

# Path Selection for High-quality Development of Waste Disposal Industry under Waste Charging System

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**Abstract:** During the “14th Five-Year Plan” period, China's entire domestic solid waste disposal system will be improved in an all-round way, and the development mode layout of waste incineration power generation projects as the main energy core projects will also produce outstanding advantages. Development mode layout of waste incineration power generation projects as the main energy core projects will also produce outstanding advantages. However, it will also put higher requirements on the front-end and back-end synergy of the industry chain of solid waste treatment service companies, However, it will also put higher requirements on the front-end and back-end synergy of the industry chain of solid waste treatment service companies, technological innovation and the ability to provide comprehensive system solutions, The waste charging system has also been constructed accordingly, and the fundamental purpose is to improve the service quality and efficiency of the waste treatment business. This article explains how to promote the high-quality development of the waste treatment industry from the following paths: In the vertical development field, the front-end needs to improve In the vertical development field, the front-end needs to improve the waste classification facility system, and promote the construction of facilities such as classification and transportation of waste; the terminal In the vertical development field, the front-end needs to improve the waste classification facility system, and promote the construction of facilities such as classification and transportation of waste; the terminal must continuously promote incineration treatment Capacity building, and promote the upgrading and updating of existing combustion equipment. In the field of horizontal development, collaborative management methods and diversified sustainable operation management models will be encouraged.

**Keywords:** Garbage charging system, Garbage disposal; domestic garbage, High-quality development.

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## 1. Introduction

“In the 14th Five-Year Plan” period, the establishment of domestic waste separation and disposal facilities in China has entered a critical period. Compared with the “13th Five-Year Plan”, which focused on the construction of end-of-pipe incineration plants, the “14th Five-Year Plan” proposes to resourceize and reduce domestic waste, and focus on resource recovery and integration of the two networks. Domestic waste classification and management infrastructure is a major part of urban environmental protection infrastructure, is to promote the implementation of domestic waste classification management system, to achieve waste reduction, resource utilization, harmless management of the basic guarantee. In order to promote and guide the establishment of domestic waste classification and treatment facilities in China, in accordance with the Law of the People's Republic of China on the Prevention and Control of Solid Waste Pollution and the Outline of the “14th Five-Year Plan”, China's Development and Reform Commission and the Ministry of Housing and Urban-Rural Development have organized the preparation of the “14th Five-Year Plan.” urban domestic waste classification and treatment facilities development plan(hereinafter referred to as “the plan”).

The “Plan” in the specific implementation of technical indicators work, successively on waste treatment resource efficiency, waste classification management collection and transportation capacity, waste incineration treatment technology capacity, etc. clearly put forward higher demand. The goal contains: by the end of 2025, China's domestic waste classification collection and transportation management capacity to achieve about 700,000 tons / day; China's urban and rural domestic waste incineration treatment to achieve

about 800,000 tons / day, China's urban domestic waste incineration treatment accounted for about 65%; China's large and medium-sized cities to achieve about 60% of the efficiency of domestic waste resource. The Plan closely follows the high-quality development needs of domestic waste disposal, compared with the construction plans of urban and rural domestic waste disposal facilities in China during the 12th and 13th Five-Year Plans, while improving the overall technical capacity of the facilities, it will be more The structural advantages of domestic waste types and disposal equipment will be emphasized. First, in order to vigorously promote China's urban waste disposal, the construction pattern of waste incineration-based disposal facilities is clearly defined to promote the reduction of China's urban waste and the use of renewable resources. Second, more emphasis on infrastructure green construction, clearly put forward to strengthen China's urban waste disposal facilities, such as secondary pollution control capacity building and other related provisions.

