

Research on the Utilization of Solid Waste Resources in China's Construction Industry from a Market-Oriented Perspective

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Abstract: This article analyzes the current situation of solid waste resource utilization in China's construction industry from a market-oriented perspective, and explores the promoting role of market mechanisms in the utilization of solid waste resources in construction. Through the analysis of the amount of solid waste generated, disposal methods, and the level of resource utilization in the construction industry in China, it is found that there are problems such as low resource recovery efficiency and imperfect market mechanisms in the current utilization of solid waste resources. Therefore, this article proposes a series of suggestions to promote the utilization of solid waste resources, including the formulation of sound policies and regulations, strengthening market supervision, and nurturing market entities. At the same time, this article also looks forward to the future development of the market for the utilization of solid waste resources in construction, believing that with the continuous improvement of policies and regulations and the soundness of market mechanisms, the market for the utilization of solid waste resources will usher in broader development space.

Keywords: Construction Solid Waste; Resource Utilization; Market-oriented.

1. Introduction

With the development of economy and the acceleration of urbanization, China's construction industry is also growing rapidly. However, it is followed by the generation of a large number of building solid waste, which not only occupies valuable land resources, but also brings environmental pollution, becoming a serious problem faced by the city [1]. Therefore, the resource utilization of solid waste has become an important topic in the sustainable development of construction industry. The resource utilization of building solid waste refers to transforming it into renewable resources for utilization, which is not only conducive to environmental protection, but also conducive to resource saving and recycling.

2. Literature review

Compared with some foreign countries that have relatively mature resource utilization system of solid waste in construction, China still faces a series of problems and challenges in the resource utilization of solid waste in construction [2]. Many scholars have conducted in-depth research and discussion on the utilization of solid waste resources in construction. For example, Zhao Na et al. (2019) argued that the resource utilization of solid construction waste can effectively reduce environmental pollution and resource waste, and is of great significance for the sustainable development of the construction industry. In addition, Wang Xiaoxiao et al. (2019) analyzed the current situation and existing problems of resource utilization of construction solid waste from three aspects of policy, technology and market, and put forward corresponding countermeasures and suggestions. Liu Yuhang et al. (2019) emphasized the important role of marketization mechanism in the resource

utilization of construction solid waste. In addition, Zhang Wei et al. (2014) proposed the economic, environmental and social benefits of the resource utilization of construction solid waste, and analyzed the policy and market environment for the resource utilization of construction solid waste [3]. Wu Zhixiang et al. (2016) analyzed the current situation and existing problems of resource utilization of construction solid waste from three aspects of policy, technology and market, and put forward corresponding countermeasures and suggestions [4]. In the past few years, quite a few scholars have studied the recycling of construction solid waste from the perspective of marketization. For example, Yang Lijuan et al. (2017) analyzed the current situation and existing problems of the recycling of construction solid waste from the perspective of marketization [5]. The research found that there were some problems in the recycling of construction solid waste in China at that time, such as unmatched policies, chaotic management and low technical level. Therefore, it is also necessary to strengthen the formulation and management of policies, improve the technical level to promote the development of construction solid waste resource utilization.

3. Methodology

This paper studies the utilization of solid waste resources in construction in China from the perspective of marketization. The perspective of marketization is to adjust and optimize the process of resource utilization of construction solid waste by introducing market mechanism, so as to maximize the benefit of resource utilization [6]. This paper aims to analyze the current situation and problems of China's construction solid waste resource utilization from the perspective of marketization, explore the supporting role of marketization mechanism, and put forward personal opinions and suggestions, in order to provide valuable references for

related fields. At the same time, combined with the actual case to further explain the problem, increase the readability and credibility of the article.

4. Theoretical Basis of Construction Solid Waste Recycling from the Perspective of Marketization

4.1. The Concept and Characteristics of Solid Waste from the Perspective of Market

The perspective of marketization refers to introducing the market mechanism into the process of the resource utilization of solid waste in construction, and realizing the maximum benefit of the resource utilization of solid waste in construction through the regulation and optimization of market mechanism. Construction solid waste refers to unavoidable waste materials generated in the construction process, mainly including concrete, brick, steel, wood, etc. Construction solid waste is characterized by large quantity, variety, complex quality and strong dispersion [7]. Therefore, the utilization of construction solid waste resources needs to introduce market mechanism for management and regulation.

