

THE STATE OF CHINA'S CITIES

——|2016/2017|——

Global Perspective and China Practice: Planning for Future of Cities

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THE STATE OF CHINA'S CITIES 2016/2017

Global Perspective and China Practice: Planning for Future of Cities

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China Association of Mayors

Urban Planning Society of China

United Nations Human Settlements Programme

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In the process of joint creation of the beautiful future for the 21st century human settlement, the UN has decided to hold the The United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in October 2016 and formulate a new historical blueprint – Habitat III New Urban Agenda.

Echoing and supporting the Habitat III, CSC-IEAS, China Association of Mayors, Urban Planning Society of China (UPSC) and UN-Habitat have cooperated to publish *The State of China's Cities 2016/2017* under the theme of Global Perspective and China's Practice: Planning for the Future of Cities.

The report reviews the brief span of 30-plus years when China's reform and opening-up initiative explored the way forward, "crossing the river by feeling for stones". Several hundreds of million of rural people have shaken off poverty in the large scale industrialization and rapid urbanization. Both the living quality and income levels of all Chinese citizens have witnessed significant improvements. As China's development is for the people and by the people, the development achievements are shared by all the people. As the Chinese saying, "people is the foundation of the state, the state will be safe if the foundation is firmed", which is also the ultimate goal of China's modernization initiative.

Looking forward to the future, our new vision shall follow the people-centered and everyone sharing concept to jointly promote the inclusive economic development and ensure that all residents including the current generation and their offspring can live, study and work in the fair, safe, healthy, resilient, and diversified cities and countryside that have convenient transportation and sustainable resources and environment. To this end, China will firmly bear in mind and resolutely implement the development concept of innovation, coordination, green, open and sharing following the goal of building a well-off society in an all-round way and dealing with such outstanding problems as imbalanced, uncoordinated and unsustainable development.

The State of China's Cities has published every two years since 2010. They are intended to make a systematic introduction to the development of China's cities, publicize the achievements of China's urban development, analyze the existing difficulties and problems and propose the active suggestions for the next stage. It is hoped that the report can make its due contributions to the global sustainable development and as a window for the international community to understand of the urban China.

March 2017



Huang Yan

Vice-Minister, The Ministry of Housing and Urban-Rural Development, China

China's urban development has entered the new era and China has made remarkable achievements after experiencing the rapidest urbanization process of the largest scale ever in the world history.

The Central Urban Work Conference was held in December 2015 in Beijing 37 years after the previous one, and it was an important conference convened at the key moment when China is dedicated to building a well-off society in an all-round way. The conference carried out a systematic analysis of the situation faced in urban development, clarified in depth the guidelines, overall principles and key tasks for urban work and defined the direction for the future development of Chinese cities. The conference put forward that currently and in the period to come, China's urban work shall focus on fully implementing the development concepts of innovation, coordination, green, open and sharing; adhere to the principles of people-orientation, scientific development, reform and innovation and rule of the cities by law; improve the urban governance system, enhance the urban governance capability; and focus on solving the outstanding problems including urban illness. Efforts shall be made to continually improve the environmental quality of cities, living quality of the people and urban competitiveness, build the harmonious, livable and vibrant modern cities of distinct features; improve the level of new-type urbanization and create the China-model route of urban development; actively adapt to and guide the new normal of economic development, and plan, build and manage the urban development in the optimal way. This is of important practical significance and far-reaching historical significance for building the people-oriented new-type urban development, building the Beautiful China and realizing the "Two Centenary Goals" and the China dream of the great rejuvenation of the Chinese nation.

The State of China's Cities 2016/2017 to be published reviews the urbanization process of China, summarizes the experience from urban development, exhibits the achievements from the practice of urbanization, and makes a brief introduction to the current status of urbanization, rural and urban governance, public services in urban and rural areas, urban infrastructure, urban and rural green development and improvement of urban space quality. I hope this report can serve as a window for the international community to understand China and promote China and other countries to conduct exchange and cooperation, share urban development experience, plan and contemplate on the future of cities.

March 2017



Joan Clos

Under-Secretary-General and Executive Director
United Nations Human Settlements Programme (UN-Habitat)

It is with great pleasure to present *The State of China's Cities 2016/2017* report. This document also serves as a contribution of China to the implementation of the *New Urban Agenda*, the outcome document of the Third UN Conference on Housing and Sustainable Urban Development-Habitat III, which took place in Quito, Ecuador, in October 2016.

At this critical juncture in our global history, when more than half of the world's population lives in cities, it is more important than ever that we seek innovative solutions to our most pressing urban challenges. The New Urban Agenda is an action-oriented document that sets global guidelines for sustainable urban development, rethinking the way we build, manage, and live in cities. Cities provide a unique opportunity to effectively address many of our problems today: social inequality, economic development, climate change and resilience to natural and man-made disasters.

In the wider context of the Sustainable Development Goals, the Paris Agreement, the Agenda for Humanity, the Sendai Framework for Disaster Risk Reduction and the Addis Ababa Action Agenda for Financing Development, the New Urban Agenda provides a structure and framework for socially, economically and environmentally sustainable urban development.

Although the relationship between urbanization and development has been established for many years, the specific causal relationship between urbanization and increased prosperity was not clearly studied until recently. The case of China's urbanization is a very interesting one in order to see how urbanization can be used as a tool to boost development.

The massive urbanization of China is one of the most significant economic and social transformations humanity has ever seen. It has been a clear example of how urbanization can contribute to economic growth and prosperity coupled with industrialization. 500 million people were lifted out of poverty and over 260 million people moved from agriculture to industrial activities.

This report provides an insightful analysis of China's policies, practices, challenges and lessons learned, on one of the most relevant trends of China: its urbanization as a tool for development.

I would like to thank the China Science Center of International Eurasian Academy of Sciences, the China Association of Mayors, and the Urban Planning Society of China for partnering with UN-Habitat in this important reference book.

I am convinced that China's policy and practice can serve as a useful reference to many growing cities around the world as they address their own urban challenges.

Enjoy the reading.

A handwritten signature in blue ink that reads "Joan Clos". The signature is fluid and cursive, with a long horizontal line extending from the end.

Summary

The State of China's Cities 2016/2017 (hereinafter referred to as “the *Report*”) expatiates the updates on urban development in China in recent several years. The compilation of the *Report* coincides with the pending adoption of the UN’s Sustainable Development Goals (SDG) and the enacting of the New Urban Agenda. Therefore, the *Report* lays special stress on how China’s cities integrate into the mainstream of world development, and by defining the theme of this year as Global Perspective and China Practice: Planning for Future of Cities, will focus more on how China aligns itself with the international standards and adopt the practice based on its own specific conditions, among other things.

The six chapters of the *Report* follow the order of Urbanization, Rural and Urban Governance and Social Integration, Public Services in Urban and Rural Areas, Urban Infrastructure, Urban and Rural Green Development, and Future-Oriented Improvement of Urban Space Quality.

The opening chapter of the *Report* details the high-level design of urban development, introduces various important conference and meeting including the urbanization-targeted Central Urban Work Conference and Central Urbanization Work Conference convened by China’s government in recent several years, demonstrates the level, quality and spatial pattern of China’s urbanization and teases out series of major reforms and significant measures of China on urbanization. The modernization of the state governance system and governance capability is central to these major reform measures. The Rural and Urban Governance and Social Integration chapter details the relevant topics and focuses on urban planning and space governance, innovative ways of urban management, urban employment and poverty reduction, situation of rural migrant workers in urban China and the rebuilding of shanty areas.

On the urban development level, the *Report* focuses on China’s public services system, infrastructure development and urban and rural green development. As for Public Services in Urban and Rural Areas, the *Report* details the four aspects of education, medical and healthcare system, care for the elderly and the building of the public culture service system, introduces the equalization of basic public education services, reforms of the science & technology, education, culture and healthcare systems, protection of the interests and rights of the elderly, and the building of the public culture service system, etc., and presents the prospect of how to better step into an all-round well-off society. As for Urban Infrastructure, the *Report* introduces the development of China’s urban water system, energy system, and transport, and highlights the two important practices of sponge city development and the utility tunnels. As the promotion of ecological progress is another key point of China’s urban development, the Urban and Rural Green Development chapter details the low-carbon eco-demonstration city development, atmospheric environment quality improvement, urban ecological security guarantee, and utilization of renewable energy, and introduces the practice of green buildings.

Finally, the *Report* presents its vision for the future of the cities in China. The last chapter introduces China’s urban design and shaping of landscape pattern, protection and inheritance of history and culture and improvement of public space quality from the perspective of improvement of urban space quality, and highlights the analysis of urban greenway development as the case of practice. The appendixes of this *Report* provide the basic data of China’s 292 cities at and above prefecture level, including the administrative land area, population, area of built-up districts, economic indicators and relevant indicators of urban development.

A thorough reading of this *Report* will present to the readers the panoramas of China’s urban development from such aspects as policy guidance, implementation of projects, status quo and improvement measures, integration with the international standards and local practices, and it is believed that the readers will surely gain a deeper understanding of the development modes, planning concepts, measures of development and tremendous changes of practical effects of the cities in China in recent several years.

Shi Nan
Executive Vice President & Secretary-General, Professor, Urban Planning Society of China

Contents*

1 Urbanization

1.1 High-level design of urbanization	14
1.1.1 Promote people-centered new-type urbanization	14
1.1.2 Realize the goals of three tasks, each concerning 100 million people.....	15
1.1.3 Take city cluster as main pattern and optimize urbanization layout...	15
1.1.4 Explore the development path of ecological progress for new-type urbanization	15
1.2 Quality and level of urbanization	15
1.2.1 Global urbanization process	15
1.2.2 Stages and main characteristics for urbanization development in China	15
1.2.3 Great achievements in urbanization development	17
1.2.4 Major contents of new-type urbanization development strategy	18
1.3 Spatial pattern of urbanization	19
1.3.1 Evolution of spatial pattern of urbanization in China	19
1.3.2 Basic features of spatial pattern of urbanization in China	19
1.3.3 Tendency for spatial pattern of urbanization in China	20
1.3.4 Growth of China's city clusters	23
1.3.5 Optimization of spatial carrier of urbanization	23
1.4 Interaction between urbanization and industrialization	23
1.4.1 Coordinated development of industrialization and urbanization in China	23
1.4.2 China's industrialization promotes orderly flow of production factors	24
1.4.3 Urban and service industry development	24
1.4.4 Ecological progress and integration of industrialization and urbanization	25
1.5 Supporting system reform related to urbanization	26
1.5.1 Household registration system reform	26
1.5.2 Land system reform	26
1.5.3 Financial and taxation system reform	27
1.5.4 Investment and financing system reform.....	27
1.5.5 Housing security system reform	27

2 Rural and Urban Governance and Social Integration

2.1 Urban planning and space governance	30
2.1.1 Modernization of the state governance system and governance capability: context, connotations and characteristics	30
2.1.2 Logic for space governance in China's urban planning	30

* The content of this Report only covers the Mainland China, does not cover Hong Kong SAR, Macau SAR and Taiwan.

2.1.3 Governance-based transformation of urban planning	31
2.2 Innovative way of urban management	31
2.2.1 Control the development intensity.....	31
2.2.2 Promote multiple planning integration.....	33
2.2.3 Safeguard the public security	33
2.2.4 Strengthen the community governance	34
2.3 Urban employment and poverty reduction.....	35
2.3.1 Overall situation of urban employment	35
2.3.2 Innovation and entrepreneurship support program	36
2.3.3 Overall situation of poverty alleviation.....	37
2.4 Situation of rural migrant workers in urban China	39
2.4.1 Basic characteristics of migrant workers.....	39
2.4.2 Living conditions of migrant workers.....	42
2.5 China practice: the rebuilding of shanty areas	45
2.5.1 Concept of shanty areas and scope of rebuilding	45
2.5.2 Achievements and targets for the rebuilding of shanty areas.....	46
2.5.3 Practice for the rebuilding of shanty areas	47
2.6 Recommendations from experts: Establishment of the social & public policy system to promote the sustainable development (draft).....	47

3 Public Services in Urban and Rural Areas

3.1 Promote fair access to education and improve the education quality	52
3.1.1 Push the equalization of basic public education service	52
3.1.2 Lead the improvement of education quality with new development concepts	55
3.2 Continue to deepen the commitment to the reform of the medical and healthcare system	56
3.2.1 National medical insurance system has been basically established	57
3.2.2 Equalization of public health services has been gradually improved	57
3.2.3 Medical and health service capability has been continuously improved	57
3.2.4 Medical and healthcare system reform has been further promoted	58
3.3 Put the <i>Law on Protection of the Rights and Interests of the Elderly</i> in full operation	59
3.3.1 Results achieved from implementing the <i>Law on Protection of the Rights and Interests of the Elderly</i>	59
3.3.2 Major issues and difficulties in implementing the <i>Law on Protection of the Rights and Interests of the Elderly</i>	60

3.3.3 Comprehensive implementation of the <i>Law on Protection of the Rights and Interests of the Elderly</i> in a further step	61
3.4 Accelerate to build the public culture service system	62
3.4.1 Basic conditions for the public culture service system development in China	62
3.4.2 Existing problems in the development of public culture service system	63
3.4.3 Thoughts on improving the development of public culture service system	64
3.5 Recommendations from experts: Jointly step into an all-round well-off society	64
3.5.1 Promote employment and entrepreneurship	64
3.5.2 Reduce the income gap	64
3.5.3 Carry out the targeted poverty alleviation project	64
3.5.4 Promote the coordinated development of urban and rural areas ...	65

4 Urban Infrastructure

4.1 Urban water system	68
4.1.1 The capability to secure urban water supply is continuously improved.....	68
4.1.2 Pressure on the urban water environment continues to rise	69
4.1.3 Treatment of urban black and odorous water body is fully promoted	70
4.1.4 Urban drainage and flood control becomes more onerous	71
4.2 Urban energy system	72
4.2.1 Urban natural gas demand and supply grows rapidly	72
4.2.2 Urban central heating witnesses improvements in both quality and quantity	73
4.2.3 Cross-regional power transmission and distributed energy co-exist....	74
4.3 Development of urban transport system.....	75
4.3.1 Urban public transport	75
4.3.2 Pedestrian and bicycle transport	78
4.3.3 The development trend of urban transport	78
4.4 China practice: Sponge City development	80
4.4.1 Situation about the planning and construction of the sponge city ...	80
4.4.2 Supporting system guarantee for “sponge city” development	80
4.4.3 Pilot project for the sponge city development in Jinan	83
4.5 China practice: the utility tunnel	84
4.5.1 Situations about the construction of utility channel	84
4.5.2 Supporting system guarantee for the utility tunnel	84
4.5.3 Pilot projects of utility tunnel development in Jilin Province	85

5 Urban and Rural Green Development

5.1 Low-carbon city/community development.....	88
5.1.1 Low-carbon eco-demonstration city	88
5.1.2 Green eco-cities (towns)	89

5.1.3	Low-carbon community	89
5.1.4	Key green and low-carbon towns	93
5.2	Atmospheric environment quality improvement.....	93
5.2.1	Overall situation about the atmospheric environment	94
5.2.2	Implementation of Air Pollution Prevention and Control Action Plan.....	95
5.3	Urban ecological security guarantee.....	96
5.3.1	Ecological space control	96
5.3.2	Urban ecological development	96
5.3.3	Urban ecological restoration	97
5.4	Utilization of renewable energy	98
5.4.1	Current state of the development of the renewable energy industry	98
5.4.2	New energy demonstration city	100
5.4.3	Demonstration of application of distributed PV power generation	100
5.5	China Practice: green building	100
5.5.1	Overall situation	100
5.5.2	Policy requirements	103
5.5.3	Characteristics of different provinces/cities in promoting the green building	104
5.6	Recommendations from experts: reinforce guidance on planning and make an overall arrangement on orderly development.....	105

6

Future-Oriented Improvement of Urban Space Quality

6.1	Shaping and reinforcement of overall landscape features	108
6.1.1	Macro landscape pattern development	108
6.1.2	Development of special feature areas	110
6.2	Protection and inheritance of history and culture	111
6.2.1	Legal system building and protection system development	112
6.2.2	Planning & guidance	113
6.2.3	Public participation and support	115
6.3	Quality improvement in public space	118
6.3.1	Public space development in the context of urban renewal	118
6.3.2	Networking development for the public space	122
6.3.3	Institutional building	123
6.4	China practice: urban greenway development.....	124
6.4.1	Overview of urban greenway development in China	124
6.4.2	Experience of urban greenway development in China	124
6.5	Recommendations from experts	126

Appendixes

Basic Data of China's 292 Cities at and above Prefecture Level (2014)...	128
Notes to Basic Data of China's 292 Cities at and above Prefecture Level (2014)	137

References



Sichuan Suining: green road bring happiness to the residents (Photo by Liu Changsong)



1

Urbanization

High-level design of urbanization / **14**

Quality and level of urbanization / **15**

Spatial pattern of urbanization / **19**

Interaction between urbanization
and industrialization / **23**

Supporting system reform
related to urbanization / **26**

1.1 High-level design of urbanization

Since 2012, China has held two highest-level special conferences on urbanization, issued several overall and policy initiatives, released and implemented China's first high-level urbanization plan, *National Plan on New Urbanization (2014-2020)* [《国家新型城镇化规划(2014~2020年)》], which developed a series of high-level designs for China's urbanization development by starting from the reality of economic and social development in China. It has insisted on promoting a people-centered new-type urbanization in a comprehensive manner and carried through the development concepts of innovation, coordination, green, open and sharing, to depict the grand blueprint on new-type urbanization with Chinese characteristics that is human-oriented, advocates harmonized development of 'four modernizations', and optimizes layout, promotes ecological progress and cultural heritage, from focusing on "finding a new way" to defining the "roadmap" for urban development and from putting forward the goals of three tasks, each concerning 100 million people (i.e. granting urban residency to around 100 million rural people who have moved to cities, rebuilding rundown city areas and villages inside cities where around 100 million people live, and guiding the urbanization of around 100 million rural residents of the central and western regions in cities there), to new urbanization pilot projects.

1. The word "urbanization" was used for the **first time** in suggestions for the 10th five-year plan
2. The new "four modernizations" concept, i.e. industrialization, urbanization, marketization and internationalization, was used for the **first time** in suggestions for the 11th five-year plan
3. In suggestions for the 12th five-year plan, it was **first** put forward that we shall pay attention to quality and level of urbanization and "promote urbanization proactively and steadily"
4. The 18th Party Congress Work Report put forward, "(we should) stick

to the road of **new-type** industrialization, Informationization, urbanization and agricultural modernization with Chinese characteristics"

5. The State Council released & implemented the **first** urbanization plan *the National New-type Urbanization Plan (2014-2020)*

6. **After 37 years**, Central Urbanization Work Conference was held again, putting forward the urban work deployment of "one respect and five balances"

7. The Outline of the 13th Five-Year Plan puts forward that "(we should) stick to **human-centered** urbanization and promote urban-rural integrated development"

1.1.1 Promote people-centered new-type urbanization

People-centricity is the core topic for new-type urbanization. *The National New-type Urbanization Plan (2014-2020)* [《国家新型城镇化规划(2014~2020年)》] puts forward that "(we should) center on people-oriented urbanization, guide people movement reasonably, promote rural migrant workers to become urban citizens orderly, steadily promote full coverage of urban essential public services for permanent residents, continuously improve population quality, promote people's all-round development and social equality and justice and make all residents share the results of modernization development". The Central Urbanization Work Conference at highest level pointed out that "(we should) promote human-centered new-type urbanization, bring into full play such greatest potential to expand domestic demands, and effectively mitigate various types of 'urban diseases'." The *Several Opinions of the CPC Central Committee and the State Council on Further Strengthening Urban Planning and Development Control* (《中共中央国务院关于进一步加强城市规划建设管理工作的若干意见》) supporting the conference outlined the "roadmap" for urban development in China during the 13th five-year plan period and beyond. It is the elaboration of sticking to people-centered

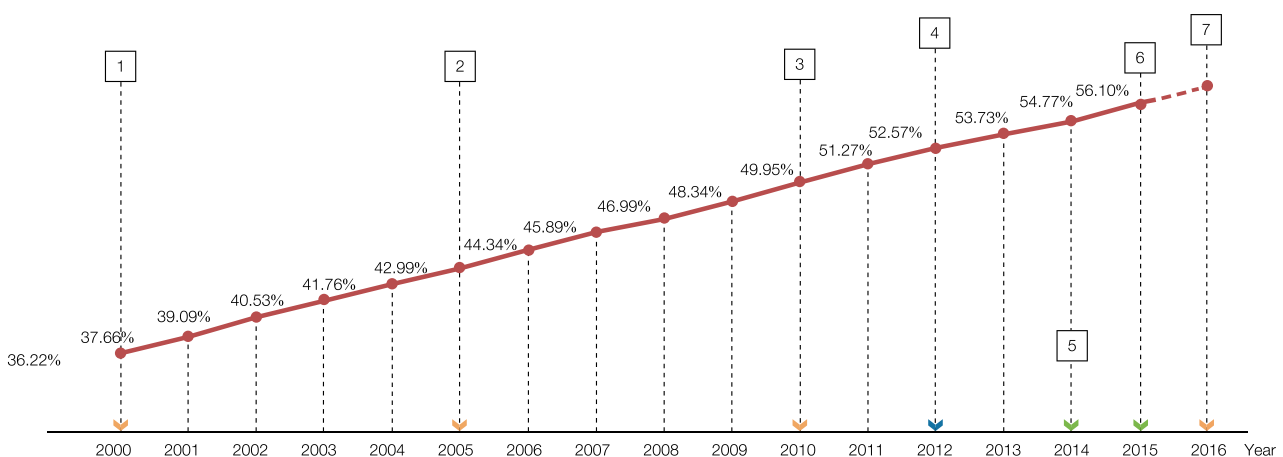


Figure 1-1 Overview of high-level design for urbanization in China

development concept defined by the Fifth Plenary Session of the 18th CPC Central Committee in urbanization to promote people-centered new-type urbanization, which is also a red thread running through the *Outline of the 13th Five-year Plan for National Economic and Social Development of the People's Republic of China* (《中华人民共和国国民经济和社会发展第十三个五年规划纲要》) (hereinafter shortened as the Outline of the 13th Five-year Plan) and the value of urban construction, development and governance in the new period.

1.1.2 Realize the goals of three tasks, each concerning 100 million people

In 2014, Premier Li Keqiang emphasized in the *Report of the Work of the Government* that “for some time to come, we will focus on three tasks, each concerning 100 million people: granting urban residency to around 100 million rural people who have moved to cities, rebuilding rundown city areas and villages inside cities where around 100 million people live, and guiding the urbanization of around 100 million rural residents of the central and western regions in cities there” . In February 2016, the State Council released the *Several Opinions on Further Promoting New-type Urbanization Construction* (《关于深入推进新型城镇化建设的若干意见》), pointing out “we shall make great efforts to solve the urbanization issue for three tasks, each concerning 100 million people, and comprehensively improve quality of urbanization” . In March 2016, in the *Report of the Work of the Government*, Premier Li Keqiang reiterated to promote the three tasks, each concerning 100 million people, and accelerate poverty relief through development in rural areas.

1.1.3 Take city cluster as main pattern and optimize urbanization layout

The National New-type Urbanization Plan (2014-2020) brought up the task that “in accordance with the principles of overall planning, reasonable layout, coordination with due division of labor and small cities driven by large ones, in urbanization areas defined in the *National Main Functional Area Planning* (《全国主体功能区规划》), (efforts shall be made to) develop city clusters with higher agglomeration efficiency, larger radiation effects, optimized urban system and highly complementary functions and make them become the most important platform to support national economic growth, promote coordinated development across regions and participate in international competition and cooperation.” It was pointed out in the 2015 *Central Urbanization Work Conference* that “(efforts shall be made to) to take city cluster as main pattern, plan urban spatial arrangement in a scientific manner and realize compact, intensive, effective and green development.”

1.1.4 Explore the development path of ecological progress for new-type urbanization

During the Third Plenary Session of the 18th Central Commit-

tee of CPC , it was first put forward that “(To promote ecological progress,) we must establish complete and integrated institutions and systems, with which the ecological environment is protected” ; the Fifth Plenary Session of the 18th Central Committee of CPC brought up the concept of “sticking to green development” , “on ecological progress” was first included as a special chapter in the 13th Five-Year Plan for National Economic and Social Development. *The National New-type Urbanization Plan (2014-2020)* requires “internal relation among production, living and ecological spaces must be manipulated in urban development to realize intensive and efficient production space, livable and moderate living space and picturesque ecological space. The concept of ecological progress shall be integrated into urbanization process to promote green, circular and low-carbon development.” During the Central Urbanization Work Conference, it was put forward that “urban work must take creating good living environment as the central goal, striving to construct cities into the beautiful home where people can live in harmony with others and the nature.”

1.2 Quality and level of urbanization

1.2.1 Global urbanization process

In 1800, the world's urban population reached 50 million globally and the urbanization rate was 5.1%; in 1900, the global urban population was up to 220 million and the urbanization rate was 13.3%; in 2009, the global urbanization rate exceeded 50% for the first time with 3.49 billion urban population, a symbol that mankind has entered the urban age. By 2014, the global urbanization rate was 54% and the total population of nearly 50% cities was less than 500,000. Nevertheless, about one out of eight urban residents lived in 28 global mega-cities with the total population exceeding 10 million. Currently, China has 6 cities with the total population exceeding 10 million, i.e. Shanghai, Beijing, Chongqing, Guangzhou, Tianjin and Shenzhen.

1.2.2 Stages and main characteristics for urbanization development in China

(I) Basic process for urbanization development in New China

Urbanization development has undergone complicated and tortuous processes for the past 6 decades after the New China (P.R.C.) was founded, which can be mainly divided into 4 development stages:

Stage 1: 3 years for national economy recovery and 1st Five-Year Plan period, when urbanization development was fast driven by large-scale industrialization across the nation.

Stage 2: period from Great Leap Forward to the Great Proletarian Cultural Revolution, when urbanization development fell into prolonged

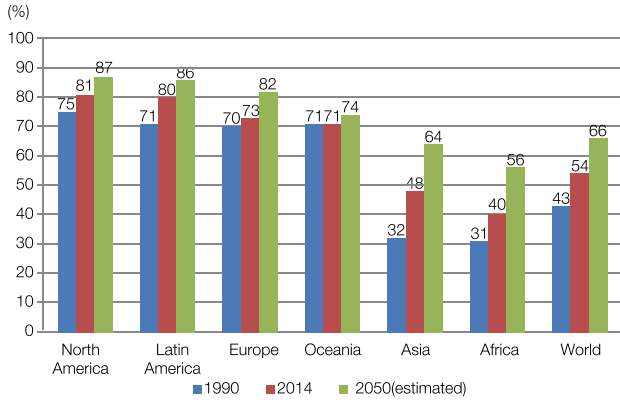


Figure 1-2 Urbanization level for all continents in 1990, 2014 and 2050
(Source: *World Urbanization Prospects 2014*)

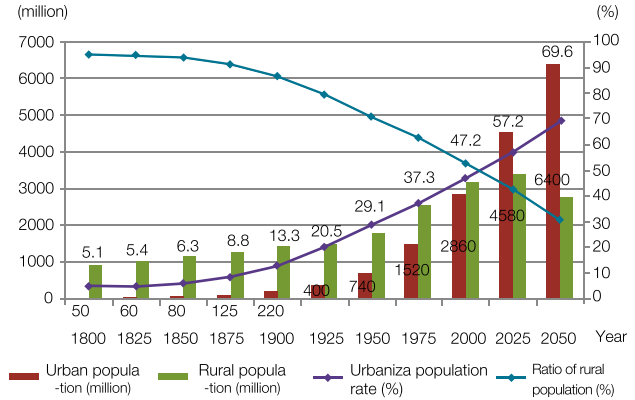


Figure 1-3 Global urbanization development process
(Source: *World Urbanization Prospects* through the years, data for 2025 and 2050 is estimated)

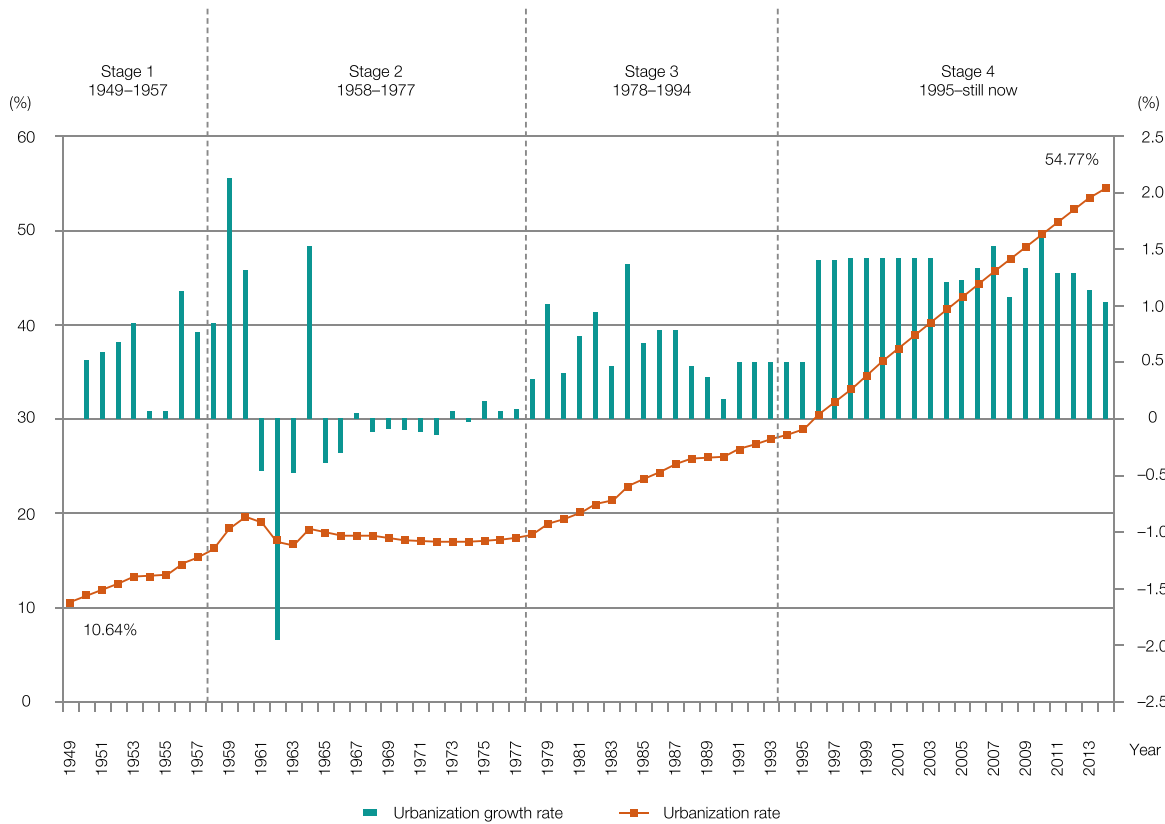


Figure 1-4 Four stages for urbanization development in New China
(Source: *China Statistical Yearbook* through the years)

stagnation after ups and downs.

Stage 3: the first 15 years after the reform and opening up, when implementation of open-door policy for seaside and riverside areas resulted in the leading development of urbanization in southeast coastal area.

Stage 4: from mid 1990s till now, when the in-depth reform of market economic system and globalization drove the overall rapid development of urbanization. It can be seen from urbanization development

speed through the years in Figure 1-5, Figure 1-6 and Figure 1-7: development of large city cluster in eastern region was the fastest and cities in central and western regions also accelerated the development pace after the Western Development Strategy was launched in 2000. This shows that regional growth of urbanization is closely linked with national strategic guidelines and pace of industrial restructuring. It shall be noted that since 2011, China's urbanization growth rate has declined year by year, while for the 15 years from 2000 to 2014, Chongqing is the only one city with CAGR (compound annual growth

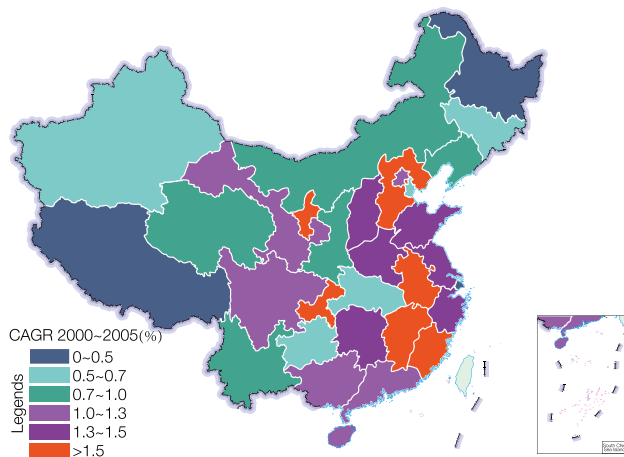


Figure 1-5 Urbanization development speed by province (city, region) (2000~2005)

(Source: *China Statistical Yearbook* through the years; data for Hong Kong, Macau and Taiwan were temporarily not available)

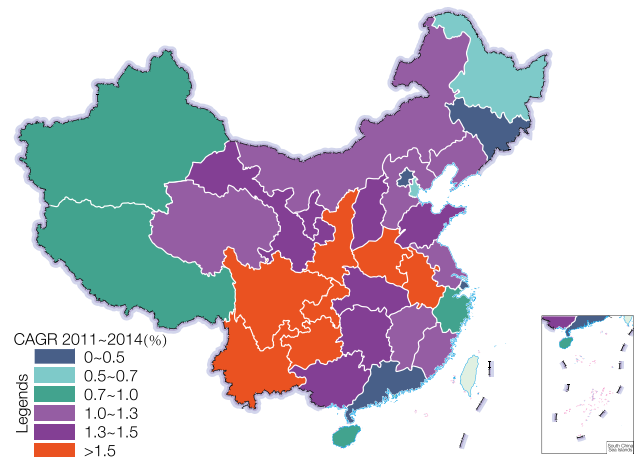


Figure 1-7 Urbanization development speed by province (city, region) (2011~2014)

(Source: *China Statistical Yearbook* through the years; data for Hong Kong, Macau and Taiwan were temporarily not available)

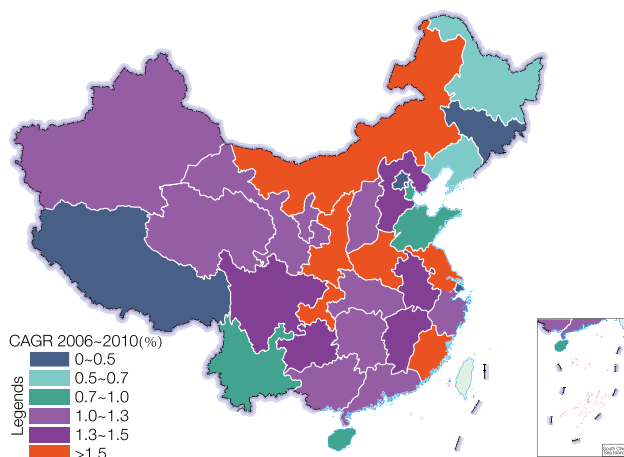


Figure 1-6 Urbanization development speed by province (city, region) (2006~2010)

(Source: *China Statistical Yearbook* through the years; data for Hong Kong, Macau and Taiwan were temporarily not available)

rate) of urbanization above 1.5% in a row.

By the end of 2014, China's urbanization rate has reached 54.77% with 750 million urban population. China has turned from a traditional agricultural country into a city state with urbanization level basically equal to the world average level.

(II) Main characteristics of urbanization development since reform and opening up

Since reform and opening up, urbanization in China has maintained continuously stable and rapid growth momentum. From 1978 to 2014, the number of permanent residents in urban area has increased from 170 million to 750 million; the number of cities has grown from 193 to 653; the urban built-up area has increased from 7,000 square kilometers in 1981 to 49,000

square kilometers in 2014, and the urbanization rate has risen from 17.92% in 1978 to 54.77% in 2014.

Though affected by integrated geographical conditions and economic & social development levels, there is distinct spatial and regional difference for urbanization levels in China, the CAGR of urbanization rate in central and western regions was 3.27% and 2.97% respectively for the past 5 years driven by the national strategies and industrial policies defined for the the 11th and 12th Five-year Plan period, which was far above that of the eastern (1.22%) and northeast (1.26%) regions. By 2014, the top cities in the above four regions in terms of urbanization level were Shanghai, Hubei, Chongqing and Liaoning respectively.

1.2.3 Great achievements in urbanization development

For the 30 years of reform and opening up, China has set out on a path for urbanization that is both different from that of western developed nations and varies greatly with other developing nations. It has made historical contributions to civilization progress of China and the world:

Firstly, urbanization has strongly supported the steady and rapid development of China's national economy and won the competitive advantage for development of manufacturing industry, making China the second largest economy in the world.

Secondly, 500 million farmers have entered urban civilization from a farming society, accounting for 1/4 of new urban population across the world and significantly improving the global mankind civilization level.

Thirdly, urbanization has solved the employment problem for a large number of surplus rural labor and made China the first

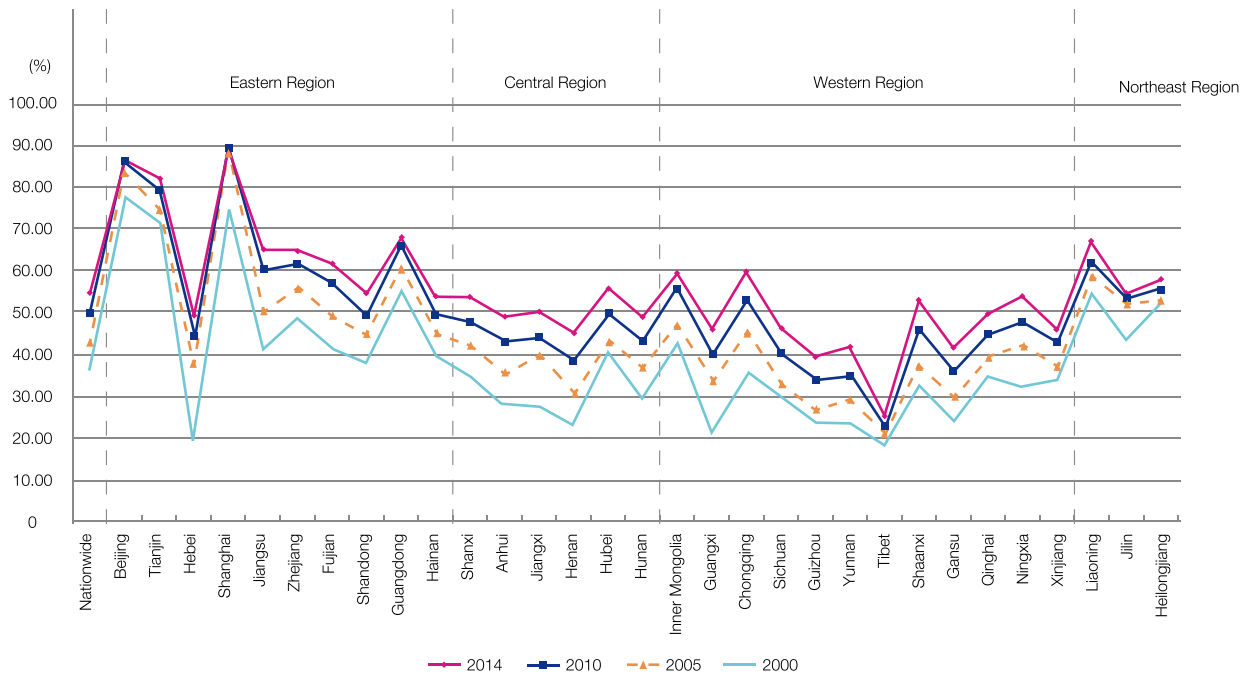


Figure 1-8 Comparison of urbanization levels in 27 provinces and 4 municipalities directly under the Central Government of China in 2000, 2005, 2010 and 2014
 [Source: *China Statistical Yearbook (2015, 2011, 2006, 2001)*]

Situation of cities in 4 major Chinese regions in 2006 and 2014

Table 1-1

Item 2014	Eastern		Central		Western		Northeast		
	2014	2006	2014	2006	2014	2006	2014	2016	
% of population in China's total	38.29	36.30	26.62	27.30	27.04	28.00	8.06	8.40	
% of urban population in China's total urban population	44.04	43.99	23.95	23.21	23.15	22.38	8.86	10.41	
Urbanization rate (%)	67.62	54.10	50.55	38.00	46.89	35.70	59.97	55.50	
cities (number)	219	232	168	168	178	167	88	89	
Including	Municipalities directly under the Central Government		3	3	0	1	1	0	
	Prefecture-level cities		85	84	80	81	89	84	34
	County-level cities		131	145	88	87	88	82	54
Towns (number)	5877	6159	5335	4907	7597	6813	1592	1490	
% of land area in China's total	9.50		10.70		71.50		8.20		

Source: *China Statistical Yearbook (2015, 2007)*.

country in achieving United Nations Millennium Development Goals to reduce by half the proportion of people living on less than a dollar a day.

Fourthly, the uprising of core cities and metropolis promotes the gathering of MNCs and R&D centers in the role of the fountain, principal part and driving force for innovation-driven development in China, significantly improving China's modernization level and international competitiveness and making China a na-

tion with the largest contribution to global economic growth.

1.2.4 Major contents of new-type urbanization development strategy

China's urbanization development is seeing major changes and entering the new stage of people-centered development guided by the five major development concepts of "innovation, coordination, green, open and sharing" :

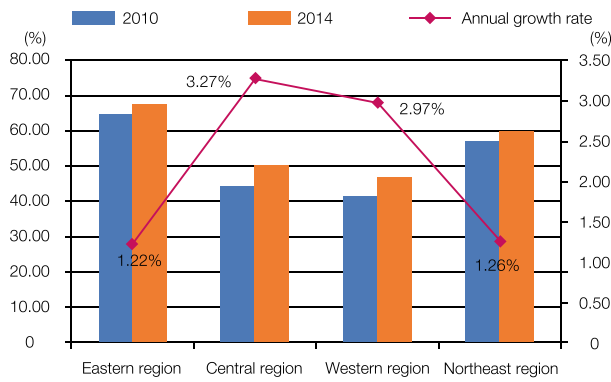


Figure 1-9 Comparison of urbanization levels and annual growth rates for four major regions in 2010 and 2014
[Source: *China Statistical Yearbook (2015, 2011)*]

New-type urbanization development is to construct human-centered livable home with great efforts. The core lies with changes of production modes and lifestyle of the people, which requires shifting from “urbanization of substances” to “urbanization of people”, reinforcing construction of grassroots infrastructure and public service system, and promoting new urban population to have equal access to development opportunities and social welfare brought by urbanization. New-type urbanization development pays more attention to quality and benefits improvement.

New-type urbanization development is to balance urban and rural development, equalize public services and gradually eliminate the dual economic structure of urban and rural areas. It is imperative to balance urban and rural development and gradually realize service equalization; pay more attention to county-level development, promote rural migrant workers to work in local regions, boost the urban-rural integration, and reduce the social risks caused by cross-regional movement of mass population; improve systems and mechanisms to enable the farmers to participate in modernization process equally and jointly share the fruits of modernization.

New-type urbanization development takes constructing ecological cities as the goal. The concept of ecological progress is pervasive in all areas and the whole process ranging from urbanization development planning, infrastructure construction, natural system conservation and afforestation, production and consumption modes, to rule of law and cultural education etc. New-type rural community development shall be promoted according to local conditions to shape the intensive and compact urban layout and supporting industrial functions as a whole as well as urban-rural spatial structure in line with the concept of ecological progress.

New type urbanization development reflects regional features of Chinese cities and promotes development of excellent cultural heritage. City is the window to showcase Chinese culture

and external exchanges and is also an important carrier for historical and cultural continuity. Urbanization development shall pay special attention to improving quality of cities, promoting cultural heritage, maintaining national features, strengthening landscape protection and enhancing influence and competitiveness of cities.

1.3 Spatial pattern of urbanization

1.3.1 Evolution of spatial pattern of urbanization in China

The evolution of spatial pattern of urbanization in China can be divided into three stages since the reform and opening up policy implemented in 1978:

Stage 1 is from 1978 to 1992, i.e. point development of eastern coastal area guided by the special economic zones. During this period, China successively established 5 special economic zones and 14 coastal open cities.

Stage 2 is from 1992 to 2001 with China’s accession into WTO when China tried gradient development for eastern and western regions. China’s urban development pattern shifted from “point development in coastal area” to “border, riverside and gradient development” to form T-shape state land development pattern.

Stage 3 is from 2001 till now, i.e. the globalization stage centered on institutional openness. China focuses on plotting multi-polar development under balanced pattern, realizing the shift from “gradient roll-out” to “balance between the eastern and western regions, polarized development”. Network-based open pattern starts to take shape with accelerated agglomeration of regional city clusters.

1.3.2 Basic features of spatial pattern of urbanization in China

(I) The spatial development pattern of “two horizontal and three vertical axes” has come into being

Currently, the spatial development pattern in China has gradually become clear, where “two horizontal and three vertical axes” will gradually take shape, i.e. the European-Asia Transportation Corridor and the grand railway passage along Yangtze River as horizontal axes; Coastal regions, Beijing-Harbin & Beijing-Guangzhou Railways and Baotou-Kunming Passage as vertical axes” .

(II) Gradient difference for urbanization level and population distribution exists across regions

There is gradient difference for urbanization levels. In 2014, Shanghai, Beijing, Tianjin and Guangdong had higher urbanization rates, all exceeding 60%, among provinces/municipalities in eastern region; Liaoning ranked top in the northeast region with

the 60%+ urbanization rate, while the rates for Jilin and Heilongjiang also exceeded 50%; Shanxi and Hubei had relatively higher urbanization levels in central region with the urbanization rate at above 45%; the urbanization level in the western region was generally not high, where only Chongqing's urbanization rate exceeded 50% and the urbanization rates of other provinces were all below 45% with Tibet even lower than 30%.

There is also gradient difference for population distribution. According to distribution of population density in China in 2014 and a series of big data analysis, China's population density basically retains the population distribution rule of "Hu Line" (Heihe-Tengchong Line). However, along with accelerated economic development in central and western regions, there are more local employment opportunities and the gap for wage income with coastal area is narrowed, meanwhile driven by multiple factors e.g. gradually well-founded social security mechanism, it's increasingly significant for migrant workers from central and western regions to move to areas within the province for employment. The gap for population growth between western and eastern regions is reduced, gradually breaking through the "Heihe-Tengchong Line". In contrast, there is labor surplus in Northeast China, where the net outflow of population has continued for the past decade.

(III) "Agglomeration on both ends" for large cities and small towns

Mega and large cities maintain high agglomeration capability. Population growth in "mega cities" like Shanghai, Beijing, Guangzhou, Shenzhen, and Chongqing etc. with more than 10 million residents has shifted from single-center agglomeration in downtown area to orderly agglomeration at metropolitan level. Going forward, there is still certain room for development in mega cities in China, which will continue to be the major carriers

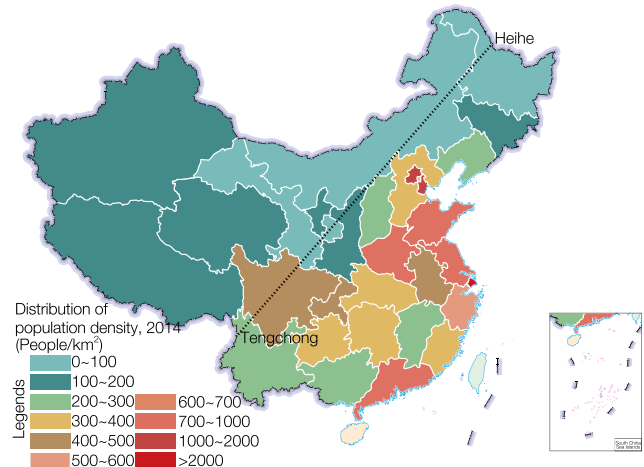


Figure 1-10 Distribution of population density, 2014 (Source: China Statistical Yearbook 2015; data for Hong Kong, Macau and Taiwan were temporarily not available)

for urban population agglomeration for a certain period of time.

Small cities and towns represented by counties have increasingly strong agglomeration capabilities for urban population and they will become the important carriers to guide urban population agglomeration. Personal consumption needs, e.g. education, medical, business needs etc., will guide rural population to agglomerate towards counties, thus making central towns in county areas become the important nodes to take on urbanization of rural population and balanced urban and rural development.

