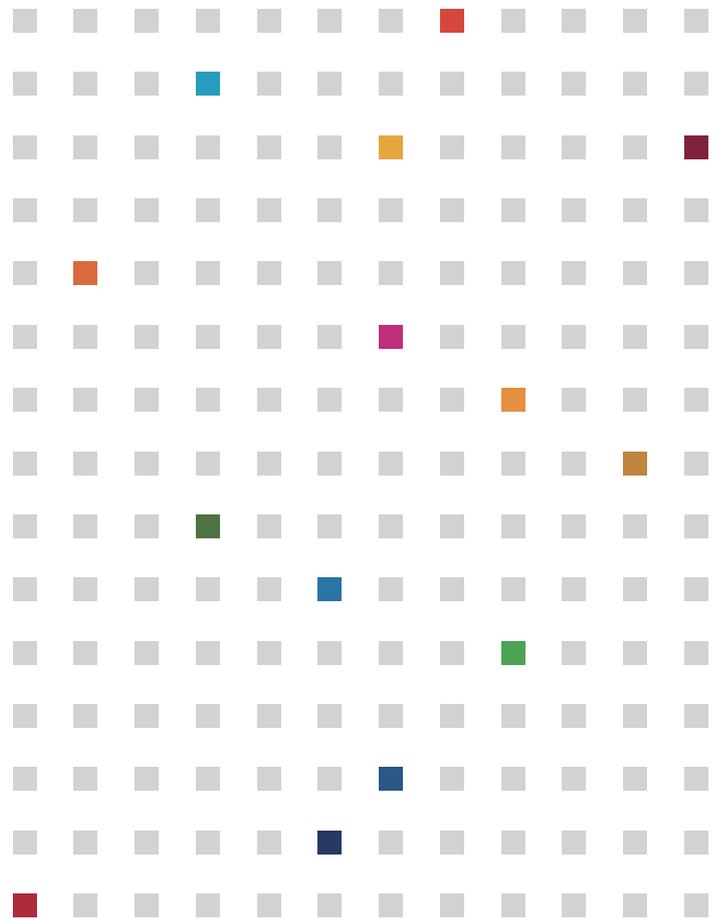
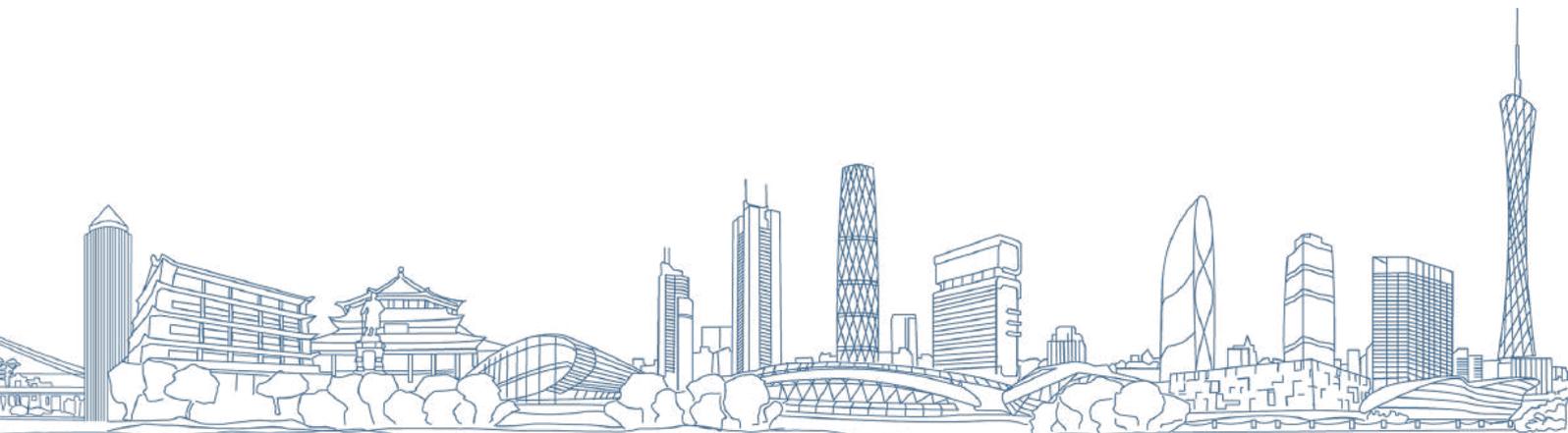


Vibrancy, Inclusion, and Open- ness; a Mega-City's Road Towards Green Development

UN SDGs Guangzhou Voluntary Local Review



Vibrancy, Inclusion and Openness, a Mega City's Road towards Green Development





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UN SDGs Guangzhou Voluntary Local Review



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Foreword

Sustainable development is an important topic in today's world. In September, 2015, the *Transforming Our World: the 2030 Agenda for Sustainable Development* (referred to as the *2030 Agenda*) was adopted at the UN Sustainable Development Summit. It was another framework document on the global development process following the *United Nations Millennium Declaration*. As a responsible, great power, China has been adhering to sustainable development as a basic state policy. China highly values the 2030 Agenda, and has enthusiastically pushed for the implementation of this Agenda within China while promoting cooperation and experience sharing on sustainable development within the international community.

Since July, 2018, some international cities have successively launched the Voluntary Local Review (VLR) Movement for the implementation of SDGs. In August, 2019, Guangzhou received an invitation from Bill de Blasio, Mayor of New York City, to join the VLR Movement. Guangzhou confirmed that it would join the initiative as a partner of New York in good faith in February, 2020.

As one of China's most important central cities, and following the State's general strategy, Guangzhou has been implementing the 2030 Agenda by utilizing *China's National Plan on Implementation of the 2030 Agenda for Sustainable Development* as its guidebook to actively promote local ecological conservation and sustainable economic and social development. Guangzhou has adhered to the key global sustainable development concept of advancing ecological protection and green development based on local situations and conditions. Attaching great importance to the harmony of its population, resources, environment, and integration of economic, social, and ecological benefits, Guangzhou has refrained from stimulating temporary economic growth at the expense of environmental degradation. Guangzhou's long-term goal is to protect the ecosystem for future generations.

As citizens of a mega city, we face common challenges such as environmental pollution, ecological degradation, and urban regeneration. Therefore, we should shoulder our due international responsibilities and learn from each other to make greater contributions to the implementation of the 2030 Agenda and jointly advance the building of a community of a shared future for mankind.

In the future, we will regularly monitor the progress of the urban sustainable development of Guangzhou, we will evaluate and optimize the city's policies and action plans to achieve the goals set forth in the *2030 Agenda*. We sincerely hope that Guangzhou can maintain an effective exchange program with New York City and other international metropolises. While learning from our successful, worldwide counterparts, we also hope that our experience in sustainable development would serve as a useful reference for the rest of the world.

Many hands make for light work. We look forward to joining hands with our partners across the globe to advance sustainable development and create a better future!

Mayor of Guangzhou





Guangzhou—Oasis on the Tropic of Cancer.

Guangzhou is situated in the Pearl River Delta in South China with the Tropic of Cancer passing directly through the city. Guangzhou is endowed with an abundant natural ecology, such as mountains, rivers, forests, farmlands, and seas. Guangzhou boasts dense river networks and exudes the great charm of Lingnan water town with three main tributaries. Namely, these are the Dong River, Xi River, and Bei River, which form a confluence here before flowing into the South China Sea. Guangzhou is the world-renowned City of Flowers with flowers in full bloom all year round, thanks to its plentiful rain and pleasant climate.

Guangzhou—A famous cultural city with a profound historical legacy

The history of Guangzhou can be dated back to the Qin dynasty, spanning more than 2,230 years. Its city landscape, which features green hills stretching into the downtown area and a reliable drainage system, embodies traditional Chinese views on nature, the philosophy of a harmonious relationship between man and nature, and an aesthetics that respects nature. As one of the first collection of China's famous historical and cultural cities, Guangzhou is blessed with many cultural relics, numerous historical sites, and a rich intangible cultural heritage. It enjoys worldwide reputation for Cantonese opera, Cantonese cuisine, and Cantonese embroidery.

Guangzhou—A persistently flourishing Millennial Business Capital

Guangzhou represents the Chinese treaty port with the longest history of being open to the world and one that had never been shut down. It is also one of the birthplaces of the ancient Maritime Silk Road. Long-term communication and trade exchange with the world have contributed to the integrated development of Chinese and Western cultures in Guangzhou; it is here where they have formed Guangzhou's characters of inclusiveness, openness, diversity, and practicality.

Guangzhou—A vibrant city with a global perspective.

Guangzhou boasts a world-class airport and a world-class seaport. In 2019, Guangzhou Baiyun International Airport ranked 11th worldwide in terms of passenger throughput. It now accommodates more than 400 flight routes, with over 160 are international and regional connections. The Port of Guangzhou ranks 4th in the world based on cargo throughput, and it connects to more than 100 countries globally. The Port of Guangzhou has become an important hub linking the Hong Kong-Macao-Guangdong Greater Bay Area with Africa, the Mediterranean Sea with Asia. Guangzhou has established friendly links with 84 international cities spread across 57 countries, while the number of foreign consulate generals based in Guangzhou has reached 66. Over the past few years, Guangzhou has successfully hosted major events of international exchange, such as the Fortune Global Forum, World Route Development Forum, and Imperial Springs International Forum. Major event like these have continuously boosted Guangzhou's international presence and influence.

1

Introduction

Guangzhou, the capital city of Guangdong Province, is a Chinese mega city; the city proper covers an area of 7,434.4 square kilometers and is home a permanent residential population of 15.31 million. The Pearl River Delta region, where cities such as Guangzhou, Hong Kong, Macau, and Shenzhen are situated, is a city mega-cluster with the largest population and area in the world, and it has been advancing the development of the entire Guangdong-Hong Kong-Macau Greater Bay Area.

Since China's reform and opening up, Guangzhou has been consistently improving its market mechanism and business environment and forming a sound, multi-governance model consisting of government, enterprises, and citizens. As a result, high-speed development in society and the economy has been achieved over the past four plus decades where they have laid a vital foundation for China's economic growth and urban development. Since 1978, Guangzhou's GDP has increased by nearly 140 times based on the comparable price with the regional GDP per capita reaching RMB 156,000. The same period has seen a massive population influx into Guangzhou for establishing businesses and residential areas. The urban population has increased by more than double with the urbanization rate increasing from 45% to 87%. Presently, Guangzhou's overall urban development is at the critical stage of shifting from high-speed to high-quality.



Guangzhou has always attached great importance to sustainable development. As early as 1996, Guangzhou invited numerous departments, experts, and scholars to jointly draft *Guangzhou Agenda 21*, which put forth the main guidelines, key areas, and policy measures for Guangzhou's sustainable development on a strategic level. In 2000, Guangzhou drafted the urban development general strategic plan, which identified the development structure consisting of *mountain, water, city, cropland, and sea*. Through effective practices over the last decade and by leveraging off the opportunity of hosting the 2010 Asian Games, Guangzhou has devoted more efforts to comprehensively improving its urban environment, achieving the goals of *a bluer sky, cleaner water, and more beautiful city*. In 2010, Guangzhou's urban development general strategic plan was given the International Award of Excellence by the International Society of City and Regional Planning (ISOCARP) for such features as ingenuity, dynamic upgrading, prospective study, extensive public participation, and application of advanced technology.

In June, 2012, the United Nations Conference on Sustainable Development was held and drafted a sustainable development global agenda for the new era, replacing the United Nations Millennium Goals. On September 25, 2015, the United Nations Sustainable Development Summit officially approved *Transforming our World: the 2030 Agenda for Sustainable Development* (hereinafter referred to as the *2030 Agenda*) which was signed by 193 countries and which identified 17 sustainable developmental goals (hereinafter referred to as *SDGs*), and 169 targets.

Since 2016, Guangzhou has been effectively enhanced its sustainable development efforts by implementing the new concept of pursuing an innovative, coordinated, green, open, and shared development. It has been advancing the coordinated development of neo-industrialization, urbanization, information-based development, and a modern and green agriculture. It has addressed stark problems in the ecological environment by optimizing a spatial planning development pattern, promoting resource conservation, and reinforcing ecological remediation and environmental governance. It has been constantly exploring an ecological development model with Guangzhou characteristics, which has breathed a new life into this old city.

During the 2019 United Nations High-Level Political Forum on Sustainable Development Goals, over 20 cities from around the world jointly signed the *Voluntary Local Review Statement*. In 2020, taking into consideration *the ongoing 2035 Strategic Planning of Guangzhou*, Guangzhou actively responded to the initiative and compiled its own *Voluntary Local Review* (short for VLR) for the first time.

2

Evaluation Methodology and Process

The VLR was jointly compiled utilizing relevant government departments, professional research institutes, and social organizations with instructions from the Sustainable Development Solutions Network China Hub; it was hosted by the Institute for Sustainable Development Goals of Tsinghua University and experts from several local universities, research institutes, and think tanks.

The compilation of the VLR dovetailed with the public engagement of the *2035 Strategic Planning of Guangzhou*. It also combined the annual *Guangzhou city health check*¹ and adopted an *online + offline method* to extensively understand the public's awareness of an urban development vision and get their opinions on SDGs. More than 16,000 copies of the questionnaire and over 4,000 opinions and suggestions were collected. Multiple platforms such as the Guangzhou Urban Planning Exhibition Center, *activities on campus*, and *activities in the community* were fully utilized to host exchange activities of various themes while online interaction platforms were established. In addition, a series of activities, such as *travelling across Guangzhou with books* and *historical and cultural tours that define Guangzhou*, were organized. Concurrently, industrial associations and chambers of commerce were mobilized to encourage numerous industries to intensify their focus on corporate social responsibility; interviews and surveys on representative enterprise practices to implement SDGs had also been conducted.



Various forms of public engagement

1. The city health check is a process that monitors, analyzes, and evaluates the city developmental process, city planning, and the implementation effects of related policies while providing feedback and corrections to ensure the effective realization of city developmental goals.

The format of Guangzhou's VLR outcome refers to the outline in the *National Voluntary Local Review Handbook* drafted by the Division for Sustainable Development Goals, United Nations Department of Economic and Social Affairs (UN DESA). Simultaneously, the report made use of the abundant information available on the UN SDG website and the VLR statement framework to analyze and study the local implementation results of SDGs in different countries and cities. Building upon this, the task group took into consideration *China's National Plan on Implementation of the 2030 Agenda for Sustainable Development* and relevant plans produced by different levels of government. It consulted with agencies specializing in sustainable development based in Guangzhou, to build a localized system on VLR outcomes. During the evaluation process, Guangzhou initially reviewed the response correlation between urban development strategy and 17 SDGs. Five prioritized review targets (see Chapter 3) were selected for in-depth evaluation. The Guangzhou VLR outcomes consists of an introduction, evaluation methodology, overview on Guangzhou's responses to SDGs, priority review targets, progress, and outlook.



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3

Overview of Guangzhou's Responses to SDGs

3.1 Guangzhou's long-term urban development strategy in response to SDGs

Since 2017, Guangzhou has been following the 2035 Strategic Planning of Guangzhou which regards the concept of sustainable development as an important premise. To accommodate the basic law of transformation into the high-quality stage of urban development, the 2035 Strategic Planning of Guangzhou has implemented the new concept of pursuing innovative, coordinated, green, open, and shared development. It aims to improve the sustainability and livability of urban development by relying upon an endowment of natural resources and focusing on the critical problems of the city's environmental and resource carrying capacity, urban security, and resilience. The plan also covers the developmental vision of the *beautiful, livable City of Flowers and vibrant, global city*. It illustrates the six major urban development strategies of *beautiful land, spatial pattern, prosperous and open international metropolis, charming Lingnan, a city of culture, inclusive and sharing, home to happiness, Baiyun Mountain and Haizhu Wetland, auspicious City of Flowers, and pastoral Lingnan, rural revitalization*. These six strategies are highly relevant to the 17 SDGs.

3.2 A people-centric city is for the people; it leaves no one behind.

Taking the VLR as an opportunity, Guangzhou further implemented one of the important principles of the *2030 Agenda—leaving no one behind* in compilation of the 2035 Strategic Planning of Guangzhou and implementation of the urban development blueprint. Guangzhou continues to focus on the actual needs of every resident in the community and every worker of industry. By adhering to the basic principle of *putting people first*, Guangzhou is advancing the transformation of city, industry, and social governance. It is generating inherent dynamism created by a smooth flow and efficient allocation of factors and carrying people's expectations for a happy life and responsibilities for economic and social development to ensure the city's healthy and sustainable development.

