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OPPORTUNITIES AND CHALLENGES IN THE PURSUIT OF SUSTAINABLE URBAN DEVELOPMENT

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Abstract: Transforming the current over-consumption cities into "waste-free cities" is a progressive urban development strategy. In view of the theoretical gap of "waste-free cities" in my country, this article systematically combed the relevant foreign literature and elaborated on the urban waste The seriousness of the threat, and summarized the opportunities and challenges currently faced by my country in building a "waste-free city".
Keywords: Waste-free city; Waste problem; Opportunities and challenges

1 THE THREAT OF URBAN WASTE PROBLEMS

In December 2018, the General Office of the State Council released the "Work Plan for the Pilot Project of "Waste-Free City"", proposing to coordinate the solid waste management in economic and social development through the pilot project of "Waste-Free City", explore the establishment of a quantitative indicator system, and form a feasible Requirements for a replicable and scalable construction model. However, for now, in the process of implementing "waste-free", there are still debates about the balance between social environmental benefits and economic burdens, and there are also theoretical gaps in how to promote the construction of "waste-free cities". This article systematically reviews relevant foreign literature and focuses on analyzing the opportunities and challenges that may be encountered in the process of building a "waste-free city", with a view to providing some reference for the construction of a "waste-free city".

1.1 Overview of Waste Issues

Along with the global urbanization process, the generation of municipal solid waste has increased significantly in the past few decades. High-income countries generate 500kg or more of municipal waste per person per year, while emerging countries including China generate 200~300kg per person per year. It is estimated that 2 billion tons of municipal solid waste are currently generated worldwide every year. By 2025, the municipal solid waste generated by each person in the world will reach 7 billion tons if calculated based on the current per capita emissions of San Francisco [1]. Today's consumption-driven society generates a lot of waste, and the production process has transformed into a complex system. The use of composite and hazardous materials has made the composition of municipal waste increasingly complex, causing damage to the environment and expensive to manage. The sources of waste we generate today are also complex. The diversity of waste forces policymakers to choose only inefficient and environmentally polluting waste management methods, such as landfills. However, the shortage of urban landfills has forced the waste management department to There is a need to find an alternative waste management system [2].

1.2 Dilemma of Waste Reduction Measures

Achieving, but worrying, research states that solid waste is growing faster than population and economic growth and that unless “aggressive sustainability strategies are successfully implemented,” there will be a “maximum value for global waste generation.” It may not appear until 2100. Waste problems and waste-related problems will lead to disasters (such as ocean plastics, dissipation of chemical toxicity, food waste, nuclear waste, etc. [3]). The breadth and diversity of the waste problem overlap with Earth's systemic causation (e.g. history, geography, infrastructure and technology, vested interests, ideology, etc.), which increases the complexity and divergence of the waste problem. The International Solid Waste Association (ISWA) pointed out in the Global Waste Management Outlook (GWMO) that currently an estimated 2 to 3 billion people in the world live under the most basic waste management system, and about 41% of the world's waste is handled by default. The method is uncontrolled burning, fueling concerns about the environmental consequences of systemic failures in global waste management. Although many developed and developing countries are vigorously implementing waste recycling policies, it is estimated that only 1/4 to 1/3 of the 3.4 billion to 4 billion tons of municipal solid waste and industrial waste produced globally every year is recycled [4]. The more difficult problem is that among different types of solid waste, the recycling rate of plastics, paper, and glass is relatively high, while the recycling rate of metals is at an extremely low level. In particular, the rare metals required for industrial production are being continuously used by us. Disposal and landfilling, if no action is taken, resource depletion will be the first to deal a fatal blow to human society before waste causes serious urban problems.

1.3 The Connotation and Significance of “Waste-Free City”

Under the threat of serious waste problems, the "Waste-Free City" based on urban waste management was proposed. "Waste-Free City" strives to face up to the urban waste problem, build a working framework to accept different opinions and behaviors, and accept the community. Or non-governmental organizations participate in the treatment of urban waste, oppose waste incineration and landfill, try to change the current waste production method and people's disposable consumption habits, reconstruct the current urban production and consumption model, and continuously reduce waste generation in " Under "business as usual" conditions, urban waste reduction, recycling and utilization can be quickly promoted. Its ultimate goal is to shift human society away from linear material flows and transform it into an economic development model in which materials circulate continuously within the urban system.

2 OPPORTUNITIES TO BUILD A “WASTE-FREE CITY”

2.1 Social Dimension - Exploring Models for Future Eco-Cities

Zaman believes that there have been two problems in the construction of ecological cities in various countries for a long time. First, eco-cities with high ecological footprints do not meet the connotation of "ecology"; second, based on the current standards of eco-city construction, the earth will be unable to accommodate the current population. As a sub-concept of ecological cities, "no waste city" has become an experimental plan to explore the harmonious coexistence of cities and nature. Although "no waste" is semantically contradictory between existence and reality, it serves as a This optimistic ideal goal will continue to spawn new technologies that enhance urban bionics. For example, some scholars have proposed that the improvement of urban composting and organic recycling systems will make urban agriculture more widely used [5], and the city's nutrient cycle will bring less energy consumption and food waste. Various possible new technologies will transform future cities into a disruptive new form—a self-sufficient industrial ecology with zero energy consumption, zero waste, and environmental sustainability [6].