1.3.3 Tendency for spatial pattern of urbanization in China

During the 13th Five-year Plan period, the spatial pattern of urbanization in China will be based on the overall regional de-

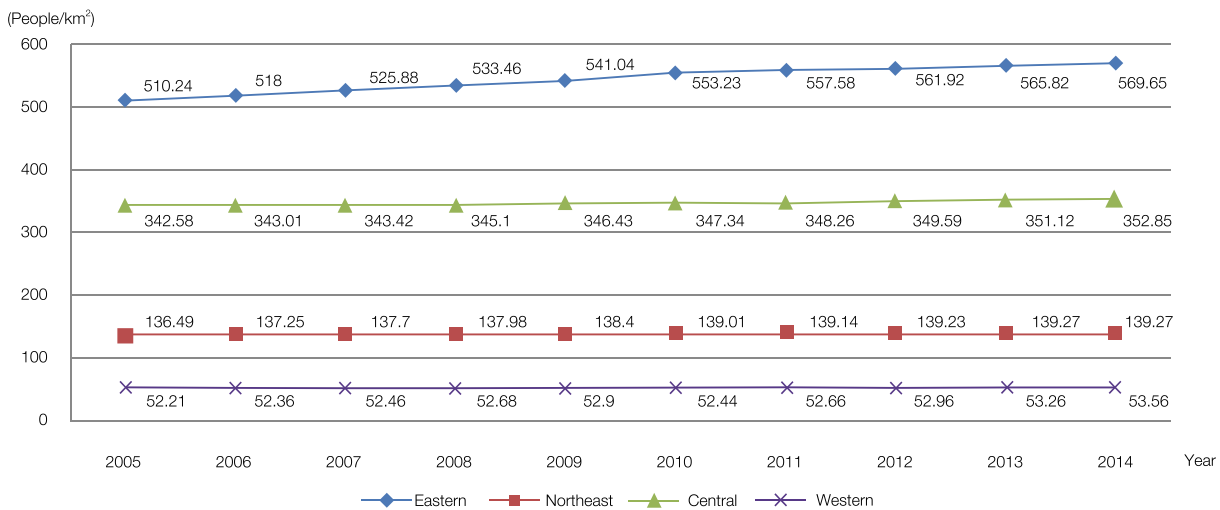


Figure 1-11 Population density of four major regions in the past decade (Source: China Statistical Yearbook 2015)

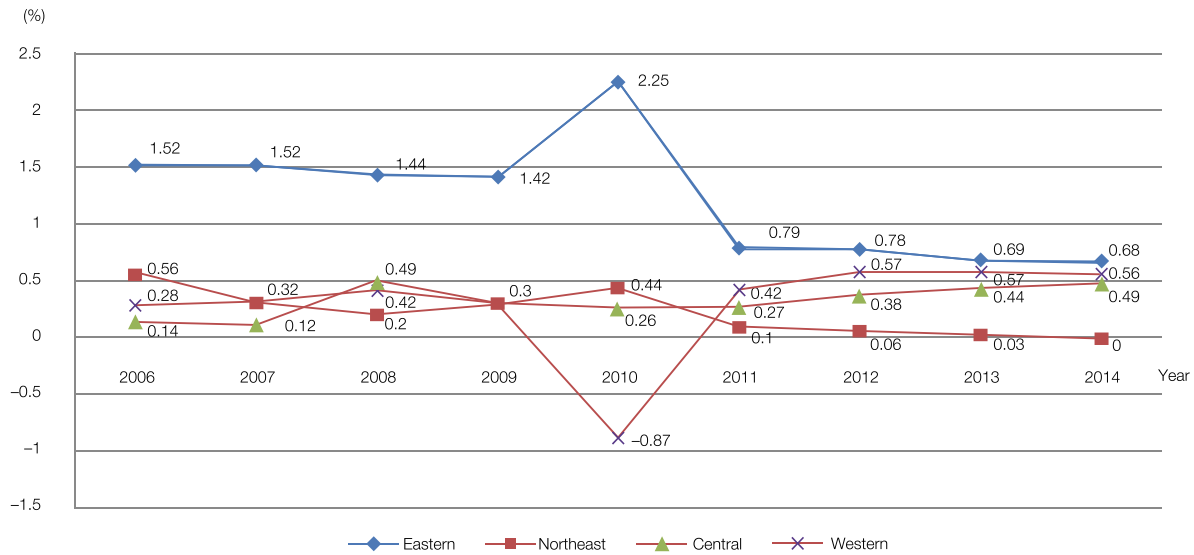


Figure 1-12 Population density growth of four major regions in the past decade
(Source: China Statistical Yearbook 2015)

velopment strategy and guided by development of the “One Belt and One Road” (OBOR) initiative, Collaborative Development of Beijing, Tianjin and Hebei Province and development of Yangtze River Economic Belt, to form the vertical and horizontal economic axes dominated by economic belts in seaside, riverside and along railway lines and shape the new pattern for coordinated regional development with orderly and free flow of factors, effective restriction on main functions, equal fundamental public services and admissible resource and environment.

(I) OBOR strategy creates the new hot spots for spatial growth

Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road (《推动共建丝绸之路经济带和21世纪海上丝绸之路的愿景与行动》) released in 2015 put forward that “China will fully leverage the comparative advantages of its various regions, adopt a proactive strategy of further opening-up, strengthen interaction and cooperation among the eastern, western and central regions, and comprehensively improve the openness of the Chinese economy.” China will develop differentiated development strategy for OBOR and accelerate the infrastructure connectivity for southwestern and northeastern regions with foreign countries, which will boost capacity expansion and quality improvement of eastern coastal area and the accelerated development of western region as well as the formation of balanced state land and space across the country.

(II) Yangtze River Economic Belt promotes fully open riverside area

The CPC Central Committee and the State Council released the *Guiding Opinions on Promoting Development of Yangtze River Economic Belt by Relying on the Golden Water Way* (《依

托黄金水道推动长江经济带发展的指导意见》) in September 2014, in which it was put forward that “relying on Yangtze River golden waterway, efforts shall be made to build comprehensive transportation system at high level, promote coordinated development of upper, middle and lower reaches and fully open coastal, riverside and border areas, and create economically efficient and ecology friendly Yangtze River Economic Belt that stretches from the east to west, radiates from the south to north, connects rivers and extends to the sea” . By effectively leveraging difference of development stage across regions and bringing out the radiating and leading role of Yangtze River Delta into play, construction of Yangtze River Economic Belt will promote the expansion of room for economic growth from coastal to inland riverside areas, realize the linkage among three blocks of Eastern, Central and Western regions, and optimize urbanization pattern and format.

(III) Transportation network realizing internal and external connectivity fuels network-based and integrated development

The total length of highways in China was 4,463,900 kilometers in 2014, increasing by 107,700 kilometers compared to the previous year. Expressways have maintained stable development, growing by 7,500 kilometers to a total length of 111,900 kilometers. Progress has been made in the development of national highway network operation monitoring system and technologies including mobile phone signaling, satellite remote sensing, data mining etc. have been widely applied in real-time monitoring of highway network operation and emergency disposal, which has successfully dealt with emergencies like earthquakes in Ludian & Puer of Yunnan and Ganzi of Sichuan, large-scale continued haze in North China and severe flood damage in Southern and Southeast China. More than 7,600 Electronic Toll Collection (ETC) lanes were built

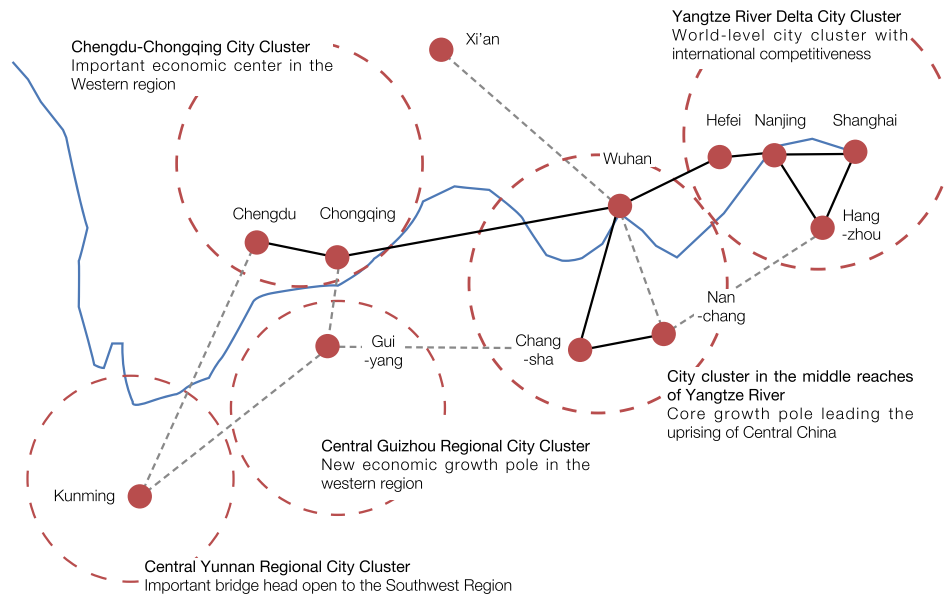


Figure 1-13 Distribution of city clusters in Yangtze River Economic Belt
 [Source: *Changjiang Daily*, September 29, 2014 (7)]

in 26 provinces/cities and ETC networking operation was realized in 14 provinces/municipalities, including Beijing, Tianjin, Hebei, Shanxi, Liaoning, Shanghai, Jiangsu, Zhejiang, Anhui, Jiangxi, Fujian, Shandong, Shaanxi, Hunan etc. Various management measures for toll free passage of passenger cars with seven seats or less on toll roads on important holidays continue to be improved, safeguarding the safe, smooth, steady and orderly operation of expressway network during the toll free period.

The total length of railway in China reached 112,000 kilometers in 2014, while the length of high-speed railway exceeded 16,000 kilometers. Development of high-speed railway has provided strong support for economic and social development of China. High-speed railway network has connected more than 160 prefecture-level and above cities, accounting for 55% of total number of such cities in China. A large batch of world advanced level high-speed railway lines with designed speed of 350 km/h have been built, e.g. Beijing-Tianjin, Shanghai-Nanjing, Beijing-Shanghai, Beijing-Guangzhou, Harbin-Dalian etc. The construction of high-speed railways has promoted the development of new cities that depends on high-speed railway stations. Rapid development of railway network centered on high-speed railway and intercity railway is changing the regional coordinated development pattern for Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta, Changsha-Zhuzhou-Xiangtan city cluster, Central plains city cluster, Chengdu-Chongqing economic zone and Guanzhong city cluster, and promoting the optimized adjustment of urban system layout and industrial structure. High-speed railways have gradually become the first choice for the mass to travel within the range of 1,000 kilometers.



Figure 1-14 ETC lane in Chenzhou Toll Gate along Beijing-Hong Kong-Macau Expressway (Photo taken by He Maofeng)



Figure 1-15 China-made new CRH380D carry passengers along Shanghai-Nanjing high-speed railway (Photo taken by Su Yang)

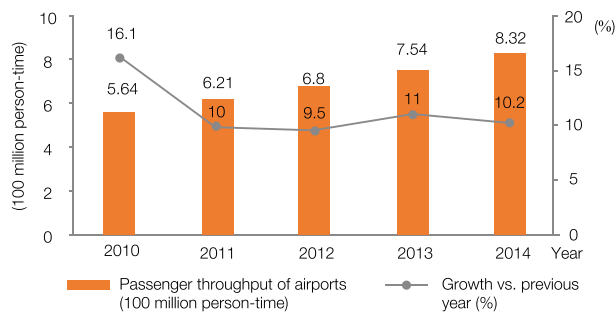


Figure 1-16 Passenger throughput of civil aviation transportation airports, 2010-2014

(Source: *Statistical bulletin for development of transportation industry through the year*)

Nine new civil airports were built in 2014 and the total number of airports open to navigation reached 202 with 3,142 regular flight routes. There were totally 64 civil airports with the annual passenger throughput exceeding 1 million, among which Beijing, Shanghai and Guangzhou airports accounted for 28.3% of China's total airport passenger throughput and 51.3% of total cargo throughput. The passenger throughput of Beijing Capital International Airport reached 86 million person-time, ranking as No. 2 in the world for 5 years in a row; the cargo throughput of Shanghai Pudong International Airport was up to 3.182 million tons, ranking as No. 3 in the world for seven consecutive years. Passenger airlines across China totally operated 3.126 million flights, including 2.137 million regular flights and 937,000 irregular flights with flight on-schedule rate reaching 68.37%.

During the 13th Five-year Plan period, China will make great efforts to build comprehensive transportation network with internal and external connectivity and construct the large corridor for comprehensive transportation stretching from the east to west, linking up the south to north and contributing to unblocked traffic internally and externally. China will also focus on constructing the exit-entry passage for Xinjiang and Tibet and building external transport corridor in the Northwest, Southwest and Northeast as well as the maritime silk road corridor; build high-quality and express transport network, accelerated to promote the formation of high-speed railway network, improve national expressway network, build local expressway as appropriate and enhanced the function of hubs and major & feeder airports; improve basic network with wide coverage, speed up railway construction in Central and Western China, promote quality improvement and renovation of general national and provincial highway and construction in bottle-necked road, improve professional level of seaside and inland river transportation facilities, reinforce rural highway and general airport construction and propelled regional oil & gas pipeline connection.

1.3.4 Growth of China's city clusters

At current stage, a number of city clusters have taken shape in China, including Beijing-Tianjin-Hebei, Yangtze River Delta,

Pearl River Delta, Chengdu-Chongqing region, the middle reaches of Yangtze River, northeast region, central plains and Guanzhong city clusters etc. In 2014, China's GDP reached RMB 63.6 trillion, while 16 cities alone in core area of Yangtze River Delta contributed RMB 10.6 trillion, accounting for 15% of China's total GDP and 9 cities in Pearl River Delta taking up only 0.57% of state land area generated RMB 7.8 trillion GDP, accounting for 12% of China's total. After breaking through the threshold of RMB 6 trillion in 2013 for the first time, Beijing-Tianjin-Hebei cluster set a record again in 2014 with GDP of RMB 6.6 trillion, accounting for 10.4% of the total. In addition, Chengdu-Chongqing city cluster, which has been included in the development plan of Yangtze River Economic Belt, took up 6% share with RMB 3.7 trillion GDP. The middle reaches of Yangtze River city cluster which was recently approved created the GDP of RMB 4.5 trillion, accounting for 7% of China's total. In recent years, though the growth of economic aggregate for city clusters has slowed down, its role in population agglomeration is still enhancing.

1.3.5 Optimization of spatial carrier of urbanization

China is currently in the rapid development period of urbanization, while resource constraints, especially land resource constraint, are becoming increasingly prominent, so the formerly extensive urbanization model cannot sustain. In the future 5 years, China will accelerate to shift the urban development model, optimize urban spatial structure, and improve development quality and environment capacity; increase living and ecological space, expand public green space in cities and leverage natural hills, lakes and water systems to construct regional greenway network; reduce the ratio of production space and sort out inefficient industrial parks and warehouse lands; vigorously develop green transport, green facilities and green buildings and promote recycling of energy and resources; arrange production, living and ecological space in a scientific manner, plan future population distribution, economic layout, state land usage and urbanization pattern based on resource and environment bearing capacity, existing development intensity and development potential of different regions, divide state land into four types (optimized development, focused development, restricted development and prohibited development), confirm main functional positioning, define directions for development, control the development intensity, regularize the development order, improve development policies and gradually shape the spatial development pattern for compatibility among population, economy, resources and environment.

1.4 Interaction between urbanization and industrialization

1.4.1 Coordinated development of industrialization and urbanization in China

China's urbanization and industrialization exhibits the same changing pattern as the international experience: the urbaniza-

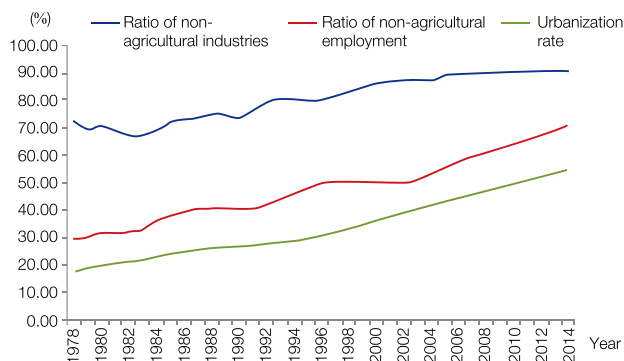


Figure 1-17 Development process of urbanization and industrialization in China (1978-2014)

[Source: *China Statistical Yearbook (2015)*]

tion rate grows with the increase of per capita income; under the same economic development level, the urbanization rate is lower than the ratio of non-agricultural employment, which is in turn lower than the ratio of non-agricultural industry in overall GDP. However, issues like discordance between industrialization and urbanization, ‘urbanization of land’ ahead of industrial development and ‘semi-urbanization’ can be observed in some regions.

For these issues, China has enacted a series of policies and documents to promote coordinated development of urbanization and industrialization, e.g. efforts shall be made to further emphasize the necessity to handle relations between the government and the market in an appropriate manner, so as to make the market play a decisive role in resource allocation and bring into full play the role of the government; further strengthen people-centric urbanization and the intensive, green and low-carbon path and improvement of urbanization quality; further roll out household registration system reform, break the limits of household registration system, actively promote citizenization of farmers working in cities and realize equalization of basic service; meanwhile, emphasize industrial structure adjustment, capture the opportunities of new breakthroughs and global restructuring incubated by world technology and industrial revolution, combine the development of urban economy, cultivation of emerging industries and transformation of traditional industries, create the grand platform for innovation and transformation and promote industrial agglomeration and development etc.

1.4.2 China’s industrialization promotes orderly flow of production factors

(I) Industrial transfer of labor force improves resource allocation efficiency

The allocation efficiency of labor, land and other resources in China has continued to rise. From 2011 to 2014, the labor force continuously shifted from agriculture with lower productivity

level to highly productive secondary and tertiary industries, and the ratio among three industries (primary, secondary and tertiary) also changed from 34.8 : 29.5 : 35.7 in 2011 to 29.5 : 29.9 : 40.6 in 2014. During the same period, the number of migrant workers increased from 252,780,000 to 273,950,000 and a large amount of relatively low-cost rural labor went to cities and towns, satisfying the demands of cities for labor and generally reducing the age structure of urban population and supply-demand costs. Migration of labor increases the supply of urban labor, which also hastens the development of labor market, resulting in the new mechanism for allocation of labor resources by the market.

(II) Citizenization of rural migrant workers within the province

The ratio of rural migrant workers working in their provinces of origin is increasing. According to monitoring and survey data of national migrant workers by National Bureau of Statistics of China, the proportion of farmers shifting to work in other industries within the province of their origin (including working in the same town and in other towns within the province) has increased from 66.8% in 2008 to 71.3% in 2014, with the annual increase of about 0.8 percentage point; in the western region, this proportion has risen from 50.3% to 60.4%, increasing by 1.7 percentage points per annum. Attraction of the central and western regions to rural migrant workers within the province is enhancing. Along with the industrial development, the wage level for migrant workers in the central and western regions is growing rapidly to gradually reduce the gap with that in the eastern region, and the employment environment and public service level is also improving. The trend for backflow of migrant workers from other provinces to their provinces of origin to find jobs and start business is increasingly prominent and the number of new rural migrant labor choosing to work in their provinces of origin is also steadily increasing.

In 2014, among migrant workers working outside their hometowns, there were 78,670,000 workers moving to other provinces, including about 31 million old-generation migrant workers (accounting for about 40% of the total), who are now gradually exiting the urban labor market. Meanwhile, there are a number of new-generation migrant workers who want to go back to their provinces of origin to find jobs and start business each year. In 2014, the number of rural workers transferring from agriculture to other industries within their hometowns was 105,740,000, accounting for 38.6% of total number of migrant workers in China, and this ratio is also increasing year by year.

1.4.3 Urban and service industry development

The added-value and employment scale of the service industry is growing rapidly, and the service industry has become the largest industry in national economy. In 2014, China’s service industry achieved the RMB 30.6 trillion added value, equal to 1.7 times of that of end of the 11th Five-year Plan period

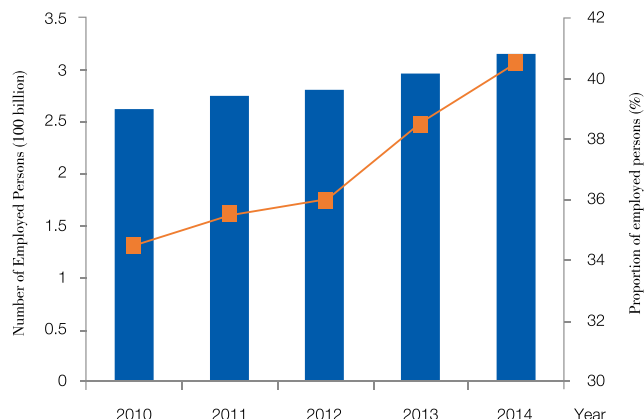
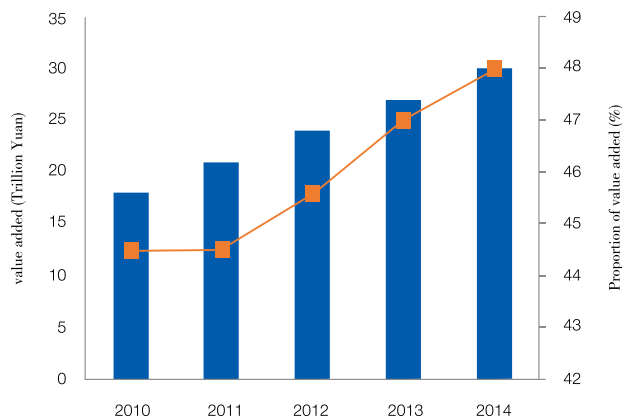


Figure 1-18 Added value and quantity of working population of China's service industry (2010-2014)
[Source: *China Statistical Yearbook (2015)*]

(2010), accounting for 48.1% of total GDP and increasing by 3.9 percentage points compared to 2010. The employment scale of the service industry also grows rapidly with over 310 million working population by the end of 2014, increasing by 50,320,000 people compared to 2010, and such figure is far larger than the total increment for the service industry during the entire 11th Five-year Plan period. The proportion of working population of the service industry (35.7%) in total employment exceeded that of the primary industry in 2011 for the first time, becoming the major channel to attract employment. On this basis, such proportion rose again to 40.6% in 2014, increasing by 6 percentage points compared to the end of the 11th Five-year Plan period.

In terms of the type of cities where producer and consumer service sectors are concentrating, the development of producer and consumer service sectors is closely related to population, economic size and administrative ranking of the city as well as whether it is in close proximity to economically developed cities in coastal areas. There are more than 280 prefecture-level and above cities with the service industry added value exceeding RMB 24 trillion, accounting for 85% of gross value added. Among them, the service industry added value for 36 medium to large cities (including municipalities directly under the Central Government, capital cities and cities specially designated in the state plan) amount to RMB 14.1 trillion, accounting for approximately 46% of the total. Compared to 5 years ago (2008), the size of service industry added value for medium to large cities grows by 1.3 times and the share increases by 2 percentage points. Among these cities, the development level of Beijing's service industry ranks No. 1 in China and its gross value added approaches RMB 1.7 trillion, accounting for 77.9% of overall city GDP and reaching the average level of central cities in developed nations. In addition, some cities e.g. Shanghai, Guangzhou etc. have also shaped the industrial structure dominated by the service economy. Accompanied with rapid development of service industry in cities, the energy consump-

tion is gradually reducing.

1.4.4 Ecological progress and integration of industrialization and urbanization

(I) Unprecedented efforts to promote ecological progress

In May 2015, the CPC Central Committee and the State Council released *Opinions on Accelerating Ecological Progress Construction* (《关于加快推进生态文明建设的意见》), in which the “green” concept was first put forward and listed in parallel with new-type industrialization, urbanization, informationization and agricultural modernization; new connotations were given to the promotion of ecological progress with practical route to construct a beautiful China clearly defined: reinforcing main functional positioning and optimizing spatial development pattern of the state land. A series of laws and regulations, including *New Environmental Protection Law* (新环保法), *Action Plan for Prevention and Control of Water Pollution (Ten Measures for Water)* (水十条), *Air Pollution Prevention and Control Action Plan (Ten Measures for Air)* (气十条), released in the same year highlight China's efforts in promoting ecological progress.

(II) Efforts shall be made to speed up the development of a batch of demonstration areas for integration of industrialization and urbanization

The National Development and Reform Commission of China issued a document in July 2015 to propose to select about 60 areas with established conditions nation-wide to carry out the building of demonstration areas for integration of industrialization and urbanization. According to the concept of integration of industrialization and urbanization, efforts shall be made to speed up the transformation from unitary production park to comprehensive urban economy, explore the route for new-type urbanization and bring out the role of pioneering and demonstration into play.

Special column 1-1 Experience of Building Sino-Singapore Tianjin Eco-City

(I) Always prioritizing ecology and building the safe and healthy ecological environment system

Efforts shall be made to respect the natural background, preserve and improve ecological environment and create the ecological pattern for integration of artificial and natural environment; save and intensively cultivate land resources, adopt compact land layout and realize population agglomeration and intensive and efficient use of land resources; allocate water resources reasonably and build a water-saving city to aim at domestic water consumption per capita capped at 120 liters/(man·day) by 2020 in the Eco City; optimize energy use structure and build an energy-conserving city.

(II) Sticking to structural adjustment and creating the circular and low-carbon ecological industry system

The Eco-City and Tianjin Binhai New Area enjoy complementary advantages and dislocation development. Efforts shall be made to explore the resource utilization model of “Reduce, Reuse and Recycle” and develop circular economy and ecological economy; vigorously develop eco-friendly industry, create high-end, high-quality and hi-tech industrial structure, construct low-input, high-output, low-consumption, low-emission, recyclable and sustainable industrial system; take the eco-friendly industry as the dominating development direction for the Eco City; forcefully develop green building industry, energy-conservation and new energy industry, and modern service industry; actively develop financial service system, promote the information industry, build the information service platform and develop the modern logistics industry.

1.5 Supporting system reform related to urbanization

1.5.1 Household registration system reform

The strict household register management system may cause inequality between urban and rural areas, and floating population and local residents in many aspects, e.g. education, medical, housing, social security etc., and constrain China's economic and social development.

The State Council released the *Opinions of the State Council on Further Promoting Household Registration System Reform* (《国务院关于进一步推进户籍制度改革的意见》) in July 2014, suggesting “further adjusting the policy for changing registered residence, unifying urban and rural household registration system, fully implementing residence permit system, accelerating construction and sharing of basic information repository for national population, steadily promoting full coverage of urban basic public services for all permanent residents, including compulsory education, employment service, basic old-age insurance, basic healthcare insurance and housing guarantee etc. By 2020, the new-type people-oriented, scientific and efficient, regularized and orderly household registration system will be basically established, which is also compatible with the goal of building the overall moderately prosperous society, effectively supports social management and public service, and legally protects rights of citizens, with the purpose to grant 100 million rural migrant workers and other permanent population with urban residency. Restrictions on household registration in designated towns and small cities will be fully removed and re-

strictions on household registration in medium-sized cities will be freed orderly; conditions for household registration in large cities shall be reasonably defined and population size of mega cities shall be strictly controlled.”

1.5.2 Land system reform

For over three decades, fast development relying on land in China has made land ownership arrangement formed during the planned economy era unable to further meet the development requirements and land issues have also become increasingly complex, so the comprehensive reform shall be further pushed to promote modernization of land system structure and governance system.

In the *Opinions on Guiding Orderly Transfer of Rural Land Operation Right and Developing Moderately Scaled Operation of Agriculture* (《关于引导农村土地经营权有序流转发展农业适度规模经营的意见》) released by General Office of the CPC Central Committee and General Office of the State Council in 2014, it was put forward that “following the arrangement of ‘spilt of three rights’ (including ownership, contractual right and operation right), efforts shall be made to liberalize land operation right; based on farmer household operation, actively cultivate new-type agricultural business entity; on the premise of respecting farmers' will, guide regularized and orderly transfer of land; and oriented by the goal of moderate operation scale, promote increase in grain yield and peasants' income.”

General Office of the CPC Central Committee and General Office of the State Council jointly issued the *Opinions on Pilot Work of Rural Land Expropriation, Market Sales of For-Profit*

Collective-owned Construction Land and House Site System Reform (《关于农村土地征收、集体经营性建设用地入市、宅基地制度改革试点工作的意见》) in January 2015, putting forward to “improve land expropriation system, set up system for market sales of for-profit rural collective-owned construction land, reform and improve rural house site system, create land increment income distribution system with due consideration to interests of the state, collective and individuals, and improve personal income reasonably”, which signifies that the rural land system reform in China is to enter the pilot stage soon.

1.5.3 Financial and taxation system reform

Since the reform of tax-sharing system in 1994, financial right has been centralized, but administrative right has been decentralized, which not only results in asymmetric power and responsibilities of local governments, but also causes the current difficulty of dependence on land finance indirectly, so that local governments lack of sufficient funds and momentum to provide migrant workers with access to public services. As for the new-type urbanization, in the process of converting tens of millions of workers into citizens, a huge amount of fund is needed to enable them to enjoy public service, meanwhile, land system reform will re-distribute land income, which can affect fiscal revenues of the governments.

In order to address the above issues, the *Overall Plan for Deepening Fiscal and Taxation System Reform* (《深化财税体制改革总体方案》) approved and passed by the Political Bureau of the CPC Central Committee puts forward that “efforts shall be made to focus on promoting reform in three aspects: firstly, improve the budget management system, strengthen budget constraints, regularize government behaviors, realize effective monitoring, and speed up to build the comprehensive, standardized, open and transparent modern budgeting system; secondly, deepen the commitment to taxation system reform, optimize taxation structure, improve taxation functions, stabilize macro tax burden, promote tax governance according to the law, set up taxation system that is favorable for scientific development, social equality and market consistency, and bring into full play the functional role of taxation in collecting fiscal revenues, adjusting distribution and promoting structural optimization; thirdly, adjust the fiscal relations between central and local governments, further streamline the division of revenues between central and local governments on the premise of maintaining the overall stability of central and local revenues, divide the administrative rights and expenditure responsibilities among governments in a reasonable manner, promote unification of power and responsibilities, as well as affairs handling and spending, and set up the system that administrative rights fit in expenditure responsibilities.”

1.5.4 Investment and financing system reform

The existing urbanization model heavily relies on land financ-

ing, leading to a series of issues, e.g. extensive land development, serious phenomenon of old and new dual economic structure of urban and rural areas, unequal supporting public service facilities and environmental deterioration. If China wants to implement efficient, inclusive and sustainable new-type urbanization model, it needs to make corresponding adjustments to the financing system.

In its consent to the *Opinions on Deepening Key Activities of Economic System Reform in 2015* (《关于2015年深化经济体制改革重点工作的意见》) of the National Development and Reform Commission, the State Council brought up “multi-pronged efforts shall be made to reform the investment and financing system, adjust the investment model of fiscal funds and study market-oriented supporting model by changing from to direct support for projects to equity investment etc. for special parts with market failure in competitive industries; actively promote PPP (public-private partnership) model, enact franchise methods for infrastructure and public utilities and fully mobilize the vigor of private investment; enact government investment regulations, study and formulate the management rules for government approval and recording of investment projects, and gradually include investment management into the track to rule of law.

In 2016, the *Several Opinions of the State Council on Further Promoting New-type Urbanization Construction* (《国务院关于深入推进新型城镇化建设的若干意见》) put forward to innovate the investment and financing system in three aspects through “deepening PPP, enhancing government inputs and strengthening financial support” and provide the funds for the development of the new-type urbanization.

1.5.5 Housing security system reform

In order to fully improve the quality of urbanization, the urban housing system must be improved. The *Several Opinions of the CPC Central Committee and the State Council on Further Strengthening Urban Planning and Management Work* (《中共中央国务院关于进一步加强城市规划加上管理工作的若干意见》) introduced in 2016 brought up, “efforts shall be made to deepen the commitment to urban housing system reform, secure basic needs for housing of the disadvantaged groups with government playing the leading role and satisfy the multi-level needs of residents for housing with the market in the dominant position.” Meanwhile, it is also clearly indicated in the *Several Opinions of the State Council on Further Promoting New-type Urbanization Construction* that the urban housing system shall be improved in four facets, i.e. “set up urban housing system combining purchase and rental together, improve urban housing security system, speed up to develop professional housing rental market and improve real estate market regulation mechanism.”

(Special thanks to support from Urban and Rural Planning Institute of China Academy of Building Research)



Yuzhong District, Chongqing Municipality (Photo by Li Heping)



2

Rural and Urban Governance and Social Integration

Urban planning and space governance / **30**

Innovative way of urban management / **31**

Urban employment and poverty reduction / **35**

Situation of rural migrant workers in urban China / **39**

China practice: the rebuilding of shanty areas / **45**

Recommendations from experts: Establishment of the social & public policy system to promote the sustainable development (draft) / **47**

China's modernization process since the reform and opening-up is generally characterized by significantly faster speed of the economic modernization than that of the social development modernization. On the one hand, the high-speed GDP growth has brought about "Chinese achievements", and on the other hand, the social problems have become increasingly severe and complicated, and turned into the deep-seated obstacles constraining the sustainable development of China. In 2014, China ushered in a new era for deepening the commitment to reform in an all-round way and included modernization of state governance system and governance capability into the overall goal of deepening the commitment to reform. Rural and urban governance is an important part in the state governance and we need to actively explore the reform path of modernization and take the promotion of the social integration as an important development goal.

2.1 Urban planning and space governance

2.1.1 Modernization of the state governance system and governance capability: context, connotations and characteristics

As a programmatic document to guide China's reform in the new era, the *Decisions of the CPC Central Committee on Several Key Issues of Deepening the Reform in an All-round Way* (《中共中央关于全面深化改革若干重大问题的决定》) passed by the Third Plenary Session of the 18th CPC Central Committee clearly put forward that, the overall goal of deepening the commitment to reform in an all-round way was to improve and develop the socialist system with Chinese characteristics and promote the modernization of state governance system and governance capability. "Modernization of the state governance system and governance capability" was officially mentioned in the document released by the Central Government for the first time, which was regarded as the "fifth modernization" (the

former "four modernizations" are industrial modernization, agricultural modernization, modernization of national defense and modernization of science and technology), which is also an essential requirement to stick to and develop the socialism with Chinese characteristics and realize the socialist modernization across the board.

The state governance system and governance capability is the epitomization of national institutions and the execution capability. The core of its modernization is to build a limited but effective government, cultivate an autonomous and self-service society, improve the free but regularized market order, weaken the top-down management of the government, and strengthen the new governance model with co-existence of regulation, consultation and cooperation. China's governance system is the result of long-term development and gradual improvement on the basis of historical inheritance, cultural heritage and economic & social development.

To realize the modernization of the state governance system and governance capability, China needs to improve scientific, democratic and law-based governing capacity of the Communist Party, enhance the capability of the state organs to fulfill their functions, increase the capability of the mass to manage the national, economic, social, cultural and individual affairs according to the law, and realize the institutionalization, standardization and routinization for governance of various affairs of the Party, state and society. Efforts must be made to vigorously develop and promote the socialist core value system and core values, and accelerate to build the value system that may sufficiently reflect the Chinese characteristics, national identity and epochal features.

2.1.2 Logic for space governance in China's urban planning

China's urban planning has changed its basic attribute from



Figure 2-1 Joint consultation and governance meeting of the Party, the government and the public in Shuangjing Sub-District, Beijing (Photo by Ren Haixia)



Figure 2-2 60 "family members" attending the discussion and consultation meeting in Anzhen Sub-District, Beijing (Photo by Ren Haixia)

“the technological tool for space creation” to “public policy” . During the planned economic period after the P.R. China was founded, urban planning was just the “tool” to implement “the national plan” in construction area. When China started to establish the socialist market economy after the reform and opening up policy was launched, the role of urban planning as the means of the government to promote the economic development and regulate space resources also became increasingly prominent. It is pointed out in the *Measures for Formulating City Planning* (《城市规划编制办法》) released in April 2006 that urban planning is one of the important public policies for the government to regulate space resources in rural and urban areas, guide the rural and urban development and construction, maintain the social equality, and safeguard the public security and interests. The *Urban and Rural Planning Law of the People's Republic of China* (《中华人民共和国城乡规划法》) taking effect since January 2008 further defines the attribute of urban planning as the public policy at the jurisprudential level, which also indicates that China's urban planning has basically finished the transformation in response to the modernization of governance. Urban planning is an important component of the state governance system and an important platform to build and improve the state governance capability. The modernization of the state governance system and governance capability is both the requirement for urban planning reform, and the goal for urban planning development. As the process to allocate and coordinate space resource usage and benefits, the urban planning must fully reflect appeals of the government, the market and the pluralistic subjects of rights, coordinate interests of the public, department and individuals and orchestrate the relationship among politics, economy, society, ecology, technology etc.

2.1.3 Governance-based transformation of urban planning

The Central Urbanization Work Conference has raised the explicit requirements to improve the planning quality and enhance the scientificity and authority of urban planning, which has defined the keynote for governance-based transformation of urban planning. On February 21, 2016, as the supporting document to the Central Urbanization Work Conference, the *Several Opinions of the CPC Central Committee and the State Council on Further Strengthening Urban Planning and Development Control* (《中共中央国务院关于进一步加强城市规划建设管理工作的若干意见》) further defined the path and direction for transformation of urban planning.

The law-based development and execution of planning shall be strengthened: efforts shall be made to reinforce the management of planning development and approval in accordance with the law, strictly execute the principles and procedures prescribed in the *Urban and Rural Planning Law*; strengthen the compulsory nature of the planning and investigate the responsibility of violating behaviors; improve urban and rural planning supervisor system across the coun-

try and realize the full coverage of planning supervision; strengthen legislation, modification, abolishment and interpretation of regulations and laws in key areas ;develop the legal system that covers the full process of urban planning and development control; and strictly follow the legal procedures for administrative decision making of urban planning and development control.

The effective planning consultation mechanism shall be developed: the *Urban and Rural Planning Law of the People's Republic of China* (《中华人民共和国城乡规划法》) has clearly indicated, “Before filing an urban or rural planning for examination and approval, the organ establishing it shall announce the draft of the planning and collect opinions from experts and the general public by way of argumentation, hearing or other.” Going forward, the social participation mechanism shall be further improved to bring out the role of experts and the mass into full play and strengthen the public supervision on implementation of the planning. The depth and width of public involvement will be continuously strengthened; meanwhile the inefficient or even morally disordered public involvement shall be avoided to ensure equality and efficiency of the planning.

The planning contents and implementation mechanism shall be innovated. Urban planning shall actively adapt to the new development concepts and requirements. The planning contents and implementation mechanism shall be enriched and improved continuously. Concepts like human-orientation, respect to nature, historical inheritance, green and low-carbon need to be integrated into the full process of urban planning. The concept of coordinated development shall be adhered to and upheld to seek the urban development at the height of overall coordination across regions and between urban and rural areas. Spatial development control shall be reinforced with urban development boundaries to be clearly defined; urban scale shall be regulated and the binding targets of urban development shall be defined based on the resource endowment and environment bearing capacity. Urban planning management mechanism shall be reformed and improved with reinforced linkage among different types of spatial plans.

2.2 Innovative way of urban management

2.2.1 Control the development intensity

Urban development intensity refers to the ratio of land for construction use to the total land area for the districted it is located in. From 1990 to 2014, the area of land for construction use in China has increased from 11,600 square kilometers to nearly 50,000 square kilometers, showing rapidly growing urban development intensity. In as early as 2006, the construction land area per capita in China reached more than 130 m², far larger than that of the developed countries (82.4 m²)

and the developing countries (83.3 m²). Till 2014, in coastal economically developed regions, the development intensity of many cities has exceeded 30%, i.e. the warning level for eco-living criteria. In order to cope with the problems of extensive and disordered urban development, the Central Government brought up the requirement on controlling the urban

development intensity in the Urbanization Work Conference. Therefore, defining the “urban development boundaries” has become the major strategy to control the urban development intensity in recent years.

The definition of “the urban development boundary” often involves adjustment of the interests for the original right owner of the land, and also needs to take into consideration the development interests of land user. The basic ecological control line adopted in Shenzhen is the earliest practice of urban development boundary in China, which has defined the compensation requirements for relocating the indigenous rural residential sites within the scope of the control line and compensation mechanism for expropriating construction land through relevant management rules. In order to address the appeals of the built-up legal buildings and structures for optimization and adjustment, and take into full account the requirements of grassroots livelihood development, and development of public welfare projects and urban major projects, Shenzhen has gradually set up the dynamic adjustment mechanism. Following the three basic principles of “ecology first, balance between land use and compensation and optimized layout” , Shenzhen’s basic ecological control line has been adjusted for 450 times in the recent decade.

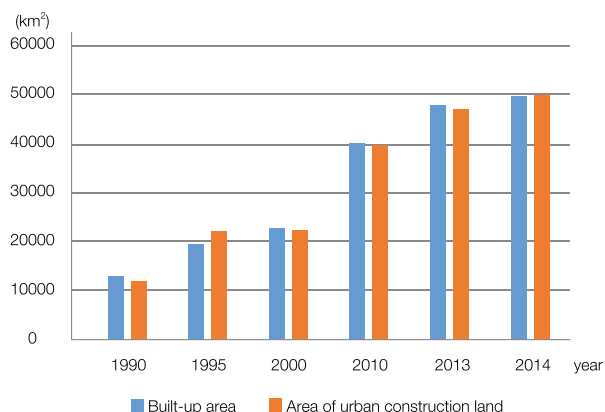


Figure 2-3 Chart for changes of urban built-up area and construction land in China
(Source: China Statistical Yearbook 2015)

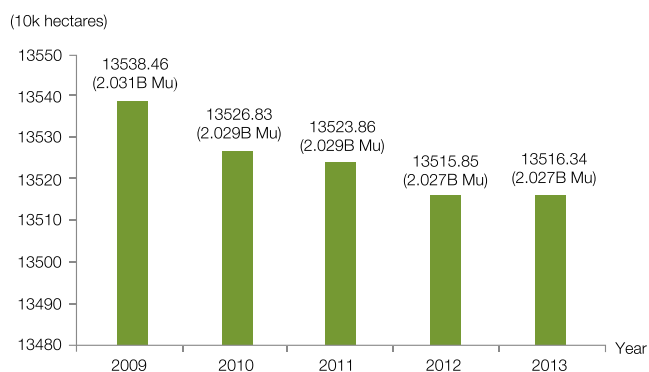


Figure 2-4 Changes of cultivated area in China, 2009-2013
(Source: Communiqué on Land and Resources of China 2014)

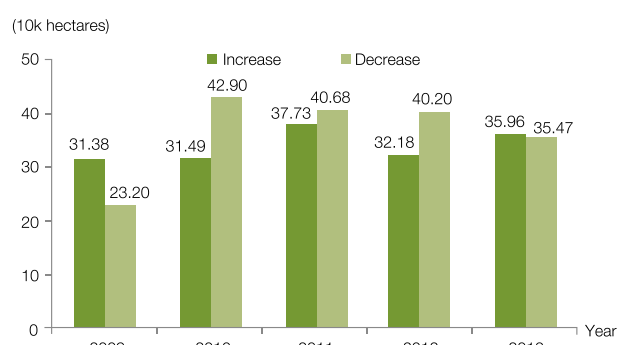


Figure 2-5 Increase & decrease of cultivated area in China, 2009-2013
(Source: Communiqué on Land and Resources of China 2014)



Figure 2-6 Changes of approved construction land in China, 2010-2014
(Source: Communiqué on Land and Resources of China)

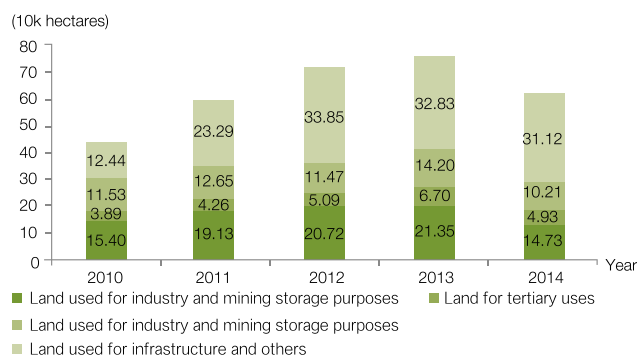


Figure 2-7 Changes of supply of state-owned construction land, 2010-2014
(Source: Communiqué on Land and Resources of China)

2.2.2 Promote multiple planning integration

At present, there are various types of spatial planning in China. Due to different focus of various types of planning authorities, their plans are not sufficiently aligned, where issues like content differences or contradictory control requirements from various plans in the same space can be observed. In order to address these issues, the concept of “multiple planning integration” came into being, which means to unify the identical contents involved in each planning and implement them onto a common spatial planning platform. Generally speaking, “multiple planning integration” can be expressed as unification of “3+N” plans, in which “3” means the national economic and social development plan, the urban-rural master planning and the overall plan of land utilization, while “N” can include the environmental protection plan, the industrial plan, the population plan and transportation planning etc. “Multiple planning integration” can reinforce the spatial control capability of the government and realize the intensive, efficient and sustainable utilization of land and space, which is also the important basis to reform the planning system of the government and set up unified and linked, functionally complementary and mutually coordinated spatial planning system. China has roughly gone through three stages for putting the “multiple planning integration” into place, i.e. “integration of two plans” (i.e. linkage and alignment between urban & rural planning and land planning), “integration of three plans” and “integration of multiple plans”. In August 2014, the National Development and Reform Commission, Ministry of Land and Resources, Ministry of Environmental Protection and Ministry of Housing and Urban-Rural Development jointly issued the document titled the *Notice on Carrying out Pilot of “Multiple Planning Integration” in Cities and Towns* (《关于开展市县“多规合一”试点工作的通知》), in which 28 cities/counties were included in the pilot project list for the purpose of promoting “integration” of economic and social development plan, urban and rural planning, plan of land utilization and ecological environment protection plan into “one” plan and realizing one plan and one blueprint



Figure 2-8 Evacuation drill for the aged held in Chongqing (Photo by Chen Shichuan)

for one city/county through the pilot project of spatial planning reform in the city/county.

2.2.3 Safeguard the public security

Public security involves prevention, response and rescue to emergencies like natural disasters, incidents, public health and social security etc. Since SARS outbreak in 2003, the public security has gained the attention from Chinese society and the basic framework for public security emergency system has been gradually set up and constantly improved.

The *Several Opinions of CPC Central Committee and the State Council on Further Strengthening Urban Planning and Development Control* (《中共中央国务院关于进一步加强城市规划建设管理工作的若干意见》) released in February 2016 has put forward specific requirements on protecting the urban security: (efforts shall be made to) strengthen the municipal infrastructure construction and implement underground pipe network renovation; improve the standards for urban flood drainage system construction and speed up the implementation of renovation; improve the configuration standards of urban comprehensive disaster prevention and security facilities, increase the investment on construction and strengthen the management of facilities operation; set up alternative drinking water sources in cities and ensure the security of drinking water; improve the urban emergency command system for earthquake and flood control, drainage, firefighting, transportation and response to geological disasters, improve urban system of green passages for life, reinforce construction of urban disaster protection shelters and strengthen the capability of resisting the natural disasters, coping with emergencies and managing crisis; enhance the urban security supervision, set up specialized and professional emergency rescue team, improve comprehensive management level of social security and build the 7x24, systematic and modernized urban security guarantee system.



Figure 2-9 Pupils are learning “skills” in disaster prevention drill (Photo by Chen Bin)



Figure 2-10 Fire protection promoted in enterprises (Photo by Xiao Minglei)



Figure 2-11 Shushan District in Hefei launched the model of “linkage among community, social organization and social work professionals” (Photo by Zhang Yazhi)



Figure 2-12 Event held by “Residents’ Self-directed committee” of Chaowai Sub-district, Beijing (Photo by Ren Haixia)

2.2.4 Strengthen the community governance

Along with the rapid progress of urbanization, grassroots units represented by the community have become the major social space for residents in daily activities. As the basic unit of the society, the community governance is undoubtedly the important basis for the social governance and even the state governance. For a long time, the government organization has been the principal for community governance in China, while issues like low involvement of residents and non-government institutions in community governance and weak power of community organization etc. have been prominent.

The modernization process of community governance at the

grassroots level needs to promote the shift of community construction and development from the government as the single owner to pluralistic subjects composed of the government, community residents and social organizations and gradually establish the community governance model with the involvement of these pluralistic subjects. In January 2014, the Ministry of Civil Affairs confirmed 31 national experimental areas for the community governance and service innovation. Each of them had their different themes and development directions. Consultation & democracy, pluralistic subjects and service improvement etc. became the key words for the community governance. In May 2015, the Ministry of Civil Affairs organized the celebration of “Top 10 innovation results for community governance in China 2014” and promoted the new experience

and new results in innovation of community governance. The *Several Opinions of CPC Central Committee and the State Council on Further Strengthening Urban Planning and Development Control* (《中共中央国务院关于进一步加强城市规划建设管理工作的若干意见》) requested to improve the grassroots governance mechanism in cities, further strengthen the leading and core role of the Party organization in sub-district & community and use community service-oriented party organizations to lead the development of residents self-governance organizations and community social organizations; enhance the service function of communities and realize the positive interaction among government control, social regulation and residents' self-governance.

2.3 Urban employment and poverty reduction

2.3.1 Overall situation of urban employment

The growth of the total number of employed persons in China has maintained steady growth with a rising ratio of urban employed persons. In 2014, the total number of employed persons reached 773 million, including 393 million urban employed persons with the ratio of 50.22% in the total. From 2010 to 2014, the number of urban newly employed people amounted to 46.23 million, and, meanwhile urban the registered unemployment rate was maintained below 4.2%. By 2014, a total of 170 million people were covered by unemployment insurance.

The average wage for persons working in urban units has increased continuously and the structure of the working units has become diversified. In 2014, the average wage for persons working in urban units was RMB 56,360, increasing by RMB 38,160 compared to 2005. In terms of nature of the working units, private enterprises (28.28%), self-employment (20.11%), limited liability companies (18.11%) and state-owned units (18.11%) play the major role in absorbing the working population.

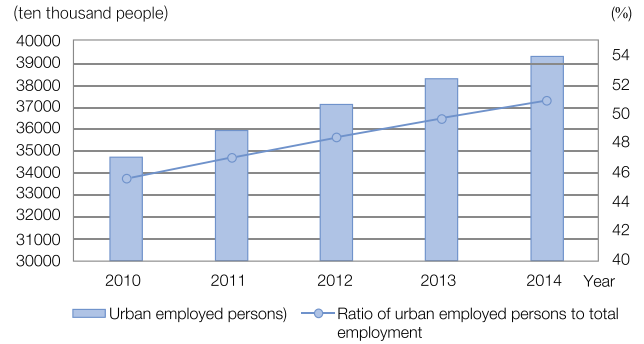


Figure 2-13 Changes for ratio of urban employed persons in total employment in China (2010-2014)

(Source: *China Statistical Yearbook 2015*)

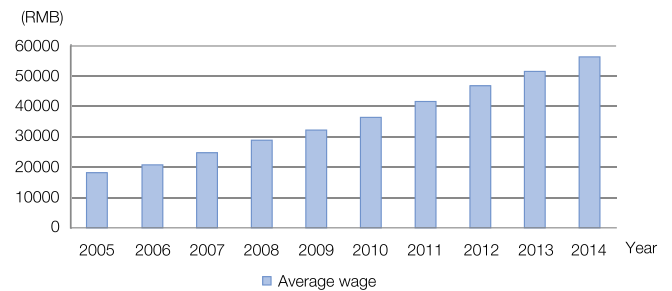


Figure 2-14 Changes of average wage for persons working in urban units in China (2005-2014)

(Source: *China Statistical Yearbook 2015*)

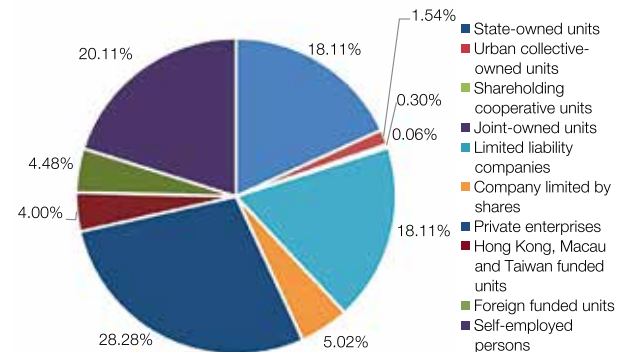


Figure 2-15 Ratio of employed persons in different types of urban units in China, 2014

(Source: *China Statistical Yearbook 2015*)

Skilled workers	2004		2009		2014	
	# (10k persons)	Ratio (%)	# (10k persons)	Ratio (%)	# (10k persons)	Ratio (%)
Total	8720	100	10650	100	15729.8	100
Senior technicians	60	0.69	85.4	0.8	145.6	0.9
Technicians	300	3.44	423.5	3.98	612.4	3.9
Senior workers	1500	17.2	2122	19.93	3378.5	21.4
Medium (skilled) workers	3140	36.01	4300	40.38	6189.8	39.4
Junior worker	3720	42.66	3719	34.92	5403.5	34.4

Source: Ministry of Human Resources and Social Security, P.R. China.

