

INDUSTRY OVERVIEW

The data and statistics provided in this section and other sections of the document are extracted from the Frost & Sullivan report that we commissioned, as well as various government publications and other publicly available sources. We engaged Frost & Sullivan to prepare an independent industry report related to the [REDACTED], known as the Frost & Sullivan report. We believe that the sources of information contained in this section are appropriate sources for such information and have taken reasonable care in reproducing such information. We have no reason to believe that such information is false or misleading or that any material fact has been omitted that would render such information false or misleading. The information from government sources has not been independently verified by us, the Joint Sponsors, the [REDACTED], the [REDACTED], the [REDACTED], the [REDACTED], any of the [REDACTED], any of their respective directors, advisors or any other party involved in the [REDACTED] and no representation is given as to its accuracy.

SOURCE AND RELIABILITY OF DATA

We have commissioned F&S, an independent market research and consulting company, to conduct an analysis of China’s green technology, clean waste-to-energy incineration, and resource utilisation industries. F&S is an independent global consulting firm, founded in 1961 in New York. It offers industry research and market strategies and provides growth consulting and corporate training. It has over 40 offices worldwide with over 2,000 industry consultants, market research analysts, and economists. We commissioned Frost & Sullivan for a total fee of RMB550,000 in connection with the preparation of the market research report (the “**Frost & Sullivan Report**”). We have included certain information from the Frost & Sullivan Report in this document to provide our potential [REDACTED] with a more comprehensive understanding of the industries in which we operate.

During the preparation of the Frost & Sullivan Report, F&S performed both (i) primary research, which involved in-depth interviews with leading industry participants and industry experts; and (ii) secondary research, which involved review of company reports, independent research reports and data based on F&S’s own research database. Projected data was obtained from historical data analysis plotted against macroeconomic data with reference to specific industry-related factors. The Frost & Sullivan Report was compiled based on the following assumptions: (i) China’s economy is likely to maintain a steady growth in the next decade; (ii) China’s social, economic and political environment is likely to remain stable in the forecast period from 2025 to 2029, which ensures the stable and healthy development of China’s solid waste processing industries.

After taking reasonable care and based on F&S’s views, our Directors confirm that there has been no adverse change in the market data since the date of the Frost & Sullivan Report up to the Latest Practicable Date, which may qualify, contradict, or have an adverse impact on the data contained in this section.

SOLID WASTE PROCESSING AND RESOURCE UTILIZATION MARKET

1. Introduction to solid waste processing and resource utilization

Solid waste is typically divided into five categories: (i) household waste, including recyclables and food waste, treated through incineration and landfill; (ii) general industrial solid waste, such as slag and waste residue, often handled through resource recovery or safe disposal; (iii) construction waste, managed through recycling and landfill; (iv) hazardous waste, which poses environmental and health risks and requires special treatment such as incineration or chemical processing; and (v) agricultural waste, including crop residues and manure, which is biodegradable and managed through recycling and harmless treatment. Household waste is the most common solid waste generated in daily life. It contains a large amount of combustible material which, after proper sorting, can be converted into fuel for waste-to-energy incineration. Food waste is rich in organic matter and fats, making it a key raw material for biogas power generation and the extraction of industrial-grade mixed oils. The scale of waste-to-energy incineration and food waste resource utilisation is steadily expanding and has now become an important component of the green energy sector.

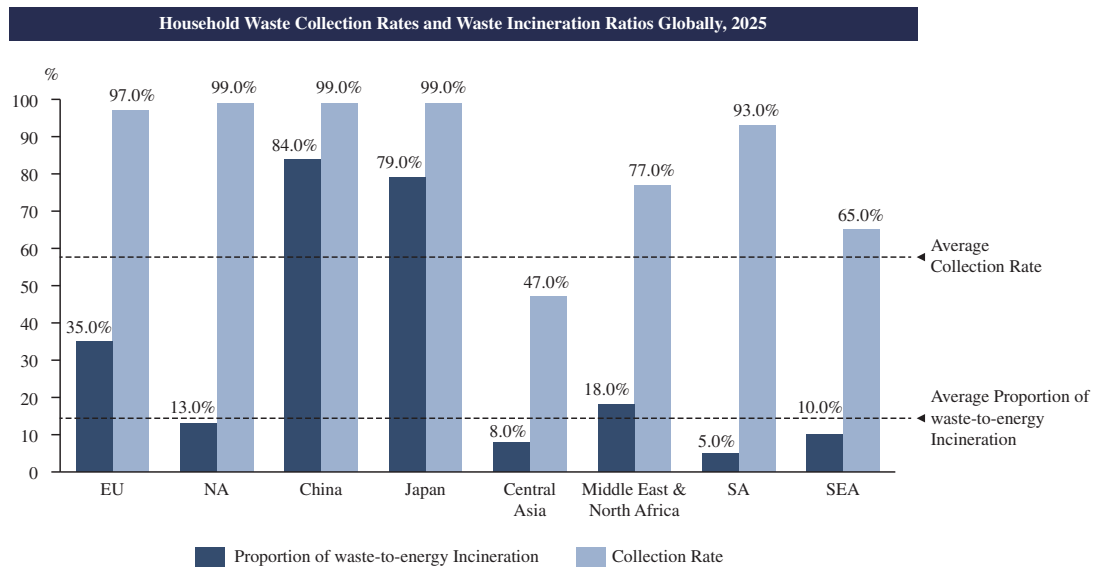
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2. Current status and trends in the global solid waste treatment industry

The global market holds significant potential, but development is uneven across regions, showing a trend of technology and expertise flowing from mature markets to emerging ones.

With population growth and economic development, the volume of various types of solid waste continues to rise globally. Taking household waste as an example, global household waste generation increased from 1,894.1 million tonnes in 2020 to 2,290.0 million tonnes in 2025, and is projected to reach 2,718.6 million tonnes by 2030. Emerging markets—particularly Central Asia, the Middle East, Southeast Asia, and South America—are the main drivers of this growth. These regions generally have low household waste collection rates and incineration ratios, with overall disposal capacity and resource utilisation levels falling significantly below the global average. For instance, in Central Asia, the current waste collection rate is below 50%, and the incineration ratio is only 8%, meaning most waste cannot enter formal disposal systems or receive proper treatment, posing potential risks to environmental pollution and public health safety.

Against the backdrop of rising solid waste generation in emerging markets, existing treatment capacity is insufficient to meet future development needs, resulting in a significant market gap. In this context, players from mature markets are leveraging their established technologies and operational experience in areas such as household waste incineration, food waste resource utilisation, and sludge co-treatment to gradually build standardised export systems for emerging markets, covering the full cycle from design, construction, commissioning to operation. Compared to European and American counterparts who often rely on customised designs and local engineering teams for delivery, leading Chinese enterprises demonstrate higher project execution efficiency under EPC general contracting and BOT/BOO models. Especially in emerging markets facing financial constraints and weak infrastructure, Chinese companies’ mature operational capabilities and rapid implementation solutions are proving more attractive.