In order to better promote the high-quality development of the waste disposal industry, the matching waste charging system is also being gradually established. China's Development and Reform Commission promulgated the “Notice on the 14th Five-Year” period to deepen the price mechanism reform action plan (hereinafter referred to as “action plan”), the “14th Five-Year”period to promote the national key industry areas of pricing management mechanism transformation work to make specific arrangements. In the garbage disposal, the “Action Plan”put forward four requirements: (1) to promote the establishment of local people's governments at the county level or above to charge for domestic waste removal, and the scientific and reasonable formulation of the fee standard. (2) the

implementation of non-resident kitchen waste metering charges. (3) the conditions of the local research and development of farmers' domestic waste disposal payment system. (4) the establishment of a sound management mechanism for the collection of hazardous waste. With the improvement of people's living standards, higher requirements for the supply of public services have also been put forward, so the fundamental purpose of improving the garbage disposal charging system and promoting the price reform of garbage charges is still to improve the quality and efficiency of garbage disposal services and promote the high-quality development of the garbage disposal industry.

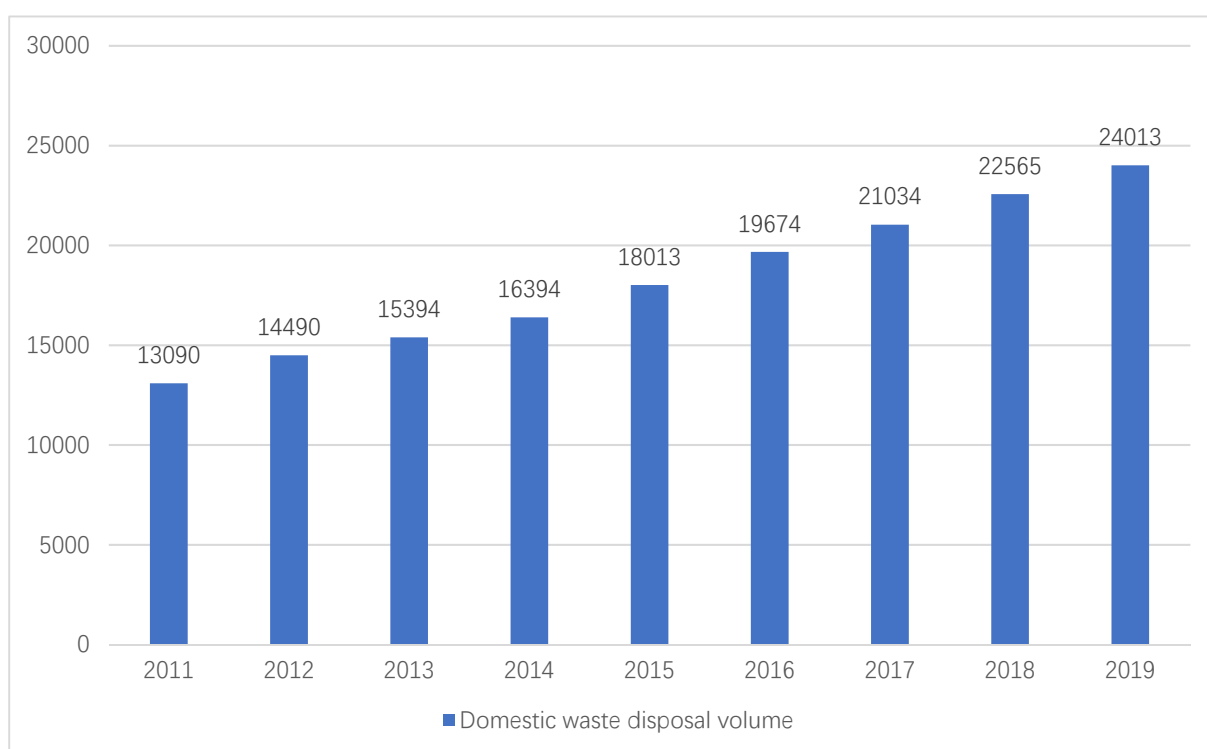
## 2. The Development Basis of China's Waste Disposal Industry

During the “Thirteenth Five-Year Plan” period, governments and departments around the world thoroughly implement the ecological civilization thought of General Secretary Xi Jinping, earnestly study and implement the strategic deployment of the decision of the Communist Party Central Committee and the General Office of the State Council, continue to strengthen the planning guidance and

government protection power, steadily implement the classification of daily life garbage disposal, actively carry out graded input, classified reception, graded transport and disposal facilities, vigorously implement waste incineration and disposal, continue to improve the collection and transportation system, promote the treatment capacity of daily life waste significantly improved, the treatment structure is substantially optimized, and make a solid foundation for promoting the high-quality development of the environmental industry.