2.3.2 Innovation and entrepreneurship support program

In order to accelerate the capacity expansion of employment and fuel the economic transformation, the Chinese government has developed a series of innovation and entrepreneurship support programs successively. In 2014, the Central Government issued 13 papers to fuel the entrepreneurship and innovation. Efforts were made to encourage workers to engage in self-employment and start up business through policies like tax cuts and exemptions and small amount guaranteed loan etc.; support people with job hunting difficulties to get employed by placing them into the public welfare positions or through the social insurance subsidy etc.; improve professional skills of workers through such policies as the subsidies for professional trainings; reinforce public employment services and enhance employment service level. The 2015 Report on the Work of the Government further defined the development goal of “Mass entrepreneurship and innovation” . The institutional environment to facilitate growth and expansion of small and micro busi-

nesses and help more people start up business freely is under acceleration and improvement.

As the typical carrier of innovation and entrepreneurship, the makerspace is rising up in all major cities. Makerspace refers to community operated working space, where people have similar interests (generally for IT, mechanics, arts etc.) may get together, engage in social networking and cooperate. Makerspace is also the space for innovation and entrepreneurship incubation with lower cost. The executive meeting of the State Council on January 28, 2015 decided on the policy initiative of supporting the development of “Mass makerspace” , putting forward that, on the basis of the incubation model of makerspace, innovation factory etc., efforts shall be made to vigorously develop market-oriented, professional, integrated and networking “mass makerspace” ;realize combination of innovation and entrepreneurship, online and offlineand incubation and investment; provide the low-cost, convenient and total-factor open service platform for growth of small and micro innovation enterprises.



Figure 2-16 Skill training for animal husbandry (Photo by Li Tiecheng)



Figure 2-17 Migrant workers returned to hometown to start up business (Photo by Zhang Jiancheng)



Figure 2-18 Shenzhen Chaihuo Makerspace (Photo by Liu Zhen)



Figure 2-19 Tianjin CCO Maker Space (Photo by Tong Yu)

Example of several typical makerspaces

Table 2-2

Name	Location	Founding year	Industry territory
Chaihuo Makerspace	Shenzhen	2010	Open source hardware, robot, smart home, electronic components, Linux and embedded development
Xin Che Jian, Hackerspace in Shanghai	Shanghai	2010	3D printing, smart home, robot
Beijing Maxpace	Beijing	2011	Open source hardware, 3D printing, wearable devices, robot
Hackerspace Onion Capsule, Hangzhou	Hangzhou	2011	Smart home including artwork, music and photography etc.
DimSumLabs	Hong Kong	2013	Wearable devices, DIY hardware
TechSpace	Shenzhen	2013	Smart home, 3D printing, wearable devices
ingchuang.com	Beijing	2014	Artificial intelligence, smart home, wearable devices
IC Café, Beijing	Beijing	2015	Service for innovation and entrepreneurship of integrated circuit, smart hardware industry chain
JD E-World	Shenzhen	2015	Wearable devices, artificial intelligence

2.3.3 Overall situation of poverty alleviation

China has been committed to reducing poverty for long and made major achievements. The number of poor people in China has decreased from 689 million in 1990 to 70 million in 2014. Among them, the proportion of urban poor people has dropped from over 60% in 1990 to 4.2% in 2014. China has become the first developing country to realize United Nations Millennium Development Goals to reduce by half the proportion of people living on less than a dollar a day and its contribution to the global poverty reduction exceeds 70%. While realizing self-development, China has also actively participated in cooperation for global poverty reduction and successively offered manageable help to more than 120 developing nations to implement the Millennium Development Goals. In 2014, the Chinese government put forward the East Asia Cooperative Initiative on Poverty Reduction and actively promoted Sino-LATAM exchange on poverty reduction under the framework of China-Latin America Cooperation Forum.

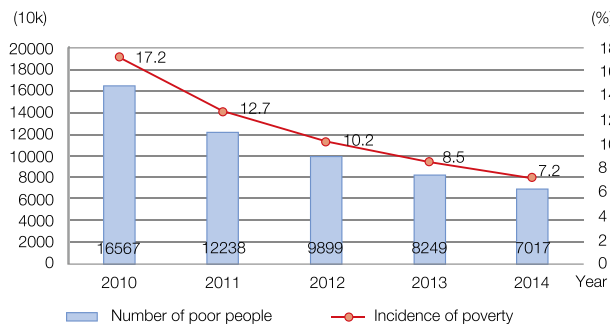


Figure 2-20 Changes of number of poor people and incidence of poverty in China (2010-2014)

(Source: China Statistical Yearbook 2015)

The Chinese government has attached great importance to poverty alleviation and created positive policy environment for it. The government has always regarded poverty alleviation through development as the important component of General Plan for National Economic and Social Development. Since 2000, it has successively developed and implemented the *Outline for Development-oriented Poverty Alleviation for China's Rural Areas (2001~2010)* (《中国农村扶贫开发纲要(2001~2010年)》) and the *Outline for Development-oriented Poverty Alleviation for China's Rural Areas (2010~2020)* (《中国农村扶贫开发纲要(2010~2020年)》) to greatly improve the standard for poverty reduction. Since 2013, China has implemented the poverty alleviation strategy that combines “targeted poverty reduction”, “regional development” and “social security” together. Main poverty alleviation measures include various contents for transportation, electricity, water conservancy, agricultural technology, dilapidated house renovation and poverty reduction by relocating to other places etc. In 2015, the Fifth Plenary Session of the 18th CPC Central Committee put forward the latest targets for poverty alleviation – bring all poor people in rural area under existing standards out of poverty, eliminate all poor counties and solve overall poverty at regional level by 2020.

Investment in poverty alleviation has always been the key field of public fiscal budget arrangement. From 2000 to 2014, the Central Government has accumulatively invested RMB 296.6 billion into the special poverty alleviation fund with the annual growth of 11.6%. During this period, the policy of “work relief” (i.e. the government invests in the rural infrastructure construction and those to be relieved get paid by joining in the construction) invested the special fund in the total amount of RMB 84 billion and granted labor remuneration in the amount of over RMB 10 billion for the poor people participating in

project construction; on the premise of voluntariness, poverty reduction projects via relocation to other places have relocated 5.88 million poor people in total with RMB 30.8 billion subsidy investment from the Central Government. Meanwhile, the state also prioritizes poverty reduction investment for minority nationalities, women, children and the disabled.

The pattern of coordinated promotion of poverty alleviation by the government, society and market has come into being. Cur-

rently, there are a total of 170,000 help centers across China, targeted at helping 174,000 villages; meanwhile, 18 relatively developed provinces/cities in the eastern region and 10 provinces/regions/cities in the western region have established the coordination mechanism for poverty alleviation. In addition, the World Bank, Asian Development Bank, United Nations Development Programme etc. have also implemented poverty alleviation projects in China, and accelerated the development process to reduce poverty in China.

The task of eliminating poverty in China still remains arduous. Currently, there are still a large number of people living in poverty and 592 national-level poor counties, especially in the western region. The depth of poverty is significant, in particular in some concentrated, contiguous poor areas with weak ecological environment, poor public service, attrition of labor, where it is large difficulty and high costs in poverty reduction. In the process of implementing poverty alleviation measures, the government also needs to combat the pressure of repoverty, as the likelihood for poor areas to suffer from natural disasters is five times of the national average level and the poor population need to cope with economic, social and natural risks at the same time.



Figure 2-21 Miao Village in Hainan reduced poverty and achieved prosperity via tourism (Photo by Meng Zhongde)



Figure 2-22 Lots drawing for housing allotment of poverty reduction via relocation (Photo by Yang Jiachang)

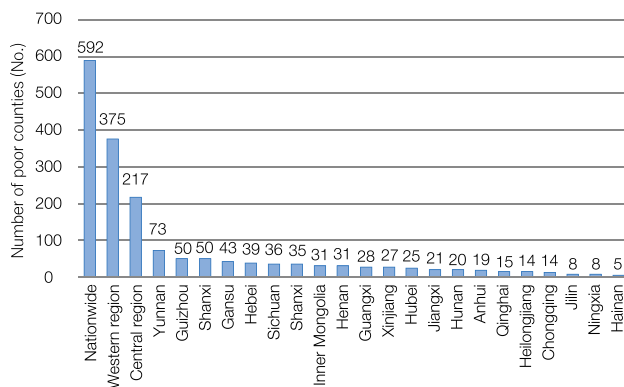


Figure 2-23 Distribution of national-level poor counties in China (Source: *China Statistical Yearbook 2015*)

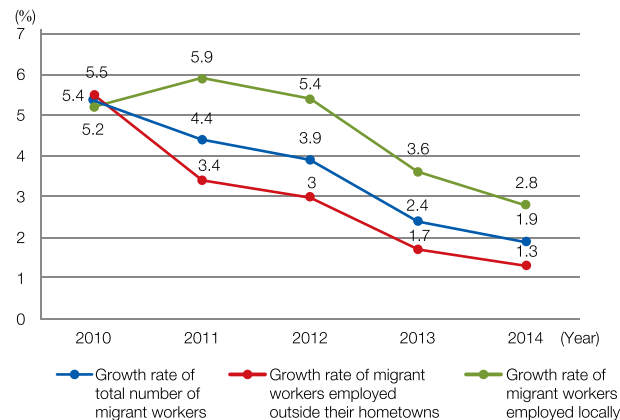


Figure 2-24 Growth rate of the total number of migrant workers

2.4 Situation of rural migrant workers in urban China

2.4.1 Basic characteristics of migrant workers

(I) Total quantity

The total quantity of migrant workers continues to increase, but the growth rate slows down. According to the results of the sample survey by National Bureau of Statistics, the total number of migrant workers in China in 2014 was 273,950,000, growing by 1.9% with 5.01 million additional workers compared to the previous year. Among them, the number of migrant workers employed outside their hometowns was 168,210,000, growing by 1.3% with 2.11 million more workers than the previous year; the number of migrant workers employed locally was 105,740,000, increasing by 2.9 million compared to the

previous year with the growth rate of 2.8%. Since 2010, the growth of the total number of migrant workers has continued to fall back, with the growth rate of 2011, 2012, 2013 and 2014 dropping by 1.0, 0.5, 1.5 and 0.5 percentage points respectively compared to the previous years and for migrant workers employed outside their hometowns, the growth rate drop for 2011, 2012, 2013 and 2014 was 2.1, 0.4, 1.3 and 0.4 percentage points respectively. In recent 3 years, the growth rate of number of migrant workers employed locally was also decreasing year on year, but the speed of growth was still faster than that of outgoing migrant workers.

(II) Demographic composition

Among all migrant workers, the ratios of male and female workers are 67.0% and 33.0% respectively. Among migrant workers employed outside their hometowns, there are 69.0%

Statistics of the number of migrant workers in China, 2010-2014 (Unit: 10k people)

Table 2-3

	2010	2011	2012	2013	2014
Total number of migrant workers	24223	25278	26261	26894	27395
1. Migrant workers employed outside their hometowns	15335	15863	16336	16610	16821
(1) Migrant workers going out alone	12264	12584	12961	13085	13243
(2) Migrant workers going out with family	3071	3279	3375	3525	3578
2. Migrant workers employed locally	8888	9415	9925	10284	10574

Source: National report on migrant worker monitoring and survey 2014.

Age structure of migrant workers (unit: %)

Table 2-4

	2010	2011	2012	2013	2014
16-20 (years old)	6.5	6.3	4.9	4.7	3.5
21-30	35.9	32.7	31.9	30.8	30.2
31-40	23.5	22.7	22.5	22.9	22.8
41-50	21.2	24.0	25.6	26.4	26.4
Over 50	12.9	14.3	15.1	15.2	17.1

Source: National report on migrant worker monitoring and survey 2014.



Figure 2-25 Migrant workers rushing home (Photo by Liu Qinli)



Figure 2-26 Migrant worker market in Nanjing ushered in job-hunting season after the Spring Festival (Photo by Hei Songzi)

Composition of educational level of migrant workers (Unit: %)

Table 2-5

	Migrant workers overall		Migrant workers employed outside their hometowns		Migrant workers employed locally	
	2013	2014	2013	2014	2013	2014
No schooling	1.2	1.1	0.9	0.9	1.6	1.6
Primary school	15.4	14.8	11.9	11.5	18.9	18.1
Junior middle school	60.6	60.3	62.8	61.6	58.4	58.9
High school	16.1	16.5	16.2	16.7	16	16.2
Junior college and above	6.7	7.3	8.2	9.3	5.1	5.2

Source: National report on migrant worker monitoring and survey 2014.

Ratio of migrant workers receiving skill training (Unit: %)

Table 2-6

	Received agricultural skill training		Received non-agricultural vocational training		Received skill training	
	2013	2014	2013	2014	2013	2014
Total	9.3	9.5	29.9	32.0	32.7	34.8
Under 20 (years old)	5.0	6.0	29.9	31.4	31.0	32.6
21-30	5.5	6.0	34.6	37.0	35.9	38.3
31-40	9.1	8.8	31.8	34.0	34.1	36.1
41-50	12.7	12.6	27.8	29.9	32.1	33.7
Over 50	12.4	12.7	21.2	24.0	25.9	28.8

Source: National report on migrant worker monitoring and survey 2014.

male and 31.0% female workers; among migrant workers employed locally, 65.1% are male and 34.9% are female workers. By age group, migrant workers are dominated by young adults, specifically, 3.5% aged 16-20, 30.2% aged 21-30%, 22.8% aged 31-40, 26.4% aged 41-50 and 17.1% aged over 50. It's shown by the survey data that the proportion of migrant workers aged under 40 continues to fall, decreasing from 65.9% in 2010 to 56.5% in 2014, and the average age of migrant workers also rises from 35.5 to 38.3.

(III) Quality of workers

In general, the educational level of migrant workers is increasing and the ratio of migrant workers with high school or above education increases to 23.8%, growing by 1 percentage point compared to the previous year. Among them, the ratio of migrant workers with high school or above education and employed outside their hometowns and employed locally was 26% and 21.4% respectively. In the meantime, the ratio of migrant

worker receiving skill trainings also increases, which is 34.8%, increasing by 2.1 percentage points compared to the previous year. Among them, migrant workers receiving non-agricultural vocational skill training account for 32%, those receiving agricultural skill training take up 9.5%, and workers receiving both of these trainings account for 6.8%.

(IV) Temporal and spatial characteristics of labor migration

The eastern region is seeing the largest inflow of migrant workers, while the western region is the region where the growth of the number of migrant workers is the highest. In 2014, a total of 164,250,000 migrant workers worked in the eastern region, increasing by 2.51 million compared to the

previous year at the growth rate of 1.6%; a total of 57,930,000 migrant workers worked in the central region, increasing by 930,000 compared to the previous year at the growth rate of 1.6%; 51,050,000 migrant workers in total worked in the western region, increasing by 1.54 million compared to the previous year at the growth rate of 3.1%. The size of in-province and cross-province migration of workers is basically identical but with large regional differences. In the eastern region, in-province migration is in dominance, while cross-province migration leads the way in central and western regions. In terms of working location of migrant workers employed outside their hometowns, a majority of them are concentrating in prefecture-level and above cities.

Regional distribution and share of migrant workers employed outside their hometowns, 2014

Table 2-7

By place of origin	Total number of outgoing migrant workers (10k)			Composition (%)		
	Migrant workers working outside their hometowns	Cross-province migration	In-province migration	Migrant workers working outside their hometowns	Cross-province migration	In-province migration
Total	16821	7867	8954	100	46.8	53.2
Eastern region	5001	916	4085	100	18.3	81.7
Central region	6467	4064	2403	100	62.8	37.2
Western region	5353	2887	2466	100	53.9	46.1

Source: National report on migrant worker monitoring and survey 2014.

Distribution and composition of regions absorbing migrant worker employed outside their hometowns, 2014

Table 2-8

	Total	Municipalities directly under the central government	Capital cities	Prefecture-level cities	Small towns	Others
Total number of migrant worker employed outside their hometowns (10k)	16821	1359	3774	5752	5864	72
Including: cross-province migration	7867	1107	1783	3163	1742	72
Migration to other cities/towns within the province	8954	252	1991	2589	4122	0
Composition of migrant worker employed outside their hometowns (%)	100	8.1	22.4	34.2	34.9	0.4
Including: cross-province migration	100	14.1	22.7	40.2	22.1	0.9
Migration to other cities/towns within the province	100	2.8	22.2	28.9	46.1	0

Source: National report on migrant worker monitoring and survey 2014.

2.4.2 Living conditions of migrant workers

(I) Income and expenses

The income of migrant workers is steadily growing. In 2014, the monthly income per capita of migrant workers was RMB 2,864, increasing by RMB 255 compared to the previous year at the growth rate of 9.8%. By industry, the monthly income per capita of migrant workers in all industries maintains the growth, with manufacturing, construction, and residents services, repair and other service industries demonstrating the fastest growth. Meanwhile, the average monthly living expenses of the migrant workers are also rising. In 2014, the average monthly living expense of migrant workers employed outside their hometowns were RMB 944 per person, increasing by RMB 52 compared to the previous year at the growth rate of 5.8%.

(II) Working conditions

In terms of working time, the annual, monthly and daily working time for migrant workers employed outside their hometowns was 10 months, 25.3 days and 8.8 hours respectively on average in 2014, showing no significant change compared to

the previous year. Migrant workers working for more than 8 hours a day accounted for 40.8%, showing a slight decrease compared to the previous year. However, migrant workers working for more than 44 hours a week took up 85.4%, growing by 0.7 percentage point compared to the previous year. Constrained by personal conditions, migrant workers are mainly working in the secondary industry, followed by the tertiary industry.

(III) Social security for migrant workers

The ratio of migrant workers covered by the “five major social insurance programs and housing provident fund” is gradually increasing. The rate of migrant workers participating in the “Five major social insurance programs and housing provident fund” in 2014 was respectively: employment injury insurance 26.2%, medical insurance 17.6%, endowment insurance 16.7%, unemployment insurance 10.5%, maternity insurance 7.8% and housing provident fund 5.5%, increasing by 1.2, 0.5, 0.5, 0.7, 0.6 and 0.5 percentage points respectively compared to the previous year. Migrant workers employed outside their hometowns have higher participation rate for employment injury and medical insurance and housing provident fund than those employed locally, but lower in endowment, unemployment and maternity

Per capita monthly income and its growth for migrant workers by industry

Table 2-9

	2013 (RMB)	2014 (RMB)	Growth rate (%)
Total	2609	2864	9.8
Manufacturing	2537	2832	11.6
Construction	2965	3292	11
Wholesale & retail	2432	2554	5
Transportation, warehousing & postal services	3133	3301	5.3
Accommodation and catering	2366	2566	8.4
Residents services, repair & other service industries	2297	2532	10.2

Source: National report on migrant worker monitoring and survey 2014.

Average monthly living and residence expense of migrant workers employed outside their hometowns

Table 2-10

	Living expenses		Including: residence expense		Share of residence expense	
	(RMB/person)		(RMB/person)		(%)	
	2013	2014	2013	2014	2013	2014
Total	892	944	453	445	50.7	47.1
Eastern region	902	954	454	447	50.3	46.8
Central region	811	861	441	414	54.3	48
Western region	909	957	443	449	48.7	46.9

Source: National report on migrant worker monitoring and survey 2014.

insurance than those employed locally. The “five major social insurance programs and housing provident fund” participation rate also shows regional difference, for which the eastern

region is the highest, but the central and western regions also grow rapidly.

Working time and intensity of work for migrant workers

Table 2-11

	2013	2014
Time of working outside per year (months)	9.9	10.0
Average time of working outside per month (days)	25.2	25.3
Average working time per day (hours)	8.8	8.8
Share of migrant workers working for 8+ hours per day (%)	41	40.8
Share of migrant workers working for 44+ hours per week (%)	84.7	85.4

Source: National report on migrant worker monitoring and survey 2014.

Distribution of industries migrant workers are working with (Unit: %)

Table 2-12

	2013	2014	Increase/decrease (Percentage point)
Primary industry	0.6	0.5	-0.1
Secondary industry	56.8	56.6	-0.2
Including: manufacturing	31.4	31.3	-0.1
Construction	22.2	22.3	0.1
Tertiary industry	42.6	42.9	0.3
Including: wholesale & retail	11.3	11.4	0.1
Transportation, warehousing & postal services	6.3	6.5	0.2
Accommodation & catering	5.9	6.0	0.1
Residents services, repair and other service industries	10.6	10.2	-0.4

Source: National report on migrant worker monitoring and survey 2014.

Ratio of migrant workers covered by “Five types of insurance and housing fund”, 2014 (Unit: %)

Table 2-13

	Employment injury insurance	Medical insurance	Endowment insurance	Unemployment insurance	Maternity insurance	Housing provident fund
Total	26.2	17.6	16.7	10.5	7.8	5.5
Including: migrant workers employed outside their hometowns	29.7	18.2	16.4	9.8	7.1	5.6
Migrant workers employed locally	21.1	16.8	17.2	11.5	8.7	5.3
Increase vs. the previous year	1.2	0.5	0.5	0.7	0.6	0.5
Including: migrant workers employed outside their hometowns	1.2	0.6	0.7	0.7	0.5	0.6
Migrant workers employed locally	1.0	0.4	0.3	0.9	0.8	0.4

Source: National report on migrant worker monitoring and survey 2014.

Ratio of migrant workers covered by the “Five major social insurance programs and housing provident fund” by region, 2014 (Unit: %)

Table 2-14

	Employment injury insurance	Medical insurance	Endowment insurance	Unemployment insurance	Maternity insurance	Housing provident fund
Eastern region	29.8	20.4	20	12.4	9.1	6
Central region	17.8	11.8	10.7	6.9	4.9	4.7
Western region	21.9	13.6	11.4	7.7	5.8	4.4
Increase vs. the previous year						
Eastern region	1	0.1	0.4	0.7	0.4	0.4
Central region	1.6	1.2	0.7	1	0.7	0.6
Western region	0.4	0.8	0.7	1.1	0.8	0.7

Source: National report on migrant worker monitoring and survey 2014.



Figure 2-27 Shaoxing, Zhejiang: “Migrant workers living in dangerous building” worried about homelessness (Photo by Li Ruichang)



Figure 2-29 The worker is working on decal line in the First Porcelain Factory in Xuanhua District, Zhangjiakou City, Hebei Province (Photo by Chen Xiaodong)



Figure 2-28 Working environment of migrant workers (Photo by Ren Weihong)



Figure 2-30 Hebei pays attention to tuberculosis control for migrant workers (Photo by Zhai Yujia)



Figure 2-31 A village in Taiyuan City under demolition and renovation (Photo by Wei Liang)

2.5 China practice: the rebuilding of shanty areas

2.5.1 Concept of shanty areas and scope of rebuilding

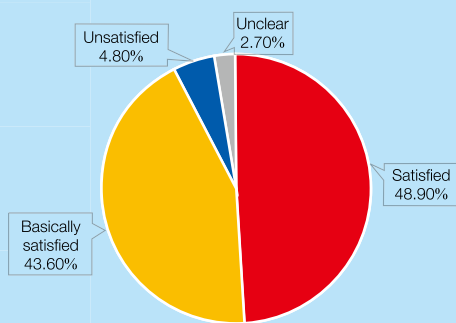
Shanty areas refer to residential areas of high building density with too many simple structure buildings and shabby infrastructure on the state land, where buildings have been built for long years, functions are incomplete and hidden security hazards are prominent, specifically including shanty urban areas, shanty areas in state-owned industrial and mining areas (including coal mines), shanty areas in state-owned forest zones and shanty areas in state-owned reclaimed land. The rebuilding of shanty areas is a major project for people's wellbeing and development and the scope of rebuilding in China is gradually expanding. In 2011, the Central Government strived to extend the scope of rebuilding to designated towns; in 2013, some 'villages in cities' projects were also included in the scope of rebuilding; in 2015, "rebuilding shanty areas in cities" were officially upgraded to "rebuilding shanty areas in both cities and towns", meanwhile comprehensive renovation of dilapidated urban housing and villages in cities were also included in the scope of rebuilding shanty areas.



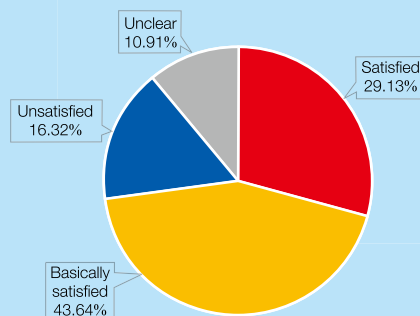
Figure 2-32 A corner of shanty area rebuilding project in a former mining area in Luocheng Mulao Autonomous County, Guangxi (Photo by Xie Shunheng)

Special column 2-1 Residents' satisfaction to the rebuilding of shanty area in China

It is shown in Survey Report on Satisfaction of the Mass for the Rebuilding of Shanty Areas” by National Bureau of Statistics in 2015, more than 90% respondents are satisfied or basically satisfied with the policy of the State Council on accelerating the rebuilding of shanty areas, while residents in shanty areas are very satisfied with the rebuilding policy as well as policy implementation and they hope to forcefully strengthen policy execution.



Evaluation of residents in shanty areas on the rebuilding policy



Appraisal of residents in shanty areas under rebuilding on local implementation of rebuilding policies and measures

(Source: Survey Report on Satisfaction of the Mass for Rebuilding Shanty Areas, National Bureau of Statistics, 2015)



Hefei, Anhui Province: residents in shanty areas moving back happily (Photo by Xie Chen)



2.5.2 Achievements and targets for the rebuilding of shanty areas

(I) Achievements made in the rebuilding of shanty areas

In the past decade, China has made great achievements in the rebuilding of shanty areas. In 2005, Liaoning Province took the lead in large-scale rebuilding of shanty areas. In 2008, the Central Government launched the projects of shanty areas rebuilding nationwide. By 2012, a total of 12.6 million households in different types of shanty areas have been rebuilt, 7.5 million resettlement houses for rebuilding shanty areas have been basically built, subsidies in amount of RMB 150 billion have been arranged for rebuilding shanty areas and more than 20 million residents in shanty areas have been resettled. From 2013 to 2014, the government rebuilt 8.2 million houses in different types of shanty areas and renovated 5.32 million rural dilapidated houses. The rebuilding projects of shanty areas

have effectively improved the housing condition for people in straitened circumstances, relieved the urban dual-structure contradiction, improved the comprehensive bearing capacity of cities and towns and promoted the social harmony and stability.

(II) Targets for the rebuilding of shanty areas

China has continued to upgrade its targets for rebuilding the shanty areas. In 2012, the *Opinions of the State Council on Accelerating to Rebuild Shanty Areas* (《国务院关于加快棚户区改造工作的意见》) planned to rebuild 10 million houses in different types of shanty areas from 2013 to 2017, but 80% of the task was fulfilled within just 2 years. In 2015, in the *Opinion of the State Council on Further Improving Efforts in Rebuilding Shanty Areas and Renovating Dilapidated Housing as well as Supporting Infrastructure Construction* (《国务院关于进一步做好城镇棚户区和城乡危房改造及配套基础设施建设有关工作的意见》), it was planned to rebuild 18 million houses

in different types of shanty areas (including 5.8 million houses for 2015), including urban dilapidated housing and villages in cities, and 10.6 million rural dilapidated houses (including 4.32 million for 2015) from 2015 to 2017. In future, China will fully realize the grand goal of rebuilding the shanty urban areas and villages in cities for about 100 million residents.

2.5.3 Practice for the rebuilding of shanty areas

(I) Practice for the rebuilding of shanty areas in Liaoning

Liaoning is an old industrial base in China. Along with the system transformation and resource exhaustion, a great number of employees were laid off and millions of workers for industrial and mining enterprises have lived in the shanty areas for long. By the end of 2004, the total floor space of residential buildings within the province was 426,150,000 m², in which shanty areas with contiguous coverage exceeding 10,000 m² amounted to 29.10 million m², accounting for 7% of the total housing stock then; the number of residents living in shanty areas took up about 10% of the total urban population then.

Starting from 2005, Liaoning listed the rebuilding of downtown areas as the “No.1 project for people’s wellbeing” in the province, explored to implement “government-led and market-operated” rebuilding model and raised the funds for rebuilding through policy loans and commercial bank loans as well as from social channels. By the end of 2013, Liaoning had rebuilt 976,900 houses in different types of shanty areas. Dwelling area per household had increased from 39 m² to 57 m², with the average growth rate of 46.2%. Per capita dwelling area also increased from 10.6 m² to 16.6 m², with the growth rate of 56.6%. Before rebuilding the shanty areas, residents with dwelling area per household less than 40 m² accounted for 55.5%, while after that, 60.0% residents had 40-60 m² dwelling area per household and a majority of them lived in a house with more than 50 m² for the whole family. 97% residents in new area possessed houses with full ownership. Among 254 new communities from the rebuilding of shanty areas in the province, new community public space amounted to 120,000 m², which



Figure 2-33 Liaoning Province: ¥ 70 billion for building new apartments for residents in shanty areas (Photo by Liu Baocheng)

is much higher than the average level of all communities in the province. Travel, drinking water, heating, gas, healthcare and education conditions have been greatly improved for people living in the new communities.

(II) Practice for the rebuilding of shanty areas in Xi’an

From 2010 to 2015, Xi’an has completed 33 rebuilding projects of shanty areas in total. Through these projects, the mass have generally realized housing value and income growth. Their income from property has increased by 2-6 times. Based on the requirements of the state and Shaanxi that monetized resettlement rate for the rebuilding of shanty areas shall strive to be 80%, Xi’an City mainly adopted three models, i.e. “outright monetary compensation, government centralized group purchase of commercial housing and residents in shanty areas organized by the government to purchase commercial housing autonomously (i.e. the practice of resettlement via housing ticket). People to be relocated will receive a housing ticket similar to the bankbook, which includes subsidy, reward, compensation fund, and even money for decoration. People may also select to purchase the commercial housing autonomously, and as the government will grant certain subsidies to the developers, the purchase prices will be lower than the market prices.

(III) Practice for the rebuilding of shanty areas in Chengdu

In 2014, Chengdu City kicked off the first batch of large-scale rebuilding projects of shanty areas, which involved 45 projects in 5 major downtown areas. Expected investment amounted to RMB 17 billion and nearly 15,000 houses were rebuilt. The plan was to rebuild the shanty areas comprehensively in the 5 years from 2013 to 2017. During the rebuilding process, people’s willingness for rebuilding has been fully respected and the simulated relocation has been regarded as an important part in the rebuilding of shanty areas. Public opinions were collected for 3 times during the rebuilding process through survey of willingness for rebuilding, soliciting opinions on compensation plan and signing the simulated relocation agreement. They upheld the policy that “the people had the final say for decision of rebuilding or not, method of compensation and settlement and agreement signing.” Only when the ratio of residents signing the simulated relocation agreement within the scope of rebuilding prescribed in relevant policies and regulations is up to 95% can the project then be put into implementation.

2.6 Recommendations from experts: Establishment of the social & public policy system to promote the sustainable development (draft)

The policy development mechanism of public involvement and coordinated governance shall be improved. The cultivation of the democratic concepts and awareness of citizens shall be the

basic precondition for innovation and development of social governance, and the democratic decision making for public policies shall be adopted to promote the innovation and development of social governance. The smooth expression mechanism for interests and appeals shall be set up and improved in order to ensure the diversification of modes and channels of public involvement. It is important to continuously improve study & research and collective decision making system for major issues, expert consulting system for major policies, public notification system as well as system for soliciting opinions from the general public etc. and strengthen democratic decision-making procedures.

The overall arrangement mechanism for policies concerning people's wellbeing that promotes social integration shall be improved. The overall planning and adjustment of social interests shall be realized through optimization of policies concerning people's wellbeing, including comprehensively promoting targeted poverty alleviation, securing backing placement for employment, strengthening the development of key parts in social security, and improving joint-development and sharing level in public services etc. The wealth gap between the rich and the poor shall be further reduced, and the divergence of social interests shall be controlled in order to realize reform dividends shared by all people and actively promote common prosperity.

The policy mediation mechanisms, e.g. emergency response

and conflict resolving etc. shall be improved. Efforts shall be made to strengthen the emergency governance system and improve the disaster early warning, emergency response and damage evaluation mechanisms; improve the social risk prevention mechanism, establish the public opinions collection & study and major public opinions emergency handling mechanism, and reinforce the early forecast and risk evaluation for issues that may trigger social disturbances; build the platform for consultation and dialogues among stakeholders and stick to such methods as organic combination of the social, administrative and legal mediations.

The policy guarantee mechanism for the grassroots governance shall be improved. Efforts shall be strengthened to develop urban and rural community-based governance and steadily improve the self-government level at the grassroots; improve the community governance structure and streamline the role and responsibility of grassroots government and community self-management organizations; set up access system for community public services, explore the standard system and evaluation system for community activities and promote the mechanism of government's purchase of community services; develop grassroots social norms like village rules, folk laws etc. and set up the grassroots consultation mechanism e.g. frank discussions of public opinions, hearing and review by villagers (residents), and forum etc.



Figure 2-34 Jinzhou, Liaoning Province: Job Fairs for residents relocated from shanty areas (Photo by Gu Jin)



Figure 2-35 Xi'an: Last moment visit to the largest shanty area to be demolished (Photo by Zhang Yuan)



Qingdao, Shandong Province: School-buses overhauled for the new semester (Photo by Yu Fangping)



3

Public Services in Urban and Rural Areas

Promote fair access to education and improve the education quality / **52**

Continue to deepen the commitment to the reform of the medical and healthcare system / **56**

Put the *Law on Protection of the Rights and Interests of the Elderly* in full operation / **59**

Accelerate to build the public culture service system / **62**

Recommendations from experts:
Jointly step into an all-round well-off society / **64**

The only way to build a country is to enrich its people. The Chinese government actively promotes the innovation of development concepts and systems and secures the fair opportunity of development for all people with the aim of improving the people's wellbeing. Governments at all levels should take effective measures and strengthen basic public services e.g. compulsory education, employment services, social security, basic medical services and public health, public culture and environmental protection etc. to strive for a full coverage. They should also reinforce the payment transfer to the old revolutionary areas, ethnic areas, border areas and poverty-stricken areas; strengthen the support for special groups of people in special difficulties; reform the income distribution system to enable more people to share the “dividends” of reform and development. In the process of urbanization, the governments should also improve the mechanism for providing the basic public services that are tied to conditions like residence period and steadily promote the full coverage of basic urban public services for all permanent residents.

3.1 Promote fair access to education and improve the education quality

Talents determine the future and education fulfills the dream. In the process of deepening the commitment to reform in an all-round way, urban and rural education in China has focused on two major tasks, i.e. promoting equality and improving the quality, with new progress continuously made in cultivating students' growth and serving the economy and society.

In 2015, the net enrollment ratio for all primary schools and the gross enrollment ratio for junior middle schools in China were 99.88% and 104% respectively, and the retention rate of nine-year compulsory education was 93% with the penetration rate higher than the average level of high-income nations; the gross enrollment ratios for high schools and higher education were 87% and 40% respectively, higher than the average level

of mid- to high-income nations. Government expenditures on education made historical breakthrough and the security level of education was improved greatly. Government expenditures on education reached 4% of the GDP in 2012 for the first time. National fiscal expenditures on education reached RMB 2.64 trillion in total in 2014, almost doubling the size of 2010. Informationization level of education has been greatly improved with the Internet access rate for all middle & primary schools exceeding 85%. Digital education equipment and resources have covered all of 64,000 teaching venues nationwide. New situations have come into being for opening up in education sector, i.e. synchronous increase of the number of Chinese students studying overseas and returning to China after graduation, the growth of the number of foreign students studying and seeking degrees in China and improvement of “bringing in” and “going global” strategies. It is shown by the interim evaluation for the *Outline of National Education Reform and Development Plan in Mid to Long Term (2010-2020)* [《国家中长期教育改革和发展规划纲要(2010~2020年)》] that the overall development of China's education has stepped into the middle and upper ranks in the world, while the gap with developed nations has been further reduced.

3.1.1 Push the equalization of basic public education service

Educational equity is the important basis for social equality. National education policies must benefit tens of thousands of students in different circumstances. We shall use educational equity to review the systems and mechanisms and assess policies and measures, continuously improve the level of educational equity through adjustment of rules and system innovation, and strive to enable all people to have better and equal access to education.

The financial aid policy system ranging from preschool to postgraduate education for students in financial difficulties has been basically established in China. From 2010-2014, student

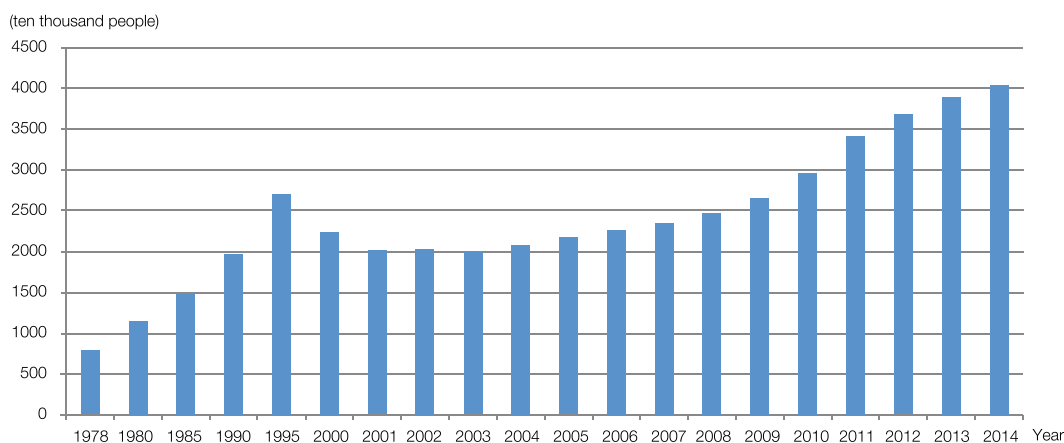


Figure 3-1 Changes of enrolled children in preschool education institutions across China (1978-2014)

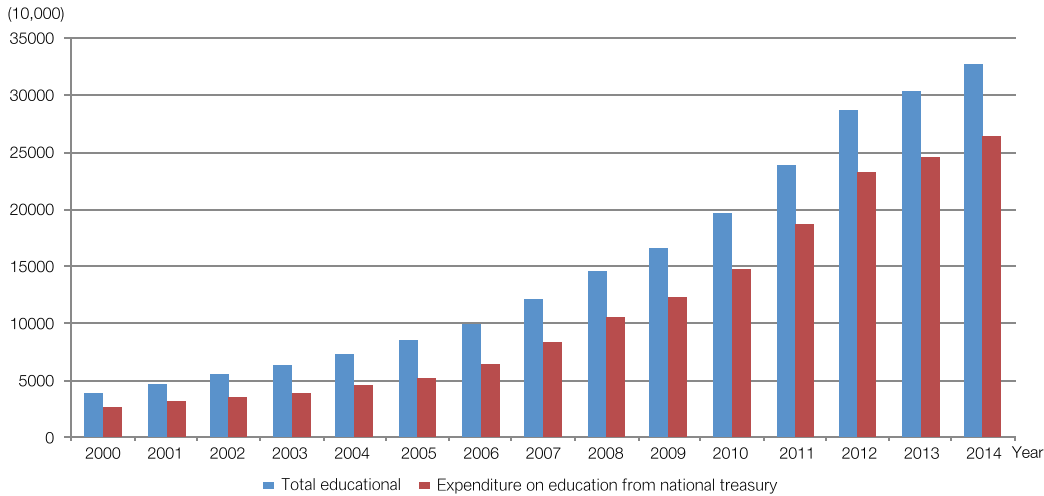


Figure 3-2 Growth of national expenditure on education (2000-2014) (Unit: RMB 100 million)

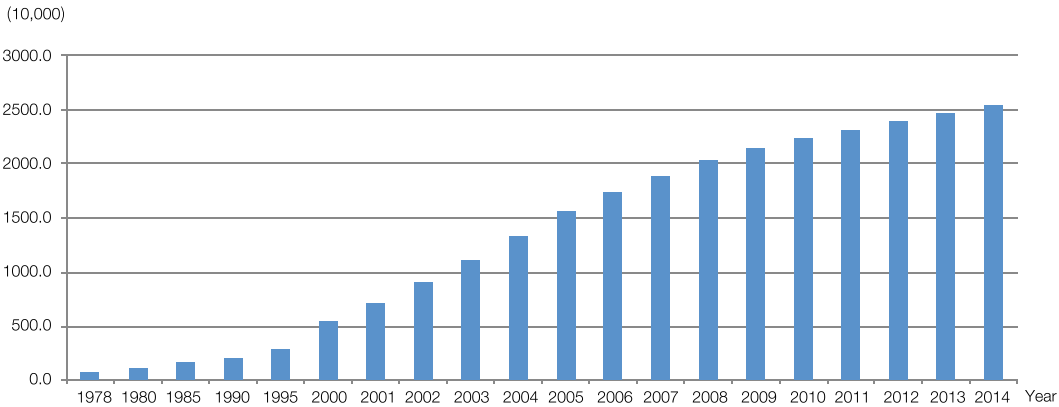


Figure 3-3 Growth of undergraduates in colleges and universities in China (1978-2014)

aid funds in the amount of RMB 556.4 billion were granted to help students for more than 410 million person-times and strive to ensure that no students would be deprived of education due to poor family conditions. Nearly 110 million rural students in compulsory education stage enjoyed the policy of tuition and fees exemption and free textbooks; Grade 1 students in primary schools got students dictionary for free; 12.4 million boarding students in financial difficulties from the central and western regions received subsistence allowance. Starting from November 2014, the subsidy standard for pilot areas of Nutrition Improvement Program for Rural Students Receiving Compulsory Education was increased from RMB 600 to RMB 800 per student per year and about 31.84 million students benefited from the policy.

During the 12th Five-year Plan period, the Central Government arranged RMB 10 billion to support the fundamental capacity building of 100 colleges and universities in 24 provinces in the central and western regions. It also granted RMB 5.6 billion to support 13 provinces (regions) with no universities directly under the Ministry of Education and Xinjiang Production and Construction Corps to each build one high-level local

university. Since the Enrollment Partnership Plan for pairing assistance to the central and western regions was implemented in 2012, the admission target of 755,000 students was achieved and provincial difference of admission rates for students taking university entrance examination has been reduced year by year.

The *Action Plan to Accelerate the Education Development in Central and Western Regions* (《加快中西部教育发展行动计划》) and the *Higher Education Revitalization Plan in Central and Western Regions* (《中西部高等教育振兴计划》) were further implemented. The Central treasury invested RMB 120 billion during the 12th Five-year Plan period to comprehensively improve the schooling conditions and teaching venues for rural compulsory education. All regions started to renovate the low-performing schools and accelerated the standardization development for compulsory education schools in urban and rural areas; optimize the layout of schools and gradually realize balanced allocation of resources among schools within the regions. It was put forward in the *Opinion of the State Council for Further Promoting the Balanced Development of Compulsory Education* (《国务院关于深入推进义务教育均衡发展的意见》) that 95% counties (cities, regions) of China shall real-

ize the basic balance by 2020. The Central treasury arranged special investments for improving the teaching conditions of schools with weak performance in compulsory education in poor regions, focusing on implementing projects to promote preschool education in rural areas, constructing short-term dorms for teachers of rural schools in remote and poverty-stricken areas, building general high schools in counties with weak education foundation in ethnic areas and building special education schools in the central and western regions etc. In recent 5 years, a total of 310,000 rural special-post teachers were recruited in China, injecting the new blood for more than 30,000 rural schools in over 1,000 counties in 21 provinces in the central and western regions. There are 28 provinces (autonomous regions, municipalities directly under the Central Government) starting to solve the issue of children of migrant workers to attend the college entrance examination at the working site of their parents after receiving the compulsory education. The *Decision about Accelerating the Development of Ethnic Minority Education* (《关于加快发展民族教育的决定》) issued by the State Council provides the better guarantee to the right of minority ethnic groups and people living in ethnic areas to receive education.



Figure 3-4 Wang Shuantang, a 54-year old veteran teacher, and his 4 students gather before the school gate (Photo by Sun Meng)



Figure 3-5 Wang Nianhua, a 58-year old veteran teacher, conducts a class to first-graders Peng Huiqun and Hu Yanmei (Photo by Chen Tingmao)

3.1.2 Lead the improvement of education quality with new development concepts

Compared to the national strategic objective of basically realizing the modernization of education, there are still apparent shortcomings for the existing education system in China: the education concepts are backward and the contents and approaches are old, while students don't have strong capability to adapt to the society and innovation & entrepreneurship; the education system and mechanism is not well-founded and schools are not sufficiently energetic in operation; the layout of educational structure is sub-optimal and the development of education is unbalanced across urban and rural areas and different regions. In particular, the education management style hasn't undergone fundamental changes for schools at different levels and their management system and management capability cannot adapt to the sustainable and healthy development of the national economy and society and the demands of the mass for receiving a good education. Addressing these major issues shall be the top priority in order to improve the overall education quality of the huge system composed of more than 500,000 schools and 260 million students across China and speed up the progress of the modernization of education.

It is put forward by the Central Government that structural adjustment is the major direction to improve the education

quality. Efforts shall be made to manage the structural reform on the supply side of education, enhance the adaptability and flexibility of the education structure and promote the education to serve the new normal of economic development and the growing new demands of the people for education in a better manner; energize the education with the innovation development, optimize the education structure with the coordinated development, lead the education style with the green development, expand the education resources with the open development, promote the education equity with the shared development and guide the improvement of education quality with the new development concept under the new normal; improve the quality of education, take promoting the all-round development of human being and adapting to the economic and social development as the basic criteria and improve the comprehensive strength of schools and the capabilities of the students to grow and become successful, make social contributions and compete internationally.

In the process of new-type urbanization and new rural development, all regions shall build kindergartens to the communities as the supporting facility, and enhance their support for kindergartens run by enterprises and public institutions, collective kindergartens and inclusive private-owned kindergartens. They shall innovate the management mechanism, bring into full play the radiation and driving functions of public kindergartens



Figure 3-6 Some left-behind children in the rural area relish on children books and magazines (Photo by Wang Guohong)



Figure 3-7 Volunteers from Jiangsu University at Farmers' Library of Jinjang Community, Hepinglu Sub-district, Zhenjiang City as book guides (Photo by Shi Yucheng)

and village/town center kindergartens and further improve the penetration rate of preschool education. On the basis of making the nine-year compulsory education universal, they shall also implement the program for strategic breakthrough of education at the high school stage and include ethnic areas, concentrated and contiguous destitute areas, key counties in the national-level poverty alleviation and development work and the province-level poor counties in some provinces with a large population in the central region into the scope of targeted poverty alleviation. They shall enhance the attraction of secondary vocational education, strive to enroll students who graduated from the junior middle schools but do not go to the general high schools in the secondary vocational schools and master some professional skills to help their family shake off poverty, and increase the years of schooling for the working-age population.

Efforts shall be made to improve the teaching level and innovation capabilities of colleges and universities and help several colleges/universities and disciplines reach or approach the world class; revise the standards for college/university settings and encourage the qualified general colleges/universities to transform into application-oriented ones; encourage the development of both comprehensive universities and lean and mean & specialized schools; develop the standards for application-oriented colleges/universities, guide them to adjust the setup of specialties and allocation of resources actively oriented by the market and conduct the 3rd party, especially the demand side, evaluation for talent cultivation; improve the national data plat-

form for regular monitoring of quality in higher education and enhance the transparency for students and parents to make the choice.

The new wave of technology revolution has brought about huge impacts on the traditional industries. In the process of economic transformation, new formats and new positions are emerging and the quality and capability of talents needs to be constantly improved to increase the total factor productivity. More attention shall be paid to vocational education and training, including building the continuing education bases for workers by leveraging the teaching resources of higher education and secondary vocational education to improve the employment capabilities, working capacities and career transition capabilities of the workers and help them adapt to the changes of the market and employment conditions in a better manner.

Efforts shall be made to promote the building of learning cities and learning organizations by means of government procurement, fiscal subsidies etc., further advance the development of community education reform, run the open universities in a better manner and focus on improving moral, scientific & cultural and health qualities of all members of the society; implement the *Development Plan for Education for Senior Citizens* (《老年教育发展规划》), expand the supply of education resources to senior citizens and provide an unblocked channel for continuing education and lifelong learning.