2.2 Government Dimension - Forming a New Urban Governance Model

The problem of urban solid waste requires active promotion by the government and inevitably involves the participation of enterprises and citizens. This is a complex challenge that tests social cohesion. The city is like a living "laboratory", and the government must actively seek long-term cooperation among different stakeholders to provide an alternative, participatory, democratized, and integrated new environment for jointly generating solutions [7]. How should waste management responsibilities be defined to better achieve the goal of “no waste”? Is the municipal waste management system provided by the government or the private sector? How to be more economically efficient? These are all issues that need to be explored in the process of building a “waste-free city”. As people's understanding of environmental threats gradually deepens, experimental governance practices will be increasingly accepted, and the cost of destructive innovation and transformative transformation of existing governance models will be at a low level. This is also an important step in reshaping the relationship between government and society. , an opportunity to form better urban governance relationships.

2.3 Enterprise Dimension - Generating New Industries and Production Processes

Recycling resources from dumped consumer products is increasingly important as waste is increasingly viewed as a valuable resource. As overconsumption becomes the norm and the amount of electronic equipment scrap is growing rapidly, these sought-after specialty metals, such as palladium, dysprosium and neodymium, are becoming increasingly valuable. Recently, some scholars have proposed the idea of "urban mining", which is to dig out electronic waste from landfills and recover the precious metals in it. Some recycling experts predict: "The mining of urban landfills may become a big business in the future." [8] In addition, waste recycling processing in some developed countries has entered the stage of industrialized operation mode, and Switzerland has for many years been leading from other European countries. The country imports waste for resource recycling. Due to its highly developed waste processing industry, the proportion of resources recovered from waste reaches 77%, while the proportion in the UK is only 25%. The benefits brought by high-level waste treatment technology are dual (environmental and economic). It is foreseeable that the development of waste treatment-related industries will bring about the birth of a number of new technology companies and great progress in treatment technology.

2.4 Citizen Dimension - Improvement of Community Space and Living Environment

Most of the time, people are unwilling to change their behavior and lifestyle, despite the huge pressure their high levels of consumption put on the planet. Therefore, education and publicity aimed at changing citizens' consumption behavior are very important. In developing countries, even without a budget, there are ways to improve waste management and change citizen consumption behavior. For example, Curitiba, Brazil, uses an innovative waste collection method, the Green Exchange Program, to encourage slum dwellers to clean up their areas. To improve public health, the city government provides free bus tickets and fresh vegetables to those who collect garbage and take it to community centers, and children are allowed to exchange recyclable items for school supplies or toys [9]. Changes in people's attitudes towards consumption and waste will not only help reduce unnecessary waste, but also make the community's

living environment more superior. These two parallel processes will continue to interact with each other and reshape the face of the city.

3 CHALLENGES IN BUILDING A "WASTE-FREE CITY"

3.1 How to Establish Producer and Consumer Responsibility Systems

Waste is generated due to consumption. It is obviously difficult for the government to provide corresponding public services for the growing urban waste. Linking waste to consumption behavior is an inevitable choice for implementing the waste responsibility system. However, in practice, the producer responsibility system implemented in Germany There is a problem of low waste disposal rate and disposal efficiency. It is difficult for producers to efficiently recycle waste products from garbage collection points [8], and the consumer responsibility system represented by the disposal tax (garbage tax) faces the problem of insufficient incentives. The problem is that the abandonment tax separates the obligation to reduce waste from citizens in the form of taxation. After paying the tax, citizens no longer have a conscious sense of responsibility, and may instead cause an increase in waste.

3.2 How to Balance the "No Waste" Goal and Implementation Costs

Under current conditions, "no waste" is expensive. In fact, according to research by the British Engineering and Physical Sciences Research Council, recycling waste paper will in some cases produce worse environmental benefits than incineration. Some studies believe that for citizens, the cost of classifying garbage is 5 to 10 times higher than disposing of waste indiscriminately. Not only that, cities must establish an effective garbage transfer and processing system to make citizens more comfortable. Efforts will not be in vain. The goal of "no waste" is progressive. The government needs to choose an appropriate implementation cost range to implement the "no waste" policy. This is a specific problem faced by every city's government.

3.3 How to Evaluate "Waste-Free City"

"Waste-free" is specific and difficult to achieve. In the process of promoting the construction of "waste-free city", how to quantitatively evaluate the degree of "waste-free" in a city is one of the difficulties in practice. In the existing literature, there are generally three tendencies: index coreization (single index), index systemization (complex system), and index framework (simple system). Each tendency has its advantages, disadvantages, and application scenarios [10]. When establishing an indicator system for evaluating my country's "waste-free cities", we should comprehensively measure whether the data can match the indicator system, whether comparisons between cities are convenient, and whether the indicators can fully reflect the entire process from production to recycling, etc. , exploring a complete set of quantitative evaluation systems for "waste-free cities" is an important direction for future research.

3.4 How to Establish a Reasonable Action Plan and Timetable

Waste management is an important part of the sustainable urban model, and the "waste-free city" is the ultimate vision based on this model, but without a properly defined action plan and a well-coordinated execution timetable, it will be difficult to transform the current Cities become "waste-free cities" [8]. The urban transition phase requires the comprehensive construction of a city's waste-free management strategy based on the comprehensive coordination of tools, systems and technologies. This includes a series of action plans with specific goals and a matching and deepening time sequence. The city will At certain specific points in time, we will enter a new stage closer to the goal of "no waste". It should be noted that these tools, systems and technologies must also be economically realistic, engineering feasible and effective within the governance framework of each locality. valid on.

COMPETING INTERESTS

The authors have no relevant financial or non-financial interests to disclose.

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