Process Management of Low-carbon Urban Development in China: The case study of Shanghai Lingang New Town

Yue SHUAI[1], Jian NING[2]

[1]A1 College of architecture and urban planning, Tongji University, Shanghai, China.
e-mail:shuaiyue9026@gmail.com
[2]A2 College of architecture and urban planning, Huazhong University of Science and Technology, Hubei, China.
e-mail:ningjian71@126.com

Abstract:
For the time being, China is at its primary stage of low-carbon city development and nearly all the work are done with the design of macroscopical framework while the low-carbon processes within urban expansion in the long run is ignored. Therefore, we should turn this pure low-carbon theory into specific practices and implement them to the urban spatial organization. Besides, it is more and more important to deal with the uncertainties and confusions in the decision-making process using tools of process management.

This study focuses on a totally new low-carbon city built from zero--Shanghai Lingang new town which has already become one of the best practice areas and demonstration areas in Shanghai for the discovery of effective ways to improve the planning management. Based on investigation analysis and case studies, we bring forward a new practical model about the process management of Lingang new town which is well organized in four phases, decision-making, planning, implementation, and maintenance. In this way, this new model correlates the urban development policy with the low-carbon practices and helps the seek of the real management method of low-carbon growth .

This paper includes:(1) make a plan of action by integrating low-carbon policy, future development features and implementation measures, and integrate the plan into the management framework; (2) adjust development measurements, divide the developing process into baby step (3)organize every participant, make full use of up-bottom regulatory system and bottom-up *public get evaluation and feedback.*

Key word: low-carbon urban development, process management, Lingang New Town

1. Introduction

1.1 Research background

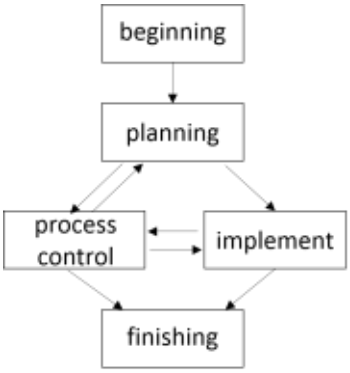
Low-carbon was a totally new concept born in the United Kingdom. Since the ye
government first proposed the idea of Low-carbon economy , the connotation of l

already extend from simply environmental research to a more comprehensive field including social, cultural, economic and environmental issues.

For the time being, China is at its primary stage of low-carbon city development and nearly all the work are done with the design of macroscopical framework while the low-carbon processes within urban expansion in the long run is ignored. There is a famous saying: three planning seven management. The implement of low-carbon strategies, complicated social conditions, multi-roles intervention, all of these growing issues imposed pressures on the process management of low-carbon urban development. Therefore, we should turn this pure low-carbon theory into specific practices and implement them to the urban spatial organization. Besides, it is more and more important to deal with the uncertainties and confusions in the decision-making process using tools of process management.

1.2 Definition of Research Object

Process Management first appeared in business administration, which is different from management, it emphasizes more on the sequence of time and how to put theory into practice step by step through overall supervision. The whole process consists five management phases,see in Firgure1-2, our research applied this concept to urban development and found out there existed one-to-one relationship, see in Figure1-2, and this bcomes our main research object.



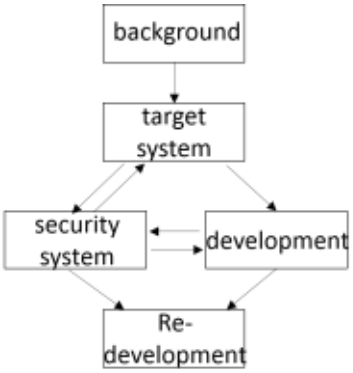


Figure1-1(left). Process management in business administration
Source: http://baike.so.com/doc/5381726.html
Figure1-2(right). Process management in urban planning
Source: drawn by author

1.3 Research structure

Firstly, we sorted out the related theories and latest trends by making a general literature review; Secondly, we did case studies to summarize different patterns of low-carbon development; In the third part, we studied every phases of Chinese low-carbon urban planning by using the idea of pr management ; In the fourth part, we focused on a specific case-Shanghai Lingang new combine theory with practices. Last but not the least, tried to summarize the features of process management during the whole phases and seek a real management method of low-carbon growth according to realities of our country.

2. Literature review

2.1 Connotation of Low-carbon city

Low-carbon city originates in the research and development of low-carbon economy and low-carbon society. As for its definition, different experts have different explanations. Low-carbon city can be defined as the city that is characterized by a low-carbon development pattern, citizens low carbon living and behaviors and urban management based on blueprint of low carbon society (Chinese Society for Urban Studies, 2009). Chinese scholar Xia Kunbao thinks that low-carbon city is to pursue the sustainable production mode and consumption mode (Xia, 2008). After summarizing different definitions Luo Qiaolin gives the connotation of low-carbon city from three aspects: low-carbon urban planning, low-carbon living style and low-carbon urban operation system (Luo, et al., 2011).