3.2 Continue to deepen the commitment to the reform of the medical and healthcare system

Health is the basic requirement of the mass. The medical and healthcare system reform is an important content of deepening the commitment to reform in an all-round way, and it is also a major project for people's wellbeing and a heart-winning project to maintain the health and wellbeing of all people. The new round of healthcare reform was launched in 2009 and the State Council set up a leadership team for the reform composed of 20 ministries and commissions. By constantly upholding the basic concept of regarding the basic medical and healthcare system as the public product for all citizens, the team has issued several major policies and papers in succession, covering multiple aspects of public hospital reform, development of universal medical insurance system and drug supply security etc., and basically set up relatively established system framework.

From 2009 to 2014, the accumulated government expenditures on medical and healthcare system reached RMB 4 trillion, including RMB 1.2 trillion in accumulation from the Central treasury. The deepening of the commitment to the reform of the medical and healthcare system reform gradually shifted from pilot-based exploration and single project breakthrough to promotion of supporting system; a multi-layered medical secu-

rity system with the basic medical security as the principal part was gradually improved, and the security capability and management level was also gradually enhanced. The commitment to the comprehensive reform of medical and healthcare settings at the grassroots level was deepened and the service network in counties and villages was gradually improved. The number of pilot counties/cities for public hospital reform exceeded 1,300.

3.2.1 National medical insurance system has been basically established

(I) The number of population covered by the basic medical insurance for urban employees, basic medical insurance for urban residents and new rural cooperative medical insurance exceeded 1.3 billion with the medical insurance coverage ratio stabilized above 95%. The standard of financial subsidy for basic medical insurance for urban residents was increased from RMB 80 per capita in 2008 to RMB 380 per capita in 2015. In 2014, the payout ratios for hospitalization expenses within the scope of policies for basic medical insurance for urban employees, the basic medical insurance for urban residents and new rural cooperative medical insurance were 80%, 70% and 75% respectively, showing a significant increase compared to figures before the reform.

(II) Critical illness insurance for urban and rural residents were implemented in full scale and the actual payout ratio for eligible medical expenses out of the patients' pocket after basic medical insurance payment was no less than 50%. Medical assistance system was further improved and medical assistance for major/critical diseases was carried out. Supplementary medical insurance for employees, e.g. subsidy for large-sum medical bills of employees etc., was generally implemented. The mechanism of inter-linkage among basic medical insurance, critical illness insurance, disease emergency rescue, and medical assistance etc. basically took shape.

(III) The management of fund budget was strengthened. Urban and rural integration for basic medical insurance was actively promoted, while basic medical insurance for urban residents mostly realized pooling arrangement at municipal level. Urban medical insurance of 29 provinces and 90% of new rural cooperative pooling areas realized inter-city settlement for medical expenses within the provinces. Support was provided to accelerate the development of commercial health insurance, with the aim to satisfy the people's diversified and multi-layered requirements for health security.

3.2.2 Equalization of public health services has been gradually improved

(I) The standard of government subsidies to basic public health service for urban and rural residents has been increased from RMB 15 per capita in 2009 to RMB 40 per capita in 2015. Measured by village (town), the rate of vaccination in the Im-

mune Programming for children of appropriate age maintained at 90%. The number of the patients with hypertension and diabetes under standardized management were respectively 86.27 million and 24.19 million and the proportion of the registered patients with severe mental disorders under standardized management was up to 73%. Seven types of major public health service projects were implemented, and intervention & treatment or subsidies were provided for free to major diseases of poor cataract patients and the elderly. The hospitalized delivery rate for pregnant women in rural areas reached 99% and the comprehensive intervention services for preventing AIDS, syphilis and mother-to-child transmission of Hepatitis B were provided for free. Major public health service projects have covered nearly 200 million people in total.

(II) 1,644 tertiary hospitals have entered into a partner assistance relationship with 3,849 county-level hospitals in China. More than 2,000 medical institutions carried out the remote medical services. Physicians are encouraged to engage in multi-site practice in the grassroots, or the remote areas and other areas with severe scarcity of medical resources and nearly 170,000 doctors from the urban hospitals have become practitioners of the county/village medical institutions. 24 provinces have issued the pilot and implementation plan of the hierarchical diagnosis and treatment system for pilot cities for province-level or public hospital reform and the proportion of counties (cities, districts) carrying out the first diagnosis responsibility system at the grassroots level exceeded 50%.

3.2.3 Medical and health service capability has been continuously improved

(I) Great efforts were made to build medical and healthcare institutions at the grassroots level to basically realize the goal that each village has at least one clinic, each township has at least one health center and each county has qualified county hospitals, with the primary medical and health service system covering urban and rural areas basically built. 80% residents may arrive at the nearest medical station within 15 minutes.

(II) The medical professional cultivation system composed of college/university education, post-graduate education and continuing education has been gradually established. More than 120,000 resident doctors received standardized trainings; the pilot projects for special position plans of general practitioners were launched and 173,000 general practitioners were developed in multiple ways; 21,000 medical students were enrolled from the rural areas free of tuitions with designated working sites after graduation; the medical and healthcare team in the grassroots, especially the rural area, was significantly improved and the building of medical team in villages was further strengthened.

(III) Through deepening the commitment to the medical and healthcare system reform, total medical and healthcare re-

sources have continued to increase and the service capabilities have been significantly improved. The health level of the mass was greatly improved with the average life expectancy reaching 76.34 years old; the maternal mortality rate dropped from 34.2/100,000 (pregnant women) in 2008 to 21.7/100,000 in 2014; and the infant mortality rate declined from 14.9‰ in 2008 to 8.9‰ in 2014. China has realized the plan for medical and healthcare system reform and the United Nations Millennium Development Goals ahead of time and generally reached the level of middle to upper income countries.

3.2.4 Medical and healthcare system reform has been further promoted

Along with the aging of population, the accelerated promotion of new-type urbanization, co-existence of threats from multiple diseases and intertwining of various health influence factors in China, the New Normal has put forward higher requirements on the reform and development of medical and health service. Therefore, China must learn from the useful experience and practices from medical and healthcare system reforms both home and abroad, adhere to the concepts of regarding the basic medical and healthcare system as the public product to provide to all people and promote the building of a well-established ba-

sic medical and healthcare system.

(I) Efforts shall be made to further promote the reform of mechanism and system, speed up to develop the modernized hospital management system, consolidate & improve the comprehensive reform of county-level public hospitals and expand & deepen the commitment to the pilot programs for comprehensive reform of urban public hospitals; include more provinces in the scope of pilot programs for comprehensive medical and healthcare system reform to realize the regional promotion as a whole; implement the system of standardized trainings for resident doctors in full scale and further strengthen the team building for general practitioners and rural doctors.

(II) Efforts shall be made to improve the mechanism for sustainable financing and reimbursement ratio adjustment of the medical insurance; promote the critical illness insurance in full scale; speed up to integrate the basic medical insurance system for urban and rural residents to realize the consolidation in 6 dimensions of coverage scope, financing policy, guaranteed treatment, National Drug Reimbursement List, designated institutions management and fund management; improve the medical security system for major and critical diseases and enhance the



Figure 3-8 TCM physician Liu Miaomiao teaches residents the massage and tuina techniques for curing children's fever, diarrhea and constipation (Photo by Bao Kangxuan)



Figure 3-9 Physician's from Jinzhou Oral Cavity Hospital, Liaoning Province examines dental health for left-behind children in the rural area (Photo by Gu Jin)

backing guarantee capability of the medical assistance.

(III) In accordance with the requirements of “first diagnosis by the grassroots institutions, two-way referral of patients, separate treatment of acute and chronic diseases and linkage among all institutions”, efforts shall be made to focus on provinces carrying out the pilot programs on comprehensive medical and health-care system reform and cities carrying out the pilot programs on public hospital reform, expand the scope of pilot programs for contracted service of general practitioners, and further improve service capabilities of the grassroots; improve the supporting policies e.g. medical insurance, price etc. and propel & improve the hierarchical diagnosis and treatment service system.

(IV) Efforts shall be made to further strengthen efforts in public health and major disease control & prevention, improve strategies for major disease control & prevention, continue to implement major public health service projects, promote the patriotic public health campaign and the building of healthy cities, advocate the healthy and civilized lifestyle and improve the national healthy quality.

3.3 Put the *Law on Protection of the Rights and Interests of the Elderly* in full operation

China has entered the aging society since 1999. By the end of 2015, the number of persons aged over 60 reached 222 million, accounting for 16.1% of China's total population; among them, the number of persons aged over 65 was 144 million, accounting for 10.5% of China's total population. It is expected that by 2020, the aging population in China will reach 243 million. In the development process of rapid aging, the number of families with fewer or no offspring is increasing sharply and the phenomenon like “empty nest”, disability, senility, poverty etc. are intertwined with various aging problems presented in parallel in short the term, which has brought about severe challenges to the economic and social development.



Figure 3-10 Several left-behind children raise the *Safety Education Manual for Left-behind Children* in their hands (Photo by Meng Zengshi)

3.3.1 Results achieved from implementing the *Law on Protection of the Rights and Interests of the Elderly*

(I) The newly revised *Law on Protection of the Rights and Interests of the Elderly* (《老年人权益保障法》) took effect since July 1, 2013. *The Several Opinions on Speeding up to Develop Elderly Care Industry* (《关于加快发展养老服务业的若干意见》) released in 2013, *The Opinions on Establishing Unified Basic Endowment Insurance System for Urban and Rural Residents* (《关于建立统一的城乡居民基本养老保险制度的意见》) released in 2014 and *The Guiding Opinions on Propelling the Combination of Health Care and Elderly Service* (《关于推进医疗卫生与养老服务相结合的指导意见》) released in 2015 respectively by the State Council have provided the clear direction for innovating the systems and mechanisms and propelling the combination of health care and elderly service.

(II) Governments at all levels have included the aging issue into the National Economic and Social Development Plan and annual plans. The average level of basic pension funds for enterprise employees reached RMB 2,200/month and the minimum standard for basic pension in basic endowment insurance for urban and rural residents was RMB 70/person/month in 2015. Given the characteristics of the elderly, many local governments have included outpatient medical expenses for some chronic diseases with long spell of illness and high treatment costs into the payment scope of the pooling funds, so as to alleviate the medical cost burden for the elderly. Some regions have also actively explored to address the needs of the patients with senile diseases for home care within the scope of basic medical insurance system. They have included the elderly with “no working ability, no source of income and no supporters” in cities to be supported by urban social welfare institutions and arranged the elderly enjoying the “five guarantees” in rural areas to be supported centrally or separately in institutions like rural nursing homes. The policy of “classified living allowance” has been adopted for the elderly in difficulties across

China, with the standard of assistance improved for the elderly included in the scope of assistance. The medical assistance system for major and critical diseases has been implemented to include the elderly from the low-income family into the scope of assistance. The accident insurance system for the elderly and the assistance system for the elderly from families in special hardships due to the family planning have generally been rolled out in China. All provinces have issued the social privilege policies for the elderly, which provides preferential treatment to the elderly in transportation, medical & health service, culture, sports and leisure, legal rights protection etc.

(III) By the end of 2015, there have been a total of 115,000 elderly care institutions and facilities in China and home-based elderly care facilities have basically covered all communities in urban areas and more than 50% communities in rural areas. The number of beds in elderly care institutions across China reached 6.717 million and the number of beds per thousand old people was 30.3. The state has launched the pilot programs for comprehensive reform of the elderly care industry in 42 areas including Shanghai Pudong New Area and made certain achievements, which have driven the establishment and development of the elderly care industry in surrounding areas. Most parts of the country have included community-based elderly care facilities into the planning for construction of community supporting facilities in urban and rural areas, requiring the newly built residential quarters to generally plan and construct the elderly care facilities and solve the issues of inadequacy of elderly care facilities in old neighborhood by means of acquisition, replacement, rental etc. Governments at all levels have enhanced their support for subsidies to community-based elderly care and supported the development of home-based elderly care in way of acquiring the services. They have also promoted the reform of public elderly care institutions, focusing on providing centralized residential and care services to the elderly in extreme poverty in urban areas, the elderly enjoying the “five guarantees” in rural areas and the disabled elderly from the households receiving subsistence allowances in urban and rural areas; brought into play the function of market mechanism, and encouraged social investment in setting up various kinds of elderly care institutions to satisfy different requirements of the elderly; promoted the integrated development of medical and health service and the elderly care, prioritized the development of care-based and medical-based elderly care institutions and continuously improved the ratio of beds per thousand old people in these institutions. All regions have innovated service supply models and encouraged the private capital to participate in the construction and operation by liberalizing the market access and leveraging the supporting role of land use, finance, taxation and talents policies.

(IV) By the end of 2015, there have been 76,300 schools for the elderly across China; 180 national-level and more than 500 province-level experimental and demonstration areas for community education have been built, where more than 60%

of the elderly have participated in the community education; there have been 24 types of newspapers and 24 types of journals for the elderly. Various kinds of digital cultural resources suitable for the elderly have been provided through multiple channels, e.g. the National Cultural Information Resources Sharing Project, National Digital Culture Network, “China Culture Network TV” etc. 490,000 associations of the elderly have been set up in urban and rural communities across China and the coverage ratio has reached 74%. The associations of the elderly have played an active role in supervising the implementation of the elderly care policies, participating in home-based elderly care work, undertaking the governments’ acquisition services, carrying out culture, sports and entertainment activities, reflecting the appeals of the elderly in accordance with the law and maintaining the interests of the elderly. Towns, sub-districts, communities and villages have been leveraged to carry out volunteer services in various forms, e.g. maintaining the security order, mediating the neighborhood disputes, improving the public sanitation, and conserving the ecological environment and so on. A vast number of the old people have been encouraged to actively participate in the activities of caring for the next generation, grassroots social affairs management, public welfare, technological guidance and consulting service etc., as well as join the economic and social development.

3.3.2 Major issues and difficulties in implementing the *Law on Protection of the Rights and Interests of the Elderly*

(I) Some leaders and officials are lack of strategic thoughts on the aging issues; the grassroots forces are weak and the working mechanism doesn’t run smoothly; and national supporting policies on land use, financing, subsidies, governments’ acquisition of services for the elderly care cannot be put into place effectively in many areas.

(II) There are still many issues with the basic medical security system, e.g. lower pooling level, difficulties in inter-province settlement of medical expenses, limits on reimbursement for critical illness and hardship of community health services to meet the needs of the elderly for medical services. In addition, issues like “difficult and expensive medical care” for the elderly people are still left unsolved. The long-term care insurance just gets started, and the special care for the disabled elderly, the elderly living alone and the people in advanced age is in severe shortage.

(III) Community-based elderly care facilities are insufficient in majorities of urban and rural communities. The comprehensive utilization rate of medical, cultural, sports and other service facilities is low. Coverage and target audience of the service is limited, the content of service is homogeneous and social & professional level is not high. Most old people living at home cannot have easy access to convenient and diversified community services nearby. Layouts and structures of the elderly



Figure 3-11 10 centenarians attend the awarding ceremony of World Home of Longevity held in Xinglong Tropical Garden (Photo by Luo Yunfei)

care institutions are not well designed and the phenomenon of “severe difficulty in securing a bed” in the urban nursing homes but a lot of vacancies in rural elderly care homes can be generally seen. Care-based institutions and those combining medical and nursing care for the disabled elderly, the people in advanced age and the elderly in extreme poverty are in critical shortage. The elderly care level in rural areas is significantly lower than that in urban areas, and issues with the rural elderly care are also more prominent. Along with the acceleration of urbanization process, the issue of “empty-nest family” will intensify and most rural elderly will generally lack proper service, care and medical service.

(IV) Compared to the public elderly care institutions, in terms of land use, financing, recruiting, government subsidies etc., there are no unified, fair and equitable policies and social environment for fair competition for the private capital to enter the elderly care industry and the preferential policies for the elderly care institutions prescribed by the State can hardly be implemented. Relevant governmental organs fail to provide active policy guidance and supporting services for the social forces to participate in the elderly care in terms of market access, service standards, pricing mechanism etc., which may affect the enthusiasm of social forces to engage in the development of the elderly care industry. The elderly care involves the knowledge from multiple disciplines, e.g. medical, recovery, nursing, psychology etc., while the training of nursing professionals falls behind significantly and the growth of social organizations to serve for the elderly is very slow.

3.3.3 Comprehensive implementation of the *Law on Protection of the Rights and Interests of the Elderly* in a further step

(I) Efforts shall be made to enhance education on all people to respond to the issue of aging population and promote the social conduct of respecting, supporting and helping the elderly; set up more equitable and sustainable social security system; implement the program of “full insurance coverage of all



Figure 3-12 Senior citizens entertain themselves in a park of Shanghai (Photo by Zhou Dongchao)

people” ; improve the personal account system for endowment insurance for urban employees; refine the incentive mechanism of “more contribution, more gain” ; establish the normal adjustment mechanism for basic pension fund and promote national pooling of basic pension fund; develop occupational annuity, enterprise annuity and commercial endowment insurance and enact the policy of gradually delaying the retirement age; arrange the assistance system as a whole, promote system integration and secure the basic living of the elderly in difficulties; actively explore the establishment of long-term care insurance system; proactively study to develop and modify laws and regulations related to response to the aging population and development of the elderly care and promote the development of the elderly care industry in China by starting from the rule of law thought and market mechanism.

(II) In the process of new rural development and urbanization, efforts shall be made to plan the elderly care facilities in rural areas in a scientific and reasonable manner, accelerate the reform of rural elderly care institutions, newly build, rebuild and expand the supporting institutions with reasonable size, practical function and complete facilities for the elderly enjoying the “five guarantees” in rural areas and prioritize the service offering to the elderly in special difficulties, e.g. “empty nest” , disability, senility and poverty etc.; encourage the urban elderly care institutions to set up partner assistance and coordination mechanism with the rural elderly care institutions; and include the long-term guarantee mechanism for the elderly care in rural areas into activities like rural land expropriation, housing site reform etc. as a whole.

(III) Efforts shall be made to set up equal, fair and well-regulated market access mechanism for the elderly care industry, agglomerate private capital and drive the social forces to become the fresh recruits for the elderly care. Governments at all levels shall make efforts to solve the conflicts between government dominance and market-oriented requirements in resource allocation, focus on solving the issues of private-owned elderly care institutions in planning, land use, finance etc. and fully

mobilize the social forces to participate in the elderly care. Efforts shall also be made to adapt to the development requirements of the socialist market economy, actively invigorate the elderly care industry by means of diversified fund investment and operation models, e.g. public built but private-operated, private owned under public support, government subsidies, acquisition of service, equity partnership etc. and support various kinds of market players to increase the supply of elderly care and product offerings.

(IV) Efforts shall be made to respond to the aging population actively, i.e. both provide various types of services to the elderly and bring into full play the role of the elderly, and make them become an important part in the economic and social development; actively organize the healthy elderly to be re-employed and participate in various kinds of volunteer services after retirement, and continuously explore the new model of “supplying the healthy retirees with appropriate jobs” ; strengthen the professional training for the existing practitioners of elderly care, include them into the minimum wage guarantee mechanism, gradually improve their wage level and secure that they may enjoy various social security arrangement by law.

3.4 Accelerate to build the public culture service system

3.4.1 Basic conditions for the public culture service system development in China

The development of the public culture service system is the major route to satisfy the basic spiritual and cultural demands of the mass, which is also a basic project to build the socialist cultural “heavy weight” and the major component of building a well-off society in an all-round way. At the beginning of 2015, the General Office of the CPC Central Committee and the General Office of the State Council issued *The Opinions on Speeding up to Build the Modern Public Culture Service System* (《关于加快构建现代公共文化服务体系的意见》) and the *National Guidelines for Basic Public Culture Service* (《国家基本公共文化服务指导标准》), presenting an overall arrangement on building the modern public culture service system.

(I) The state has promoted the development of basic public culture facilities and network in urban and rural areas in an overall manner. Since 2001, it has invested more than RMB 4 billion in funding local governments to build 1,086 county-level libraries and cultural centers and 24,200 comprehensive cultural stations in towns, basically realizing the goal for “each county has at least one library/cultural center and each village has at least one cultural station” . Since 2012, the state has invested RMB 1.6 billion to support construction, rebuilding and expansion of 214 public libraries, museums and cultural centers in prefecture-level cities. It has also invested RMB 1.7 billion to subsidize the infrastructure construction for 1,229 high-mountain backbone

broadcast wireless transmitting stations in remote rural areas. By the end of 2015, a total of 3,139 public libraries, 3,315 cultural centers, 40,976 cultural stations, 4,692 museums, 409 science and technology museums and over 3,000 youth extracurricular activity centers have been built in China. By the end of 2014, there were a total of 2,564 radio and television broadcasting agencies and more than 21,000 radio and television transmitting stations. Additionally, there were more than 120,000 publication distribution units, over 170,000 distribution outlets, more than 72,000 newspaper reading boards and screens, and over 420,000 sport and fitness projects for peasants. 601,000 rural bookstores were built with 16,000 satellite digital bookstores for the remote areas. 2,780 public museums, 347 demonstration bases for patriotism education and 43,510 public libraries, art galleries and cultural centers (stations) were open to the public for free with significant increase of visitor traffic.

(II) The project of “radio and television coverage to every village” has been promoted smoothly. By the end of 2014, the comprehensive coverage rates of radio and TV programs reached 97.99% and 98.6% respectively, the number of mobile multimedia broadcasting television users reached 45 million (households) and the number of digital TV users was close to 190 million (households). The national cultural information resource sharing project built 35,500 town (sub-district) grassroots service stations and 700,000 village (community) grassroots service stations, basically covering all towns and administrative villages. The rural movie projection program built up 252 digital cinemas and a total of 50,000 projection teams projected more than 8 million movies a year with the audience exceeding 1.5 billion person-times. There were more than 7,200 digital screens in county-level cities across China and there were 10 provinces (regions, municipalities) realizing the full coverage of digital cinemas for all counties.

(III) In 2015, the number of Internet users in China reached 688 million and the penetration rate of Internet reached 50.3%. The number of fixed broadband users reached 210 million (households), the number of Internet broadband access ports was 470 million and the optical fiber covered more than 446 million households.

(IV) A series of private-run amateur art teams, cultural yards and cultural clubs have emerged across the country. By the end of 2013, there were 282,000 amateur art teams guided by the cultural centers (stations). Cultural volunteer service system was improved and cultural volunteer team was expanded. By the end of 2014, there were 6,337 county-level or above cultural volunteer service organizations, 910,000 cultural volunteers and 1.74 million social and sports coaches registered on file, basically forming a grassroots team for cultural work composed of both full-time and part-time members.

(V) The Silk Road, the Grand Canal and Tusi heritage have been included in the “World Heritage List” in succession, so



Figure 3-13 Over 500 aunties dance rhythmically to the new hit song *CITIC Red - Red Across China* on Binjiang Square, Wuyi County, Zhejiang Province (Photo by Zhang Jiancheng)

there are a total of 48 world heritage sites across China, ranking No. 2 in the world. 38 intangible cultural heritage items have been included in the UNESCO Intangible Cultural Heritage List, ranking top in the world. 1,372 representative projects for national-level intangible cultural heritage have been approved and confirmed in four batches and 1,986 national-level representative inheritors have been identified. A total of 100 demonstration bases for intangible cultural heritage productive protection have been named in two batches and 18 experimental zones for national-level cultural ecological protection have been established. “Project Spring” (Along the Frontier Activity for National Cultural Volunteers) has been organized to carry out more than 500 cultural volunteer service projects, serving for nearly 2 million people. Construction of “10,000 Li Digital Cultural Corridor along the Frontier (边疆万里数字文化长廊)” has been carried out, with 810 village service stations and 3,104 digital cultural posts in 10 provinces built along the frontier.

3.4.2 Existing problems in the development of public culture service system

(I) Though China’s public cultural facilities have basically realized “a full set-up” by administrative level, there are still blank spots in rural areas at the grassroots level, especially in the rural-urban fringe zones, the poor areas, ethnic areas and

frontier areas. Due to the low cardinal number for government expenditures on cultural promotion, there is still a large gap between the growth of fiscal inputs and the demands of cultural development. In 2014, the expenditure on culture, sports and media was RMB 268.3 billion, accounting for 1.77% of total national fiscal expenditure. Per capita expenditure on culture, sports and media was RMB 206 in China.

(II) Issues about less diversified and low-quality public culture products can be commonly seen, while the contents of some Internet websites are overly entertainment and vulgarization oriented. Some non-profit cultural units are less energetic and inefficient. In some places, the issue of “prioritizing facilities building over management and usage” can be found and some public culture & sports facilities are left unused.

(III) In 2013, among 2,712 county-level public libraries in China, there were 580 libraries without funds for purchasing books, accounting for 21.4%. By region, the central and western regions were far behind the eastern region. By demographics, the public culture and sports resources for the elderly, the pupils, the disabled, the migrant workers and the people in frontier and ethnic areas were generally fewer and the policy requirements for including the migrant workers into the urban public culture service system were not put into place in many locations.

3.4.3 Thoughts on improving the development of public culture service system

(I) Efforts shall be made to make overall planning and reasonable layout, strive to improve the grassroots facilities network that is dominated by the public libraries, cultural centers, radio & television broadcasting agencies, radio & TV transmitting (monitoring) stations, town-level comprehensive cultural stations, and village (community) comprehensive culture service centers and supplemented by the mobile and digital cultural facilities; leverage existing urban and rural public facilities, and make an overall arrangement for building the grassroots public culture service centers that integrate the functions of culture publicity, education of Party members, popularization of science & technology, legal education, sports & fitness into a whole and build the space for culture and sports activities as supporting facilities.

(II) Efforts shall be made to combine with local people's requirements, fiscal capacity and cultural features, develop the specific local implementation standards as soon as possible and promote the implementation county by county; promote the integration of cultural development in both urban and rural areas, allocate public culture resources between urban and rural areas in a balanced manner and realize the urban-rural resources integration and connectivity; enhance the efforts to support public culture service to the migrant workers; combine the public culture development in poor areas and poverty alleviation and development of the concentrated and contiguous areas with urbanization and new rural development, and speed up the establishment of the public culture service system in poor areas.

(III) Efforts shall be made to promote the development of coordination mechanism for the public culture service system, make an overall planning, integrate resources, engage in co-construction and sharing and realize the integrated development; build and improve the legal-person governance structure for non-profit public culture institutions and improve the decision-making, execution and monitoring mechanism; promote the participative management model for public culture service at the grassroots level and improve the mechanism for expression and monitoring of public opinions.

3.5 Recommendations from experts: Jointly step into an all-round well-off society

It is the first step to build a well-off society in an all-round way by 2020 towards achieving the "Two Centenary Goals". China's development shall start from solving the most direct and most realistic interest issues that the people are most concerned about, enhance the responsibilities of the government and improve the co-construction capability and sharing level for the public service; focus on improving the people's welfare, adhere to the requirements of "everyone participates in it, everyone dedicates to it and everyone shares it", stick to the

bottom line, highlight the priorities, improve the system, guide the expectations, focus on opportunity equality, safeguard the basic livelihood of the people and realize the goal of all people entering the well-off society together.

3.5.1 Promote employment and entrepreneurship

Efforts shall be made to stick to the strategy of prioritizing job creation, implement more proactive employment policies, create more jobs and make efforts to solve the structural employment contradiction; improve the entrepreneurship supporting policy, encourage entrepreneurship-driven employment and build the entrepreneurship service platform open to everyone.

Efforts shall be made to make an overall arrangement for the human resources market, break through the urban-rural, regional and industry fragmentation as well as status and gender discrimination, and maintain the workers' equal rights to employment; reinforce the support for flexible employment and new employment patterns and promote self-employment of workers; implement the employment promotion and entrepreneurship guiding program for university graduates and lead the youth to find a job and start a business; strengthen the employment support and help those having difficulties in finding a job get employed.

3.5.2 Reduce the income gap

Efforts shall be made to insist on the synchronous growth of residents' income and economic growth, increase labor remuneration and productivity in parallel and continuously improve income of urban and rural residents; Adjust the pattern of national income distribution, regulate the primary distribution and reinforce the regulation power of re-distribution.

Efforts shall also be made to implement the policies favorable for reducing the income gap, significantly increase the income of low-income workers and expand the proportion of the middle-income class; speed up the development of personal income tax system that combines the consolidated and classified income taxes and increase the property income of the residents via multiple channels.

Efforts shall be made to support the development of charity cause, and widely mobilize the social forces to carry out social relief and mutual assistance and volunteer service activities. Improve the taxation policies that encourage contribution to the society and provide help or relief to the poor.

3.5.3 Carry out the targeted poverty alleviation project

Efforts shall be made to provide classified support to the poor families and take actions that suit personal and local circumstances to improve the effectiveness of poverty alleviation; for those who have work capacity, support them to develop charac-

teristic industries and transfer their jobs; for those who cannot earn a living in their hometowns, relocate them to other locations to alleviate poverty; for those living in areas where the ecology is especially important and fragile, implement poverty alleviation measures that protect the ecology; for those losing the work capacity, carry out the minimum guarantee policy; for those becoming poor due to illness, offer the guarantee of medical assistance; take targeted measures to help people lift themselves out of poverty, implement connection of the minimum guarantee policy and poverty alleviation policy and cover the poor people ought to be insured under the social insurance.

Efforts shall be made to expand the coverage of infrastructure in poor areas and solve the issues of roads, water and power supply and Internet access based on local conditions; improve the quality of basic education and medical service level in poor areas and promote equalization of basic public services in those areas; build and improve the caring system for the “left-behind” children, women and the elderly in rural areas.

Efforts shall be made to improve the assistance and supporting system for people in extreme poverty, strengthen the responsibility of the government in minimum guarantee and provide guarantees to urban and rural residents in extreme poverty for basic living, caring, disease treatment, funeral services etc.; consolidate the guarantee system for people “with no source of income, no work capacity and no legal supporters” into the

supporting system for people in extreme poverty and save and support those who ought to be saved and supported.

3.5.4 Promote the coordinated development of urban and rural areas

Efforts shall be made to promote human-centric new-type urbanization. Stick to the principle of “industry nurturing agriculture and cities supporting countryside”, improve the integrated development system and mechanism for urban and rural areas, and propel the exchange of factors on an equal basis, balanced allocation and equalization of basic public services between urban and rural areas.

Efforts shall be made to facilitate rural migrant workers who are able to work and live in urban areas to be provided with urban residency together with their family members, and enable them to enjoy the same rights and obligations as the urban residents; improve the long-lasting mechanism for investment in rural infrastructure, put the priorities of the socialist development on the rural areas and cities accommodating a lot of migrant workers and promote the extension of urban public service to the rural areas, improve the level of socialist new rural development, carry out residential environment improvement actions in rural areas, enhance the efforts to protect folk houses in traditional villages and major historic towns/villages and build a beautiful and livable countryside.

Special column 3-1 Example for targeted poverty alleviation: The story of poverty alleviation in Shibadong Village

Shibadong Village, located in Paibi Town, Huayuan County in the deep Wuling Mountain of Xiangxi, Hunan Province, is a typical Hmong village. As the distance is far and the mountains are high, the poverty issue in the closed-up and lagging behind Shibadong Village was well-known in the past. By the end of 2013, there were a total of 136 poor households and 542 poor residents in the village and the per capita annual income was only RMB 1668. On November 3, 2013, General Secretary Xi Jinping visited Shibadong Village and put forward the important thought of “taking targeted measures to help people lift themselves out of poverty”. Afterwards, Huayuan County organized a poverty alleviation team composed of 6 members to be stationed in the village and actively explored the “replicable, scalable” new model of targeted poverty alleviation, for which they would identify the roots of poverty, take targeted poverty alleviation measures to solve the root causes and truly mobilize the spirits of all people to shake off poverty and build a well-off society. The per capita net income across the village reached RMB 2,518 in 2014, increasing by 50% compared to the previous. For the original 542 poor residents in the village, more than 210 of them have put an end to poverty by the end of 2015.



New Governance Practice in China: Story of Poverty Alleviation in Shibadong Village

Identify the “root causes”, mobilize the spirit before helping with poverty alleviation

(Reference: Yan Ke, “Story of Poverty Reduction in Shibadong Village, *Xinxiang Review*, First Edition 2016)



江苏省交通工程集团有限公司

本工安全操作规程
起重机械安全操作规程
电气安全操作规程
主要禁令

Hai'an, Jiangsu Province: efforts made to strengthen the weak links in transport infrastructure (Photo by Gu Huaxia)



4

Urban Infrastructure

Urban water system / **68**

Urban energy system / **72**

Development of urban transport system / **75**

China practice: Sponge City development / **80**

China practice: the utility tunnel / **84**

Urban infrastructure is the material base for a city to operate normally and develop healthily, and plays an important role in improving the living environment, enhancing the comprehensive urban bearing capacity, improving the urban operation efficiency, steadily promoting the new-type urbanization and ensuring the building of a well-off society in an all-round way by 2020. In recent years, the Chinese government has issued a series of documents to strengthen the urban infrastructure construction and is now organizing to develop the 13th Five-Year Plan for National Municipal Infrastructure Construction (《全国城市市政基础设施建设“十三五”规划》), which will promote the urban infrastructure construction towards safe, intensive, smart, green and low-carbon development and greatly improve the operation, management and service level of infrastructure.

4.1 Urban water system

During the 12th Five-Year Plan period, the development and management of China’s urban water system, including urban water supply, drainage and flood control and sewage treatment, has made great progress. However, it is still faced with three prominent issues: firstly, risks that urban drinking water source confronts become increasingly diversified, the water supply facilities are backward and the water purification process doesn’t match with the source water quality, so that it’s difficult to effectively guarantee that “tap water” for urban residents can be up to the standard sustainably and steadily; secondly, the sewage collection rate is too low and issues like overflow pollution in combined sewer system and surface pollution etc. are still the major factors that influence the quality of water environment in cities; thirdly, the phenomenon of “waterlogging” can still be commonly seen in cities and there is still a long way to go for cities in their efforts for drainage and flood control. During the 13th Five-year Plan period, the Chinese government will further emphasize the problem and target orientation, and transform the development concept of urban water system, improve the management level and secure its safe and stable operation by strengthening the development of urban water system.

4.1.1 The capability to secure urban water supply is continuously improved

(I) The service level of urban public water supply is significantly improved

Efforts have been made to realize the strategic transformation of urban water supply from mainly satisfying the needs for water volume to dual emphasis on guarantee of both volume and quality and promote the construction and rebuilding of urban water supply facilities, by centering on protecting the drinking water safety and targeting at the prominent shortcomings in urban water supply. By the end of 2015, the comprehensive water supply

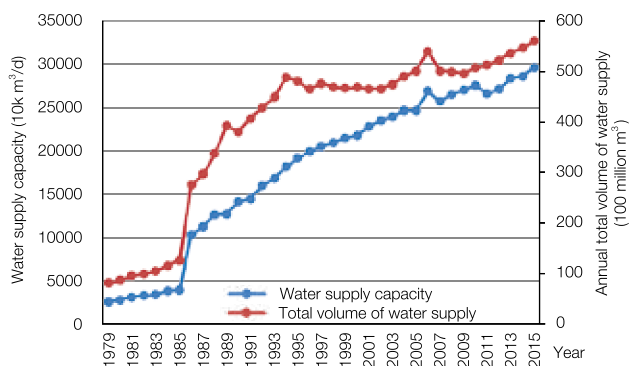


Figure 4-1 Changes of capacity and total volume of water supply in Chinese cities (1979-2015)

capacity of all Chinese cities were 296,782,600 m³/day with the annual total volume of water supply of 56.05 billion m³ and 451 million people with access to tap water. The scope of urban public water supply service continues to expand and the public water supply coverage has increased to 93.1%. Compared to the end of the 11th Five-year Plan period, newly added capacity for urban water plants in China reached 20,768,000 m³/day and the capacity of water plants completing the rebuilding was 29,100,000 m³/day; the total length of newly constructed water pipeline was 177,000 km and that of the rebuilt pipeline was 70,000 km.

(II) The water quality monitoring system for urban water supply is increasingly improved

By the end of 2015, the water quality monitoring network for China’s urban water supply has included one national water quality monitoring center, 43 national monitoring stations and nearly 200 local monitoring stations, covering 30 provinces, autonomous regions and municipalities directly under the central government, so the national water supply and drainage monitoring system with “two levels of networks (national and local monitoring networks) and three levels of monitoring centers/stations (central station at Ministry of Construction level, monitoring stations at capital/large city level and monitoring stations at local level” as the core has been gradually improved. From 2013 to 2015, the water quality supervision and inspection covered more than 1,400 counties in 30 provinces, autonomous regions and municipalities directly under the central government, including full coverage in 26 provincial-level administrative regions and partial coverage in 4 provincial-level administrative regions. The number of counties under supervision accounted for over 80% of China’s total counties. The continuous deployment of nationwide water quality supervision and inspection has effectively promoted the regulation on the safety of water quality and provided the important rationale for competent urban water supply authorities to reinforce industry guidance, develop and implement relevant plans and guide the healthy development of the industry.

(III) State-level planning and guiding is reinforced

As required by the *Action Plan for Water Pollution Prevention and Control* (《水污染防治行动计划》) released by the State Council in April 2015, the water supply network in use for over 50 years and made of backward materials shall be upgraded and rebuilt, and by 2017, the leakage rate of national public water supply network will be controlled within 12%; and by 2020, it shall be controlled below 10%. Currently, the Ministry of Housing and Urban-Rural Development is formulating the *13th Five-year Plan for Rebuilding and Construction of National Urban Water Supply Facilities* (《全国城镇供水设施改造与建设“十三五”规划》), which will further define the major tasks to protect the safety of urban water supply across China during the 13th Five-year Plan period, including the construction and rebuilding of the water plants and networks, the rebuilding of secondary water supply, improvement of the monitoring system and enhancement of emergency response capabilities, and the total investment is expected to reach RMB 420 billion.

4.1.2 Pressure on the urban water environment continues to rise

(I) Quality of the water environment generally becomes better, but the pressure is rising

According to 2015 China Environment Condition Communiqué (《2015年中国环境状况公报》), 972 surface water monitoring

sections (sites) in China's 423 major rivers and 62 key lakes (reservoirs) carried out water quality monitoring in 2015, and the ratios of sections falling into Class I, II, III, IV, V and below V based on division of water quality were 2.8%, 31.4%, 30.3%, 21.1%, 5.6% and 8.8% respectively, with chemical oxygen demand (COD), biochemical oxygen demand for five days (BOD 5) and Total Phosphorus (TP) as major pollution indicators. Among the 61 lakes (reservoirs) under nutritional status monitoring, 6 lakes were oligotrophic, 41 were mesotrophic, 12 were slight eutrophic and 2 were medium eutrophic. 202 prefecture-level or above cities carried out water quality monitoring for the underground water and total number of monitoring sites were 5,118, including 1,000 national-level monitoring sites. The ratios of monitoring sites reaching excellent, good, fair, bad and very bad levels were 9.1%, 25.0%, 4.6%, 42.5% and 18.8% respectively.

(II) Capacity of sewage collection and treatment facilities grows rapidly

China's sewage treatment capacity reached 140 million m³/day in 2015, and the annual sewage treatment volume reached 41.05 billion m³ with the sewage treatment rate up to 91.9%, increasing by 9.6 percentage points compared to 2010. Urban drainage pipeline construction grows significantly: the total length of drainage pipeline reached 540,000 km in 2015, increasing by 46% compared to 2010. The reclaimed water treatment capacity reached 20,653,000 m³/day and the usage of reclaimed water was 3.63 billion m³.

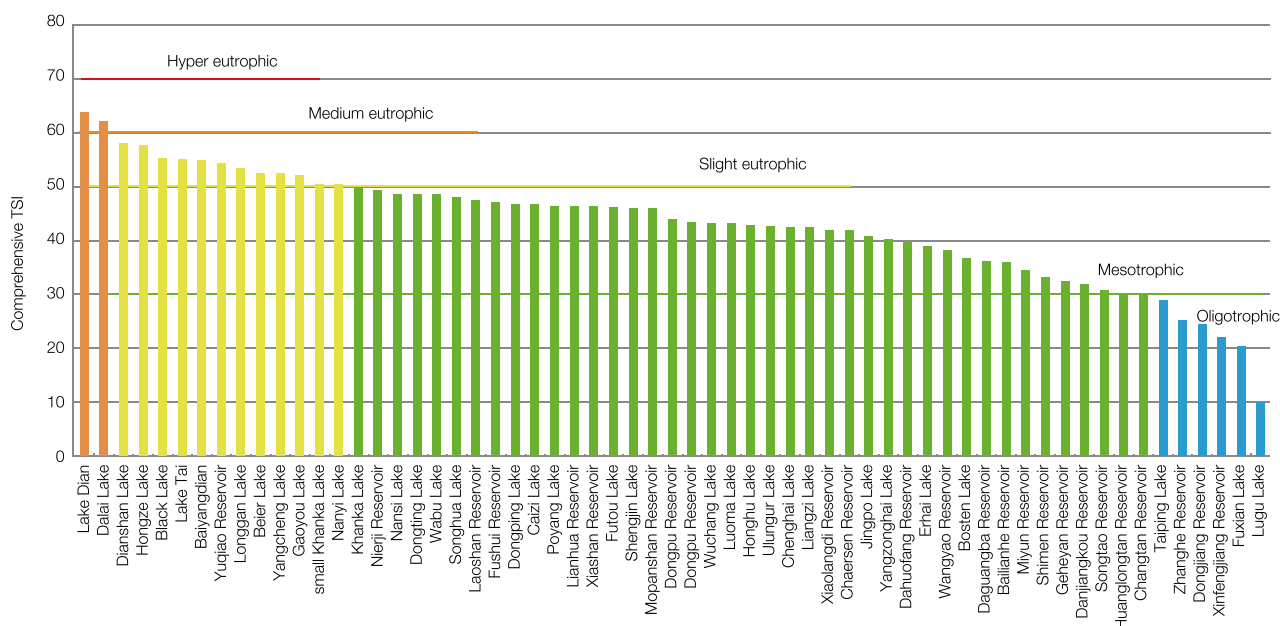


Figure 4-2 Comprehensive trophic status index (TSI) for key lakes (reservoirs) in 2015

(Source: 2015 China Environment Condition Communiqué)



Figure 4-3 State of water quality in Seven Major River Basins and rivers in Zhejiang-Fujian regions, northwest China and southwest China in 2015

(Source: 2015 China Environment Condition Communiqué)

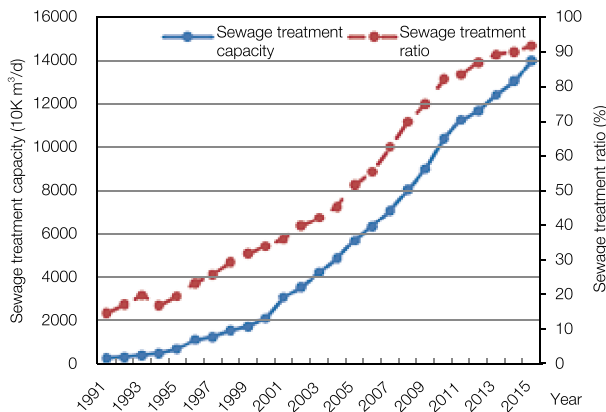


Figure 4-4 Changes of urban sewage treatment capacity and rate in China (1991-2015)

(III) The planning and guiding at national level are strengthened

It was pointed out in the *Outline of the 13th Five-Year Plan for National Economic and Social Development of the People's Republic of China* (《中华人民共和国国民经济和社会发展第十三个五年规划纲要》) released in March 2016 that during the 13th Five-year Plan period, efforts shall be made to speed up the construction and rebuilding of urban sewage treatment facilities and networks, promote the bio-safety disposal of sludge and resource utilization, and realize the comprehensive coverage and stable & compliant operation of urban domestic sewage and refuse disposal facilities with concentrated sewage treatment rates in cities and counties reaching 95% and 85% respectively. Currently, the National Development and Reform Commission is organizing to formulate the *13th Five-Year Plan for Construction of Urban Domestic Sewage Treatment Facilities* (《“十三五”城镇生活污水垃圾处理设施建设规划》), which will further define the tasks for construction and rebuilding of urban sewage treatment facilities, sewage network concentration and rebuilding, sludge treatment and disposal



Figure 4-5 Serious pollution in Yaweixi, Haikou (Photo by Wang Jiazhuo)

etc. during the 13th Five-Year Plan period and the expected investment may reach RMB 790 billion.

4.1.3 Treatment of urban black and odorous water body is fully promoted

(I) Defining the timeline for black and odorous water body treatment

The *Action Plan for Water Pollution Prevention and Control* requires that urban built-up areas in prefecture-level or above cities shall complete the water body screening and announce the name, owner and compliance deadline of black and odorous water body by the end of 2015; realize no large-area floating debris on the river, no garbage on the river bank and no illegal drain outlet by the end of 2017; complete the goal for black and odorous water treatment by the end of 2020. Built-up areas in municipalities directly under the central government, capital cities and cities specially designated in the state plan shall basically eliminate the black and odorous water body by the end of 2017.

(II) Strengthening the guidance on black and odorous water treatment

In August 2015, the Ministry of Housing and Urban-Rural Development and the Ministry of Environmental Protection jointly issued the *Guidelines on Treatment of Urban Black and Odorous Water Body* (《城市黑臭水体整治工作指南》), bringing up the general requirements for definition, identification and classification of urban black and odorous water bodies, development of treatment plan for urban black and odorous water body, the treatment techniques, treatment results evaluation, implementation and policy guarantee for urban black and odorous water body.

(III) Guiding the all-round participation of the public

■ The government Introduced the public participation for iden-

tification of black and odorous water body. It is proposed that the competent authority may entrust the professional organizations to carry out questionnaire survey for community residents, merchants or random population surrounding the urban water body and in principle, the number of valid questionnaires for each water body cannot be less than 100. In case more than 60% respondents identified the “black” or “odorous” issue, it will be defined as “black and odorous water body” .

■ For supervision of black and odorous water body, the remediation and monitoring platform for urban black and odorous water body composed of 3 sub-systems, i.e. information reporting, information release and public participation, has been established and information reporting (<http://wsxm.cin.gov.cn>) and information release (<http://www.hcstzz.com>) websites have been put into operation; the official WeChat account for urban black and odorous water treatment, i.e. “public participation for urban water environment” , has been open to the public.

(IV) Distribution of black and odorous water bodies

Through the preliminary screening of black and odorous water bodies, as of February 16, 2016, among 295 prefecture-level or above cities, 77 of them were found to have no black and odorous water body; among the remaining 218 cities, a total of 1,861 black and odorous water bodies were identified. In terms of geographical distribution, 1,197 of them were in the southern region, accounting for 63.4% and 664 in the northern area, accounting for 35.7%, showing the trend of “more in the south than in the north” . In terms of provincial distribution, 60% of black and odorous water bodies were found in the southeast coastal and economically developed areas, e.g. Guangdong, Anhui, Shandong, Hunan, Hubei, Henan, Jiangsu etc.

4.1.4 Urban drainage and flood control becomes more onerous

By the end of 2014, there were a total of 192,155 km urban stormwater drainage systems and 107,950 km combined sewer

systems (of stormwater and domestic sewage) in 658 Chinese cities, playing an important role in assuring the urban drainage safety. However, affected by global climate changes, extreme weather (e.g. rainstorm) has brought about huge impacts on the social management, municipal operation and production and living of the mass; additionally, due to backward infrastructure development for drainage and flood control and insufficient capability of rainwater regulation and storage in some cities, serious rainstorm and waterlogging disasters took place. Meanwhile, there are also other issues in China, e.g. relatively backward development of drainage and flood control facilities, incomplete engineering system, lagging-behind drainage concepts, higher ratio of combined sewer systems, low standards of pipeline and tunnel design, limited funding input and insufficient drainage management capability etc.

The Ministry of Housing and Urban-Rural Development carried out systematic survey on urban waterlogging in 351 Chinese cities in 2010. The result showed that a total of 289 cities experienced the waterlogging to a different degree from 2008 to 2010, accounting for 80% of all surveyed cities. China’s urban waterlogging is distinctively characterized by wide range of occurrence, large depth and long duration of ponding. Since 2010, serious urban waterlogging has happened in Wuhan, Beijing, Guangzhou, Shenzhen, Fuzhou, Nanjing, Nanchang etc., and affected the normal urban operation, and caused larger property loss, even serious casualties in some cities.

Based on the requirements of Ministry of Housing and Urban-Rural Development in *Notice on Releasing the Outline for Developing the Comprehensive Plan for Urban Drainage (Stormwater) and Flood Control* [《关于印发城市排水(雨水)防涝综合规划编制大纲的通知》] [J.C. (2013) No. 98], local governmental authorities shall organize to develop the comprehensive plan for urban drainage (stormwater) and flood control, basically understand the current state of urban drainage and flood control, assess the capacity of urban drainage and flood control and risk of waterlogging, put forward the planning scheme for urban stormwater pipeline & tunnel system and flood control

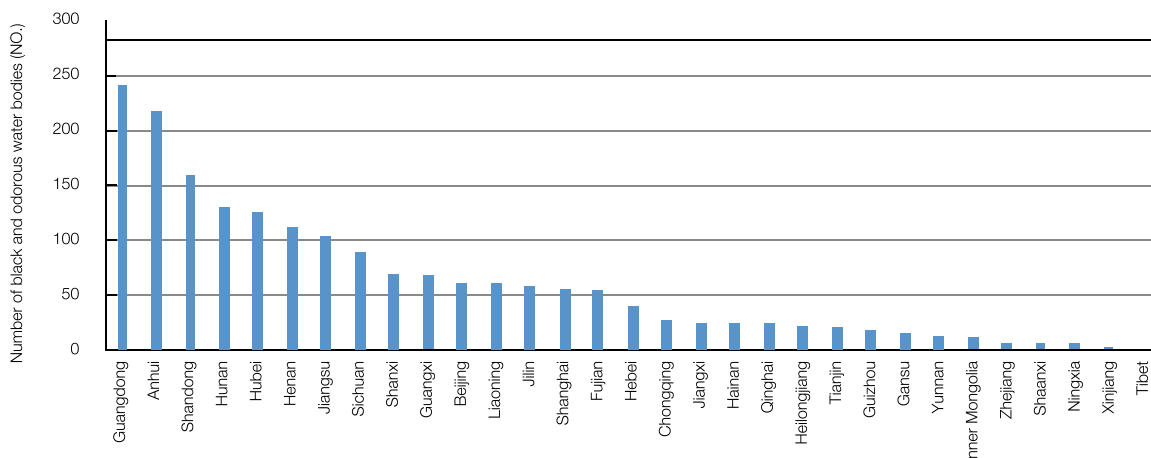


Figure 4-6 Distribution of the black and odorous water bodies in China (February 2016)

system, and compile & aggregate the construction tasks in near and long terms. Most cities have developed the plan in a scientific and reasonable manner as required by the Outline, which is of great significance for guiding the local efforts in drainage and flood control.

