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Research on the Planning and Design of Chongqing Old City Renewal Based on Health Utility

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Abstract: In the face of global natural disasters, epidemics and other related emergencies, the ecological space is threatened, and the emergency response capability of the old city is particularly important. This paper takes the research on the green and low-carbon micro-renovation design of the old city space in Chongqing as an example, based on the implementation strategy of "carbon source sequencing-index parameters-renovation technology-implementation management". Combined with the influencing factors of spatial carbon source index and the current carbon emission in the old city, the relevant evaluation system is established, which provides reference for the development direction of green and low carbon, circular economy and eco-city in China.

1. Introduction

In the face of global natural disasters, epidemics and other related emergencies, the emergency capacity of the old city is particularly important, and the creation of human settlements and the pursuit of healthy human life have become the focus of urban development, building a healthy city is the main direction of future urban construction.

In 2021, "Urban renewal" was written into the government work report for the first time in, and not long ago, the State Council's "peak carbon dioxide emissions Action Plan to 2030" listed "Urban renewal to meet the requirements of green and low carbon" as the key task of the national peak carbon dioxide emissions action, indicating that China's urban renewal work has become increasingly urgent, and a new national strategy focusing on urban renewal in low-carbon life has been implemented. In August, 2021, the Ministry of Housing and Urban-Rural Development issued the Notice on Preventing Demolition and Construction in the Implementation of Urban Renewal Action (Draft for Comment), which reflects that the country has begun to collectively reflect and correct the urban renewal model of demolition and construction in the past from the top-level design level. The "14th Five-Year Plan" emphasizes "deepening the low-carbon transformation in the construction field and building a low-carbon city", and the Ministry of Housing and Urban-Rural Development requires urban renewal to "take green and low-carbon development as the path". In August, 2022, Chongqing Municipal People's Government issued the 14th Five-Year Plan for Urban Renewal and Upgrading in Chongqing, in which it mentioned that the transformation of green and low-carbon was continuously deepened. With the opportunity of urban renewal, low-carbon life's urban construction

was taken as the goal, and low-carbon life's upgrading of urban stock space became the main path to realize urban construction and carbon emission reduction in low-carbon life.

Based on the national actions of "green and low carbon", "healthy living" and "urban renewal", this study starts from the actual situation of the old city of Chongqing, from point to surface, from micro to macro, and integrates the systematic theory of green and low carbon urban renewal practice with the overall dimensions of "goal, index, technology, planning and implementation" to provide theoretical support for the mutual coupling of "green and low carbon city" and "urban renewal" in Chongqing[1]. The renewal of green and low-carbon cities is an important national undertaking in China. Only through the overall coordination of the general meeting system, the cooperation of the core and supporting programs, and the professional guidance of each coupling system, can we better promote the continuous development and progress of domestic cities in the direction of green and low-carbon, circular economy and healthy ecological cities, and promote the development of China's green and low-carbon city renewal cause, thus enhancing people's well-being. Under the dual guidance of "health" goal and green and low-carbon city renewal, the paper uses systematic strategy to make overall planning and design of all elements of the renewal area and comprehensive green and low-carbon transformation and upgrading, so as to find the main implementation path and strategy for the transformation of the old city in Chongqing. Furthermore, the urban concept of low-carbon life will be further promoted to the effective implementation of the sustainable development strategy of urban renewal in cities across the country, so as to realize high-quality urban development and regional revitalization.

2. Related research background

2.1. Related research progress

"Health" and "green and low-carbon micro-renewal" have become highly consistent and universal demands and visions of all cities, and have also become new academic hotspots. The major developed countries in the world have made in-depth research on the renewal of green and low-carbon cities and achieved certain results. In the renewal of green and low-carbon cities in South Korea, it is necessary to systematically carry out urban renewal planning, set low-carbon life indicators and implement corresponding technical methods. Through long-term research and practice, South Korea has completed the practical experience of low-carbon life's urban construction goals and sustainable urban governance. Encouraged by national laws and policies, relevant achievements have been made[2]. It includes the basic concept goal, overall planning strategy, specific design method, index and technical system, carbon emission calculation and other contents of low-carbon life urban renewal, and also includes the perspectives of implementation management and other fields. The large-scale urbanization process in western countries has come to an end, and rich achievements have been made in the development mode of green and low-carbon cities. However, most of the research and practice achievements are concentrated on the green and low-carbon indicators and technologies of communities or buildings, and there are few cases that systematically investigate the realization path of green and low-carbon cities based on overall planning thinking.