### 2.1. Stable Growth of Urban Domestic Waste Disposal Volume

The quality of people's daily life is increasingly improving, and the production of daily waste is also increasing year by year. Figure 1 shows the disposal volume of domestic waste in China from 2011 to 2019, of which 240.13 million tons in 2019, an increase of 6.4% compared with 2018. The harmlessness rate of domestic waste has reached 99.2%, and all municipalities and counties in the province have basically achieved harmless management of domestic waste.

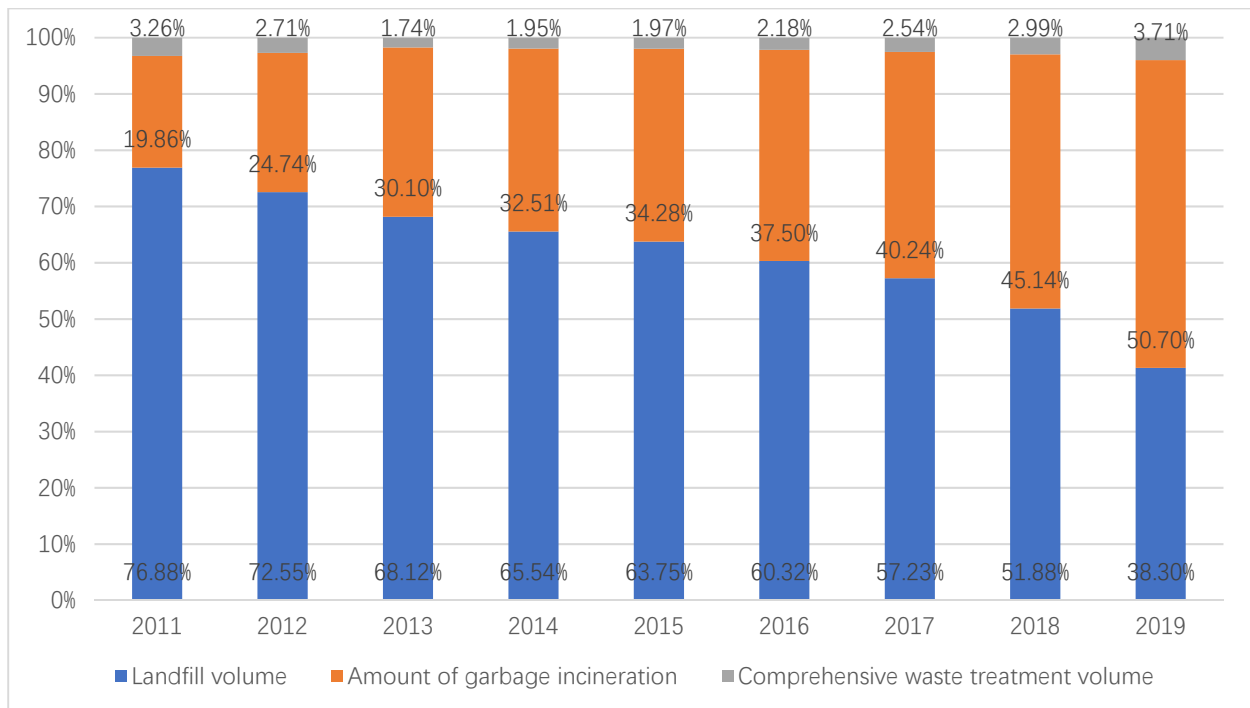


**Figure 1.** 2011-2019 domestic waste disposal volume (unit: million tons)  
Data source: 2019 China Urban Construction Statistical Yearbook

### 2.2. Waste Treatment Structure Optimization Is Obvious, Waste Incineration Gradually Replace Landfills

Based on environmental considerations, municipal waste incineration has gradually replaced municipal waste landfills as the most important waste treatment method since 2011.