4.2 Urban energy system

Since the 12th Five-year Plan period, along with the stable growth of the national economy, the urban energy demand has increased rapidly, driving the major achievements in construction of cross-regional energy channel and urban energy transmission and distribution system, e.g. long distance natural gas pipelines, UHV transmission lines etc. Meanwhile, as the relevant regulations, policies and plans of the state became established, the requirements on environmental protection and energy conservation of urban energy supply system have improved continuously and urban central heating system, distributed energy system, and new energy and renewable energy system have grown rapidly. However, in the long run, there are still the following three issues with urban energy system: firstly, the capacity of urban energy supply system cannot meet the needs of urban development; secondly, the ratio of clean energy (like natural gas, solar PV etc.) and renewable energy in the energy mix is still low; thirdly, the ratio of distributed energy system to the energy supply is also low, which is unfavorable for realizing the goal of urban energy system to reduce loss, improve efficiency and carry out smart management. During the 13th Five-year Plan period, China will still treat improving the urban energy security capability, adjusting the urban energy consumption structure and optimizing the urban energy supply as

the major contents for urban energy system development, so as to secure the demands of cities for the safety of energy use and the social and economic development.

4.2.1 Urban natural gas demand and supply grows rapidly

(I) The capability to protect the source of natural gas continues to improve

In 2014, the General Office of the State Council released *the Strategic Action Plan on Energy Development (2014~2020)* [《能源发展战略行动计划(2014~2020年)》] (G.B.F. [2014] No. 31), clearly putting forward that, efforts shall be made to insist on the strategic guidelines of “saving, clean and safety”, focus on the implementation of four major strategies, i.e. “priority to energy conservation, green & low-carbon, firm presence in home country and innovation driven”, and accelerate the development of low-carbon, efficient and sustainable modern energy system. It also brought up that “efforts shall be made to actively develop the clean energy including the natural gas, improve the ratio of natural gas consumption and by 2020, and the ratio of natural gas to the primary energy consumption will be increased to over 10%”.

On the basis of support from the national macro policy, in May 2014, China National Petroleum Corporation and Gazprom signed the Sino-Russia Purchase and Sales Contract on Gas Supply via the Eastern Route Pipeline, under which Gazprom will start transmitting gas to China via the eastern route from 2018, with gas delivery gradually increasing to 38 billion cubic meters per annum for 30 years. In the same month, Line C



Figure 4-7 Gas transmitted to China through Line C of China-Central Asia Gas Pipeline (Photo by Liu Tao)

of China-Central Asia Gas Pipeline was put into production, which is another energy trunk planned to be constructed by CNPC on the basis of Line A & B that were already built up and put into operation. Line C is predicted to have a length of 1,830 kilometers and pipe diameter of 1,219 mm with designed annual gas transmission capacity of 25 billion m³ and will be in parallel with lines A and B. The Pipeline starts at Gedaim on the border between Turkmenistan and Uzbekistan, runs through Uzbekistan and Kazakhstan, and finally ends at Horgos Port of Xinjiang in China to connect with the three lines in West-to-East Pipeline Project.

These two international natural gas pipelines will add 63 billion m³ imported natural gas resources each year for China, which will further satisfy China's demands for the clean energy and play a significant role in securing the natural gas supply in China through connectivity of pipelines and balancing the national gas supply landscape.

(II) The pipeline natural gas replaces other sources of gas at a higher speed

Urban gas supply is composed of manufactured gas, natural gas and LPG Liquefied Petroleum Gas). In 2015, the total supply of manufactured gas in Chinese cities was 4.71 billion m³, decreasing by 16% compared to the previous year; the total supply of LPG was 10,392,000 tons, decreasing by 4% compared to the previous year; total supply of natural gas reached 101.84 billion m³, increasing by 7.9% compared to the previous year. Replacement of manufactured gas and LPG by urban pipeline natural gas continues to accelerate and the ratio of clean energy, including pipeline natural gas, to the urban energy supply is growing.

(III) There is still high potential to improve the ratio of natural gas as the clean energy in total energy consumption

From 2010 to 2014, the ratio of natural gas to the primary en-

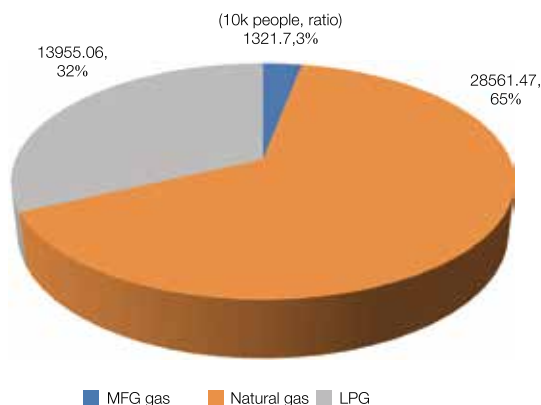


Figure 4-8 Population with access to gas and ratio of gas consumption in Chinese cities in 2015

ergy consumption maintained the annual growth of 20%, and by 2014, China's consumption of natural gas has accounted for 6% of the primary energy consumption. It is expected that this ratio will increase at the CAGR (compound annual growth rate) of no less than 9% by 2020.

4.2.2 Urban central heating witnesses improvements in both quality and quantity

(I) Urban central heating capacity is increasing

There are two types of urban central heating, i.e. steam heating and hot water heating. By 2015, national urban central heating covered an area of 6.72 billion m³. To be specific, for steam heating, its supply capacity was 80,699 tons/hour, decreasing by 3,965.4 tons/hour compared to the previous year; total quantity of heat supply was 49703 GJ, decreasing by 59,110,300 GJ compared to the previous year; length of steam pipe was 116,900 km, decreasing by 784 km compared to the previous year. For hot water heating, its supply capacity was 473,000 MW, increasing by 25,500 MW compared to the previous year; the total quantity of heat supply was 302,000 GJ, increasing by 26,000 GJ compared to the previous year; length of hot water pipeline was 192,700 km, increasing by 18,013 km compared to the previous year.

(II) Heat sources for urban central heating are more clean

The State Council released *Air Pollution Prevention and Control Action Plan* (《大气污染防治行动计划》) (G.F. [2013] No. 37) in September 2013; National Development and Reform Commission, Ministry of Environmental Protection and National Energy Administration issued *Upgrading and Reconstruction Action Plan on Energy Conservation and Emission Reduction of Coal Power (2014~2020)* [《煤电节能减排升级与改造行动计划(2014~2020年)》] [F.G.N.Y. (2014) No. 2093] in September 2014. Both of these two documents require to actively develop the combined heat and power (CHP), stick to

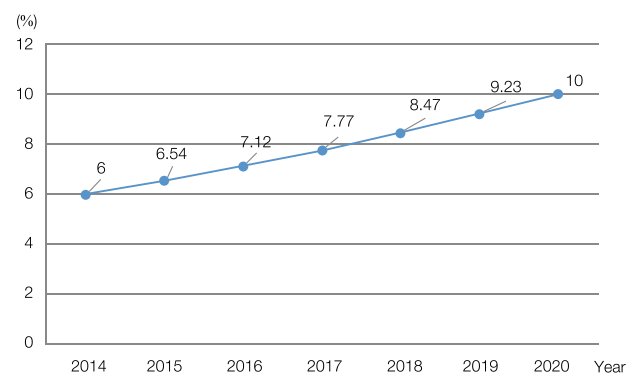


Figure 4-9 Forecast on the ratio of natural gas to primary energy consumption (2014-2020)



Figure 4-10 Haze treatment in progress in Hebei: strengthened efforts to reduce production for the green heating (Photo by Zhai Yujia)

“heat to determine electricity” principle, strictly implement actual heat load, develop CHP plan in a scientific manner, build highly efficient coal-fired CHP units, improve supporting heating network in parallel, and replace small coal-fired boilers within the range of central heating or eliminate them before the deadline.” According to the requirements of relevant state policies, energy conservation and environmental protection will become the important principles for selecting the heat sources for urban central heating. More and more coal-fired central heating boiler rooms and urban thermal power plants will undergo upgrading and reconstruction of equipment and facilities, so as to reduce the pollution to the atmospheric environment by increasing the application of dust removal, desulfurization and denitration equipments. New CHP projects will also adopt the environmental protection standards of ultra-clean emission to reduce the pollutant emission to the minimum, so the environment pollution issue caused by fire coal in heating season will gradually be alleviated.

(III) The diversification trend for forms of urban central heating becomes apparent

Currently, the form of urban heating dominated by fragmented coal-fired boilers is gradually replaced by urban central heating. Meanwhile, as China’s capability in securing the sources of gas for the natural gas continues to rise and the gas transmission & distribution system is gradually improved, decentralized natural gas heating displays its advantage in flexibility and environmental protection and its ratio in urban heating rises increasingly; moreover, in cities where there are abundant

shallow geothermal resources, the buildings and neighborhoods have selected the geothermal heating method, which is more economical and energy saving. Urban heating will display the co-existence of central heating (CHP, central heating boiler room etc.), decentralized natural gas heating and new energy heating.

4.2.3 Cross-regional power transmission and distributed energy co-exist¹

(I) Generating capacity and electricity consumption continue to grow

In 2015, the overall capacity of all types of power generating equipment was 1.507 billion kW, increasing by 147 million kW compared to the previous year, including 319 million kW for hydropower, increasing by 17 million kW compared to the previous year; 990 million kW for thermal power, increasing by 74 million kW compared to the previous year; 26.08 million kW for nuclear power, increasing by 6.2 million kW compared to the previous year; 171 million kW for on-grid solar and wind power, increasing by 50 million kW compared to the previous year.

The total electricity consumption of the same year was 5,550 billion kWh, with a year-on-year growth of 0.5%. To be specific, the electricity consumption of the primary industry was 102 billion kWh with a year-on-year growth of 0.5%; that of the secondary industry was 4,004.6 billion kWh with a year-on-year decrease of 1.4%; that of the tertiary industry was 715.8 billion kWh with a year-on-year growth of 7.5%; residential electricity consumption in urban and rural areas was 727.6 billion kWh with a year-on-year growth of 5%.

(II) Cross-regional power transmission continues to grow and UHV power transmission technologies and capabilities reach the world advanced level

Driven by the regional difference for the spatial distribution of energy resources and the economic and social development, the eastern and central regions will still be the center of electric load in China. By the end of 2014, the total size of inflow electric power in 12 provinces (municipalities) in the eastern and central regions was 110 billion kW. Based on the speed of economic growth in the eastern and central regions, the electric load will continue to grow during the 13th Five-year Plan period and the incremental electric load will need to be balanced via cross-regional UHV projects. In order to safeguard the demands for electricity use in the eastern and central regions, in May 2014, China decided to speed up the construction of 12 key power transmission channels for the *Air Pollution Preven-*

¹ Note: due to statistical coverage, electric system data used in this Report are China’s total electricity consumption data (data from 2014 China’s total electricity consumption data released by National Energy Administration). As urban electricity consumption takes up a larger share in the total electricity consumption, the latter may basically reflect the basic features and development tendency of the former.

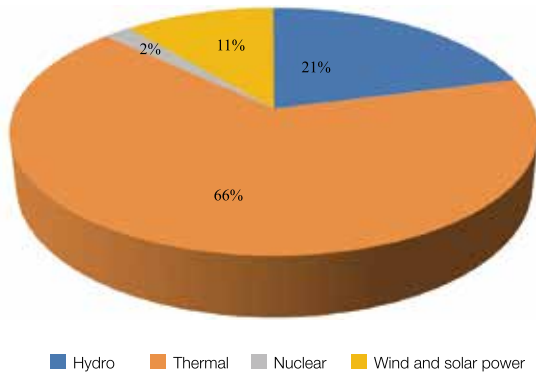


Figure 4-11 Composition of overall power generation capacity in 2015

(Source: 2015 China's total electricity consumption data by National Energy Administration)

tion and Control Action Plan, including “four alternating current and four direct current” UHV projects, which should be fully completed by 2017. Among them, Left Bank of Xiluodu-Zhejiang Jinhua ±800 kV UHV direct current transmission project and North Zhejiang-Fuzhou 1,000 kV UHV alternating current transmission project have been built and put into operation successively.

(III) Distributed energy system begins to take shape and will grow rapidly

In May 2014, the State Grid Corporation of China held the press conference for “Opening the markets for projects about connection of the distributed generation to the grid and electric vehicle charging facilities” in Beijing and officially distributed the *Opinions on Offering Good Service to Connection of the Distributed Generation to the Grid (revised)* [《关于做好分布式电源并网服务工作的意见》(修订版)] and the *Opinions on Offering Good Service to Electric Vehicle Charging Facilities to Apply for Power Use* (《关于做好电动汽车充换电设施用电报装服务工作的意见》) to the public, which were of great significance for promoting the development of new energy industry. In September of the same year, the National Energy Administration released the *Notice of National Energy Administration on Further Implementing Policies Related to Distributed Photovoltaic Power Generation* (《国家能源局关于进一步落实分布式光伏发电有关政策的通知》), encouraging “self-generation for self-use and the rest connected to the grid” and defining that the part of “self-generation for self-use” won't be restricted by the size quota for promoting the distributed PV policies. It also pointed out that PV application had a strategic significance for optimizing the energy structure, protecting energy security, improving the ecological environment and shifting the energy consumption modes in urban and rural areas. Along with the issuance of relevant policies on connection of the distributed energy to the grid by the state, the benefits of distributed energy in low loss, high efficiency and intelligence

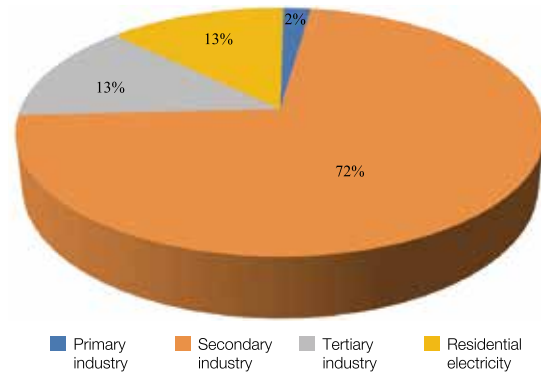


Figure 4-12 Composition of China's total power consumption in 2015

(Source: 2015 China's total electricity consumption data by National Energy Administration)

will greatly enhance its large-scale application in cities, and the distributed energy will become the important component for urban power supply.

4.3 Development of urban transport system

Urban transport is an important carrier to support the urban operation and it will evolve with the urban growth and the development of regional transportation. In recent years, China's urban transport has entered the critical period for development and change. Traffic congestion, environmental degradation, resource constraints, regional synergies and living quality have become the major issues that are inevitable for the development of urban transport. Building the comprehensive urban transport system, guiding the urban transport towards the “human-oriented, smart, diversified and ecological” development and serving the urban demands for diversified activities are becoming the important direction for the urban transport transformation and development. Various strategies have gained preliminary results, e.g. prioritizing the development of urban public transport, promoting the diversified and coordinated development of different means of transport, improving the transportation quality, guiding the green transportation etc., but there is still a long way to go in fully improving the overall situation of urban transport.

4.3.1 Urban public transport

(I) Public bus/trolley bus

Public bus/trolley bus is the principal part of urban public transport. In 2014, there were a total of 597,900 (standard units) public buses/trolley buses in all Chinese cities and counties, increasing by 4.3% compared to the previous year. The total length of operation lines was 817,800 km and the annual passenger traffic reached 78.188 billion person-times, increasing by 9.19% and 1.4% respectively compared to the previous



Figure 4-13 Jinhua section along the North Zhejiang-Fuzhou 1,000 kV UHV transmission line was linked up (Photo by Zheng Xianlie)



Figure 4-14 Office building solar distributed generation project was connected to the Grid in Shaoxing (Photo by Yuan Yun)

year. All cities accelerated the construction of BRT system (bus rapid transit), with, size, length and passenger traffic of BRT vehicles increasing by 19.1%, 1.37% and 34.7% respectively compared to the previous year. The length of bus only lanes reached 6,897.3 km¹. Cities, including Beijing, Shenzhen, Chengdu, Jinan, Fuzhou etc. have all established special bus service models, e.g. customized shuttle bus, community bus etc., which both enhanced the level and attraction of public transport service and facilitated the travelling of the public.

(II) Urban rail transport

Urban rail transport has become the backbone for public transport in mega cities. In 2014, the annual passenger traffic of urban rail transport system accounted for 14.91%² of total passenger traffic of the public transport in 22 cities (Table 4-1). The annual passenger traffic of urban rail transport in Beijing, Shanghai and Guangzhou all exceeded 2 billion person-times,

reaching 3.39 billion, 2.83 billion and 2.22 billion person-times respectively. In Shenzhen, the corresponding number exceeded 1 billion person-times for the first year, attaining 1.04 billion person-times. There were 40 cities with urban rail transport system under construction with the total length reaching 4,073 km, which covered 6 modes of transport, including the subway, light rail, monorail, tramcar, maglev train and regional express rail. The total length of lines under construction in Beijing, Guangzhou, Shanghai, Chengdu, Nanjing and Chongqing exceeded 200 km³. It can be expected that, as rail transport network gradually becomes established in all mega cities, the urban rail transport will play an increasingly important role in supporting the urban operation.

(III) Taxicabs and ride hailing

Development of the taxi market is on the verge of reform. In 2014, the Ministry of Transport released the *Administrative*

Status about urban rail transport operation, 2014

Table 4-1

No.	City	Length (km)	Annual passenger traffic (10k person-times)	Passenger flow over a road segment in peak hour (10k person-times)	Minimum departure interval (second)
1	Beijing	604	338668	5.8	120
2	Shanghai	643	282727	5.7	140
3	Tianjin	147	30061	1.3	300
4	Chongqing	202	51710	2.9	162
5	Guangzhou	247	222325	5.3	132
6	Shenzhen	179	103566	4.0	150
7	Wuhan	96	35624	2.2	230
8	Nanjing	187	50317	3.3	140
9	Shenyang	114	26294	2.1	300
10	Changchun	56	7218	1.0	270
11	Dalian	127	9241	1.9	180
12	Chengdu	155	28431	2.4	170
13	Xi'an	52	13094		312
14	Harbin	17	5386	1.0	390
15	Suzhou	76	12670	1.2	300
16	Zhengzhou	26	6851	1.4	360
17	Kunming	59	4921	0.9	300
18	Hangzhou	66	14515	2.6	210
19	Foshan	21	5467		315
20	Changsha	22	4580	1.1	400
21	Ningbo	21	1379	0.5	420
22	Wuxi	56	1561	0.6	475
Total		3173	1256608		

Source: data from China Association of Metros.

1 Statistical Communiqué on 2014 Development of the Transportation Industry.

2 National Bureau of Statistics of the People's Republic of China.

3 China Association of Metros.



Table 4-15 2015 China's Car Free Day campaign—Zhuji City distributed the publicity materials for Car Free Day
(Source: contributed by Steering Committee of China's Car Free Day Campaign from Ministry of Housing and Urban-Rural Development)

Provisions on Taxicabs Operation Service (《出租汽车经营服务管理规定》) in the form of ministry directives, encouraging large-scale, intensive and company-based operation. Documents that may promote the orderly development of mobile APP-based ride-hailing service were also issued to strengthen the market regulation and boost the IT-based development for taxicabs in a comprehensive manner. However, with the emergence of various kinds of app-based ride-hailing, reform of taxicab operation model and management of ride-hailing service has aroused wide public concern and discussion. In 2015, the Ministry of Transport solicited the public opinions on *The Guiding Opinion on Deepening the Reform to Further Promoting the Healthy Development of the Taxicab Industry* (《关于深化改革进一步推进出租汽车行业健康发展的指导意见》) and the *Interim Administrative Measures for App-based Ride-Hailing Operation Service* (《网络预约出租汽车经营服务管理暂行办法》) via the web, encouraging the innovation of taxi service, promoting the integrated development of diversified taxi services and including the ride-hailing service into the scope of taxi management. Shanghai started to regulate the management of ride-hailing sector. In September 2015, Shanghai Qiyang Information Technology Co., Ltd. (i.e. the operation entity for chauffeur-driven car on demand service under “Didi Kuaidi”) was granted the first *Taxicab Operation Qualification Certificate in Shanghai* (《上海市出租汽车经营资格证书》) with the approved business scope as the internet platform for ride-hailing, signifying the access management for the development of ride-hailing sector starting to be implemented.

4.3.2 Pedestrian and bicycle transport

The Ministry of Housing and Urban-Rural Development issued the *Guidelines on Planning and Design of Urban Pedestrian and Bicycle Transport System* (《城市步行和自行车交通系统规划设计导则》), making up for a deficiency of technical stan-



Table 4-16 Walkway in Changshu City
(Source: contributed by Changshu Municipal Bureau of Housing and Urban-Rural Development)

dards for pedestrian and bicycle transport system planning and also providing the technical guidelines for the development of the 3rd batch demonstration projects for urban pedestrian and bicycle transport system started since 2014. Starting from 2007, China has carried out the “China's Car Free Day” campaign in cities for 9 years in a row to advocate the green transportation. The theme of 2015 campaign was “Green transportation-Select, Change and Integrate”, during which more than 120 cities held various kinds of activities with more than 200 million urban residents involved.

In order to improve the pedestrian and bicycle transport environment, all cities have started to pay attention to pedestrian and bicycle transport system development, gradually restoring the right of way to pedestrians and bicycles, strengthening the construction of relevant facilities (e.g. pedestrian road-crossing facilities, bicycle parking facilities, avenues and afforestation, lighting etc.) and fully improving the safety, convenience and attraction of pedestrian and bicycle transport system.

Public bicycle system is developing rapidly. 123 cities have built the public bicycle operation system with more than 510,000 bicycles in use across over 20,000 service stations. The popularization and application of public bicycles has offered the convenient and green way of travelling for the public and solved the difficulty of “last mile” in travelling via public transport.

4.3.3 The development trend of urban transport

(I) Transport and city

The *National New-type Urbanization Plan (2014-2020)* has taken prioritizing the development of urban public transport, effectively regulating and reasonably guiding the demands of individuals for motor traffic and promoting the information

sharing and resource integration for various types of modes of transport and urban road traffic management system as major contents to improve the basic public services in cities, and the basic strategy for comprehensive urban transport management has taken shape. “Internet + convenient transport” has been included in National Key Action Plan, encouraging the Internet platform to offer real-time inquiry of transport operation status, route planning, online ticket purchasing and smart parking services and leveraging the big data platform to mine and analyze the population migration pattern and demands of the public for travelling etc. The development of “Internet+” and big data analysis technology has accelerated the change of urban transport management and service models.

Urban roads and public transport have both experienced substantial growth of size. In 2014, the total length of urban roads reached 352,000 km, increasing by 16,000 km compared to the previous year; the per capita road area was 15.34 m², a 3.16% increase over the previous year; and the number of public transport vehicles per 10,000 people was 12.99 (standard unit), growing by 1.64%¹ over the previous year. There were 35 cities with the car parc exceeding 1 million units, among which 10 cities including Beijing, Chengdu, Shenzhen etc. have the car parc exceeding 2 million units². The 3rd batch demonstration project for urban pedestrian and bicycle transport system in 94 cities has started and the total number of demonstration projects has reached 106. The development of 37 “Transit Metropolis” has made new progress, which insists on planning before action and promoting the public transport facilities construction and smart public transport project in parallel. In the context of the increasingly severe traffic congestion and air pollution in cities, Hangzhou and Shenzhen started to implement the policies on restricting the vehicles travelling and purchasing via license plate and the number of cities adopting such

policies increased to 8.

(II) Transport and industry

■ As the national strategic emerging industry, the new energy vehicle (NEV) has made significant achievements by relying on the promotion of application in cities and the number of battery-driven bus, taxi and passenger car has also grown considerably. In 2015, outputs of NEVs reached 379,000 units, including 142,800 units of battery-driven passenger cars, 63,600 units of plug-in hybrid electric passenger cars and 147,900 units of battery-driven commercial vehicles, and the annual sales accumulated to 400,000 units³. China has become the largest NEV market in the world.

■ Urban rail transport development has driven the development of urban rail transport equipment industry. By the end of 2014, the total length of operation lines in 22 cities reached 3,173 km, including 2,365 km of subway, accounting for 74.5%; 239 km of light rail, accounting for 7.5%; 89 km of monorail, accounting for 2.8%; 141 km of tramcar, accounting for 4.4%; 30 km of maglev train, accounting for 0.9%; and 308 km of regional express rail, accounting for 9.7%. The number of urban rail transport vehicles reached 17,300, growing by 2,934 units over the previous year⁴. The rapid development of urban rail transport has not only improved the quality of urban public transport, but also created a huge market for the rail transport equipment industry.

■ The scientific management of urban transport has promoted the rapid development of intelligent transportation industry. In 2014, among 323 prefecture-level and above cities in China, 253 cities built the well-established public security traffic command centers, 205 cities built integrated command and control

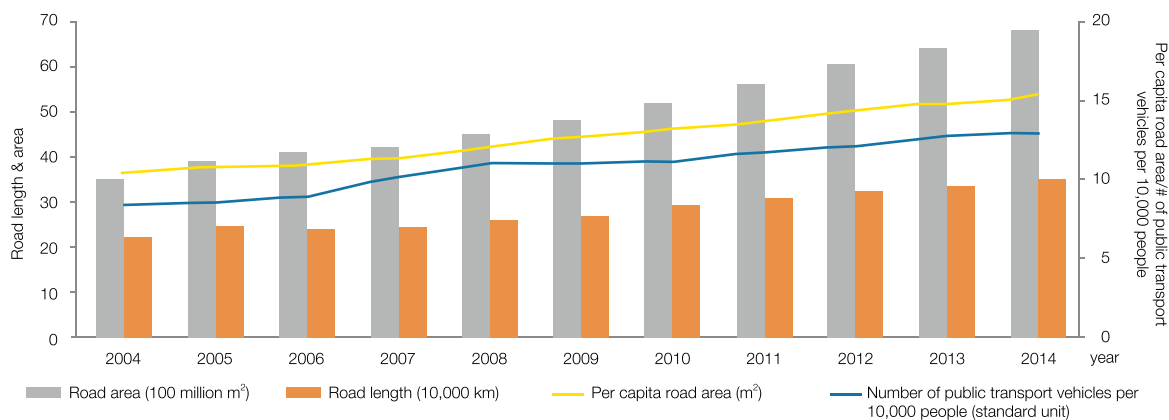


Figure 4-17 Growth of length and area of urban roads in China

1 National Bureau of Statistics of the People’s Republic of China.

2 *Report on Urban Development of China (2014)*.

3 Ministry of Industry and Information Technology of the People’s Republic of China.

4 China Association of Metros.



Figure 4-18 Charging stations for electric vehicles on Hefei-Xuzhou Expressway were fully completed (Photo by Song Weixing)

platforms, 194 cities realized the inter-area coordinated control of traffic signals and 161 cities set up 25,000 road transport flow data collection points/sections. The automatic recording devices for jumping the red light have been installed at 21,000 traffic light controlled intersections and 11,000 sets of other traffic offense forensic equipment were installed on urban arterial roads¹. Penetration and application of intelligent transportation technology and equipment has played a leading role in alleviating urban traffic congestion, enhancing traffic law enforcement and improving road safety guarantee, which has also provided the vast space for the innovative development of intelligent transportation industry.

4.4 China practice: Sponge City development

Along with the rapid development of urbanization, urban water resources, water environment, water ecology and water security is faced with increasingly severe situations. From December 12 to 13, 2013 when Central Urbanization Working Conference was held, General Secretary Xi Jinping put forward the requirements that China should let nature take its course to solve the issue of urban water shortage. While improving the urban drainage system, cities shall first consider retaining the limited rainwater, using natural forces to drain the water and building the “sponge city” that supports natural accumulation, natural permeation and natural purification.

4.4.1 Situation about the planning and construction of the sponge city

(I) The first batch of pilot ‘sponge cities’ in 2015

On January 20, 2015, the Ministry of Finance, Ministry of

Housing and Urban-Housing Development and Ministry of Water Conservancy released *The Notice on Organizing the Application for the Pilot Cities to Build the Sponge City in 2015* (《关于组织申报2015年海绵城市建设试点城市的通知》) and defined the guidelines for applying for the pilot cities of “sponge city” development in 2015. 16 cities including Qian’an, Baicheng, Zhenjiang, Jiaxing, Chizhou, Xiamen, Pingxiang, Jinan, Hebi, Wuhan, Changde, Nanning, Chongqing, Suining, Gui’an New Area and Xixian New Area were determined as the first batch of pilot cities.

(II) The second batch of pilot ‘sponge cities’ in 2016

On February 25, 2016, the Ministry of Finance, Ministry of Housing and Urban-Housing Development and Ministry of Water Conservancy jointly issued *The Notice on Carrying out the Pilot of Sponge City Development under the Support of Central Treasury in 2016* (《关于开展2016年中央财政支持海绵城市建设试点工作的通知》) and defined the guidelines for applying for the pilot cities of ‘sponge city’ development in 2016. 14 cities including Beijing, Tianjin, Dalian, Shanghai, Ningbo, Fuzhou, Qingdao, Zhuhai, Shenzhen, Sanya, Yuxi, Qingyang, Xining and Guyuan, were determined as the second batch of pilot cities.

(III) The State Council put forward the general requirements on the development of “sponge cities”

On October 11, 2015, the General Office of the State Council released *The Guiding Opinion on Promoting the Development of “Sponge City”* (G.F.B [2015] No. 75) (《关于推进海绵城市建设的指导意见》) and put forward that, through building sponge cities and by comprehensively adopting the measures of “permeation, perching, storage, purification, use and drainage”, (the goal is to) reduce the impacts of urban development & construction on the ecological environment to a maximum degree and make 70% rainfall assimilated and utilized onsite. By 2020, over 20% of urban built-up areas will achieve the goal; by 2030, over 80% urban built-up areas will achieve the goal. Meanwhile, it also brought up specific requirements on strengthening the planning and guidance, arranging the orderly development as a whole, improving the policy support and putting the orderly implementation in place etc.

4.4.2 Supporting system guarantee for “sponge city” development

(I) Strengthening the planning and guidance

On March 11, 2016, the Ministry of Housing and Urban-Rural Development issued the *Interim Provisions on Special Plan Development for the Sponge City* (《海绵城市专项规划编制暂

¹ Yearbook of Development of China’s Intelligent Transport Industry (2014).



Figure 4-19 The concept model of “sponge city” (Photo by Zhang Zhijun)

行规定》) and required that the draft special plan for “sponge city” should be completed by the end of October 2016 for all cities and reported for approval in accordance with the procedures.

(II) Promoting the performance evaluation

On July 10, 2015, the General Office of Ministry of Housing and Urban-Rural Development released *Performance Evaluation Indicators for the Sponge City Development (Trial)* [《海绵城市建设绩效评价与考核指标(试行)》], defining 18 specific indicators in 6 dimensions of water ecology, water environment, water resources, water safety, system development & implementation and visibility for performance evaluation of sponge city development and dividing the evaluation into 3 stages, i.e. self-inspection by the city, evaluation from the province and spot check at Ministry level.

(III) Strengthening the technical guidance

On October 22, 2014, the Ministry of Housing and Urban-Rural Development issued the *Technical Guidance for the Sponge City Development—Building the Storm Sewer System Based on Low Impact Development (trial)* [《海绵城市建设技术指南——低影响开发雨水系统构建(试行)》], putting forward the basic principles for developing the LID-based (low impact development) storm sewer system in sponge city development, planning the technical framework for cascading, implementation and development of the control target, defining the contents, requirements and approaches in LID-based storm sewer system development in the process of urban planning, engineering design, construction, maintenance and management and providing some practical examples in China. On September 11, 2015, the

Ministry of Housing and Urban-Rural Development announced the *Notice on Establishing the Committee of Technical Experts for the Sponge City Development* (《关于成立海绵城市建设技术指导专家委员会的通知》), putting forward that (efforts shall be made to) reinforce technical guidance for the sponge city development, bring into full play the important roles of experts in this area and continuously improve China’s management level in sponge city development. Based on the relevant management rules for the expert committee, the Committee of Technical Experts for the Sponge City Development under the Ministry of Housing and Urban-Rural Development was established, which was composed of 37 experts.

(IV) Leveraging the financial support

In December 2015, the Ministry of Housing and Urban-Rural Development worked with China Development Bank and Agricultural Bank of China respectively to release the *Notice on Promoting Development Financing to Support the Sponge City Development* (J.C. [2015] No. 208) (《关于推进开发性金融支持海绵城市建设的通知》) and *Notice on Promoting Policy-based Finance to Support the Sponge City Development* (J.C. [2015] No. 240) (《关于推进政策性金融支持海绵城市建设的通知》), regarding the sponge city development as the priorities for credit support and enhancing the support from the financial institutions on the sponge city development.

(V) Popularizing applicable technologies and products

In order to solve the urgent demands of different locations for relevant technologies and products in the process of sponge city development, the Ministry of Housing and Urban-Rural

Performance evaluation indicators for the Sponge City development (trial)

Table 4-2

Category	Item	Indicator	Nature
I . Water ecology	1	The capture ratio of total annual runoff volume	Quantitative (binding)
	2	Ecological restoration of waterfront	Quantitative (binding)
	3	Ground water level	Quantitative (binding, classified guidance)
	4	Urban heat island effect	Quantitative (encouraging)
II . Water environment	5	Water environment quality	Quantitative (binding)
			Quantitative (encouraging)
III . Water resources	6	Urban diffused pollution control	Quantitative (binding)
	7	Sewage recycling rate	Quantitative (binding, classified guidance)
	8	Rainwater resource utilization rate	Quantitative (binding, classified guidance)
IV . Water security	9	Network leakage control	Quantitative (encouraging)
	10	Urban rainstorm waterlogging disaster prevention & control	Quantitative (binding)
	11	Drinking water safety	Quantitative (encouraging)
V . System development and implementation	12	Planning and development control system	Qualitative (binding)
	13	Blue & green lines delineation and protection	Qualitative (binding)
	14	Technical standards and criteria development	Qualitative (binding)
	15	Investment and financing mechanism development	Qualitative (binding)
	16	Performance evaluation and reward mechanism	Qualitative (binding)
	17	Industrialization	Qualitative (encouraging)
VI . Visibility	18	Demonstration effect from contiguous areas	Qualitative (binding)

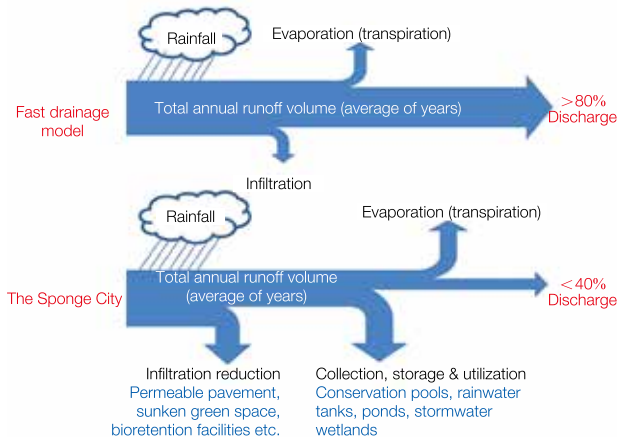


Figure 4-20 Core indicators of sponge city annual runoff control rate concept diagram

Development announced the *List of Advanced Applicable Technologies and Products for the Sponge City Development* (Batch 1) [《海绵城市建设先进适用技术与产品目录(第一批)》] in February 2016, including 36 technologies in 6 main categories, i.e. collection & permeation, regulation & storage, transfusion, sewage purification, black & odorous water treatment and design & management, which provided the technical support for different locations to promote the sponge city development.

(VI) Focusing on mechanism innovation

For the “fragmentation” issue in the process of sponge city development, *The Guiding Opinion on Promoting the Sponge City Development* (G.F.B. [2015] No. 5) (《关于推进海绵城市建设的指导意见》) clearly put forward (efforts shall be made to) encourage the competent scientific research & design units, engineering enterprises and manufacturing enterprises to join hands with the financial capital to set up the business conglomerates or consortia with comprehensive business capabilities and adopt the general contracting model to organize the implementation of projects related to the sponge city development in an overall manner to produce the best possible results in a whole. The *Notice on Carrying out the Pilot for the Sponge City Development under the Support of the Central treasury* (《关于开展2016年中

央财政支持海绵城市建设试点工作的通知》) further required that the cities applying for the pilot project should provide reasonable PPP (public-private partnership) plan.

4.4.3 Pilot project for the sponge city development in Jinan

Jinan, the capital city of Shandong Province, is known as the City of Springs for numerous springs within its territory. In the southern part of Jinan's urban area, there are continuous hills, numerous valleys and rivers and dense percolation zones. Xinglong area surrounding the Daming Lake was selected as the pilot area for the sponge city development in Jinan, which covered a total area of 39 square kilometers with about 320,000 residents with the south border reaching Jingshi Road, the east border to Yingxiongshan Road and the west border to East Qianfoshan Road. The pilot area could take various measures like protecting and restoring the percolation zones, bubbling spring discharge or water collection and use in a planned manner, and realize the function of "absorption, storage, purification and discharge of water" through planned storage, regulation and use.

The sponge city development in Jinan can be divided into the following five aspects: firstly, improvement of the water circulation system. The circulation of "deposits and lending" for the "natural bank of underground water" will be realized by combining with the special hydrogeological conditions in pilot areas, i.e. infiltrating the storm water into the "underground natural reser-

voir" through permeation, perching, storage and purification in the south and discharging or collecting & regulation water via bubbling spring in the north. The surplus storm water will be assembled and discharged into the lake or reservoir via the river channel for planned use in the future. Secondly, improvement of the green space system. Specific measures include building the sunken green space and grass swales appropriately, implementing permeable and ecological pavement, and improving the functions of the green space in gathering the storm water, flood storage and drainage and replenishment of the underground water; reasonably setting up rainwater conservation pools and utilization facilities to enhance the functions of green space in permeation, storage and utilization. Thirdly, application of the permeable pavement for roads. The new road construction and rebuilding projects shall implement the concept of low impact development for the full process from planning, design, engineering and acceptance and adopt permeable pavement for foot walks, and parking lots & squares affiliated to roads to enhance the infiltration volume of surface water. Fourthly, improvement of the residential zone system. Roads and squares within the neighborhood shall adopt permeable pavement and such rate shall not be less than 70%. For projects with road hardening area exceeding 2,000 m², storm water regulation & storage facilities e.g. storage pools, scenic water and bioretention facilities e.g. green roof, rainwater garden, high flower terrace and ecological tree pool etc., shall be built to enhance the water resource conservation capability of the space. The stored and accumulated storm water can be used for road sprinkling, tree wa-

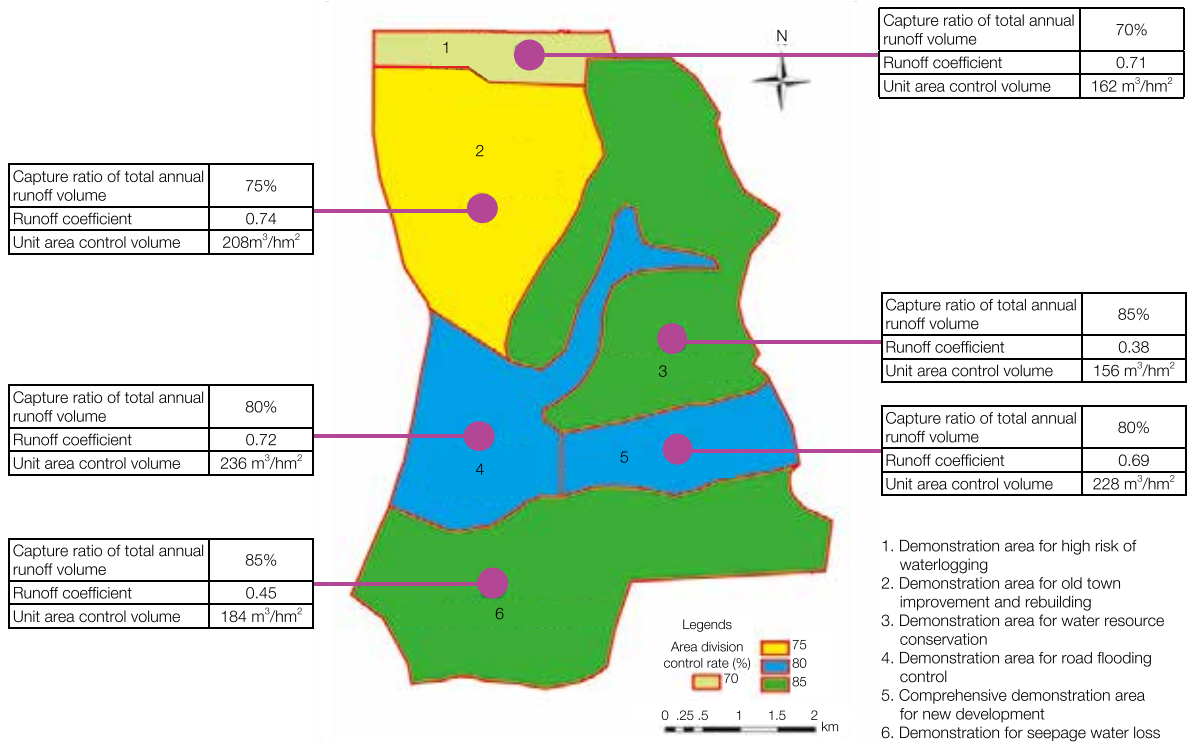


Figure 4-21 Illustration of control targets by area for the "sponge city" development in Jinan

tering and reclaimed water for buildings after treatment. Fifthly, strengthening of the comprehensive capability building. Efforts shall be made to develop the urban water system regulation capabilities e.g. rainstorm forecast and early warning, hydrology monitoring & forecast, water quantity allocation & scheduling, early warning for water quality monitoring etc.; built the comprehensive management system for urban water system that integrates the functions of rainfall forecast, hydrologic forecast, comprehensive water quantity allocation, water monitoring, emergency scheduling and decision-making support to offer the security guarantee and technological support for the sponge city development. As scheduled, there will be a total of 43 pilot area projects in Jinan from 2015 to 2017 with the total investment amounting to RMB 7.594 billion.

4.5 China practice: the utility tunnel

China has now entered the period of rapid urbanization development, but underground infrastructure development is still backward. Actions to promote the urban underground utility tunnel development, arrange various types of municipal pipeline planning, construction and management as a whole, and solve the issues of repeated road excavation, dense overhead line network and frequent occurrence of pipeline incidents are beneficial for protecting the urban security, improving urban functions, beautifying the urban landscape and promoting the intensive and efficient urban transformation and development, which will also improve the comprehensive urban bearing capacity and the quality of urbanization development, increase the effective investment into public products, driven the private capital investment and create the new momentum for economic growth.

4.5.1 Situations about the construction of utility channel

(I) The State Council has put forward the general requirements.

In August 2015, the General Office of the State Council released *The Guiding Opinion on Promoting the Construction of Urban Underground Utility Tunnel* (G.F.B. [2015] No. 61) 《关于推进城市地下综合管廊建设的指导意见》), putting forward that a series of world advanced-level underground utility tunnels shall be built and put into operation by 2020; the issues of “road zipper” for repeated road excavation shall be significantly improved; the safety level and disaster prevention and resistance capability of pipelines shall be prominently enhanced; cobweb-type overhead lines in major streets shall be gradually eliminated with the urban landscape improved remarkably.

(II) The first batch pilot cities in 2015.

In January 2015, the General Office of Ministry of Finance and the General Office of Ministry of Housing and Urban-Rural Development released *The Notice on Organizing the Applica-*



Figure 4-22 The utility tunnel in Pingtan comprehensive experimental area, Fujian (Photo by Liu Guangqi)

tion for the Pilot City of Underground Utility Tunnel in 2015 (《关于组织申报2015年地下综合管廊试点城市的通知》). Based on scores from the competitive review, Top 10 cities including Baotou, Shenyang, Harbin, Suzhou, Xiamen, Shiyang, Changsha, Haikou, Liupanshui and Baiyin were included in the pilot project scope of underground utility tunnel in 2015.

(III) The first batch pilot cities in 2016.

In February 2016, the General Office of Ministry of Finance and the General Office of Ministry of Housing and Urban-Rural Development released *The Notice on Carrying out the Pilot for Underground Utility Tunnel Supported by the Central Treasury in 2016* (《关于开展2016年中央财政支持地下综合管廊试点工作的通知》). Based on scores from the competitive review, Top 15 cities including Shijiazhuang, Siping, Hangzhou, Hefei, Pingtan Comprehensive Experimental Area, Jingdezhen, Weihai, Qingdao, Zhengzhou, Guangzhou, Nanning, Chengdu, Baoshan, Haidong and Yinchuan etc. were included in the pilot project scope of underground utility tunnel supported by the Central treasury in 2016.

4.5.2 Supporting system guarantee for the utility tunnel

(I) Attention paid to standards and guidances

In May 2015, the Ministry of Housing and Urban-Rural Development released the national standard to guide the utility tunnel development, i.e. *Technical Specifications for Urban Utility Tunnel Projects* (《城市综合管廊工程技术规范》). In June 2015, the Ministry of Housing and Urban-Rural Development released the *Investment Estimation Index for Urban Utility Tunnel Projects (trial)* (《城市综合管廊工程投资估算指标》(试行)), which played an active role in determining and controlling urban utility tunnel project investment and satisfying the requirements of developing the investment estimation for urban

utility tunnel project proposal and feasibility report. In January 2016, *National Building Standard Design System for Urban Utility Tunnel* (《城市综合管廊国家建筑标准设计体系》) was released, which further improved the standardization of design and engineering for urban utility tunnels.

(II) Strengthening the project management

In order to establish the reserve system for urban underground utility tunnel projects, the Ministry of Housing and Urban-Rural Development developed the information system for national urban utility tunnel development projects and established the national underground utility project repository (hereinafter shortened as the “Repository”), providing the qualified pipeline projects for underground utility tunnel development supported by the Central Treasury, special financial debt as well as China Development Bank and Agricultural Bank of China etc.

(III) Reinforcing the performance evaluation

In April 2016, the General Office of Ministry of Housing and Urban-Rural Development and the General Office of Ministry of Finance issued *The Notice on Carrying out Annual Performance Evaluation on Pilot Project of Underground Utility Tunnel* (《关于开展地下综合管廊试点年度绩效评价工作的通知》), requesting to carry out performance evaluation in seven dimensions, including commencement and construction as scheduled, alignment between actual and planned work of quantity, implementation of technical standards for relevant projects etc., so as to summarize and roll out the experience and practice of pilot cities in utility tunnel projects, identify the weakness in work, put forward relevant improvement measures and supervise different locations to promote the pilot projects as scheduled.

(IV) Improving the billing system

In November 2015, National Development and Reform Commission and Ministry of Housing and Urban-Rural Development released *the Guiding Opinion on Implementing the Paid Use System for Urban Underground Utility Tunnel* (《城市地下综合管廊实行有偿使用制度的指导意见》), which regulated the fee structure of the utility tunnel and requested to set up the market-oriented price mechanism.

4.5.3 Pilot projects of utility tunnel development in Jilin Province

In April 2015, the Jilin Provincial Government, Ministry of Housing and Urban-Rural Development and China Development Bank jointly made the decision to select Jilin as the pilot province for urban underground utility tunnel development in China and officially signed the tripartite partnership framework agreement in July. In 2015, 15 cities in Jilin Province started to construct tunnels in total length of 94.26 km covering 25 road sections, the tunnel body with the length of 24.75 km basically took

shape and the total project investment amounted to nearly RMB 3.347 billion. The practice of Jilin in promoting the construction of utility tunnel mainly covers the following several aspects:

(I) Defining the goal for the development

Jilin Province has defined the following goal: “by 2020, the total length of underground utility tunnel under construction across the whole province will reach 1,000 km with the total investment of RMB 100 billion. Efforts shall be made to explore the management and operation mechanism for sustainable development of urban underground utility tunnel, initially build the pattern of coordinated development among utility tunnels for trunk, feeder and cable lines and provide the replicable and scalable experience for the state to fully roll out the urban underground utility tunnel development.”

(II) Strengthening the leading role (of government agencies)

Jilin provincial government and municipal governments have set up the leadership team headed by the major government leaders and designated the authorities in charge of the projects.

(III) Reinforcing the policy guidance

In August 2015, the Jilin Provincial Government issued the *Opinion on Accelerating to Promote the Development of Urban Underground Utility Tunnel in Jilin Province* (《加快推进吉林省城市地下综合管廊建设的实施意见》), defining the overall requirements, basic principles, priorities and requirements for tunnel development. By combining with the actual requirements of tunnel project development, this Department has successively developed and distributed more than 10 technical documents about technical guiding rules, design standards, bidding & tendering, survey & design and quality safety management etc. for utility tunnel projects.

(IV) Insisting on planning and control

At the beginning of May 2015, Jilin Province issued the *Outline for Developing the Plan for Urban Underground Utility Tunnel Development in Jilin Province* (《吉林省城市地下综合管廊建设规划编制纲要》), putting forward the requirements on project plan development in different cities. By the end of August 2015, 27 cities across the Province have formulated the plans for their own utility tunnel development. The reviewed plans will be implemented upon approval of the local governments.

(V) Sticking to trial before rollout

In 2015, Jilin Province decided to launch the project in some cities/counties in advance as pilot projects and defined the goal of constructing the tunnels in the total length of 100 km. Experience can be drawn from these pilot projects.