Chou Baoxing, Vice Minister of Housing and Urban-Rural Development of China, further stated on the theory of "Rebuilding Microcirculation" at the 2016 Silicon Valley High-tech Innovation and Entrepreneurship Summit: To solve the urban diseases caused by rapid development, it is necessary to enhance the urban connotation, improve the living environment and advocate green development, and the idea of entrepreneurship should be oriented to rebuilding and finding back the urban microcirculation. The State Council's opinion on the renewal of old urban communities pointed out that the renewal and development of old urban areas should adopt orderly repair and organic renewal to restore the vitality and develop the old urban areas.

To solve many problems of environmental decline and cultural loss in the old city with the purpose of being able to continue the historical context and show the city's style[3].

China's healthy city theory and the achievements of green and low-carbon cities are in the primary stage, and a complete system theory system has not yet been formed. Most of the existing studies have been carried out from two separate perspectives: "urban renewal" and "green low carbon", which lack academic achievements in deepening and upgrading, comprehensive planning and implementation. At present, the research on green and low-carbon urban renewal focuses on the micro-fields such as building renovation and environmental renovation, and the research lacks comprehensiveness and systematicness, and the renewal theory and policy formulation are not perfect enough; The index selection, implementation strategy and management system of low-carbon city renewal are very lacking[4]; Moreover, the regional systematic development is poor and the sustainability is poor. A large number of renewal projects still have problems such as demolition and construction, urban waterlogging and neglect of green and low-carbon governance. The traditional extensive urban transformation methods with high energy consumption, high carbon emission and high pollution are still active in the realistic urban renewal projects, and the quality of urban life has not been fundamentally changed. There are few studies on the overall planning of "low-carbon life City" and "Urban Renewal". Green cities urgently need to change the high-energy development mode of urban renewal and explore the renewal path (Figure 1).

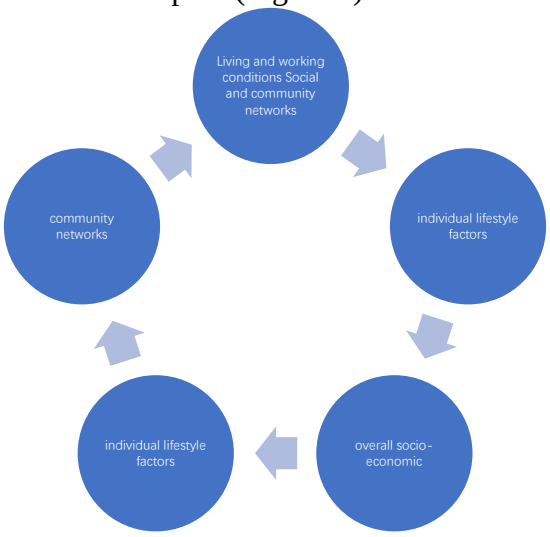

Figure 1: Urban Health Impact Model

2.2. Problems existing in urban renewal and development

With the development of urbanization in China entering another stage, urban renewal, which is different from the traditional renewal mode of high energy consumption, large-scale demolition and large-scale construction, realizes the improvement of spatial quality and avoids the high-carbon locking effect through the low-carbon transformation of built-up areas. It has achieved the goal of green and low carbon, improved the use value of existing space, combined with environmental improvement to improve urban quality and guide healthy life, and promoted an intensive, efficient, healthy and environment-friendly urban model. The research on green and low-carbon and urban renewal in Chongqing is still blank, and the related systematic exploration is still insufficient[5].

2.3. Chongqing green low-carbon city renewal research objectives

(1) Clarify the spatial types, characteristics, components and carbon cycle system of the old urban

renewal area in Chongqing.