2.2 Related theories and research trend in Low-carbon urban planning

(1) Low-carbon urban planning

Low-carbon urban planning combines low-carbon idea and urban spatial planning, arranges time schedule to achieve the goal of sustainable development (Lei, et al., 2011). In 2007, ChinSiong H. and Wee Kean F. studied the relationship between energy consumption, carbon reduction and urban planning. They pointed out that urban carbon emission could be reduced in the next years by correct policy guidelines in the area of urban land use planning, transportation planning and architecture design (Ho & Fong, 2007). Glaeser E L and Kahn M found out that there was an obvious negative correlation between land development density and carbon emission, which proved the more restriction of land use conducted by urban planning the lower the carbon emission (Glaeser & Kahn, 2008).Professor Pan proposed planning strategies for low-carbon urban planning and distributed them into three levels of regional plan, master plan and regulatory plan (Pan, et al., 2008).

(2) Low-carbon urban management

Jenny Crawford and Will French thought the key to realizing low-carbon target is that planning system should be well prepared for new technology, then implement the advantages of nat management and regional power devolution, it was the urban managers and planners who could promote the development of low-carbon city. (Crawford & Will, 2008). Lu used the Delphi method and ISM[1] to analyze the inherent links among 19 factors which affect the low-carbon development in China. The result showed there were 5 levels, government and low-carbon Index were in the highest level and they were the demands right from the area of management (Lu, et al., 2012).

2.3 The practices and development of Low-carbon cities in the world

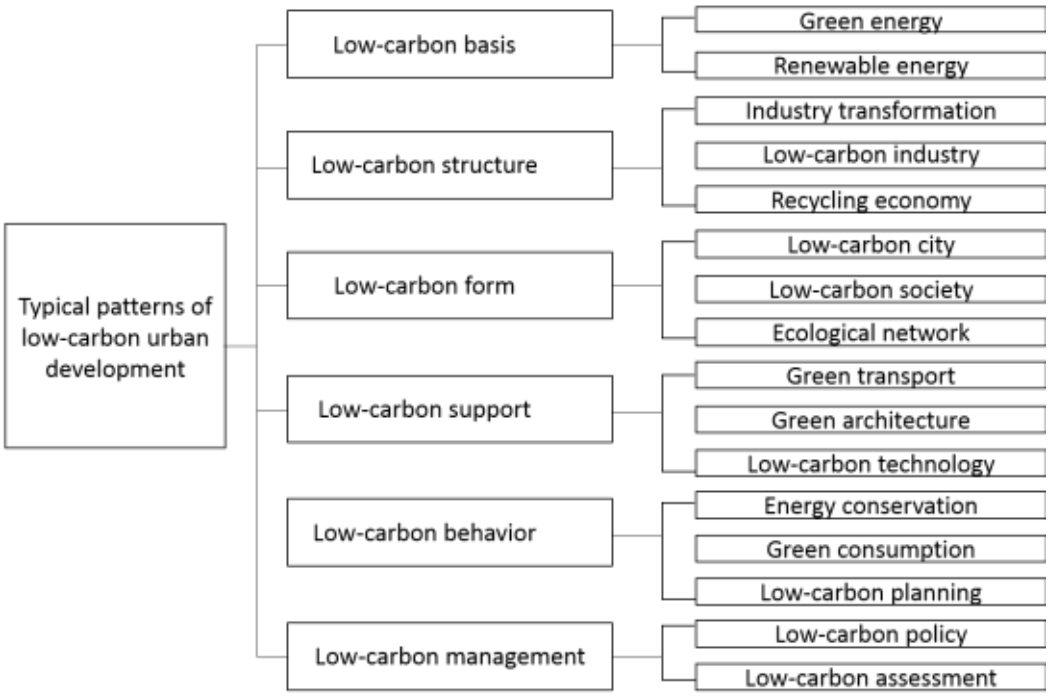
In recent years, more and more countries in the world have carried out practice activities for low-carbon

[1] ISM, interpretative structural modeling

urban development. Some world cities have already made action plans successively, such as London s The Mayor s Climate Change Action Plan (Greater London Authority, 2007)and New Yor PlaNYC2030: A Greener, Greater New York (City of New York, 2007). At the same time, there emerged some international platforms which combined many cities on a global scale to explore the best way of developing low-carbon city, such as the famous C40[1], ICLEI[2], Covenant of mayors and so on.

In nowadays, the majority of successful cases are coming from C40 members, including London, New York, Copenhagen, Toronto, Chicago etc. most of them are in high level of economic development and have quantitative targets together with specific action plan (Large Cities Climate Leadership Group, 2005). Chinese scholar Lu studied all the members of C40 and then summarized five typical patterns of low-carbon development and we completed it to six patterns, see in Figure2-1.

