

Jiuyuan District, Baotou, Inner Mongolia

1 Million Tons/Year Coal Gasification Slag Comprehensive Utilization Project

Business Plan

Preparation Entity: Huazhu Lvjian (Beijing) Technology Co., Ltd.

Construction Entity: Inner Mongolia Lvboxin Environmental Technology Co., Ltd.

Preparation Date: January 2026

I. Project Summary

This project is located in Jiuyuan District, Baotou, Inner Mongolia Autonomous Region. It is a new construction project focusing on large-scale comprehensive utilization of coal gasification slag resources. Total investment RMB 681.8924 million, construction period 12 months (March 2026 - March 2027). The project adopts a dual-line parallel process of "acid leaching line + glass-ceramic line", processing 1 million tons/year of coal gasification slag, producing series of high-value-added products such as liquid polyaluminum chloride, solid polyaluminum chloride, white carbon black, and glass-ceramic. After reaching full production, average annual output value RMB 1,260 million, average annual net profit RMB 323.7413 million, after-tax financial internal rate of return 51.19%, investment payback period 3.05 years (excluding construction period), break-even point 23.30%.

The project deeply fits national circular economy, comprehensive solid waste utilization and "dual carbon" strategies, with significant economic, social and environmental benefits, providing investment institutions with a low-risk, high-return high-quality investment target.

II. Project Background and Necessity

(I) Policy Background

1. National policy support: Policies such as the "14th Five-Year Plan" Circular Economy Development Plan and the "Guiding Opinions on Comprehensive Utilization of Bulk Solid Waste in the 14th Five-Year Plan" clearly list coal gasification slag as a key comprehensive utilization solid waste, propose the goal of reaching 60% comprehensive utilization rate of bulk solid waste by 2025, and encourage the construction of large-scale utilization demonstration projects.
2. Local policy support: Inner Mongolia Autonomous Region's "14th Five-Year Plan" for Energy Conservation and Environmental Protection Industry and the "14th Five-Year Plan" Comprehensive Work Implementation Plan for Energy Conservation and Emission Reduction list coal gasification slag resource utilization as a key project, providing policy support and fund■■■, supporting the construction of industrial waste comprehensive utilization bases.

(II) Industry Background

China is a major coal consumer, and the coal chemical industry produces a large amount of coal gasification slag every year. Traditional treatment methods are mainly landfilling and road paving, with prominent problems such as environmental pollution, resource waste, and land occupation. With the tightening of environmental protection policies and the intensification of resource shortages, high-value utilization of coal gasification slag has become an inevitable trend in industry development. Currently, the market has strong demand for products such as liquid polyaluminum chloride, white carbon black, and glass-ceramic, providing broad market space for the project.

(III) Project Necessity

1. Respond to policy calls: Implement national green development strategy, solve the contradiction between industrial solid waste pollution and resource constraints, and promote circular economy development.
2. Promote industrial upgrading: Build a new industrial chain for coal gasification slag resource utilization, promote the development of new materials industry, and improve regional industrial supporting facilities.
3. Ensure market supply: The regional market gap for liquid polyaluminum chloride is significant, the national market space for solid polyaluminum chloride and white carbon black is broad, and glass-ceramic can replace high-grade architectural ceramics. Project products can effectively meet market demand.
4. Drive local development: Provide 145 direct employment positions, indirectly drive about 500 jobs in upstream and downstream industries, contribute RMB 539.5689 million in taxes and profits annually, and help local economic transformation and upgrading.