Beautiful land, spatial pattern



Based on Guangzhou's natural resource reserve, the city is coordinating the development of urban ecology, agriculture, and urban spaces. It is creating and protecting a spatial pattern where humans and nature co-exist. It is using areas with important natural resources as its core. Moreover, Guangzhou also uses a water system and ecological corridor as a link, uses ecological parks as connecting points, and covers both mountains and seas. These measures correspond to SDG 11, SDG 14, and SDG 15.

Prosperous and open international metropolis



In order to achieve quality development, Guangzhou continues to uphold the ideas of using science and technology to improve the competitiveness of the city, while facilitating the developments of the science and technology and advanced manufacturing sectors. It wishes to building a prolific and balanced industrial landscape. Guangzhou is also creating an international business environment which aims at improving international exchange. The city has been strengthening its functions as a transportation hub, created demonstration zones for seaports, airports, manufacturing services, and business services, which have connected it to the global population movement and supply chain network. These endeavors are highly relevant to SDG 8, SDG 9, and SDG 17.

Charming Lingnan, a city of culture



Guangzhou is creating an urban space that showcases historic features and preserves the historical and cultural spaces of the Pearl River Basin within the city. Meanwhile, Guangzhou is preserving historical districts, towns, villages, and streets, as well as other immovable cultural relics. It has created cultural heritage tourist attractions with historical features and promoted the integrated development of business, tourism, and culture, and in the process, improving the convenience of utilizing historical and cultural resources. These activities are in line with SDG11.

Inclusive and sharing, home to happiness



Guangzhou has appropriately increased the supply of residential land and housing, improved the supply of affordable housing, and used its living zones as a basic unit for the allocation of public resources in the community. The provisions of inclusive and shared public services have also been on going. An optimization for the construction of a three-tier park system, consisting of natural, urban, and community parks, and promoting the balanced distribution of parks at all levels in the city, are among the efforts to be made. Promoting the transformation of the city's transportation structure, moving to a rail transportation driven system, building a quality habitat, and providing zoning that makes it easy to do business and easy to have fun are some of Guangzhou's lofty goals. These measures correspond to SDG1, SDG3, SDG4, SDG5, SDG10, SDG11, and SDG16.

Baiyun Mountain and Pearl River, auspicious City of Flowers



Using the Pearl River Basin as the primary framework, Guangzhou has coordinated the systematic preservation and maintenance of mountains, waterways, forests, farmlands, lakes, and seas, while taking into consideration key issues, such as natural resources, endowment, and the ecological environment to promote differentiated ecological remediation and environmental legislation. In addition, Guangzhou has comprehensively been improving the functionality of the ecological system and quality of the ecological environment in Guangzhou. It has been facilitating a low carbon transformation in urban development. Moreover, the city has responded to climate change and improved the comprehensive capacity to mitigate multiple types of disasters. These are closely related to SDG6, SDG7, SDG12, and SDG13.

Pastoral Lingnan, rural revitalization



Guangzhou has accelerated its modern agricultural system, and it aims to create three distinct, agricultural developmental belts within its northern, central, and southern sectors. Guangzhou promotes comprehensive agricultural development and encourages specialized agricultural development in numerous areas; it supports the intensified and diversified development of agriculture. Lastly, significant improvement continue to be made to rural road network connectivity and supporting infrastructure in order to build an integrated urban and rural infrastructure. These are in line with SDG2 and SDG6.

3.3 Guangzhou's development measures driven by SDGs

Since the release of the 2030 Agenda, Guangzhou has taken into account the 2035 long-term urban development strategy and adopted about 70 specific measures, which have delivered remarkable results. Nevertheless, challenges and deficiencies still exist due to imbalanced and inadequate social and economic development.

Guangzhou's Long Term Development Strategy and Measures in Response to SDGs

SDGs	Guangzhou's Measures
<p>01 No poverty  To end poverty in all its forms everywhere</p>	<ul style="list-style-type: none"> • Micro-targeted poverty alleviation for families living under the poverty line has basically been completed • All enterprises, social organizations, and individuals are encouraged to take part in poverty alleviation on a voluntary basis
<p>02 Zero hunger  To end hunger, achieve food security, improve nutrition, and promote sustainable agriculture</p>	<ul style="list-style-type: none"> • Permanent basic farmlands are under strict protection. • Optimize the farming structure, improve the self-sufficiency rate of staple foods, vegetables, meat, and poultry • Improve the modern food distribution industry • Ensure food reserve security
<p>03 Good health and well-being  To ensure healthy lives and promote well-being for all age groups</p>	<ul style="list-style-type: none"> • Allocate health care resources appropriately • Provide work-out facilities and services for all • Improve the service capacity of community health care facilities • Set up a health insurance system covering both urban and rural areas
<p>04 Quality education  To ensure inclusive, equitable, and quality education while promoting lifelong learning opportunities for all</p>	<ul style="list-style-type: none"> • Ensure education for all children, and expand the supply of quality educational resources • Promote the integrated development of vocational education and the in-depth development of higher education and further strengthen the role of education in driving social development • Improve the lifelong education service system to satisfy diversified educational demands • Strengthen the coverage of special education and focus on the needs of vulnerable groups • Strengthen education on sustainable development and promote knowledge of green development
<p>05 Gender equality  To achieve gender equality and empower all women and girls</p>	<ul style="list-style-type: none"> • Conduct education on gender equality • Improve the legal protection of women's rights • Promote the construction of mother's rooms at public spaces
<p>06 Clean water and sanitation  To ensure the availability and sustainable management of water and sanitation for all</p>	<ul style="list-style-type: none"> • Improve the water supply capacity in rural and urban areas and set up a water supply system that is balanced and is of high quality • Strengthen the prevention and treatment of water pollution and carry out environmental sanitation campaigns • Control water use and create a water-saving city • Preserve and restore the river basin ecosystem and improve the leisure function of the urban water system • Set up a water maintenance system that involves public participation and regional coordination
<p>07 Affordable and clean energy  To ensure access to affordable, reliable, sustainable, and modern energy for all</p>	<ul style="list-style-type: none"> • Optimize the availability of multiple energy forms • Strengthen the development of natural gas production, supply, reserve, and market system • Improve electricity supply security • Develop new energy and renewable energy resources
<p>08 Decent work and economic growth  To promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all</p>	<ul style="list-style-type: none"> • Maintain medium/high-speed economic growth • Improve the allocation of science and technological innovation • Promote the clustered development of innovation factors • Set up a lifelong professional training system

SDGs	Guangzhou's Measures
<p>09</p>  <p>Industry, innovation, and infrastructure</p> <p>To build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation</p>	<ul style="list-style-type: none"> • Establish quality, reliable infrastructure to support economic development • Improve the business environment and promote inclusive, sustainable industrialization • Provide more support to innovative, small, and micro enterprises and set up a diversified employment development system • Conduct sustainable, industrial transformation and improve the output efficiency of resources and energy • Construct an effective and innovative ecosystem to promote innovation
<p>10</p>  <p>Reduce inequality</p> <p>To reduce inequality within and among countries</p>	<ul style="list-style-type: none"> • Strengthen the balanced distribution of community public service facilities • Ensure vulnerable groups can enjoy equitable access to public service • Deepen reforms in the Hukou system and for rural and urban areas
<p>11</p>  <p>Sustainable cities and communities</p> <p>To make cities and human settlements inclusive, safe, resilient, and sustainable</p>	<ul style="list-style-type: none"> • Strengthen urban ecological resilience and improve the quality characteristics of the city • Promote collective governance and sharing, advance joint development of the community, and build a community that is sustainable • Facilitate the implementation of a healthy city concept • Nurture urban and rural environments which are conducive to living and for business • Provide fair and convenient public transport services
<p>12</p>  <p>Responsible consumption and production</p> <p>To ensure sustainable consumption and production patterns</p>	<ul style="list-style-type: none"> • Integrate the management of natural resources • Promote the ecological restoration of land and environmental management • Develop a structured system for managing solid waste
<p>13</p>  <p>Climate action</p> <p>To take urgent action to combat climate change and its harmful impacts</p>	<ul style="list-style-type: none"> • Control greenhouse gas emissions • Engineer climate change adaptive infrastructure and management • Perform risk assessment on Guangzhou's response to climate change
<p>14</p>  <p>Life below water</p> <p>To conserve and use and maintain oceans, seas, and marine resources for sustainable development</p>	<ul style="list-style-type: none"> • Identify the marine ecological preservation red line and ocean protection utility zones • Optimize the spatial patterns of ocean industries • Conduct coastline and island restoration and management
<p>15</p>  <p>Life on land</p> <p>To protect, restore, and promote the sustainable use of terrestrial ecosystems, manage forests, combat desertification, impede and reverse land degradation, and halt biodiversity loss</p>	<ul style="list-style-type: none"> • Build a green ecological network in the city • Value the protection of forest resources and improve forest ecological quality • Protect and restore wetlands and improve the ecological environment of wetlands • Implement micro-green landscape designs to enhance the charm of the City of Flowers • Protect wild animals and plants to ensure biodiversity
<p>16</p>  <p>Peace, justice, and strong institutions</p> <p>To promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels</p>	<ul style="list-style-type: none"> • Strengthen the comprehensive governance of public security • Build an international business environment based on the rule-of-law • Establish a smart governmental affairs platform
<p>17</p>  <p>Partnership for the goals</p> <p>To strengthen the means of implementation and revitalize the global partnership for sustainable development</p>	<ul style="list-style-type: none"> • Jointly build the Guangdong-Hong Kong-Macau Greater Bay Area • Develop the Guangzhou Nansha Guangdong-Hong Kong-Macau Greater Bay Area • Comprehensive Cooperation Demonstration Zone • Improve Guangzhou's cultural international presence • Host the Guangzhou International City Innovation Award

We believe that, as a mega city with a population of over 15 million, Guangzhou's explorations and practices in SDG 4 - quality education; SDG 6 - clean water and sanitation; SDG 9 - industry, innovation and infrastructure; SDG 11 sustainable cities and communities; as well as SDG 15 - life on land play a rather important role in improving the city's sustainable development capacity. As a result, Guangzhou will elaborate on these review targets in its initial VLR report and share our experiences with cities throughout the world.





4

Priority Review Targets and Progress

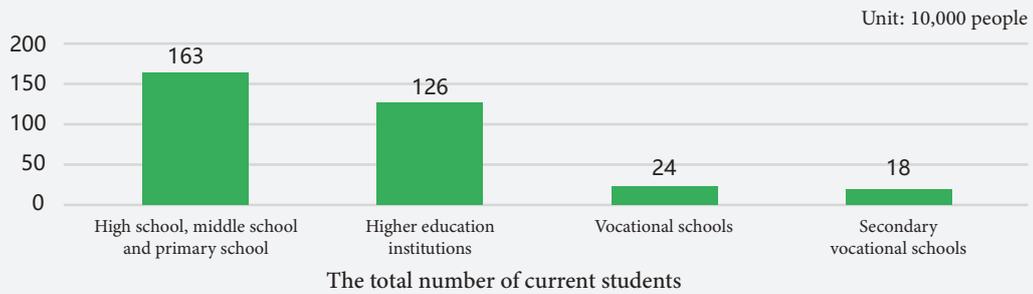
- **SDG4** Quality education: To ensure inclusive and equitable, quality education and promote lifelong learning opportunities for all
- **SDG6** Clean drinking water and sanitation facilities: To ensure the availability and sustainable management of water and sanitation for all
- **SDG9** Industrial innovation and infrastructure: To erect disaster-resilient infrastructures, facilitate inclusive and sustainable industrialization, and promote innovation
- **SDG11** Sustainable cities and communities: To construct inclusive, safe, disaster-resilient, and sustainable cities and human settlements
- **SDG15** Life on land: To protect, restore, and promote the support use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and impede biodiversity loss.



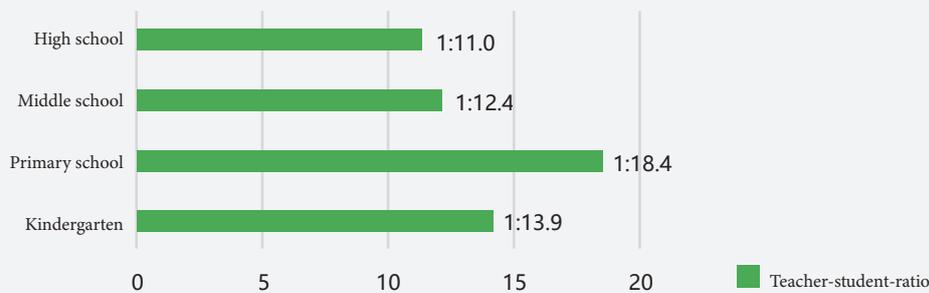
Quality Education:

To ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Importance attached to education for all

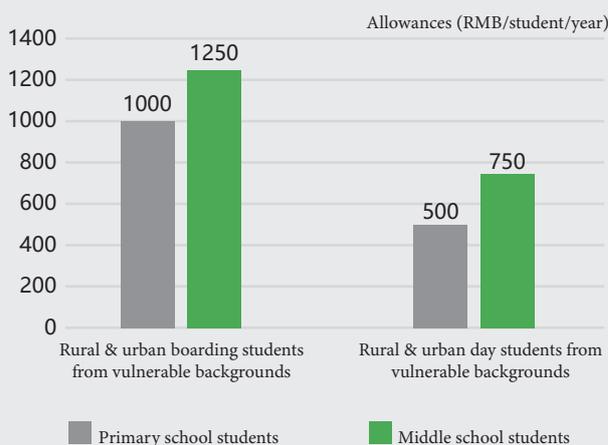


Extended availability of quality education



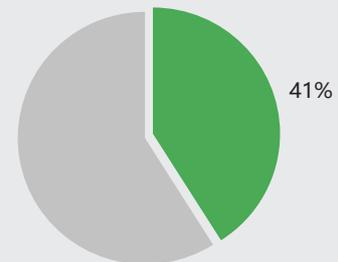
Safeguard compulsory education

Provide allowances to vulnerable students during compulsory education phase



61 million

Number of current students in primary and middle schools who migrated to Guangzhou with their parents



Proportion of current students in primary & middle schools who migrated to Guangzhou with their parents

Strengthened special education

20

Number of special education schools

4,938

Number of students with special needs during the compulsory education phase

15 years

Years of free education offered to students with special needs

Overview and Background

Obtaining a quality education is the foundation of improving people's lives and sustainable development. In addition to improving the quality of life, obtaining inclusive education enables residents to get a hold of essential tools which can be used to develop innovative solutions to the thorniest issues in the world. SDG 4 calls on decision makers to redirect their attention to this area, strive to ensure improvement in the quality of education, and make sure that people from more age groups can get access to education.

Overall Progress

Guangzhou has always been putting the development of education at the top of its agenda providing people with inclusive and quality resources for lifelong education. Attention to and participation in education are both on the rise. Since 2015, Guangzhou has been taking a proactive approach to achieving the goals set forth in SDG4, and government expenditure on education has been increased in recent years. The quality and number of both government-run and privately-owned educational institutions have been increasing on a constant basis. An educational system covering all levels and all categories has been established, and the quality of Guangzhou's educational infrastructure leads the country.

Guangzhou highly values equity in education, and this equity has been constantly enhanced. The equal distribution of educational resources has been basically achieved, which has further expanded the supply of quality educational resources. Guangzhou has also set up a financial aid system covering all levels and all categories of education. For students coming from households with financial difficulties, a financial aid system for vulnerable students has also been established. The availability of special education resources in Guangzhou has increased as well, and a special education system which is able to address the targets of each student's healthy development has been established.

Efforts will be made to strengthen the cultivation of innovative capacity and to develop a leading vocational education. The path for lifelong learning has been cleared, ensuring that the entire society has access to education. Guangzhou's competence in international exchange and cooperation has been enhanced. The promotion and education of sustainable thinking has been directed on an ongoing basis. Education on the environment has been introduced in both schools and our society at large.

Through collective decision-making and efforts, multiple plans and policies for the development of education have been formulated, and an extensive consensus has been reached. These ventures make contributions to the advancement of SDG4.

Specific measures

(1) Ensure education for all children and expand the supply of quality educational resources

- With regard to basic education, universal access to a nine-year compulsory education has become a reality in Guangzhou. The system of financial assistance to vulnerable students and the system that allows children migrating to Guangzhou with their parents to be admitted into local schools have been established to ensure the right of education for all children. In recent years, Guangzhou has been vigorously encouraging the establishment of education groups led by quality high schools, middle



After this school's welcoming ceremony, free, new textbooks have been given to students.

schools, and primary schools. Such educational groups are encouraged to disperse into new towns and districts with a large amount of affordable housing. By increasing governmental investment, the number and quality of inclusive kindergartens have both increased which has further ensured the provision of preschool and compulsory education.