Source: United Nations Environment Program, International Solid Waste Association, Frost & Sullivan

Note: In some North American and European countries, the waste incineration rate is relatively low, mainly due to two factors: 1) Land resources available for the construction of landfills are abundant and landfill costs are low, making landfill still the primary treatment method; 2) Recycling systems are well-developed, resulting in a higher proportion of recyclables and a relatively smaller volume of waste entering the incineration process.

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Leading enterprises are driving industry upgrades by expanding their involvement across the value chain, leveraging advantages in scale and efficiency.

Progressing towards integrated treatment of multiple types of solid waste. In mature solid waste treatment markets, operations are shifting from single-process management to comprehensive systems covering collection, sorting, transportation, treatment, and resource utilisation. This transformation is being led by top-tier enterprises with scale and technological advantages. Integrated and coordinated treatment combines the processing of household waste, food waste, sludge, and leachate concentrates, enabling centralised configuration and efficient utilisation, thereby improving economic returns and overall management efficiency.

Progressing towards diversified revenue models. Different types of solid waste vary in treatment methods and profit mechanisms. For example, industrial and hazardous waste sectors rely on specialised, high-certification treatment providers that implement differentiated pricing, while household waste treatment primarily depends on government subsidies for waste processing and revenue from waste-to-energy incineration. In addition to government subsidies, waste-to-energy income, and heating revenue, kitchen waste treatment within household waste management is gradually forming a distinct resource utilisation track. Enterprises generate income through industrial-grade mixed oil sales and biogas power generation, effectively expanding their profit potential.

Progressing towards exporting technological capabilities. In the mature markets where leading companies operate — such as China — the waste-to-energy market in large and medium-sized cities has become saturated, while there is still room for growth in county-level areas. In the 2024 State Council’s Office Opinion on Accelerating the Development of a Waste Recycling System, it was proposed to ‘accelerate the construction of urban household waste treatment facilities and address the gaps in waste-to-energy capacity in county-level regions’. This opens up opportunities for companies with mature operational management systems to expand their business domestically through light-asset models such as technology and operations outsourcing.

3. Opportunities

Green energy has broad development potential: Waste-to-energy incineration plants operate with stable loads and long operating times, offering significant opportunities for energy synergy and expansion. Waste-to-energy incineration plants typically have high land-use efficiency and favourable grid access conditions, allowing for energy complementarity with distributed photovoltaic systems, effectively reducing the plant’s own electricity costs. In addition, measures such as transferring residual heat to regional heating networks reflect the diverse downstream applications of waste incineration.

Industrial-grade mixed oil and biodiesel have strong demand potential: The energy recovery pathway for kitchen waste has gradually evolved into a co-production model that includes oil-water separation, anaerobic digestion, and the generation of biogas and industrial-grade mixed oil. Industrial-grade mixed oil is the primary raw material for biodiesel, which can replace conventional diesel and is a key pathway for achieving carbon emission reductions. Driven by the EU’s mandatory blending policies, biodiesel has broad demand prospects in sectors such as aviation and shipping, fuelling growth in the industrial-grade mixed oil and kitchen waste treatment markets.

4. Challenges

Compliance, technical, and operational requirements continue to rise: China’s waste-to-energy incineration industry has expanded rapidly in recent years. By 2025, the proportion of household waste treated through incineration reached approximately 85%, significantly exceeding the target of 65% set for 2025 in the 14th Five-Year Plan. As the industry matures, the focus is shifting from growth to optimisation, with increasing demands from environmental protection policies. At the same time, many regions are encouraging enterprises to equip incineration facilities with the capability for co-treatment of multiple types of solid waste. Due to the wide variation in calorific values and complex physical properties of different materials, this can affect furnace combustion stability and co-treatment efficiency, and some projects still face technical bottlenecks. Additionally, tightening urban emission standards for waste-to-energy plants is further driving up investment and operational costs.

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HOUSEHOLD WASTE INCINERATION AND HARMLESS TREATMENT MARKET

1. Introduction to household solid waste incineration and harmless treatment

Household waste incineration refers to the process of treating household waste through high-temperature combustion, recovering thermal energy for electricity generation and heating. It is the primary method of harmless treatment for household waste. Waste-to-energy incineration, as a form of biomass power generation, has been incorporated into the renewable energy system and has become an important component of green energy. Below are the characteristics of waste-to-energy incineration:

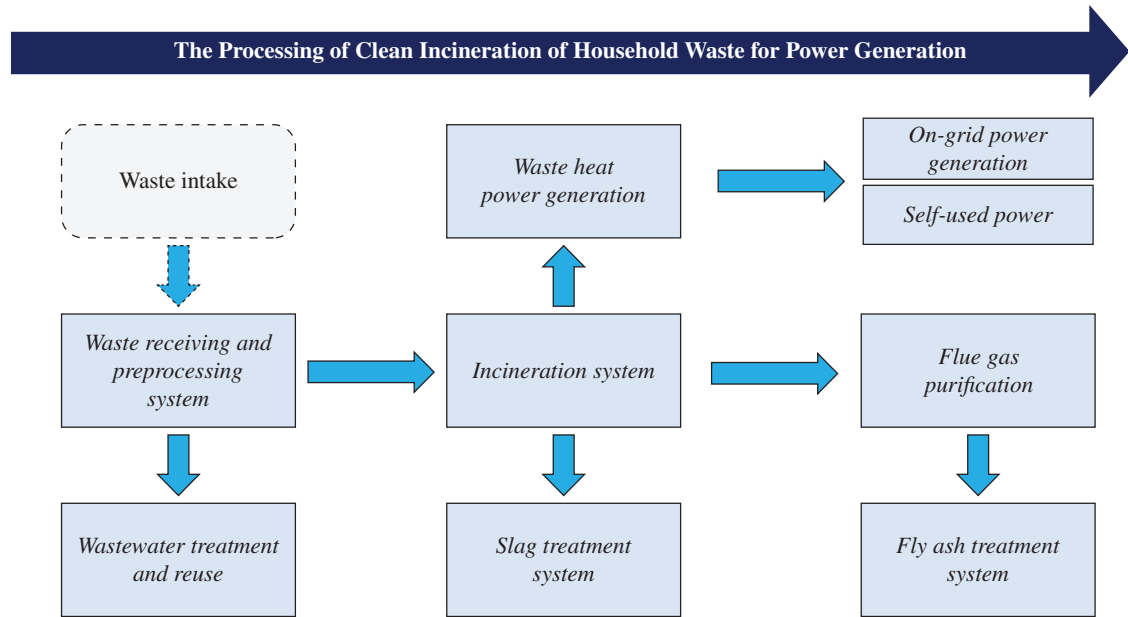
Waste-to-energy incineration is a highly stable green energy pathway: The 2025 white paper Carbon Peaking and Carbon Neutrality: China’s Plans and Solutions (《碳達峰碳中和的中國行動》) expressly refers to waste-to-energy incineration and the clean utilisation of biomass energy as part of China’s policy framework for promoting non-fossil energy and the green and low-carbon transition of the energy sector. In 2023, the green energy attribute of waste-to-energy incineration was included within the scope of green certificate issuance, allowing participation in green electricity trading and making it a key foundation for renewable energy quota assessments and carbon market transactions. Waste-to-energy incineration plants operate for over 7,000 hours annually on average, offering greater stability and predictability compared to wind and solar power, thereby enhancing their value as a renewable energy source. In 2025, the government issued a notice on direct green electricity connections, officially including biomass power generation within the scope of direct green energy supply, allowing energy to be supplied directly to enterprises with strict carbon reduction requirements, further reinforcing its value.