Starting from the concept of "green and low-carbon urban renewal", this paper studies the types and components of existing spaces in Chongqing, sorts out the spatial relationship and type characteristics between renewal spaces, and integrates the carbon source components and carbon cycle system (fixed carbon source, mobile carbon source, process carbon source, natural and artificial carbon source) of Chongqing renewal space.

(2) Find strategies and implementation paths suitable for Chongqing's urban green and low-carbon renewal.

Comprehensive analysis of the transformation of energy saving and emission reduction in the old city renewal space in Chongqing, the improvement of low-carbon measures, the travel situation of green transportation, the sound market of green buildings and green industries, etc., combined with the "health" orientation, clear the strategies suitable for Chongqing's green and low-carbon city renewal[6].

(3) Popularizing Chongqing's green and low-carbon renewal construction strategy is the main path to realize the task of carbon emission reduction.

On the basis of the construction strategy of green and low-carbon renewal, taking the planning and design of an updated space in Chongqing as a practical case, we strive to establish Chongqing's green and low-carbon city renewal as a "demonstration point", and gradually promote it from point to area, so as to enhance the competitiveness of Chongqing's city and promote the transformation of the city's spatial structure to sustainable development, effectively promote the development of China's green and low-carbon city renewal cause and enhance the comprehensive ability of the city(*Figure 2*).

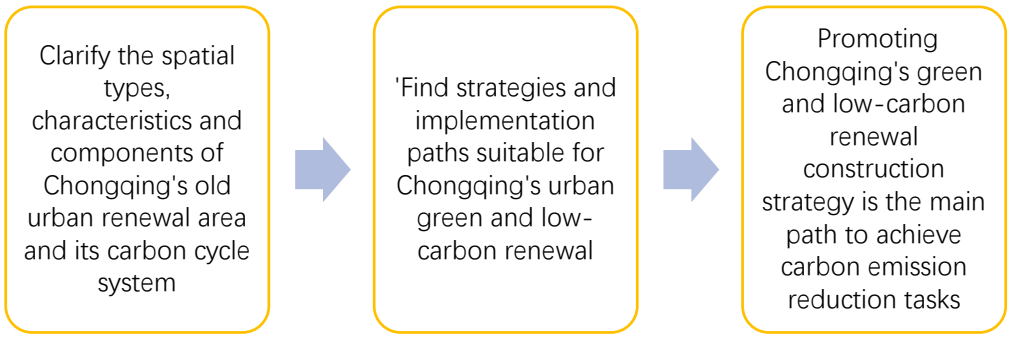

Figure 2: Research objectives of low-carbon urban renewal

3. Construction of green and low-carbon micro-renewal index system and strategy research in Chongqing old city under health orientation

Combined with national actions such as "green and low carbon" and "urban renewal", we will implement a new national strategy focusing on urban renewal in low-carbon life. Low-carbon life upgrading of urban stock space has become the task of building a green and low-carbon city and implementing carbon emission reduction. This study focuses on the old city renewal space in Chongqing, focusing on the strategic construction and path research of green and low-carbon urban renewal, organically integrating the "healthy" goal with the urban green and low-carbon renewal strategy, and trying to explore new propositions arising from the development of the times[7]. Drawing on international experience, based on the urban system view and holistic view, this paper constructs a high-quality urban renewal framework with the goal of "health" from three levels: urban governance, district renewal and district creation, innovates the design of green and low-carbon district renewal, explores the mode of high-quality community co-construction, co-governance and

sharing, and forms a high-quality urban renewal system with both green and low-carbon and quality improvement (Table1).

Table 1: Health-oriented Green and Low carbon Micro-renewal Strate

Update target	Top-level design	Planning innovation	Implementation guarantee
Carbon source cardin	Carbon sink network Index selection Sharing: healthy low-carbon space		
Index parameter	Carbon sink network	Index selection	Co-construction:quality public facilities
Updating	Urban characteristics	Index composition	Co-construction:quality public facilities
technology	Organic renew	Index evaluation	Co-construction:quality public facilities
Implementation management	Quality city governance framework	Planning programming	High-quality area sharin

3.1. Chongqing old city renewal space type characteristics analysis

Chongqing is a typical mountainous city, and the construction land in the old city area is irregular or concentrated in pieces; The overall building density is high, and the vertical height difference is large; Effective use of space is scarce and outdated; Green infrastructure and living environment are dilapidated and lack of vitality[8]. According to the Guidelines for Planning and Design of Urban Renewal in Chongqing issued by Chongqing Planning and Natural Resources Bureau, focusing on the four most representative types of renewal areas in Chongqing, namely, old residential areas, old commercial areas, old factory areas and old blocks, the planning and design guidelines with different characteristics are put forward according to different status quo characteristics, resource endowments and existing problems.