- Provide financial aid to vulnerable students to help them complete their education

Guangzhou instituted a financial aid system for students coming from households with financial difficulties, and it waived tuition fees and miscellaneous fees for eligible students. Allowances and grants for students coming from households with financial difficulties have been made available through multiple channels such as governmental financial assistance and public donations.

- Make sure that children who migrated to Guangzhou with their parents have access to compulsory education

In the past, due to restrictions in parenting and frequent changes to places of residence, it was difficult for children from migrant families to access a quality education in most cities. Municipal and district governments launched a series of measures to help these migrant children who arrived in Guangzhou with their parents to have a share of the better educational resources to be had in Guangzhou. These include an increasing number of places at public schools which provide subsidies to schools and offer textbook subsidies. Right now, there are more than 1.47 million students in primary and middle schools in Guangzhou. Among them, 610,000 represents the number of students who migrated to Guangzhou with their parents where they account for more than 41% of the total.

- Increase the availability of inclusive kindergartens

Since 2011, through the implementation of a preschool education action plan and the introduction of a number of other measures, such as instituting government-run kindergartens and encouraging the establishment of private-run kindergartens, Guangzhou has aimed to provide an affordable, quality, and inclusive early childhood education that benefits public interests. By the end of 2019, around 83% of preschoolers had attended inclusive kindergartens.

- Extend the coverage of quality education to new districts with a large amount of affordable housing

In 2017, Guangzhou started to roll out the establishment of educational groups in full gear. By putting in place educational groups on a stage-by-stage and batch-by-batch basis, Guangzhou managed to deliver quality educational resources to districts away from the city center, such as Baiyun, Nansha, Conghua, Zengcheng, Huangpu, and Huadu. Simultaneously, Guangzhou encouraged each district to create local education groups based on its own specific circumstances. In relation to the composition of these educational groups, a variety of combinations were introduced. They include quality education + disadvantaged school, quality education + rural school, quality education + new school and grouping of schools of different levels. By doing so, prestigious schools were able to expand into different districts. Top schools took the lead in promoting the equal development of quality education. Resources of prestigious schools were able to reach a wider audience.



New campuses of well-established middle schools and primary schools in new districts

(2) Promote the integrated development of vocational education and the in-depth development of higher education and further strengthen the role of education in driving social development

Guangzhou is actively promoting skill training and the cultivation of innovation capacity of the workforce through vocational and higher education.

Guangzhou's development of vocational education has several focuses. These include strengthening school-enterprise cooperation, encouraging enterprises to form joint vocational education groups with schools, and promoting the inclusion of both secondary and tertiary vocational schools within such education groups. These education groups are also encouraged to adopt new recruitment models such as apprenticeships to promote compatibility between skill training at school and the demands of socioeconomic development, as well as the requirements of specific positions. Thus, these groups will be able to realize the organic connections between education, workforce, industry chain, and innovation chain. Vocational education has delivered 40,000 highly qualified workers, intermediate, and senior skilled workers to Guangzhou and the Pearl River Delta region.

Guangzhou is home to 83 higher institutions, and in 2019, the number of registered students attending higher educational institutions stood at around 1.26 million. Guangzhou is also home to Double First Class universities (World First Class University and First-Class Academic Discipline Construction), which have empowered Guangzhou's innovation-driven development.

In recent years, Guangzhou has accelerated its efforts to opening up in education, and the city has taken a proactive approach to sharing the Guangzhou Story with the rest

of the world. In conjunction, it has spread the Guangzhou Voice, in order to achieve a higher level of opening up in the education sector on a progressive basis. Guangzhou has strenuously promoted the construction of the Hong Kong University of Science and Technology, Guangzhou Campus and the South China Polytechnic University, Guangzhou International Campus. Guangzhou Municipality affiliated universities have formed partnership programs with prestigious universities from abroad. Different levels and different types of schools have been conducting in-depth educational exchanges and cooperation with overseas schools. At the same time, Confucius Institutes and branch offices have been established overseas. A total of 88 international partnerships have been set up between middle and primary schools in Guangzhou and their international counterparts. Local international private schools and schools for children of foreign citizens have achieved in-depth development, and their advantages in brand reputation as well as differentiated development have become more obvious.



Manufacturing industry skill competition

(3) Improve the lifelong educational service system to satisfy diversified educational demands

Guangzhou consistently adheres to the idea of lifelong education and provides its citizens with a wide range of educational and training opportunities. It accomplishes this through effective coordination between government, community, market, and enterprise and the application of the Internet, multimedia, and other modern technologies. All-aged universal and lifelong learning service platforms were established to enhance the capacity for serving key groups, such as senior citizens, teenagers, migrants, and professional farmers. A four-tier education network at the municipal, district, neighborhood, and community levels was formed. Since 2013, Guangzhou has been positively engaged in developing of universities of the third-age. As such, it established the Guangzhou Regional Association of Universities of the Third-Age to promote education for the elderly. As of 2018, there were 213 educational institutions for the elderly spread across Guangzhou with 30,000 education places provided. There were 2,593 senior activity rooms in the city, and an average of 80,700 people visited these activity rooms each day. There were 1,998 cultural and sports teams for the elderly with 49,000 members.



University of the Third-Age offers music and ICT lessons

(4) Strengthen coverage of special education and focus on the needs of the vulnerable groups

In order to promote the healthy development of students, Guangzhou has gradually increased the availability of special education resources with a view to building a special education system that is appropriately distributed. Said special education system also covers all educational stages and integrates general education with vocational education, while at the same time combining medical care with education. Access to compulsory education for all children with special needs was basically guaranteed and students with special needs are offered 15 years of free education all the way from preschool to high school.

Currently, there are 20 special education schools and 976 regular schools and kindergartens providing special education throughout Guangzhou. A total of 221 resource classrooms and 52 special education classes have been built.



Nansha District Special Education School which is scheduled to open in September, 2020

(5) Strengthen education on sustainable development and promote knowledge of green development

Guangzhou has actively launched its promotional and educational programs on sustainable development and sustainable lifestyles. Under the concerted efforts of government and society, citizens have shown an increasing passion for sustainable development. Various social groups and enterprises have voluntarily held numerous activities regarding education on ecological and environmental protection.

- Ecological civilization education on campus

In primary schools, 1 to 2 class hours of local, comprehensive lessons on environmental protection will be introduced, while in middle schools, 1 class hour of local, comprehensive lessons on environmental protection will be conducted. On-campus, ecological civilization themed educational campaigns, such as the Low Carbon Campus and My Environmental Protection Day will be launched throughout the city every year. By making use of a variety of activities, including on-campus culture and arts events, science education, comprehensive practical courses, lectures delivered by experts, and in-class teaching, Guangzhou aims to turn ecological civilization education into an organic part of the curriculum, thus making quality

ecological civilization education available to more than 2 million students across the city.

- Sustainable development and environmental protection education for the general public

Social organizations and enterprises have energetically engaged in sustainable development and environmental protection education. Environmental protection facilities and environmental education bases open to the general public have been built. Environmental science education is now provided to the general public, especially for young people and children. These courses are offered in an imaginative, intuitive, vivid, and interactive manner. Efforts have been made to establish a social action system that enables everyone to participate in environmental protection, which also enhances the public's understanding of sustainable development and raises the public's awareness of the ecological environment.

Case: Sustainable development and environmental protection education

In 2016, the Guangzhou Municipal Bureau of Ecology and Environment and GAC Honda Automobile Co., Ltd. cooperatively hosted an environmental protection photo contest. The contest attracted more than 2,000 photographers and photography enthusiasts while collecting over 4,200 entries and reaching more than a million viewers online. In November, 2017, the Guangzhou Municipal Bureau of Ecology and Environment hosted the 2017 Green City of Flowers Environmental Protection Knowledge Competition for Middle School and Primary School Students, which attracted participation from more than 1,000 primary schools and over 400 middle schools. The number of contestants exceeded 100,000. The competition helped students to learn more about environmental protection, enhanced their commitment to green development, and further increased their willingness to engage in environmental protection activities. Their environmental protection awareness has been significantly improved as well.



Group photo of the finalists

In 2019, the Haizhu Wetland was included in the WWF theme courses on environmental education. Through the launching of a series of free courses on environmental education, and providing a combination of indoor classes and outdoor classes in the park, children have been given the opportunity to explore the wetland together. As a result, their love for nature has been further crystallized.



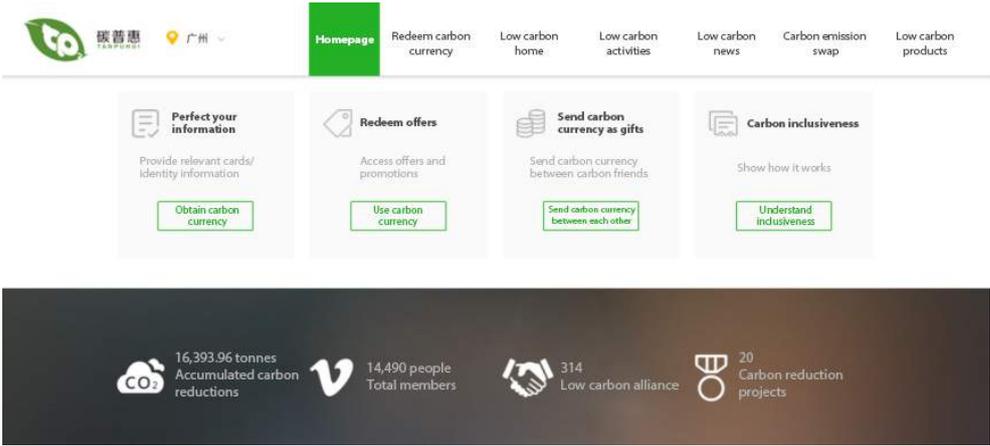
Haizhu Wetland Nature School - Experience Nature



Haizhu Wetland Nature School - Experience Nature

- **Establishment of ETS and education on ETS**

As one of the first ETS pilot cities in Guangdong Province, Guangzhou has developed quantitative, carbon reduction accounting methods for low-carbon behaviors, such as saving electricity, saving water, saving gas, travelling on subways, travelling on buses, and recycling used clothing. Guangzhou has also developed certified voluntary emission reduction projects and encouraged society to take actions on the small things in order to turn Guangzhou into a low-carbon city.



Everyone can contribute to building a low carbon city through the Tanpuhui (ETS) Platform



Clean drinking water and sanitation facilities:

To ensure the availability and sustainable management of water and sanitation for all

Continuous improvement in water use efficiency

2.85%

Water utilization rate



Importance attached to education for all

≥760 million tonnes per day

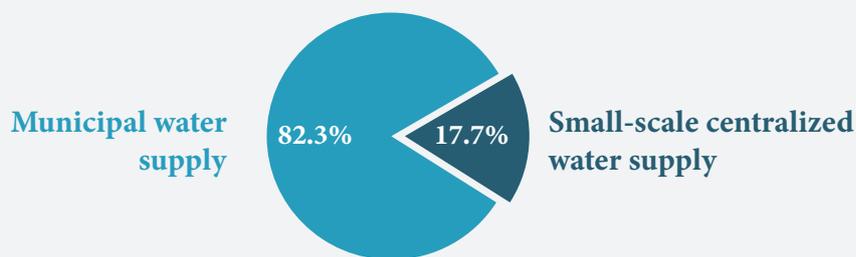
Urban wastewater processing capacity

97% Treatment rate of urban domestic wastewater

147 Black odorous rivers treated

99.8% Penetration rate of clean toilets in the rural areas

Importance attached to education for all



Centralized water supply in rural areas

100%

Tap water penetration rate in Guangzhou

100%

Percentage of population who have access to a rural, centralized water supply service

99.98%

Water quality comprehensive pass rate of the municipal water supply system

Overview and Background

Freshwater is a valuable resource, and it is of critical importance to human health, food and energy security, poverty eradication, and many other aspects of sustainable development. Adequate water and sanitation facilities serve as an essential foundation for achieving sustainable development goals, including good health and social equity. By managing water resources in a sustainable approach and providing good water ecosystems, we can alternately better manage food and energy production, while at the same time contribute to productivity and economic growth, among many other things.

Overall Progress

In response to the requirements of SDG6, Guangzhou earnestly practices the water management policy of *prioritizing water conservation, promoting spatial balance, utilizing systematic governance, and effectively employ the respective roles of both the government and market*. Prominent effects have been achieved thanks to Guangzhou's efforts in mobilizing society to strengthen treatment of the water environment, restoration and protection of water ecology, and in conducting environmental sanitation campaigns.

Since 2015, Guangzhou has been implementing the most stringent water resource administration system. It continues to exercise *dual control* over the total volume and use intensity of water resources, while incorporating water conservation throughout the process of building a water-saving city. It has ensured full coverage of a clean water supply in remote rural areas and older residential communities. Efforts have been made to curb water pollution at the source and fix weaknesses in the construction of wastewater collection and treatment facilities. Results for reducing water pollutants have been remarkable, and the water environment quality has been improving. With goals designed to ensure the free flow of water, return *serenity, vitality, clarity, beauty* to the waters of the city, and introduce a smart water management system, Guangzhou has taken actions to restore and protect the water ecosystem and enhance the leisure functions of the urban water ecosystem. Each and every citizen is encouraged to take part in water management. Furthermore, Guangzhou has updated and revised its policies and regulations on drainage and other related issues. A real-time, full-process, monitoring information system has been established. The *River Chief System* has been fully implemented and a water maintenance mechanism with regional coordination has been established. This effective system has already mitigated serious, water contamination issues.

Specific measures

(1) Improve the water supply capacity in rural and urban areas and create a water supply system that is balanced and is of high quality

Guangzhou has been optimizing its public service system for water resources and has effectively implemented the most stringent water resource administration system to control total water consumption. Binding constraints on the carrying capacity of water resources have been strengthened to ensure water safety in both urban and rural areas.

- Diversified water supply options

Guangzhou's goals in this area are to improve the multi-source secure water supply system and build an integrated, interconnected, and complementary water supply system in urban and rural areas. Water supply methods should be appropriately determined on the basis of water sources, geographical locations, water usage, and

the distribution of water consumers. For remote rural areas which are not covered by a municipal water supply network, a small-scale, centralized water supply is being used to ensure the penetration rate of centralized water supply is able to reach 100%. In 2019, the urban water supply was stabilized and secure with a daily water supply exceeding 7 million cubic meters. Drinking water source protection zones were identified and safeguarded to ensure drinking water quality. Water supply quality has consistently met standards, and the comprehensive water quality pass rate is 99.98%.



One of Guangzhou's drinking water sources – the Liuxi River Reservoir

- Renovate water supply facilities in rural areas and old residential communities

In rural areas, Guangzhou implemented tap water reforms; in urban areas, Guangzhou has continuously improved water supply facilities in old residential communities and urban villages to address the problems of secondary pollution, high levels of leakage, and damage to the pipeline network. These actions have ensured full coverage of a secure water supply. Between 2019 and the first half of 2020, a total investment of RMB 430 million had been put into use to renovate the water supply facilities in 288 administrative villages, expand the municipal water supply network, reform small-scale, centralized water supply facilities, and upgrade pipelines to a high standard. The achievements helped to ensure that the water quality in rural areas could meet the standards. At present, the city's rural, centralized water supply penetration rate has reached 100%. Among the city's 1,144 administrative villages, 942 villages are using tap water provided by municipal water supply plants. This tap water has been found to be safe, reliable, and of good quality. The compliance rate has stayed at over 99% for many years. The remaining 202 administrative villages, located in areas at high altitudes or remote areas which have yet to connect to the municipal water supply network, rely on small, centralized water supply facilities to get water into households, ensuring that water demand coverage stands at 100%. These actions have effectively addressed the issues of water supply quality and pressure while improving the quality of life in rural areas.

(2) Strengthen water pollution prevention and treatment and conduct environmental sanitation campaigns

- Improve the wastewater treatment capacity of urban communities and industrial parks
Additional goals that Guangzhou has specifically focused on involve correcting the loopholes of wastewater treatment capacity in key areas, systematically promoting the expansion and upgrades to wastewater treatment plants, and improving the construction of wastewater treatment infrastructure, such as the fabrication of a wastewater network. In special areas, such as urban villages, wastewater interception sewage systems have been introduced into each of these villages and every household. Concerted efforts have been made to regulate water pollution in industrial clusters; industrial enterprises that illegally discharged polluted wastewater and caused environmental damage have been shut down. By the end of June, 2020, Guangzhou had built 62 urban wastewater treatment plants with a daily processing capacity surpassing 7.6 million tonnes. These facilities have effectively reduced the discharge of pollutants such as ammonia and nitrogen.