III. Market Analysis

(I) Target Product Market Status and Prospects

1. Liquid polyaluminum chloride: National demand in 2023 was approximately 850,000 tons, with obvious regional consumption characteristics (sales radius 200 km). The project target area has annual demand of 600,000 tons, while existing capacity is only 120,000 tons, with significant market gap. Driven by policy, regional demand will grow at an average annual rate of 5%-7% from 2025-2030, with market potential continuously released.
2. Solid polyaluminum chloride: National demand in 2023 was 4 million tons, with annual growth rate of 3.8%, showing a pattern of "concentrated production capacity in central and western regions, concentrated consumption in eastern regions". The project's 480,000 tons/year capacity only accounts for 12% of national demand, with low competitive pressure. Relying on raw material and logistics advantages, it can radiate the national market.
3. White carbon black: National demand in 2023 was 1.78 million tons, with the tire industry as the core consumption field (accounting for 35%). With the development of green tires and new energy vehicle industry, demand will grow at an average annual rate of 6%-8% from 2024-2028. The general-grade product market capacity is sufficient, and the project's 240,000 tons/year capacity can be stably digested.
4. Glass-ceramic: Domestic annual demand for high-grade architectural decorative stone is 30 million square meters, with high import dependence. Glass-ceramic has advantages such as no radiation, easy cleaning, and low cost, can replace high-grade natural stone, with annual market demand of 5 million tons and broad replacement space.

(II) Competitive Advantages

1. Cost advantage: Relying on coal gasification slag and waste hydrochloric acid resource utilization, enjoying solid waste treatment subsidies, the production costs of liquid polyaluminum chloride, solid polyaluminum chloride, and white carbon black are significantly lower than the industry average.
2. Environmental advantage: Environmental protection investment accounts for 25% of total investment, adopting advanced wastewater and waste gas treatment technology, with emission standards superior to national standards, fitting the "dual carbon" policy orientation, more likely to gain favor from government and corporate customers.
3. Location advantage: Located in Jiuyuan District, Baotou, adjacent to raw material production areas and demand concentration areas, with convenient transportation (intersection of Beijing-Tibet Expressway, Beijing-Baotou Railway, etc.), low logistics costs, enjoying local policy support.
4. Technical advantage: Adopting mature technologies such as "aluminum-silicon step-by-step extraction" and "continuous counter-roller calendaring integral crystallization method", product quality reaches domestic advanced level, cooperation with universities and research institutes ensures technological innovation capability.

(III) Competitor Analysis

Regional competitors are mainly small and medium-sized enterprises, with problems such as small production capacity scale, backward technology, and insufficient environmental protection investment. Relying on large-scale production, green technology, and diversified product matrix, the project forms differentiated competitive advantages in price, quality, and environmental attributes, and can quickly seize market share.

IV. Project Construction Planning and Scheme

(I) Project Site Selection and Construction Conditions

The project is located in Jiuyuan District, Baotou, Inner Mongolia, with a total land area of 200 mu (approximately 133,333 square meters) and total construction area of 106,667 square meters. The site selection conforms to urban planning, with rich regional mineral resources, convenient transportation, complete public facilities, and basic conditions such as water supply, power supply, and communication meeting project construction and operation needs.

(II) Construction Content and Scale

1. Production facilities: Construct industrial buildings (85,000 square meters) including acid leaching workshop, concentration workshop, polymerization workshop, white carbon black workshop, glass-ceramic workshop, etc., with supporting ancillary facilities (21,667 square meters) such as office buildings, power distribution rooms, and gatehouses.
2. Production line configuration:
 - Acid leaching line: annual processing of 800,000 tons of coal gasification slag, annual production of 320,000 tons of liquid polyaluminum chloride, 480,000 tons of solid polyaluminum chloride, 240,000 tons of white carbon black.
 - Glass-ceramic line: annual processing of 200,000 tons of coal gasification slag, annual production of 180,000 tons of standard glass-ceramic, 20,000 tons of special glass-ceramic.
3. Supporting projects: Road hardening area 20,000 square meters, greening area 33,333 square meters (greening rate 25%), construct basic service facilities such as water supply and drainage, power supply, HVAC, and fire protection.

(III) Process Technology Scheme

1. Acid leaching line process: Coal gasification slag undergoes acid leaching reaction → solid-liquid separation → crude liquid concentration → polymerization reaction → post-treatment, extracting aluminum and silicon components, producing polyaluminum chloride and white carbon black products, with comprehensive resource utilization rate ≥90%.
2. Glass-ceramic line process: Coal gasification slag and acid leaching products undergo proportioning and mixing → melting → forming → crystallization → cutting and grinding → packaging, adopting high-temperature melting and controlled crystallization technology to produce high-quality glass-ceramic.
3. Technical features: High process integration, achieving optimal matching of material flow and energy flow, comprehensive energy consumption reduced by more than 20% compared with traditional processes; key equipment selection is mature, with guaranteed operation reliability.

