Guiyang Circular Economic Ecological City Planning and Construction

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Keywords: Guiyang City; Circular Economy; Eco-city; Planning and Construction

Abstract: Guiyang is one of the first circular economy Eco-cities built in China, and its overall plan is to maximize resource utilization and minimize pollution emissions. The economic development strategy of Guiyang City's circular economy ecological city planning and construction is a development path that integrates clean production, comprehensive resource utilization, ecological design, and sustainable consumption. This study analyzes the general background and goals of the planning and construction of a circular economy eco-city in Guiyang, and builds a "three-dimensional model of a circular economy eco-city in Guiyang" .This study provides a theoretical and practical basis for the economic development, environmental protection, and overall progress of many cities in southwest China.

Introduction

Guiyang, China is the capital of Guizhou Province, an inland province of China, and an important capital city of China. Guiyang East Station is a railway transportation hub in the southwest. Urban planning and construction in the urban area plays an important role in the development of inland areas in the west of China. The development of Guiyang is affected by the ecological environment and the economic development process has slowed down. The planning and construction of a circular economy ecological city has become the way out for economic development in the region. By developing a circular economy, the region solves the problems of the industrial recycling system encountered in the urban construction process, the construction of urban infrastructure systems, and the optimization of the ecological security system. In constructing a "three-dimensional model of a circular economy eco-city in Guiyang", the relationship between circular economy and market economy, the structure and function of ecological cities, sustainable development, and the comprehensive construction of a wealthy society were all taken into consideration. In the end, a set of characteristic development models based on the guidance of economic and ecological laws and the unification of economic, social and environmental conditions were established.

I. Planning objectives and background

To construct a "three-dimensional model of a circular economy eco-city in Guiyang" and conduct a pilot project to provide a unique and sustainable development path for the development in Western China. The project started as the "Guiyang Circular Economy Eco-city Construction Master Plan" project on August 31, 2003, and was jointly planned by the State Environmental Protection Administration and the Guiyang Municipal Government.

II. Dimensional model

(I) Basic economic development model

The "Resources-Products-Renewable Resources" type of economic form is in line with international standards. As China's first circular economy pilot city, Guiyang City has integrated the multidisciplinary advantages of Environmental science ， engineering, chemical engineering and

building science , etc. These subjects work together to help the concept apply faster and more comprehensively.

(II) Basic direction and analysis of advantages and disadvantages

The three-dimensional model is based on Guiyang's current economic, social, and environmental status and strategically builds circular economy in Guiyang as the starting point.

Favorable factors for the strategic objective of circular economy: In the new period of economic construction, the direction and thinking of economic development actions have been clarified through the establishment of a new position. Reform and opening up have continuously and vigorously stimulated the vitality of the markets economy. Improved macro-controls have promoted sustainable and healthy economic development.

The government has continuously shown positive effects through major reforms and policies that have been introduced in the early stage. The municipal government has unveiled new huge development potential through a series of major strategies. The government insist on the people as the center and people play the role actively and creatively.

Restrictions on strategic objectives of circular economy: external effects lead to market failure, external conditions of asymmetric external information; government failures hinder the development of circular economy, which is reflected in the lagging of circular economy policies and regulations, weak government enforcement and inadequate government assessment mechanisms.. Public consciousness is not strong, the development of circular economy is superficial.

(III) System construction

"Guiyang City's three-dimensional model of circular economy ecological city" system mainly includes the core system and the circulation system. The content includes recycling economy industrial system, urban infrastructure system , ecological security system, chemical industry, light industry and building materials industry, etc. In the development direction, the model based on the urban planning and construction of the attempt to build a well-off society in Guiyang City and take a new type of industrialization. This plan has been proved to be a realistic development model in terms of design thinking, design goal planning, scientific design and operability of the design. The specific mode is shown in Figure 1:

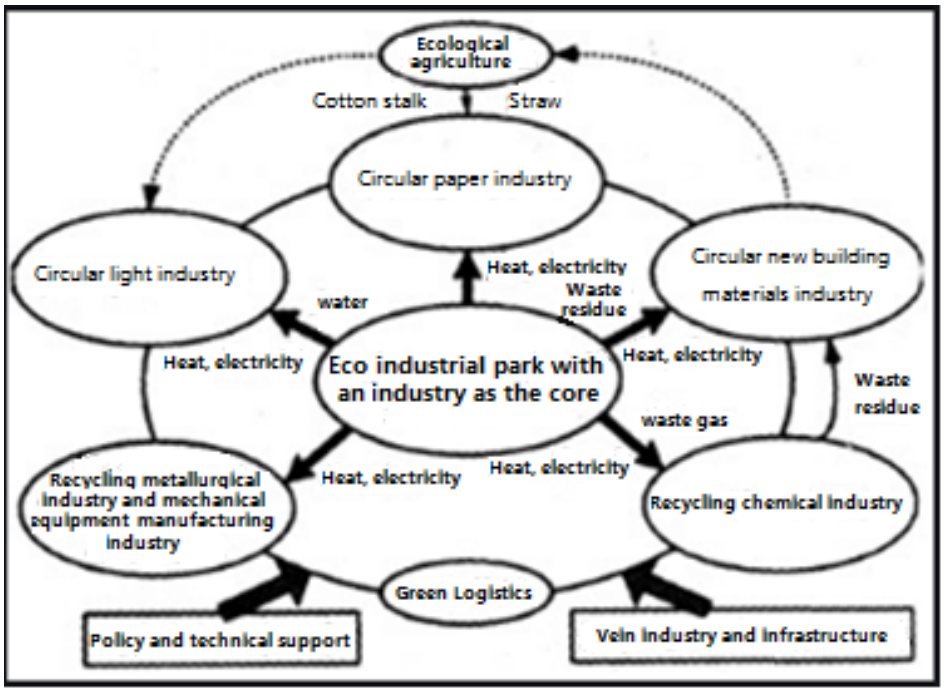

Figure 1. The eco-industrial park planning in Guiyang as a example

(IV) Planning details

After the planning and construction of a circular economy eco-city in Guiyang, a pilot project has been launched and in-depth investigations were conducted by the inter-ministerial coordination group of the urban construction pilot, the municipal ecological environment bureau, and the municipal key office. As an important carrier of urban planning and construction, the circular economy industrial park, the trial during operation stage, the overall planning of the industrial park, the construction of the starting area, and the production and operation of the pretreatment workshop (waste treatment process: feeding, upgrading, sorting, crushing, heating, separation), domestic waste incineration power generation projects (disposal capacity, construction progress and estimated operational time) and other specific projects were included in in-depth study.

Machinery manufacturing is the core industry in the XX Industrial Park, and future industrial clusters will be a competitive focus in urban development. Specific planning is developed as a growing industry chain model. The industrial park develops leading enterprises and owns supporting industries and supporting services. It has a complete industrial collaboration mechanism (consulting, planning, research and development, design, manufacturing, inspection, commissioning, monitoring, maintenance, recycling).

Specific layout design thinking: The key industries —supporting industries —parts processing plants according to geographical advantages and industrial foundation ~~the~~—form the complete layout.

(V) Design expectations

The planning and construction of a circular economy ecological city is driven by the investment, construction and operation of a circular economy industrial park. Guiyang xx Chemical Co., Ltd. is taken as an example, as a professional production and processing enterprise that produces polyacrylamide, drilling mud materials, carboxymethylcellulose, sewage treatment chemicals, paper dispersants and other products. The company always adheres to the circular economy concept as the priority to build a circular economy relationship between enterprises, as shown in Figure 2:

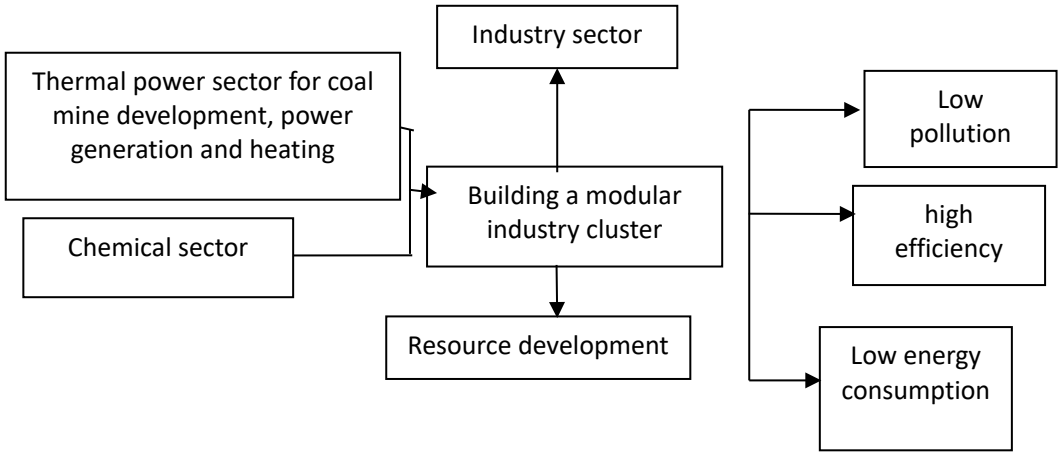

Figure 2. Guiyang xx Chemical Co., Ltd circular economy

(VI) Research Summary

The new industrial park development model provides a sustainable development path to solve problems such as resource shortages and environmental pollution. It is guided by the theory of circular economy and industrial ecology, upholds the sustainable development model, and runs through the materials circle and energy flow in organizational forms. Sequentially transmitted to each link, a symbiotic combination of exchange of by-products and shared resources was constructed [1]. Analyze typical cases of planning and summarize similarities. Plan and design with development goals, principles, zoning, planning points, planning strategies, environmental

restoration design, and environmental protection design [2]. Integrate the construction of artificial function service facilities and the protection of rural green ecological space to meet the needs of multi-dimensional spatial developments of rural ecological, social, economic, and cultural functions in southern Jiangsu. The infrastructure is used as a framework to accommodate the coordinated development of gray and green infrastructure Resilience planning of infrastructure [3]. The SWMM (Storm Water Management Model) model was used to estimate and evaluate the design results of the Yangtze River East Avenue, and it was concluded that the rainwater runoff control of sponge urban roads is better than traditional urban roads .The hydrology is similar to the hydrology before the site development. The environment is conducive to protecting the ecological environment of urban road systems [7].

Comprehensive scholars' progress in the field of circular economy ecological city planning and construction requires Guizhou to follow the layout of academics in the process of urbanization to accelerate the layout of ecological industrial parks and ecological economic zones. In terms of system construction, we have established an institutional system that is suitable for the harmonious development of urban and rural integration, and has adopted a coordinated development of “energy saving, emission reduction, and sustainability” among the large, medium, and small cities in Guizhou. The ecological model further provides a feasible reference for the long-term development of the region and the inland areas of the Southwest.

III. Model optimization

The optimization of the three-dimensional model of a circular economy eco-city in Guiyang is mainly based on the value of a superior circular economy city as a basis to promote the construction of ecological civilization. First of all, strengthen ecological protection and restoration, which is specifically delineated and strictly adhered to the ecological protection red line to control important ecological spaces ， protect ecosystems and eliminate illegal situations in nature reserve,enforce natural forest ecosystems, wetland purification projects for the wetland protection and restoration, Comprehensive management of desertification, soil erosion and air pollution need to be used, Improve air pollution comprehensive treatment and water pollution purification system and make control plans to protect clean water resource.

Conclusion

Guiyang City's circular economy as well as the eco-city planning and construction has developed a unique development model that focuses on "guidance of economic and ecological laws and the unification of the economy, society and environment. " and the achievements of the model at this stage has played a guiding role in the development of many cities in the Western region.

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