Wastewater purification facilities which have become part of the city landscape

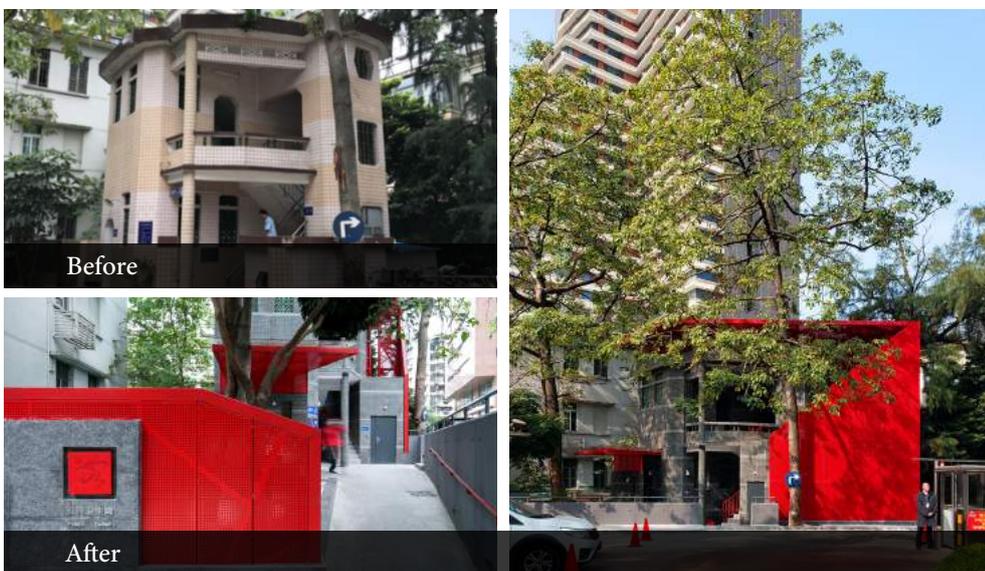
- Ramp up efforts to treat black, odorous bodies of water
Treatment of black, odorous bodies of water remains the top priority in Guangzhou's wastewater treatment efforts. Guangzhou has taken the approach of source control, wastewater interception, desilting, replenishment, management. Through the implementation of four major tasks, including building a sophisticated wastewater collection and treatment system, comprehensively clearing and regulating sources of pollution, improving wastewater collection and treatment efficacy, and improving urban drainage management competence, the focus of black, odorous water treatment has made improvements into the branches and small gutter ways which flow from main waterways. The overall conservation efforts have yielded remarkable outcomes. A total of 147 black, odorous rivers have become clear and clean again in established districts. As a result, Guangzhou has been enlisted as the first select group of model cities for the treatment of black and odorous bodies of water.
- Conduct comprehensive water environment conservation in rural areas
The comprehensive conservation and maintenance of the water environment in rural areas focuses on the management of domestic waste and wastewater, as well as the

protection of rural drinking water sources. Additional efforts have been dedicated to the inspection of rural drinking water sources in order to identify environmental issues, decide on immediate actions, and take corrective measures on newly identified environmental issues. By the end of June, 2020, among the 7,598 villages across Guangzhou, domestic wastewater treatment facilities had been built in 88.6% of these villages, and this figure is expected to be raised to 100% by the end of the year.



Positive results of water environment improvement in rural areas

- Put the toilet revolution into action to provide equitable sanitation and hygiene
- Guangzhou Municipality has promulgated and fully advanced a set of guidelines on the construction and management of public toilets in conjunction with the three-year action plan for the toilet revolution. Currently in the central districts, one toilet can be found within a 20-minute walk. In 92% of public toilet facilities, the ratio of male to female toilet stalls have reached just over a 2:3 ratio. Coverage of barrier-free facilities in public toilet areas has exceeded 90%. Simultaneously, Guangzhou has made the toilet revolution a part of the rural area habitat environment improvement efforts. Rural public toilets can be found in all administrative villages, and reformation projects are under way in natural villages according to actual demand. By the end of 2019, the sanitary toilet penetration rate had reached 100% in rural areas.



A public toilet on Huanshi East Road styled by a renowned designer

(3) Control water use intensity and create a water-saving city

Guangzhou launched the *Water Conservation Plan (2018 - 2035)* and the water conservation action plan to vigorously promote water conservation in industrial sectors, across all rural sectors, and urban areas as well. Construction of water-consumption projects has been placed under strict control. Water-consumption techniques, technologies, and equipment have been phased out while promoting water-saving techniques and technologies. At the same time, Guangzhou has advanced water-conservation reforms for industrial enterprises and industrial parks. Guangzhou will promote the popularization of water-saving household appliances and conduct free, water-saving, appliance replacement campaigns for low-income families. By 2020, the penetration rate of water-saving household appliances is expected to hit 100%. High-risk water supply networks have been in use for more than 50 years, but they were constructed of outdated materials and have developed serious leakage problems. They are due to be upgraded on a step-by-step basis. Water conservation measures combining agricultural machinery and agricultural techniques will be advanced in rural areas to improve the utilization rate of water resources. Tiered pricing for domestic water use has been introduced in urban areas. Meanwhile, above-quota water usage will be subject to progressively higher surcharges for non-domestic water consumption. Guangzhou intends to take full advantage of the role of the market and pricing mechanisms in water resource allocation and demand adjustment. The city will continue to set an example for water-conservation and build water-saving platforms. By the end of June, 2020, a total of 889 water consumers in Guangzhou completed the water balance test. During that same time period, 103 provincial-level, water-saving enterprises, 147 provincial-level, water-saving organizations, and 269 provincial-level, water-saving residential communities had been created. Guangzhou has taken aim at strengthening education on water-conservation and improve public awareness regarding the topic of water-conservation. Guangzhou hosts the quiz competition *World Water Day, China Water Week* every year and organizes events for national urban water-saving education week. In June, 2019, Guangzhou passed the inspection organized by the Guangdong Department of Housing and Urban-Rural Development and the Guangdong Development and Reforms Commission. It was named *Guangdong Water-saving City*, and all results have indicated that each requirement laid out in the *National Water-saving City Evaluation Standards* had virtually been met. In June, 2020, Guangzhou submitted an application to the Ministry of Housing and Urban-Rural Development, as well as the National Development and Reforms Commission to become a *national water-saving city*.

Case: GAC Group achieved zero discharge of wastewater and 100% recycle and reuse of wastewater

The GAC Group has incorporated the idea of water conservation into every production process across all of its manufacturing bases, and it has achieved remarkable results to date.

- A significant 100% of domestic wastewater and production wastewater has been recycled and reused after being processed by wastewater treatment stations, and the GAC Group has taken the lead in accomplishing *zero discharge of wastewater* in the automobile industry.
- The world-class technology of *continuous activated carbon adsorption reverse osmosis concentration* has been introduced, and factories no longer discharge wastewater to the environment, thereby turning *100% recycle and reuse of wastewater* into a reality. Reclaimed water is used to water vegetation, clean campus roads, and cleanse toilets.

- The efficiency of water resources has been continuously improved with the water consumption quota for vehicle production reduced to 2 tons/vehicle. This statistic is more than 50% lower than the industry water consumption standard.
- The GAC Group has set up an energy management affairs bureau, which regularly carries out water balance tests to eliminate water leakage points. The bureau regularly delivers publicity and educational programs on energy and water saving so that all employees are able to raise awareness of water conservation.



The GAC Honda wastewater treatment plant

(4) Preserve and restore river basin ecosystems and improve the leisure functions of urban water systems

With *improving environmental quality and guaranteeing environmental safety* as its core message, Guangzhou has promoted the restoration and protection of water-related ecosystems, unblocked the sponge system, and enhanced the ecological and recreational functions of urban water systems.

Guangzhou has kept a sharp focus on the protection of watercourses, wetlands, and natural water ecosystems. It has resisted the excessive occupation of river areas by river-related construction projects. It has strictly prohibited land reclamation over rivers and the filling and blockage of rivers. Former quarry pits have been transformed into lakes, and canals have been built to link these man-made lakes with externally flowing rivers, so that water can be conveyed, aerated, and replenished leading to the improved water quality of Guangzhou's waterways. A water allocation program, based on safeguarding ecological flow, has been drafted and implemented. Guangzhou is accelerating the implementation of key ecological projects, such as the targeted improvement of forest quality, the restoration and protection of wetland resources to restore and enhance the ecological and recreational functions of urban water systems, and the construction of a water-friendly ecological embankment to create a *Lingnan water town* with clear water, green riverbanks, and beautiful scenery.



Vibrant and healthy waterfronts property in Guangzhou

(5) Set up a water management system involving wide public participation and regional coordination

- Form a water-management system featuring joint development, effective management, and wide public participation

Guangzhou took the lead in establishing a River Chief System in 2014. As of now, all rivers and lakes in Guangzhou have been stationed with a river chief or lake chief. A four-tier accountability system of river chiefs in cities, districts, towns/streets, and villages/communities has been established. They cover the management and protection of all rivers, lakes, reservoirs, ponds, and small to micro- bodies of water. A civilian river chief mechanism has been developed utilizing a comprehensive and extensive

participation in water management by individual groups and other social forces such as college students, volunteers, and environmental protection organizations. For instance, in 2018, college students actively took part in water management by organizing and establishing 13 youth volunteer service teams to patrol rivers. A river system management information system has been established to clarify the tasks of river chiefs at all levels. Water management grids have been created, and the Guangzhou River Chief app has been launched to mobilize society to form an all for rivers pattern featuring joint building, management, and sharing.

- Set up a river basin ecological preservation compensation mechanism

In March, 2019, Guangzhou issued Guangzhou Ecological Protection and Compensation Measures. Beneficiaries of this program will bear the costs of compensation. By means of governmental leadership and in-region coordination, compensation will be given to ecological conservation red line zones, water environment, ecological public welfare forests, and basic farmlands. The Liuxi River Basin will be used as a pilot zone for the implementation of water environment ecological conservation compensation.



Industry innovation and infrastructure:

To build disaster-resilient infrastructure, facilitate inclusive and sustainable industrialization, and promote innovation

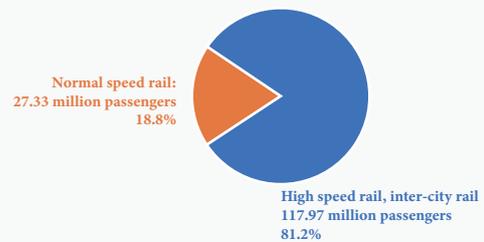
Infrastructure

232

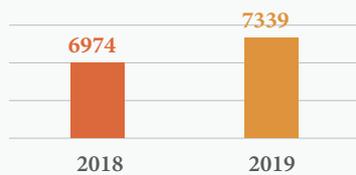
Cities with flight connections to Guangzhou Baiyun Airport

217

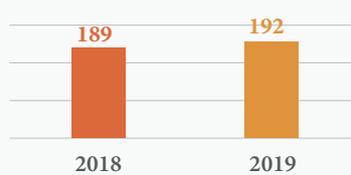
Container shipping routes operated via the Port of Guangzhou



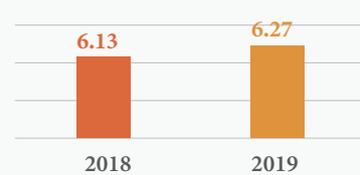
Proportion of high-speed rail and inter-city rail throughput of the total rail transportation throughput



Baiyun Airport throughput (10,000 passengers)



Baiyun Airport cargo throughput (10,000 tonnes)



Port of Guangzhou freight throughput (100 million tonnes)

100%

Proportion of population covered by rural and urban mobile network

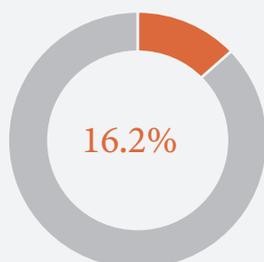
≈ 587 million households

Number of households with fixed broadband access

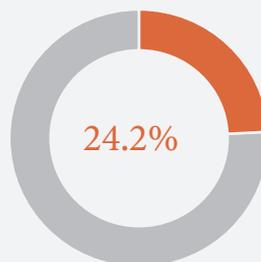
3200 million households

Number of mobile phone subscribers

Innovation development



Proportion of high-tech manufacturing in industries of a certain scale



Proportion of industrial added value in GDP

39.2

Number of patents owned per 10,000 people

Overview and Background

Infrastructure, industrialization, and innovation are the key drivers of sustainable development. Investment in infrastructure guarantees economic and social development. Industrial growth is the engine of sustainable development. Inclusive, sustainable industry helps to improve everyone's life and provides technological solutions to environmentally sound industrialization. Innovation acts as the cornerstone of environment goals, through which resources and energy be used efficiently. Therefore, SDG9 states that in the face of a rapidly changing global economy and rising inequality, sustainable growth must include opportunities for all and industrialization must be underpinned by innovative and resilient infrastructure.

Overall Progress

In response to the requirements of SDG9, Guangzhou has been continuously improving its infrastructure and energy mix, strengthening the integration of industrialization and informatization, and accelerating the establishment of a modern integrated transportation system. Since 2015, Guangzhou has been actively striving to achieve to goals set forth in SDG9. It boasts a high-speed rail network which can reach the entire country, and its capacity to drive development as a hub for air travel and sea transportation has been continuously improved. The Pearl River Delta's *one-hour living circle* has been virtually established. Guangzhou attaches a major emphasis on the availability and sharing of public resources. It does so by effectively reducing enterprises' operational costs, promoting the ideas of a circular economy and clean production, and continuously enhancing industrial inclusiveness and sustainability. The city has also built an innovative ecosystem in terms of company development, business environment, R&D investment, innovative atmosphere to support the development of small and medium-sized enterprises, and sustained improvement to innovation capacity. In 2019, advanced manufacturing and high-tech manufacturing accounted for 58.4% and 16.2%, respectively, in industries above a designated size. As a result, Guangzhou was named *Global Capital Customization* by the United Nations Industrial Development Organization.

Specific measures

(1) Build a high-quality, reliable infrastructure network to support economic development

Guangzhou places great significance on the construction of transportation and telecommunication infrastructure to enhance the competitiveness of all of its industries. Through the construction of airports, seaports, and other transportation infrastructure, Guangzhou and its surrounding areas have enhanced their connectivity with the rest of the world and promoted the beneficial flow of people, goods, and information. Conversely, the widespread use of mobile cellular networks and mobile broadband Internet along with increased efforts in building new infrastructure, such as the industrial Internet, Internet of Things, and CapEx, have reduced the operational costs to enterprises.

- International air travel hub

In recent years, Guangzhou has been advancing the construction of multiple, international air traffic hubs. Projects such as the Terminal 2 at Baiyun International Airport and the Business Aviation Service Base have been placed into service

successively. At the *World Routes, 2018 (Guangzhou) Conference*, Guangzhou put forward the vision to work with global air industry partners to continuously optimize and improve route networks and raise the quality of service. By 2019, there were 79 domestic and international airlines operating at Baiyun International Airport, with flights reaching 47 countries and territories worldwide. These air carriers connect 232 cities, of which 86 cities are located outside of China. Route network coverage reaches all six of the heavily populated continents of the world. As the route network continues to expand, Guangzhou Baiyun International Airport's status as an international air traffic hub has been further solidified. In 2019, passenger air traffic hit 73.39 million while cargo throughput reached 1.92 million tons, making Baiyun one of the busiest airports on earth.

Guangzhou Baiyun International Airport has formed a green administration model that coordinates energy, the environment, and carbon emissions. In the second half of 2019, as Terminal 2 went into use, unit energy consumption per passenger dropped by 11.3% on a year-on-year basis, and vehicle gasoline consumption reduced by 8.1%. At the *11th Clean Energy Ministerial*, it received the *2020 Energy Management Insight Award*.



Guangzhou Baiyun International Airport

- International shipping hub

Since the Nansha Port Area of Guangzhou Port went into operation in 2004, port shipping has witnessed a rapid growth. The Port of Guangzhou has become the largest, comprehensive shipping hub in south China, and it is well on its way to become a world-class shipping hub. By 2019, 217 container shipping routes had been launched at the Port of Guangzhou, among which, 111 were international routes reaching over 400 ports in more than 100 countries and regions. The annual cargo throughput reached 627 million tons while the container throughput totaled 23.24 million TEUs. Both of these statistics rank Guangzhou among the top 5 ports in the world.

In 2019, at the World Ports Conference themed *Open Cooperation, Shared Future*, as the host city, Guangzhou set forth the initiative to *work with friends from all countries to promote the green, smart, and sustainable development of the world shipping industry*. According to the *Green Port Five-year Action Plan of Guangzhou Port*, it will construct

and transform emission reduction and environmental protection infrastructure, develop and utilize green low-carbon equipment as well as a smart logistics information system, and optimize its work flow, to become one of the first four *green ports* in China.