V. Environmental Protection and Energy Conservation

(I) Environmental Protection Measures

1. Construction period: Control dust, noise, and solid waste pollution through measures such as watering and dust reduction, selecting low-noise equipment, and classified waste collection and transportation.

2. Operation period:

- Wastewater: Domestic sewage is recycled for greening and road washing, production wastewater is treated and discharged into municipal sewage pipe network after reaching standards.
- Waste gas: Adopt alkali liquor spraying + activated carbon adsorption process to treat acidic gases (treatment efficiency $\geq 95\%$), with supporting deodorization system to ensure standard emission.
- Solid waste: Production residues are used for building materials, domestic waste is regularly collected and transported by the environmental sanitation department.
- Noise: Select low-noise equipment, set up sound insulation covers, plant green belts in the factory area for sound absorption and noise reduction.

(II) Energy Conservation Measures

1. Building energy conservation: Adopt energy-saving materials such as thermal insulation walls and hollow glass plastic steel windows, public building energy conservation reaches 50%, residential building energy conservation reaches 65%.

2. Electrical energy conservation: Select energy-saving electrical equipment and lighting sources, promote variable frequency speed regulation technology, optimize distribution line layout, reduce electrical energy loss.

3. Water resource conservation: Collect rainwater for greening irrigation, adopt water-saving appliances, strengthen pipe network leakage control, achieve water resource recycling.

4. Management energy conservation: Establish energy consumption statistics system, formulate water and electricity consumption quotas, carry out energy conservation education and training, improve energy utilization efficiency.

Project annual electricity consumption 1.48 million kWh, annual water consumption 600,000 tons, comprehensive energy consumption per unit product 1.4 tons of standard coal/ton, energy utilization rate $\geq 85\%$, reaching domestic advanced level.

VI. Organization and Human Resources Configuration

(I) Organization

The project adopts the general manager responsibility system, implements a linear hierarchical management system, with departments such as production department, technology department, marketing department, operation department, administration department, and finance department, ensuring efficient decision-making and execution in place.

(II) Human Resources Configuration

Total project staffing 145 people, including 100 workers, 30 technical personnel, 15 management personnel. Personnel sources are mainly through social public recruitment, key positions require certificates, all employees need to receive professional training and safety education before taking up positions.

(III) Management Mode

Establish market-oriented incentive and constraint mechanisms, implement management by objectives, digital management and knowledge management, build an efficient operation team with innovation as the core and market orientation, ensuring stable and orderly project operation.

VII. Project Implementation Schedule

Phase	Time Node	Main Tasks
Preliminary Work	March 2026	Project approval, site survey, engineering design
Construction Preparation	April 2026	Implement collaboration relationships, equipment bidding and procurement
Engineering Construction	May - December 2026	Plant construction, equipment installation, supporting facilities improvement
Completion Acceptance	January - March 2027	Engineering acceptance, equipment commissioning, production preparation

During project implementation, through organizational measures, technical measures, economic measures and contract measures, strictly control progress, quality and funds, ensuring the project is put into production on schedule.

VIII. Investment Estimation and Fund Raising

(I) Investment Estimation

Total project investment RMB 681.8924 million, specific composition as follows:

Item	Amount (RMB 10,000)	Proportion
Construction Investment	59,995.00	91.97%
- Engineering Fees	55,000.00	86.47%
- Other Engineering Construction Fees	2,495.00	3.92%
- Reserve Funds	1,000.00	1.57%
Construction Period Interest	4,325.33	2.27%
Initial Working Capital	3,868.91	5.77%

(II) Fund Raising

Fund sources are enterprise self-financing + external financing:

- Enterprise self-financing: RMB 201.3004 million, accounting for 29.52% of total investment;
- External financing: RMB 480.592 million, accounting for 70.48% of total investment, loan term 5 years, interest rate 6%, adopting equal principal and interest repayment method.

