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A Research on the Development Path of New Urbanization Based on Low-Carbon Perspective

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Abstract

China is in a decisive phase of building a moderately prosperous society, and the steady sequence of urbanization has great significance in promoting economic and social development. While in the process of urbanization, some problems are challenging the development quality of Chinese urbanization and the planning concepts of new urbanization, such as urban industrial pollution, agricultural high carbon emissions, high-carbon lifestyle of urban residents, etc.. Therefore, from low-carbon perspective and with the current status of Chinese urbanization development as the object for the study, the paper introduces the mainly high-carbon emissions in all aspects of the urbanization process in China and proposes a low-carbon ecological path for the sustainable development in the future.

Key words: New urbanization; Low-carbon; High-carbon problems

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INTRODUCTION

The National Plan of New Urbanization (2014-2020), printed and distributed by the Central Committee of the Communist Party of China and the State council, was issued by the Xinhua News Agency in March, 2014. *The Plan*, drawn up according to the spirit of the 18th National Congress of the CPC and the 12th five-year plan, sticks to the Chinese characterized path of New Urbanization. It is the macroscopic, strategic and fundamental plan to direct the healthy development of the nationwide urbanization during current and future periods. *The Plan* pointed out that the concept of ecological civilization should be fully integrated into the urbanization process; efforts should be paid to advance the green, cyclic and low-carbon development. It also proposed that we should make economic and intensive use of the resources as land, water and energies, etc., enhance the environment protection and ecological remediation, reduce intervention and damage towards nature, and encourage the formation of green and low-carbon production method and lifestyle as well as urban construction and operation mode. Thus, the research, studying the development path of urbanization based on low-carbon perspective, is not only responding to the spirit of *the Plan*, but also has certain significance to the steady sequence of the urbanization in China.

1. RESEARCH STATUS

1.1 The Research Status of Low Carbonization and New Urbanization

Low carbonization represents a new production method and life style with recyclability, ecology and sustainability, etc., and it is a revolutionary change to many aspects, such as energy consumption, economy structure, social lifestyle as well as technology. Specifically, the concept can be expressed as three “low”s and three “high”s: the former refers to low emission, low pollution, and low consumption, while the latter refers to high efficiency, high potency and high benefits (Lü, 2013).

During recent years, the Chinese research on low carbonization has deepened from macroscopic to microscopic views. From macro perspective, the contents

of low carbonization is divided into several layers as low-carbon society, low-carbon economy, low-carbon industry and low-carbon technology, etc., and measures and advice aiming at the domestic transition from high-carbon to low-carbon have been put forward according to the layers above (Zou, 2010). From micro perspective, scholars have connected low carbon research with the research of policy influence, city construction, low carbonization of specific industry and business, low carbonization of public service infrastructure and so on. For instance, Zhang (2012) studied the development status of low-carbon economy and the advice on its adjustment in terms of law; Dai and Chen (2009) described the methods to construct low-carbon cities from four aspects, peri-urban ecological service system, city plan and construction, city operation, and lifestyle; Chen (2011) studied low-carbon development as well as its solutions and advice from the green agriculture point of view; Jiao (2012) studied the low-carbon transition of the coal industry city; Zhang (2012), Sun (2012) and Zeng (2011) respectively analyzed the current status and future development of hotels from evaluation system, development path and countermeasures of development point of view; Liu (2011) researched into the problems of developing low-carbon cities from the view of public transportation and meanwhile proposed measures and advice on the public transportation service, low-carbon technology of public transportation tools and the optimization of public transportation system; Gao (2012) studied the low-carbon status and problems of the indoor living environment design. Judging from the above, low-carbon research is closer to the life of people though, scarce study has paved its way from the view of new urbanization.

Urbanization refers to an inevitable natural historical course with the industrial development, which mainly features in the urban concentration of the non-agricultural industry and the immigration of population from rural to urban areas. Urbanization is the objective trend of the development of human society as well as an important symbol of domestic modernization. New urbanization fundamentally features in the urban-rural balance, urban-rural integration, industrial-urban interaction, economic-intensive growth, ecological-livable standard and harmonious development. It is the urbanization that encourages the coordinate development and mutual benefits between new rural communities, small towns and cities, medium-sized cities and large cities, whose development isn't based on the cost of agriculture and food as well as ecology and environment. New Urbanization focuses on farmers, covers rural areas, aims to achieve urban-rural integration on infrastructure and the equalization of public service, to promote economic and social development, and to achieve common wealth. Recent years have also seen many researches on low-carbon from the viewpoint of the construction and development of small towns and cities. For example, Xu (2012) and Wang (2010) did their researches on the development path of low-carbonized cities from the perspective of the plan and construction of small towns and cities; while Gu (2012), further, took a specific district as an example: on account of the current status of low-carbonization in the small towns and cities in Dalian, Gu analyzed the development path of domestic low-carbonization of urban areas from the perspective of urban spatial planning.