Figure 2 shows the structural approach of domestic waste disposal in China from 2011 to 2019, in which, in 2019, the volume of domestic waste landfilled accounted for 45.59%, the total volume of domestic waste incineration accounted for 50.70%, and the comprehensive treatment volume accounted for 3.71%, and initially established the development layout of waste disposal with new disposal energy mainly domestic waste incineration.



**Figure 2.** Structure of domestic waste disposal methods in China, 2011-2019 (unit: %)   
 Data source: 2019 China Urban Construction Statistical Yearbook

### 2.3. Positive Progress of Stockpile Waste Remediation and Treatment Equipment Renewal

During the “Thirteenth Five-Year Plan” period, the city's domestic waste storage quantity remediation work has been accelerated, the elimination of informal storage sites, saturated landfill area closure and remediation, landfill seepage sieve liquid disposal facilities construction and renewal, waste incineration disposal equipment upgrading and renewal work has made positive progress, most areas have been eliminated informal domestic waste dumping sites. The management level of disposal of stockpile facilities has been significantly improved. The special rectification of the domestic waste disposal industry has been effective, and the daily average compliance rate of particulate matter, sulfur dioxide, nitrogen oxides, and hydrogen chloride emissions from domestic waste incineration enterprises in the city in 2020 was 100 percent.

### 2.4. The First Results of Waste Separation

Forty-six key large and medium-sized cities in China have actively carried out early and pilot implementation of domestic waste classification management, demonstrating and leading the way, with a coverage of more than 86.6% in large and medium-sized urban residential areas, basically establishing a graded domestic waste disposal, graded reception, graded transportation and graded disposal system in large and medium-sized cities, and studying and establishing a number of repeatable and implementable models and successful experiences of graded domestic waste management in large and medium-sized cities. The city's domestic waste classification and transportation capacity is about 500,000 tons/day, the pilot work of kitchen waste has been steadily promoted, and the capacity of daily life food waste disposal has been greatly improved.

## 3. Problems of China's Waste Disposal Industry

At present, China's urban and rural domestic waste classification and disposal facilities are still facing many problems such as insufficient disposal capacity, uneven regional development, large potential problems of environmental hazards of stockpile landfill facilities, and imperfect management system mechanism, which are great obstacles and challenges to the efficient development of environmental industries.

### 3.1. Current Collection and Disposal Equipment Systems That Do Not Meet This Type of Standard

First, the infrastructure for classification and transportation still faces an obvious shortage. In the era of “14th Five-Year Plan”, China's urbanization level is still in the stage of rapid improvement, and the work of rural revitalization and comprehensive improvement of rural habitat environment will also be rapidly deepened, and the rural domestic waste treatment system will be gradually integrated into the urban domestic waste collection and disposal system, resulting in a great increase in the total amount of domestic waste generated in China's townships, but the original collection and transportation. However, the original collection and transportation infrastructure can no longer meet the actual needs. At present, except for forty-six key counties in China, most of the prefecture-level cities and county-level rural domestic waste centralized treatment and classification collection and transportation infrastructure still need to be established. Second, there is still a large gap in waste incineration disposal capacity, at present, about fifty percent of China's counties (including prefecture-level cities and county-level cities) have not yet built new waste incineration equipment, and most counties still have a large gap in waste

incineration disposal capacity. Third, the efficiency of resource utilization still needs to be improved. At present, China's municipal waste disposal by landfill method is still a large proportion of municipal domestic waste disposal enterprises in the “small, scattered, chaotic” and low level of recycling still prevails, but the efficiency of municipal domestic waste resource utilization of about fifty percent, and there is still much room for improvement. Fourth, the way of food waste classification and disposal is still not smooth. At present, the efficiency of food waste separation is still poor, and the way of fertilizer consumption after disposal is hindered, and the stable operation of facilities is difficult and the cost of disposal is high.

