	<b>Uses:</b>	Sulphate resistant, cement, pigment and colours chemical industry, paint industry, cement industry etc.

## 17. LIME STONE



1.	<b>Location:</b>	Khairpur, dadu, jamshoro, larkana, sukkur, hyderabad, thatta and karachi.
2.	<b>Estimated reserves:</b>	Very large
3.	<b>Composition:</b>	Rock containing at least 50% calcite (CaCO <sub>3</sub> )  Impurities: - iron, silica and organic matter.

## Uses of Lime Stone

- Building Material, Construction stone, cement factories, steel mill, chemical industries sugar industries, filter and soil conditioner
- Lime stone was most popular in the early 20th and late 19th centuries, Train station, Banks and other structure from that era are normally made of lime stone.
- May land mark across the world including the Pyramids in Egypt are made of lime stone.
- Lime stone is very common in Architecture especially in North America and Europe.
- Lime stone is readily available and relatively easy to cut into blocks or more elaborate carving.
- It is also long lasting and stands up well to exposure.
- It is a very heavy material, making it impractical expensive as a building material.
- A lime stone plate with a negative map of Moosburg in Bararia is prepared for a Lithography print.
- Beer stone was a popular kind of lime stone for medieval building in southern England.
- Lime stone is used in the manufacturing of Quick Lime (Calcium oxide) and slaked Lime (Calcium Oxide).
- Lime stone is used in the cement manufacturing and Mortar.

- Lime stone is used as reagent in Desulfurization.
- Pulverized lime stone is used as a soil conditioner.
- Geological formation of lime stone are among the best petroleum reservoirs.
- Lime stone is used for glass making in some circumstances.
- Added to paper, Plastic, Paints, Tiles and other materials as both white pigments and cheap filler.
- Lime stone is used in the Toothpaste.
- Suppression of methane explosion in underground coal mines.
- Added to bread and cereals as source of calcium.
- The largest use of lime is in steel manufacturing where lime is used as a flux to remove impurities such as phosphorus and Sulfur.
- Lime stone is used water treatment and Purification and also in waste water treatment.
- It is used in the road construction.
- If Lime stone is powdered it can be used to neutralize the acidity in lakes caused by acid rain and to neutralize acidic soils.

## 18. MARBLE (GOLDEN MARBLE)



1.	<b>Location:</b>	Thana bola khan jamshoro & sondha thatta
2.	<b>Reserves:</b>	Over 350 million tonnes
3.	<b>Composition:</b>	Crystalline metamorphosed limestone rock with impurities of iron, silica, clay, and carbonaceous matter.
4.	<b>Uses:</b>	Building stone, decorative stone & articles, inferior varieties used like limestone.

## 19. QUARTZITE / SAND STONE



1.	<b>Location:</b>	Thatta
2.	<b>Estimated reserves:</b>	Huge reserves
3.	<b>Composition:</b>	Cemented or otherwise compacted detrital sediment composed of quartz grain.
4.	<b>Uses:</b>	Cement, pottery, building stone, road construction, etc.

## 20. RED OCHRE



1.	<b>Location:</b>	Dadu, Jamshoro & Thatta
2.	<b>Estimated reserves:</b>	Not estimated
3.	<b>Composition:</b>	Mixture of hematite, limonite, and clay iron oxide 15%, 80% of the mass.
4.	<b>Uses:</b>	Paint industry, pigments, and cement manufacturing.

## 21. SHALE CLAY



1.	<b>Location:</b>	Thatta, Jamshoro & Dadu.
2.	<b>Composition:</b>	Main composition is the same as that of China clay, which is kaolinite mineral $Al_2Si_2O_5(OH)_4$ . The impurities affect the behavior of clays, categorizing them into different types like shale clay, ball clay, china clay, bauxitic clay, fire clay, etc. Shale clay has moderately high iron oxide, silica, and alumina. Likewise, fire clay has a low percentage of iron oxide, lime, magnesia, and alkalis, enabling it to withstand temperatures up to $1500^{\circ}C$ or even higher.
3.	<b>Uses:</b>	1. Shale clay is mostly used in ordinary Portland cement manufacturing to maintain iron and silica ratio.

## 22. SILICA SAND



1.	<b>Location:</b>	Jamshoro, thatta & karachi.
2.	<b>Estimated Reserves:</b>	60 million tonnes
3.	<b>Composition:</b>	Main composition is quartz again over 93% Others are iron oxide, aluminum, and silicates. Calcium, magnesium and alkalies may be present.
4.	<b>Uses:</b>	<ul style="list-style-type: none"><li>• Used in glass industry, ceramics, and chemical industry.</li><li>• Used as refractory material for bricks and floors of open hearth furnaces and lining cupolas for molten metal.</li><li>• Used as an abrasive.</li></ul>

## 23. TRONA / SODA ASH



1.	<b>Location:</b>	Khairpur, shaheed benazirabad.
2.	<b>Reserves:</b>	Un-estimated
3.	<b>Composition:</b>	Trona, an evaporite mineral, hydrated sodium bicarbonate [ $\text{Na}_2\text{H}(\text{CO}_3)_2 \cdot 2\text{H}_2\text{O}$ ], occasionally encountered as a saline lake deposit or evaporation product and as an efflorescence on arid soil
4.	<b>Uses:</b>	Chemicals, industries & detergent

# THANK YOU!



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