Figure2-1 Pattern and structure of low-carbon city construction in C40



Source: Lu, C. J. et al., 2012. Analysis of Influencing Factors of Low- carbon City Development in China. *China Population, Resources and Environment*, Volume 22, pp. 58

2.4 Summary

After doing the literature review we found some common characteristics, first one is that all low-carbon cities share one development background which originated from climate changes; Secondly, low-carbon development should be supported by professional data processing technology; lastly, international

C40, Large Cities Climate Leadership Group
ICLEI, Local Governments for Sustainability

platforms played an important role in sharing experiences, technology and funds.

3. Case studies

In the 21st century, the notion of low-carbon development has been sinking deep into the hearts of people, some countries in and around the world develop practical constructions one after another. However, because of the different levels of urbanization and economic development, there would be diversity in choosing the constructive path and developing pattern. After doing the case studies of different patterns of Low-carbon urban development, we summarized three main patterns.

a) Comprehensive developing of low-carbon society . Representative city: London, Tokyo
This kind of pattern nearly concentrates on every part of urban development, range from energy supply to energy consuming, such as new energy development, green architecture, environmental transportation, and low-carbon consumption. These cities are usually in the late industrialization stage and have better foundation on transformation.

b) **Depend on low-carbon industry pulling power.** Representative city: Boston, Birmingham
Low-carbon industry is a new idea opposite to energy intensive industry, it can reach relatively high output by means of low emission of greenhouse gases. Such as Birmingham chose creative and cultural industry (knowledge-intensive) as its core strategy, Boston chose technology-intensive industry to promote low-carbon development.

c) **Build low-carbon community and demonstration area.** Representative city/country: Denmark, Masdar, most Chinese cities
This is a transitional pattern used at the beginning of low-carbon transformation, lots of cities firstly will build demonstration area or small-scale community to gain wider experience. Such as Freiburg in Germany developed two famous low-carbon communities in suburb areas and Masdar eco-city in United Arab Emirates tried to build a zero-emission park.

4. Analysis of process management of low-carbon urban development in China

In this section, we will analyze every phase of process management in detail, as the Figure 1-2 shows at the very beginning, which includes background, target system, domestic exploring of low-carbon cities and security system.

4.1 The background of Low-carbon urban development

The development of Chinese low-carbon city are influenced and promoted by international practices in the early time. In 2008, World Wide Fund for Nature (WWF) launched the low-carbon city development program in China (LCCI) with Baoding and Shanghai being the first pilot cities (Zhang, 2008), trying to explore new patterns of development for the other cities. Climat

low carbon leadership program in 2008, aimed at constructing city low-carbon leadership in China with the collaboration among relevant local governments, commercial enterprises, research institutions, news media and other shareholders. In 2009, many cities started to make low-carbon plan. It is estimated that there are at least 259 cities put forward slogans of low-carbon city in China by 2011 (Chinese S for Urban Studies, 2011), see in Figure 4-1, and this number is still growing. At the meantime, there has already been a specific framework of four large clusters among those low-carbon cities, they are Bohai costal region, Yangtze River Delta, Pearl River Delta and Southwest region (CCID Consulting, 2011) , among which all the cities shared advanced economic level and developed together as a whole unity.

Figure 4-1. Distribution map of Chinese cities with low-carbon targets
Source: CCID Consulting. (2011). *Strategic Study of Chinese Low-carbon Urban Development.* CCID Consulting.pp.2
Chinese Society for Urban Studies. (2011). *China's Low Carbon Eco-city Development Strategy.* Beijing: China Building Industry Press.

From this chronicle of events, we can see low-carbon pilot cities are the attempts of new urbanization in China. Because urbanization is always the most important driver about energy consumption and carbon emission and whether it can become greener and greener is still unsuspected and full of uncertainties.

4.2 The target system of low-carbon urban development

(1) Low-carbon policies

CCID Consulting, China's largest research, consulting and IT outsourcing service company

In order to achieve the goal of energy-saving and environmental-friendly society and carry low-carbon planning smoothly, both Chinese central government and relevant departments have introduced a combination of policies, see in Table 4-. All these policies worked together to create a better condition for low-carbon development.

Table 4-1 China s main policy framework for low carbon city development

National law		Circular Economy Promotion Law(2005) Renewable Energy Law(2007)
National policy	The State Council	Comprehensive program of energy conservation work(annual) Public sector energy efficiency regulations(2008)
Ministry policy	Development and Reform Commission	Acting as energy conservation authorities
	Ministry of Finance	Financial support for 10 key tasks on new energy and energy conservation(2008)
	Ministry of Science and Technology	National assessment report on climate change(2006) Special technology and program for energy saving(2007)
	Ministry of Housing and Urban-Rural Development	Advice on the implementation of energy conservation in the field of construction(2008)
	Ministry of Transport	Advice on strengthening energy conservation in transport service(2008)
	China Development Bank	Implementation of the State council s advice on energy conservation(2008) Program of loans for pollution emission reduction(2009)

Source: website of NPC, http://www.npc.gov.cn/; NDRC, http://en.ndrc.gov.cn/; Ministry of Finance, http://www.mof.gov.cn/index.htm; Ministry of Science and Technology, http://www.most.gov.cn/; Ministry of Transport, http://www.moc.gov.cn/; China Development Bank, http://www.cdb.com.cn/ etc.

