

A CITY OF SYMBIOSIS

**The Shenzhen Practice of Harmonious
Coexistence between Humanity and Nature**

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PREFACE

The ecological environment is the foundation for human survival and development, and maintaining a sound ecological environment represents the shared aspiration of people around the world. Since the 18th National Congress of the Communist Party of China (CPC), China, guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, especially Xi Jinping Thought on Ecological Civilization, has upheld and acted upon the vision that lucid waters and lush mountains are invaluable assets, and remained firmly committed to a path of green development with priority to ecological conservation. It has made coordinated efforts in carbon reduction, pollution control, green expansion, and economic growth, advanced the integrated protection and systematic governance of mountain, river, forest, farmland, lake, grassland, and desert ecosystems, and pursued modernization of harmony between humanity and nature. Through sustained efforts, China has made remarkable achievements in the ecological progress and green development.

With a strong sense of responsibility for the future of human civilization, China has proposed building a community of all life on Earth, made a solemn commitment to achieving carbon peaking and carbon neutrality and taken concrete actions to honor it, and called for jointly building a green Belt and Road. China has made important contributions to promoting a fair and equitable system of global environmental governance for win-win cooperation, advancing sustainable development of humanity, and building a clean and beautiful world.

Shenzhen is a new city built by the Chinese people under the leadership of the CPC following the launch of reform and opening up. It represents how the concept of socialism with Chinese characteristics has been turned into reality from scratch. Over the past four decades and more, Shenzhen, with a firm commitment to reform, opening up, and innovation, has transformed itself from an underdeveloped border town into a globally influential international metropolis, writing a brilliant chapter in the history of urban development worldwide. In 2025, Shenzhen recorded a GDP of RMB 3.87 trillion, ranking among the world's top ten cities. It also ranked first among all cities in Chinese mainland in terms of industrial output and total import and export value.

As a fast-growing city, Shenzhen has incorporated green development into the whole process and all aspects of its economic and social development. Anchored in its strategic position as a pilot demonstration area of socialism with Chinese characteristics, a vanguard of sustainable development, Shenzhen has advanced high-quality development and high-standard conservation in coordination, accelerated green transition in all areas of economic and social development, and cultivated and strengthened green, new-quality productive forces. It has carried out the ecological campaign themed “Green and Beautiful Shenzhen: A City of Mountain-Sea Vistas,” established the world’s first International Mangrove Center, and taken an active part in international cooperation on ecological governance. Its efforts have yielded significant results in building a green, low-carbon, and beautiful city, and a sustainable development path is unfolding that leads to harmony between humanity and nature in a megacity.

The APEC Ministerial Meeting on Forestry was held in Shenzhen in July 2026. On this important occasion, this white paper is released to provide a comprehensive overview of Shenzhen’s concepts, practices, and achievements in building a modern, beautiful city of human-nature harmony. Through this white paper, we would like to share Shenzhen’s experience and insights, contribute Chinese solutions, and promote exchanges and mutual learning between civilizations.

CHAPTER I. GUIDING PHILOSOPHY

Modernization of Harmony Between Humanity and Nature

Harmony between humanity and nature is a key characteristic of Chinese modernization. Shenzhen fully implements Xi Jinping Thought on Ecological Civilization, upholds the concept of modernization of humanity-nature harmony, and aligns its actions with the *UN 2030 Agenda for Sustainable Development*. Grounded in its reality as a densely populated megacity with intensive human mobility, Shenzhen steadfastly advances protection and development in parallel and follows a path of intensive, green, and high-quality development.

