

Nanjing's low carbon planning strategy research and practice, China.

1 Background of Nanjing city planning's low carbon strategy

1.1 China's urbanization with economic growth and the internal demand

China, as the world's most populous developing countries, the achievement of nearly 30 year's economic development is remarkable, also the urbanization level has been rose rapidly by the economic growth. From 1978 to 2007, the annual GDP growth of China grew nearly 10%, (At the same time, the world economy nearly 3.3%), the comprehensive national strength greatly increased. It has been expected that by 2020, China's population would reach 14.5-14.9 billion, Urbanization Rate would reach 55 percent.

From the economic output, China's economy and urbanization level has reached the level of moderately developed countries. But China's population base is huge, the per capita occupancy resources and economic level are below the international average level. To improve people's living standards, China must continue to promote the economic development level.

1.2 China's economic growth pattern exists risk and unsustainable

Economic development, urbanization level of ascension always accompany pollution of water, atmosphere, soil etc. and increased emissions of solid waste, automobile exhaust, persistent organic pollutants, etc. China will not be able to avoid. According to relevant Chinese experts preliminary estimate, In 2004, China's total greenhouse gas emissions was 61 billion tons of carbon dioxide equivalent. From 1994 to 2004, China's total greenhouse gas emissions was at an average rate of about 4%, about 20% of the total emissions is due to export products or carbon dioxide. In the fast economic growth, China has paid great environmental cost, Water pollution, air pollution, the green disappear, resource depletion, etc. The Chinese government and people have realized this trend,

1.3 The Chinese government's action and efforts for sustainable development

The Chinese government has acknowledged that economic growth shouldn't sacrifice environment, In the process of development, We will transform the economic growth mode, adjust economic structure, promote science and technology, strengthen resource conservation and environmental protection. China proposed overall goal of "construction resource-saving and environment-friendly society", And at the first time, building a resource-conserving and environment-friendly society has been a strategic task for national economic and social long-term development planning.

- Formulating the strategy of sustainable development report

The Chinese government has made a "The 2009 China's sustainable development strategy report", Put forward China's development strategic target of low-carbon economy, That is, by 2020 reducing emissions of carbon dioxide per unit of GDP by 50%. China's carbon emissions try to reach peak at 2030-2040, then in a period of decline and stable.

- Responding actively to climate change

The Chinese government has made a "China national plan to respond to climate change", Proposed with a series of legal, economic, administrative and technique means, to slow greenhouse gas emissions, and improve the ability to adapt to climate change. Development of hydropower will be an important measures to promote China's energy structure to clean and low carbon development direction.

- Adjusting industrial structure and energy utilization policy

To realize the sustainable development of strategic objectives and actively respond to climate change challenge, Chinese government concentrated on the transform and upgrade traditional industries, Published "ten industrial revitalizing planning". From fiscal, taxation and so on a series of administration and economic method, Promoting use and development of new energy and clean energy, such as wind and solar power, water and electricity, nuclear power, and etc.

- China's success in energy conservation and emission reduction

According to the statistics, in 2007, the national chemical oxygen demand (cod) and sulfur dioxide emissions were dropped 3.14% and 4.66% than in 2006. From 2007 to 2009, unit of gross domestic product consumption dropped to 10.08%.

2 Research Practice in Nanjing Master Planning's low carbon strategy

The role of master planning is guiding the city construction, Urban planning will decide urban production and lifestyle, the low carbon strategy of master planning is the basic premise and assurance to guarantee city life, production realizing low carbon objectives.