4.2. Value and Significance of Building Solid Waste Recycling from Market Perspective

4.2.1. Resource Protection and Environmental Protection

Building solid waste is a kind of renewable resources, and its resource utilization can avoid waste, but also reduce the exploitation and consumption of natural resources, so as to achieve the purpose of resource protection. In addition, the resource utilization of construction solid waste can also reduce the discharge of waste, reduce the pollution to the environment, and realize the purpose of protecting the environment.

4.2.2. Cost saving and Efficiency Improvement

The utilization of solid waste resources can reduce the cost of construction enterprises and improve their economic benefits. For example, recycling waste concrete can reduce the consumption of raw materials and reduce production costs; The recycling of waste steel bars can reduce the purchasing cost of enterprises and improve the economic benefits of enterprises.

4.2.3. Promote Sustainable Economic Development

The utilization of construction solid waste resources can promote the sustainable development of economy. The utilization of building solid waste resources can promote the recycling of resources, reduce the consumption and waste of resources, and thus promote the sustainable development of economy. In addition, the utilization of solid construction waste resources can also create employment opportunities and promote the harmonious and stable development of society.

4.3. The Supporting Effect of Market Mechanism on the Recycling of Construction Solid Waste

Market mechanism refers to the adjustment and optimization of resource allocation to achieve the optimal allocation of resources through price mechanism, supply and demand relationship, competition mechanism and other means under the condition of market economy. In the process of resource utilization of construction solid waste, the market

mechanism can play a supporting role in the following aspects:

4.3.1. Price Mechanism

Market mechanism can guide enterprises to recycle waste through price adjustment and optimization, so as to realize resource utilization of construction solid waste. For example, by setting up a price subsidy for waste recycling, enterprises are encouraged to recycle waste and reduce their costs.

4.3.2. Supply and Demand Relationship

The market mechanism can promote the recycling of solid waste resources by adjusting and optimizing the relationship between supply and demand. For example, through the establishment of construction solid waste resource trading market, promote the coordination and optimization of supply and demand relations, and achieve the optimal matching and allocation of resources.

4.3.3. Competition Mechanism

Market mechanism can promote the recycling of building solid waste resources through regulation and optimization of competition mechanism. For example, technological innovation and management innovation of waste recycling enterprises can be promoted through the guidance of competition mechanism to improve the efficiency and quality of recycling.

5. Current Situation of China's Construction Solid Waste Recycling from the Perspective of Marketization

With the rapid development of urbanization and construction industry, construction solid waste production shows an increasing tendency year by year. Therefore, how to make good use of these building solid waste has become a thorny problem. At present, the utilization of construction solid waste resources has made certain progress, but there are still many problems. Specific performance in the following aspects:

5.1. Policies and Regulations Do Not Match

The imperfection of policies and regulations is a difficult problem for the resource utilization of construction solid waste [8]. At present, construction solid waste utilization policies and regulations are not perfect, lack of relevant supporting policies. For example, in terms of recycling of waste building materials, relevant policies and regulations are not perfect enough, resulting in a low penetration rate of solid building waste resource utilization (Zhang Xiaoming, 2020).

5.2. Management Disorder

The chaotic management of solid waste resource utilization in construction is also one of the current problems [9]. On the one hand, there are many departments involved in the utilization of construction solid waste resources, and the management is difficult. On the other hand, there are many enterprises in the construction industry with different management levels and lack of standardized management (Lin Jun, 2016).

5.3. Low Technical Level

The technical level of construction solid waste resource utilization is also a problem that needs to be solved [10]. At present, the technology level in this field is relatively low in China, and it is difficult to maximize the utilization of

resources (Yang Haitao, 2019).

5.4. Imbalance between Supply and Demand

At present, there is a problem of unbalanced supply and demand in the utilization of solid waste resources in construction [11]. On the one hand, the quantity of solid waste resources in construction is large, but the demand for recycling is small. On the other hand, there is a large demand for recycling construction solid waste resources, but the supply is insufficient, that is, there is an imbalance between supply and demand (Qian Min et al., 2015).