Waste-to-energy incineration contributes to environmental protection and creates economic value: The Action Plan for Comprehensive Treatment of Solid Waste (《固體廢物綜合治理行動計劃》), issued by the State Council in 2026, incorporates municipal solid waste incineration, regulated collection and transportation, resource utilisation and safe disposal into China’s comprehensive solid waste treatment framework. Accordingly, waste-to-energy incineration forms part of China’s broader framework for pollution prevention and control and ecological and environmental protection. As a key method for the harmless treatment of household waste, incineration can reduce waste volume by over 80%, effectively easing urban land resource pressure and lowering environmental risks from secondary pollutants such as leachate and biogas. Beyond environmental benefits, incineration also generates energy revenue through energy conversion based on waste reduction and harmless treatment. Compared to traditional landfill, which incurs ongoing costs, incineration projects can generate stable income through electricity sales and heat supply, offering higher economic efficiency.

Key technologies and production process of waste incineration: Household waste is transported to the incineration plant via the city’s collection and transfer system, weighed, and temporarily stored in a waste pit. Leachate is collected from the bottom and sent to the wastewater treatment system. After fermentation, the waste is fed steadily into the incinerator via the feeding system. Fuel ignition and the SNCR system assist in temperature control and emission reduction. The high-temperature heat generated from incineration is recovered by a waste heat boiler for power generation. Flue gas is purified through a reaction tower and bag filter to remove acidic gases, particulates, heavy metals, and dioxins. Fly ash is stabilised through chelation and safely landfilled. Tail gas is discharged in compliance with standards.

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The diagram below illustrates the incineration and harmless treatment process.

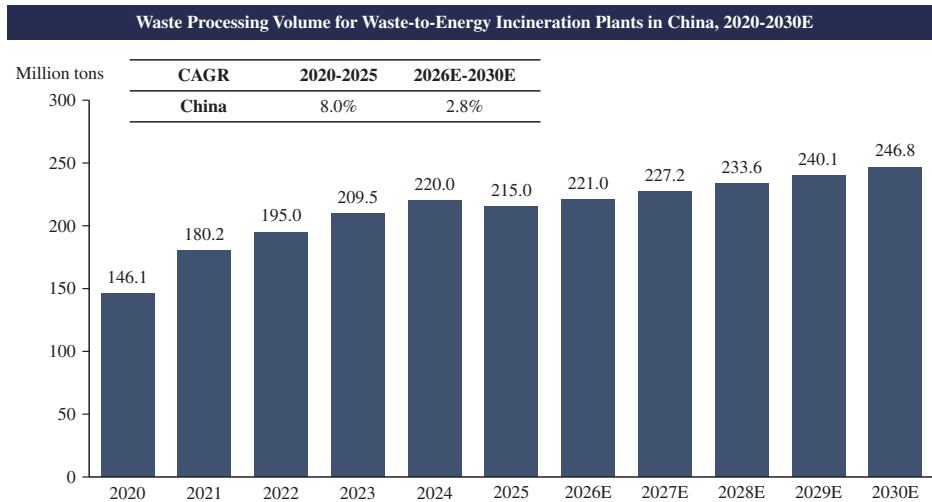


Source: Frost & Sullivan

2. Market Potential of Household Waste Incineration in China

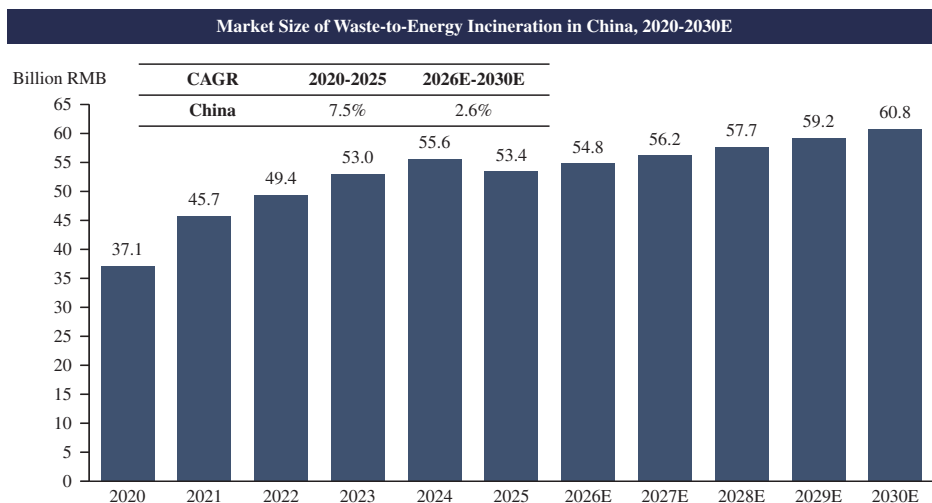
The volume of household waste in China has continued to grow steadily, increasing from 235.1 million tonnes in 2020 to 252.3 million tonnes in 2025. As of the end of 2023, there were 696 operational household waste incineration and harmless treatment plants across China. The volume of waste entering incineration facilities has grown rapidly, rising from 146.1 million tonnes in 2020 to 215.0 million tonnes in 2025, achieving a CAGR of 8.0% during this period. Despite the overall growth trend, the volume of waste entering incineration facilities experienced a slight decrease in 2025, primarily due to slower growth in municipal solid waste generation amid moderating population and urbanisation growth, as well as continued waste sorting and resource recycling, which reduced the volume of waste entering incineration facilities in certain regions. In addition, following a period of rapid capacity expansion, certain regions experienced a temporary mismatch between waste supply and existing processing capacity. With continued development of urban areas and further improvement of waste collection, sorting and treatment systems, the volume and growth rate of waste entering incineration facilities for power generation is expected to stabilise. At the same time, pollution caused by historically landfilled waste urgently needs to be addressed through incineration. Legacy waste is now being reprocessed through harmless incineration, further expanding the market potential. From 2026 to 2030, the compound annual growth rate of waste entering incineration facilities for power generation nationwide is projected to reach 2.8%, with the volume expected to grow to 246.8 million tonnes by 2030.