Tour on Grass Skyline on the Mid-Autumn Day (Photo by Liu Tao)



5

Urban and Rural Green Development

Low-carbon city/community development / **88**

Atmospheric environment quality improvement / **93**

Urban ecological security guarantee / **96**

Utilization of renewable energy / **98**

China Practice: green building / **100**

Recommendations from experts: reinforce
guidance on planning and make
an overall arrangement on orderly development / **105**

In face of the severe situations caused by the traditional development model, e.g. increased carbon emissions, serious environmental pollution, ecological degradation in urban and rural areas etc., the Chinese government has taken the green development as the high priority. In recent years, China has carried out a great number of highly effective explorations and practices in low-carbon city/community development, ambient air quality improvement, ecological security guarantee, utilization of renewable energy, promotion of the green buildings etc.

5.1 Low-carbon city/community development

5.1.1 Low-carbon eco-demonstration city

(I) National low-carbon province/city pilot projects and pilot cities for carbon emissions trading

The Chinese government has clearly put forward the goal of reducing the 2020 carbon emission intensity per unit of GDP by 40%-45% compared to 2005. To this end, the state has vigorously promoted the pilot projects of low-carbon province/city development and the carbon emission trading market etc. In July and November 2010, the National Development and Reform Commission confirmed a total of 42 pilot low-carbon provinces/cities in two batches to realize the goal of reducing the regional carbon emission intensity, adjusting the industrial structure through reverse transmission, improving the energy efficiency through energy conservation, optimizing the energy structure and increasing the forest carbon sink etc. In November 2011, “Two provinces and five cities” including Guangdong and Hubei provinces, Beijing, Tianjin, Shanghai, Chongqing and Shenzhen were selected as the pilot regions for carbon emissions trading¹.

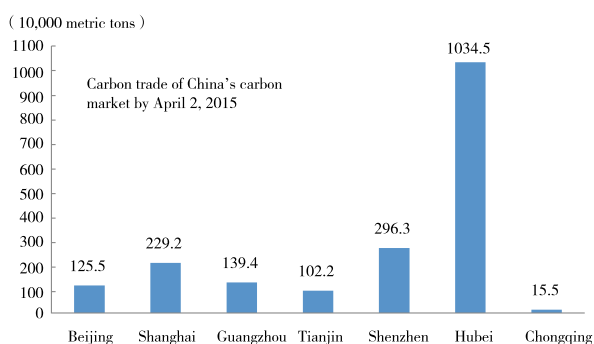


Figure 5-1 Breakdown drawing of carbon market trading volume in China

(Source: *China's Low-carbon Eco-city Development Report 2015*)

Shenzhen's carbon trading market kicked off on June 18, 2013, becoming the pioneer for pilot carbon trading market among the 7 pilot areas in China. *The Provisional Measures for the Administration of Carbon Emissions Trading in Shenzhen* (《深圳碳排放交易管理暂行办法》) implemented since March 2014 has comprehensive and detailed provisions on system design and implementation for carbon emissions trading market, which is the most detailed administrative measure among the carbon emissions trading pilots in China. The scope of Shenzhen's carbon emissions trading covers the enterprises with annual emissions exceeding 3,000 tons CO₂ equivalents, large public buildings and office buildings of state organs with more than 10,000 m² floor area as well as other carbon emissions units designated by the municipal government or volunteering to join the trade in the administrative area of the city, i.e. a total of 635 industrial enterprises and 197 large public buildings.

(II) National low-carbon eco-demonstration city

In January 2010, the Shenzhen government and Ministry of Housing and Urban-Rural Development signed the partnership agreement to jointly build the first “low-carbon eco-demonstration city” in China and focus on exploring the low-carbon eco-city planning and development model of “gradual normalization” in the context of urban development transformation and under the southern climate conditions. Currently, Shenzhen has defined the main tasks in 8 key areas, i.e. planning, transport, building, ecological environment, water resources utilization, recycling of solid wastes, industry and energy.

(III) Sino-foreign partnership on pilot low-carbon eco-cities

International cooperation becomes popular for pilot low-carbon eco-city projects in China. Strategic partnership framework



Figure 5-2 Shenzhen's basic ecological control line

(Source: <http://www.szpl.gov.cn/main/csggh/zxgh/stkzx/2.jpg>)

¹ Carbon emissions trading is the adjustment means under the market mechanism adopted to promote the control of greenhouse gas emissions and reduce the global carbon dioxide (CO₂) emissions, i.e. conduct CO₂ emissions trading as a commodity, while the trading volume is derived from the costs paid by the enterprises for their emissions.

Sino-foreign partnership projects for pilot low-carbon eco-cities

Table 5-1

Country	Year of approval of the pilot projects	Number of cities	Pilot cities (projects)	Contents of pilot projects
Special pilot & demonstration cities of Sino-EU low-carbon eco-city partnership project	2015	2 comprehensive pilot cities	Zhuhai, Luoyang	Urban compact development, clean energy utilization, green building, green transport, water resources and water system, refuse treatment, urban renewal and historical & cultural landscape preservation, investment & financing mechanism for urban development, green industry etc.
		8 special pilot cities	Changzhou, Hefei, Qingdao, Weihai, Zhuzhou, Liuzhou, Guilin, Fengxi New Town in Xixian New Area	
Sino-US pilot low-carbon eco-cities	2013	6	Langfang, Weifang, Rizhao, Hebi, Jiyuan, Hefei	Urban planning, low-carbon and green design, development, operation and management of infrastructure, energy efficiency in buildings and green buildings, utilization of renewable energy, green transport system, ecological green space system etc.
Sino-Germany pilot & demonstration low-carbon eco-cities	2014	6	Haimen, Yixing, Zhangjiakou, Qingdao, Yantai, Urumqi	Low-carbon eco-city planning & development, urban development and old town renewal & rebuilding, energy efficiency in buildings, green buildings with ultra-low energy consumption and energy efficiency in communities, safe & efficient energy supply and utilization of renewable energy, intelligent management of cities, urban transport solution, urban infrastructure etc.

Source: Website of Ministry of Housing and Urban-Rural Development.

agreements have been signed with some developed countries and regions to learn from the foreign advanced concepts and technologies in low-carbon ecological development. Currently, Sino-foreign pilot low-carbon eco-city projects mainly include Sino-EU, Sino-US, Sino-Germany partnership projects, involving planning, construction, management and other aspects.

5.1.2 Green eco-cities (towns)

Urbanization has witnessed rapid development in China. In order to encourage the planning, design and development of the urban new area based on green, ecological and low-carbon concepts, in April 2012, the Ministry of Finance and Ministry of Housing and Urban-Rural Development jointly issued *The Opinions on Accelerating to Promote the Development of Green Buildings in China* (C.J. [2012] No. 167) [《关于加快推进我国绿色建筑发展的实施意见》(财建[2012]167号)], putting forward to develop green eco-cities (towns), and establishing the administrative measures of review, measurement and as-

essment of green eco-cities (towns). Currently, 49 cities/towns are included in the list of national green and eco-demonstration cities (towns) in 4 batches, which have made good results in the practice of planning and development.

5.1.3 Low-carbon community

Low-carbon community is the important carrier to fulfill the low-carbon development. In order to realize the full process of putting the low-carbon and ecological development concepts into the community development, cultivate low-carbon culture and lifestyle, explore the management model to promote the low-carbon operation, roll out energy-saving and green buildings, build highly efficient and low-carbon infrastructure and create the beautiful and livable community environment, on March 21, 2014, the National Development and Reform Commission released the *Notice on Carrying out the Pilot Projects for Low-Carbon Community* (“关于开展低碳社区试点工作的通知”), focusing on pilot projects in prefecture-level and above cities.

Special column 5-1 the building of Sino-EU pilot low-carbon eco-city in Zhuhai

Zhuhai is one of the two comprehensive pilot cities under Sino-EU partnership nationwide. Zhuhai's comprehensive pilot project is the test bed for the development of low-carbon eco-cities. The European party will start pilot cooperation with Zhuhai in 9 major areas through Sino-EU low-carbon eco-city partnership project, including planning for urban compact development, utilization of clean energy, green building, green transport, water resources and water system, refuse treatment and disposal, green industry development, urban renewal and historical & cultural landscape preservation etc. 8 key demonstration projects have been confirmed by now, including the green eco-town pilot & demonstration project of Shangchong trolley, the Qianshanhe green building demonstration area project, the Nanwan green transport demonstration project, the water environment improvement and remediation in Qianshanhe basin, the demonstration project of sponge city start zone in the western downtown area, the Xikengwei landfill ecological remediation and cement kiln technical enhancement project, and Beishan village renewal project etc.



Bird's eye view of Zhuhai city

(Source: http://xxgk.zhuhai.gov.cn/ZH00/201601/t20160108_9138587.html)

Special column 5-2 the Development of National Green Eco-Demonstration Area in Wuxi Taihu New City

The planned area of Wuxi Taihu New City is 62 km². As the national low-carbon eco-demonstration area, its top priorities cover the following aspects: firstly, build a city of commerce. The New City has built the civic center and the financial & business street based on the layout of compact and mixed functions; 14 building complexes have been built and put into use. Secondly, build an unblocked city. In 2014, rail transport was basically built and the No. 1 metro line was open to the public formally. The micro-cycle project of buses is upgrading and accelerating with 7-10 bus lines planned to be operated. Thirdly, build an eco city. The planned greening rate of the New City is 42% and per capita public green space is 15 m². Attention is paid to preserving the natural mountain body and river system with more than 300 river courses interspersed with the land use of New City under their current state. Fourthly, build a convenient city. The New City will promote the construction of schools, hospitals, cultural tourism, business complexes, community service centers etc., so as to create the new urban center that is livable and employment friendly.

Tag list of national green and eco-demonstration cities (towns)

Table 5-2

Batch	Demonstration city/town	Planned area (km ²)	Features
8 cities in Batch 1 (2012)	Sino-Singapore Tianjin Eco-city	31.23	Modern, international, ecological & livable city
	Tangshan Bay Eco-city in Tangshan	150	Livable, education oriented, employment and business friendly coastal city
	Shenzhen Guangming New District	156.1	Modern & green new district
	Wuxi Taihu New City	150	Open, ecological & modern city
	Changsha Meixi Lake Eco-city	7.63	Technologically innovating, green, eco-friendly and livable new district
	Chongqing Yuelai Green Eco-city	2.46	Eco-friendly, livable comprehensive community
	Guiyang Zhongtian Future Ark Eco-city	9.53	Tourism-integrated comprehensive livable city
	Kunming Chenggong New District	122.87	Plateau lakeside featured eco-city
14 cities in Batch 2 (2013)	Chizhou Tiantanghu New District	15	High-end transformed park in underdeveloped area
	Zhuozhou Eco, Livable Demonstration Area	50	Information industry park integrating technology, education & industry
	Nanjing Hexi New Town	94	Civilized, green and multi-functional smart & livable park
	Zhaoqing Central Eco Axis New Town	115	Green & low-carbon livable park
	Zhuzhou Yunlong New Town	76	Technological & industrial park integrating tourist culture
	Xi'an Chanba Ecological District	129	Livable and employment-friendly business & culture park
	Beijing Changxindian Eco-city	0.1048	Well-founded eco-friendly technological park
	Shanghai Hongqiao CBD	86	Low-carbon business trading park
	Shanghai Nanqiao New Town	84	Livable service park with industry-city integration
	Nanning Wuxiang New District Downtown Eco-city	275	Eco information park with complex functions
	Langfang Dachang Chaobai New Development Area	94	Modern industrial park with regional coordination
	South New Town of Tianjin Binhai New Area	52.6	Eco & business-friendly, livable and smart park
	Qingdao Sino-German Ecopark	11.58	Green, eco-friendly and sustainable park
	Jiaxing Haiyan Lakefront New Town	13.4	Livable, employment-friendly, modern cultural park
15 cities in Batch 3 (2014)	Nanxun Urban New District	6	Industrially upgraded waterside town, cultural & boutique city
	Yueqing Economic Development Zone	39	"Low-carbon in industry, energy consumption and living"
	Taizhou Xianju New District Eco-city	16.3	"Eco-oriented"
	Zhuhai Hengqin New District	106.46	"An open, energetic, smart and eco-island"
	Yunfu Xijiang New Town	80	Scientific utilization of mountains, smart water treatment and rural landscape in cities
	Xiaogan Airport Economic Zone	85.2	Agglomeration zone of "resource-saving and environment-friendly" industries
	Zhongxiang Mochou Lake New District	20	Organic city relying on cultural heritage
	Jingmen Zhanghe New District	17.24	Ecological-friendly, culture-oriented and industry-backed district
	Xinyu Yuanhe Eco-city	11.87	"Integration", "ecology", "energy", "convenience"
	Kunshan Huaqiao Economic Development Zone	50	Low-carbon eco-city with concentration of modern service industry
	Langfang Wanzhuang Eco-city	80	Geographical advantage, neighboring to Beijing, smart industry
	Yangshu New Town in Changsha Great Hexi Pioneering Zone	11.98	Eco-friendly and livable city in "Resource-saving and environment-friendly" society
	Wuhan Sixin New Town	17.43	Key demonstration area for development of the "Resource-saving and environment-friendly" society
	Jiyuan Jidong New Town	10	Green & eco, livable, employment-friendly modern demonstration town
	Central Lake Area of Ningbo Hangzhou Bay New Zone	242	"Linkage between city and industry, pilot & pioneering, eco-oriented district"

Batch	Demonstration city/town	Planned area (km ²)	Features
12 cities in Batch 4 (2014)	Beijing Future Science and Technology Park	3.38	"Innovation", "open", "human-centric", "low-carbon", "symbiotic"
	Beijing Yanqihu Eco Development Demonstration Area	21	Eco development demonstration area with Chinese cultural characteristics
	Beijing Zhongguancun Software Park	2.6	Demonstration for ecological planning improvement and rebuilding of existing park
	Baicheng City Eco-Area	26.6	Novel, fashionable, well-founded, livable and business-friendly new urban area
	Qiqihar Nanyuan New City	12	Livable, employment-friendly, eco & green, energy-saving and environment-friendly
	Shanghai International Tourism and Resorts Zone	20.6	Green & environment friendly resorts zone
	Changzhou Wujin District	1245.84	Large-scale development of green building
	Hangzhou Qianjiang Economic Development Zone	23.8	Eco industry, green building, low-carbon living
	Huzhou Anji Science, Education & Culture New Area	19.4	New urban district fusing with natural & ecological environment
	Tongling West Lake New Zone	14.78	Water-centric, culture-upmost, green- dominated and human-oriented
	Ya'an Daxing Green Eco Zone	11	Green eco-city demonstration in economically underdeveloped area in the western region
	Yichang Dianjun Eco-city	40	The eco-city that combines the dream for natural scenery and rural life with modern urban vitality

Source: *China's Low-Carbon Eco-city Development Report 2015*.

Special column 5-3 Zibo launched a publicity campaign for "low carbon in communities"

In order to respond to the national low-carbon community pilot and demonstration work and create the good environment for developing the low carbon community, Zibo launched a publicity campaign for low carbon in communities, explaining the significance of energy saving and low carbon emission to the community residents, popularizing the tips of energy saving and low carbon in daily life, solving the small problems for energy saving that residents may experience, carrying out extensive interaction with residents and calling for everyone to actively practice the energy-saving and low-carbon lifestyle. The community residents noted that they would start from themselves to save water, electricity and gas, ride a bicycle or take public transport vehicles for travelling, make purchase by carrying the reusable bag and live a comfortable "low-carbon life".

Special column 5-4 Beijing Gubeikou Town—Pilot & demonstration project for key green and low-carbon towns

Gubeikou Town is located in the northeast of Miyun County, Beijing and its total land area is 85.82 km². In order to realize the low carbon development, the Town has focused on promoting the following activities: firstly, develop the special plan for green ecology, delimit three ecological zones for development and construction control and define the recent priorities for overall development. Secondly, promote the ground source heat pump application projects, adopt solar lights in main streets, popularize the solar water heaters and biomass gas stations, and forcefully promote the construction of new-type energy-saving dwellings, installation of insulation boards and use of separate air source heat pump for heating in new rural development. Thirdly, actively carry out projects like artificial afforestation, enclosing the hills for natural afforestation, small watershed management etc., and complete the sandstorm source control in Beijing and Tianjin and the ecological management in Tanghe river basin. Fourthly, reinforce the long-lasting system development for comprehensive management of human settlement environment in rural areas, fully implement the integrated environment remediation actions for roads, scenic areas, river courses, folk villages and town areas, and develop the grid-based management mechanism for sanitation.



Energy-saving lights installed on main roads of all villages



Sewage treatment system built for each village

[Source: the People's Government of Gubeikou Town. Situation about the development of key green and low carbon town pilot& demonstration project in Gubeikou Town. Development of Small Cities & Towns [J]. Development of Small Cities & Towns, 2014 (01): 31-35]

5.1.4 Key green and low-carbon towns

In order to steadily promote the green urbanization, the Ministry of Housing and Urban-Rural Development and Ministry of Finance jointly issued *The Opinions on Pilot and Demonstration of Key Green Towns* (《关于绿色重点小城镇试点示范的实施意见》), with the aim of guiding the transformation of urban-rural development and creating a batch of demonstrative key green towns with good ecological environment. Currently, there are 7 towns winning the honorary title of national-level “Key green and low-carbon towns”, including Beijing Gubeikou Town, Daqiu Zhuang Town of Tianjin City, Haiyu Town of Jiangsu Province, Sanhe Town of Anhui Province, Guankou Town of Fujian Province, Xiqiao Town of Guangdong Province and Mudong Town of Chongqing City.

5.2 Atmospheric environment quality improvement

China started to implement the *Air Pollution Prevention and Control Action Plan* (《大气污染防治行动计划》) from 2014 and in this year, it issued a series of supporting policies by means of revising the *Law on the Prevention and Control of Atmospheric Pollution* (《大气污染防治法》). The air pollution situation in China has got better since then.

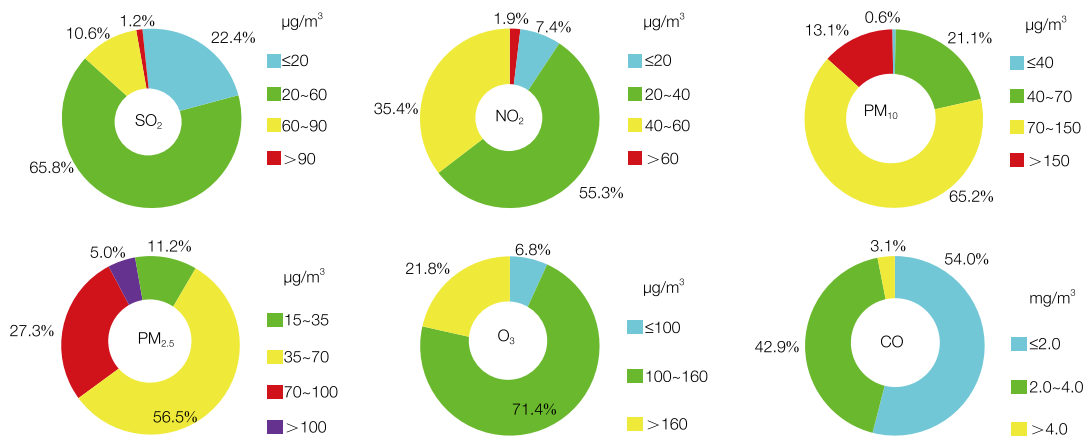


Figure 5-3 Ratio of cities in different density ranges for various indexes among cities implementing Phase 1 and 2 monitoring under the New Standards in 2014
(Source: 2014 China Environment Condition Communiqué)

Total emissions of major pollutants in the exhaust gas across China in 2014

Table 5-3

SO ₂ (10,000 tons)				NO _x (10,000 tons)				
Total emissions	Industrial source	Domestic source	Concentrated	Total emissions	Industrial source	Domestic source	Motor vehicles	Concentrated
1974.4	1740.3	233.9	0.2	2078.0	1404.8	45.1	627.8	0.3

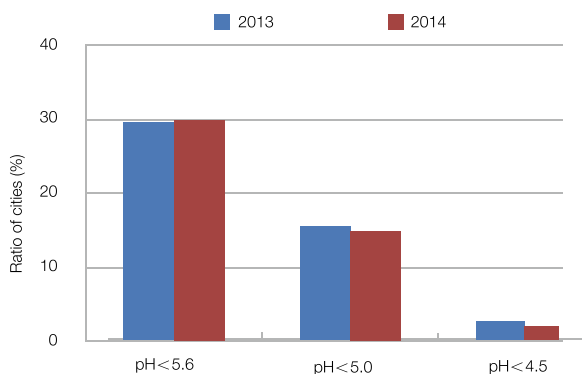


Figure 5-4 Year-on-year comparison for ratios of cities with different annual average of rainfall pH values in 2014
(Source: 2014 China Environment Condition Communiqué)

5.2.1 Overall situation about the atmospheric environment

(I) Air quality

In 2014, among the 161 prefecture-level and above cities carrying out the air quality monitoring based on new standards, 16 cities met the air quality standard (better than National II standard), accounting for 9.9%; 145 cities failed to meet the standard, accounting for 90.1%. In the 74 cities implementing the monitoring based on the new ambient air quality standards in the first batch, the annual density of fine particulate matters

(PM_{2.5}) was 64 µg/m³, down by 11.1% year on year.

(II) Pollutant emission

In 2014, the total sulfur dioxide (SO₂) emissions were 19.744 million tons, decreasing by 3.40% compared to last year; the total NO_x emissions were 20.78 million tons, decreasing by 6.70% compared to last year.

(III) Acid rain

In 2014, the ratios of cities with the annual average of rainfall pH value below 5.6 (acid rain), 5.0 (slightly strong acid rain) and 4.5 (strong acid rain) were 29.8%, 14.9% and 1.9% respectively, which basically maintained unchanged compared to the levels of the last year.

Acid rain pollution is mainly distributed in the regions from south of the Yangtze River to east of the Qinghai-Tibet Plateau, including most regions in Zhejiang, Jiangxi, Fujian, Hunan and Chongqing as well as the Yangtze River Delta and the Pearl River Delta regions.

(IV) Fogs and hazes

The average number of haze days across China was 35.9 in 2013, increasing by 18.3 days compared to the last year and hitting a record high since 1961. Fog and haze weather has oc-

Special column 5-5 analysis on sources of fogs and hazes

The analytical on sources of atmospheric fine particulate matters (hereinafter shortened as source analysis) was fully launched in municipalities directly under the central government, capital cities (except for Lhasa) and cities specially designated in the state plan (a total of 35 cities) in January 2014. By the end of 2014, source analysis and argumentation have been done for 9 key cities in Beijing-Tianjin-Hebei, Yangtze River Delta and Pearl River Delta regions. It is shown from the results that major sources of pollution for urban atmospheric environment varies by city. To be specific, the primary pollution source is the motor vehicles for Beijing, Hangzhou, Guangzhou and Shenzhen, and for Shijiazhuang and Nanjing it is the coal, while for Tianjin, Shanghai and Ningbo, the primary pollution sources are respectively dust, mobile source and industrial production.

occurred more frequently in the central and eastern regions and the number of fog and haze days in most regions from the central and southern region of North China to the northern region of South of Yangtze River falls into the range of 50 to 100 with some regions even exceeding 100 days.

5.2.2 Implementation of Air Pollution Prevention and Control Action Plan

(I) Policy guarantee

The state has successively issued 19 supporting policies & measures and released 20 standards for related pollutant emission. In terms of laws and regulations, it has revised the *Law on the Prevention and Control of Atmospheric Pollution*; in terms of evaluation and technical standards, it has released the *Evaluation Measures for Implementation of the Air Pollution Prevention and Control Action Plan (trial)* [《大气污染防治行动计划实施情况考核办法(试行)》], the *Collection of Advanced Technologies for Air Pollution Prevention and Control* (《大气污染防治先进技术汇编》) etc., and established the evaluation system centering on the quality improvement; in terms of energy structure adjustment, it has printed and distributed the *2014-2015 Action Plan for Energy Saving, Emission Reduction and Low-carbon Development* (《2014~2015年节能减排低碳发展行动方案》), further defining the specific goals for energy saving, emission reduction and carbon abatement in 2014 and 2015, reinforcing the various activities & measures and quantifying division of labor among different locations for energy saving, emission reduction and carbon abatement; meanwhile, it has also developed a series of industry standards and management measures for air pollution prevention and control.

(II) Key industry oriented and pollution source control

For the industrial source, within a year, the outdated and excess capacities were eliminated, including 31.1 million tons for iron & steel, 81 million tons for cement, 37.6 million weight cases for sheet glass and 55,000 units for small coal-fired boilers;

as for capacity expansion, desulfurization and denitrification equipments were added for coal fired power units and coal to gas projects were actively promoted to replace 5.2 million tons raw coal and reduce the SO₂ emissions by 48,000 tons.

For the mobile sources, more than 6 million units of yellow-label cars and old vehicles were eliminated. Automotive gasoline and diesel meeting National IV standard was supplied as scheduled across the nation. Beijing, Tianjin, Shanghai, Jiangsu, Guangdong, Shanxi etc. took the lead to supply automotive gasoline and diesel meeting National V standard, radically solving the long-lasting issue of mismatching between automobiles and fuels.

(III) Improvement of law enforcement supervision, monitoring and early warning

The environmental protection authorities actively leverage the hi-tech means in their work, e.g. the satellite and UAV (Unmanned Aerial Vehicle). 1,436 monitoring sites in 338 prefecture-level and above cities are all provided with the monitoring capability to implement the new air quality standards. Satellite remote sensing monitoring and information release for straw burning fire points is further enhanced. A total of 5,034 straw burning fire points were found across the nation (excluding cancelled fire points), decreasing by 2,844 compared to 2013 at the decrease rate of 36.3%. 21 provinces (autonomous regions, municipalities directly under the central government) and 194 prefecture-level and above cities have released the contingency plan for heavy pollution weather.

(IV) Great achievements

The air quality guarantee task for Beijing APEC (Asia-Pacific Economic Cooperation) Summit and Nanjing Youth Olympic Games was successfully fulfilled. During the APEC Summit, there were 4 days with excellent air quality and 7 days with good air quality and the average density of various pollutants reached the lowest level in 5 years for the same period, exhibiting the "APEC Blue" .

5.3 Urban ecological security guarantee

In the process of urban development, China is increasingly aware of the importance of ecological security and how to guarantee the health, stability and sustainability of urban ecological system becomes an important topic. In recent years, protecting the important ecological space, restricting the urban sprawl, constructing the ecological gardens, maintaining the biodiversity and restoring the damaged ecosystem have become the new requirements of the Chinese government for urban development and construction.

5.3.1 Ecological space control

(I) Red line for ecological protection

In April 2015, the Ministry of Environmental Protection released the *Technical Guideline for Delimiting the Red Line for Ecological Protection* (《生态保护红线划定技术指南》) to guide the ecological red line delimiting activities of different locations. Currently, some provinces and cities have taken the lead to complete the task of delimiting the red line for ecological protection: the initially delimited ecological red line area in Beijing accounted for more than 70% of its total urban area, while Shanghai delimited 44.5% of its land area into ecological red line protection area. Other provinces and cities are also deploying relevant tasks rapidly.

(II) Urban development boundary

In July 2014, the Ministry of Land and Resources joined hands with the Ministry of Housing and Urban-Rural Development to carry out the pilot projects for delimiting the urban development boundary in 14 cities including Beijing, Shenyang,

Shanghai, Nanjing etc. At present, the pilot project for delimiting the development boundary in these 14 cities has gained initial results and relevant principles and methods for development boundary delimitation have been basically established. Meanwhile, relevant work for promoting “urban development boundary delimitation” to 600 cities as soon as possible has been defined.

For example, in Guangzhou, it has taken the joint surrounding lines for construction land, urban ecological green space and constructive expansion conditionally-permitted zones as the control line for growth boundary of construction land, which covers an area of 2,440 km². Among them, the contiguous urban concentrated construction control zones are delimited to be the urban growth boundary.

5.3.2 Urban ecological development

(I) Eco-garden development

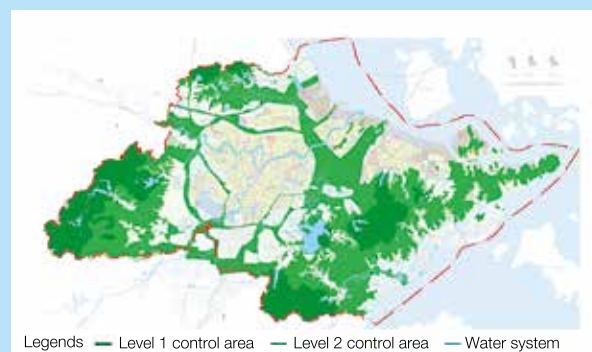
In 2014, the green area in urban built-up areas across China was 1,819,960 hectares, while the greening rate and the percentage of greenery coverage for built-up areas were 36.29% and 40.22% respectively. The total area of various kinds of parks was 367,926 hectares and the park land area per capita was 13.08 m². From 2006 to 2014, various indicators for urban afforestation rate have climbed up year on year with the green space area and park area in built-up areas growing by 74.9% and 76.8% respectively.

(II) Eco-garden city development

Currently, about half of Chinese cities have won the title of “National Garden City” and about 1/10 counties have won the title of National Garden County. In 2012, the Ministry of Housing and

Special column 5-6 the red line for ecological protection in Ningbo

For its urban area, Ningbo has included some important mountains and water bodies, urban ecological belts and various ecological isolation zones into the red line for ecological protection, a total area of 1,306 km², accounting for 51.0% territory of the city. Level 1 control area covers 355 km², where the strictest ecological protection and control measures are adopted and all development and construction activities detrimental to the ecological environment are banned; Level 2 control area covers 951 km², where the current state of the ecosystem shall be maintained and the ratio of construction land and construction density shall be strictly controlled.



Red line for Ecological Protection in Ningbo's urban area

(Source: *Red Line Planning for Ecological Protection of Ningbo City*)



Figure 5-5 Changes of afforestation indicators for Chinese cities
(Source: *Statistical Yearbook of China Urban Construction 2014*)



Figure 5-6 Cattle egrets foraging on the grassland
(Source: *Investigation and Research Report on Biodiversity in Suzhou Industrial Park*)

Urban-Rural Development started to promote the development of and application for the title of eco-garden cities. Compared to the national garden city, the national eco-garden city pays more attention to ecological function improvement, ecological security guarantee, sustainability and quality of life. At the beginning of 2016, the Ministry of Housing and Urban-Rural Development announced the list of the first batch of national eco-garden cities, and 7 cities including Xuzhou, Suzhou, Kunshan, Shouguang, Zhuhai, Nanning and Baoji were on the list.

(III) Protection of urban biodiversity

In 2014, the National Development and Reform Commission

joined hands with 12 ministries and commissions including the Ministry of Housing and Urban-Rural Development to release the *National Ecological Protection and Construction Plan (2013-2020)* [《全国生态保护与建设规划(2013~2020年)》], putting forward to build and improve the urban ecosystem. In 2015, the Ministry of Housing and Urban-Rural Development compiled and distributed the *National Urban Ecological Protection and Construction Plan (2015-2020)* [《全国城市生态保护与建设规划(2015~2020)》], bringing up that protection and construction activities shall be carried out by mainly targeting at urban natural ecological resources and ecological space.

Currently, some cities have formulated or are formulating the urban biodiversity protection plan or work plan.

5.3.3 Urban ecological restoration

(I) Urban water body treatment

The *Action Plan for Water Pollution Prevention and Control* (《水污染防治行动计划》) released by the State Council in April 2015 puts forward that efforts shall be made to carry out urban black and odorous water body treatment and prefecture-level and above cities shall complete the goal of black and odorous water body treatment for urban built-up areas. In August 2015, the Ministry of Housing and Urban-Rural Development and Ministry of Environmental Protection jointly issued *The Guideline on Urban Black and Odorous Water Body Treatment* (《城市黑臭水体整治工作指南》) to guide the black and odorous water body treatment work in all Chinese cities. At present, the black and odorous water body screening has been done for built-up areas of prefecture-level and above cities across China. Among 295 prefecture-level and above cities, a total of 1,811 black and odorous water bodies were identified in 216 cities, including 1,545 rivers, accounting for 85.4%; 264 lakes and ponds, accounting for 14.6%. The black and odorous water body treatment work has also been fully rolled out in all cities.

(II) Urban mountain restoration

In 2013, the state leaders put forward the ecological development concepts that “Lucid waters and lush mountains are invaluable assets” and “We’d rather maintain the lucid waters and lush mountains than make them into invaluable assets”. In recent years, the value of mountains as the important landscape resource has been gradually recognized by the local governments. Many cities with mountains in their territories have started to give up the old practice of digging the mountains to acquire construction land resources and mountain restoration and afforestation for barren hills and slopes have also become the main content in urban ecological development.



Figure 5-7 Yanchi Mountain in Jinan: before and after mountain restoration project (Photo by Li Rongxu)

Special column 5-7 Donghaochong treatment in Guangzhou

Donghaochong is one of the major creeks along the Guangzhou reach of Pearl River. This 7-11 meters wide and 5 km long creek used to be a dirty ditch due to sedimentation, narrowed river course and serious pollution. Guangzhou started to carry out 9 major treatment projects for Donghaochong in 2009, which have not only improved the water quality of Donghaochong, but also made it the water scenery for residents to enjoy. On the basis of following the natural law of river ecology, it has also restored the landscape of waterside villages in Lingnan and refreshed the memory of Guangzhou as a waterside town.

(III) Soil remediation of contaminated sites

At the same time of strengthening air pollution and water pollution treatment, the soil pollution issue in China has also gained the attention and relevant remediation work has been put onto the agenda. In March 2014, the Ministry of Environmental Protection developed and released a series of guiding documents, e.g. *Technical Guidelines for Site Environmental Investigation* (《场地环境调查技术导则》), *Technical Guidelines for Soil Remediation of Contaminated Sites* (《污染场地土壤修复技术导则》) etc. Meanwhile, the draft of *Action Plan for Soil Pollution Prevention and Control* (《土壤污染防治行动计划》) has been basically finalized, which will be implemented after reporting for approval in near term.

5.4 Utilization of renewable energy

In order to promote the energy production and consumption revolution, the General Office of the State Council issued the *Action Plan for National Energy Development Strategy (2014-2020)* [《国家能源发展战略行动计划(2014~2020年)》], clear-

ly indicating that “the development of clean and low-carbon energy shall be the major direction for adjusting the energy structure” and “the ratios of renewable energy e.g. wind, solar, geothermal energy etc. and nuclear power consumption shall be greatly increased”. *The Guiding Opinion on Further Doing a Good Job in Developing the 13th Five-Year Plan for Renewable Energy Development* released by the National Energy Administration defined the specific goal that “the ratio of non-fossil energy consumption shall reach 15% by 2020 and 20% by 2030”.

5.4.1 Current state of the development of the renewable energy industry

By the end of 2014, the supply of China’s commercialized renewable energy accounted for 9.3% of total energy consumption. From 2010 to 2015, the percentage of installed capacity of renewable power generation in China’s total installed capacity increased from 26.1% to 34.2% and the percentage of generating capacity increased from 18.2% to 26.3%. The power supply structure have been optimized better year on year.

Special column 5-8 soil remediation of contaminated sites in Shanghai World Expo Park

Shanghai World Expo Park is built on an old factory site and 75% of the plots in a total area of 6.28 km² are old industrial sites for steel mill and chemical plant with serious and complicated heavy metal and organic pollution. Site soil pollution is the major environmental issue that the construction of Shanghai World Expo needs to solve in first place. Shanghai has carried out detailed soil pollution census for all plots in the Park, confirmed dozens of suspicious contaminated plots and put forward the remediation plan for the contaminated soil based on the health risk assessment results. It has adopted several processing techniques at the original and different sites to remove or reduce the contents of pollutants in the soil and the human health risks, and carried out appropriate management and maintenance to the contaminated sites. The soil remediation project for the whole park processed a total of 300,000 m³ contaminated soil.



Bird's eye view of remediation operation to some sites in Shanghai World Expo Park (Photo by Fu Rongbing)

(I) Hydropower

In 2015, the installed capacity of hydropower stations in China was 320 GW, accounting for 21.2% of the total installed capacity, which exceeded the goal of 290 GW defined in the 12th Five-year Plan for National Hydropower Development; the hydropower generating capacity was 1.11 TWh with the percentage of 19.8% in total generating capacity, increasing by 5.1% compared to last year.

(II) Wind power

At the end of 2015, the installed capacity of China's grid-connected wind power was 130 GW, up 34.9% year on year; the generating capacity for the year was 1851 GW · h, up 15.8% year on year. China's new installed capacity in 2015 leads the world. As the first set of seawater desalination units were successfully exported from Yancheng to Indonesia at the beginning of 2016, China's wind-powered seawater desalination industry and technology has also made the new breakthrough.

(III) Photovoltaic (PV)

Distributed PV adoption grows rapidly in the eastern region, while PV large bases scale up in the northwestern region. Along with the technological progress, the price of battery pack has reduced by more than 80% compared to the beginning of the 12th Five-year Plan period and the economics of PV power generation has improved significantly. Starting from 2013, China has become the global largest new PV application market.

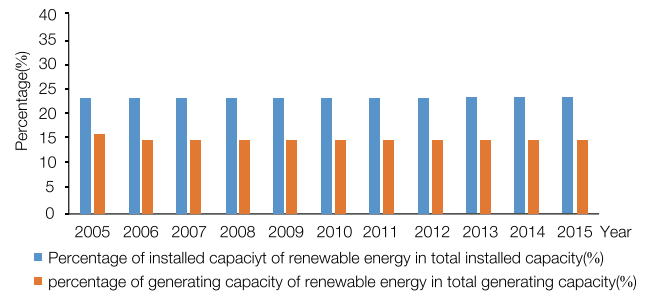


Figure 5-8 Percentage of installed capacity and generating capacity of renewable energy, 2005-2015

(Source: National Energy Administration, China Electricity Council)

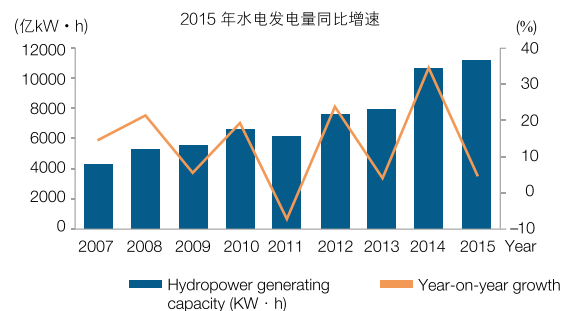


Figure 5-9 Hydropower generating capacity and year-on-year growth from 2007 to 2015

(Source: *Research Report on China's Hydropower Industry Operation Tendency and Strategic Investment, 2016-2022*)

(IV) Biomass energy

The installed capacity of biomass power was 9480 MW and total generating capacity reached 416 GWh in 2014. In addition, biomass briquette fuel has also been rapidly applied in Beijing-Tianjin-Hebei, the Yangtze River Delta and the Pearl River Delta regions, becoming the important alternative fuel for small coal-fired boilers.

(V) Geothermal and ocean energy

By the end of 2014, total area of geothermal heating buildings in China reached 400 million m². Additionally, the technology of ocean energy exploitation is also gradually developing. Significant progress has been made for technology R&D, demonstration and application of tidal energy, wave energy and tidal current energy etc.

5.4.2 New energy demonstration city

In order to bring out the role of renewable energy in adjusting the energy structure and protecting the environment, the National Energy Administration released *The Notice of National Energy Administration on Announcing the List of New Energy*

Demonstration Cities (Industrial Parks) (Batch 1) (G.N.X.N. [2014] No. 14) [《国家能源局关于公布创建新能源示范城市(产业园区)名单(第一批)的通知》], deciding that 81 cities including Changping District, Beijing etc. and 8 industrial parks were selected as the first batch to construct the new energy demonstration cities and industrial parks.

5.4.3 Demonstration of application of distributed PV power generation

In order to effectively promote the utilization of distributed PV power generation by various means, the State Council issued *Several Opinions on Promoting the Healthy Development of PV Industry* (G.F. [2013] No. 24) [《关于促进光伏产业健康发展的若干意见》(国发[2013]24号)], encouraging the exploration of specialized service model and the innovation of business model, investment & financing model, pilot projects of smart distribution grid with integrated power generation and distribution etc. Currently, there are 18 demonstration areas and 12 demonstration parks for application of distributed PV power generation in the first batch.

5.5 China Practice: green building

Compared to the developed nations, the green building has a relatively late start in China. However, the large number of new buildings in China means that there is great significance and huge room for China to develop the green building. Meanwhile, as the environmental issues become increasingly prominent and the economic development turns to a more sustainable path, in recent years, the Chinese government has started to promote the development of green building in a more active and strong posture.

5.5.1 Overall situation

(I) Quantity of projects with Green Building Evaluation Label

In recent years, the quantity of projects with Green Building Evaluation Label has maintained the strong growth momentum. In particular, the number and area of green buildings have shown explosive growth since the release of *Green Building Action Plan* (《绿色建筑行动方案》) in 2013.

According to relevant statistics of the Ministry of Housing and Urban-Rural Development, as of January 2015, the total number of projects obtaining China's Green Building Evaluation Label (China Green Label, the same below) reached 2,538 with accumulated building area exceeding 290 million m².

(II) Situation about the development of green buildings by province/city

The development of green building is somewhat characterized

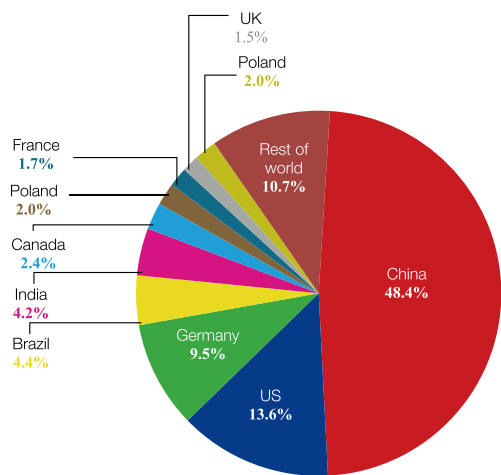


Figure 5-10 Top 10 countries in the world in terms of new installed capacity of wind power in 2015

(Source: Global Wind Energy Council, newenergy.in-en.com)

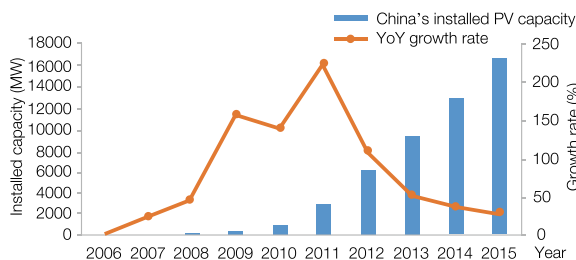


Figure 5-11 Installed PV capacity in China, 2006-2015

(Source: newenergy.in-en.com)

First Batch New Energy Demonstration Cities and Industrial Parks Approved

Table5-4

Demonstration Cities			
Province (District, Municipality)	Name of Demonstration Cities	2015	
		Alternative energy (10,000 TCE/year)	Share in energy consumption of cities (urban areas/industrial parks) (%)
Beijing Municipality	Changping District	34.0	7.1
Hebei Province	Chengde	95.0	11.1
	Xingtai	115.0	6.6
	Zhangjiakou	125.0	6.2
Shanxi Province	Yuncheng	18.0	6.0
	Datong	104.0	7.4
	Changzhi	275.0	6.4
Inner Mongolia Autonomous Region	Huhhot	48.0	7.0
	Tongliao	85.0	9.7
Liaoning Province	Jinzhou	80.0	8.0
	Fuxin	51.0	7.0
Jilin Province	Taonan	45.0	25.7
	Dunhua	33.0	18.0
	Baicheng	28.0	16.8
Heilongjiang Province	Mudanjiang	50.0	8.3
	Yichun	83.0	13.4
	Hailun	18.9	13.9
	Shuangcheng	25.6	12.2
Jiangsu Province	Yangzhou	126.0	8.0
	Xuzhou	98.0	6.8
	Huai'an	94.0	8.4
	Yancheng	72.0	10.6
	Nantong	104.0	8.2
Zhejiang Province	Wenzhou	77.2	8.6
	Taizhou	35.7	6.7
	Ningbo	134.0	6.7
	Xiuzhou District, Jiaxing	31.0	10.0
Anhui Province	Wuhu	38.0	6.5
	Hefei	113.0	6.6
	Bozhou	23.0	16.7
Fujian Province	Putian	96.0	10.7
	Jian'ou	50.0	38.0
	Nan'an	28.0	7.0
Jiangxi Province	Ganzhou	200.0	19.5
	Xinyu	57.0	6.6
Shandong Province	Dezhou	52.0	8.0
	Tai'an	48.0	7.4
	Dongying	130.0	10.0
	Jimo	43.0	6.4
	Changqing District, Jinan	28.0	9.4

Demonstration Cities			
Province (District, Municipality)	Name of Demonstration Cities	2015	
		Alternative energy (10,000 TCE/year)	Share in energy consumption of cities (urban areas/industrial parks) (%)
Henan Province	Zhengzhou	118.0	10.2
	Kaifeng	40.0	10.0
	Puyang	40.0	8.07
	Nanyang	72.0	12.3
	Anyang	65.0	8.0
Hubei Province	Xiangyang	104.0	6.0
	Ezhou	59.0	6.0
	Yichang	112.0	7.1
	Huangshi	49.0	6.7
Hunan Province	Xiangtan	69.0	6.0
	Huaihua	32.7	10.9
	Zhuzhou	62.3	6.0
	Shaoyang	24.7	7.9
Guangdong Province	Shenzhen		6.0
	Sanshui District, Foshan	15.0	6.2
Guangxi Zhuang Autonomous Region	Nanjing	196.0	8.0
	Wuzhou	19.2	7.7
	Laibin	59.0	9.2
Hainan Province	Dongfang	25.8	6.9
Sichuan Province	Panzhihua	87.4	6.2
	Guangyuan	39.7	14.8
Guizhou Province	Guiyang	159.0	6.8
	Zunyi	212.0	11.0
	Xingyi	33.0	7.8
Yunnan Province	Dali	53.7	20.0
	Chuxiong	41.0	28.0
	Baoshan	128.0	21.6
	Shilin	12.4	14.6
	Chenggong District, Kunming	31.0	7.6
Shaanxi Province	Yulin	48.0	10.4
	Xi'an	212.0	6.4
Gansu Province	Dunhuang	21.0	27.0
	Jinchang	85.9	12.5
	Wuwei	35.0	8.0
Qinghai Province	Golmud	120.0	12.0
	Tibetan Autonomous Prefecture of Hainan	27.4	18.2
Ningxia Autonomous Region	Yinchuan	84.0	7.0

Demonstration Cities			
Province (District, Municipality)	Name of Demonstration Cities	2015	
		Alternative energy (10,000 TCE/year)	Share in energy consumption of cities (urban areas/industrial parks) (%)
Xinjiang Uygur Autonomous Region	Turpan New Area	0.6	33.0
	Kashgar	19.0	9.0
	Korla	10.0	9.0
Xinjiang Production and Construction Corps*	Beitun	10.0	12.9
Demonstration Industrial Parks			
Province (District, Municipality)	Names of Demonstration Industrial Parks	2015	
		Alternative energy (10,000 TCE / year)	Share in energy consumption of cities (urban areas/industrial parks) (%)
Tianjin Municipality	Sino-Singapore Tianjin Eco-City	4.4	16.6
Hebei Province	Beidaihe New District	10.0	8.0
Liaoning Province	Dalian Sanshilipu Harbour Industrial Park	14.0	50.3
Jilin Province	Changchun Economic and Technological Development Zone	14.0	9.1
Jiangsu Province	Nanjing Jiangning Economic and Technological Development Zone	28.0	36.8
	Zhenjiang Economic and Technological Development Zone	90.0	15.3
Anhui Province	Maanshan Demonstration Park for Undertaking Industrial Transfer	3.9	9.4
Shandong Province	Qingdao Sino – German Eco-park	3.9	20.0

Source: National Energy Administration.

* Xinjiang Production and Construction Corps belongs to the Subordinate units of the Chinese State Council.

by the geographical imbalance in China. Generally speaking, the size of green building market is highly correlated with the economic development level of different regions. Currently, those provinces/cities at the top of GDP list, e.g. Jiangsu, Shanghai, Guangdong, Beijing, Shandong etc., are also the regions making rapid development in green buildings.

(III) Development of LEED in China

According to the statistics, by the end of April 2015, there were a total of 627 projects passing LEED certification in mainland China (excluding Hong Kong, Macau and Taiwan, the same be-

low) with accumulated building area exceeding 28 million m²; calculated by the area getting LEED certification, China has become one of the most important overseas markets for the US LEED certification.

5.5.2 Policy requirements

In 2014, China released multiple policy documents: *National New-Type Urbanization Plan (2014-2020)* [《国家新型城镇化规划(2014~2020年)》], prescribing that 50% of new buildings shall reach the green building standard by 2020; *2014-2015 Action Plan for Energy Saving, Emission Reduction and Low-*

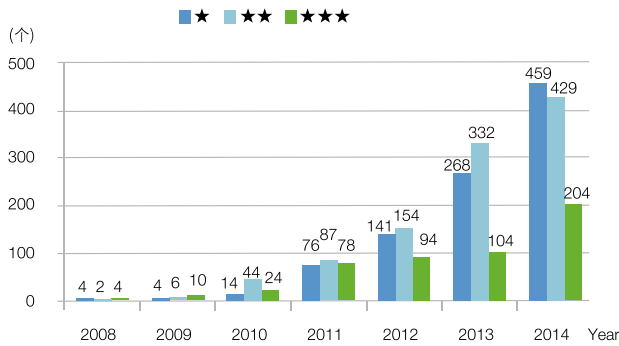


Figure 5-12 Quantity of green buildings in China (2008-2014)
(Source: Ministry of Housing and Urban-Rural Development)

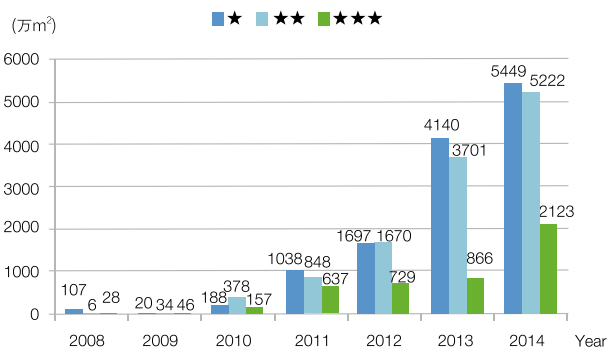


Figure 5-13 Area of green buildings in China (10km²) (2008-2014)
(Source: Ministry of Housing and Urban-Rural Development)

carbon Development (G.B.F. [2014] No. 23) (《2014~2015年节能减排低碳发展行动方案》), calling for in-depth deployment of green building action and stipulating that execution rate of green building standard for new buildings shall reach 20% by 2015 and the area of new green buildings shall reach 300 million m². In 2014, China make the latest revision to and released & implemented the *Green Building Evaluation Standard* (GB/T 50378—2014) (《绿色建筑评价标准》).