(1) In the aspect of renewal of old residential areas, the focus is on "micro-renewal", respecting residents' wishes, filling in and upgrading files, improving community facilities, strengthening the construction of integrated pedestrian bus, inheriting community history and culture, repairing public spaces, revitalizing idle resources, and promoting the application of green and low-carbon renewal technologies.

(2) For the renewal of old business districts, we should guide public functions such as commerce to extend to characteristic streets and lanes around business districts in an orderly manner, strengthen the separation of transit traffic, improve the internal traffic organization mode of giving priority to public transportation and walking, improve the service level of TOD stations, increase the connectivity of underground garages and shape urban landmarks and nodes.

(3) In the aspect of renewal of old factory areas, cultural inheritance and characteristics are highlighted, and the old factory areas are integrated into urban texture through ecological restoration, environmental landscape shaping and building retention, modification and demolition, so as to increase attractive public space and public functions for the city and promote the transformation and upgrading of old factory areas.

(4) In the aspect of renewal of old blocks, it is emphasized that on the basis of clear protection elements, historical and cultural resources should be protected, repaired, activated and utilized, innovative formats should be developed, and historical stories should be told well.

In the process of urbanization, these old urban spaces gradually become obsolete, and evolve into various negative, unhealthy and lifeless urban spaces(*Figure 3*). The traditional spatial forms can no longer meet the needs of modern life, which is different from the modern spatial model. Some public service facilities are insufficient and obsolete, and have long lost their functions. Street life is gradually disappearing, and the walking environment is deteriorating(*Figure 4*), which can not meet the current green and low-carbon urban development and people's demand for a healthy life. Therefore, green and low-carbon renewal of urban renewal space is the main path to realize healthy living and implement carbon emission reduction tasks(*Figure 5*)[9].

Figure 3: Economic environment is declining,

Figure 4: Green infrastructure c human settlements are dilapidated and block

Figure 5: Lacks vitality

3.2. Determine the index system of green and low-carbon micro-renewal in the old urban area of Chongqing

This paper analyzes the theories and practices of green and low-carbon urban renewal at home and abroad, analyzes the urban spatial planning layout, construction and operation, the whole process of

building, lifestyle and other aspects from the top-level design, planning innovation and implementation guarantee, analyzes the root causes of the phenomenon of "non-low-carbon" in Chongqing's renewal space, determines the low-carbon index system of Chongqing's green and low-carbon renewal, that is, "index selection-index composition-index evaluation", and determines the index type of urban renewal carbon source and its carbon emission reduction effect(Table 2). Formulate comprehensive and feasible green and low-carbon city renewal goals and establish simple, reproducible and scalable operation systems and procedures. Clear the concept suitable for Chongqing's green and low-carbon city renewal.

Table 2: Green and Low-carbon Micro-renewal Index System and Corresponding Technical Methods in Old Chongqing

category	Index layer	assessment result			computing technique
		serious	medium	slight	
build	The building is compact and dense.	√			Promote mixed use of land, increase parks and green spaces, introduce environmentally friendly vehicles and expand proprietary roads.
	Lack of life circle in walking center		√		Add tree-lined trails
	Generation of heat island effect		√		Add air duct
	Lack of application of new renewable energy sources	√			Use solar energy to generate electricity
	Construction of energy-saving buildings			√	Adopt LED lighting, use environmental protection materials and structural equipment.
traffic	Bicycle use		√		Increase the burden rate of bicycles
	The use of energy-saving vehicles		√		Bus using compressed natural gas (CNG)
Greening (absorption)	Stereoscopic greening and roof greening			√	Increase roof and wall greening
	Planting of carbon absorption source		√		Increase the area of park green space and build ecological network
	Systematization and protection of park green space		√		Increase the area of ecological park
	Construction of hydrophilic space pair		√		Increase ecological runoff
waste	Rainwater and heavy water utilization			√	Increase rainwater and heavy water production capacity
	Discharge of domestic garbage	√			Garbage sorting and recycling

