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Developments of housing industry modernization in China*

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Abstract: A brief description of the housing industry developments in China is given in the paper. Housing industry modernization will be greatly promoted by the implementation of science and technology projects and makes a great benefit for the national economy. By the implementation of housing industry modernization research project, it can be ensured to obtain breakthroughs in research on the key technologies, therefore, considerably increase the contribution rate of scientific and technological progress of housing industry, and refine engineering quality and economic, social and environmental benefit, and make the housing industry a real modern industry. To gain all the objectives of the project, great efforts still need to be made.

Keywords: housing industry; research; key technology; development

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The policy of reform and opening to the outside world has accelerated nationally social and economic development in China. In the 21st century, with China's accession to the WTO, China will enjoy more opportunities to attract foreign capital, technology and management expertise, while at the same time, all the national industry including construction industry will face severe challenges brought on by stronger international competition. The Program for China's Urban Housing Development which is now being formulated shows that by 2000, 1.2 billion m^2 houses will be built and every family will have their own dwelling with living area per capita rising to 9 m^2. Housing conditions in rural areas will also be improved. So the unprecedented scale of house construction, the large consumption of materials, equipment and residential products, and the promising market are imminent in future of China. However, the obsolete housing industry in China is not capable to meet this huge demand for construction. Problems in technology, management and financing need to be solved. These problems include insufficient technology, squandering building materials and resources in poorly planned projects, the poor quality of residential products along with poor planning and designing of residential district. In addition, the imperfect investment mechanism and the low commercialization rate in housing construction do not comply with China's current transition from the planning economic system to the socialist market system. It is highly necessary and feasible to carry out researches on investment and policies, developing property management mode, and key techniques in order to accelerate housing industry modernization in China and to meet the future demands for residential construction in China. In sight of this situation, a project named 'Modernization of Housing Industry' is proposed jointly by Ministry of Construction and Ministry of Science and Technology in order to significantly improve the scientific and technological level of housing industry in China.

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1 Background

For quite a long time, housing has been regarded as mechanism of social welfare. As a result, it has been difficult to accumulate sufficient funds for construction of new housing or for renovations of the old. Housing industry were not a real industry at that time. The planning, design and engineering quality were at a low level, situation has changed since the mid—term of 1980s, and especially since the mid—term of 1990s, when housing industry has been taken as a new consumption growth area by the government. Efforts to improve the technical and management level of housing industry become intensified. Then, in white paper "China's Agenda 21" issued during the period of 1992—1994, the strategy of sustainable development has been taken as a important national strategy that should be vigorously followed in furthering economic and social development, where residential building construction and human dwelling environment composing an important part. Since 1995, Chinese government has organized a group of theoretical and applied key projects researching on dwelling technology. It also as launched cooperative research and development in the field of dwelling place with foreign countries, such as Japan, France, USA, Canada, etc. Subsequently, State Science and Technology Commission and Ministry of Construction cooperatively sponsored the project "Science and Technology Industry Engineering of Comparatively Well—off Residential Buildings in Towns and Countries of the Year 2000" which is the most important part of the Chinese ninth Five—Year Plan from 1995 to 1999. The purpose of the project is to seek the goal and the way of the development of housing industry in China from the point of view of the development of science and technology. So far, a set of key technologies and products of comparatively well—off residential building has been completed, several dozens of model units has been built, and a lot of fundamental works on the development of the modernization of housing industry have been done. In addition, international cooperation has been strengthened and several projects been proposed. For instance, project "Study of New Technology of Chinese Residential Building Developing and Human Resources Training Center" jointly sponsored by Japanese International Cooperation Association (JICA) and Ministry of Construction China, Japanese technologies and equipments being introduced through this project. The purpose is to improve the level of layout design and construction by researching and training of human resources. Many subjects of this project are directly related to the development of the Modernization of Housing Industry. Another key project of the Ninth Five—Year Plan of State Development Planning Commission: Energy—saving Reconstruction Demonstration of Existing Residential Building has been conducted from 1996～1999. Chinese government cooperated with the Canadian government in the project. According to the aim of reducing the consumption of building energy by 50%, technologies and relevant policies of the reconstruction of heat resources and heat webs of existing residential buildings were studied, and many demonstration projects were performed.