(2) Low-carbon urban planning system

After several years of low carbon practicing, some pilot cities summarized a 1+4+X plann based on the demand of central government and local characteristics (Qi, 2013), see in Figure4-2. Every pilot city should integrate low-carbon development into local economy and social development planning. At the meantime, provincial pilots made climate change project and Greenhouse ga every pilot city made low-carbon pilot implementation plan and low-carbon dev some of the local pilot cities had also made special planning projects according to their own features

and development conditions, such as energy saving, clean energy, circular economy, architecture, transport and so on. Those special planning projects played a vital role in supporting, completing and coordinating with low-carbon development

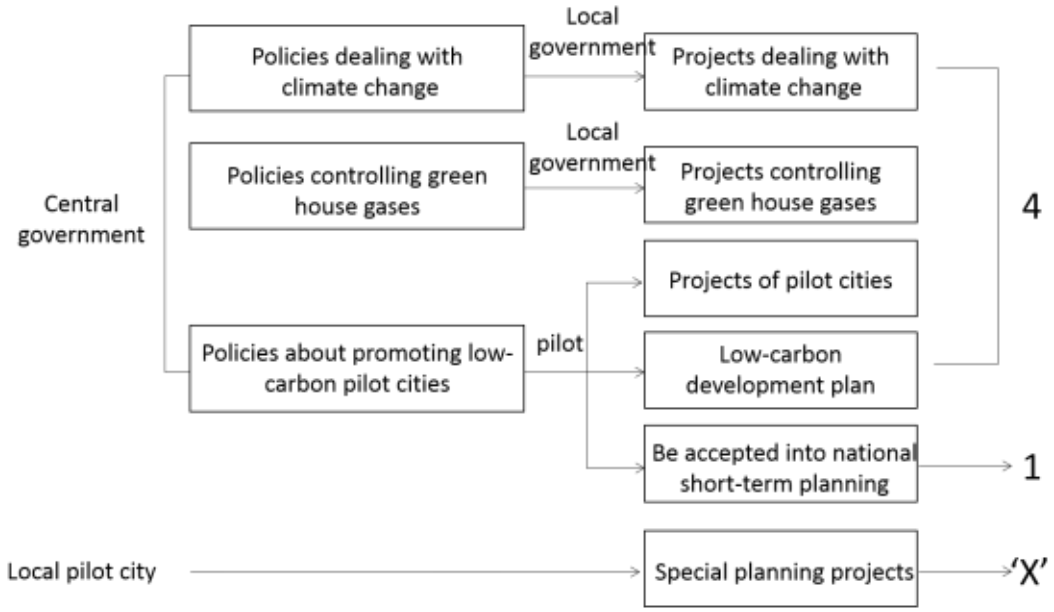


Figure4-2. Low-carbon urban planning system of pilot cities
Source: Qi, Y. (2013). *Annual Review of Low-carbon Development in China.* Beijing: Social Science Academic Press.pp.34

4.3 Domestic exploring of low-carbon urban development

Since China is a large country with complicated natural conditions and unbalanced regional economies, all these characteristics finally determine the diversity of low-carbon development. In order to achieve the goal of corresponding target system, different cities choose different constructive paths and time schedules, as Table4-2 shows.

Table 4-2. Low-carbon development patterns for different types of cities

Classification criteria	Features of cities	Patterns of low-carbon development	Representative cities
Population scale	Small and medium-sized cities	Based on single industry or project	Kunshan, Yiwu,
	Large cities and metropolis	Comprehensive development of Mulita-industry or projects	Beijing, Guangzhou
Resource endowment	Abundant fossil energy	Combine urban development with industry transformation	Fushun, Daqing
	Renewable resources	Explore renewable resources	Baoding, Nanchang
Geographical	Coastal cities	Based on marine industry and marine	Tianjin, Qindao

location		energy resources	
	Inland cities	Focus on structure adjustment	Wuhan, Chengdu
Industrialization stage	Industrial cities	Improve energy efficiency, change high-carbon industry into low-carbon	Zhengzhou, Taiyuan
	Post-industrial cities	Combine low-carbon energy system, industry system and technology system	Beijing, Shanghai

Source: summarized and made by author

As we have already mentioned in literature review, there are six patterns of low-carbon urban development in the practices of C40 (Figure2-1.) However, most of the low-carbon cities in China are following the patterns of low-carbon basis and low-carbon structure , trying to explore new e and renewable resources, optimizing the industrial structure and striving to develop tertiary industry. By summarizing the majority of Chinese low-carbon practices, we find out two typical representative cities.

a) Baoding style. This type mainly depends on new energy as a breakthrough point, such as the construction of China Power Valley and Solar City in Baoding which contr development of low-carbon society.
b) Shanghai style. This type is mainly driven by some major projects or demonstration areas, such as Shanghai took the chance of World Expo to carry out low-carbon architecture and carbon-offset projects, promote green commuting and low-carbon living, chose Chongming Island and Lingang New Town as low-carbon best practices areas.