### 3.2. Regional Development Imbalance Is Still Prominent

First, the harmless disposal capacity of the central and western regions is still lacking, and the harmless disposal rate of domestic waste in the central and western regions and some regional towns in the northeast is less than 30 percent, far less than the 70 percent target demand level mentioned in the national “13th Five-Year Plan”. Second, although the progress of each region in the development of waste treatment classification work varies, but the eastern region in general, the work is relatively fast, the work of key counties also began to gain positive progress, while the central and western regions in addition to key counties are mostly in the preliminary stage of exploration. Third, the coastal areas of urban waste incineration disposal level is far less than the eastern, southeast coastal areas of urban waste incineration disposal rate is much greater than 60%, while the central and

western regions of urban waste incineration disposal rate of less than 50%, especially in the central and western sparsely populated, remote and other specific areas, by economic conditions, population, transportation conditions and other factors, has not been able to figure out with the regional economic and social development level of the mature and effective, the Development level to adapt to the mature and effective, economic conditions suitable for the management of municipal waste incineration disposal mode.

### 3.3. High Leachate Production and Leachate Treatment Capacity Need to Be Improved

The environmental problems of waste landfill facilities are also becoming increasingly prominent, some landfill environment, technical equipment and operating level are not high, a large amount of landfill waste and no harmless treatment measures, the environment may produce a great deal of secondary pollution. In particular, the management of low leachate is not up to standard, the seepage control system is fragile, the daily operation is not standardized and other environmental hazards are highlighted, which will cause potential danger to the surrounding environment. At the same time, some landfill facilities are filling up, and the service period is also expiring one after another, so the difficulty and high cost of rectification have become the key constraints to the implementation of site closure and rectification. Table 1 shows the national garbage leachate production estimation table from 2011 to 2019, the national domestic garbage leachate production from 2011 to 2019 increased year by year, in 2019, China's domestic garbage leachate production reached 83,431,800 tons, an increase of 4.63%.

Table 1. 2011-2019 national waste leachate production projection table (unit: million tons)

| Year | Landfill volume | Amount of garbage incineration | Comprehensive waste treatment capacity | Amount of waste leachate generated |
|------|-----------------|--------------------------------|--|------------------------------------|
| 2011 | 10063.74        | 2599.28                        | 426.62                                 | 4594.60                            |
| 2012 | 10512.49        | 3584.06                        | 392.99                                 | 5417.76                            |
| 2013 | 10492.69        | 4633.72                        | 267.57                                 | 5680.84                            |
| 2014 | 10744.27        | 5239.88                        | 319.59                                 | 6008.53                            |
| 2015 | 11483.14        | 6175.52                        | 354.35                                 | 6569.93                            |
| 2016 | 11866.43        | 7378.42                        | 428.93                                 | 7110.22                            |
| 2017 | 12037.62        | 8463.32                        | 533.22                                 | 7540.67                            |
| 2018 | 11706.20        | 10184.92                       | 674.42                                 | 7973.93                            |
| 2019 | 10948.03        | 12174.17                       | 890.62                                 | 8343.18                            |

Data source: 2019 China Urban Construction Statistical Yearbook

### 3.4. The Management System Mechanism of Separate Collection and Disposal of Domestic Waste Treatment Still Needs to Be Gradually Improved