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Source: Frost & Sullivan

Waste-to-energy incineration projects typically generate profit through revenue from electricity sales to the grid and waste disposal fees. Although standards vary across regions, these sources collectively form a stable and sustainable cash flow for incineration power enterprises. China's waste-to-energy incineration market increased from RMB37.1 billion in 2020 to RMB53.4 billion in 2025, achieving a CAGR of 7.5% during this period. The slight decline in waste processing volume in 2025 was primarily attributable to weaker consumption activities, which reduced household consumption and consequently the amount of municipal solid waste generated. The impact was further compounded by relatively lower waste collection coverage in certain county-level and less-developed areas, which limited the amount of waste that could be collected and delivered to waste-to-energy incineration facilities. As a result, the volume of waste processed by waste-to-energy incineration facilities decreased in 2025. Since industry revenue is primarily generated from waste disposal fees and electricity sales, the lower processing volume also reduced the corresponding waste disposal and power generation revenue, resulting in a slight decline in the market size in 2025. Driven by the steady growth in waste entering incineration facilities and the diversification of revenue models, the national waste-to-energy incineration market is projected to grow at a CAGR of 2.6% from 2026 to 2030, reaching RMB60.8 billion by 2030.



Source: Frost & Sullivan

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The projected increase in the market size of China’s waste-to-energy incineration in 2026 mainly reflects the emergence of additional revenue channels beyond the benchmark tariff. First, renewable energy green certificates provide an incremental policy-backed income stream. Second, the marketisation of the electricity market enables operators to participate in power trading, where the stable output profile of waste-to-energy plants allows electricity to be sold during peak demand periods at prices higher than the benchmark tariff. Together, these mechanisms are expected to substantially enhance the effective revenue base of the sector.

3. Drivers of China’s waste-to-energy incineration market

Technology export demand as a driver

China’s waste incineration rate is significantly higher than the global average, giving rise to leading enterprises with scale advantages. These companies have developed strong competitiveness through accumulated technology and operational experience. As emerging markets continue to experience growing demand for waste treatment and energy, the need for mature incineration technologies and operational capabilities is becoming increasingly urgent. At the same time, there are certain small-scale projects or those constructed and put into operation at an early stage among the household waste incineration projects in China, which also require scaled enterprises to export technology and enhance treatment capacity to meet government expectations for improved incineration efficiency. This is expanding the demand for waste incineration technology exports.

Emerging industry demand as a driver

The growth of new industries and large-scale industrial parks is generating greater demand for green energy. For example, in 2024, China’s National Development and Reform Commission (NDRC) mandated that by the end of 2025, over 80% of electricity used by newly built data centers must come from green sources. This is driving increased demand for stable green electricity in high-energy-consuming sectors such as AI computing centers. Due to high-performance applications like AI training and intelligent inference, electricity consumption by China’s AI computing centers has surged from 93.9 billion kWh in 2020 to 196.0 billion kWh in 2025, and is expected to reach 400 billion kWh by 2030. Among all available green energy sources, waste-to-energy incineration stands out as the most ideal option for powering data centers due to its low electricity cost and high stability. This trend is prompting data centers to explore closer integration with waste incineration, such as pairing incineration power generation with heating or cooling systems. Such integration ensures a stable, round-the-clock supply of green electricity while supporting local waste treatment, forming a closed-loop system of “waste treatment – green power generation – computing power development,” opening new growth pathways for the waste incineration industry.

Policy as a driver

China’s national policy framework is continuously improving, laying a solid foundation for the development of the waste-to-energy incineration industry. In 2021, the NDRC clearly stated that by the end of 2025, the national urban household waste incineration capacity should reach approximately 800,000 tonnes per day, setting a clear target for the industry. In 2022, the Ministry of Ecology and Environment issued a document further emphasising the critical role of waste-to-energy incineration in achieving China’s “dual carbon” goals, effectively promoting market expansion. The NDRC’s “Guiding Opinions on Regulating the Implementation of New Mechanisms for Public-Private Partnerships” stipulates that “projects such as waste-to-energy incineration and solid waste treatment should in future be solely funded or majority-owned by private enterprises,” giving private companies a favourable position in future market development.

4. Drivers of Hunan Province’s waste-to-energy incineration market

Economic Trends. Incineration has increasingly become the principal method of municipal waste treatment in Hunan province, with the proportion of waste treated through incineration increasing from approximately 79.0% in 2023 to 88.0% in 2024 and 96.2% in 2025. In 2025, the province treated approximately 15.1 million tonnes of municipal waste. As of 2025, the province’s incineration capacity reached 41,700 tonnes per day, with an average operating load factor of about 96%, indicating high utilisation of existing facilities and limited spare capacity. Regional coordination has also expanded the coverage of incineration services, with the county-level coverage rate reaching 88.5%. Under provincial planning, total capacity is expected to increase to 56,300 tonnes per day by 2030, supporting further expansion of incineration coverage and treatment capacity.

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Regulatory Developments. Hunan is tightening environmental management through local emission standards that are materially stricter than the national requirement GB 18485-2014, lowering limits on particulate matter, sulphur dioxide and nitrogen oxides and introducing ammonia-emission control for the first time. Combined with the Hunan Waste-Incineration Development Plan (2022-2030), which emphasises “to fully incinerate all waste that should be incinerated” principles and regional capacity coordination, the regulatory environment is shifting toward higher standards, refined governance and greater emphasis on environmental performance.

Competitive Dynamics. The provincial market is characterised by increasing concentration, with leading operators holding substantial shares of total capacity. Annual processing capacities of top operators can reach 3 million tonnes or above, representing around 40-45% of provincial capacity, reflecting the scale advantages and operational efficiency required to compete under stricter regulatory and environmental requirements.

5. Core competencies of waste-to-energy incineration enterprises

Refined operational capabilities

China’s waste-to-energy incineration industry is gradually entering a phase of standardised construction and refined operations, where the operational efficiency of individual plants has become a core competitive strength. This is reflected in two key areas: First, in terms of economic performance, key operational indicators such as power generation per tonne of waste and revenue per tonne of waste directly reflect project profitability. Second, in terms of environmental emission control, as environmental regulations become more stringent, enterprises must continuously optimise operational parameters while ensuring stable and compliant emissions. Currently, projects with refined operational capabilities generally achieve core indicators, such as dioxins, nitrogen oxides, and particulates, well below national standard limits, and some industry-leading companies even outperform the limits of emission standards of EU.

Centralised, large-scale, and integrated capabilities

The core competitiveness of waste-to-energy incineration projects lies in large-scale operations, which are closely tied to their geographic location. Large and medium-sized cities, due to their dense populations, high waste volumes, and well-developed collection and transportation systems, can ensure a stable supply of waste to support the operation of large single-plant projects. On this basis, high daily processing capacity helps reduce unit costs, improve equipment efficiency, and enhance economic performance, strengthening cost advantages. Moreover, the scale advantages brought by location allow for the intensive construction of multiple facilities—such as incineration, sludge treatment, fly ash processing, and waste heat utilization—within the same plant or adjacent areas. This creates a coordinated treatment network that maximises equipment utilization. At the same processing scale, projects with integrated coordination capabilities are more likely to consistently reach designed capacity output and enhance project value density and risk resilience through services like waste heat heating, sludge treatment, and fly ash processing. This has become one of the key pillars supporting project deployment and return on investment for leading enterprises.

