

***STRATEGY FOR DEVELOPING UZBEKISTAN'S KAOLIN RAW
MATERIAL BASE: RESOURCE POTENTIAL, UTILIZATION EFFICIENCY,
AND INVESTMENT PROJECT PROSPECTS***

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Abstract: *This article analyzes the strategy for developing Uzbekistan's kaolin raw material base, its resource potential, utilization efficiency, and*

investment project prospects. The mineral composition of kaolin, its formation process, and its applications across various industries (paper, ceramics, paint, rubber, plastics, pharmaceuticals, cosmetics, construction, agriculture, and food) are described in detail.

Keywords: *kaolin, raw material base, mineral reserves, processing efficiency, investment projects, export potential, high value-added products, ceramics industry, construction materials.*

СТРАТЕГИЯ РАЗВИТИЯ СЫРЬЕВОЙ БАЗЫ КАОЛИНА УЗБЕКИСТАНА: РЕСУРСНЫЙ ПОТЕНЦИАЛ, ЭФФЕКТИВНОСТЬ ИСПОЛЬЗОВАНИЯ И ПЕРСПЕКТИВЫ ИНВЕСТИЦИОННЫХ ПРОЕКТОВ

Аннотация: *В статье рассматривается стратегия развития сырьевой базы каолина Узбекистана, её ресурсный потенциал, эффективность использования и перспективы инвестиционных проектов. Подробно описаны минеральный состав каолина, процесс его образования и применение в различных отраслях (бумажная, керамическая, лакокрасочная, резиновая, пластмассовая, фармацевтическая, косметическая, строительная, сельскохозяйственная и пищевая промышленность).*

Ключевые слова: *каолин, сырьевая база, минеральные запасы, эффективность переработки, инвестиционные проекты, экспортный потенциал, продукция с высокой добавленной стоимостью, керамическая промышленность, строительные материалы.*

Kaolin is a type of rock primarily composed of the white clay mineral kaolinite, with smaller amounts of other minerals from the kaolinite group— dickite, nacrite, halloysite, and anauxite. The presence of sand, organic matter, and iron oxide impurities in kaolin can alter its color, ranging from gray to red. Kaolin forms through the chemical weathering of granite, gneiss, and other quartz-feldspar

rocks in warm and humid climates under the influence of organic and mineral acids.

Kaolin raw material is used both in its natural and enriched forms across a wide range of industries, including paper, ceramics, paint, rubber, plastics, adhesives, construction, pharmaceuticals, cosmetics, agriculture, and the food industry [1]. In particular:

In the paper industry – it serves as a filler and white pigment, enhancing the smoothness and brightness of paper surfaces, and improving print quality and color stability.

In the ceramics industry – it is the main raw material for the production of floor and wall tiles, sanitary ceramics, refractory materials, and electrical insulators (porcelain). It improves the plasticity and strength of products, and ensures whiteness and shape stability during firing.

In the production of paint and coating products – kaolin is used in emulsion paints as an extender for titanium dioxide pigment, improving density and color.

In the rubber and plastics industry – it increases volume and strength in rubber products such as tires, hoses, and seals. It is used as a filler and auxiliary pigment in pipes, profiles, and containers.

In the production of adhesives and bonding materials – kaolin improves the strength of construction adhesives and enhances their spreadability.

In the construction industry – as a component in concrete and cement additives (metakaolin), it accelerates hydration and increases the strength and durability of concrete. In gypsum and brick products, it enhances moisture resistance and ensures structural integrity.

In pharmaceuticals and medicine – kaolin acts as a binding and toxin-absorbing agent in medications for diarrhea and stomach discomfort. It is also used in hemostatic infusion materials and ointments.

In the cosmetics industry – kaolin serves as a cleansing and exfoliating agent in facial and body masks, toothpaste, shampoos, and hair masks.

In agriculture and the food industry – kaolin additives are used in insecticides and dispersants to protect crops from pests.

The global application of kaolin by industry sectors is shown below (Figure 1)

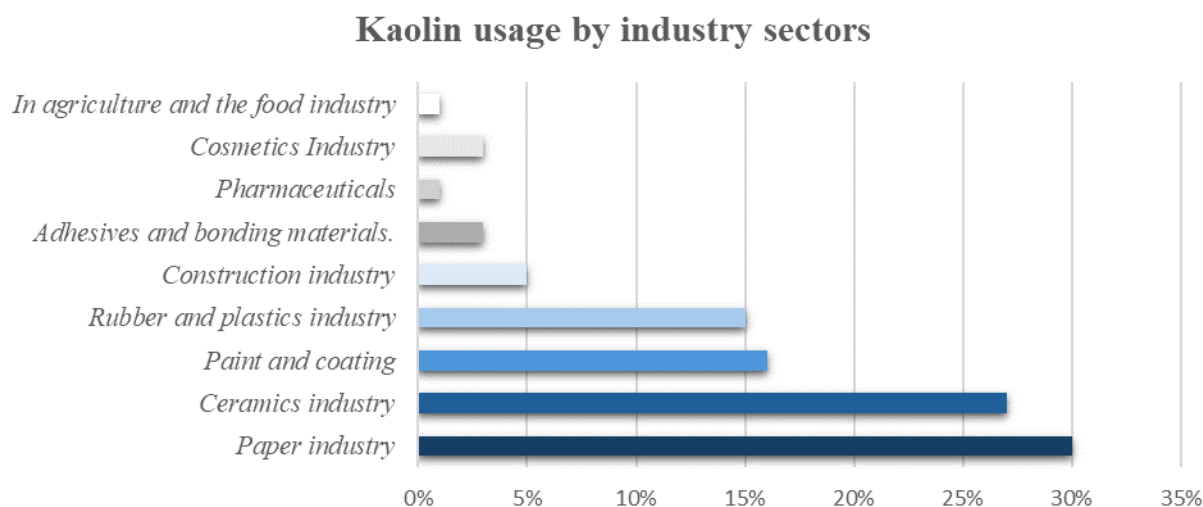


Figure 1. Industrial Applications of Kaolin by Sector.