Furthermore, in order to promote the research of the science and technology of residential buildings, special research institutes of the science and technology of resjdential buildings were set up, departments for cultivating relevant human resources were established in colleges and universities. From the 90's, many research groups, such as "Seminar of Residential Buildings of Chinese Cities", "Population Resource Environment Commission" came into existence, special research centers, such as "State Residential Buildings and Residential Environment Engineering Technology Center", "Research Center of Residential Buildings of Chinese Cities" were founded, advanced laboratories of residential

building products came into use, the databases of residential buildings products were established, the residential buildings products demonstration centers and human resources training centers of residential buildings were built up.

All the pre—described researches make a sound base for the housing industry modernization in China. And it can be deduced from the research result that the housing industry has a common development tendency, i. e. to develop a housing industry modernization system, which is centered with standardized, serialized, generalized constructional structural parts and takes the specialized, socialized, commercialized supply as basic direction. In accordance with this tendency, we think that the technological development of Housing Industry also has the following features:

1) To adopt late and high technology to promote and transform residential building industry.

2) To consider residential technology research, environment control and urban construction comprehensively.

3) To emphasize the transfer of technology and the application of research results in enterprises.

4) To further the investment in research and development of residential building industry.

2 Purpose and Significance

Housing Industry possesses an important position in development of social economy of every country. According to UN statistics of 71 countries, investment in dwelling building possesses an average of 3%～8% of GNP, 20%～30% of gross fixed assets of whole society and 30%～50% of fixed capital investment in fundamental construction. In China, investment in new house is 7%～8% of GNP in recent years. In the year 1998, for example, the completed areas in both cities and towns were 1. 275 71 billion m^2, the housing investment amounted to ¥ 431 billion and was 26. 6% of gross fixed assets of whole society. The growth rate of GNP in 1999 was 7. 1%, and 1. 5%～2. 0% of it was contribution of Housing Industry.

The Housing Industry and its interrelated industries have a high degree of association. The development of Housing Industry can bring along the developments of other thirty industries, including the structural material industry, chemical industry, mechanical and electrical industry etc, and has direct effects on developments of electrical equipment, furniture, decorating products, finance industry, garden, commerce and service industry. ! Statistical analysis shows that ¥ 1 output value in Housing Industry can bring along ¥ 1. 7～2. 0 increment output value in related industries.

The quantity of employment in Housing Industry in developed countries is about 5%, but is under 3% in China. According to the input—output production table of Japanese construction departments in 1994, one hundred thousand new houses can create 229 thousand employment opportunities. The employed in Housing Industry in China is about 15 million, and the admission of one hundred labors in Housing Industry can offer 200 employment opportunities for other interrelated industries. The housing consumption per capita in towns of China was 193. 16 RMB in 1994, 250. 18 RMB in 1995, 300. 85 RMB in 1996, 358. 64 RMB in 1997, and 408. 39 RMB in 1998, with a very rapid speed of increase. Nevertheless, in 1998, housing consumption per family in China was only 9. 43 percent of total expenditure, which was far from about 20 percent of the developed countries. Urban Investigation Head office of State Statistical Bureau had made a survey from 5 000 families in cities and towns of ten provinces, the results showed that housing consumption was the first choice of consumption in China. The other aspect that adding significance to housing industry modernization in

China is that the demand for residential buildings will be sustained increasing. Dwelling building construction has been developed very rapidly in China. A comparison between the year 1999 and the beginning of reform and opening, namely the year 1978, shown that living space per person in cities increased from 3.6 m^2 to 9.6 m^2, floor space completed in cities and towns increased from 37.52 million m^2 to 500 million m^2, and the investment in dwelling construction in cities and towns increased from 3.921 thousand million RMB to 51.1billion RMB. In the year 1979 and 1998, the national floor space completed in cities, towns and villages were 3.5 thousand million m^2 and 12.3 thousand million m^2 respectively, and 1.7 hundred million families has moved into new houses.

The policy of reform and opening to the outside world have accelerated national social and economic development and promoted urban development in China. The rural population is continuously flowing into cities and towns in increasing numbers. Therefore, it is necessary not only to continue to improve the housing standards for the current urban population, but also to meet the needs of the newcomers.

The Amelioration of Housing Conditions also leads to increasing of residential buildings demand. In 1999, living space per person in China was 18.6 m^2 and is estimated to reach 40 m^2 in 2030, which is equivalent to the average level of developed countries in the late 1980s and the early 1990s. Floor space per family of nuclear families in cities and towns was 55～60 m^2 in 1990. According to the survey from 5 000 families of cities and towns in 10 provinces made by Urban Investigation Head office of State Statistical Bureau, most of the families prefer floor space per family of 80～120 m^2.