Green Port - Nansha Port Area of Guangzhou Port

- High speed rail and inter-city rail networks

Guangzhou has always been one of the most important rail transportation hubs in China. Building upon the existing normal speed rail network, After 2010, Guangzhou has prioritized increasing its efforts in the construction of high speed rail and inter-city rail. Currently, Guangzhou has built a series of high speed rail routes, including the Beijing-Guangzhou High Speed Rail, the Guangzhou-Shenzhen-Hong Kong High Speed Rail, the Guizhou-Guangzhou High Speed Rail, and the Nanjing-Guangzhou High Speed Rail, as well as a number of inter-city rail transportation links, including the Guangzhou-Zhuhai Inter-City Rail, the Guangzhou-Foshan-Zhaoqing Inter-City Rail, the Guangzhou-Foshan Inter-City Rail, and the Guangzhou-Dongguan-Shenzhen Inter-City Rail. In 2019, 145 million passengers travelled from the Guangzhou Railway Hub, with a daily average of 397,300. High speed rail and inter-city rail passengers have become the mainstay of rail passenger traffic, accounting for 81.2% of the total.

In the future, Guangzhou will continue to build a more sophisticated high speed rail network to shorten the time needed to travel to neighboring cities and other cities throughout the nation. Guangzhou's objective is to achieve the following goals: reaching city centers in Greater Bay Area cities within 1 hour, reaching cities in Guangdong Province within 1.5 hours, reaching capital cities of neighboring provinces within 3 hours, and reaching major cities in national level city clusters within 5 to 8 hours.

- Information hub and telecommunication network

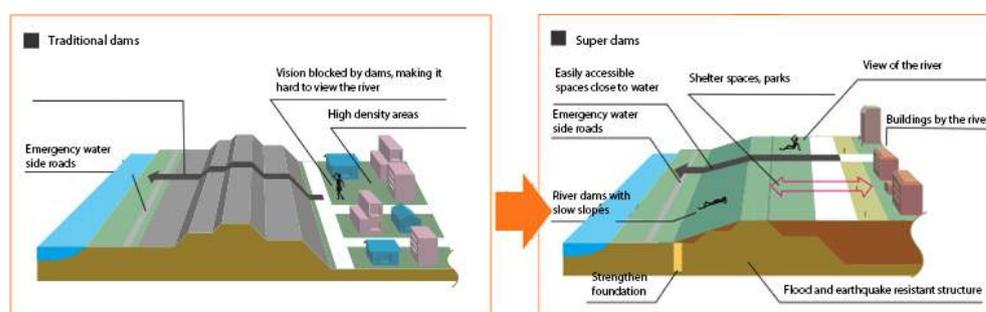
Another of Guangzhou's aspirations is to develop full coverage of an inclusive information and telecommunication service. In fact, Guangzhou has put a premium on the coordinated development of urban and rural information infrastructure to install fiber-optic cable into the households of remote rural areas. By the end of 2019, Guangzhou recorded more than 2,000G International Outlet Bandwidth, and nearly 5.87 million households in Guangzhou had access to fixed broadband Internet. The number of mobile phone users reached 32 million, while the number of mobile broadband users hit 29.181 million. Meanwhile, Guangzhou has ramped up its investment in the integration of information infrastructure construction, manufacturing industry, and service industry to promote the development of the IT and digital industries.

Case: Promotion of mobile network applications in Guangzhou

Mobile network applications have witnessed rapid development in Guangzhou, particularly in the areas of health care and transportation. By the end of July, 2020, mobile payment could be used at 146 medical insurance designated health care facilities in Guangzhou. Approximately 6.06 million insured users signed up for health insurance mobile payment, which could save nearly 40 minutes for each resident as they no longer need to line up to settle their payments. During the critical stage of the implementation of nationwide COVID-19 prevention and control measures, Guangzhou included the online diagnosis and treatment services for high blood pressure and diabetes into the coverage of health insurance. By proactively encouraging patients with chronic diseases to receive follow-up diagnoses through online medical care platforms, Guangzhou has successfully reduced the pressure on medical care facilities and lowered the risks of cross infections. Guangzhou Metro has become home to the only subway system in China where QR code ticket scanners are available at every station, and all five mobile payment methods are supported.

- Resilient city and infrastructure

In order to readily address the pressure of environmental carrying capacity restraints posed by global climate change and urbanization, Guangzhou has adopted innovative approaches, such as low-impact development, sponge city development, and sustainable urban temperature reduction to improve its capacity to survive, adapt, and grow in the face of external shocks. For instance, Guangzhou is a city with a large number of rivers. Through the research of tidal patterns with the utilization of climate statistics, Guangzhou has been able to create a sponge system that possesses the ability to retain and drain water. By taking full advantage of facilities such as reservoirs, canals, sluices, pump stations, and artificial lakes, Guangzhou has managed to build a system that can control and even prevent floods. Simultaneously, in the southern coastal areas, Guangzhou has built Super Dams which combined banks, dams, greenbelts, and roads. Super dams help to control floods and mitigate damages caused by typhoons while bringing the water system closer to the public and creating riverside scenery. With regards to policies and regulations, Guangzhou has ordered all new projects to abide by green building standards and surface runoff control measures, which are reflective of the basic requirements of a sponge city.



Representation of the Super Dam in Nansha District

(2) Optimize the business environment for enterprises to facilitate inclusive and sustainable industrialization

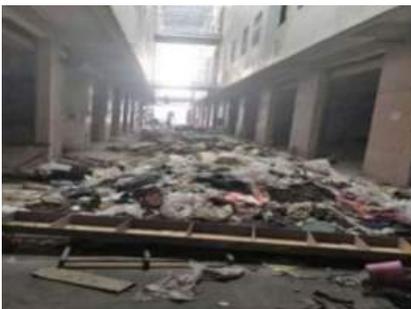
Guangzhou actively benchmarks itself against the World Bank business environment evaluation indicators. In terms of business registration, it has fully implemented the following measures: For online registration, every action is done on the same website using the same interface; for offline registration, every action can be completed at the same service desk using the same form. In 2020, Guangzhou will ensure that 100% of application-based requests can be processed online. For requests which need to be processed offline at governmental service centers, 100% of such appointments can be made online.

According to the *Evaluation Report on China's Business Environment and Private Business Owners* published by the China Academy of Social Sciences in 2019, Guangzhou's business environment comprehensive score ranked first among major cities in China. The Guangzhou Development Zone has genuinely pursued the new model of business service featuring *Blockchain + AI*, which earned it the award of *2019 Global Outstanding Investment Promotion Agency* presented by the United Nations, making it one of only three recipients of this award in the world and the only recipient of this award in China.

(3) Provide stronger support to small and medium-sized enterprises, innovative companies and build diverse employment development platforms

Guangzhou has built diverse entrepreneurship-based employment development platforms and genuinely integrated various types of resources to provide one-stop services including entrepreneurship guidance, entrepreneurship practical training, office spaces, business registration, patent application, investment and financing, as well as ad-hoc support in project financing, financing channels, and intellectual property right protection for enterprises listed on these development platforms. By 2019, there were 35 national level science and technology enterprise developers covering an area of 5.82 million square meters, with a number of the 10,756 enterprises under development. There were also 213 open-access, co-working spaces in Guangzhou, among which, 49 were nationally registered co-working spaces that offer 30,460 office slots for start-ups. Through transforming old factories and industrial zones, a myriad of development platforms types are offering well-appointed, flexible, and low-cost work spaces for small and micro-sized enterprises.

Guangzhou also provides diversified financial support to SMEs by establishing numerous support channels, such as credit risk compensation pools for technology-based SMEs, SME developmental funds, risk compensation funds for IP pledge financing, and SME financing re-guarantee companies.



Select views of Weipin Tongchuanghui in Haizhu District, a project which showcased the resurrection and renovation of former village-level industrial parks

(4) Conduct sustainable industrial transformation and improve resource and energy production rates

Guangzhou attaches great importance to the development of a circular economy. It views the development of a circular economy as an important step to promote economic transformation and upgrades, improve urban ecological civilization, and realize sustainable development goals. Between 2010 and 2019, Guangzhou's unit GDP energy consumption dropped by a total of 33.5%. In 2019, the value of technical transformation investment in Guangzhou's industrial investment had grown by 43% compared with the previous year.

- Promote the use of new energy sources

Guangzhou has made the development and utilization of solar energy a priority in the development of renewable energy sources. By the end of 2019, the total installed capacity of PV power generation projects reached approximately 517 MW. Guangzhou energetically promotes the development of the new energy industry, has comprehensively built new energy infrastructure, and is advancing the manufacturing and use of new energy vehicles. In 2019, the production of new energy vehicles increased by 114.7% as compared with 2018. NEV ownership exceeded 220,000, with a mileage driven of over 5.8 billion kilometers, resulting in remarkable energy conservation and emission reduction outcomes.

Case: Electrification of buses in Guangzhou won the *World C40 City Green Technology Award*

Guangzhou's aim is to develop the electrification of buses in Guangzhou. By the end of 2019, Guangzhou had already introduced 11,394 fully electric buses, making it one of the cities with the largest number of fully electric buses in the world. Guangzhou's busses have all entered into the green, low-carbon era of electrification. Guangzhou's bus electrification efforts earned widespread recognition at the 2018 Global Mayors' Forum held in Guangzhou and won the World C40 City Green Technology Award at the 7th C40 Global Mayors' Summit hosted in Copenhagen, Denmark, in October, 2019.

- Fully promote clean production

Guangzhou launched a clean production program that got thousands of companies involved as early as 2013. This program concerned more than 1,200 industrial companies above a designated size, whose energy consumption collectively accounted for over 80% of the total energy consumption in Guangzhou. It also extended the coverage of this program from the manufacturing industry to the service industry. By far, more than 2,000 enterprises have engaged in clean production. Guangzhou has also launched an energy conservation movement within key energy consumption organizations, advanced energy-saving supervision and law enforcement, and implemented an energy-saving target responsibility review program. As a result, the unit energy consumption of industrial added value has been constantly decreasing. In 2019, this figure dropped by approximately 24% compared with that of 2015.

- Apply state-of-the-art, energy-saving and clean production technologies to transform traditional companies

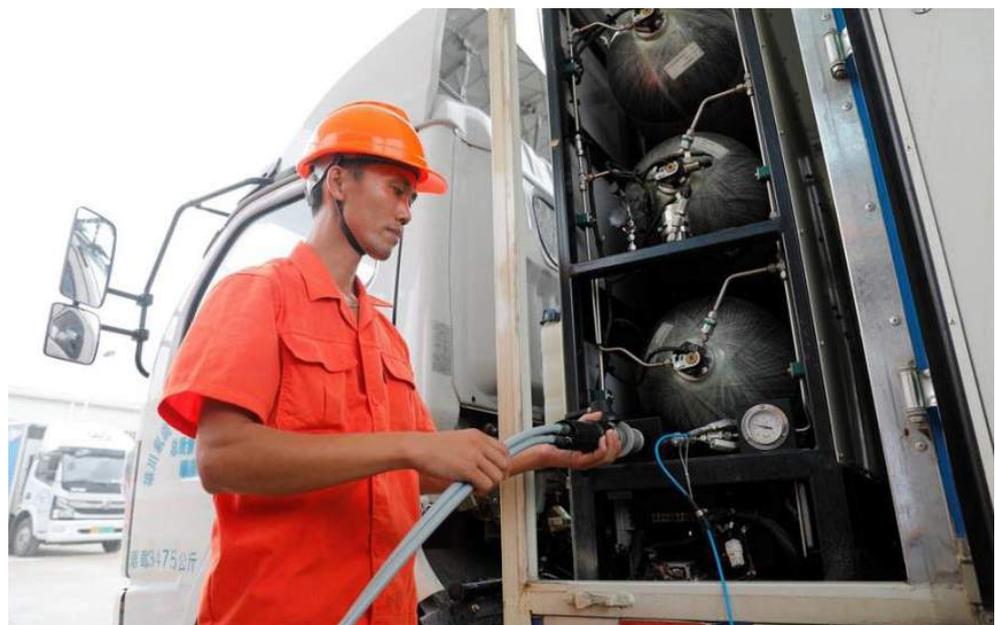
Guangzhou has provided support to energy-saving technological transformation by setting up the Database for 100 Key Energy-Saving Technological Transformation

Projects. These projects have enabled data sharing in terms of techniques, technologies, progress, and achievements in key transformation projects. Guangzhou set up special public financing programs in multiple sectors to provide support to energy-saving transformation projects. Private capital has been introduced to carry out energy-saving transformation projects. Guangzhou published several different editions of energy-saving and carbon emission reduction technology and achievement catalogue, to promote the application of such technologies through a variety of channels including exchange sessions. Up until now, Guangzhou has completed the development of high-efficiency motors and energy-saving motor systems with an installed capacity of more than 2 million kilowatts.

Guangzhou took the lead in China in the transformation of coal power plants for the purpose of ultra clean emissions. Coal-fired power plants in Guangzhou went through the ultra clean emissions transformation according to the standards for air pollutant special emission limit of gas turbines set out by the State and province in key regions. By the end of 2016, all incumbent turbines had been transformed. This represented a total of 24 units that completed the transformation with a total installed capacity of around 5 million kilowatts.

- Conduct centralized and circular transformation on industrial parks

Centralized circular transformation is a key step in promoting the development of a circular low carbon economy. Guangzhou has launched policies to facilitate the circular transformation of industrial parks and rigorously promoted the implementation of projects such as central heating, gray water recycling, and graded use of energy. Currently, a total of 28 industrial parks have drafted and implemented circular transformation plans and achieved fairly good results. For example, the Guangzhou Economic and Technological Development Zone and other industrial parks have accelerated the construction of comprehensive energy pipelines and Internet of Energy, promoted development in areas such as regional smart cities, smart pipelines, Internet of Energy, Internet of Things, renewable energy, and clean energy. They have specifically promoted demonstration projects including solar PV power generation, gray water recycling, and hydrogen fuel cell vehicle operation.



Demonstration of a hydrogen vehicle refueling operation

- Support the sustainable development of industrial enterprises by means of innovation in a green finance mechanism

Guangzhou is strengthening its credit support to the circular economy. In 2019, green credit loan balances in Guangzhou totaled RMB 340 billion, witnessing a year-on-year growth of 31%. Guangzhou also launched financing programs using pollution emission rights as pledges, providing low-cost guarantees to the implementation of sustainable development projects, including the electrification of nearly 10,000 buses and the introduction of facilities for the recycling and harmless disposal of waste. The transportation sector, energy sector, and water resources sector issued RMB 59 billion worth of green bonds.

Guangzhou has focused on the establishment of a carbon trading platform. Its further aim is to drive the China Emissions Exchange (CEEX) into becoming the largest emissions trading platform in China. By July, 2020, emissions quota traded via CEEX surpassed 150 million tonnes, ranking it first in China. Its accumulated trading value exceeded RMB 3.1 billion. Guangzhou enterprises fulfilled their emissions commitment for 6 years in a row (2013 - 2018), covering 31.82 million tonnes of emissions quota.

(5) Build an innovation ecosystem for the society and industries

Innovation driven development has become an important driving force for Guangzhou's economic development. Guangzhou places a significant value on the integration of innovation resources, through increasing investment in scientific research, building an open environment for innovation exchange, and creating an effective, synergistic innovation ecosystem. Guangzhou's intention is to develop the free low and in-depth integration of innovation factors, such as talent, technology, capital, and information. In 2019, Guangzhou ranked 21st within the top 100 global innovation clusters listed in the Global Innovation Index Report. In 2020, together with Shenzhen and Hong Kong, the *Shenzhen-Hong Kong-Guangzhou Cluster* ranked 2nd in the *Global Innovation Index Report*. In 2018, it ranked 25th in *Nature Index Science Cities*.

- Facilitate integrated development of production, education, and research

Universities and research institutes are the primary players in original innovation. They are also the source of talent and technology in any innovation ecosystem. In the 2019 Academic Ranking of World Universities, 3 universities, Sun Yat-sen University, South China University of Technology, and Jinan University in Guangzhou, made it to the top 500. Higher education institutions delivered a large amount of talent for innovation driven development. Guangzhou is also earnestly seeking cooperation with higher education institutions outside of Guangzhou. The recently constructed Hong Kong University of Science and Technology (Guangzhou) has already shown interest, and the recruitment of students is well underway. In order to advance the integrated development of production, education, and research, Guangzhou encourages enterprises, higher education institutions, research institutes, and agencies to form industry alliances. By making use of social organizations to integrate the innovation factors of the industry such as human resources, technology, information, and capital, these organizations can advance the in-depth integration of production, education, and research. Guangzhou places an emphasis on all production, education, and research cooperation within the Greater Bay Area. It encourages and guides large number of enterprises and research institutes to engage in in-depth cooperation with universities,

hospitals, and research organizations in Hong Kong and Macao. Examples include the creation of joint research centers with Hong Kong University, The Chinese University of Hong Kong, and Hong Kong University of Science and Technology. Furthermore, the city has entered into the Guangzhou-Macao strategic cooperation framework agreement on science and technology industry with Macao University.