2.1 background of Nanjing Master Planning

2.2.1 Nanjing Introduction

—Location. Nanjing is the capital of Jiangsu province, the famous ancient capital of the six dynasties,

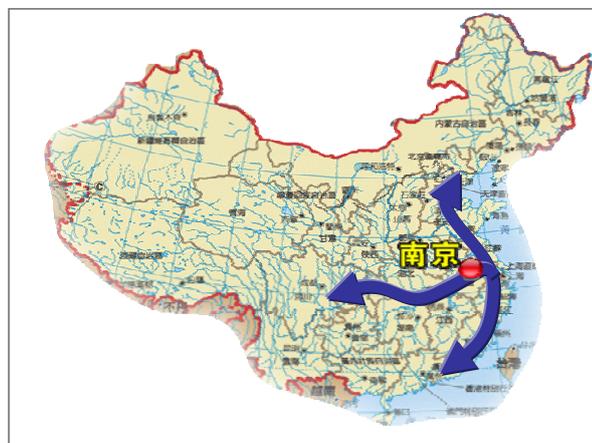


Fig 1 Nanjing's Location

Yangtze river delta region's second-largest center after Shanghai city. It has geographical advantage, Along the Yangtze river and the eastern coastal "T" type with overlapping economic development area, it is an important traffic and communication hub in East China district.

—Geographical features. Open hilly basin in the south of Yangtze river, continuous mountain in the north of Yangtze river, it has the urban characteristic of "Mountain, River, Cith, Forest" constituting the city into a whole.

—Population and Economy. Total area of nanjing is 6582km². In 2007, the resident population was 741 million, GDP was 3284 billion RMB, Three kind of industrial structure was 2.6: 49: 48.4, Per capita GDP was around \$6,300, in 2008 it was More than \$7,000.

GDP (billion yuan),	3283.73
Per capita GDP (RMB/person)	53638
To all GDP (yuan/square kilometers)	4964
Three times (added)	2.6: 49.0: 48.4
Heavy industries (%)	14.9: 85.1
Wan Yuan GDP energy (tons of standard coal/wan yuan),	1.25

Table 1 2007 Nanjing Economic Development

—Historical and Cultural. Nanjing has 2500 years of history, it has rich historical culture, ten dynasties capital here successively in brilliant. MingXiaoLing and affiliated tombs here in Ming already listed as a world cultural heritage. Nanjing Ming Great Wall has been

listed as world cultural heritage list of China's reserves.

2.2.2 Problems need to be solved in Nanjing Mater planning

— Regional competitive pressures increasing, to consolidate the position of central city.

—The gap between city and town is still exist, Urban and rural overall development pressure is big.

— Development is extensive, the contradiction between supply and demand is facing serious challenges.

— Historic protection responsibility is



Fig 2 Territory of Each Dynasty

significant, protection and development contradictions still prominent.

—Overweight status of industrial structure, impact the urban environment's further improve.

—Traffic demand pressures increase, traffic leading development face challenges.

2.2 low carbon strategy in Nanjing urban planning

In the new round of Nanjing Master Planning Revision, Nanjing followed the national strategy, put forward a series of planning and strategy in theme of 'Low Carbon City, Green Planning ".trying a kind of low carbon urban planning with Chinese characteristics.

— Increasing industrial structure adjustment, strictly restricting the development of new high-energy industry, building a whole low carbon oriented energy system;

— Strengthening transportation and land development, emphasizing mixed land functions, vigorously developing rail transition and optimizing public transportation;

— Perfecting the green infrastructure, restoring the ecological environment

t, cleaning drinking water, Solid waste treatment and disposal;

— Promoting low carbon new materials, new technology application in building, advancing green architecture development in large-scale;

— From angles of ecological environment health, social harmonious development, economic efficient circulation, regional integration, etc, Constructing reasonable index system, making planning operable and implemental

— Establishing effective economic policy system, Including ecological compensation, green credit, green securities, etc.