Other than the above, Zhang (2011), Liu (2013), Dai (2013), and Zhang (2013), etc. respectively took the reclamation area of Heilongjiang province, Jilin province, Zhejiang province, and small coastal cities and towns as the research objects, and analyzed the construction and development path of low-carbonization within. Nevertheless, most researches at present are involved in the path of developing low-carbonization in small towns and cities from the microscopic view, and researches on low-carbonization are much less done on the macro-development of new urbanization. Therefore, the paper, established on the development plan of domestic new urbanization and based on the analysis of the current status of low-carbonization development, is carrying out the discussion about its development path overall.

1.2 Current Status of Domestic Urbanization

During the past thirty years after the reform and opening and with the fast development of the domestic industrialization, domestic urbanization experienced a developing process with a low starting point and a high speed. From 1978 to 2013, the population of permanent residents in urban areas increased from 170 million to 730 million, and the urbanization rate increased from 17.9% to 53.7%, which makes current period a fast developing stage with the rate within 30%-70% and an annual increase of 1.02%; the number of cities increased from 193 to 658 and that of the municipal cities increased from 2,173 to 20,113. The fast development of urbanization has absorbed a great many rural work forces to transfer employment, improved the efficiency of urban-rural allocation of production factor, driven the fast and steady development of domestic economy, brought deep changes to the society structure, promoted the comprehensive upgrade to the life of urban and rural residents and has made remarkable achievements.

However, China is still in the fast developing stage of urbanization, and the maintenance of the old, traditional and extensive development mode will cause risks such as slow upgrade of industry structure, deterioration of resources and environment, an increase in social conflicts, etc., which may also influence the process of domestic modernization. Thus, as the inner-outer environment and conditions are taking deep changes, domestic urbanization must be driven into the new transitional development

stage which concentrates on quality improvement and lays emphasis on the ecological balance, and it is called the stage of New Urbanization.

2. HIGH-CARBON PROBLEMS IN CHINA

2.1 Industrial High-Carbonization

The main impetus of domestic urbanization is industrialization. The development of a small town needs the driving force of an industrial enterprise, which means, country and towns, as the main source of labor forces, will gradually upgrade and develop at the influence of industrialization, with the improvement of supporting facilities and certain amount of increase in economic income. But meanwhile, small towns will also face risks unconditionally such as air pollution, water pollution and resource shortage that industrial enterprises possibly bring.

As domestic industrial technologies are not advanced enough, it is difficult to take 100% advantage of resources during the production process, as is also difficult to achieve zero-pollution emission. However, due to the technology defects and the lack of social responsibility awareness in the anaphase, many industrial enterprises fail to complete the second block to the emissions, which lead to heavy pollution. The discharge amount of sulfur dioxide, smoke, and dust has made up the highest proportion of the sum domestic amount for several years. Therefore, while urban residents are enjoying the economic benefits that industrial enterprises bring, they are facing the dilemma of air pollution. Secondly, water pollution is also another evil consequence of industrialization. On account of the lack of responsibility awareness towards environment protection in many enterprises, much wastewater and waste residue from industries directly goes into rivers and lakes without reasonable disposal, and radiant waste residue is also randomly disposed, which results in the heavy pollution of underground water in both urban and rural areas, great damage to the living environment and threats and inconvenience to the livelihood of residents. Thirdly, most of the domestic industrial enterprises are built close to the mine of resources and energies. The technology defects of many enterprises have directly caused low efficiency of mine resource usage and high waste rate, which mediately caused too much resource consumption and huge pollution. Nevertheless, the chase towards benefits still drives enterprises to continuously explore its local resources and energies. If this vicious circle exists longer, local resources of coal, gas and mine are about to decrease in a huge range.

Urbanization is an irreversible domestic trend, but the guaranteeing the living environment of residents in those districts during its process is a necessary aspect to concern. Thus, the establishment of low-carbon industries must be initiated during new urbanization process, and the concept of low-carbon should be penetrated through the whole process, with the guarantee of the living interest of urban residents on top.