4.4 The security system of Low-carbon urban development

(1) Financial and technical supporting system

The financial supporting system for low carbon city construction mainly consists two parts: policy finance and commercial finance. Policy Finance is based on state credit and needs to get support from the government. And the commercial finance is the most important financial power for the construction of the low-carbon city (Ma, et al., 2012). In recent years, with the introduction of the concept low-carbon city, Chinese financial institutions gradually realized their role in promoting a sustainable society.

In addition to the financial support, there exist some scientific research institutions providing technical support for low-carbon development, such as CSUS and CRSUD , they are non-profit social organization including relevant departments, enterprises, communities, universities and volunteers. The scope of their work covers the research of carbon footprint, advanced developing patterns, low-carbon technology and products, they also hold academic exchanges activities regularly.

(2) Indexes system

As a complex giant system, urban construction involves many aspects of social and economic

CSUS, Chinese Society For Urban Studies
CRSUD, China Research Society of Urban Development

development, so we have to establish the macro-urban planning to make all low-carbon economic projects a system and build the evaluation indexes system to assess city development level.

In the view of different development phases of low-carbon cities, Chinese researchers built some corresponding evaluation indexes system from different directions. Such as CASC Index (The Chinese Academy of Social Science) which has 12 specific relative indicators and now widely used in China; Cao Feidian Eco-city Index (Katarina & Tan, 2009)and Tian Jin Zongxing Index (Singapore Government, n.d.)are designed especially for these two cities, which are quite suitable and convenient for local developments; Besides, there is a composite indexes method corresponds to the comprehensive evaluation index of low-carbon economy in urban areas, involving economy, technology, energy and pollution emission, society, environment.

(3) Monitor and Assessment system

The index system mainly works as a restriction at the early stage of low-carbon urban development, as to the whole process, there will be monitor and assessment system to guide and guarantee a successful procedure. For the part of monitor system, there are various management mechanism like land use plan, cap-and-trade system, urban scale control etc. For the part of assessment system, China has tried times recent years. In 2011, CSUS created Urban Ecological & Livable Development Index (UELDI) to assess the development situation. In 2013, Chinese Academy of Social Sciences together with Environmental Research Institute and Universities ranked 110 cities by using low-carbon development index, gave a general view of low-carbon cities in China and also provided a basic criteria for the other cities. Besides, Chinese government will publish research report every year to summarize the construction situation.

(4) Public participation

Low-carbon development is neither simple market behavior nor total government behavior, it is a process influenced by three main body, government-market-public . In China, ther of public participation in low-carbon development, like the widespread of low-carbon production in daily life, donation to low-carbon projects, and participation in environmental protection activities. Although the degree of participation and low-carbon sense had been improved, there still needs effective ways to guide people to take actions and combine up-bottom regulatory system and oversight system.

4.5 Summary

After doing the rounded analysis of the process management of low-carbon urban development in China, we improved the main structure into more detailed one. It turned out that every phase should be well connected, interact with each other and make full use of bottom-up public oversight system to get evaluation and feedback. In the following section, we will take a specific example to analysis the whole process in detail.

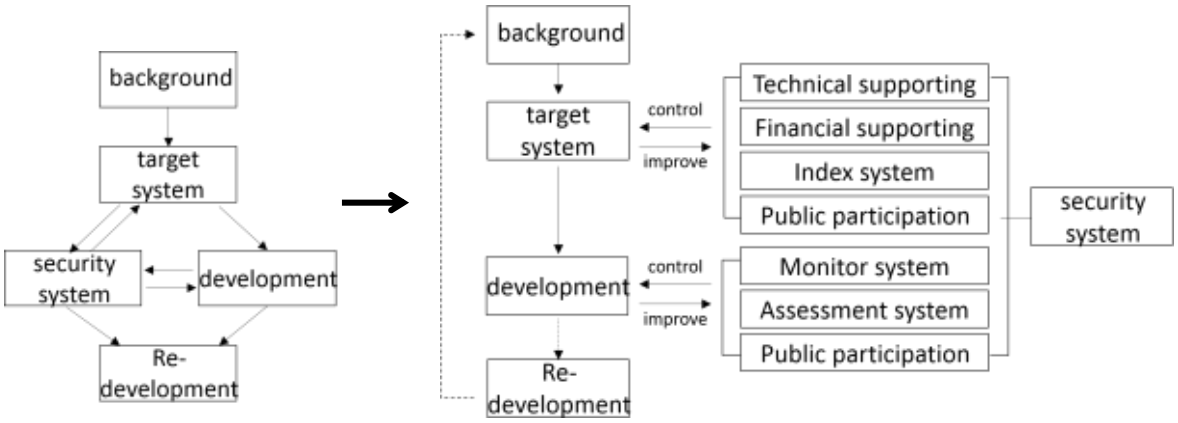


Figure4-3(right). Process management of low-carbon urban planning
Source: drawn by author

5. The case study of Shanghai Lingang New Town

5.1 Introduction

Lingang New Town is a totally new low-carbon city built from zero, and it has already become one of the best practice areas and demonstration areas in Shanghai for the discovery of effective ways to improve the planning management. Lingang New Town is located in southeast Shanghai, near the East China Sea, the central planning area is 70km^2, of which 4.5 km^2 is a big lake called Dishui Lake as Figure5-1 shows. The general layout is arranged radially, and it is estimated that all the construction will be finished in 2020. In the next research, we followed the pattern of process management in section 4.5, tried to analyze the low-carbon development of Lingang New Town and gave marks on each part.