- Strengthen IPR management and protection

First, support the creation of IPRs. Guangzhou has encouraged the delivery of invention and PCT patents by setting up an ad-hoc patent fund. In 2019, Guangzhou issued 105,000 patents, among which, 12,000 were invention patents, representing a growth of 16.7% and 13.2%, respectively. Second, the need exists to strengthen IPR protection. Measures on strengthening IPR protection have been officially released. IPR protection centers, IPR courts, and comprehensive IPR reform pilot zones have also been installed.

- Advance innovation cooperation

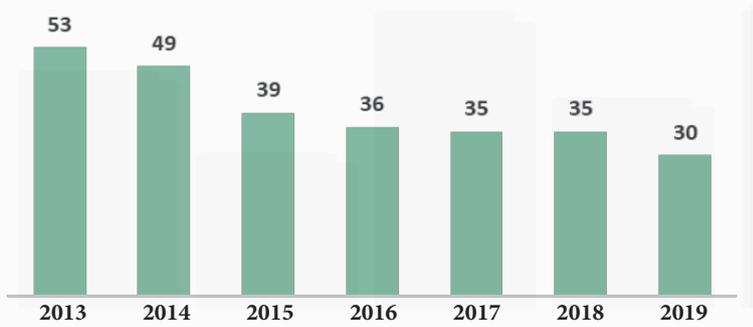
To develop the flow and sharing of innovation factors and innovation outcomes, Guangzhou has strengthened its cooperation and exchanges in science and technology with other cities and regions. It has hosted a series of events such as the Canton Tower Science and Technology Conference, China Innovation and Entrepreneurship Fair, China Overseas Talent Exchange Conference, and Science and Technology Seminar for Chinese Students Studying Abroad. These fairs and conferences are designed to expand international innovation and cooperation. Meanwhile, as permitted by relevant policies, Guangzhou has cooperated in the open access and sharing of large, science apparatuses, as well as the sharing of a science and technology evaluation expert pool which has fueled the sharing of innovative resources in the region and facilitated the development of innovation in the region.



Sustainable Cities and Communities:

To build inclusive, safe, disaster-resilient, and sustainable cities and human settlements

Average PM_{2.5} concentration constantly on the decrease



82.5 years old
Average resident life expectancy

94.9%

Coverage rate of 500-meter bus stops in central districts

522.5 kilometers

Mileage of metros and trams

61.2%

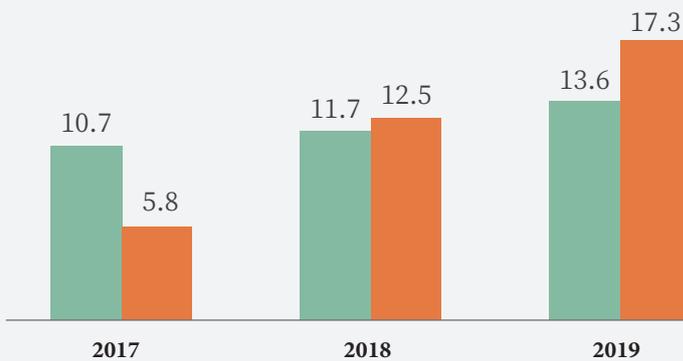
Proportion of travel on public transportation (rail and bus) in relation to motorized travel

15.19 million passengers

Daily average throughput of public transportation (rail and bus)

18.9K passengers/day/kilometer

Metro passenger density



- Number of households that received a housing subsidy (1,000 households)
- Shanty town renovation projects started throughout the year (1,000 units)

6.54 beds

Hospital beds per 1,000 people

5,093

Medical care facilities

100%

Coverage of community aged care facilities

Overview and Background

Currently, more than half of the world's population lives in cities. Rapid urbanization brings unplanned urban sprawl. Scarce and overwhelmed infrastructure and public services, a lack of public spaces, increased pollution, and resource shortages approaching the warning level are issues that concern every modern city on earth. To tackle these challenges and enable cities to develop in a more sustainable and inclusive way, SDG11 suggestions are to build inclusive, safe, disaster-resilient, and sustainable cities and human settlements.

Overall Progress

As an important central city in China, Guangzhou has been at the forefront of China's *reform and opening up* efforts. The distribution of infrastructure, such as hospitals and higher education institutions, is relatively balanced. Along with diversified economic development, Guangzhou offers diverse and inclusive employment opportunities. It is one of the most attractive places for a population on the move and one of the cities with the most dynamic economy. Pressures coming from a rapid increase in population has also posed challenges to Guangzhou's efforts in creating inclusive, safe, and sustainable urban spaces and living environments. Focusing on the typical conflicts in urban development at this current stage, Guangzhou continues to gather a deeper understanding of urban development, coordinate the three structures of space, scale, and industry, and transform the implementation of urban work into becoming more holistic. Guangzhou has coordinated the three major steps of planning, construction, and management which made the implementation of urban work more systematic. It has coordinated the three driving forces of reform, science, and technology, as well as organize culture to improve the sustainability of urban development. Guangzhou coordinates the planning of production, living, and ecology to improve its livability. It has coordinated the three important aspects of government, society, and residents to improve engagement in urban development.

In response to the requirements of SDG11, Guangzhou has been following the development path of *old city with fresh energy* to effectively advocate for the sustainable transformation of urban development. It has been trying to find its place in the global resource distribution system in order to create a city that is *warm and welcoming*. Since 2015, it has been earnestly working towards achieving SDG11. With regards to urban planning, Guangzhou has been constantly learning about advanced ideas on sustainable development. Guangzhou has spared no effort in improving the urban transportation system, preserving cultural heritage, and enhancing disaster resilience. It has been committed to building a healthier and more sustainably resilient eco-friendly city. In terms of urban living environment, by putting *fairness* and *livability* in the spotlight, Guangzhou has worked extremely hard to create a favorable living environment for residents and provide equitable quality public services for all residents. When it comes to urban governance, Guangzhou has shown care for the elderly, women, children, and all other groups who live, grow, and work in the city. Guangzhou's citizen contribute to the city and foster collaboration, participation, and common interests in this community, while improving the level of inclusiveness, openness, and cooperation in the city.

Specific measures

(1) Enhance the ecological resilience of Guangzhou, improve its quality, and highlight the personality of the city

- Preserve the urban green ecological spaces

The poem *All Six Major Rivers Flow into the Ocean, Green Mountains find their Ways into the City* perfectly captures the environment of Guangzhou as an eco-friendly city with beautiful mountains and waters. Through the creation of urban scenery near the mountains, along the rivers and coastlines, Guangzhou manages to highlight its special features as a Lingnan city. It also preserves the ecological foundation consisting of the *Baiyun Mountain and Pearl River* while creating a charming urban identity of the gorgeous Pearl River. It has taken full advantage the functions of forest, natural reserves, green road networks, wet lands, and coastal shelter belts. The Guangzhou Land Space General Plan (2018 - 2035) puts forth that, based on the evaluation of land space development suitability and environmental carrying capacity, approximately two thirds of urban spaces will remain ecological and agricultural spaces for preservation. Steps have been taken to highlight the natural beauty of mountains and forests in the north part of Guangzhou, showcase the charm of the modern metropolitan area in the central part of the city, and use the three 10-kilometer boutique Pearl River scenery belts as the leading examples. This new coastal town is the feature of the southern part; a coastal new town has been created which faces the South China Sea and combines views of the city and port.



View of the Gorgeous Pearl River urban embankment

- Refine the quality and the design of the city and highlight its personality

Guangzhou has been improving the functions and the quality of the city from a human perspective. It has launched the *green plants every 500 meters* project as a way to improve the urban park infrastructure. New green plazas, urban parks, and community parks have been constructed and renovated. Infrastructure improvement plans have been implemented in 230 community, town, and village parks. Many old parks have undergone barrier-free transformations. Micro afforestation renovations have been carried out at roads, streets, and communities. Idle, deserted spaces in communities have been turned into *pocket* and *urban* parks. Guangzhou has launched environmental governance and quality improvement projects which enhanced the quality of open urban spaces on all levels. In 2019, the average park and green land space per capita was around 18 square meters in Guangzhou, while the service radius coverage rate of parks and green lands stood at approximately 75%.

Guangzhou has drafted road design standards containing all key elements, introduced a wide range of refined environment improvement actions including *roads with a small turning radius*, urban living rooms, quality streets, and routes with special features. Pavements have been widened, the preservation areas of roadside cultural heritage has been expanded, roadblocks have been cleared, barrier-free designs have been improved, historical views of old streets and communities have been restored, and all of these efforts have turned the streets into popular attractions. By reorganizing spaces under overpasses, Guangzhou aims to create public spaces that can offer shelter to residents on rainy days. Through road transformation, Guangzhou strives to build a smart, caring, eco-friendly, and favorable road environment that provides residents with satisfying services and experiences.



improvements to the quality of streets and roads



Upgrading of Spaces under Overpasses



Upgrading of spaces under overpasses

(2) Promote collaboration, participation and sharing of common interests in the community, build sustainable communities

Guangzhou has been thoroughly stimulated the introduction of community designers and community planners. They connect governments with residents, and they are deeply involved in the building of sustainable communities. Guangzhou has facilitated diversified participation in urban planning, opinions, demands, and suggestions of the community, which is indicative that the public is highly valued. This city has been protecting the natural environment, improving community facilities, revitalizing public spaces, creating convenient transportation, and discovering the special features of communities to encourage the comprehensive and benign development of the community environment. Workshops have been introduced in the micro renovation projects of old communities which promote direct consultation between government, residents, experts, and community workers.

(3) Implement the concept of a healthy city

In 2010, Guangzhou rolled out a 10-year plan to build a healthy city in which it coordinated the development of five areas: creating a healthy environment, building a healthy society, optimizing health services, encourage healthy lifestyles, and developing health industries. In 2019, the average density of PM2.5 was $30\mu\text{g}/\text{m}\mu$, which meant that it had met the standard for 3 years in a row and the average life expectancy increased to 82.52 years. The level of healthy urban development increased significantly as well.

Guangzhou has sincerely put the healthy city concept into action and advocated for a healthy lifestyle. All residents have been encouraged to take part in physical activities, while educational programs on science-based exercises have also been launched. The construction of soccer fields has been accelerated. Guangzhou currently has more than 1,500 soccer fields and it has been continuously improving its network of exercise facilities. The construction of 15-minute exercise circles throughout the city has been completed. Guangzhou has also encouraged and supported the building of hiking and fitness walking routes to offer more outdoor activity spaces for the public.

Guangzhou boasts abundant medical care resources. It is the third largest medical care area in China. There are a total of 5,093 medical care facilities in Guangzhou. Guangzhou has 269 hospitals that offer 6.54 available hospital beds for every 1,000 inhabitants. Medical services can be accessed within 15 minutes in urban areas while rural area medical services can be reached within 30 minutes. According to the 2018 National Hospital Comprehensive



Rooftop Soccer Field, Central Plaza, Yuexiu District



Chen Clan Ancestral Hall Plaza, Liwan District



Hiking Route, Zengcheng District



Hiking Route, Conghua District

Strength Ranking published by Fudan University, 9 hospitals in Guangzhou made it into the top 100, and 40 departments made into the top 10.

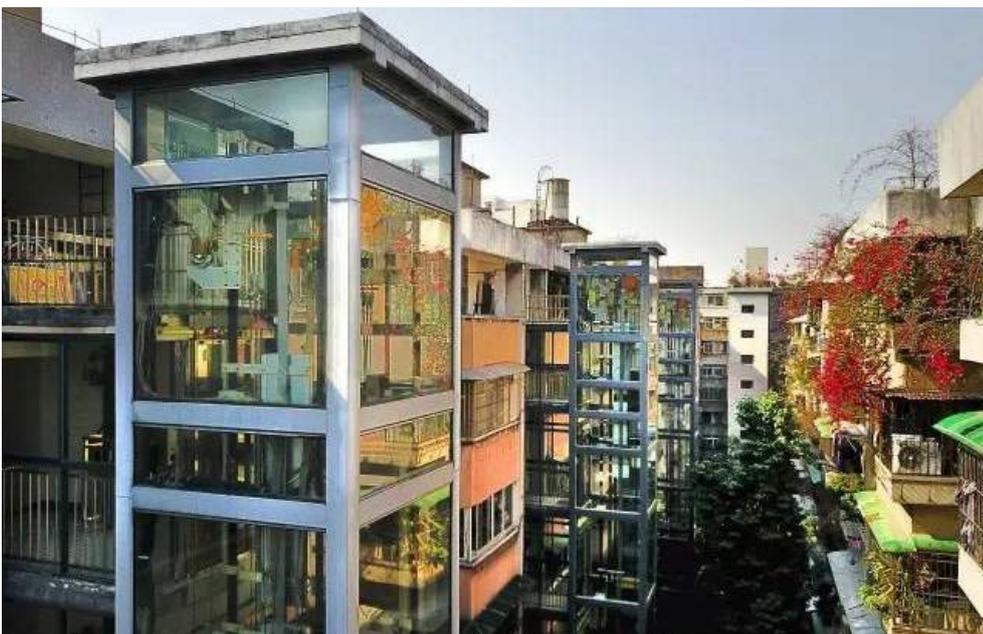
(4) Build an urban and rural habitat that is conducive for living and working

- Strenuously improve urban secure housing capacity

Guangzhou has been increasing the supply of secure housing and improving the availability of secure housing for vulnerable groups in the city. In the development of public rental housing, the government has addressed the basic living demands of those who are eligible through offering rental subsidies or providing public rental housing and gradually expanded the coverage of public rental housing to solve the housing issues for new residents, especially for those who don't have a Guangzhou Hukou and for fresh graduates who have just started working in Guangzhou. In 2019, Guangzhou gave out rental subsidies to 13,589 households and provided 7,000 units of public rental housing to residents with difficulties accessing decent housing.

- Remarkable progress in the micro renovation of old residential areas and shantytowns

Guangzhou has been pushing forward with the renovation of shanty towns to improve the housing conditions for people in need. In 2019, 17,283 housing units in shanty towns were renovated, and another 17,686 units had been constructed. Guangzhou enhanced its efforts in the renovation of old residential areas to improve the living environment in these areas. Considering the historical context of the ancient districts and outdated infrastructure in the old neighborhood, this city formulated a renovation plan on the basis of keeping the original layout and aesthetics while highlighting the quality of each living environment, passing on the inherent historical and cultural legacy, and improving social governance. Between 2016 and end of May, 2020, a total of 349 old residential communities had been renovated to the benefit of 1.5 million residents and 470,000 households. A total of 5,003 new elevators had been installed in existing buildings, 49 km of barrier-free passages had been constructed, and 25,000 fire safety facilities had been improved, effectively bringing significant upgrades to the environment of old neighborhoods.



Installation of elevators in existing buildings



Renovation of an old neighborhood on Liurong Street

- Promote the full coverage of domestic waste classification

Waste classification was fully implemented in 2012. In 2019, rubbish bins were removed in the corridors of all residential communities and scheduled waste disposal at designated sites was introduced. The *Internet + Waste Classification* model and the *Integration of Two Networks* model combining waste collection and resource recycling have been adopted to reinforce the recycling and reuse of resources. The rate of the recycled use of domestic waste reached 36%. Residents have developed good waste disposal habits which have facilitated the full coverage of waste classification.

(5) Provide fair and convenient public transportation services

- Ramp up effortsto build public transportation facilities and optimize the traffic structure

Since the first metro line went into operation in 1997, another 14 metro lines and 1 tram line had been launched in Guangzhou by the end of 2019; operating mileage covered 522.5 km. The Guangzhou subway network now covers all districts of Guangzhou and ranks third in the world in terms of track length. In addition to developing rail transportation, Guangzhou also implemented the Bus First policy by defining 520 kilometers of dedicated bus lanes, including the 45.8 kilometer BRT Corridor on Zhongshan Avenue, which has ensured the operational efficiency of the bus system. The coverage rate of public bus network, which provides fundamental support to and safeguards the public transportation system, has been continuously on the rise. Currently, 94.9% of central district areas have a bus stop every 500 meters making bus service accessible in large suburban residential areas and densely populated areas.



