

2 Million Tons/Year Coal Gangue Solid Waste Resource Utilization Project

Advanced technology converts coal gangue into high-value refractory materials and soil conditioner.

Total Investment RMB 1.281 billion Total project investment	Annual Processing Capacity 2 million tons/year Coal gangue solid waste	Annual Revenue RMB 1.244 billion At full production
Annual Net Profit RMB 599 million At full production	After-tax Financial IRR 43.35% Project IRR	Static Investment Payback Period 3.17 years Static payback

Project Overview

The project is located in Tumed Right Banner, Baotou, Inner Mongolia, within the Hohhot-Baotou-Ordos Golden Triangle and adjacent to the Daqingshan coal-rich area. It utilizes locally sourced coal gangue as feedstock, with an annual processing capacity of 2 million tons. The core process integrates patented technologies: physical field mineral separation, supercritical thermal cracking, and high-temperature synthesis. The project produces 102,000 tons per year of high-purity mullite (M70), 127,500 tons per year of flint clay, 370,500 tons per year of high-quality kaolin (coating, ceramic, and electronic grades), and 900,000 tons per year of mineral soil conditioner. The total project investment is RMB 1.281 billion. The project is positioned as a benchmark for Zero-Waste City construction and is supported by local government policies. It is currently in the planning stage, with construction and ramp-up expected to follow.

Technology & Competitive Edge

- Patented process combines physical field mineral separation, supercritical thermal cracking, and high-temperature synthesis.
- Transforms low-cost coal gangue into mullite (RMB 4,000/ton), flint clay (RMB 1,600/ton), and kaolin (RMB 600/ton).
- Achieves full-production gross margin of 67.34% through technological dimensionality reduction.
- Raw material costs are negligible due to local sourcing and short transportation distances.
- Low energy costs in Inner Mongolia further amplify cost advantage.

Market & Business Model

- Mullite and flint clay target domestic substitution for high-end refractory materials in steel, cement, and glass industries.
- High-quality kaolin addresses import reliance (800,000-1.1 million tons annually) for ceramics, papermaking, and coatings.
- Mineral soil conditioner serves trillion-level ecological restoration market with potential demand exceeding 30 million tons/year.
- Diversified product matrix provides anti-cyclical hedging across refractory, ceramic, agricultural, and electronic sectors.
- Strong export earning potential for high-end refractory raw materials.

Scope of Works & Project Status

- Construction of a 2 million tons/year coal gangue processing facility.
- Production lines for mullite (102,000 t/y), flint clay (127,500 t/y), kaolin (370,500 t/y), and soil conditioner (900,000 t/y).
- Core equipment to be procured from mature domestic and international commercial sources.
- Phased ramp-up: 60% load in first year of operation to allow equipment commissioning and process optimization.
- Project is currently in planning stage; construction timeline not specified.

Key Financials

Total Project Investment	RMB 1.281 billion
Annual Operating Revenue (full production)	RMB 1.244 billion
Annual Net Profit (full production)	RMB 599 million
Return on Equity (ROE)	140.86%
After-tax Financial IRR (FIRR)	43.35%
Static Investment Payback Period	3.17 years
Full Production Gross Margin	67.34%
Enterprise Value (DCF, WACC 8.67%, g=0%)	RMB 6.362 billion
Equity Value (DCF)	RMB 5.506 billion

Investment Highlights

- Policy dividend: aligned with national Dual Carbon strategy and 14th Five-Year Plan for Circular Economy.
- High-value products: mullite, flint clay, and kaolin with strong market demand and import substitution potential.
- Superior cost structure: negligible raw material costs and low energy costs in Inner Mongolia.
- Attractive returns: IRR of 43.35%, payback of 3.17 years, and value creation multiplier of nearly 5x.

Key Risks

- Macroeconomic and downstream demand fluctuation risk mitigated by diversified product matrix and low-cost advantage.
- Technology scale-up and capacity ramp-up risk addressed by using mature commercial equipment and phased production ramp-up.

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