3.3. Construct the implementation strategy of "carbon source sorting-index parameters-updating technology-implementation management"

This paper analyzes and summarizes the types and characteristics of Chongqing's urban renewal space, and clarifies the relationship between the content of low-carbon life's urban renewal planning, carbon source indicators and technical system. Quantitatively evaluate the relative importance and priority of indicators at all levels, and select and establish the final core and applicable green low-carbon indicator system according to the applicability of indicators by using expert questionnaires.

The carbon emissions in the renewal area are divided into construction, transportation, absorption and waste, and the index layers of each category are subdivided. The corresponding low-carbon technologies are put forward for each index layer, so as to form a simple, easy-to-use, scalable and reproducible operating system and procedure, improve the corresponding implementation management strategy and build a database. Use systematic means to carry out overall renewal planning and comprehensive green and low-carbon upgrade for each coupling system in the renewal area.

Urban renewal has changed from the unitary governance led by the government in the past to the comprehensive governance path of "multi-governance". The interaction of "government, enterprise and people" encourages diversified participation and builds a pattern of co-governance. Make urban renewal a systematic project to promote the sustainable development, high-quality development and high-level governance of the city, and through the means of "micro-renewal" of multi-co-governance, co-construction and sharing, adhere to the logic of "government guidance, market subject and commercialization", deepen the implementation of the "integration of planning, planning, design, construction, operation and governance" model, attract more social capital and social forces to participate extensively, simultaneously promote community development and governance, give full play to the main role of residents, and enhance the city.

3.4. Promote the development and continuation of low-carbon life

As the core content of optimization strategy, low-carbon life is the basis of space creation. Low-carbon life refers to a lifestyle with low energy, low consumption and low expenditure, which reduces carbon dioxide emissions. Under the mode of low-carbon economy, people's life can gradually get away from the negative effects caused by unreasonable use of energy and enjoy a new life with the theme of economic energy and green energy-low-carbon life. Low-carbon life is to try to adopt a lifestyle with low energy consumption and low emissions in life. Low-carbon life is a healthy and green living habit. For example, green travel, water saving, CD action, garbage sorting, energy saving and other lifestyles can reduce energy consumption and its pollution to the environment, and can also improve the health of the public.

4. Summary

At present, green and low-carbon development is also a basic national policy of our country. Under the background that the country puts forward the goal of "double carbon" and the city enters the new normal of stock management, urban renewal integrating the concept of green and low carbon will become a hot and difficult point in urban and rural construction in the new era of our country. Based on the urban renewal space in Chongqing, this paper puts forward the path of green and low-carbon city renewal as "carbon source sorting-index parameters-renewal technology-implementation management", and defines the implementation strategies suitable for Chongqing's green and low-carbon city renewal, such as concepts, laws and regulations, standards and norms, and database construction. Through the overall coordination of the whole system, it can provide methodological

guidance for the green and low-carbon city renewal under the dual-carbon goal, provide theoretical basis for further national designation of green and low-carbon city renewal construction measures, improve urban renewal related laws and regulations, and standardize urban renewal system, and achieve the dual-carbon goal.

This study comprehensively considers the regional economy, society, culture, environment, people's lifestyle, and specific industries, functions, structures, and space governance. Based on the research, the coupling systems in the renewal area are comprehensively updated and planned and comprehensively upgraded with green and low carbon by systematic means. Find the main implementation paths and strategies for Chongqing to realize the urban construction of low-carbon life and the task of carbon emission reduction. Under the opportunity of green city renewal, low-carbon life's urban construction has been promoted, and low-carbon life upgrading of urban stock space has become the main path to realize low-carbon life's urban construction and implement the task of carbon emission reduction, so as to enhance people's well-being and enhance the city's competitiveness and international comprehensive ability.

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