

2 Million Tons/Year Coal Gangue Solid Waste Resource Utilization Project in Tumed Right Banner, Baotou, Inner Mongolia

High-value, full-component recycling of coal gangue into new materials

Total Investment RMB 1,280.8966 million Including self-financing RMB 425.0486 million (33.18%) and bank loan RMB 855.848 million (66.82%)	Annual Processing Capacity 2 million tons Coal gangue feedstock	Annual Revenue RMB 1,244.30 million Full production year
Net Profit RMB 598.7042 million Full production year	IRR (after-tax) 43.35% Financial internal rate of return	Payback Period (after-tax, static) 3.17 years Including construction period

Project Overview

The project is located in Tumed Right Banner, Baotou, Inner Mongolia Autonomous Region, covering 172.33 mu. It aims to utilize locally abundant coal gangue from surrounding coal mines, with an annual processing capacity of 2 million tons. The project adopts world-advanced patented technologies including physical field mineral separation and supercritical thermal cracking to achieve full-component separation and deep processing. The construction content includes 5 modern production workshops and supporting facilities. In full production, it will produce 240,000 tons of clean coal, 370,500 tons of kaolin, 900,000 tons of mineral soil conditioner, 102,000 tons of mullite, 127,500 tons of flint clay, and other high value-added products. The project is positioned as a circular economy green industry benchmark. The construction period is planned for 12 months. The project company will implement a general manager responsibility system with a total workforce of 270 people, including 60 technical and management personnel, and will establish a complete DCS distributed control system for full-process automated production. The project is currently in the planning stage and seeks bank financing.

Technology & Competitive Edge

- Physical field mineral separation using intelligent photoelectric sensing and high-precision spiral chute gravity separation to efficiently separate clean coal, iron-titanium impurities, and silica-aluminous raw materials.
- Supercritical thermal cracking and magnetic separation impurity removal technology with 3T high-intensity magnetic separation to produce high-quality kaolin (coating grade, ceramic

grade, electronic grade).

- High-temperature synthesis and calcination technology using 1500-1600°C tunnel kiln to synthesize mullite (phase content $\geq 70\%$) and calcine flint clay at 1300-1400°C.
- High-pressure activation and compounding technology to produce multi-functional mineral soil conditioner from silica-aluminous tailings, agricultural waste, and microbial agents.
- Core equipment adopts mature patented technology and DCS automated control, ensuring high efficiency and product quality.

Market & Business Model

- Kaolin: National annual consumption about 7.5 million tons, with 800,000-1.1 million tons imported annually, offering huge import substitution space.
- Mullite and flint clay: High-end refractory materials with national refractory product output exceeding 22 million tons in 2024 and strong export demand.
- Mineral soil conditioner: National potential demand about 30 million tons/year for saline-alkali land management and ecological restoration.
- Clean coal: Local demand in Baotou and surrounding heavy industry bases exceeds 20 million tons/year.
- Revenue generated from diversified product portfolio with estimated unit prices (excl. tax) ranging from RMB 80/ton for gangue to RMB 4,000/ton for mullite.

Scope of Works & Project Status

- Construction of 5 modern production workshops and supporting facilities within a 172.33 mu site in the New Industrial Park of Tumed Right Banner.
- Project construction period planned for 12 months: Month 1 preliminary work, Month 2 construction preparation and bidding, Months 3-11 engineering construction and equipment installation, Month 12 completion acceptance and trial production.
- Total project investment of RMB 1,280.8966 million, including construction investment of RMB 1,241.64 million and initial working capital of RMB 20 million.
- Proposed bank loan of RMB 855.848 million with a 5-year term, mainly for equipment procurement and engineering construction.
- Project company will have a total workforce of 270 people, including 60 technical and management personnel, and implement a DCS distributed control system.

Key Financials

Total Investment	RMB 1,280.8966 million
Equity Financing	RMB 425.0486 million (33.18%)
Bank Loan	RMB 855.848 million (66.82%)
Annual Revenue (full production)	RMB 1,244.30 million
Net Profit (full production)	RMB 598.7042 million
Gross Margin	Over 67%
Net Margin	48.71%
Return on Investment (ROI)	63.89%
Average Annual Net Cash Flow (operation period)	Over RMB 600 million

Investment Highlights

- After-tax FIRR of 43.35% and static payback period of 3.17 years indicate exceptional profitability.
- Strong debt service metrics: average ICR of 27.77 and DSCR of 2.60 during loan period.
- Aligns with national circular economy and carbon peak policies, enjoying significant policy dividends.
- Produces multiple high-demand products with import substitution potential, enhancing market resilience.

Key Risks

- Market and price risk: Product price fluctuation is the most sensitive factor; mitigated by diversified product lines and long-term purchase agreements with downstream factories.
- Technology and operation risk: Long process flow and complex equipment; mitigated by mature patented technology, DCS automation, and experienced technical team.
- Environmental compliance risk: Mitigated by closed-loop circulating water system and high-temperature flue gas bag dust removal, ensuring emissions superior to national standards.

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