In 2015, the Ministry of Industry and Information Technology and Ministry of Housing and Urban-Rural Development jointly released the *Action Plan for Promoting Production and Application of Green Building Materials* (《促进绿色建材生产和应用行动方案》), pointing out that, by 2018, the application rates of green building materials in new buildings, green buildings, pilot & demonstration projects and rebuilding projects of existing buildings shall reach 30%, 50%, 70% and 80% respectively.

5.5.3 Characteristics of different provinces/cities in promoting the green building

(I) Local legislation guarantee

Jiangsu Province issued and implemented the *Green Building Development Rules of Jiangsu Province* (《江苏省绿色建筑发展条例》) on July 1, 2015 and became the first province in China that comprehensively promoted the green building via lo-

cal legislation. *Rules for Green Buildings in Zhejiang Province (draft)* [《浙江省绿色建筑条例(草案)》] was released recently to solicit the public opinions. Shanghai Housing and Urban-Rural Development Commission actively carried out the legislative research for *Rules for Green Buildings in Shanghai* (《上海市绿色建筑条例》) with the aim of management by laws.

(II) Development of local technical standards

Zhejiang Province took the lead to implement the *Standards for Green Design of Civil Buildings* (《民用建筑绿色设计标准》) and fully enforced the green design standards for new civil buildings starting from January 1, 2014, becoming the first province in China that executes the green building standards in a comprehensive manner.

(III) Local fiscal incentive policies

Xiamen issued the *Interim Measures for Fiscal Incentives for Green Buildings* (《绿色建筑财政奖励暂行管理办法》), prescribing that the construction units working on the acquired civil construction land in accordance with the green building standards and obtaining the green building operation labels as well as owners who purchase these green buildings (residences) may get fiscal incentives. The standards for granting fiscal incentives to the units developing and constructing the green buildings are: RMB 30/m² for 1-star green buildings (residences); RMB 45/m² for 2-star green buildings (residences); RMB 80/m² for 3-star green buildings (residences); and RMB 20/m² for star-level green buildings other than residences and projects with fiscal investment and financing. For commercial housing owners purchasing the green buildings, their deed tax will be refunded as incentives based on the principle of paying tax before returning as incentives: 20% and 40% of the deed tax will be returned respectively for those purchasing 2-star and 3-star green commercial residences.

(IV) Building of regulation system and information platform

Jiangsu Province has carried out the research on regulation system for energy efficiency in buildings and green building demonstration area as well as management information system of the demonstration area, and developed the demonstration area regulation system and management information platform centering on “coordination between departments of construction and finance, hierarchical management, concentrated resources and linked regulation”. Development of the regulation platform for energy efficiency in buildings in Zhejiang was listed as a national demonstration project.

(V) Full coverage and focused promotion

The total area of new buildings with Green Building Evaluation Label in Guangdong reached 24,226,500 m² in 2014, exceeding the task prescribed for the 12th Five-year Plan period



Figure 5-14 Changzhou Wujin green building industry cluster demonstration area

(Source: <http://www.zhclg.gov.cn/>)

and realizing the full regional coverage of green buildings for the first time. Jiangsu has nearly 1,000 projects obtaining the Green Building Star Label and the total area exceeds 100 million m², topping the list in China. Jiangsu started the construction of province-level demonstration areas for energy efficiency in buildings and green buildings from 2010; by end of 2014, 54 province-level demonstration areas have been built across the province, realizing the full coverage of all provincial cities.

5.6 Recommendations from experts: reinforce guidance on planning and make an overall arrangement on orderly development

(I) Focus on low-carbon eco-planning and strengthen low-carbon eco-demonstration

Lead and guide the urban planning, design & development with green and low-carbon concepts and put it into practice at all levels from city, urban area and communities to small towns. Pay attention to integration of low-carbon ecology and urban morphology, land utilization, industrial development, modes of transport, energy utilization and urban buildings etc.; continue to explore and innovate the planning for low-carbon eco-demonstration cities, realize the low-carbon goal in all aspects, actively carry out the special practices for low carbon cities, urban areas, communities and small towns, and accumulate the experience for building the low-carbon eco-city.

(II) Improve the management on urban development and improve water and ambient air quality

Take resource and environment capacity as the constraint for local development. Adjust and optimize the industrial structure, promote industry transformation and upgrading and set

up the environmental thresholds. Optimize the spatial pattern of industries, make a reasonable layout of water and green space, reserve the ventilation corridors in cities, refine the layout and form of buildings and improve urban micro-climate. Strengthen urban environmental infrastructure development and ecological restoration, control and mitigate water and ambient air pollution and concentrate efforts on urban black and odorous water body treatment.

(III) Strengthen ecological space control and improve ecosystem structure

Further expand and refine the eco-space control system and strengthen the effective control on urban green space, water surface etc., meanwhile further reinforce the protection of biodiversity, create the organic linkage between urban green space and regional natural ecosystem, improve the ecosystem structure, realize the quantity and quality improvement of urban eco-space in parallel and steadily improve the urban ecological security.

(IV) Reinforce the utilization of renewable energy and promote the development of green buildings

Combine with the characteristics of urban resources to adjust the energy structure in a reasonable manner and encourage the use of renewable energy. Assess the impacts of climate change on cooling, heating and energy saving standards for different cities and various kinds of users including urban residents, enterprises, public institutions etc. and revise relevant facilities construction standards. Fully roll out the green building standards for new civil buildings, gradually carry out the rebuilding of existing buildings for energy saving and actively promote the modernization of building industry.

(V) Focus on the actual effects of low-carbon ecology and pay attention to saving and utilization

The development of low-carbon eco-city shall match with the urban economic strength by paying attention to the principle of “doing what you are capable of” . The development of low-carbon eco-city shall also match with the resource endowments and pay attention to act according to local circumstances, e.g. regions rich in solar resources shall forcefully develop the solar power and determine the advantageous development area pertinently. Application of low-carbon and ecological technologies shall consider the applicability, as technologies with high technology contents are not always applicable for each type of cities. Therefore, cities may select less expensive or even free technology, and they can even make better results by guiding the residents’ lifestyle.



Shanghai: Flexible Landscape on Jing'ansi Square, an integration of architectural art into public culture (Photo by Zhong Yang / 东方IC)



Future-Oriented Improvement of Urban Space Quality

Shaping and reinforcement of
overall landscape features / **108**

Protection and inheritance of
history and culture / **111**

Quality improvement in public space / **118**

China practice: urban greenway development / **124**

Recommendations from experts / **126**

The Central Urbanization Working Conference held in 2015 clearly pointed out that China had entered the new period of development. *The Several Opinions of the CPC Central Committee and the State Council on Further Strengthening the Urban Planning & Construction* (《中共中央国务院关于进一步加强城市规划建设管理工作的若干意见》) released in 2016 brought up that “(efforts shall be made to) shape the urban style and feature, encourage the urban design work, strengthen the management of architecture design and protect the historical and cultural features.” At the important stage of transformation of urban development mode, the management concept of urban planning and development is also changing, while improving and shaping the urban style and feature and enhancing the quality of urban space environment has become the important topic faced with the urban development.

For future-oriented improvement of urban space quality, activities at the following two levels need to be carried out by leveraging the means of urban design: on the one hand, efforts shall be made to strengthen the control on overall urban landscape features at the macro level, shape the urban landscape features that accord with the regional traits, historical & cultural contexts and epochal characters through the protection and inheritance of natural landscape pattern and historical & cultural contexts, reinforce the urban features, shape the urban spirit and realize the effects of “image establishment externally and cohesion improvement internally” ; on the other hand, efforts shall be made to take the urban public space as the breakthrough point, combine with different forms of urban renewal, continuously carry out systematic development and human-oriented improvement of the public space, build the comfortable, convenient, attractive and high-quality public space, comprehensively improve the space environment for the residents in daily life and social activities, enhance the urban glamour and vitalize the cities.

Nowadays, some municipal governments in China have had a deep understanding of the significant promoting role of urban space quality for the urban development and improvement of people’s livelihood. To this end, they have carried out various kinds of explorations and practices in planning formulation, system guarantee, standard establishment, facilities construction etc., so as to gradually change the issues in urban development, e.g. extensive & disordered development, “stereotyped urban appearance” etc., and strive to move towards the livable, employment-friendly and happy life.

6.1 Shaping and reinforcement of overall landscape features

The urban development shall reflect the concept of respecting for nature, letting nature take its course and harmony between man and nature, so that the residents may watch hills, enjoy waters and remember the hometown by relying on the special

scene of existing landscape features and fusing cities into the nature. To shape the urban style and feature, we must maintain the correspondence with urban featured landscape and reinforce it in the process of artificial construction and highlight the urban features through controlling the urban morphology and building heights and gradual developing the special feature areas.

6.1.1 Macro landscape pattern development

China is a country with more mountains and less plains. Among the 9.6 million km² in its existing territories, the area of mountains and hills takes up 2/3, while the area of plains only accounts for 1/3. Our ancestors have gone through the process of “living in hillsides, moving towards the intersecting zones between mountains and plains, then moving to the plains” in their migration going after the natural environment and resource conditions, while “living by water” is the main thread in this process. Therefore, the landscape (i.e. mountains and rivers) culture has played a vital role in macro pattern creation and evolution for most Chinese cities.

Nowadays, many cities also pay attention to the role of landscape culture in macro landscape pattern in their macro strategic plans. Xiamen emphasizes the beauty of “the mountain-sea pattern” in the “Beautiful Xiamen Strategic Plan” (《美丽厦门战略规划》), coming up with the idea of taking the beautiful mountains as the context, the vast and open sea as the basis, and the abundant natural resources (“mountains, rocks, forests, springs, sea, bays, islands and seashores”) as the components to create the landscape feature of “fusion between the mountains and the sea” that is flexible and rhythmic and the urban image of “mountains and sea everywhere” . In deepening the results for *Urban-rural Master Planning of Chongqing (2007-2020)* [《重庆市城乡总体规划(2007~2020年)》] in 2014, Chongqing put forward the concept of developing a beautiful landscape city for the first time, planning to take the natural mountains and waters as the ‘background’ for the urban picture, construct the hiking trails, build shorelines for water sports and improve the systematic layout of urban green space on the basis of respecting and protecting the nature, so as to make citizens enjoy the mountain and water resources in a convenient manner. Kunming has delimited the urban landscape pattern protection zone in *The Research on Urban Landscape Feature and Height Control & Planning of Kunming* (《昆明城市景观风貌及高度控制规划研究》), carrying out landscape feature and height control at three levels, i.e. urban landscape pattern area, urban landscape gallery area and urban landscape environment penetration area, to create the orderly macro landscape pattern with appropriate density. In *The Implementation Outline for Constructing “A Beautiful Hangzhou” (2013-2020)* [《“美丽杭州”建设实施纲要(2013~2020年)》], Hangzhou puts forward to maintain the urban landscape pattern of “a river flowing through the city” and “a city circled by mountains in three directions and a city



Figure 6-1 A real picture of “mountain-sea pattern” in Xiamen
(Source: “Beautiful Xiamen” Strategic Plan)



Figure 6-2 A real picture of Hangzhou as “a landscape city”
(Source: quanjing.com)

with hills echoing to lakes” , taking the natural background as the basic carrier for shaping Hangzhou’s urban and rural style and feature, maintaining the West Lake and Qiandao Lake as the core for the regional landscape, fully leveraging the landscape elements of mountains, rivers, forests, gardens and cities, making all clusters and districts inlaid among the green spaces, forests, wetlands and rivers, and manifesting the characteristics of “a city surrounded by mountains and a forest city with beautiful lakes and green waters running through” for Hangzhou as a landscape city.

It is the spatial axis rooted in the landscape composition that is inseparable with the landscape culture. In the process of urban settlement, Chinese cities often form the organic spatial axis among mountains and rivers. It is undeniable that ancient urban settlement (especially the capital) in China exhibits the strong axis order, for example the central axis of Beijing in Ming and Qing dynasties, the north-south central axis in Tang Chang’an City, East Capital Bianliang of North Song dynasty, the traditional central axis in the old urban districts of Guangzhou etc. These urban axes keep evolving and continue to extend, playing a critical role in the urban macro landscape pattern development.

Today, the traditional central axis of Beijing (extending 7.8 km from the Yongding Gate in the south to the Drum and Bell Tower in the north) has been included in the tentative list of World Heritage sites recommended by the state. Meanwhile, Beijing’s urban planning also points out that on the existing basis, extending to Yongding River system in the south (Beijing new airport area), Yanshan Mountains in the north and accompanying by Chang’an Avenue and its extension to form the cross framework for Beijing’s urban and rural landscape pattern. Similarly, starting from 1950s, Xi’an has also rebuilt and extended the axis space on the basis of north-south central axis for Tang Chang’an City and Xi’an City in Ming and Qing dynasties to shape the current north-south axis for Xi’an. Different from the two examples above, on the basis of maintaining the traditional central axis in the old urban districts (a total length of 3.3 km starting at Zhenhai Tower on top of Yuexiu Hill in the north and ending at Haizhu Square in the south), Guangzhou made the plan and brought up the “new urban central axis” (extending 12 km from Yanling Park in the north and Haixinsha Island along the back course of Pearl River in the south) to add the new momentum and new look for urban development in accordance with urban space resources & conditions and the development requirements of the new era.



Figure 6-3 A real picture of the central axis of Xi'an (Bell Tower section on the left and Dayan Tower section along the central axis on the right)
(Source: quanjing.com)



Figure 6-4 A real picture of the central axis of Guangzhou
(Source: www.huitu.com)

6.1.2 Development of special feature areas

To address the issue of gradual fading of urban features in the past rapid development and construction, many cities pay more attention to the development and control of special feature areas. They have combined the urban features with the functional layout and carried out the research on planning of urban special feature areas and guidelines on architecture features control, so as to guide the shaping and reinforcement of urban special features.

It has been a long time for Tianjin to explore the development of special feature areas. Starting from 2009, Tianjin has carried out the explorations and practices on special control guidelines by relying on urban design at different levels and formulated the *Collection of Guidelines for Planning & Construction in Tianjin* (《天津市规划建筑导则汇编》), and on this basis developed *The Guidelines for Planning and Design of Tianjin* (《天津市规划设计导则》). *The Guidelines for Planning and Design* puts forward the control requirements for architecture features, colors, heights, toppings etc. and the architecture design for different types of buildings e.g. residential, commercial and office buildings, and delimited five special feature areas with distinctive styles, i.e. historical feature area, office, culture &



Figure 6-5 Guidance on architecture feature control in historical feature area of Tianjin
(Source: *Collection of Guidelines for Planning & Construction in Tianjin*)



Figure 6-6 Illustration of guidance on commercial buildings in special feature area of Nanning
(Source: *The Guidelines for Urban Landscape Zoning & Planning Research and Building Control of Nanning*)

sports area, business & commercial area, living & residential area and modern industrial area, so as to shape Tianjin’s urban style of “distinguished and fashionable, fresh and elegant, combination of Chinese and western styles and blends of ancient and modern features” .

In recent years, similar explorations emerge one after another. In *The Guidelines for Architecture Planning and Design in Chengdu (2013)* [《成都市建筑规划设计导则(2013)》], Chengdu has delimited the urban space into five important areas, including circular city eco area, major riverside area, major park peripheral area, major roadside area and historical & cultural block development and control zone, carried out area-based control by category for urban space and building façade style and brought up the three major color system of grey, warm yellow and brick red to guide the urban architecture colors, so as to strive for developing the urban style and feature of “appropriate density, suitable height arrangement, overall coordination and distinctive image” . In *The Guidelines for Urban Landscape Zoning & Planning Research and Building Control of Nanning* (《南宁市城市风貌分区规划研究和建筑控制导则》), Nanning has developed the special space system for urban architecture features by delimiting the special feature area, urban landscape zone, view corridor and urban landscape node etc., and provided detailed guidelines on landscape control for residential, office, commercial, cultural & educational, medical and sports buildings in different areas.

6.2 Protection and inheritance of history and culture

In February 2014, in his inspection to Beijing, General Secretary Xi Jinping pointed out that history and culture are the soul of a city and everyone should protect the historical and cultural heritage in cities like caring for their lives. Centering on a series of requirements of the central government, in recent years, the common understanding on cultural protection and inheritance has been continuously improved, the number of cultural heritage items has continued to grow, the protection targets have continued to expand in category and relevant protection implementation work has been steadily promoted. By the end of 2015, there were a total of 4,295 cultural relics sites under the national protection announced by China in 7 batches and the number of cultural relics sites announced for Batch 7 in 2013-2014 is the largest, reaching 1,944; compared to previous batches, Batch 7 contains more new-type cultural heritage, e.g. industrial heritage, local architecture and cultural landscape, meanwhile the number of cultural relics in ethnic minority areas grows significantly. Technological means used in national cultural relics census have been enriched and technologies including underwater archaeology, aerial remote sensing, geospatial information technology, network technology have been applied sufficiently. In such a context, a batch of important cultural relics were found and registered. On the 39th Session of the World Heritage Committee held in Bonn, Germany from

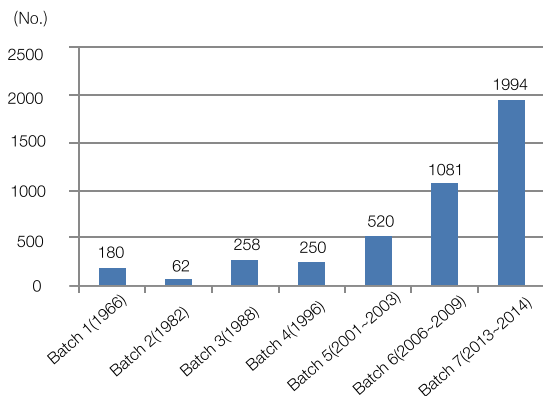


Figure 6-7 National Key Cultural Relics Sites under National Protection from Batch 1 to 7 (1966-2014)

(Source: Beijing Municipal Institute of City Planning & Design)

June 28 to July 8, 2015, Tusi ruins were added to the World Heritage List. Since then, the number of World Heritage items in China increased to 48 and China ranked the second in the world.

The number of historic cities, towns & villages and traditional villages announced with approval grows substantially, reflecting the increased attention on protection from national to local levels. As of May 2016, the State Council has approved and announced 129 Historic Cities of China, with Huzhou and Qiqihar added in the list in 2014, Changzhou, Ruijin and Huizhou added in 2015 and Wenzhou added in 2016. In 2014, the Ministry of Housing and Urban-Rural Development and the State Bureau of Cultural Relics jointly approved and announced a total of 71 historic towns and 107 historic villages in Batch 5, far more than the number announced for previous batches. In order to further promote the protection and development of traditional villages and expand the scope of protection, from 2012 to 2014, the Ministry of Housing and Urban-Rural Development, Ministry of Culture, Ministry of Finance and other ministries and commissions jointly announced a total of 2,555 traditional Chinese villages in 3 batches. In April 2015, the Ministry of Housing and Urban-Rural Development and the State Bureau of Cultural Relics announced 30 blocks as the first batch of historic blocks of China, including the Historic Block of the Imperial City in Beijing.

6.2.1 Legal system building and protection system development

As the protection system for historic cities is gradually enriched and the protection practices go deeper, the legal system for historical and cultural protection becomes gradually established. On the basis of taking “two Laws and one Rules” as the back bone, i.e. *Urban and Rural Planning Law of the People’s Republic of China* (《中华人民共和国城乡规划法》), *Law of the People’s Republic of China on the Protection of Cultural*

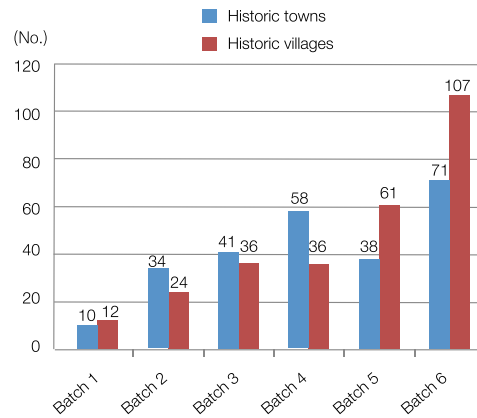


Figure 6-8 Historic Towns (Villages) of China from Batch 1 to 5 (2003-2014)

(Source: Beijing Municipal Institute of City Planning & Design)

Relics (《中华人民共和国文物保护法》) and *Rules for the Protection of Historic Cities, Towns and Villages* (《历史文化名城名镇名村保护条例》), relevant ministries and commissions and local governments has issued departmental rules, local regulations, rules, normative documents, supporting technical standards and management systems to jointly tamp the legal framework for cultural protection. From 2011 to 2015, efforts were focused on activities in the following two aspects: firstly, revise the backbone laws based on the new situation in protection, e.g. *Law on the Protection of Cultural Relics* and *Urban and Rural Planning Law* have been revised three times from 2013 to 2015. Secondly, a series of normative documents and technical standards were issued based on the requirements of the state on protecting the historic towns and villages, e.g. in 2012, the Ministry of Housing and Urban-Rural Development and the State Bureau of Cultural Relics printed and distributed *Requirements on Formulating the Protection Plans for Historic Cities, Towns and Villages (trial)* [《历史文化名城名镇名村保护规划编制要求(试行)》], putting forward the overall requirements and providing the specific provisions on historical and cultural protection and the formulation of protection plans for historic towns and villages. In December 2014, the Ministry of Housing and Urban-Rural Development started to implement *The Approval Measures for Formulating the Protection Plan for Historic Cities, Towns, Villages and Blocks* (《历史文化名城名镇名村街区保护规划编制审批办法》).

Meanwhile, the development of protection system becomes increasingly established with the connotation continuously deepened and contents further expanded. For example, in 2015-2016, Beijing enriched and expanded the original protection system of “three levels, one focus and cultural integration” based on its long-term explorations and practices and in combination of the New Master Plan development, included the following targets into protection, e.g. industrial heritage, historical buildings, contiguous cottage areas in historical urban areas, feature areas established after the founding of New



Figure 6-9 Newly added historic cities/towns/villages and industrial sites in Beijing's Historic City Protection System and Framework (Ancient villages in southern Anhui province on the left; the rebuilt silos in Shougang's industrial plant area on the right) (Source: the left picture from www.huitu.com; the right picture from Beijing Municipal Institute of City Planning Design)

China, cultural routes, old towns/villages and ruins, landscape scenes etc. and established the contents framework for historic city protection system, which takes the three protection layers as the core, i.e. cultural relics and historic sites, historical areas and pattern & feature of historic cities, and involves the triple spatial domains of old town, urban territory and region, by emphasizing the completeness and integrity of protection and diversification of specific protection measures.

6.2.2 Planning & guidance

Along with the announcement of various kinds of historical and cultural protection directories, the protection planning has become the important enabler for scientific and orderly deployment of protection activities. With the protection activities further deepened, the protection planning framework and standards have also become increasingly refined and established from the time the Ministry of Construction released *Requirements on Developing the Protection Plan for Historic Cities* (《历史文化名城保护规划编制要求》) in 1994 to the present days after entering the 21st Century. The protection planning framework with special protection plans in the core, e.g. protection plan for cultural relics sites, protection plan for historic cities, towns and villages and intangible heritage conservation plan etc., is established and its linkage with other relevant plans is also strengthened, e.g. statutory plans for urban and rural areas (e.g. urban master planning, control-oriented detailed plan), construction-based detailed plans at implementation level and action plans.

In November 2014, the list of winners for 2013 National Award for Outstanding Urban and Rural Planning and Design organized by China Association of City Planning was announced. Among the 26 urban planning projects winning the first prize, 6 projects are special protection plans, fully reflecting the guid-

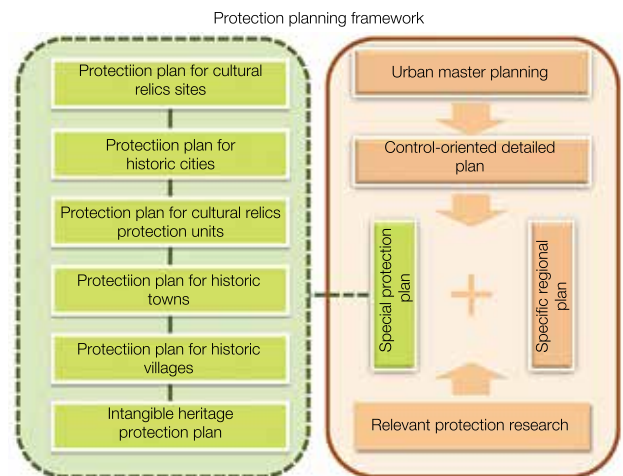


Figure 6-10 Illustration for composition of the protection planning framework (Source: Beijing Municipal Institute of City Planning & Design)

ing role of the planning on the protection practice. For example, the *Research and Protection Plan for Fenghuang Regional Defense System to Apply to Be Included in the Tentative List of World Cultural Heritage Sites* (《凤凰区域性防御体系申报世界文化遗产预备名录研究及保护规划》) studies the history and composition of the military defense facilities and systems in Miao area during the Ming and Qing dynasties as well as the tonden system (i.e. have garrison troops or peasants open up wasteland and grow food grain); further expands the scope of Fenghuang Ancient City's application for World Heritage sites to "Fenghuang Regional Defense System", which has greatly promoted the application activities; carries out in-depth research on its value and develops the application and protection planning system based on value research. It can be said to be a comprehensive practice by leveraging the inter-disciplinary and multi-dimensional research methods in a comprehensive

manner, covering cultural anthropology, historical geography, historical and cultural landscape science, geo information system etc.

Planning on Protection System of Historic Cities (Towns, Villages and Streets) in Yunnan Province [《云南省历史文化名城(镇村街)保护体系规划》] is based on the literature review of research on Yunnan's traditional settlements and folk houses and analysis on basic conditions within the province to carry out comprehensive analysis of historical elements for the formation and development of historical settlements, cultural demarcation for traditional folk houses and classification of settlement patterns and evaluation on the preservation conditions, and clearly define the requirements of protection planning, near-term priorities of plan implementation and guarantee measures for implementation. The *Plan* is the first system planning in China to make an overall arrangement and provide classified guidance for historic cities (towns, villages, streets) within the provincial territory and its implementation will promote the construction and formation of settlement cluster of open historic cities, towns, villages and streets composed of

different ethnic groups, different topics, different cultural connotation and types, offer an overall guidance on excavation and listing and sustainable protection, management and utilization of historical and cultural settlement heritage within Yunnan, gradually build and improve the protection system for Yunnan's historical and cultural settlement heritage and provide the important reference for decision making in the provincial comprehensive development.

The Research on Protection and Renewal Planning for Historical and Cultural Blocks, Five-Avenue, Tianjing, China (《中国·天津·五大道历史文化街区保护与更新规划研究》) reviews and analyzes the development process and current issues of Five-Avenue, indicating that one of the important contribution from Five-Avenue area to Tianjin lies in its distinctively human-oriented blocks, buildings and environment. On this basis, Tianjin tried to apply the methodology in urban morphology to analyze the Five-Avenue, identify and continue the spatial feature of historical blocks through the research on architecture types, block texture, streets and alleys, and guide the development of protection plan, lead the better integration



Figure 6-11 Pictures for current state of Fenghuang Regional Defense System

(Barracks for Quanshi Battalion on top-left; Wangpotun ruins on top-right; Huangsiqiao gate tower on bottom-left; Shujiatang Castle Village on bottom-right)

[Source: the bottom-right picture from Research Center for Heritage, Tsinghua Tongheng Urban Planning and Design Institute (THUPDI), others from Cultural Relics Bureau of Fenghuang County]

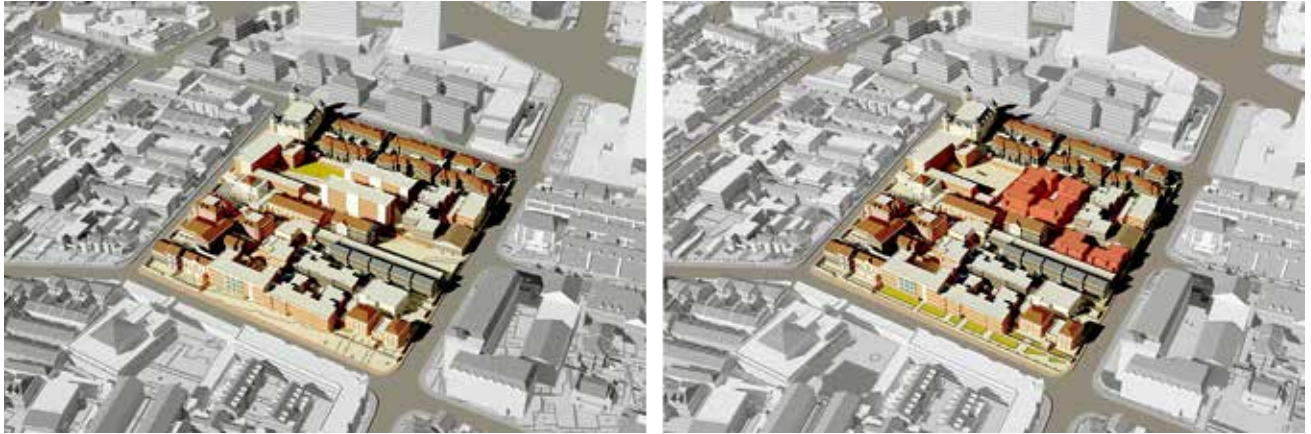


Figure 6-12 Bird's view design sketch for current state and new plan of No. 24 housing block
(Source: *Research on Protection and Renewal Planning of Historical and Cultural Blocks, Five-Avenue, Tianjin, China*)



Figure 6-13 Pictures for current state of No. 24 housing block after implementing the protection and renewal planning
(Source: *Research on Protection and Renewal Planning of Historical and Cultural Blocks, Five-Avenue, Tianjin, China*)

of future new elements into the historical environment of Five-Avenue and maintain the vitality of blocks.

6.2.3 Public participation and support

2015 Central Urbanization Working Conference also requests to coordinate the government, society and citizens as three major subjects and improve the enthusiasm of all parties to promote the urban development. The government needs to innovate the urban governance model, especially pay attention to

reinforce the refined management for urban development and realize the co-governance, co-management, co-construction and sharing for cities. Guided by the above concepts, the government shall gradually strengthen the efforts in communicating and popularizing the outstanding history and culture, create the dense atmosphere for the public to care for, participate in and monitor the protection, and gradually shift the priorities to reinforce “high-level decision-making participation” and “grassroots community development” through the vertical and horizontal structure of public participation system, so as to up-

hold the civil spirit and enhance the homeland consciousness.

For example, in the projection of Beijing old town, on the basis of government guidance and social cooperation and by coordinating the relationship between old town protection and development, Beijing gradually explored its own route characterized by frequent highlights. To be specific, it promoted the construction of Shijia Hutong Museum and the public space environment improvement for traditional courtyards in historical and cultural blocks through self-governance of communities, built Dashilan Platform to promote the organic renewal of Dashilan with the International Design Week as the resource platform, develop the Temple Hotel with unique temple brand effects by renovating Zhizhu Temple (a city-level cultural relics site), created 77 Theatre C&C Creative Park through industrial transformation of waste plant and realized the improvement of the compounds occupied by many households through neighborhood consultation in Foreign Architect “Micro-rebuilding” project. All of these efforts have acted as an important catalyst

to bring into full play the resource features of the old town and promote the implementation of overall protection for the old town. The above practices not only get rid of the spatial constraint of historical area for “one courtyard in one place” , form the bond to link resources and groups in a wider scope and realize the outputs of cultural value and inputs of economic value for the old town, but also promote the community development e.g. consultation among residents and self-governance etc. Through the gradual transformation of population demographics, industrial and community public facilities, we can realize the new social structure balance that promotes harmonious cohabitation and develop the virtuous circle for protection and development.

More importantly, the participation of social forces in heritage conservation has made great achievements and gradually become the mainstream. For example, in 2014, the social volunteer team carried out the trial for social participation in the protection of Meizhou Weilong Houses. Professional volun-



Figure 6-14 Community self-governance promoted the construction of Shijia Hutong Museum and follow-up courtyard public space environment improvement

(Source: Beijing Municipal Institute of City Planning & Design)

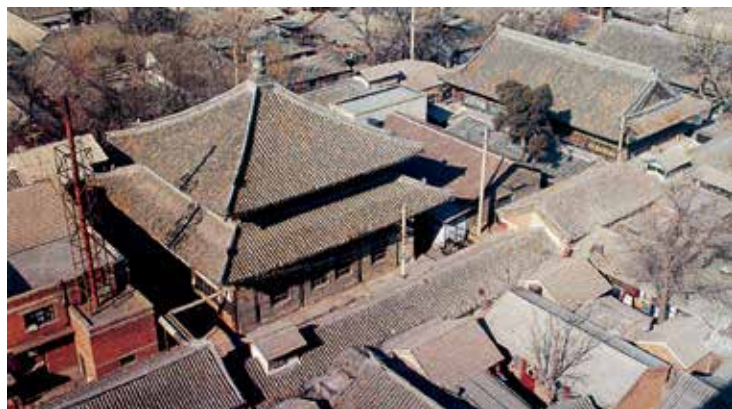


Figure 6-15 Comparison of photos for Beijing Zhizhu Temple before and after renovation

(Source: *Planning for Protection of 25 Historical and Cultural Blocks Protection in Beijing Old Town* on the left; right picture from Beijing Municipal Institute of City Planning & Design)

teers applied the way of thinking and investigation experience developed in previous historical and cultural block protection practices and WebGIS technology, completed the onsite investigation in 3 days and developed the investigation report rapidly. Through investigation, the professional volunteers found there were actually more than 400 folk houses, where more than 100 of them shall be protected. Such figure is well above the requirements put forward in the original plan that there were about 130 folk houses locally and 40 of them should be protected. The document about adjusting and optimizing the original plan was formulated and transferred to Guangzhou Institute for re-formulation after the results were submitted to the Ministry of Construction, in which information collected by the volunteer team would be combined with the planning. Along with the penetration of network and mobile terminals in the future, Internet-based public participation platform convenient in operation will become the inevitable direction for future development.

In addition, digitalization is also widely applied in cultural heritage utilization, representation and regeneration. The 3rd stop of “Digital Heritage in China” on the 4th International Symposium on Cultural Heritage Conservation and Digitalization (CHCD) in 2016 arrived at Gandong Jinxi, the cradle of Linchuan culture with over 1,000 years history that is out of sight for long and centered on the topic of “Re-activate” to display the Jinxi ancient village with Ming and Qing style and pattern well preserved till now and explore the route of activating the advantageous resources of traditional villages by building the digital museum for them. The concept of digital museum has displayed



Figure 6-16 Pictures for current state of Meizhou Weilong Houses and the surrounding environment
(Source: provided by Meizhou Weilong Houses follower team)

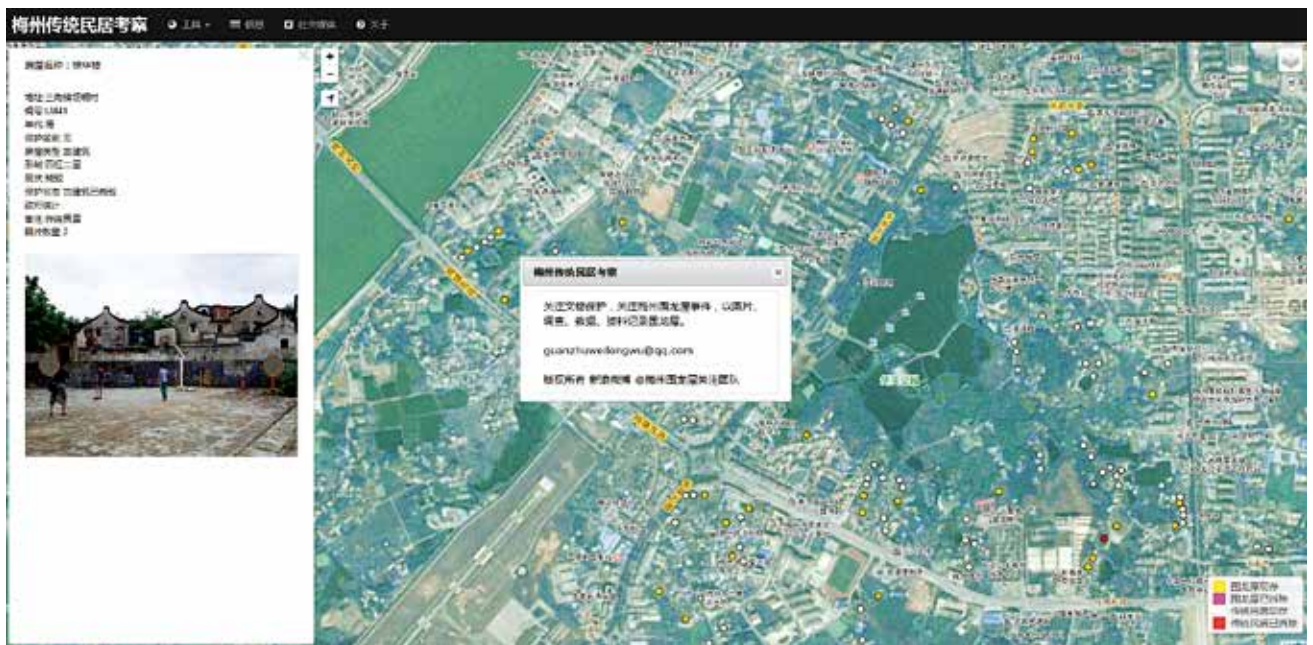


Figure 6-17 WebGIS data platform open to the public for traditional folk houses preservation state in Meizhou
(Source: provided by Meizhou Weilong Houses follower team)



Figure 6-18 Leveraging digital technologies to protect Gandong Jinxi Cultural Heritage
[Source: Tsinghua Heritage Institute for Digitalization (THID)]

diversified contents ranging from convenience provided by mobile shopping for tourists, big data making the tourists stay with the ancient villages, reproducing the beauty of ruins via augmented reality (AR), digital restoration facilitating historical inheritance etc., disrupted the traditional industrial model of migrant workers and awakened the dream of villagers for home return. Digitalization helps the public travel across time and space, pay wide attention to and enjoy the cultural heritage, sufficiently feel the cultural essence and value of architectural complex in ancient villages and greatly activate the enthusiasm of the villagers and people from all walks of life in preserving the traditional villages. Villagers will be retained and converted into the major force to preserve the cultural features of villages by respecting their will and maintaining their right. Under the active guidance of the local government and funding support from the society e.g. donation and subscription etc., the traditional villages as the carrier of Chinese agricultural civilization have been revitalized and in full blossom.

6.3 Quality improvement in public space

As people's living standards continue to improve, their demands also shift from resting satisfied with the simple material life to desiring for social and public activities. However,

in the process of transformation "from traditional incremental growth to new-type renewal of existing stock" for cities, the space resources are especially in shortage, so the conflict between the growing demands for public space and scarcity of urban space resources becomes increasingly prominent. Urban public space development needs to strengthen systematic and network-based development, tap the existing urban resources to continuously grow the number of public spaces and provide the public space system that is convenient, accessible, multi-layer and networked for citizens and tourists on the one hand; and further establish and improve the management mechanism and procedures for public space development and ensure the development quality on the other hand.

6.3.1 Public space development in the context of urban renewal

In the context of development based on existing resources, the urban development shall pay more attention to offering the beautiful and comfortable space for public activities to a maximum degree in the process of urban renewal. In order to improve the urban vitality and quality and enhance the citizens' sense of happiness, many cities are actively exploring the gradual and sustainable organic renewal model to satisfy the space demands of cities to carry out public activities via renewal and



Figure 6-19 Picture for current state of Jinwan Square on Haihe River, Tianjin
(Source: Tianjin Urban Construction Archives)

utilization of existing land and create the diversified, inclusive and intimate urban public leisure space.

(I) Public space in residential communities

In 2016, the state policy clearly put forward that (efforts shall be made to) strengthen the planning and construction of blocks, define the area coverage of newly built blocks by tier, and promote to develop the open, convenient, suitably sized, well-founded and harmonious living blocks. With the increase of public living standard, technological progress and the advent of aging, the community open space carries on increasingly richer contents, provides more diversified services, pays more attention to the demands of special groups like the elderly and children and emphasizes the promotion of community renewal and rebuilding through public participation. In the rebuilding of rundown areas in many provinces and cities, clear requirements have been put forward on the construction of public space. Shaanxi Provincial Department of Housing and Urban-Rural Development put forward that, in the rebuilding of rundown areas and villages inside cities, no less than 30% public space should be reserved and construction of green space, parking lots, educational and medical infrastructure and supporting public service facilities should be prioritized. The rebuilding of villages inside cities in Hangzhou is combined with the comprehensive environmental treatment of “A beautiful Hangzhou” to develop the rebuilding plan of “one policy for one village” in line with local conditions. A great number of previous villages inside cities have been transformed into new-type urban communities with abundant public space, beautiful landscape environment and convenient living facilities.

(II) Riverside public space

Rivers are the blue blood of cities. As the leisure space in cities, the riverside space often plays a vital role in shaping the urban landscape and dynamics and improving the economic value of land. More and more cities have recognized the importance of riverside public space and created the boutique urban public space by utilizing the natural or man-made rivers. Tianjin has taken a series of initiatives, e.g. formulating the *Planning for Comprehensive Rebuilding and Development of Haihe River Banks* (《海河两岸综合改造开发规划》), establishing Tianjin Haihe River Rebuilding and Improvement Command Center etc., to carry out the comprehensive planning for space rebuilding and reutilization for its “mother river” and make it become the representative of Tianjin image and the urban dynamic core that citizens may enjoy in their leisure time. Through underground and ground three-dimensional transport transformation and reducing the number of motor vehicle lanes on the ground, Shanghai Bund waterfront has increased the area of ground public activity space to 140% and provided more safer leisure and sightseeing space for the public.

(III) Business and cultural entertainment space

The growth of national consumption demands and improvement of quality requirements is promoting the reinvention of consumption venues for business, cultural entertainment etc. On the one hand, internationally well-known theme parks have settled down successively, e.g. the Universal Studios and Madame Tussaud’s in Beijing, Shanghai Disneyland Park, Hello Kitty Theme Park in Zhejiang etc. On the other hand, a batch



Figure 6-20 Bird's eye view of night scene of Sino-Ocean Taikoo Li Chengdu (Photo by Wei Fenggao)
(Source: www.huitu.com)



Figure 6-21 Bird's eye view of night scene of Beijing Xinhua 1949 International Creative Design Industry Park
(Source: IDEAL)

of new-type and high-quality creative business blocks and complexes are emerging, e.g. Sino-Ocean Taikoo Li Chengdu, Xinhua 1949 International Creative Design Industry Park, Parkview Green and INDIGO Beijing, Minyuan Stadium in Tianjin etc. For these business and cultural entertainment spaces, some are developed by rebuilding the ground structures in the urban built-up areas, which often leverage the cultural elements with regional characteristics on sites e.g. historical and cultural spots, industrial ruins etc. to shape the new-type dynamic public space in cities; some are created through creativity on the public space inside the blocks or complexes, which may provide a new-type, open public space for the city while attracting the customers.

(IV) Micro public space

Under the condition of limited urban space resources, the refined design and reutilization of some “lost spaces” in cities becomes increasingly important for improving the quality of public space and public facilities surrounding the residents, which have also become the hot spots for planning & research and practice activities in the recent period of time. Beijing has carried out a series of relevant seminars & researches, e.g. *Research on Guidelines for Art Planning of Urban Public Environment in Beijing* (《北京城市公共环境艺术规划导则研究》), *Investigation of Space for Public Activities in Dongcheng District, Beijing* (《北京市东城区公共活动空间调查研究》) etc.,



Figure 6-22 Photo for interior of Parkview Green Beijing (Source: Beijing City Planning & Construction)



Figure 6-23 Minyuan Stadium in Tianjin (Photo by Tong Yu)



Figure 6-24 Photos for comparison of Hutong micro space before and after renovation during 2014 Beijing Design Week
(Source: Beijing Municipal Institute of City Planning & Design)

and explored the route to activate the negative spaces in the old town through presence of exhibition, onsite building etc. during the 2014 and 2015 Beijing Design Week. Shanghai initiated Let's talk academic lecture series, rolled out the exhibition for "Renaissance Plan for Urban Micro Space" and launched

the implementation of some small-scale renaissance projects, which also achieved the initial results.

6.3.2 Networking development for the public space

The public space development in the new era shall pay more attention to equality and strive to provide the conditions and opportunities for outdoor public activities to all. In the *Planning on Public Open Space System in Shenzhen Special Economic Zone* (《深圳经济特区公共开放空间系统规划》), Shenzhen takes the per capita area of public space and accessibility as the standards to evaluate the public space, establishes the public space early warning system for the Special Economic Zone and puts forward the corresponding main points for public space improvement areas and planning.

The practice of *Fun City-Plan for Shenzhen as a Beautiful City* (《趣城——深圳美丽都市计划》) takes the public space as the breakthrough point, explores how to invite people to participate in more urban life by means of urban design, collects the public space renovation plan for "creativity + venue" from the society openly, cherry-picks the outstanding plans to develop detailed measures for implementation and creates a series of distinctive and charming urban venues. It is just the power concentrated by these 'venues' that drives the overall quality improvement of urban space and creates a dynamic and fun Shenzhen.

Public space development in the new era shall also pay more attention to networking development, strive to provide the pervasive and continuous public space activity system for people and advocate the green and healthy lifestyle. There are many



Figure 6-25 Map for "Fun City" Shenzhen
(Source: Fun City-Map for Shenzhen's Urban Design)

cities launching the greenway network development projects. In particular, the hiking trail development with the characteristics of Chongqing has connected the important historical and cultural spots, local parks and public service facilities together by combining with the mountain and ground forms, developed the “five horizontal, 12 vertical and 1 ring” pedestrian network system and provided a good example for public space networking development in mountainous cities.

6.3.3 Institutional building

With more attention to and emphasis on the urban design, relevant system building and planning management becomes increasingly established, which lays the solid foundation for improving the quality of urban public space. By the end of 2015, the Ministry of Housing and Urban-Rural Development has completed the drafts for the *Administration Measures for Urban Design* (《城市设计管理办法》) and the *Technical Guidelines for Urban Design* (《城市设计技术导则》), which are expected to be released in 2016. Different provinces and cities have also released the guidelines or guidances for urban design successively, e.g. the *Urban Design Standards and Codes of Shenzhen (2009)* [《深圳市城市设计标准与准则(2009年)》], the *Guidelines for Central Urban Area Design in Chengdu (2010)* [《成都市中心城区城市设计导则(2010年)》], the *Provisional Administration Measures for Guidelines for Urban Design in Key Areas of Tianjin Binhai New Area (2010)* [《天津市滨海新区重点地区城市设计导则管理暂行办法(2010年)》], the *Research on Standards and Administration Measures for Formulating the Guidelines for Central Urban Area Design of Beijing (2010)* [《北京中心城地区城市设计导则编制标准及管理暂行办法研究(2010年)》], the *Guidance for Urban and Architecture Design with Lingnan Characteristics in Guangzhou (2012)* [《广州市岭南特色城市设计及建筑设计指南(2012年)》], the *Guidelines for Urban Design in Nanjing (2013)* [《南京市城市

设计导则(2013年)》], the *Guidelines for Urban Design in Fujian Province (2013)* [《福建省城市设计导则(2013年)》], and the *Guidelines for Developing Urban Design in Zhejiang Province (2014)* [《浙江省城市设计编制导则(2014年)》] etc.

As an important component in urban planning & development and approval management, explorations for relevant technical standards and administration measures have continued for long. In terms of technical standards, the *Guidelines for Public Space Improvement Plan and Design in Chongqing* (《重庆市公共空间整治规划设计导则》) and the *Guidelines for Urban Public Space Plan and Design in Hefei* (《合肥市城市公共空间规划设计导则》) were released; in terms of administration measures, Tianjin issued the *Provisional Administration Measures for Public Space Planning in Construction Engineering Projects of Binhai New Area* (《滨海新区建设工程项目公共空间规划管理暂行办法》), Chengdu issued the *Provisional Administration Measures for Public Space Planning in Chongqing's Construction Projects* (《成都市建设项目公共空间规划管理暂行办法》), and Shaanxi issued the *Urban Public Space Management Rules of Shaanxi Province* (《陕西省城市公共空间管理条例》) successively.

It should be noted that as one of the important public spaces in cities, the public attributes of streets have gained the public attention. Many cities have formulated the guidelines or guidances for the street space, and even issued some local standards. For example, in 2014, Beijing issued the *Standards for Urban Road Space Planning & Design (DB11 1116—2014)* (《城市道路空间规划设计规范》), while the *Guidelines for Pedestrian and Bicycle Transport System Planning & Design in Shenzhen* (《深圳市步行和自行车交通系统规划设计导则》) and the *Guidelines for Street Space Design in Shanghai* (《上海市街道空间设计导则》) were also released in recent years.

Summary table of current state of greenway planning in some Chinese cities

Table 6-1

City	Planned greenway length & duration (year)
Pearl River Delta	1690km (2010-2012)
Beijing	1000km (2013-2017)
Shanghai	120km (2015-2020)
Tianjin	500km (2015-2020)
Chengdu	1117km (2011-2012)
Hangzhou	1200km (2013-2020)
Nanjing	1200km (2012-2015)
Wuhan	880km (2012-2015)
Changsha	1336km (2012-2020)

Source: Beijing Municipal Institute of City Planning & Design.