FOOD WASTE TREATMENT AND RESOURCE UTILIZATION MARKET

1. Introduction to food waste treatment and resource utilization

Food waste refers to food residues, food processing waste, expired food, and discarded edible oils generated by entities and individuals engaged in catering, institutional meal provision, and food processing activities. In China’s urban household waste classification system, food waste is treated as a separate category for independent collection and processing, and is an important component in promoting the resource utilization of household waste. After classification and collection, food waste undergoes harmless treatment through specialised equipment involving combined sorting, crushing and pulping, high-temperature cooking, and three-phase separation. This process separates waste oil, wastewater, and solid residues, and enhances the level of resource utilization through further processing.

Food waste is characterised by high organic content, high moisture levels, and rapid decomposition and fermentation. It can be utilized through the production of industrial-grade mixed oil, biogas power generation or purification, and as feedstock for animal feed, offering significant potential for energy and material recovery. The composition and calorific value of food waste vary significantly across regions. In recent years, most large cities in China have established dedicated

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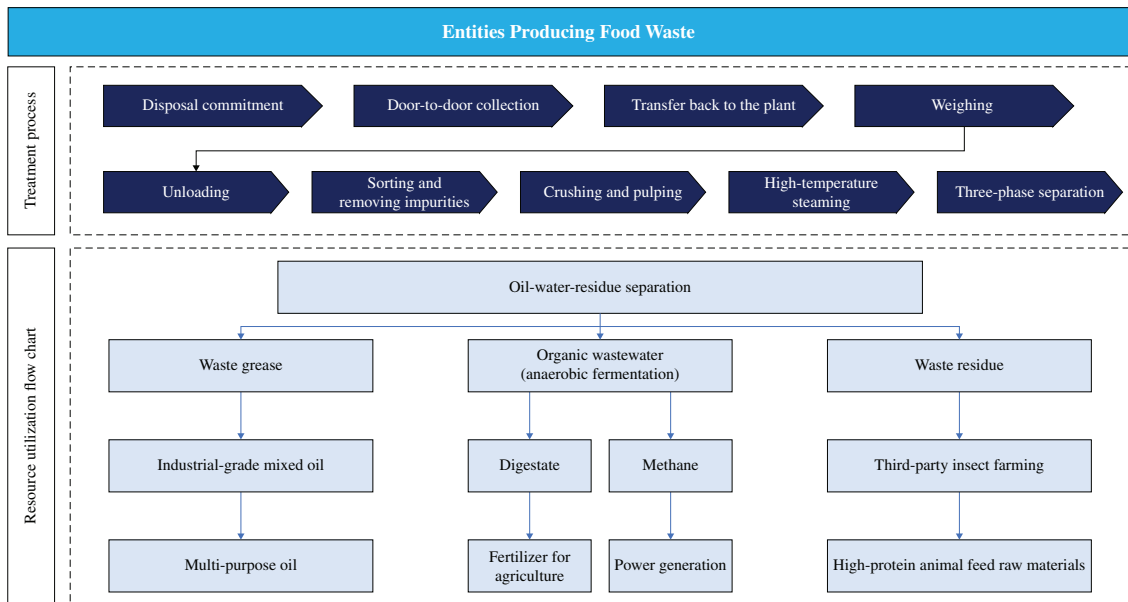
collection and treatment systems, while some small and medium-sized cities lag behind in treatment capacity development. Enterprises with stable collection systems and mature processing technologies have gradually developed the ability to replicate projects and export their technologies.

2. Food waste treatment and resource utilization process and key technologies

Food waste treatment mainly involves the following key stages: First, waste is collected and sorted, then transported to treatment facilities via door-to-door collection. Upon arrival at the facility, the waste is weighed, unloaded, and sorted to remove contaminants. It then enters the crushing and pulping stage to form a homogeneous slurry, followed by high-temperature cooking. The cooked slurry is then processed through a three-phase separation system to physically separate oil, water, and solids.

During the resource utilization phase, the outputs from the three-phase separation follow different paths for comprehensive use: (i) Waste oil can be further refined into industrial-grade mixed oil, used to produce multipurpose base oils; (ii) Organic wastewater can undergo anaerobic digestion to generate biogas for power generation, with the resulting digestate recovered as organic fertiliser for agricultural use; (iii) Solid residues can be used for insect farming, converting them into high-protein animal feed.

The diagram below outlines the main treatment process and key technologies for kitchen waste treatment and resource utilization:



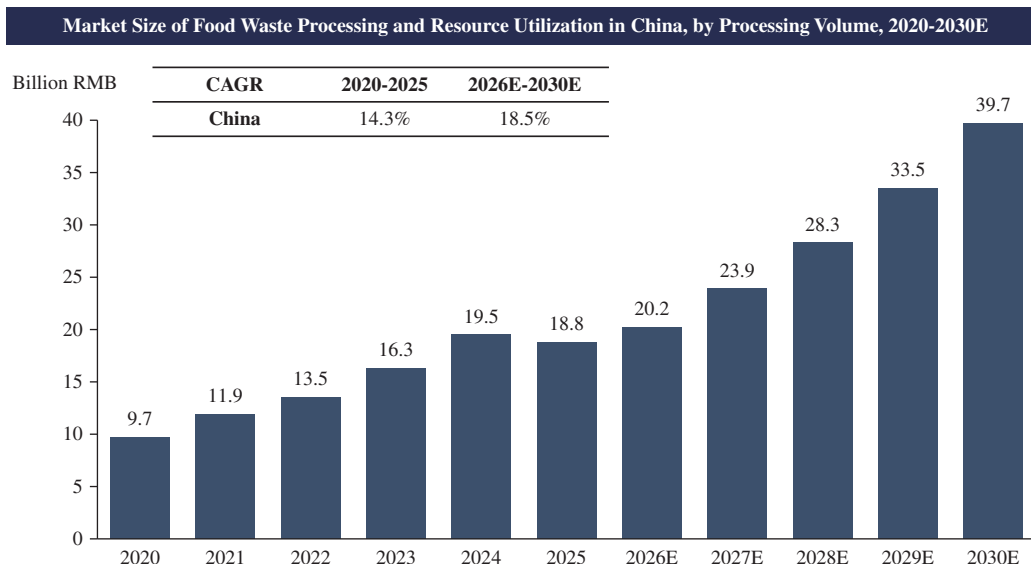
Source: Frost & Sullivan

3. Market Potential of food waste resource utilization in China

Since the release of the 14th Five-Year Plan for Urban Household Waste Classification and Treatment Facility Development in 2021, China has clearly emphasised strengthening the independent collection and treatment capacity for food waste. The establishment of a comprehensive collection system has driven a continuous increase in treatment volumes. China’s food waste treatment volume grew from 17.6 million tonnes in 2020 to 34.4 million tonnes in 2025, achieving a CAGR of 14.3%. Looking ahead, with the full implementation of mandatory food waste classification policies in key cities and accelerated development of supporting infrastructure, treatment volumes are expected to rise from 37.8 million tons in 2026 to 74.5 million tons by 2030, with a projected CAGR of 18.5%.