2.2 High-Carbonization of Agriculture

Industrialization is the core of urbanization, while agriculture is the traditional reliance of human existence. Urbanization is not abandoning agriculture, but to achieve the integration of farmer's land and place it on an auxiliary position beneficial to the urban development. Although agriculture is not dominating in the urbanization process, the high-carbon effect it brings is still powerful. Agriculture contributes to the high-carbon career of urbanized agriculture whether from the agricultural machinery, chemical fertilizers or to the production process of the farm products.

According to statistics, the number of domestic agricultural machinery has been booming since the reform and opening. During recent five years, the quarter-on-quarter growth rate of large and medium-sized machinery was averagely kept at 12%, amount to 4,852,400 sets at the end of 2012; the quarter-on quarter average growth rate of small tractors was 1.7%, amount to 17,972,300 sets at the end of 2012; the quarter-on-quarter average growth rate of agricultural irrigation diesel engines was around 2.0%, amount to 9,823,100 sets. Judging from the statistics above, the agricultural mechanization keeps developing, especially the boom of the proportion of large and medium-sized machinery, which also proves the development of the modernization of domestic agriculture and the optimization and adjustment of the agricultural management structure. However, in the meantime when agricultural modernization is developing, the total energy consumption of agricultural machinery is increasing, with also an increase in carbon emission.

Statistics show that recent years the annual growth of the fertilizer input of domestic agriculture is averagely around 1.5 million tons. The total amount of domestic fertilizer input in 2012 was 58.388 million tons, which primarily include nitrogenous and compound fertilizers and auxiliarily includes phosphorus and potassic fertilizers. As is shown above, natural fertilizers are rarely applied by domestic agriculture, and the pollution caused by fertilizer input every year is hard to ignore. Moreover, during the farm production process, certain high-carbon pollution rises on account of technology drawbacks and the low efficiency of energy use.

2.3 High-Carbonization of Urban Planning

New urbanization is a healthy development plan with the support of the national government. Whether it is the plan of street construction, the design of public transportation system, or the promotion of urban

public infrastructure, it must be green, low-carbon, and beneficial to the long existence of human. However, during the urbanization process, "fake" low-carbon phenomenon exists. For example, to improve the land utilization, some cities and towns plan to build extremely high buildings, while the consumption of fossil energy is huge if lifting every ton of water from the land to a floor several hundred meters high above, which is falsely intensive and low-carbon. The genuine low-carbon cities and towns should include harmonious environment and ecology, convenient and comfortable transportation system, livable and green buildings as well as healthy and sensible lifestyle.

Nowadays, the construction plans of some urban areas and houses are unreasonable. Problems are as follow: Using land with low efficiency; lack of consideration about local ecological characters on the design of community energy supply system; in the districts with abundant wind and solar power, thermal power supply system is still applied during planning and construction design. What's more, shopping and entertaining facilities for the residents are too separated from the residential area, which increases the distance of residents' travel and forces part of urban residents to make the high-carbon traveling choice and at last increases carbon pollution in the urban environment. The functional area in some large and medium cities are planned too separated, while the public transportation system is not planned according to the travel characters of residents, which causes the lower chosen rate of public transportation than driving and riding; and in some small towns with small geographic area, there is no public transportation. These problems above are all in the wrong direction against the planning concept of new urbanization.

2.4 High-Carbonization of Lifestyle

The goal of urbanization is to promote the life quality of urban residents and improve their living environment. However, in most of the small town areas in China, they "use thermal power; burn with coal; warm with briquette; travel with motorcycle." The energy consuming structure are dominated by coal and natural gas, causing increasing carbon pollution in the living environment and worse air quality; besides, due to the small area of small towns and a lack of public supporting facilities, many districts lack public transportation lines, which makes residents travel by motorcycles to balance efficiency and pay. And in some plainer areas, people mostly travel by electromobiles. Therefore, compared with the life habits with more developed medium and small cities, the life of residents in small towns are still in the high-carbon stage, which must be improved during the process of new urbanization, or urban residents are living in the urban districts while living the life of farmers.