IX. Financial Analysis

(I) Profitability Analysis

- Average annual operating revenue after reaching full production: RMB 1,260 million;
- Average annual total cost after reaching full production: RMB 818.3058 million;
- Average annual net profit after reaching full production: RMB 323.7413 million;
- Financial internal rate of return (after-tax): 51.19%;
- Financial net present value (after-tax, discount rate 13%): RMB 744.7774 million;
- Investment payback period (after-tax, excluding construction period): 3.05 years;
- Return on total investment: 67.94%;
- Project capital net profit rate: 160.82%.

(II) Debt Solvency Analysis

- Interest coverage ratio: 29.65;
- Debt service coverage ratio: 2.68;
- During the operation period, the asset-liability ratio gradually decreases to 8.90%, with strong debt solvency and controllable financial risks.

(III) Uncertainty Analysis

- Break-even point: 23.30%, that is, production load reaching 23.30% can break even, with strong anti-risk capability;
- Sensitivity analysis: Operating unit price is the most sensitive factor, with its critical point at -20.44%. Fluctuations in factors such as construction investment, material cost, and operating cost have little impact on project feasibility, with overall controllable risks.

X. Social Benefits and Risk Analysis

(I) Social Benefits

1. Ecological benefits: Annual processing of 1 million tons of coal gasification slag, reducing CO₂ emissions by approximately 150,000 tons, saving 200 mu of land, saving 800,000 tons of primary resources, effectively alleviating solid waste pollution.
2. Employment and income increase: Directly provide 145 employment positions, indirectly drive the development of transportation, engineering construction, service industries and other industries, improving residents' income levels.
3. Financial contribution: Annual payment of RMB 83.6588 million in value-added tax and RMB 107.9138 million in corporate income tax, making positive contributions to local fiscal revenue.
4. Industrial driving: Improve the circular economy industrial chain, promote regional coal gasification slag resource utilization towards industrialization, large-scale, and intensive development, promoting industrial structure optimization and upgrading.

(II) Risk Analysis and Response Measures

Risk Type	Risk Description	Response Measures
Market Risk	Product price fluctuations, intensified competition	Sign long-term supply contracts, expand diversified sales channels, continuously optimize

Management Risk	Insufficient team operation efficiency, poor talent use	Establish perfect incentive and constraint mechanisms, strengthen talent training and reservation
Fund Risk	Financing not in place, capital turnover difficulties	Broaden financing channels, optimize fund use plan; strengthen financial control, improve fund management
Policy Risk	Environmental protection, tax policy adjustment	Closely follow policy dynamics, timely adjust project operation strategy; adhere to green production

XI. Conclusions and Recommendations

(I) Conclusions

This project conforms to national and local industrial policies, fits circular economy and green development trends, with mature and reliable technology, broad market prospects, significant investment benefits, and outstanding social benefits. The project has reasonable site selection, superior construction conditions, obvious competitive advantages, high financial internal rate of return, short investment payback period, and strong anti-risk capability. It is technically feasible and economically reasonable, and is a high-quality project that balances economic, social, and environmental benefits.

(II) Recommendations

1. Quickly improve various project approval procedures, urgently carry out survey design and equipment procurement work, ensuring the project starts construction on schedule.
2. Strictly implement the "three simultaneities" system during project construction, strengthen environmental protection and safety production management, ensuring engineering quality and operation safety.
3. Strengthen cooperation with upstream and downstream enterprises, establish stable raw material supply and product sales systems, and lay out market promotion work in advance.
4. Continuously increase technology R&D; investment, optimize production processes, reduce production costs, and enhance product core competitiveness.
5. Strive for more policy support from local governments, including financial subsidies, tax incentives, financing facilities, etc., to further improve project profitability.

XII. Contact Information

- Project Contact:
- Contact Phone:
- Email:
- Construction Entity: Inner Mongolia Lvbaoxin Environmental Technology Co., Ltd.
- Preparation Entity: Huazhu Lvjian (Beijing) Technology Co., Ltd.