6. Countermeasures and Suggestions for China's Construction Solid Waste Recycling from the Perspective of Marketization

At present, China's construction solid waste recycling market is still in the initial stage, lack of market-oriented means and policy support. According to statistics, at present, China's construction solid waste recycling coverage rate is only about 30%, compared with developed countries there is still a big gap. From the perspective of marketization, this paper aims to provide some countermeasures and suggestions for the marketization of construction solid waste resources in China, specifically as follows:

6.1. Policies and Regulations for Recycling Construction Solid Waste Need to be Improved

Policies and regulations are crucial to the promotion of marketization. At present, China's construction solid waste recycling policies and regulations are not perfect, lack of related supporting policies. Therefore, improving policies and regulations is the primary task to promote the marketization of construction solid waste resources. The government should strengthen the policy support for the recycling of construction solid waste, and introduce relevant preferential tax policies to reduce the operating costs of enterprises and increase their profitability. In addition, the government should also strengthen the standardized management of construction solid waste recycling technology and standardize the industrial chain of construction solid waste recycling.

6.2. Technological Innovation is the Key to Promoting Marketization

At present, the technical level of building solid waste recycling is relatively low in China, so it is difficult to maximize the utilization of resources. Therefore, the government should increase the investment in the research and development of construction solid waste recycling technology, improve the technical level, and promote the innovation of construction solid waste recycling technology. In addition, the government should also strengthen the standardized management of construction solid waste recycling and promote advanced construction solid waste recycling technology.

6.3. Deepen Market-oriented Reform and Establish Market-oriented Mechanism

Marketization reform is an important means to promote the marketization of construction solid waste resources. In the market-oriented reform, we can start from the following

aspects: First, strengthen the market investigation and research, understand the market demand, adjust the industrial structure, and promote the marketization of construction solid waste resources. Second, establish a sound marketization mechanism, establish a marketization system of construction solid waste resources, and promote the marketization of construction solid waste resources. Third, we will strengthen market regulation, standardize market order and maintain fair market competition. These measures will help promote the marketization process of construction solid waste recycling, improve the efficiency of resource utilization, and promote the sustainable development of China's construction solid waste recycling cause. At the same time, attention should be paid to avoiding the adverse effects of market reforms and ensuring that the environment and people's lives and health are not harmed.

6.4. Strengthen Industry-University-research cooperation and Promote Technological Innovation

Industry-university-research cooperation is an important means to promote technological innovation. In the field of construction solid waste recycling, the government should strengthen the cooperation with universities and scientific research institutions, establish a research and development center of construction solid waste recycling technology, and carry out the research and development and promotion of construction solid waste recycling technology. In addition, the government should strengthen cooperation with enterprises to explore a new mode of recycling construction solid waste and promote the marketization of recycling construction solid waste. These measures are helpful to promote the innovation and development of construction solid waste recycling technology, improve the efficiency of resource utilization, and promote the sustainable development of China's construction solid waste recycling cause.

7. A Case Study of China's Construction Solid Waste Recycling from the Perspective of Marketization

7.1. Case 1: Guangzhou Construction Waste Recycling Center

Guangzhou Construction Waste Recycling Center is an institution established by Guangzhou Municipal Government to promote the utilization of construction waste resources. The center is responsible for collecting, transporting, processing and selling construction waste to realize the reuse of solid waste resources in construction. The center adopted the mode of cooperation between government and enterprises, and established Guangzhou Construction Waste Recycling Co., LTD., which realized government guidance, enterprise main body and market-oriented operation. Up to now, the center has built 30 construction waste collection sites with an annual handling capacity of 5 million tons, effectively promoting the recycling and utilization of solid waste resources in construction.

7.2. Case 2: Shanghai Solid Waste Recycling Center

Shanghai Solid Waste Recycling Center is an institution established by Shanghai Municipal government to solve the

problem of solid waste in urban buildings. The center is mainly responsible for collecting, classifying, processing and selling construction solid waste resources to promote the reuse of urban construction solid waste resources. The center adopts the mode of government-guided, enterprise-dominated and market-based operation, cooperating with enterprises to promote the recycling and utilization of construction solid waste resources. Up to now, the Shanghai Solid Waste Recycling Center has set up 20 solid waste collection points for buildings. The annual treatment capacity has reached 3 million tons, effectively promoting the recycling and utilization of building solid waste resources in Shanghai.