Figure5-1. The master plan of Lingang New Town
Source: http://sh.house.163.com/14/0724/07/A1TEU2KK00074JAS_all.html

5.2 Background of low-carbon development of Lingang New Town

Lingang New Town was first called Haigang New Town in 2003, after Shanghai gove the research of its development scale, general layout, industry condition and municipal facilities, the name Lingang New Town was finally settled. Next year in 2004, the planning of was officially approved by Shanghai government. It was until 2008 that WWF chose Shanghai as one of the low-carbon pilot cities in China, Lingang New Town had become an important project to promote low-carbon development (Chinese Society for Urban Studies, 2009). In 2011, it was authorized as one of the eight practices area to build resource-efficient and environmentally-friendly society.

All in all, Lingang New Town has a potential to become a low-carbon city.

5.3 The building of Low-carbon target system

(1) Low-carbon urban planning system and strategies.

Depending on the national low-carbon urban planning system mentioned in the section 4.2(2), Lingang New Town gradually formed its specific one, which concludes four parts. Master planning, Special planning, Zoning and Regulatory plan (Figure 5-2). The establishment of Master Plan took two years, and emphasized more on top-bottom macro-allocation and general layout; Zoning bottom planning with bottom-up implementing needs, put Master plan into mor Special planning was mainly about the area of new industry; and Regulatory plan was the right linkage between theory and reality.

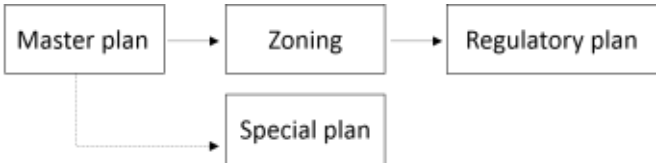


Figure 5-2 low-carbon urban planning system of Lingang New Town
Source: drawn by author

By collection information in all kinds of medium, we have summarized d low-carbon targets and strategies in corresponding planning phases, see in Table 5-1.

Table 5-1. Low-carbon target system of Lingang New Town

Planning phase	Low-carbon target	Low-carbon strategy
Master planning, ,	Theory of Garden City	Ring and radiate layout of space
	Intensive land-use	TOD mode
	Green transport	Green corridor
Zoning	Efficient urban spaces	Refine Master Plan
		Reasonable urban block scale

TOD, Transit Oriented Development

Regulatory plan	Mixed land development	Suitable development intensity and building density
Special planning	Job-housing balance	Low-carbon energy and industry Technology supporting system

Source: made by author

(2) Security system and management

a) Technology support
Along with the huge amount of constructive programs, there are abundant researches as well, such as, questionnaires, marine industry investigation, technical standards of industrial parks and landscape research. Besides, the cooperation with foreign design companies also brought lots of new ideas.

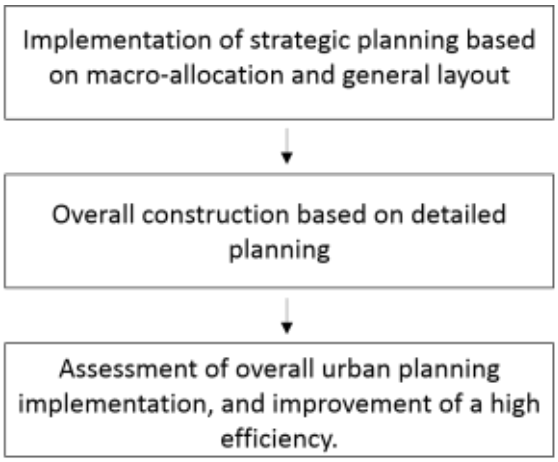
b) Multi-phase organization
The whole planning system is divided into three main phases and each phase is divided again to a smaller step. This kind of system meets the basic requirement of process management and lower the risks in each phase.

c) Trans-department cooperation
Different departments and organizations will take part in every different phase. Such as, before making urban planning, environmental department gives advices on sites selection; in the designing part, municipal department, transport department and other related departments will work together to reach an agreement, this will help to make special planning in turn.

5.3 low-carbon urban development and management

(1) The process of development

Since the Master Plan of Lingang New Town was officially approved, the construction activities showed three phases clearly (Luo, 2009, p. 57), see in Firgure5-3.