First, the domestic waste supervision mechanism needs to be gradually strengthened. The coordination and linkage mechanism between cross-regional removal and disposal of domestic waste disposal is not smooth enough. The third-party service market mechanism is not perfect enough, and conditions such as successful bidding below the market cost price, unclear or non-reciprocal responsibilities, inaccurate management information release, and unrestricted supervision and inspection occur from time to time. Secondly, the incentive mechanism for the reduction of residential domestic waste disposal is not yet perfect. The incentive mechanism for residential domestic waste disposal with graded price and measurement collection is not yet sound, and

it is difficult to pay the domestic waste disposal fees, and the collection ratio and collection standard are generally low, most of which are directly borne by the local finance for domestic waste disposal, which puts great pressure on the local government tax subsidies. Third, the standard specification and management system is not perfect, domestic waste treatment classification, leachate standards and other aspects of the standardization system needs to be gradually improved.

The “14th Five-Year Plan” period has put forward new and higher requirements for the current management of domestic waste classification and disposal to promote the implementation of high-level protection of the ecological environment and to comprehensively improve the efficiency of land resources utilization. At present, the construction of domestic waste classification and disposal facilities has entered a critical period.

## **4. Path Options for High-quality Development of the Waste Disposal Industry**

In terms of vertical development areas, the front-end needs to improve the waste separation facility system and promote the construction of facilities for graded waste reception and sorting and transportation; the terminal must continuously promote the construction of incineration and treatment capacity, and promote the upgrading of existing combustion equipment; the number of such project companies will also increase. In terms of horizontal development areas, collaborative management methods and diversified sustainable operation and management models will be encouraged. In the collaborative project management, the demand for residential heating, park heating and power supply, etc. will increase, while the profitability and profit margin of waste treatment companies will be further broadened.

### **4.1. Accelerate the Improvement of Waste Separation Facilities System**

1. Standardize the domestic waste disposal classification put method. Refers to the national “domestic waste classification mark”, combined with the actual situation of society to determine the method of domestic waste disposal types, set the standard domestic waste disposal types to put the mark, in order to facilitate the public to put domestic waste disposal. Strengthen the standardized supervision and management of non-toxic and harmless items, and increase the ratio of separate input of low-value non-toxic and harmless items. Actively implement effective graded input management modes such as removing barrels and building stations, regular input and supervision and guidance to improve the efficiency of graded input of daily waste.

2. Continued to improve the waste separation receiving equipment. According to the classification categories, reasonable layout of residential communities, business offices and some public places of domestic waste, classification collection containers, boxes, houses, stations and other equipment, in order to promote the receiving force and the number of people in the receiving area, the number of domestic waste generation of mutual coordination. At the same time to promote the old waste classification receiving equipment renewal, and spraying unified, standard, clear logo, in order to achieve the standard setting of facilities, clean and neat.

3. Strengthen the sound grading and transportation infrastructure. In the province's municipalities and cities and counties and cities with the conditions as soon as possible to build a complete domestic waste grading transport system, a reasonable connection between the graded drop-off end and the graded disposal terminal. According to the characteristics of the graded categories of daily life waste disposal in the jurisdiction and the number of corresponding waste types generated, the collection and transportation outlets, frequency, time and roads are scientifically and reasonably determined, and are equipped with well-marked and clear waste classification collection and delivery vehicles. Through the integrated planning and layout of transfer station network, effectively enhance the effectiveness of waste separation and recycling delivery, in places where required, the implementation of “truck-mounted barrels, barrels for direct transport” and other enclosed, safe food waste delivery

methods. To strengthen the supervision of the delivery process, to avoid the “first divided and then mixed” “mixed loading and mixed transport” of daily waste disposal.

### **4.2. Comprehensively Promote the Construction of Domestic Waste Incineration Facilities**

1. Strengthened the layout of waste incineration facilities plan. Do well with urban land spatial planning and ecological protection, environmental sanitation facilities, urban centralized heating and heating and other special planning, integrated planning and construction of domestic waste disposal infrastructure, in accordance with the law for domestic waste construction project site selection work, to encourage the use of existing domestic waste infrastructure land to build domestic waste engineering projects.