6.4 China practice: urban greenway development

6.4.1 Overview of urban greenway development in China

The earliest greenway concept in China can be dated back to the Zhou Dynasty before Year 1,000 BC. Since the 1990s, the greenway concepts and theories in the western world have also been introduced to China by the planners in a systematic way. Nowadays, it is commonly believed that the greenway can play multiple roles in optimizing the urban and rural ecological environment, reducing the heat island effects, providing green and open space to the residents, and connecting the natural and artificial landscape and cultural connotations in urban and rural areas. The greenway development is an important means to solve the ecological and environmental issues and improve the quality of life for residents and it is the project for people's wellbeing with distinctive ecological, social and economic benefits.

Greenway practice in Chinese cities is in the booming development in recent years. In 2009, Guangdong took the lead to put forward to build the greenway network in the Pearl River Delta region by combining with its realities, which has become the hot spot for urban development in Guangdong and the focus of public concern. Subsequently, there were many cities launching the greenway development initiative. Till now, 9 cities in the Pearl River Delta region, Beijing, Shanghai, Tianjin, Chengdu, Hangzhou, Nanjing, Wuhan, Changsha and a series of small and medium sized cities have actively carried out the greenway development at different levels. Additionally, provinces including Zhejiang, Fujian, Anhui etc. have put forward the planning for province-level greenway network system. In July 2013, the Executive Meeting of the State Council studied and deployed to strengthen the urban infrastructure construction, among which "accelerating the construction of 'greenway' for pedestrians and bicycles in all cities across China" is determined as one of the 6 key tasks. The issuance of this opinion has further promoted the greenway development practice in Chinese cities.

6.4.2 Experience of urban greenway development in China

(I) Multi-level development, i.e. regional-urban-community level

Outline of Master Planning for Greenway Network in Pearl River Delta (《珠江三角洲绿道网总体规划纲要》) divides the greenway development into three levels, i.e. regional, urban and community levels, while its own focus is put on the regional greenway level, mainly including relevant control and provisions for the planning goal, overall layout, supporting service facilities, construction implementation and guarantee

for the greenway in the Pearl River Delta region. On this basis, the cities in Pearl River Delta region have successively developed the greenway network development plans for their own and made further deepening and refinement to the regional greenway. Meanwhile, they have also put forward the ideas on the planning of urban internal and community-level greenways and defined the order of construction etc. Beijing has planned to develop the greenway system at three levels, i.e. city, district and community levels. Hangzhou's greenway is divided into province, city and community levels, as it takes the interfacing with *Province-Level Greenway Network Layout Plan in Zhejiang* (《浙江省省级绿道网布局规划》) into account. In general, the urban greenway planning in China on multiple levels is beneficial for developing the inter-linked spatial pattern and a comprehensive network system in a wider region in the future, so as to meet the residents' demands at different levels.

(II) Differentiated requirements on classified greenway development

The *Outline of Master Planning for Greenway Network in Pearl River Delta* has divided the regional greenway into ecological, countryside and metropolis types and the total width of ecological greenway control area is generally no less than 200 meters, while countryside and metropolis types no less than 100 and 20 meters respectively. The *Special Plan for Greenway Network in Shenzhen* (《深圳市绿道网专项规划》) puts forward the construction coverage goals of 5 minutes to community greenway, 15 minutes to urban greenway and 30-45 minutes to regional greenway. At the urban greenway level, four types are delimited, i.e. seaside flavor greenway, urban dynamic greenway, riverside leisure greenway and mountain & sea view greenway, which have different construction principles and standards. Through detailed division of types and differentiation of construction requirements, the original features of ecological resources can be fully utilized to guide the greenway to realize different main functions and provide abundant and meaningful experience for the residents.

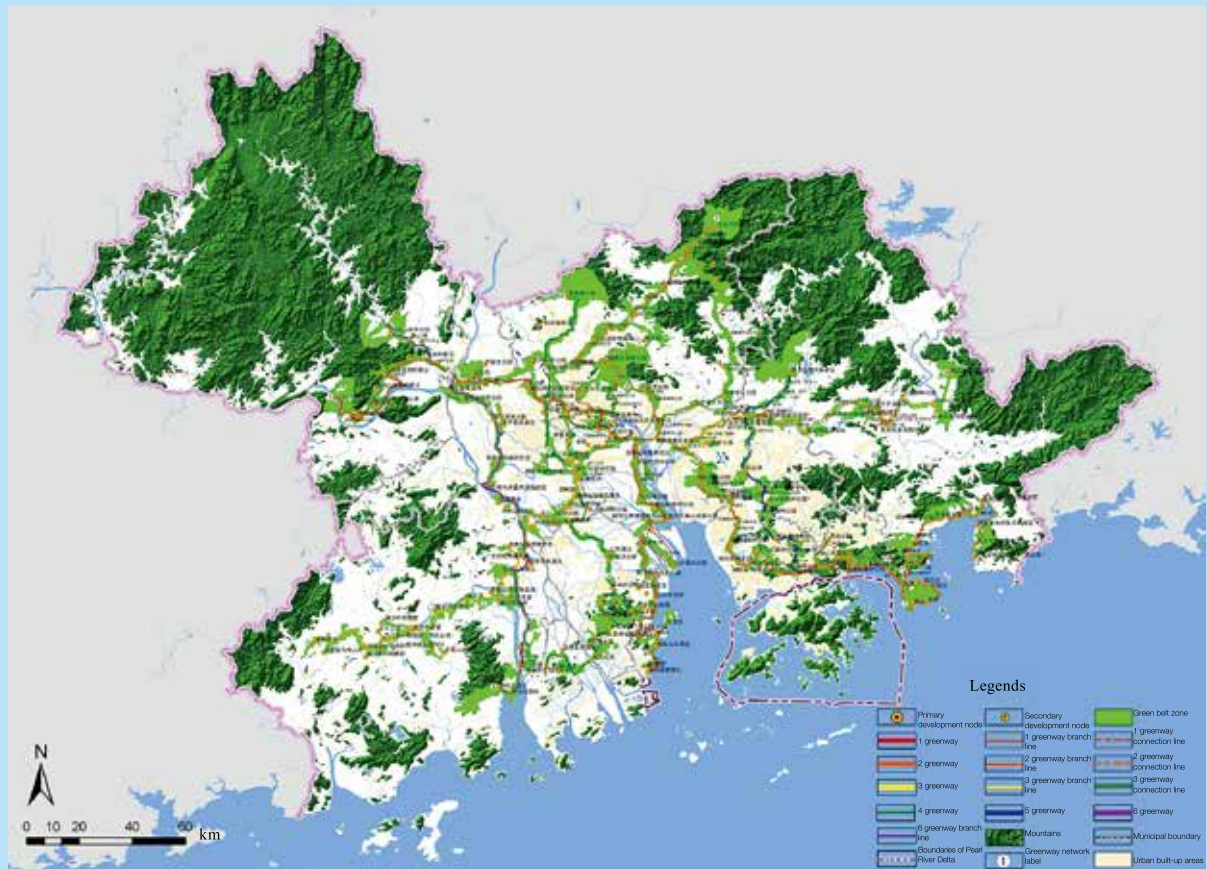
(III) Multi-goal and win-win overall design

Guangdong Greenway Network highlights three major functions in its development: the ecological function to curb the urban sprawl and protect the regional ecology; the living friendly function to improve the living environment of residents and enhance the livability index of the city; and the economic function to attract the leisure consumption of citizens and promote the economic growth. Such arrangement reflects the multiple benefits of the greenway as well as its great contribution to urban development in many aspects. By setting up diversified goals, integrating different resources and enriching the connotation of the greenway at the beginning of planning & design, we can create the complex functions and realize the synergies and a win-win situation. For example, the 286.4 km long gre-

Special column 6-1 Pearl River Delta Greenway

The *Outline of Master Planning for Greenway Network in Pearl River Delta* issued in February 2010 establishes the general layout for the greenway network composed of 6 major lines, 4 connection lines, 22 branch lines, 18 inter-city junctions and 4,410 km² green belt zones, which links and runs through the 9 major cities in the Pearl River Delta region. Among them, 6 major lines link the three major metropolitan areas of “Guangzhou-Foshan-Zhaoqing”, “Shenzhen-Dongguan-Huizhou” and “Zhuhai-Zhongshan-Jiangmen” and connect more than 200 development nodes including major forest parks, natural reserves, scenic spots, countryside parks, riverside parks and historical & cultural sites etc. The total length of the planned greenway is 1,690 km with the construction period of 3 years, directly serving 25.65 million population. Pearl River Delta Greenway has gained broad and active support from all walks of life in its actual construction, so it exceeds the construction goal ahead of schedule. By the end of 2014, Guangdong Province has built the greenway in a total length of 10,976 km, including 8,909 km in the Pearl River Delta region.

Various service supporting facilities in the Pearl River Delta also become increasingly established. A total of 238 way stations, over 300 parking lots and 368 bicycle rental stations have been built as supporting facilities and 358 public destinations “for entertainment, sight-seeing and consumption” have been established.



General layout of Pearl River Delta greenway network

enway in Jiangmen City has connected more than 1,000 watch-towers included in the World Cultural Heritage List together and this “golden greenway” travel route has made the number of visitors increased by nearly 40%. Greenway is not only an important part of urban and rural ecosystem, but also a comprehensive development strategy that integrates the environmental protection, leisure, sports, tourism and culture functions into one and an effective carrier for the perfect combination of ecological protection, human settlement environment improvement and economic growth.

6.5 Recommendations from experts

As the focus of urban development in China has shifted from the highly concentrated production space to the livable space with appropriate size, improving the space quality has become the core content for creating the new situation of urban modernization development in the future. High-quality urban space will become the core competitiveness of future cities. In the process of improving the urban space quality, we need to focus on the following several aspects:

Firstly, we should respect the law of urban development and

understand the connotations of urban features. We need to recognize that urban features are “not created”. Good urban features must be based on the deposits of urban cultural contexts, full respect and delicate utilization of natural environment and objective evaluation and proper balance of residents’ demands. Particularly inheritance and promotion of outstanding history and culture shall be reflected in the material space of cities in a lasting and stable manner. It is a historical accumulation process of culture and arts to improve the urban space quality, so we must have the patience to inherit and shape the urban features from a sustainable perspective and avoid the pursuit of ‘newness and strangeness’ to generate a short-term buzz.

Secondly, we should reinforce the urban design. We need to make an overall arrangement of the urban architecture design, coordinate the urban landscape environment and reflect the geographical characteristics, ethnic features and epochal style in terms of the overall layout and three-dimensional space. The urban design shall start from humanistic concerns to realize more human-oriented space design by emphasizing landscape, cultural and ecological elements and achieve the improvement of urban charm, cultural sustainability, harmony between man and nature and increase of national happiness index. The high-quality urban design shall adapt to the public aesthetics, make

Special column 6-2 Guangzhou Greenway

In the Pearl River Delta Greenway, Guangzhou has built more than 3,000 km greenway, which is the longest not only in Guangdong Province, but also in China. 16,000 hectares of green spaces are added and rebuilt surrounding the greenway. Guangzhou Greenway connects 320 major scenic spots and 151 way stations and service points, covers an area of 3,600 km² and serves a population of more than 8 million. Currently, the Administration of Forestry and Gardening of Guangzhou Municipality has launched the first batch of boutique travel routes composed of 18 greenways in Guangzhou. According to the Plan, during the 13th Five-year Plan period, Guangzhou will basically set up a pedestrian and bicycle transport system to connect the existing greenways together.

The construction fund for Guangzhou Greenway is led by the government with regional (county, urban) government as the main body for construction and management. The average cost is RMB 1 million/km and the maintenance expenses is RMB 10,000-15,000/km/year. For the greenway development, Guangzhou has successively issued the *Planning on Guangzhou Greenway Network Construction* (《广州市绿道网建设规划》) and the *Administration Measures for Guangzhou Greenway* (《广州市绿道管理办法》), to make the greenway development and management go by regulations and laws. In addition, it has also developed various kinds of professional guiding documents to promote the standardization and refinement of greenway management, e.g. the *Technical Guidance for Guangzhou Greenway Planning & Construction* (《广州市绿道规划建设技术指引》), the *Plan for Guangzhou Greenway Management and Maintenance* (《广州市绿道管养维护方案》), the *Guangzhou Greenway Tourist Service Standards* (《广州市绿道旅游服务规范》), and the *Guidance for Setting up Street Signs for Guangzhou Greenway* (《广州市绿道过街标示建设指引》) etc.

It is estimated that the green belt along the Guangzhou Greenway may absorb 590,000 tons of carbon dioxide and release 440,000 tons of oxygen a year. According to the survey, 85.8% citizens recognize the cooling and moisturizing function of the greenway and 91.6% citizens recognize its air purification function. At present, the greenway becomes the “only one civil project that gets no complaints from the citizens”.

everyone feel pleasant and get resonance and inspiration for beauty; so as to cultivate a better citizen life, shape the public spirit and promote the formation of a civil society.

Finally, we should develop the legal system and decision-making procedures. In term of way of working, we need to respect the science and establish the decision-making procedures based on experts' decisions and public participation and scientific decision-making mechanism for urban space quality by developing the scientific and reasonable management regulations for

urban design, urban renewal and architecture design etc. We also need to improve the guidance and supervision mechanism and provide the better guarantee for the interests of the public in landscape, environment and community open spaces. In terms of actual mechanism, we need to make an overall arrangement for the three main bodies (government, society and citizens), fully mobilize the enthusiasm of all parties and realize the co-development, co-management, co-governance and sharing in the process of urban space quality improvement.

Appendixes

Basic Data of China's 292 Cities at and above Prefecture Level (2014)

Name of cities	Total area of city's administrative (km ²)	Total population at year-end (10,000 persons)	Total residents of the Sixth Population Census (10,000 persons)	Area of built-up district (km ²)	Gross regional product (10,000 yuan)	Per capita gross regional product (yuan)	Water coverage rate(%)	Waste-water treatment rate(%)	Per capita public green space (m ²)	Domestic garbage treatment rate(%)
Beijing	16411	1333.4	1961.24	1386	213308300	99995	100.00	86.11	15.94	99.59
Tianjin	11917	1016.7	1293.87	738	157269300	105231	100.00	91.04	9.73	96.67
Shanghai	6340	1438.7	2301.92	999	235677000	97370	100.00	89.72	7.33	81.92
Chongqing	82374	3375.2	2884.62	1231	142626000	47850	96.78	92.99	16.97	99.20
Hebei										
Shijiazhuang	13109	1024.9	1016.38	264	51702653	48970	98.57	95.60	15.33	74.68
Tangshan	13472	753.2	757.73	249	62253023	80450	100.00	95.00	15.08	100.00
Qinhuangdao	7802	295.1	298.76	103	12000219	39282	98.79	98.72	20.41	100.00
Handan	12065	1029.5	917.47	124	30800054	32943	100.00	97.56	18.98	100.00
Xingtai	12433	772.9	710.41	90	16469408	22758	100.00	96.35	12.53	100.00
Baoding	22185	1196.6	1119.44	146	30352036	26501	96.12	100.00	10.52	96.00
Zhangjiakou	36873	468.6	434.55	86	13489726	30540	100.00	93.61	12.33	90.00
Chengde	39490	380.7	347.32	115	13425500	38128	100.00	93.60	24.76	99.55
Cangzhou	14035	768.4	713.41	68	31333822	42676	100.00	100.00	10.68	96.16
Langfang	6382	450.4	435.88	66	21759631	48407	100.00	90.23	13.46	95.50
Hengshui	8815	452.6	434.08	46	11491345	26022	99.38	60.41	12.15	38.36
Shanxi										
Taiyuan	6988	369.7	420.16	330	25310917	59023	100.00	85.85	10.94	100.00
Datong	14176	339.2	331.81	125	10017256	29607	100.00	83.50	8.84	96.30
Yangquan	4570	133.2	136.85	55	6166154	44382	97.15	77.81	10.55	78.52
Changzhi	13896	339.2	333.46	59	13311415	39196	97.50	92.73	12.35	100.00
Jincheng	9425	218.9	227.91	45	10358203	44943	99.81	95.00	11.94	100.00
Shuozhou	10674	175.4	171.49	42	10034100	57368	99.12	97.71	10.86	100.00
Jinzhong	16392	330.5	324.94	53	10413000	31434	100.00	96.61	16.68	85.00
Yuncheng	14181	525.2	513.48	52	12017177	22940	94.00	91.01	10.51	95.50
Xinzhou	25152	312.5	306.75	36	6803394	21796	100.00	94.98	16.50	
Linfen	20275	429.0	431.66	54	12132401	27557	98.28	90.93	11.13	100.00
Lvliang	21239	390.7	372.71	24	11013462	28960	95.22	91.23	13.02	100.00
Inner Mongolia										
Huhhot	17186	237.9	286.66	230	28940500	95961	99.69	81.02	17.32	98.74
Baotou	27768	223.7	265.04	190	36363100	130676	99.45	86.06	13.04	95.97

Name of cities	Total area of city's administrative (km ²)	Total population at year-end (10,000 persons)	Total residents of the Sixth Population Census (10,000 persons)	Area of built-up district (km ²)	Gross regional product (10,000 yuan)	Per capita gross regional product (yuan)	Water coverage rate(%)	Waste-water treatment rate(%)	Per capita public green space (m ²)	Domestic garbage treatment rate(%)
Wuhai	1754	55.4	53.29	63	6010187	108556	100.00	94.57	18.39	90.70
Chifeng	90021	465.8	434.12	104	17783716	41309	96.00	89.60	18.21	97.94
Tongliao	69625	319.4	313.92	87	18868000	60380	95.50	97.50	20.07	91.00
Ordos	86752	156.0	194.07	113	40554873	200152	99.75	98.13	37.45	95.20
Hulunbeier	252777	265.9	254.93	114	15222009	60512	95.94	92.30	21.95	93.49
Bayannur	65140	178.6	166.99	52	8674600	51872	95.66	97.88	16.71	99.26
Ulanqab	54500	277.0	214.36	60	8737258	41138	97.07	98.54	34.81	98.08
Liaoning										
Shenyang	12860	730.8	810.62	465	70987051	85816	100.00	95.11	14.10	100.00
Dalian	12574	594.3	669.04	396	76555761	109939	100.00	91.42	11.18	100.00
Anshan	9255	348.2	364.59	170	23858951	66860	100.00	87.08	11.68	100.00
Fushun	11272	217.4	213.81	136	12765826	61183	98.62	70.34	10.41	100.00
Benxi	8411	152.0	170.95	109	11712452	67879	97.89	93.69	10.32	100.00
Dandong	15290	239.5	244.47	53	10226035	42291	100.00	89.99	11.21	100.00
Jinzhou	10047	305.3	312.65	77	13639990	44264	100.00	88.21	12.75	100.00
Yingkou	5242	233.3	242.85	110	15460811	63234	97.44	100.00	10.18	100.00
Fuxin	10355	191.0	181.93	77	6061578	33882	98.77	53.24	12.39	99.55
Liaoyang	4736	179.9	185.88	104	10146163	54800	100.00	100.00	10.58	100.00
Panjin	4065	129.2	139.25	73	13039536	90615	100.00	100.00	12.76	100.00
Tieling	12985	302.0	271.77	50	8672909	32562	97.72	100.00	11.95	100.00
Chaoyang	19698	340.6	304.46	57	9935232	33379	99.78	88.62	9.24	100.00
Huludao	10414	280.7	262.35	76	7215505	28021	100.00	89.35	14.92	100.00
Jilin										
Changchun	20594	754.6	767.44	470	53424262	70891	99.40	92.08	13.81	99.23
Jilin	27711	427.7	441.32	259	23795605	55548	98.50	94.50	12.04	100.00
Siping	14080	328.1	338.52	55	12103150	36900	77.10	85.11	8.89	81.99
Liaoyuan	5140	121.8	117.62	46	6903093	56467	97.25	98.39	9.43	100.00
Tonghua	15612	222.2	232.44	82	10084958	45378	91.21	92.84	11.52	99.73
Baishan	17505	126.3	129.61	56	6752889	53300	83.65	74.20	10.26	98.00
Songyuan	21089	278.5	288.01	59	15962932	56868	95.48	95.88	17.54	95.75
Baicheng	25832	197.8	203.24	49	6861811	34586	98.13	69.67	12.90	96.05
Heilongjiang										
Harbin	53068	987.3	1063.60	401	53400715	53872	100.00	89.30	10.41	85.00
Qiqihar	42469	553.2	536.70	140	12093360	23099	100.00	73.06	10.02	61.73
Jixi	22531	183.6	186.22	79	5160088	27881	98.38	32.47	10.71	48.08
Hegang	14657	107.0	105.87	53	2594613	24154	96.51	50.14	14.90	

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Shuangyashan	22619	149.0	146.26	58	4326831	28964	99.57	89.51	14.71	81.11
Daqing	21219	276.0	290.45	245	40775057	146518	92.44	97.61	14.20	97.90
Yichun	32800	122.0	114.81	171	2560255	20885	75.52	41.74	20.51	10.40
Jiamusi	32704	241.4	255.21	97	7659799	32864	95.53	81.98	14.02	100.00
Qitaihe	6221	88.2	92.05	71	2142590	25123	94.36	39.72	11.84	100.00
Mudanjiang	38827	264.0	279.87	81	12640168	42792	94.94	41.95	11.24	98.28
Heihe	68240	170.5	167.39	19	4213621	24731	96.95	90.09	13.45	100.00
Suihua	34873	553.2	541.82	35	11902452	21467	95.44	100.00	8.69	83.71
Jiangsu										
Nanjing	6587	648.7	800.37	734	88207500	107545	99.98	95.32	14.98	100.00
Wuxi	4627	477.1	637.44	328	82053100	126389	100.00	96.79	14.81	100.00
Xuzhou	11765	1023.5	857.72	255	49639100	57655	97.54	92.74	16.21	95.07
Changzhou	4372	368.6	459.24	204	49018700	104423	100.00	95.00	13.21	100.00
Suzhou	8657	661.1	1045.99	447	137608900	129925	100.00	95.74	15.20	100.00
Nantong	10549	767.6	728.36	190	56526900	77457	100.00	92.81	16.76	100.00
Liangyungang	7615	526.5	439.35	160	19658900	44277	100.00	84.09	14.15	100.00
Huai'an	10030	560.3	480.17	150	24553900	50736	100.00	90.99	13.83	100.00
Yancheng	16931	828.5	726.22	111	38356200	53115	100.00	89.17	11.97	100.00
Yangzhou	6591	461.3	446.01	136	36979100	82654	100.00	93.72	18.01	100.00
Zhenjiang	3840	272.1	311.41	134	32524400	102652	100.00	92.80	18.69	100.00
Taizhou	5787	508.5	461.89	99	33708900	72706	100.00	89.45	9.47	100.00
Suqian	8524	580.7	471.92	79	19306800	39963	100.00	93.45	13.81	100.00
Zhejiang										
Hangzhou	16596	715.8	870.04	495	92061633	103813	100.00	95.61	15.50	100.00
Ningbo	9816	583.8	760.57	309	76102816	98362	100.00	92.35	10.64	100.00
Wenzhou	12065	813.7	912.21	215	43030460	47118	100.00	91.45	12.99	100.00
Jiaxing	3915	348.1	450.17	96	33526045	73458	99.31	90.48	13.34	100.00
Huzhou	5820	263.8	289.35	99	19559985	66917	100.00	92.00	16.57	100.00
Shaoxing	8279	443.0	491.22	192	42658839	86136	100.00	89.26	13.28	100.00
Jinhua	10942	475.1	536.16	78	32082030	59056	100.00	90.02	11.48	100.00
Quzhou	8845	255.7	212.27	69	11150977	43740	100.00	89.26	14.56	100.00
Zhoushan	1455	97.5	112.13	61	10152567	88746	100.00	86.34	13.00	100.00
Taizhou	9411	597.1	596.88	128	33873783	56208	100.00	90.05	12.07	100.00
Lishui	17298	265.7	211.70	34	10517517	49459	100.00	89.02	10.90	100.00
Anhui										
Hefei	11445	712.8	570.25	403	51805600	67689	99.78	98.90	13.32	100.00

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Wuhu	6026	384.5	226.31	160	23095488	64039	100.00	91.61	12.59	98.00
Bengbu	5951	371.1	316.45	127	11511949	35542	100.00	99.30	12.79	100.00
Huainan	2584	243.4	233.39	106	7893187	33361	99.19	98.18	12.17	98.50
Maanshan	4049	227.2	136.63	92	13331200	60091	100.00	99.08	15.39	98.14
Huaibei	2741	215.3	211.43	80	7596370	35324	99.05	97.87	14.96	100.00
Tongling	1201	73.8	72.40	69	7163100	97193	100.00	90.04	14.79	100.00
Anqing	15402	620.9	531.14	85	15443170	28808	100.00	90.97	13.19	98.92
Huangshan	9807	147.7	135.90	63	5071697	37306	100.00	94.11	14.98	100.00
Chuzhou	13516	449.6	393.79	83	12144000	30562	99.88	96.00	13.31	100.00
Fuyang	9776	1051.4	759.99	112	11889663	15303	93.92	90.03	12.26	100.00
Suzhou	9939	642.3	535.29	72	11405288	20895	99.96	99.47	12.39	100.00
Lu'an	18399	720.5	561.17	72	10958100	19211	99.48	91.20	14.23	100.00
Bozhou	8521	634.4	485.07	54	8836299	17769	91.22	96.93	11.52	100.00
Chizhou	8272	160.6	140.25	37	5171690	36267	99.01	92.31	17.08	100.00
Xuancheng	12313	279.8	253.29	50	9176300	35726	98.33	93.40	13.23	100.00
Fujian										
Fuzhou	13066	674.9	711.54	254	51691647	69995	99.99	87.73	12.94	96.00
Xiamen	1573	203.4	353.13	301	32735772	86832	100.00	93.38	11.44	100.00
Putian	4131	341.2	277.85	57	15020721	52890	99.73	87.46	12.72	99.13
Sanming	22965	284.0	250.34	36	16212064	64590	99.87	85.49	13.71	98.09
Quanzhou	11015	716.2	812.85	214	57333576	68254	99.04	87.68	14.00	98.40
Zhangzhou	12880	497.4	481.00	62	25063612	50685	99.85	89.06	14.20	99.21
Nanping	26280	319.2	264.55	30	12325593	47044	100.00	86.96	13.64	99.99
Longyan	19063	307.1	255.95	50	16212107	62716	99.79	89.51	12.22	99.50
Ningde	13452	352.2	282.20	27	13760938	48369	99.21	87.00	15.45	94.00
Jiangxi										
Nanchang	7402	517.7	504.26	262	36679635	70373	98.85	91.98	12.04	100.00
Jingdezhen	5261	167.8	158.75	79	7382137	45438	99.78	72.07	14.81	100.00
Pingxiang	3831	198.2	185.45	51	8649524	45867	100.00	84.89	10.58	100.00
Jiujiang	19078	513.1	472.88	103	17799599	37097	100.00	99.47	17.65	100.00
Xinyu	3178	122.3	113.89	74	9002683	77730	100.00	100.00	18.08	100.00
Yingtian	3560	126.9	112.52	34	6069809	53011	97.77	94.22	13.29	100.00
Ganzhou	39446	954.2	836.84	137	18435921	21708	99.89	50.35	10.37	100.00
Ji'an	25283	526.7	481.03	53	12421109	25486	92.99	90.96	16.97	100.00
Yichun	18668	595.6	541.96	68	15229911	27764	95.21	93.18	15.55	100.00
Fuzhou	18799	427.5	391.23	58	10367713	26119	99.34	92.19	16.38	100.00

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Shangrao	22791	773.1	657.97	50	15502360	23221	99.73	90.32	14.27	100.00
Shandong										
Jinan	7998	621.6	681.40	383	57705966	82052	100.00	98.00	10.50	100.00
Qingdao	11282	780.6	871.51	491	86921000	96524	100.00	94.93	14.57	100.00
Zibo	5965	428.0	453.06	262	40297668	87531	100.00	95.76	15.94	100.00
Zaozhuang	4564	401.3	372.91	148	19801360	51890	99.42	95.12	15.03	100.00
Dongying	8243	189.1	203.53	115	34304900	163982	100.00	94.71	23.50	100.00
Yantai	13852	653.4	696.82	316	60020788	85795	100.00	95.54	20.22	100.00
Weifang	16143	888.3	908.62	176	47860000	51826	100.00	92.79	17.87	100.00
Jining	11311	860.1	808.19	186	38000607	46213	100.00	94.40	13.61	100.00
Tai'an	7762	562.3	549.42	127	30021852	53853	100.00	95.37	19.90	100.00
Weihai	5797	254.8	280.48	190	27903400	99392	100.00	94.83	25.31	100.00
Rizhao	5359	293.9	280.10	100	16118700	56349	100.00	93.98	22.64	100.00
Laiwu	2246	127.8	129.85	120	6876000	51352	100.00	83.39	19.59	100.00
Linyi	17191	1113.2	1003.94	200	35698000	35032	100.00	92.83	19.82	100.00
Dezhou	10358	583.2	556.82	145	25960800	45641	99.82	95.96	24.93	100.00
Liaocheng	8984	612.1	578.99	91	25164000	42482	99.70	94.65	14.99	100.00
Binzhou	9660	386.7	374.85	112	22767060	59557	100.00	93.00	18.51	100.00
Heze	12155	990.6	828.77	95	22221900	26446	100.00	95.99	12.44	100.00
Henan										
Zhengzhou	7446	937.8	862.71	413	67769890	72991	100.00	95.89	6.98	95.00
Kaifeng	6253	553.8	467.65	113	14920564	32454	94.76	92.63	10.51	100.00
Luoyang	15236	696.2	654.99	194	32845734	49417	98.01	97.71	8.54	83.08
Pingdingshan	7882	557.1	490.47	73	16371717	33014	97.53	91.76	10.31	92.81
Anyang	7352	611.4	517.32	110	17918143	35210	100.00	97.72	10.09	100.00
Hebi	2182	166.9	156.92	64	6821975	42550	96.03	70.38	14.85	92.88
Xinxiang	8666	630.5	570.82	113	19179974	33699	99.08	90.00	10.25	100.00
Jiaozuo	4071	369.6	354.01	114	18443139	52421	99.83	87.50	11.03	97.40
Puyang	4188	424.5	359.87	54	12536056	34895	91.01	91.96	13.59	90.97
Xuchang	4979	499.8	430.75	88	20872312	48471	97.01	96.99	10.51	96.44
Luohe	2692	266.7	254.43	73	9411601	36671	91.43	96.25	14.78	99.89
Sanmenxia	10496	227.8	223.40	30	12400597	55259	98.74	97.10	14.14	79.18
Nanyang	26509	1181.4	1026.37	149	26755709	26651	74.72	88.22	17.15	76.21
Shangqiu	10704	949.7	736.30	63	16976370	23359	67.10	90.03	6.33	90.53
Xinyang	18757	890.4	610.91	89	17573375	27490	94.62	88.99	14.14	94.04
Zhoukou	11961	1236.9	895.38	66	19920815	22651	100.00	90.34	10.38	91.00

Name of cities	Total area of city's administrative (km ²)	Total population at year-end (10,000 persons)	Total residents of the Sixth Population Census (10,000 persons)	Area of built-up district (km ²)	Gross regional product (10,000 yuan)	Per capita gross regional product (yuan)	Water coverage rate(%)	Waste-water treatment rate(%)	Per capita public green space (m ²)	Domestic garbage treatment rate(%)
Zhumadian	15083	920.6	723.12	71	16912964	24461	86.69	92.07	10.50	91.88
Hubei										
Wuhan	8569	827.3	978.54	553	100694800	98000	100.00	95.26	11.06	100.00
Huangshi	4583	265.1	242.93	88	12185600	49796	100.00	92.51	10.91	100.00
Shiyan	23680	347.0	334.08	96	12008200	35604	97.59	92.50	11.64	100.00
Yichang	21084	400.4	405.97	162	31322100	76369	100.00	91.00	14.24	95.14
Xiangyang	19727	595.5	550.03	157	31292600	55924	100.00	91.52	13.28	99.54
Ezhou	1594	110.2	104.87	64	6866400	64851	100.00	89.00	14.95	100.00
Jingmen	12404	300.3	287.37	55	13105900	45378	100.00	86.19	10.45	100.00
Xiaogan	8910	525.7	481.45	70	13547200	27891	100.00	85.43	9.05	98.63
Jingzhou	14099	658.5	569.17	74	14804900	25774	99.71	90.60	11.44	100.00
Huanggang	17457	741.4	616.21	47	14591500	23128	99.36	100.00	14.09	100.00
Xianning	9751	296.5	246.26	73	9642500	38770	96.27	87.59	13.03	99.09
Suizhou	9636	257.1	216.22	45	7234500	33156	94.08	93.87	9.18	99.77
Hunan										
Changsha	11816	671.4	704.10	336	78248074	107683	100.00	96.90	10.19	100.00
Zhuzhou	11272	396.1	385.71	135	21610147	54741	100.00	94.46	11.59	100.00
Xiangtan	5008	291.5	275.22	80	15705611	55968	98.46	90.00	9.03	100.00
Hengyang	15303	791.5	714.83	159	23965488	32934	96.45	75.99	8.88	100.00
Shaoyang	20830	819.0	707.17	58	12616104	17498	90.06	86.03	8.78	95.73
Yueyang	14858	563.3	547.61	93	26693384	47862	100.00	90.80	9.17	100.00
Changde	18910	608.7	571.46	87	25141545	43215	99.56	84.92	14.29	100.00
Zhangjiajie	9516	172.1	147.81	33	4100187	27051	97.19	81.09	8.85	100.00
Yiyang	12320	483.2	430.79	71	12531471	28596	97.29	91.34	16.22	99.99
Chenzhou	19342	518.8	458.35	72	18725768	39999	100.00	90.30	11.50	100.00
Yongzhou	22260	630.9	519.43	60	13014528	24295	99.15	83.24	9.37	100.00
Huaihua	27753	525.5	474.17	62	11812366	24368	89.72	85.42	7.11	100.00
Loudi	8109	444.9	378.46	47	12108581	31509	99.79	85.27	9.53	100.00
Guangdong										
Guangzhou	7434	842.4	1270.19	1035	167068719	128478	99.80	98.72	20.19	86.80
Shaoguan	18412	329.1	282.62	96	11134897	38386	97.68	81.35	12.36	100.00
Shenzhen	1997	332.2	1035.84	890	160018207	149495	100.00	96.60	16.84	100.00
Zhuhai	1724	110.2	156.25	124	18672129	116537	99.92	90.13	18.75	100.00
Shantou	2064	546.6	538.93	250	17165113	31201	92.17	92.08	14.41	92.34
Foshan	3798	385.6	719.74	158	74415994	101617	100.00	79.65	12.95	94.19
Jiangmen	9505	393.4	445.07	159	20827636	46237	98.75	91.23	17.60	100.00

Name of cities	Total area of city's administrative (km ²)	Total population at year-end (10,000 persons)	Total residents of the Sixth Population Census (10,000 persons)	Area of built-up district (km ²)	Gross regional product (10,000 yuan)	Per capita gross regional product (yuan)	Water coverage rate(%)	Waste-water treatment rate(%)	Per capita public green space (m ²)	Domestic garbage treatment rate(%)
Zhanjiang	13261	819.0	699.48	108	22589897	31420	94.38	96.67	12.97	100.00
Maoming	11427	772.4	581.75	120	23490313	38951	100.00	88.19	12.54	100.00
Zhaoqing	14891	433.7	391.65	95	18450647	45795	99.96	93.16	21.17	100.00
Huizhou	11346	348.5	459.84	244	30003674	63657	99.16	97.46	17.27	96.15
Meizhou	15865	528.6	423.85	53	8858389	20529	97.04	85.03	15.80	100.00
Shanwei	4865	359.1	293.55	16	7169931	23928	99.05	88.07	12.66	100.00
Heyuan	15654	365.3	295.02	34	7689506	25208	100.00	93.11	12.50	100.00
Yangjiang	7956	289.4	242.17	51	11685491	46938	100.00	68.67	11.07	100.00
Qingyuan	19036	412.3	369.84	373	11977408	31477	100.00	85.59	16.18	100.00
Dongguan	2460	191.4	822.02	922	58813173	70605	100.00	95.58	17.28	100.00
Zhongshan	1784	156.1	312.13	107	28230069	88682	100.00	90.60	17.80	100.00
Chaozhou	3146	268.8	266.95	42	8502208	31302	92.26	63.07	10.55	80.74
Jieyang	5240	694.2	588.43	120	17804442	29600	71.70	77.09	8.39	93.96
Yunfu	7785	294.2	236.72	98	6640048	27252	98.81	91.38	13.17	100.00
Guangxi										
Nanning	22244	729.7	665.87	285	31482973	43303	90.39	87.10	12.65	100.00
Liuzhou	18597	377.9	375.87	180	22085074	57049	97.94	91.00	13.03	100.00
Guilin	27851	526.5	474.80	71	18270531	37288	97.25	87.02	11.53	98.22
Wuzhou	12588	340.3	288.22	54	10648152	31293	90.12	88.52	8.64	100.00
Beihai	3337	169.3	153.93	73	8560135	53603	99.61	77.55	10.86	100.00
Fangchenggang	6238	94.2	86.69	35	5889380	65184	100.00	71.33	7.48	97.00
Qinzhou	12154	402.0	307.97	89	8549638	26971	92.90	88.90	7.32	86.65
Guigang	10602	543.2	411.88	69	8053951	19004	91.75	86.63	12.11	98.67
Yulin	12824	708.0	548.74	67	13417462	23784	100.00	99.11	9.95	100.00
Baise	36202	412.0	346.68	41	9179154	25806	100.00	80.85	11.62	100.00
Hezhou	11753	238.1	195.41	24	4483807	22345	70.60	66.55	7.08	100.00
Hechi	33476	419.9	336.93	22	6013922	17474	97.99	89.84	7.09	100.00
Laibin	13411	266.4	209.97	37	5512357	25563	100.00	83.19	10.40	100.00
Chongzuo	17331	248.2	199.43	28	6497236	31944	89.13	41.43	10.36	57.86
Hainan										
Haikou	2284	165.3	204.62	152	10917021	49943	99.95	85.07	12.47	100.00
Sanya	1919	58.6	68.54	47	4022558	54584	95.64	78.41	18.96	100.00
Sansha	13	0.3		0.25			76.92			
Sichuan										
Chengdu	12121	1210.7	1404.76	604	100565926	70019	98.44	94.64	13.77	100.00
Zigong	4381	330.0	267.89	109	10734046	39145	70.03	90.56	10.14	93.00

Name of cities	Total area of city's administrative (km ²)	Total population at year-end (10,000 persons)	Total residents of the Sixth Population Census (10,000 persons)	Area of built-up district (km ²)	Gross regional product (10,000 yuan)	Per capita gross regional product (yuan)	Water coverage rate(%)	Waste-water treatment rate(%)	Per capita public green space (m ²)	Domestic garbage treatment rate(%)
Panzhuhua	7401	111.9	121.41	72	8708501	70646	95.06	81.77	9.91	98.53
Luzhou	12236	508.9	421.84	113	12597311	29655	90.85	85.03	9.01	100.00
Deyang	5911	392.5	361.58	72	15156490	43091	98.19	91.00	10.73	100.00
Mianyang	20248	548.8	461.39	118	15798910	33558	99.07	92.37	9.63	100.00
Guangyuan	16311	310.1	248.41	54	5661920	22117	93.29	86.43	11.70	89.59
Suining	5325	380.4	325.26	78	8095540	24691	82.66	96.11	8.24	91.98
Neijiang	5385	426.0	370.28	66	11567723	31024	93.17	88.78	9.09	82.24
Leshan	12723	355.7	323.58	73	12075899	37125	96.38	79.73	8.33	99.32
Nanchong	12477	759.0	627.86	113	14320202	22639	97.22	83.58	11.02	99.09
Meishan	7140	353.0	295.05	45	9448913	31664	82.60	85.62	10.57	79.67
Yibin	13271	554.3	447.19	80	14438115	32318	77.00	36.31	8.44	98.64
Guang'an	6341	471.7	320.55	48	9196124	28489	98.98	91.74	20.30	100.00
Dazhou	16588	688.1	546.81	108	13478324	24411	71.88	47.24	13.83	90.44
Ya'an	15046	157.2	150.73	31	4624143	30052	99.09	67.45	9.64	97.89
Bazhong	12293	383.1	328.31	30	4566596	13756	93.07	80.26	11.02	100.00
Ziyang	7960	507.3	366.51	45	11956020	33592	98.74	86.73	9.89	100.00
Guizhou										
Guiyang	8043	382.9	432.26	320	24972691	55018	95.06	95.70	15.47	96.17
Liupanshui	9914	328.3	285.13	39	10427300	36228	90.88	98.09	16.66	96.40
Zunyi	30762	787.0	612.71	86	18743600	30484	95.85	95.00	12.70	92.55
Anshun	9267	290.0	229.76	41	5200600	22569	96.95	94.50	2.63	81.10
Bijie	26849	880.8	653.75	43	12667000	19369	95.97	96.02	18.73	93.65
Tongren	18003	432.3	309.32	43	6477345	20826	90.27	82.67	5.42	90.28
Yunnan										
Kunming	21012	550.5	643.22	407	37129943	56236	99.58	94.89	10.57	96.28
Qujing	28905	646.5	585.51	66	16494046	27529	99.49	90.05	9.03	100.00
Yuxi	15285	216.0	230.35	29	11847251	50511	98.40	81.93	12.02	84.53
Baoshan	19637	258.8	250.65	31	5009758	19566	90.65	86.05	7.73	99.55
Zhaotong	22440	594.4	521.35	40	6703372	12480	96.63	84.71	6.47	100.00
Lijiang	21219	121.2	124.48	23	2618385	20663	100.00	90.61	29.01	100.00
Pu'er	45385	253.8	254.29	25	4769455	18422	98.30	81.38	10.62	91.00
Lincang	23620	237.8	242.95	18	4651215	18710	85.05	91.14	10.86	93.92
Tibet										
Lasa	29518	52.7	55.94	91	3474500	56617	94.69	17.91	6.88	99.39
Xigaze	182000	72.0	70.33	29	1464000	20333	95.33		33.25	63.11
Changdu	110154	58.4	65.75	7	1171100	20053	57.69	50.60	3.46	82.16

Name of cities	Total area of city's administrative (km ²)	Total population at year-end (10,000 persons)	Total residents of the Sixth Population Census (10,000 persons)	Area of built-up district (km ²)	Gross regional product (10,000 yuan)	Per capita gross regional product (yuan)	Water coverage rate(%)	Waste-water treatment rate(%)	Per capita public green space (m ²)	Domestic garbage treatment rate(%)
Shaanxi										
Xi'an	10097	815.3	846.78	440	54926400	63794	100.00	93.50	11.60	99.87
Tongchuan	3937	84.1	83.44	44	3253630	38552	92.94	88.98	11.49	88.63
Baoji	18117	383.8	371.67	87	16429000	43824	100.00	95.96	12.27	100.00
Xianyang	10189	526.7	509.60	89	20773400	41971	91.94	86.97	15.23	96.38
Weinan	13134	561.4	528.61	71	14237500	26675	99.33	85.49	12.22	64.73
Yan'an	37037	234.3	218.70	36	13860940	62714	81.24	89.98	11.97	89.05
Hanzhong	27285	384.1	341.62	36	9910500	28908	79.71	91.18	14.57	93.44
Yulin	43578	373.8	335.14	70	29205800	86482	93.89	86.65	16.60	91.40
Ankang	23536	306.2	262.99	40	6894370	26117	94.39	87.42	13.24	99.73
Shangluo	19292	251.7	234.17	26	5762670	24538	92.12	93.75	9.88	96.70
Gansu										
Lanzhou	13086	374.7	361.62	221	20009389	54771	96.10	84.13	11.49	98.75
Jiayuguan	2935	24.1	23.19	68	2430618	101955	100.00	85.73	19.42	100.00
Jinchang	8896	47.0	46.41	40	2561027	54565	100.00	95.85	19.38	100.00
Baiyin	21158	177.9	170.88	61	4476423	26174	100.00	71.75	9.55	95.60
Tianshui	14277	364.5	326.25	46	5228228	15852	80.69	84.42	7.19	100.00
Wuwei	33238	188.9	181.51	32	4059679	22406	95.24	96.06	14.83	99.00
Zhangye	41924	129.7	119.95	64	3617771	29852	100.00	87.11	75.05	100.00
Pingliang	11170	233.7	206.80	36	3505533	16776	99.79	85.13	8.08	99.72
Jiuquan	193974	111.2	109.59	49	6105496	55000	100.00	93.62	11.11	100.00
Qingyang	27119	265.5	221.12	24	6688607	30087	98.79	90.26	7.00	92.65
Dingxi	19609	301.4	269.86	23	2901643	10470	98.00	90.67	10.56	100.00
Longnan	27839	283.2	256.77	14	2625279	10171	87.67	98.80	2.27	100.00
Qinghai										
Xining	7649	202.6	220.87	90	10657811	46762	99.99	72.11	12.03	94.42
Haidong	12751	172.4	139.68	11	3656927	25446	99.80	71.39	4.65	96.77
Ningxia										
Yinchuan	9025	196.0	199.31	149	13886244	65942	100.00	94.26	17.94	88.57
Shizuishan	5310	76.5	72.55	99	4672622	61001	97.85	97.46	20.77	96.87
Wuzhong	16757	143.5	127.38	50	3834317	28572	93.24	91.98	21.74	99.00
Guyuan	13047	153.3	122.82	40	2010289	16268	90.53	72.43	7.99	91.67
Zhongwei	17448	122.2	108.08	39	2975704	26354	90.21	99.59	20.08	99.88
Xinjiang										
Urumqi	13788	266.9	311.26	412	24614698	70428	99.96	84.90	10.66	93.04
Karamay	7735	39.0	39.10	69	8476725	153084	100.00	95.10	11.48	100.00

Notes to Basic Data of China's 292 Cities at and above Prefecture Level (2014)

Date Sources

Administrative level, Total land area of city's administrative region, Total population at year-end, Area of built-up district, Gross regional product, Per capita gross regional product: Department of Urban Social and Economic Survey of National Bureau of Statistics. China City Statistical Yearbook 2015. China Statistics Press, Beijing, December 2015.

Wastewater treatment rate, Domestic garbage treatment rate, Water coverage rate, Per capita public green space: Ministry of Housing and Urban-rural Development of the People's Republic of China. China Urban Construction Statistical Yearbook (2014). China Planning Press, Beijing, September 2015.

Explanation of Indexes

1. In the end of 2014, 653 cities in the country are divided into four administrative levels: 4 municipalities directly under the Central Government, 15 sub-provincial cities, 273 prefecture-level cities and 361 county-level cities, of which total 292 are prefecture-level cities and above.

——China City Statistical Yearbook 2015, p.3

2. Total Land Area of Administrative Region

It refers to the all land and water area under the city, including land area such as cultivated land, barren hills and mountains, grassland, wasteland, tidal flats, covers an area of roads and buildings, and water area such as rivers, lakes and reservoirs.

——China City Statistical Yearbook 2015, p.479

3. Total Population at Year-end

It refers to the population at the 24 clock, December 31, of the reporting year. The data are register population from public security department.

——China City Statistical Yearbook 2015, p.479

4. Total Residents of the Sixth National Population Census

It refers to the permanent population in the Sixth National Population Census conducted at zero hour of November 1, 2010 as the reference time, including persons living in this town with their household registration at this town or with pending household registration; persons living in this town and having left the town (township or street) of their household registration for over 6 months; and persons with household registration in this town and having left this town for less than 6 months or studying overseas.

——Communiqué of the National Bureau of Statistics of the People's Republic of China on Major Figures of the 2010 Population Census (No.2), April 29, 2011

5. Area of Built-up District

It refers to the region that had been developed and constructed on a large scale, with the basic municipal infrastructure and public facilities.

——China City Statistical Yearbook 2015, p.479

6. Gross Regional Product

It refers to the final products at market prices produced by all resident units in a region during a certain period of time.

——China City Statistical Yearbook 2015, p.479

7. Water Coverage Rate

It refers to proportion of urban population supplied with water to the total urban population. The calculation equation is:

Water Coverage Rate = urban population with access to water supply / (urban permanent population + urban temporary population) × 100%.

——China Urban Construction Statistical Yearbook (2014), p.643

8. Wastewater Treatment Rate

It refers to the proportion of the quantity of wastewater treated to the total quantity of wastewater discharged at the end of the reported period. The calculation equation is:

Wastewater Treatment Rate = quantity of wastewater treated / quantity of wastewater discharged ×100%.

——China Urban Construction Statistical Yearbook (2014), p.643

9. Per Capita Public Green Space

It refers to the average public recreational green space owned by each urban dweller in given areas. The calculation equation is:

Per Capita Public Green Space = public green space in given urban areas/ urban permanent population + urban temporary population.

——China Urban Construction Statistical Yearbook (2014), p.644

10. Domestic Garbage Treatment Rate

It refers to the ratio of quantity of domestic garbage treated to quantity of domestic garbage produced at the end of reported period. The calculation equation is:

Domestic Garbage Treatment Rate = quantity of domestic garbage treated / quantity of domestic garbage produced ×100%.

——China Urban Construction Statistical Yearbook (2014), p.644

Notes

1. China Urban Statistical Yearbook (2015) does not statistics Area of Built-up District of the following cities: Shanghai, Sansha City of Hainan Province, and Lhasa City of Tibet Autonomous Region. The data in the 2014 China's urban basic data table is from the China Urban Construction Statistical Yearbook (2014).

2. China City Statistical Yearbook (2015) does not statistics Total Population at Year-end of Sansha City in Hainan Province. This data in the 2014 China's urban basic data table is from the resident population in December 2015 shown in the Government Website of Sansha City.

3. At present, due to the different paces of the permanent residence registration reform in different cities, some regions have completely included the temporary population into the local population for administration, while some other regions still maintain the existing residence registration system which excludes the temporary population. As a result, the concepts of total population of different cities vary greatly. This Basic Data of China's 292 Cities at and above Prefecture Level in 2014 has listed all the sources of population data and the data are for reference only.

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