Firgure5-3. Three phases of the process of development
Source: Luo, Q. L., Hu, Y. D. & Qiu, Y. D., 2011. The Theory, Practice and Prospect of the Low Carbon City Planning. *Planners*, Volume 5(27), pp. 57

a) First Phase: from 2004 to 2005
2004, 2005 are the first two years to start the overall construction of Lingang New Town, everything needed to build from zero, so the implementation of strategic planning became a main feature.

b) Second Phase : from 2006 to 2007
The revise of urban planning provided a great challenge for overall construction. At the same time, More detailed community planning has been finished and put into actions.

c) Third Phase : from 2008 to now
In 2008, the publication of new Urban and Rural Planning Law pointed out that assessment of urban planning implementation was compulsory in the process of development. And this just fitted in the time schedule of Lingang New Town. We picked out the major outcomes from the detail assessment materials (Sun, 2011) and put them into the table we made before to see the differences between targets and realities (Table 5-2).

Table 5-2. The assessment of low-carbon implement of Lingang New Town

Planning phase	Low-carbon target	Assessment
Master planning, ,	Theory of Garden City Intensive land-use Green transport	Land function is relatively the same, simplex and isolated. Over-reliance on cars
Zoning	Efficient urban spaces	Large scale of green space caused extensive land use
Regulatory plan	Mixed land development	Living area is too big to form sense of community Lack of entertainments and service industry
Special planning	Job-housing balance	Excessive municipal facilities The development speed of industry areas is faster than residential areas

Source: Sun, Q., 2011. Low Carbon City Planning Exploration and Practice of Lingang New City. *Shanghai Urban Planning Review*, 5, pp. 24-29.

(2) Security system and management

a) The assessment of low-carbon implement

Lingang New Town is the first area to carry out the assessment of low-carbon implement in Shanghai. It has ten aspects: land use, industry development, index system, job opportunities, public facilities, comprehensive transport, road system, municipal system, planning management and technical standard, almost covered the major contents of five different departments and formed a relatively complete system at last. The assessment is not confined to the planning itself, but also includes the general situation of the whole society.

b) Public participation

The development of Lingang New Town was originally driven by government, and followed path of upscale strategy, which means the participation part mainly consist relative departments, design organizations and green groups, so it has a higher standard to choose its residents and developers. This kind of development pattern made it difficult to include ordinary citizens and also had negative influence on the implementation of plans.

5.4 Evaluation and Solution

Taking Case studies (section3.) as a reference, the development pattern of Lingang New Town is more like the first one, nearly concentrates on every part of urban development, range from general layout to energy consuming, however the result seemed to be unsatisfactory (Table 5-2). The reason lies in two aspects: firstly, the target is too ambitious and abstract to put into practice without a specific index system and flexible spaces, thus making all the perfect ideas just blueprints; secondly, there lacks enough public participation during the phases of building low-carbon target system and low-carbon urban development.

As a result, Lingang New Town should try to divide all the work into baby steps, make sure every part is done and then move forward, in addition to this, the feedback and interaction of each part are also of great importance. Another solution is to build a cooperation model of governmen role of government is guiding other participants to engage into the process of low-carbon development. For those reasons and solutions we improved the process management of low-carbon urban development for Lingang New Town and make full use of up-bottom regulatory system and b oversight system to get evaluation and feedback, see in Figure 5-4. We hope this new model will correlate the urban development policy with the low-carbon practices and help the seek of the real management method of low-carbon growth .

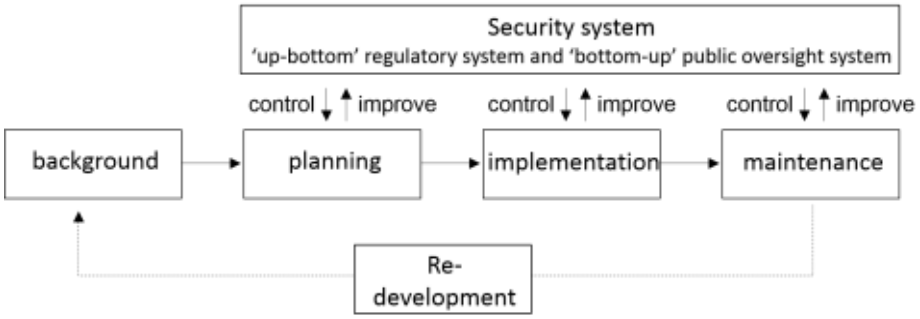


Figure 5-4 process management of Lingang low-carbon urban development
Source: drawn by author

6. Research conclusion and outlook

Chinese low-carbon development started relatively compared to other western countries. The original

motivation concentrated more on economic growth, and the major content of low-carbon urban planning is huge and complex. As to the implement phase, western planning usually take use of the market power, however, Chinese planning depends on the guidance of government in most cases. Since more and more cities are in a common background of climate changes, high-risk natural disasters, excessive high-carbon emission and serious urban pollution, changing our traditional way of planning into a more resilient system becomes an urgent issue nowadays.