BRT Corridor

- Provide low-cost and quality public transportation services and encourage bus travel

Guangzhou has always implemented a low bus fare policy providing the availability of affordable public transportation services to all residents. The bus fare in Guangzhou has remained unchanged for more than 20 years. Since 1996, the fare for air-conditioned buses has been 2 RMB, and the rate collected has been 1 RMB for some short-distance routes. Guangzhou public transportation service has been rolling out more policies to benefit the public. Since 2010, people using Yang Cheng Tong to take buses or subways have been able to enjoy a 40% discount after their 16th ride each month.

In 2019, the daily average throughput of public transportation in Guangzhou was 15.19 million, and metro throughput accounted for 59.6% of the public transportation throughput. Meanwhile metro passenger intensity reached 18,900 trips/day/kilometer. Travel on public transportation (rail and bus) accounted for 61.2% of all motorized travel in the central parts of Guangzhou. Residents' satisfaction with public transportation has stayed above 80% for 6 years in a row.



Green public transportation system

- Build a comfortable and convenient slow traffic system

Guangzhou has always attached great importance to the planning and construction of green transportation. In 1993, the city worked with the World Bank to carry out urban transportation research and formulated the development strategy of green transportation and concept of a *public transportation oriented city*. As cycling and fitness walking has become increasingly popular among residents, Guangzhou has carried out its *slow traffic system planning*. It proposes that cycling shall utilize 12% of the transportation modes while 20% of metro passengers shall be able to travel to and from metro stations on bikes. In areas with historical and cultural heritage, *slow travel routes* connecting different historical and cultural attractions have been created. In the old downtown area, more efforts have been invested into refined urban design, pavement renovation, and afforestation. Simultaneously, Guangzhou has been identifying slow traffic areas. In these areas, slow transportation modes are the dominant ways of travel. Slow travel lanes, public bicycles, a pedestrian crossing system, and bicycle shuttle service connecting urban rail transportation stations with surrounding areas within 3 kilometers have been introduced.

In 2017, permanent residents were surveyed on *Residents Views and Suggestions on the Development of Slow Traffic and the Building of Urban Slow Traffic System*, and results suggested that over 80% of residents gave the management of the slow traffic system in Guangzhou positive reviews.



Slow traffic and pedestrian spaces

- Make innovations in green technologies and promote the application of green energy

Guangzhou has been promoting the use of new energy vehicles and electric buses on all levels. By the end of 2019, Guangzhou had launched 11,394 fully electric buses, 9,830 new energy cruising taxis, and 537 new energy logistic vehicles. Additionally, the city built approximately 26,000 charging stations and 30 battery exchange stations.

(6) Pass on the cultural identity of Guangzhou and preserve its historical and cultural heritage.

- Pay attention to the preservation of heritage across Guangzhou and improve its preservation system

Guangzhou is one of the first historical and cultural cities in China. The drafting of the Guangzhou Historical and Cultural Town Preservation Plan has clarified the principles for historical and cultural preservation, covering spaces, historical aesthetics, and other cultural and historical elements, which are aimed at effectively preserving and utilizing historical and cultural heritage as well as resources, in order to convey the cultural identity and the traditional Lingnan culture. Guangzhou has conducted multiple cultural heritage censuses across the city to complete its list of cultural and historical heritage sites. These actions were taken in order to formulate a preservation system covering specific sites, streets, and areas. The preservation system touches upon six aspects including historical towns, historical and cultural streets, and historical buildings.

Guangzhou named 26 historical and cultural neighborhoods, 19 areas with historical looks, 7 famous towns and villages, 91 traditional villages, 727 cultural heritage preservation units of different levels, 817 historical buildings, and 400 traditional buildings. Guangzhou has been strengthening the protection of historical routes. The Guangdong-Hong Kong-Macao Greater Bay Area historical and cultural route, the 800-kilometer long Nanyue Ancient Courier Route, and the nine Baiyun Mountain-Pearl River, Auspicious City of Flowers Guangzhou historical and cultural hiking routes have connected the city's scattered historical and cultural heritage. Guangzhou has launched themed travel routes such as Heritage of the Silk Road and the Red Culture Ancient Courier Route. From 2017 to now, areas located along the ancient courier routes have received about 400,000 visitors and generated more than 140 million RMB of tourism revenue for rural areas along these routes.



A traditional village



Nanyue Ancient Courier Route, Conghua Section

- Lead practical explorations with planning, and promote the flexible use of historical and cultural resources

Guangzhou has been focusing on the preservation and flexible utilization of historical and cultural heritage. Using Yong Qing Fang on En'ning Road as a pilot project, Guangzhou conducted the flexible utilization, improvement projects, and preservation of many historical and cultural neighborhoods, at historical buildings, and along the Nanyue Ancient Courier Route. Through 10 years of continuous preservation and flexible utilization, the Xinhepu Historical and Cultural Neighborhood, which has now successfully reflected its cultural and historical heritage, was presented with the 2019 Asia Urban Landscape Award.

Case: Yong Qing Fang renovation and flexible utilization demonstration project

The Yong Qing Fang project placed a great attention to detail, and it was carried out from a holistic planning perspective. This project allowed workers to engaged in the preservation and flexible utilization of historical neighborhoods in Guangzhou, which brought back fond memories to many and gave others a taste of nostalgia.

Yong Qing Fang used to be an area inundated with dangerous, old buildings. Under the leadership of government agencies, enterprises participated in micro projects that transformed the area. The beneficial results were as follows: a better environment, the passing on of cultural identity, transformation of functions, and a revitalized old town. The restoration project not only focused on the preservation of existing historical buildings and the original look of the entire neighborhood, but it also highlighted the safe use of buildings. Alterations have been made to the structures of buildings to make them more resilient. The structural intensity of these buildings is now identical to that of newly built modern buildings. Renovation projects have significantly improved the neighborhood's environment, and refurbishment of old buildings has restored their previous charm. Mashi Street has become cleaner and more beautiful after the renovations. Reconstruction projects also free up more space; this increases the availability and beauty of public leisure spaces. The transformation of fire safety facilities has been conducted where brand new fire safety pipelines have been installed, and a small fire station staffed with qualified fire safety administrators has been set up. Degraded electrical wiring has been replaced, increasing the safety of electricity usage.

Since its implementation, the Yong Qing Fang project has been directed towards passing on cultural and historical identity with the additional benefits of revitalizing the neighborhood and effectively improving the quality of life the surrounding environment. After the Phase I Yong Qing Fang project went into operation, nearly 60 businesses and enterprises have been drawn here. They include cultural and creative businesses, boutique homestays, restaurants offering creative light snacks, and communications agencies. This has created a hub for young entrepreneurs, new attractions in the Guangzhou old town, and a special neighborhood that has drawn attention from the entire country. Each month, this neighborhood receives around 200,000 visitors. By the end of 2019, the Phase II project had restored about 18,000 square meters of renovation spaces, 20 households had moved to new settlements, more than 20 households had their homes redecorated and renovated, over 30 dangerous buildings had been reconstructed, and nearly 50 families had their roofs repaired.



Improvement in the Enning Road Historical and Cultural Neighborhood

- At the initial phase of the project, the government's investment in large cultural facilities drove regional rejuvenation, and the construction of the Cantonese Opera Museum served as a catalyst for local development.



- In terms of urban texture, the existing roads and layout have been preserved. Urban aesthetics has been sustained. Lanes and alleyways have been repaired. Buildings have been restored and organically renovated.



- Restoration and replacement of surface materials brought back the original look and highlighted the features of specific periods.



- The original structure and style of the buildings have been retained. The original look of the buildings was restored through cleaning and restoration of the walls. Energy-saving reconstruction was performed on the buildings to make them more adaptive to contemporary usage.



- The project has improved the quality of life for residents in the community and enhanced their sense of happiness, belonging, and achievement. Many famous Cantonese opera singers live in this neighborhood. Mr. Ye is a Cantonese opera singer with 75 years of experience in the industry. Not long ago, he could only do his morning routine on the rooftop, and there was not enough space for him to do stretches. Now, as the Enning Road micro renovation project has concluded, Mr. Ye and his students can practice in the green spaces under the sunshine.

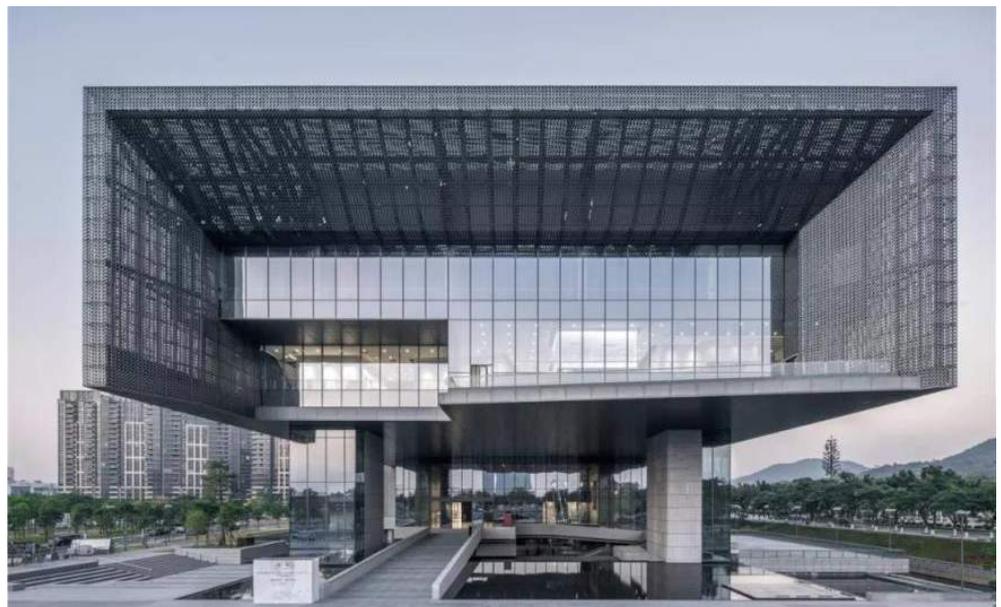


- Build a City of Libraries and a City of Museums

Additional Guangzhou projects have accelerated the construction of key cultural facilities such as Guangzhou Cultural Hall, Art Gallery, Cantonese Opera House, Annex of the Guangzhou Museum, Science Museum, and Music Museum. Presently, there are 433 libraries (branches) in Guangzhou. Readers can borrow books from one public library and return it to any other public library branch. There are 64 museums located in Guangzhou. Guangzhou Library received 9.175 million visitors in 2019, 11.697 million books were lent out, and the number of registered readers hit 1.7687 million. Guangzhou Library ranked first in China both in terms of the volume of visitors and the volume of books lent out. Between 2015 and 2020, a total of 40 key cultural facilities at the municipal and district level have been constructed with a total investment amounting to 12.7 billion RMB and a total construction area of 1.12 million square meters. Newly built edifices include the Guangzhou Cultural Hall, Guangzhou Art Gallery, Museum of the Two Tombs of the South Han Dynasty, and Guangzhou Cantonese Opera House.



Guangzhou Library



Planning and Exhibition Center

- Strengthen the preservation and flexible utilization of immovable cultural relics

Guangzhou has launched five large scale cultural heritage censuses and completed the compilation of cultural heritage census catalogue. Right now, there are more than 3,800 immovable, cultural relics in Guangzhou. Under the context of Guangzhou's rapid urban development, putting archaeological research and surveys as the prerequisites for selling land to be used for construction has effectively eased the tension between cultural heritage preservation and urban development. Preservation areas of municipal level and above cultural relics and construction restricted zones have been systematically identified, and preservation plans for protected cultural heritage sites have been drafted. The quality of cultural heritage preservation projects has been improved by establishing an ad-hoc cultural heritage preservation fund. Guangzhou will continue to achieve innovation in the preservation and flexible utilization of immovable cultural relics to ensure their centralized protection.

- Facilitate the conveyance of intangible cultural heritage

Guangzhou boasts 2 representative works of the intangible cultural heritage of humanity, 17 items on the national intangible cultural heritage list, 81 items on the provincial list, and 116 items on the municipal list. Guangzhou offers support to the representative inheritors of intangible cultural heritage to conduct activities in historical and cultural neighborhoods, such as Yong Qing Fang and Beijing Road, in a bid to search for the ways to achieve the creative transformation and innovative development of intangible cultural heritage.



Preservation of intangible cultural heritage

(7) Provide people-centric public spaces for all ages

- Improve baby care facilities in public places

Guangzhou has given significant importance to the health of mothers and babies. Between 2017 and 2019, Guangzhou rolled out its three-year plan for the construction of baby care rooms in public places. By the end of 2019, Guangzhou had built over 900 baby care rooms in public places, surpassing its three-year construction goal. As a result, it became the first city in China where baby care rooms could be found in every key public place. The public spoke highly of this initiative. In 2019, the first local regulations on breastfeeding in China, *Guangzhou Municipality Breastfeeding Facilitation Provisions*, was passed in the Municipal People's Congress. It was officially implemented on March 1st, 2020. On November 14th, 2019, the construction of public baby care rooms in Guangzhou was presented as the case study in China at the General Assembly of World Association of Major Metropolises hosted in Durban, South Africa.



Newly constructed baby care rooms

- Build child-friendly communities

Guangzhou places great importance on children's travel safety and the availability of children's public activity spaces. The construction of child-friendly traffic facilities ensures safety both during their journey to schools and when they are taking part in outdoor activities in. On top of that, Guangzhou has built separate activity circles for children which has created a safe environment where children can safely play and have fun in green spaces and at schools. Residential communities have been equipped with basketball courts, soccer fields, and other public service facilities. Guangzhou has built the largest number and widest area of children's parks in China; the number of children's parks have increased from 1 to 13, and the area from 1.1 hectares to 173 hectares.



A child-friendly city

Case: child-friendly community space - Xiaohé's Home

Organize urban volunteer teaching teams through public engagements and train these volunteers to be community teachers. They will go on to provide educational services to children of migrant workers and their families living in urban villages during their weekends or spare time. They offer ukulele lessons, storytelling sessions, and early childhood educational games.

Thanks to the efforts of community mothers, community resources have been utilized in a flexible manner to offer a stable, open, safe, child-friendly community space; Xiaohe's Home is just such a space that has been created in the urban villages of Guangzhou and Foshan. Xiaohe's Home is a child-friendly space open to all. It is also a space where volunteer community teachers carry out education activities. Moreover, it offers a community space for children in urban villages where they can safely have fun, learn, read, and socialize. A total of more than 120 community mothers are working at Xiaohe's Home to provide support to over 3,000 children of migrant workers.



Xiaohe's Home

- Create a community based aged care model with Guangzhou characteristics

Guangzhou has always viewed aged care services as a priority for improving the quality of life. It strives to build a quality aged care service system that coordinates homestay and community agencies while combining medical care and recovery care. A comprehensive approach like this helps to ensure that everyone has access to basic aged care service and is catered to their multifaceted, diversified aged care service needs. Guangzhou has promoted the integrative development of Housekeeping plus Aged Care in 174 communities which serves a total of 68,600 people. Community aged care service facility coverage has reached 100% where more than 201,000 senior citizens have gained access to community homestay aged care services. Smart aged care services have also been improved for the elderly through the introduction of Guangzhou's unified information platform. It combines application, service, and supervision of homestay aged care and care for the elderly. In 2019, there were 217 care homes in Guangzhou, with 30 newly added community aged care facilities providing full-time care services, day care services, and at-home services. There were 68,000 beds for aged care services; this amounted to approximately 40 beds for every 1,000 senior citizens and ranking at the top in Guangdong and China. At the end of 2019, Guangzhou had built 1,036 canteens for the elderly which have served 8.059 million customers, where they cover all streets (towns) and communities (villages) in Guangzhou. In central areas, there is one canteen for the elderly within a 10 to 15 minute walk. In surrounding areas, there is one canteen for the elderly within a 20 to 25 minute walk.