7.3. Case 3: Shenzhen Construction Waste Recycling Center

Shenzhen Construction Waste Recycling Center is an organization set up by Shenzhen Municipal government to promote the recycling of urban construction solid waste. The center is mainly responsible for collecting, classifying, processing and selling building solid waste resources to realize the reuse of urban building solid waste resources. The center adopts the mode of government-guided, enterprise-dominated and market-based operation, cooperating with enterprises to promote the recycling and utilization of construction solid waste resources. Up to now, Shenzhen Construction Waste Recycling and Utilization Center has built 10 solid waste collection points for construction, with an annual processing capacity of 2 million tons, effectively promoting the recycling and utilization of solid waste resources for construction in Shenzhen.

The above three cases all adopt the market-oriented operation mode, and cooperate with the government and enterprises to promote the recycling and utilization of construction solid waste resources. The successful experience of these cases shows that the marketization mechanism is one of the important means to promote the recycling of construction solid waste, which helps to stimulate the enthusiasm and creativity of enterprises. At the same time, the guidance and support of the government is also one of the important guarantees to promote the recycling of construction solid waste. The government should strengthen policy support, encourage and guide enterprises to participate in the recovery and utilization of solid waste resources, so as to promote the circulation and reuse of solid waste resources [12-14].

8. Conclusion and Prospect

8.1. Problems in the Reclamation of Construction Solid Waste

8.1.1. Imperfect Marketization Mechanism

The imperfect marketization mechanism is one of the key problems affecting the recycling of construction solid waste. In the current market environment, it is difficult to fully realize the benefits of recycling construction solid waste resources, resulting in a large number of solid waste resources cannot be effectively used.

8.1.2. Insufficient Policy Support

Insufficient policy support is also an important factor affecting the recycling of solid waste in construction. The government should strengthen the policy support for the recycling of construction solid waste, encourage and guide enterprises to carry out the work of recycling solid waste.

8.1.3. Low Technical Level

At present, China's construction solid waste recycling technology level is relatively low, it is difficult to meet the market demand. Therefore, we need to strengthen technology research and development, improve the level of technology to meet the market demand.

8.2. Countermeasures for Recycling Construction Solid Waste

8.2.1. Improve the Market Mechanism

Establish a sound market mechanism and a market system for recycling solid waste resources. At the same time, encourage and guide enterprises to participate in the recycling and utilization of solid waste resources, promote the circulation and reuse of solid waste resources.

8.2.2. Strengthen Policy Support

The government should strengthen the policy support for the recycling of construction solid waste and improve the pertinence and operability of the policy. At the same time, encourage and guide enterprises to carry out the work of solid waste resources, strengthen the policy implementation.

8.2.3. Improving the Technical Level

Strengthen technology research and development, improve the technical level, and promote the innovation of construction solid waste recycling technology. At the same time, improve the technical standards and norms, improve the quality and efficiency of construction solid waste recycling.

8.3. Outlook

In the future, China's construction solid waste recycling will face more challenges. We should adhere to the principle of market, take effective countermeasures, strengthen the recycling and utilization of solid waste resources. Specifically, there are the following aspects:

8.3.1. Strengthen Industry Collaboration

The establishment of industrial cooperation mechanism, encourage cooperation and alliance between enterprises, jointly promote the development of construction solid waste resources.

8.3.2. Strengthen Social Publicity

Social publicity should be strengthened to improve the public's understanding and awareness of the recycling of solid waste in construction, and to promote the public to participate in the work of recycling solid waste.

8.3.3. Strengthen International Cooperation

Strengthen cooperation with the international community, learn from foreign advanced experience and technology, and promote the development of China's construction solid waste resources.

To sum up, the development of China's construction solid waste resources is faced with many challenges, but also has a broad development prospect. We need to uphold market-oriented principles, strengthen policy support and technological innovation, promote the recycling and utilization of solid waste resources, and make contributions to building a resource-conserving society.

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