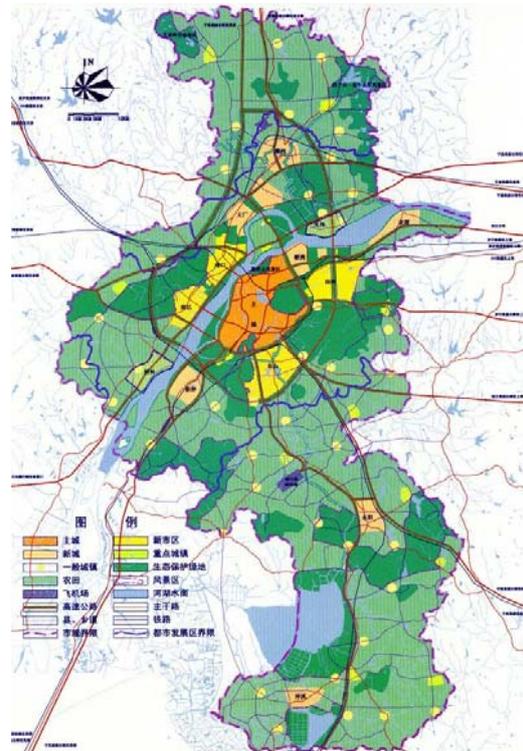


Fig 3 Nanjing Regional Scope 6597km²

2.3 practice of low carbon concept in nanjing master planning

● Urban Development Key

— Innovations Driven. Promoting the optimization and upgrading of industrial structure, optimizing urban spatial structure.

— Intensive Growth. Adhering to axial group, many centers open, strengthening the integration use of all kinds of resources.

— Quality Promotion. Preferring historical, cultural and ecological protection, paying

attention to cultural construction and urban characteristic shape, pushing the historical and cultural city and ecological city construction.

—Coordinated Development. Promoting regional co-operation, integration of urban and rural economic and social development, ascending to nanjing metropolitan circle as the core competitive ability.

● Main Functions

Regional modern service center, Long triangle advanced manufacturing base, National comprehensive transport hub, International innovative city, Ecological livable riverside city, Historical and cultural cities in the world.

● Urban structure

Each capital in Nanjing constructed by water, Layers and rings added together. The plan strengthened the maintain of ecological environment of area and along the river, with radioactive transport corridor for development axis, based on the ecological space for green wedge, constructing Spatial pattern of "Sweat open, axial group, hold river development."

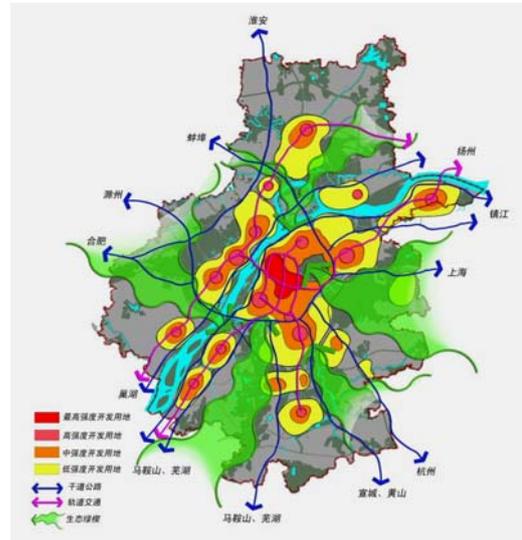


Fig 4 General Spatial Structure

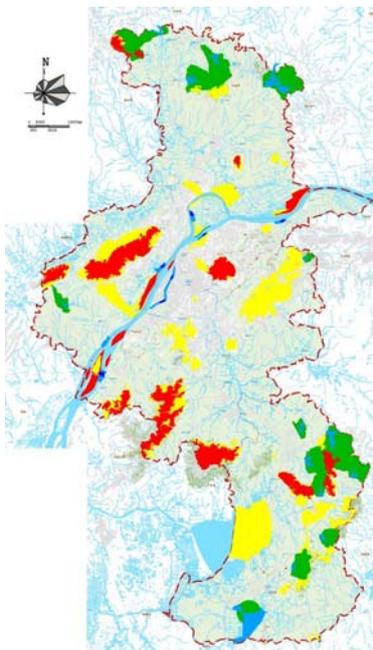


Fig 5 Ecological Resources Protection



Fig 6 Yangtze River Shoreline Protection

● Urban Industry Choice and Positioning

Nanjing has entered the mid-lat stage of industrialization period, During the planning period will enter the post-industrial age, Industry of service, industrial and technological knowledge, information, etc will be the Industrial direction.