There is no precise data on the global reserves and processing volume of primary kaolin raw materials. According to various sources, global kaolin reserves are estimated at 15–16 billion tonnes. Countries with the largest known reserves (in billion tonnes): USA – 3.5, United Kingdom – 1.8, Czech Republic – 1.8, Brazil – 1.4, China – 1.2, Ukraine – 1.0. In addition, more than 60 countries around the world are known to have kaolin reserves [2].

In 2024, the total global production volume of kaolin reached 44 million tonnes, with the main producing countries being India, China, USA, Uzbekistan, Czech Republic, Iran, Turkey, and Brazil.

According to a press release by Fortune Business Insights, the five largest companies in the global kaolin market are Imerys S.A. (France), Ashapura Group (India), EICL Ltd. (India), Sibelco (Belgium), and Thiele Kaolin Company (USA). These companies employ strategies such as establishing joint ventures, acquiring assets, and expanding service areas to strengthen their market share and position [3].

China is currently the largest global consumer of kaolin, having surpassed the USA in recent years in terms of consumption. In Europe, the major consuming countries are Germany, Italy, Finland, and Spain.

Average price of processed kaolin in the U.S. market (\$/ton).

2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
144	151	157	156	156	161	159	152	157	161	160

source: USGS 2025

In 2024, the global market price of kaolin ranged approximately between 140–240 \$/t. In 2024, the global kaolin market size was estimated at 4.21 billion USD, and this figure is expected to reach 6.28 billion USD by 2032. The consistent growth in demand for kaolin in the ceramics, construction, and paper industries serves as a key factor in expanding the market potential of this mineral.

In Uzbekistan, a total of 6 kaolin deposits (Angren, Oltintog, Oltintog-2, Alyans, Urazali, Paxtachi-1) have been registered, with total reserves amounting to 1.3 billion tonnes (primary kaolin – 106 million tonnes, secondary kaolin – 1.19 billion tonnes). In 2024, the total volume of extracted kaolin reached 7.5 million tonnes, including: primary white kaolin – 320 thousand tonnes, secondary colored (reddish) kaolin – 4.4 million tonnes, and secondary gray kaolin – 2.8 million tonnes.

In Uzbekistan, the high-quality portion of primary white kaolin is used in the production of paper, porcelain, and ceramics, while secondary (reddish and gray) kaolins are used in ceramic tile, cement, and fired brick production [4].

Until recently, kaolin was mainly sold in raw form, and high value-added products were not sufficiently produced. This situation reduces profitability and leads to inefficient use of existing resources.

Therefore, in order to expand the deep processing of kaolin raw materials, the production of ready-made construction materials from it, the creation of a high value-added chain, and to further develop the attraction of investments into the

processing of local raw material resources, a relevant Government resolution has been adopted.

The Ministry of Mining Industry and Geology has developed proposals for Angren, Samarkand, and Navoi HUB projects by region, aiming to increase the product types, expand export potential, and create new jobs by improving the quality and production indicators of kaolin raw materials. As a result of implementing these projects, in addition to the existing processing volume, the capacity to process an additional 165 thousand tonnes of kaolin raw materials in the initial phase, and up to 715 thousand tonnes at full capacity, will be created. Besides high-quality processed kaolin, sanitary ceramics, and porcelain products, the HUB projects envision the production of high-purity aluminum oxide (HPA) products [5].

To ensure raw material supply for these HUB projects and local entrepreneurship entities, a strategy to gradually increase kaolin raw material extraction indicators during 2024–2030 has been developed. By 2030, increasing the extraction volume of primary white kaolin raw materials to 1 million tonnes is set as one of the main goals.

For the implementation of the above projects, major foreign companies such as Austria's Lasselsberger and Turkey's Kar Porselen (producer of porcelain products under the Bonna brand) have been engaged alongside local enterprises, with a total investment volume of 150 million USD, the creation of over 1,000 new jobs, and the majority of produced goods planned for export.

In conclusion, the development of kaolin raw material resources is of significant importance for Uzbekistan's economy. The growing global demand for this resource, the wide application of kaolin products in various sectors, as well as the large reserves and production potential available in the country, demonstrate the necessity of organizing the production of innovative and competitive products.

Industrial cluster projects and investment programs based on cooperation with foreign partners provide opportunities for deep processing of kaolin,

modernization of local industrial sectors, expansion of exports, and creation of new jobs.

In other words, through efficient use of resources, adoption of technologies, environmental sustainability, and consideration of both local and global market demands, it becomes possible to diversify the kaolin industry, transform kaolin raw materials into high value-added products, and unlock new prospects for the national economy.

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