2. Continue to promote the construction of incineration and disposal capacity. In the daily removal of domestic waste to meet the requirements for the establishment of larger-scale waste incineration and disposal facilities in places, can be appropriate ahead of the establishment of waste incineration and disposal facilities that are commensurate with the rate of increase in the total amount of domestic waste removal. Do not meet the requirements for the establishment of large-scale waste incineration and disposal facilities in the region, you can take cross-regional cooperation to share and other ways to establish waste incineration and disposal facilities. In counties and built-up areas and other areas where the daily volume of domestic waste removal is greater than three million tons, you can accelerate the establishment of waste incineration and disposal facilities.

3. carried out the existing incineration equipment to improve the standard of alteration. A comprehensive survey to evaluate the operation of existing waste incineration and disposal equipment and pollution emissions, the equipment can not be stable to meet the standard emissions, to accelerate the upgrading of equipment updates. Encourage places with conditions to optimize waste incineration disposal process technology according to the conditions of high-quality development, sound disposal of pollutants supporting equipment, and gradually improve the level of environmental protection management of equipment operations.

### **4.3. Encourage Domestic Waste Co-disposal**

1. Actively coordinate the planning and construction of a comprehensive solid waste treatment base. Actively introduce advanced vein park construction and management mode, study and establish comprehensive treatment bases for domestic waste, construction waste, pharmaceutical waste, hazardous waste, agricultural waste and other solid pollutants, give full play to the principle of intensive, effective, environmental protection and safety, give full play to the synergistic treatment efficiency, promote the sharing of various comprehensive disposal equipment process equipment, shared resources and energy, environmental governance, social responsibility Risk sharing, effectively reducing the effect of “neighbor avoidance” and the risk of social stability.

2. Promote the establishment of intra-regional synergy of domestic waste disposal infrastructure. Promote cross-regional integration and collaboration, the small capacity of domestic waste removal, in a single establishment of disposal facilities is less economical or unreasonable in the region, can be coordinated with neighboring regional governments to

plan the establishment of cross-regional disposal facilities. For more types of non-toxic and non-hazardous substances, the place in a single establishment of hazardous waste or non-toxic and non-hazardous substances disposal equipment is less economical, but also cross-regional establishment of collaborative treatment system to reduce disposal costs and improve disposal efficiency.

#### 4.4. Sound Standard Specification and Strengthen Publicity Guidance

1. Sound technical specifications. As soon as possible to improve the classification and disposal of urban domestic waste treatment specification system, and to establish a number of cities in urgent need of domestic waste treatment equipment construction, operation, supervision and management and other technical specifications, and further improve the leachate disposal, fly ash treatment, domestic wastewater discharge management and other specification system and technical conditions. Gradually improve the norms of domestic waste classification and disposal facilities construction, in strict accordance with the provisions of the facility protection distance, strict implementation of environmental protection supervision of the “installation, trees, joint” and other provisions, and do a good job related to the construction of landscaping and leisure facilities. And reasonable optimization and adjustment of pollution emission standards, so that pollution standards and production technology and equipment level, the regional environmental capacity and so on to adapt.

2. Strengthen the propaganda guidance around the strict implementation of domestic waste classification collection and disposal facilities to establish supervision and management of work regulations and information dissemination mechanisms. Guide the social domestic waste disposal graded collection and disposal infrastructure support, the establishment of landscaping, recreational infrastructure, publicity and education base, the establishment of efficient interactive publicity to carry out the platform, expand the public participation channels, increase citizen participation. Deeply promote the graded management of social domestic waste, actively promote the classification and reduction of the roots of social domestic waste, actively guide citizens to establish a correct concept of the graded management of social domestic waste, deeply publicize and popularize the

historical significance and importance of the construction of graded social domestic waste collection and treatment facilities, actively publicize classic examples of facility construction, raise citizens' environmental awareness, and promote a green lifestyle To create a healthy atmosphere of social opinion.

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