3. THE PATH DESIGN BASED ON LOW-CARBON PERPECTIVE

3.1 Enhancing Legal Restraint Towards Industrial Enterprise, and Improving Social Responsibility Awareness

A thorough low-carbon law system is the guarantee of constructing low-carbon city, but at present the law toward high emission and pollution is not as complete in China. Industrial enterprises are currently the pillar industry and the core of development in urbanization, so to guarantee the huge economic benefits that urbanization has brought, the living environment of urban residents are also supposed to be under protection. Therefore, national government should carry out targeted legal measures as soon as possible, set the highest standard of carbon emission and the emission standard of wastewater and waste residue of city industrial enterprises, with violators prosecuted according to the law and substantial penalties as fine and production cut-down or shutdown, etc.. However, legal measures alone are far than enough, in the meantime when legal restrictions are enhanced, attention should also be paid to improve social responsibility awareness. Social responsibility awareness of the enterprises should be kept through the whole production process, and the enterprises be made to willingly contribute to the protection and treatment towards ecological environment. Besides, government should manage relevant departments to complete the non-scheduled carbon-emission examinations to the industrial enterprises, encourage the R&D of the enterprises, urging them to focus on the improvement and advancement on technologies, and lower the emission of polluting objects from the root.

3.2 Complete the Integration of Farming Lands, and Design Application System of Natural and Biological Fertilizers

Agriculture is the home front of the steadily developing urbanization, thus constructing low-carbon agriculture system is also the requirement of new urbanization. Aiming at the high carbon problem of agricultural machinery in urban areas in China, we could integrate the land and cooperate to plant corn, make recycling use of agricultural machinery, increase the proportion of large-sized machinery and reduce the small ones, improve planting efficiency and meanwhile lower the high-carbon emission which energy consumption brings. Also, we should popularize drip irrigation technology, improve the efficiency of irrigation and meanwhile alleviate the waste of water to maintain the ecological balance. What's more, according to the specific conditions of the urban area, we should design the network of underground tube, and integrate the collection of human and animal excreta in the accommodation pool; while bio-gas is produced, tube branches are also built to farming lands which apply

bio-gas as natural fertilizer. Not only can this method solve the disposal of excreta emission, but it also creates bio-gas energy to transport energy resources to part of urban areas, which contribute to the reduction of chemical fertilizers and the establishment of low-carbon agriculture.

3.3 Establish Low-Carbon Community, and Improve Urban Public Transportation System as Well as Public Service Infrastructure

The Plan has put forward clearly that new urbanization is required to be ecologically civilized, green, low-carbon, economic and intensive. Therefore, urban planning is supposed to be dominated by intensively developing mode with high density, mingling functions and public transit directed, population density in residential areas should be improved, functional low-carbon community be built, with low-carbon production, low-carbon consuming taking the mainstream of urban residents' economic life. Moreover, we should concentrate on building green and low-carbon constructions, framing the power network of new energies, advocate the use of wind power and water power, boost the underground fraction of coverage of the tube network of natural gas and reduce the obstacles for the residents to use low carbon energies. Furthermore, establish and gradually improve urban public transit system, covering from point to area; according to the travel characters of the residents, establish the renting area of public bicycles, advocating traveling by bus and bicycles. Increase the covering area of green land, reasonably construct public entertainment sites and propose people to choose a low-carbon life.

3.4 Set the Evaluation Standard of Low-Carbon City, and Intensifyt the Propaganda of Low-Carbon Concept to Urban Residents

According to the construction concept of new urbanization, establish the evaluation system and set the standards of low-carbon cities, including the carbon emission limits of industrial enterprises, the carbon emission standard of agriculture, the construction of low-carbon system, the low-carbon equipment evaluation of residents, evaluation of public transit system, energy consumption structure of the residents, and fraction of coverage of urban green land, etc.. Set the low-carbon standards of the local governments, which should also be included into government performance examination. Intensify the propaganda, take multiple measures of popularizing, deepen the residents' awareness and advocacy towards low-carbon concept, and encourage residents to use low-carbon products, energy-saving and water-saving products and recyclable products to intermediately improve the life quality of the residents.

CONCLUSION

Urbanization is the irreversible trend of regional development in China. The plan of new urbanization emphasized the combination of ecological concept and city plan to construct a low-carbon, green, recyclable and new development system. Therefore, measures should be taken from low-carbon of industry, of agriculture, of city planning and of life style. For industrial enterprises, enhance legal restraint, and improving social responsibility awareness; for agriculture, complete the integration of farming lands, and design application system of natural and biological fertilizers; establish low-carbon community, and improve urban public transportation system as well as public service infrastructure; set the evaluation standard of low-carbon city, and intensify the propaganda of low-carbon concept to urban residents, encourage the development of urban low-carbonization from root.

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