- Urban Comprehensive Traffic Organization
 - Metropolitan circle: Efficient and Convenient. Strengthen hub radiation, compound channel and coordinate docking; Implement the resources sharing, local exchange and integrated traffic.
 - Urban District: Lead and Intensive. Outstanding track leading, Strengthen the "double speed" guide, Project support, Gather and intensive. Pay attention to the reasonable allocation of land and function in new and deputy city, promote inter-district traffic reduction.
 - Main City: Optimize and unobstructed. Increasing density of orbit, Accelerate rail construction speed; Optimize transit network, secure public right; Perfect network system,



Fig 7 Comprehensive Urban Transportation Planning



Fig 8 Historical and Cultural Space Network

improve speed trunk; Strengthen inter-district channel construction, attention supporting functions.

—Old City: Reduction and Order. Advocate bus priority by means of policy regulation, strengthen demand management. Focus on urban rail network, Fast road network, River channel, Integrated passenger transportation hub, etc. Build "rail, double quick guide" main urban traffic frame.

3 Problems and Solving methods that Nanjing low carbon strategy may encounter

3.1 Contradiction between economic development phase and environmental protection

Nanjing economic development level has reached the level of post-industrialized countries, it need to coordinate economic development and protection of global climate change, But faced huge environmental protection's investment, Local government feel difficult to deal with funding sources. The world wildlife fund suggested developed countries providing every 16 billion euros in emissions funds, for carbon emissions financial aid in developing countries. The world should adhere principle in 'The United Nations framework convention on climate change' and 'The Kyoto protocol', that developed countries and developing countries has "common but differentiated responsibilities" in the field of climate change. Developed countries consumers cheap goods from developing countries, If the goods were from high and high emissions, consumers should also be aware of their responsibilities.

3.2 Contradiction between technical bottleneck of environmental protection and Technology obtaintion

The fundamental way of China's rapid economic development is developing low carbon technologies, Transforming the mode of economic development, But low carbon involve high technical requirements, developing countries lack or couldn't afford. It restricted Nanjing city low carbon strategies and objectives in a certain extent. According to the protocol of emissions targets, Half reduction of Developed countries need to achieve emissions credits through advanced technology or output device modification funds to developing countries, or by clean development mechanism on the basis of project cooperation between developing countries and developed countries, complete transfer trade of Emission quotas. The developed countries should give support to developing countries that can be measured, verificated and reported, in fund, technology and construction ability, Help developing countries in technology import, transfer, personnel training, etc. We have seen this progress, according to the American government and Chinese government's agreement, Sino-us joint research center in clean energy Established in July 2009, all this is just beginning.

3.3 Contradiction between pursuing Europe and America's lifestyle of and low carbon life mode requirements

European-American lifestyle set up a bad benchmarking for China's newly affluent people, People pursue European-American type way of life, Low density housing, car trip, etc. This is a trend that difficult to change in short time. Advocating low carbon life mode, is the Chinese traditional mode of life. As Chinese ancient stressing syncretic, harmony between man and nature, This itself is a kind of simple environment protectionism. So, We will take the scientific practice, Through regression and influence of traditional culture, Makes people realize

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low-carbon lifestyle's significance and value. This is will be a long, arduous process, we will give unremitting efforts.

4 Conclusion

With low carbon strategy in Nanjing Master planning, there are many foreseeable and unforeseeable difficulties, But this is the most common target for human. If we set crisis consciousness and sense of responsibility, Adopt strict saving technology and corresponding policies and measures, And in the effective international technology transfer and financial support, Through our joint efforts, We believe that the earth will have a better future!

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