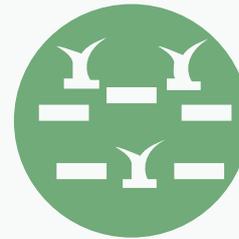
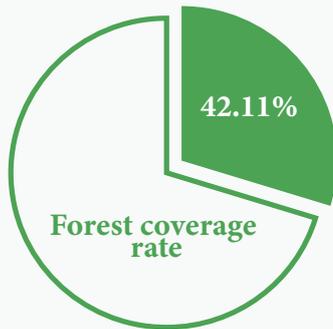
Canteen for seniors

SDG15



Life on Land:

To protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and cease and reverse land degradation, and halt biodiversity loss



Wetland areas
76,510 hectares $\approx \frac{1}{10}$ the size of the city

Ecological landscape forest belts (2016-present)

221 kilometers



\approx 552,400 meters of running track

Length of green paths

3,560 kilometers

$> \frac{1}{4}$



the diameter of the Earth



Major flower appreciation sites

130

Flower landscape

20 hectares

Length of over-pass afforestation

350 kilometers

6
Natural reserves

National level **5**



89
Nature protection zones

Provincial level **11**



Municipal and prefecture level **73**



Overview and Background

Human activities are having a long-lasting impact on the ecosystem that is critical for the survival of all species; these activities have also increased the loss of bio-diversity worldwide. Around 1 million animal and plant species are currently endangered according to a report at a meeting convened by the UN in Paris in May, 2019. To achieve SDGs, a slew of countries and regions are taking measures to restore, sustainably use, and protect the land ecosystem to promote the sustainable management of all forests, halt and reverse land degradation, and protect more key biodiversity areas and natural habitats. These endeavors must be undertaken in a bid to curb the loss of biodiversity and protect ecosystems for the well-being of all human-beings.

Overall Progress

Guangzhou has been endowed with beautiful natural surroundings and it has always adhered to the principle of harmonious co-existence between humanity and nature. Guangzhou boasts a host of diversified natural resources with mountains, rivers, forests, farmlands, lakes, and oceans. Building upon these natural resources, Guangzhou has achieved remarkable results in the recovery, sustainable use, and preservation of terrestrial ecosystems. However, as a result of rapid urban development, Guangzhou has been faced with pressure coming from a limited carrying capacity and ecosystem protection.

Based on the green development principles of people centric, ecology first, Guangzhou has been actively working towards achieving the goals of SDG15 since 2015. In so doing, Guangzhou drafted the *Plan for Building an Eco-friendly City and the Plan for Ecological Civilization Construction*. Building upon Guangzhou's natural resource endowment and environment carrying capacity, the protection of important agricultural and ecological lands such as farmland, forests, and wetlands has become a major priority. Ecological and agricultural lands account for more than two thirds of the administrative area of Guangzhou. Land space development and preservation mechanisms have been continuously improved. An ecological space network spanning across Guangzhou has been formed through the creation of ecological patches and spots. Guangzhou has striven to turn itself into a forest city in order to protect biological habitats, develop ecological diversity, and maintain ecological balance. Guangzhou's forest area shall not be smaller than 2,600 square kilometers. Guangzhou has improved the ecological environment of wetlands by having natural restoration at the core, combining it with artificial remediation, and adhering to a preservation first point of view. Moreover, Guangzhou has been collaborating with higher education institutions and research institutes to carry out research into the monitoring, control, conservation, and protection of endangered species. A wildlife monitoring, aid, and utilization system has been established. More efforts have been invested into wildlife aid, preservation of wild plants, and storage of indigenous plant seeds. Guangzhou has energetically promoted the prevention and control of hazardous alien species and advocated for the conservation of wildlife. Bio-diversity in Guangzhou has been continuously improved.

Specific measures

(1) Build an green urban ecological network

Using a dense water system in the city as the basic framework, Guangzhou built a three-tier ecological corridor consisting of area-group-community. Forests in the north, parks and green lands in the central region, coastal shelter belts in the south, and the Pearl River basin are used as an ecological matrix. This matrix makes use of green plants and

landscaped forests along main roads to connect Guangzhou's has green spaces to different areas. Isolated urban parks have been linked together as well, and they have formulated 8 regional, ecological corridors. The city has even connected open green spaces such as rivers, canals, parks, and urban mountains to form other ecological corridors that provide residents with spaces for entertainment, education, and leisure. Community ecological corridors have aggregated community green spaces, leisure spaces, slow traffic system with parks located in residential and densely populated areas in the city. These corridors also offer green public open spaces to residents for leisure, health, and fun, which have raised the quality of the living environment.

Combining the preservation and utilization of ecologically lush, green lands, existing waterways, and greenery along roadsides and ecological shelter belts to connect major ecological and cultural sites with public activity spaces in the city. Guangzhou has used these methods to design green paths in the rural and urban areas which provide residents with exercise and rest areas, while also enabling them to get closer to nature. Guangzhou endeavors to conduct the construction of observation sections along hiking routes, fitness walking routes, and urban jogging routes, while it expands the functions of green paths, thereby placing greater significance on green paths. As of 2019, a total length of 3,560 kilometers of rural and urban green paths had been built, creating 24 boutique green path routes.



Urban green paths

(2) Attach great importance to the preservation of forest resources; improve the quality of the forest ecosystem

- Develop forest carbon sinks and improve the ecological remediation and compensation mechanism

Guangzhou set up ecological landscape forest belts, promoted the development of carbon sink forests, improved coastal and riverside shelter belts, implemented emergency protection of natural mangroves, and carried out remediation of the ecological landscape forest belts along coasts and rivers. Policy documentation stipulating the preservation and economic compensation of ecological forests has been released to expand the scope of preservation and improve the compensation standard. During the implementation of the 13th-Five-Year-Plan, Guangzhou built a total length of 221 kilometers of ecological landscape forest belts.

- Build forest parks and improve the environments of parks

Guangzhou implemented a stringent ecological preservation policy to improve the quality of forest parks. Guangzhou also promoted landscape improvement projects at forest parks to improve park infrastructure. Presently, Guangzhou has a total of 91 forest parks.



Guangzhou Shimen National Forest Park

(3) Preserve and restore wetlands to improve the the ecological environments of wetlands

Guangzhou has drafted and implemented the *Provisions on Administration of Wetland Protection in Guangzhou*. It urges people to embrace new ideas about the protection and utilization of wetlands. Guangzhou launched a variety of activities at wetland parks for the purpose of improving popular science education. The city has also taken proactive measures to protect the tidal wetlands at the estuary of the Pearl River, the Lotus Mountain, and Nansha Wetland Park. The number of wetland parks in Guangzhou rose from 1 in 2012 to 23 in 2019.

Following the basic principle of *protection first, science-driven remediation, reasonable utilization and sustainable development*, Guangzhou adopted a series of remediation measures including dredging, flora configuration, habitat establishment, and introduction of animals to improve the natural ecological environment of wetlands, improve biodiversity, and generate greater ecological benefits from the wetlands. Guangzhou has attached specific importance to the remediation projects involving migratory bird habitats, typical ecological system of wetlands, mangroves of the Haizhu Wetland, and mangroves of the Pearl River Estuary Wetland.

Case: Haizhu National Wetland Park

Haizhu National Wetland Park is located in the city center of Guangzhou, and it covers an area of approximately 1,100 hectares. It consists of Haizhu Lake and 39 rivers. It is a typically complex pallet wetland consisting of a river island, river bed, ditches, and fruit forests. At the end of the 20th century, as Guangzhou witnessed rapid industrialization and urbanization, tens of thousands of mu of orchids within Haizhu Wetland and its surrounding areas were gradually engulfed by cities, factories, and villages. It led to a series of problems including water pollution, blockage of

rivers, and deterioration of the ecological environment. These ecological maladies posed serious threats to local residents and severely affected the quality of the living environment for the population residing in the surrounding areas. Those charged with maintaining the wetland park have always practiced the ideas of original look, micro renovation, and minimal intervention, and they implemented a nature-based resolution. Guangzhou repaired the tide-sensitive river network and used the changes in tidal sea-levels to improve water body circulation, aeration, and overall water quality. By building plants and animal habitats, bio-diversity has been improved. Issues such as urban flooding, heat islands, and pollutant disposal have been resolved at a low cost. Remediation and preservation of wetlands have generated huge ecological, economic, and social benefits. A complete ecological chain has been restored; habitats for birds, fish, and insects have been created. The number of bird species has increased from 72 in 2012, to 178 at present. The number of insect species increased from 66 to 285. Traditional pond agriculture has been retained, and numerous types of fruits grown have increased from about a dozen to more than 200. This is an indication that fruit farming is an import carrier of eco-friendly agriculture. Wetland tourism has been encouraged and new outdoor leisure activity spaces have been created. Every year, 200 cultural events, such as dragon boat competitions, Cantonese opera performances, Cantonese embroidery exhibitions, calligraphy shows, and painting exhibitions are held in the park where they have received more than 60 million visitors. A wetland production, education, and research platform has been set up, and a national demonstration nature education school has been established. This school gave nearly 2,500 lessons on nature in more than 70 schools in Guangzhou to the benefit of 400,000 audience members. Important ideas and concepts, such as wetland preservation and green development, were taught in these lessons, and outdoor activities were also introduced into traditional classroom education. The construction of the Haizhu National Wetland Park has been highly spoken of by international organizations such as the UN Habitat and Ramsar Convention. It also became the first national wetland park in China listed in the International Union for Conservation of Nature (IUCN).



Guangzhou Haizhu National Wetland Park

(4) Carry out micro-greening to bring out the natural charms of the *City of Flowers*

Roads and streets have undergone micro-transformation techniques for greening. The construction of *one road, one landscape* has been implemented, and diversified greening for pedestrian overpasses, flyovers, viaducts, building walls, and roofs has conducted through a generous use of garden plants. Innovation has been made on three-dimensional greening approaches with the introduction of three-dimensional flower beds, flower boxes, hanging flowers, artistic flower boxes, and other attractive arrangements, where they significantly enhance the city's beauty. By the end of 2019, the city had added 400,000 square meters of

three-dimensional greening areas, completed the greening of 426 bridges, and finished the greening of 350 kilometers of overpasses.

The *Guangzhou Flower Landscape Construction Plan* was drafted and implemented to optimize spatial distribution of floral landscapes and balance the layout of floral viewing areas. As of this writing, no less than 350,000 theme-based, flowering trees have been planted on a grand scale. They form 130 major floral observation areas.



Layout of a floral landscape in Guangzhou

In its efforts to develop the flower industry, Guangzhou has guided and supported the development of a flower trading center, and it has focused on the construction of nursery-grown plant industrial bases such as Guangdong's Garden Plant Germplasm Resource Nursery, Ornamental Plant Germplasm Resource Nursery, Improved Tree Specie Breeding Base, and Ornamental Plant Germplasm Resource Innovation Base. It also integrated flower production and marketing, built service platforms for the benefit of farmers' flowers and seedlings, and stimulated the information services for flowers, seedlings, and forestry products in Guangzhou. It also boosted the construction of floral research support projects and the establishment of the National Flower R&D Center (Guangzhou) and national-level Flower Germplasm Resource Bank.

The prestigious Flower Guangzhou Series flower events have been held, in addition to the Guangzhou Garden Expo, Guangzhou International Flower Art Exhibition, China Cup Flower Arrangement Festival, Spring Flower Market, and other important activities. These amazing events have served as carriers of the cultural soft power of the Flower City. They have aimed to make good use of Guangzhou's reputation as a floral city and significantly built its flower brand. They have literally turned the whole city into a sea of blooming flowers.

Case: Ecological restoration of the surrounding areas of Baiyun Mountain for *returning green to the people*

Designed with the approach of *low interference and minimal intervention*, the Baiyun Mountain project of *returning green to the people* has conducted ecological restoration in the surrounding areas of Baiyun Mountain, transformed and upgraded the mountain's gate and surrounding buildings, enabled tours into the depths of the mountain, made more parts of the mountain available for visitation, built corridors for sightseeing, and achieved faster access to the mountain scenery. Traffic organization has been optimized and relaxed tours through the whole line of the mountain are available. A *Cloud Road* which allows visitors to enjoy breathtaking views and to play in the air. The Cloud Road features a 10 kilometer green path which connects urban and natural landscapes while conveying the cultural context of Baiyun Mountain, Luhu Lake, and Yuexiu Mountain to happy visitors. By connecting the 8 major urban parks by way of the Cloud Pathway, the topography of mountains, bodies of water, and other lovely scenery have been advantageously integrated into the city. These splendid features have successfully balanced the development of the scenic recreational environment between humans and nature and achieved *returning of green to the people*. They have continued to strengthening the mountain-city relationship where the mountain stretches into the city. They have allowed for the further greening and beautifying of the mountain-city interface, so that more citizens can embrace the magnificent environment of Baiyun Mountain.

At present, the focal part of the 6.2-kilometer trial section of the project for linking Baiyun Mountain, Luhu Lake, and Yuexiu Mountain (the Cloud Pathway) has been completed. Citizens are now able to walk to the city's *green lung*, Baiyun Mountain, from the memorial hall in the traditional city center to Yuexiu Park.



The Cloud Pathway

(5) Protect wildlife to safeguard biodiversity

- Build a naturally protected areas system to protect wildlife habitats

Guangzhou has established conservation areas and bases and formulated a citywide master plan for natural reserves. A complete administration system for natural reserves has been preliminarily established to strengthen the restoration and protection of multiple categories of habitats. The city now has 89 natural protected areas. Among these, 6 are nature reserves and 83 are nature parks. While 5 are national-level natural protected areas, 11 are provincial-level protected areas and 73 are municipal/county/district level protected areas.

With the construction of forest parks, suburb parks, ecological landscape belts, and greenways, Guangzhou has progressively designed migratory corridors for wildlife to ensure the appropriate interaction between species and increase their populations. The city has implemented a project to recover the mangrove forests with measures suitable to local conditions. It has restored additional ecological functions to the seaside Nansha Wetland and made it a habitat for nearly 100,000 migratory birds. Nansha Wetland is now a foraging place for wild birds during their migration journeys, and it is also as a key node and demonstration zone of the eco-corridor for waterfowl in the Guangdong-Hong Kong-Macao Greater Bay Area. During years of monitoring the Nansha Wetland, a total of 180 species with 17 orders and 48 families of birds have been observed and recorded. This includes one specie under the First Level State Protection, namely *Haliaeetus albicilla*. Another 15 species under the Second Level State Protection have been distinguished and cataloged, such as *Platalea minor*, *Platalea leucorodia*, *Centropus sinensis*, and *Buteo*. Nansha Wetland is even home to protected animals on the list of CITES appendices and birds included in the Sino-Australian/Sino-Japanese migratory birds protection protocols.



Wild birds returning to the city

- Survey and monitor wild animals and plants and build a species repository

Guangzhou has established forest ecosystem and wetland ecosystem positioning and observation stations along with wildlife rescue and breeding bases. Locally, 17 species of rare and endangered plants, 4 species of plants with minimal population, and 32 species of national levels I and II key protected wild animals are protected.

Build unique animal and plant germplasm repositories, develop artificial cultivation of wild animal and plant resources, and promote a transition from the utilization of wild resources to the cultivation and utilization of artificial resources.

- Prevention and control of alien pests

In order to strengthen prevention and control of alien pests, Guangzhou has cooperated with scientific research institutes to control major forestry/garden pests and new invasive pests.

Pest control and quarantine teams have been built. Since 2015, a comprehensive system has been established for the monitoring and early warning of invasive pests, prevention of disasters through quarantine, and mitigation of disasters through the prevention and control of forests and parks. Exemplary stations at the district level, monitoring sites at the town level, and a 4-tier monitoring network covering the city, district, town/sub-district, village/community have also been established. More efforts have been put into research and promotion of advanced monitoring technologies, such as those involving the use of drones and aerial remote sensing.

5

Outlook

Guangzhou has always incorporated the concept of sustainable development into its urban development planning, and it proposed the urban development vision of Guangzhou 2035 based on that important concept. In this report, the core principles for implementing SDGs in Guangzhou have been presented, and the existing sustainable development strategies, indicators, and action plans have been reorganized and improved during this compilation.

Through the production of this review, Guangzhou has further implemented the concept of sustainable development in four aspects, namely land and space control, high-quality development, high-quality life, and high-level governance, and focused on the current five priority assessment objectives. The practice and preliminary status quo of Guangzhou regarding each objective are to correspond to the UN's sustainable development breakdown objectives and indicators. Additionally, continuous follow-up evaluations will be launched in order to ensure the achievement of the five objectives of this assessment at an even higher level. In the future, facing the challenges of achieving sustainable development goals, Guangzhou will closely follow procedures of the post-COVID-19 era and emerging economy development, highlight the relationship between environmental health and human health, adhere to the direction of green and low-carbon development, strengthen public participation in urban sustainable development, and gradually form a long-term, routine working mechanism, so as to make unremitting efforts to build a sustainable city with more vibrancy, inclusion, and openness.

Guangzhou will submit this report to international platforms for public review and release, and it will continue to compile VLR to take full advantage of Guangzhou's exemplary role on sustainable development as a mega-city, so that Guangzhou can move forward, together with its global partners, on the road to sustainable development and continue to make contributions to global sustainable development.

Lively, inclusive, open - the green development path of a mega city
UN SDG Guangzhou Voluntary Local Review Report

Vibrancy, Inclusion and Openness, a Mega City's Road towards Green Development