The planning of Lingang New Town provided us an international view and a new platform to improve our planning theories and technical levels, we still have a lot to learn about low-carbon urban development.

Reference:

CCID Consulting, 2011. *Strategic Study of Chinese Low-carbon Urban Development,* s.l.: CCID Consulting.

Chinese Society for Urban Studies, 2009. *China's Low Carbon Eco-city Development Staregy.* s.l.:Beijing: China City Press.

Chinese Society for Urban Studies, 2011. *China's Low Carbon Eco-city Development Strategy.* Beijing: China Building Industry Press.

City of New York, 2007. *PlanNYC 2030: A Greener, Greater New York.* [Online]

Available at: http://www.nyc.gov/html/planyc/html/home/home.shtml

Covenant of Mayors, 2008. [Online]

Available at: http://www.covenantofmayors.eu/index_en.html

Crawford, J. & Will, F., 2008. A low-carbon future spatial planning's role i n enhancing technological innovation in the built environment. *Energy Policy*, 12, Volume 36, pp. 4575-4579.

Glaeser, E. L. & Kahn, M. E., 2008. The Greenness of Cities: Carbon Dioxide Emissions and Urban Development. *Journal of Urban Economics*, Volume 38, pp. 650-655.

Greater London Authority, 2007. *Action Today to Protect Tomorrow: The Mayor's Climate Change Action Plan.* [Online]

Available at: http://legacy.london.gov.uk/mayor/environment/climate-change/docs/ccap_summaryreport.pdf

Ho, C. S. & Fong, W. K., 2007. *Planning for Low Carbon Cities - The case of Iskandar Development Region, Malaysia.* Seoul, Korea, Sustainable Urban Development Institute, pp. 11-15.

Katarina, S. & Tan, Y., 2009. The Indicator System for Caofeidian Eco-city. *World Architecture*, Volume (6), pp. 28-33.

Large Cities Climate Leadership Group, 2005. [Online]

Available at: http://www.c40.org/

Lei, H. P., Zhuang, G. Y. & Zhang, C., 2011. *Analysis of Chinese Low-carbon Urban Development--Strategy and Method.* Beijing: China Environment Science Press.

Lin, Y. Y. & Wu, J. M., 2010. Analysis of International Low-carbon Urban Practices. *Urban Planning International*, Volume 25, pp. 121-124.

Liu, Z. L., Xin, D. Y., Dong, C. G. & Qi, Y., 2009. Low Carbon City: Concepts, International Practice and

Implications for China. *Urban Studies*, Volume 16, pp. 1-7.

Li, Y. Y. & Zhao, G. L., 2014. A review of low-carbon city construction research in China. *Ecological Economy*, Volume 10(1), pp. 66-79.

Local Governments for Sustainability, 1990. [Online]
Available at: www.iclei.org/

Lu, C. J. et al., 2012. Analysis of Influencing Factors of Low- carbon City Development in China. *China Population, Resources and Environment*, Volume 22, pp. 57-62.

Luo, Q. L., Hu, Y. D. & Qiu, Y. D., 2011. The Theory, Practice and Prospect of the Low Carbon City Planning. *Planners*, Volume 5(27), pp. 5-27.

Luo, Z., 2009. Lingang New City:The Best Practice Zone for the Exploration of Technology of Urban Planning. *Shanghai Urban Planning Review*, pp. 56-60.

Ma, Z. J., Wei, H. & Zhang, Z. B., 2012. *The Research on the Financial Support System of Low-Carbon City Construction.* s.l., China Academic Journal Electronic Publishing House, pp. 680-684.

National Developmet and Reform Comission, 2010&2012. [Online]
Available at: http://www.sdpc.gov.cn/

Pan, H. X. et al., 2008. Spatial Planning Strategy for "Low Carbon Cities" in China. *Urban Planning Forum*, pp. 57-64.

Qi, Y., 2013. *Annual Review of Low-carbon Development in China,* Beijing: Social Science Academic Press.

Singapore Government, n.d. *The Index System of Tianjin Eco-city.* [Online]
Available at: http://www.tianjinecocity.gov.sg/chinese/bg_kpis.htm

Sun, Q., 2011. Low Carbon City Planning Exploration and Practice of Lingang New City. *Shanghai Urban Planning Review*, 5, pp. 24-29.

Xia, K. B., 2008. A low carbon economy development and realize the sustainable development. *Environmental Protection*, 7, pp. 33-35.

Xia, N. K., 2008. *Introduction to Urban Development.* s.l.:Shanghai:Tongji Univesity Press.

Zhang, K., 2008. *Shanghai and Baoding are elected as low-carbon pilot cities by WWF.* [Online]
Available at: http://news.163.com/08/0128/14/43A70SA9000125LI.html

Zhu, S. X. & Liang, B. F., 2012. Comprehensive evaluation index construction and application of urban low-carbon development in China. *Urban Studies*, Volume (9), pp. 99-104.