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Food waste treatment and resource utilization projects generate revenue through a diversified model, including service fees, biogas power generation income, and the sale of industrial-grade mixed oil or biodiesel. Since the Chinese government adopted refined treatment approaches for food waste, the market for food waste treatment and resource utilization has grown rapidly—from RMB9.7 billion in 2020 to RMB18.8 billion in 2025, with a CAGR of 14.3%. As waste classification coverage expands, collection systems improve, and resource utilization technologies mature, the proportion of independently collected and harmlessly treated kitchen waste continues to rise. From 2026 to 2030, the market size for kitchen waste treatment and resource utilization in China is expected to grow at a CAGR of 18.5%, reaching RMB39.7 billion by 2030.



Source: Frost & Sullivan

4. Drivers of China’s food waste treatment and resource utilization market

Rising demand for biodiesel applications

Biodiesel is a type of diesel fuel processed from bio-based materials such as plants and waste oils, and is a key pathway for achieving carbon emission reductions. China’s biodiesel industry has reached internationally advanced levels in terms of products, technology, and equipment. The country also has abundant potential resources in the form of waste oils, giving it a natural advantage for developing biodiesel. In 2025, China’s biodiesel production exceeded 1.6 million tons, with 56.8% exported. Currently, the EU’s biofuel feedstock relies on imports, EU regulations stipulate that from 2025, aviation fuel must gradually incorporate sustainable aviation fuel, with the blending ratio increasing to 6% by 2030 and 70% by 2050. Driven by mandatory blending policies, biodiesel is consistently in short supply. China’s biodiesel market has continued to grow, from RMB9.0 billion in 2020 to RMB12.2 billion in 2025, achieving a CAGR of 6.2%. With rising production capacity, increasing international oil prices, and growing demand for renewable fuels, the market size is expected to reach RMB21.5 billion by 2030, with a projected CAGR of 12%.

Refined demand driving food waste treatment

Since China fully implemented waste classification in 2019, food waste has been incorporated into dedicated collection and treatment systems. Multiple cities have successively issued technical guidelines covering all stages—from collection and transportation to pre-treatment and resource recovery—requiring enterprises to establish a closed-loop system with source separation, sealed transport, centralised weighing, and traceable disposal. These systems typically use GPS-equipped vehicles and weighbridge monitoring. To ensure compliance, many regions enforce strict management requirements such as “full collection of eligible waste,” “no mixing with other waste,” and “sealed transport vehicles with no leakage,” continuously promoting high-quality development of the food waste treatment market.

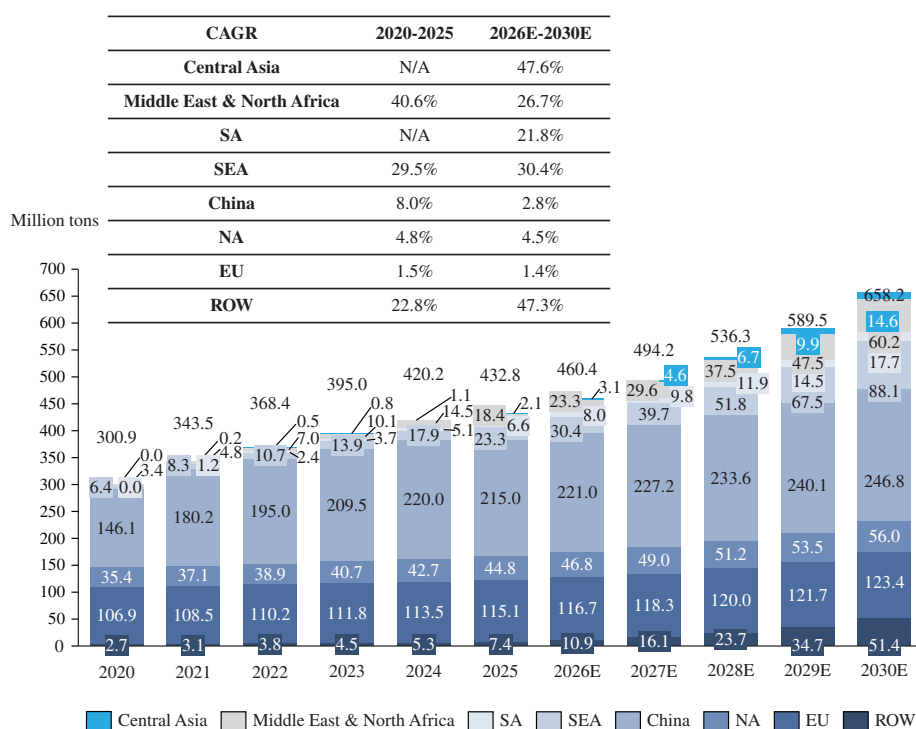
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CHINA'S SOLID WASTE TREATMENT AND GREEN ENERGY ENTERPRISES IN OVERSEAS MARKETS

1. Regional market potential for household waste incineration abroad

Over the next five years, driven by increased government focus on environmental governance, international development aid funding, and the growing economic viability of waste-to-energy incineration projects, emerging markets will accelerate the construction of waste incineration plants and solid waste resource utilization facilities. This will lead to increased household waste-to-energy incineration volumes. From 2026 to 2030, incineration volumes are expected to rise significantly: Central Asia: from 2.1 million to 14.6 million tons; Southeast Asia: from 30.4 million to 60.2 million tons; Middle East and North Africa: from 23.3 million to 60.2 million tonnes; and South America: from 8.0 million to 17.7 million tons. All regions are projected to grow faster than the global average. This growth is also supported by multiple ongoing waste-to-energy incineration and solid waste treatment projects led by Chinese enterprises in these regions. These facilities are expected to be completed and operational within the next five years, helping to steadily enhance local treatment capacity.

Market Size of Global Household Incineration, 2020-2030E



Source: Frost & Sullivan

2. Core competitiveness of Chinese solid waste treatment and green energy enterprises in overseas markets

Advantages in technology and operational capabilities, with standardised process export and model replication capacity

In recent years, Chinese solid waste treatment enterprises have leveraged their mature technologies and operational experience in areas such as household waste incineration, kitchen waste resource utilization, and sludge co-treatment to gradually establish standardised process systems and the ability to export entire plants and replicate operational models. They have built a full-cycle standardised export system covering design, construction, commissioning, and operation. Compared to their European and American counterparts, which often rely on customised designs and local engineering teams for delivery, leading Chinese enterprises demonstrate higher project execution efficiency under EPC general contracting and BOT/BOO models. This is especially attractive to the customers in emerging markets with poor infrastructure, who are generally more concerned about cost-effectiveness when building their solid waste disposal facilities, where Chinese enterprises offer a compelling combination of stable operational experience, high quality-to-price ratio and rapid implementation.