Fitting in with the developing speed in economy, the process of urbanization in China has taken on a sign of acceleration. In 1999, urban population amounted to 30.9% total population in China, will be 55% at estimation. Definitely, the population growth and the urbanizing process will lead to the greater demand for housing. In addition, there are about 15 million newly—married couples yearly in China, most of whom need individual housing. In view of the demands above, it is estimated that it needs to build new residential buildings of 46 thousand million during the early 30 years of the 21st century, namely 1.5 thousand million per year.

To accelerate the modernization process of housing industry are crucial decisions which are in line with the state's general requirement, and it is possible to improve and strengthen the new growth point of national economy.

3 Strategy and Develop Contents

Housing industry modernization is an important benefit for China. President JIANG Zhe-min once said: "With the development of production and the increment of social wealth, the real income, the consumption standard and the quality of life of residents should be remarkably improved, and basic necessities of life especially housing conditions should be quite improved". Major research fields of housing industry modernization in China shall be the following: policy of housing Industry, new standards and codes, new type building systems, energy—saving and optimization of energy consumption structure, internal and external ambience securing systems, operating mechanism of Housing Industry modernization. The guideline for the research is to form systematic and scientific system of residential building standardization, bring into being system of industrialization production and promote the harmonious development of economy, society, and environment. As a result, four major research topics are decided, there are:

1) Research on the industry standard and basic technology of residential buildings;

2) Research on the residential building systems and related key technology;

3) Development and industrialization of new applied technology in dwelling industry;

4) Development strategies of housing industrialization and the industrialization promoting project.

In each topic the above research fields are included, for example in research topic three, six sub—topic will be considered, which are

1) Research on complete sets of energy saving technology and development of the related products in residential buildings;

2) Research and development on the new energy resource applied technology of residential buildings;

3) Research and development of complete sets of environment quality securing technology in residential area;

4) Research and development of the intellectualized integrating technology of residential buildings;

5) Research on the fire and disaster prevention technology of residential building and development of the related products;

6) Research on new building materials and development of the related products.

Through the innovative research of the technology complementation of residential buildings, the labor productivity of housing industry should be improved from the present completing area of 20 m^2 per capita per annum to 30 m^2 per capita per annum by the end of Tenth Five—Year Plan, the contribution rate of the development of science and technology will increase from 25.4% to 35%, the service life of residential buildings should be increased from the present 50 years to 100 years, the existing common fault of the residential buildings should be eliminated by and large, the industrialization rate should be improved from the present 15% to 30%. As for standardization, materials, techniques and technologies of buildings, a set of world—leading standards and regulations of the industry will be drawn up. Then, by integrating of technologies, through implementing and studying of related policies, the contribution of Housing Industry to national economy will increase by 0.3%—0.5%.

To apply the research result in the construction exercise, it is planed that during the Tenth Five—Year Plan, on the basis of the research and development of a set of key technologies and auxiliary components of residential buildings, 10 Housing Industry group companies will be established, 10 scientific and technological developing and industry bases and 10 sustainable, inhabitable and adaptable scientific demonstration projects will be built up. It will promote the general development of Housing Industry by its technical diffusion and radiation. By the implementation of housing industry modernization research project, it can be ensured to obtain breakthroughs in research on the key technology and, therefore, considerably increase the contribution rate of scientific and technological progress of housing industry, and refine engineering quality and economic, social and environmental benefit, and make the housing industry a real modern industry.

(下转第 42 页)

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重庆开展住宅产业化国际合作项目的设想与实施方案

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摘要:就住宅产业化的概念,重庆市开展住宅产业化的重要性,和具有的条件进行分析,并对重庆市开展住宅产业化的具体实施途径,达到的目标,项目的组织形式,社会各方的参与方式和作用等进行了介绍。文中特别强调了本项目开展国际合作的重要性及可能的合作方式,供决策者参考。

关键词:重庆;住宅;产业化;国际合作;建筑业

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中国住宅产业化发展

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摘要:对中国住宅产业化的发展作了简要的介绍。通过实施科技示范项目可以极大的促进住宅产业化的发展,从而推动国民经济的发展。同时通过这些研究项目的实施,可以在关键技术研究方面取得突破,从而有效地提高住宅产业的科技含量、确保工程质量和经济、社会、环境综合效益,使住宅产业成为一个现代化的产业。要实现这一目的,我们还有大量的工作要做。

关键词:住宅产业化;研究;关键技术;发展