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Policy environment and green financing channels support overseas expansion

Chinese solid waste treatment enterprises benefit from national-level multilateral cooperation mechanisms such as the Belt and Road Initiative, which enhance adaptability in project access, policy alignment, and resource allocation. Meanwhile, with the acceleration of green finance cooperation, solid waste treatment projects such as household waste incineration are gradually being included in the sovereign loan support scope of international development finance institutions like the World Bank and the Asian Infrastructure Investment Bank. These funds are primarily allocated to emerging markets to improve environmental infrastructure capacity. Chinese enterprises, acting as EPC contractors or investment operators, indirectly benefit from green financing, expanding their project participation scope and implementation capabilities.

3. Drivers of overseas expansion for solid waste treatment enterprises

Policy-driven: Target markets have recently accelerated the development of green energy. For example, in 2022, Kyrgyzstan and China signed a Memorandum of Understanding on promoting investment cooperation in the field of green development, initiating active collaboration in the green economy and opening the market to foreign enterprises with mature technologies and project experience. In 2024, China and Kazakhstan jointly signed an agreement on implementing renewable energy projects, supporting Chinese enterprises in commercial investment in Kazakhstan’s renewable energy sector, with an initial project list totalling 1.8 GW.

Solid waste treatment demand-driven: As urbanisation continues to rise in emerging markets, household waste generation is growing rapidly. However, in many regions, the proportion of incineration and resource utilization remains below 10%, and the development of solid waste collection systems and end-treatment facilities has long lagged behind, creating a mismatch between high waste volumes and insufficient treatment capacity. At the same time, regional power supply is tight, with limited grid coverage and absent electricity pricing mechanisms, hindering the achievement of sustainable development goals. Waste-to-energy incineration, with its dual attributes of harmless treatment and green energy production, is increasingly being incorporated into local energy supply strategies. For example, in Kyrgyzstan, the government has introduced concession agreements with fixed electricity prices and long-term subsidy contracts, encouraging more internationally capable Chinese solid waste treatment enterprises to invest.

Advanced technology demand as a driver: Compared to traditional landfill and low-efficiency incineration methods, some emerging markets are increasingly seeking high-efficiency, low-emission solid waste treatment technologies. Chinese enterprises possess mature technologies and rich experience in waste-to-energy incineration, sludge treatment and disposal, and kitchen waste resource utilization, effectively filling the gap in high-standard environmental infrastructure in these regions. As environmental standards in various countries gradually align with advanced benchmarks, overseas markets continue to release demand for advanced solid waste treatment processes and integrated solutions.

MARKET COMPETITION ANALYSIS

1. Competitive landscape of the waste-to-energy incineration industry

China’s waste-to-energy incineration industry has relatively low market concentration, with most enterprises operating under local government concession agreements and few national-level players. Key competitive factors include the ability to secure concessions, technological innovation, and financial strength. As environmental standards rise, the market is expected to consolidate through mergers and acquisitions. Internationally, the situation varies: mature markets such as Europe and the United States are dominated by large multinational corporations, making it difficult for Chinese enterprises to enter. In emerging markets such as Central Asia, Southeast Asia, South America, and the Middle East, Chinese enterprises benefit from cost advantages, mature operational models, and government partnerships, enabling expansion through demonstration projects and cooperative operations.

The scale of individual waste-to-energy incineration projects is one of the key dimensions for assessing an enterprise’s operational efficiency and resource integration capability. Compared to total enterprise processing capacity, single-plant scale better reflects the level of process integration, equipment configuration, and resource utilization efficiency at individual facilities. The table below lists the national rankings of single waste-to-energy incineration projects by daily processing capacity in 2025:

Ranking of Waste-to-Energy Incineration Plants by Daily Processing Capacity and in Terms of Scale of Standalone Waste-To-Energy Project, 2025				
Ranking	Company	Project	Enterprise type	Daily processing capacity (tons/day)
1	Company A	Guangzhou Project	State-owned	9,900
2	Company B	Shanghai Project	State-owned	9,000
3	Company C	Shenzhen Project	State-owned	8,450
4	The Company	Changsha Project	Non-State-owned	8,300
5	Company D	Suzhou Project	State-owned	6,850

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Power generation per ton of waste is an economic indicator used to measure the energy utilization efficiency and operational management level of waste-to-energy incineration projects. It directly affects the overall profitability of such projects. The table below lists the national rankings of enterprises by average power generation per tonne of waste in 2025:

Ranking of Waste-to-Energy Incineration Plants by Average On-Grid Electricity Generated per Ton of Waste, 2025			
Ranking	Company	Enterprise type	On-grid electricity generated per ton of waste (kWh)
1	The Company	Non-State-owned	486
2	Company E	State-owned	411
3	Company F	State-owned	347
4	Company G	Non-State-owned	338
5	Company D	State-owned	326

The table below lists the national rankings of enterprises by revenue of waste-to-energy incineration in 2025:

Ranking of Waste-to-Energy Incineration Enterprise in China, by Revenue of Waste-to-Energy Incineration, 2025		
Ranking	Company	Revenue (RMB Billion)
1	Company D	12.9
2	Company G	8.0
3	Company C	7.0
4	Company L	5.0
5	Company A	4.2
6	Company F	4.1
7	Company M	3.8
8	Company B	3.7
9	Company N	3.7
10	Company O	3.6
11	Company P	3.5
12	Company Q	3.0
13	Company R	2.8
14	Company S	2.3
15	Company T	1.7
16	Company E	1.6
17	Company U	1.5
18	Company V	1.5
19	Company W	1.4
20	The Company	1.2

**Note:* The ranking is based on each company’s global total revenue from its respective waste-to-energy incineration projects.

2. Competitive landscape of other solid waste treatment sub-segments

Competitive landscape of food waste treatment and resource utilization

Food waste resource utilization in China involves high technical barriers and is driven by policy and local government investment. The industry is fragmented, with small enterprises operating regionally. Competitive advantages depend on the choice of technical route, the efficiency of collection and transportation systems, and the ability to market resource-based products. Specialised treatment enterprises perform well in specific regions or technologies, while large environmental companies rely on broader resources to undertake large-scale projects.

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National food waste treatment projects are a key link in the process from source collection to end-point harmless treatment and resource utilization. They feature capabilities such as pre-treatment of high-organic waste, oil recovery, anaerobic digestion, and wastewater treatment. The table below lists the national rankings of food waste treatment projects by daily processing capacity:

Ranking of Food Waste Projects by Daily Treatment Capacity and in Terms of Scale of Standalone Waste-to-Energy Project in China, 2025				
Ranking	Company	Project	Daily processing capacity (tons/day)	Grease recovery rate
1	Company G	Chongqing Project	3,200	8.5%
2	Company H	Beijing Project	2,100	4.0%
3	The Company	Changsha Project	1,200	7.4%
4	Company I	Wuxi Project	1,000	4.2%
5	Company J	Guangzhou Project	1,000	1.9%

Competitive landscape of the market for Integrated treatment of various types of waste (sludge, sewage and leachate, fly ash, etc.)

The market is fragmented with numerous regional players, and competition is driven by technical capabilities, compliance with environmental standards and cost efficiency. Leading waste-to-energy operators often expand into these segments for synergies, but no player holds a dominant nationwide position.

Competitive landscape of the market for Interim treatment, compression and transfer of household waste

Competition is localized as projects are tendered by municipal governments, with relatively low entry barriers compared to waste-to-energy incineration. Both state-owned and private operators participate, and success depends mainly on operational reliability and service quality. This market is highly fragmented, with the top ten players together representing less than 10% of market share.

3. Ranking of Chinese solid waste treatment enterprises in overseas markets (Central Asia Region)

The solid waste treatment market in Central Asia is still in its early stages, with most projects still under planning or construction. Based on the daily processing capacity of individual projects, our company ranks first in Central Asia.

Ranking of Chinese Solid Waste Processing Enterprises in Overseas Markets (Central Asia) in Terms of Standalone Project			
Ranking	Company	Project Status	Daily processing capacity of the project (tons/day)
1	The Company	In operation/Preparatory construction	9,000
2	Company K	Preparatory construction	3,000
3	Company D	Preparatory construction	3,000

**Note:* The statistic is up to 30 May 2026

Notes:

- Company A is a state-owned enterprise, founded in 2008 and headquartered in Guangzhou, China. It is committed to researching and promoting environmental sanitation industry technologies, including urban household waste treatment and comprehensive atmospheric management.
- Company B is a listed company, founded in 2004 and headquartered in Shanghai, China. It focuses on environmental technology and product development, investment and construction of environmental projects such as solid waste disposal, urban sewage treatment, and other municipal infrastructure projects.
- Company C is a state-owned enterprise, founded in 1997 and headquartered in Shenzhen China. It operates in fields including waste-to-energy incineration, treatment of three industrial wastes, sludge-to-energy incineration, etc. It is one of the earliest specialized companies in China engaged in garbage incineration power generation.

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- 4 Company D is a listed company, founded in 1961 and headquartered in Hong Kong, China. It is the world’s largest operator of waste to energy investment, establishing three core sectors: environmental energy, green environmental protection, and environmental water management.
- 5 Company E is a listed company, founded in 1992 and headquartered in Beijing, China. The company is an environmental services provider focusing on the resource utilization of solid and hazardous waste, environmental operation services, and environmental remediation and engineering solutions.
- 6 Company F is a listed company, founded in 2009 and headquartered in Chongqing, China. It is a leading player in the domestic waste incineration power generation industry, with a complete set of world-class waste incineration and flue gas purification technologies, and has led the drafting of national standards for waste incineration.
- 7 Company G is a listed enterprise, founded in 1992 and headquartered in Foshan China. It pioneered the “no wall” model for solid waste treatment and achieved digital management of water supply network via a smart water management platform.
- 8 Company H is a state-owned enterprise, founded in 2002 and headquartered in Chongqing, China. It has rich experience in undertaking the collection and transportation and harmless treatment of domestic waste in the main urban area, leading in solid waste treatment domestically, such as food waste treatment and industrial pollution soil remediation.
- 9 Company I is a listed company, founded in 2001 and headquartered in Shenzhen, China. It is a leader in biotechnology-driven resource utilization, specializing in the integrated treatment of urban solid waste such as food waste, household waste, animal solid waste, etc.
- 10 Company J is a private company, founded in 1956 and headquartered in Switzerland. It is an international global company with business areas involving urban organic waste treatment, municipal sewage and sludge treatment, industrial wastewater treatment, and comprehensive utilization of green energy such as biogas.
- 11 Company K is a listed enterprise, founded in 2001 and headquartered in Guangzhou, China. It is one of the largest environmental sanitation service provider in China, integrating environmental sanitation management, garbage classification, solid waste disposal and other aspects with an integrated strategy.
- 12 Company L is founded in 2008 and headquartered in Shanghai, China, specializing in the investment, construction, and operation of waste-to-energy and solid waste treatment projects.
13. Company M is a company founded in 2013 and headquartered in Wuhu, China. It is a Hong Kong-listed company with primary businesses including waste treatment, port logistics, new building materials, and new energy.
14. Company N is a privately-owned enterprise, founded in 2001 and headquartered in Wenzhou, China. It listed on the Shanghai Stock Exchange in 2015, with core businesses in environmental governance, equipment manufacturing, and new energy materials.
15. Company O is a central state-owned enterprise, founded in 2001 and headquartered in Xi’an, China. specializing in the R&D, manufacturing, and integrated solutions of energy-saving and environmental protection equipment.
16. Company P is a mixed-ownership enterprise, founded in 2014, and headquartered in Hangzhou. it was listed on the main board of the Singapore Stock Exchange in 2016.
17. Company Q is a privately-owned enterprise, founded in 1998 and headquartered in Huzhou, China. It is a Shenzhen Stock Exchange listed company dedicated to the investment, construction, and operation of waste-to-energy plants, as well as the R&D, design, manufacturing, sales, and installation of environmental protection equipment.
18. Company R is a state-owned enterprise, founded in 2000 and headquartered in Shenzhen, China. It is a Shenzhen and Hong Kong Stock Exchange listed company in China’s waste-to-energy industry, specializing in the investment, construction, operation, and maintenance of waste-to-energy plants.
19. Company S is a privately-controlled enterprise, founded in 1984, and headquartered in Nantong. It is a large international listed company engaged in zero-carbon environmental protection, new energy, smart environmental services, and renewable resource recycling, covering waste-to-energy, new energy power generation, and circular economy sectors.
20. Company T is a state-controlled enterprise, founded in 2005, and headquartered in Beijing. It focuses on the investment, construction, and operation of integrated solid waste management projects, with its main businesses covering municipal solid waste collection and transportation, waste-to-energy incineration, organic waste treatment, resource recovery and recycling, sanitary landfill, and environmental remediation.
21. Company U is a state-owned enterprise, founded in 1981 and headquartered in Tianjin, China. It is a Shenzhen Stock Exchange listed company since 1996, with a business scope extending across multiple provinces and cities in China.
22. Company V is a state-controlled enterprise, founded in 2017. It is an investment holding company primarily involved in wastewater treatment, water supply, sludge treatment, solid waste incineration, and other environment-related fields.
23. Company W is a central state-owned enterprise, founded in 2012, and headquartered in Beijing. It provides comprehensive waste treatment and disposal services to governments and society.

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4. Industry Entry Barriers

Technical barriers: Waste-to-energy incineration involves multiple system components and requires high technical standards. Food waste resource utilization involves complex processing flows and strict requirements for core technical stages. Both types of projects require significant technical and engineering barriers.

Operational barriers: The operational capability in the later stages of a public infrastructure project constitutes a major industry barrier. Waste-to-energy incineration must ensure efficient and stable equipment operation and continuous compliance with pollutant emission standards. The operational efficiency and compliance capability of food waste resource utilization directly determine the economic viability and stability of a project.

Financial barriers: Waste-to-energy projects commonly adopt BOT or BOO business models, requiring large upfront investment, long construction periods, and extended return cycles. Food waste resource utilization projects have more complex revenue models, requiring even greater financial coordination capabilities.