1. Sharing Chinese Solutions with the International Community

In the face of global governance challenges such as environmental crises and imbalanced development, the United Nations has actively promoted the concept of sustainable development. From “Only One Earth” to “Our Common Future,” from *Agenda 21* to the *2030 Agenda for Sustainable Development*, it has made continuous efforts to forge international consensus on ecological conservation. The Chinese civilization has always valued harmony between humanity and nature as well as observance of the laws of nature. Having actively responded to and acted upon the sustainable development agenda, China, with a strong sense of responsibility for human civilization, has upheld the vision of a community with a shared future for humanity and deeply engaged in global environmental governance to promote sustainable human development. At the Leaders Summit on Climate held in 2021, Chinese President Xi Jinping proposed to establish a global environmental governance system, and called upon the international community to “work together to foster a community of life for man and nature.” He emphasized that, “Lucid waters and lush mountains are invaluable assets;” “We must treat Nature as our root, respect it, protect it, and follow its laws;” and “We should protect Nature and preserve the environment like we protect our eyes, and endeavor to foster a new relationship where man and Nature can both prosper and live in harmony.”

In 2022, at the opening ceremony of the 14th Meeting of the Conference of the Contracting Parties to the *Ramsar Convention on Wetlands* (COP14), President Xi Jinping announced the plan to build an international mangrove center in Shenzhen. Building on this important platform, Shenzhen, leveraging its strengths in scientific and technological innovation and green and low-carbon development, has actively advanced joint efforts in global mangrove conservation and restoration, coastal biodiversity protection, and sustainable blue carbon governance. This represents not only a proactive response to the United Nations sustainable development agenda and the Global Development Initiative, but also China’s pragmatic exploration for turning global governance from a concept to city-level actions, contributing its unique wisdom and urban solutions to the international community.

2. Pioneering the Implementation of National Strategies

China has written ecological advancement and conservation into its *Constitution* and incorporated it into the overall plan for building socialism with Chinese characteristics. It guides its actions with Xi Jinping Thought on Ecological Civilization, implements the new development philosophy, and works towards the goal of carbon peaking and carbon neutrality, safeguarded by a sound institutional framework for ecological civilization. China has comprehensively implemented major national strategic projects such as the Three-North (northwest China, north China, northeast China) Shelterbelt Forest Program, established a Protected Area (PA) system with national parks as the mainstay, and carried out holistic conservation and restoration of mountains, rivers, forests, farmlands, lakes, grasslands, and deserts. It has won the battle of defending blue skies, clean waters, and unpolluted soil, developing a conservation and governance framework extending from mountain peaks to the sea.

Focusing on high-quality and sustainable urban development, the 2025 Central Urban Work Conference called for building modern cities of the people that are innovative, desirable to live in, beautiful, resilient, culturally advanced, and smart. It emphasized that cities should maintain the beauty of nature, preserve the natural landscape of mountains and waters, and protect rivers, lakes, wetlands, and the overall water environment. They should develop ecological parks and other urban sights rationally, and enhance biodiversity in cities.

In 2019, the *Guidelines of the CPC Central Committee and the State Council on Supporting Shenzhen in Building a Pilot Demonstration Area of Socialism with Chinese Characteristics* assigned a strategic role to Shenzhen—“to be a vanguard of sustainable development.” The Guidelines set the goal that Shenzhen will become a model city for a great modern socialist country by 2035 and a global benchmark city with outstanding competitiveness, creativity, and influence by the middle of this century. It called upon Shenzhen to be a pacesetter in building a Beautiful China where humanity and nature coexist in harmony, and contribute Chinese experience for implementing the United Nations 2030 sustainable development agenda.

Living up to its historical mission in the new era, Shenzhen has been committed to building a city of the people and promoting its high-quality development. It has adopted a science-based approach to creating safe and efficient production spaces, comfortable and pleasant living spaces, and ecological spaces of clear waters and blue skies, and made coordinated advances in the green transformation of industries, restoration of ecosystems, and enhancement of urban development quality. Shenzhen is pioneering a new pattern of green urban development, taking the lead in achieving the modernization of harmony between humanity and nature.

3. Exploring New Pathways of Symbiosis Based on Fundamental Principles

Over the past more than 40 years, Shenzhen’s extraordinarily fast development has elevated the city to new heights while imposing sustained pressures on its ecosystems. Facing stringent resource and

environmental constraints, Shenzhen rejects the pursuit of short-term economic growth at the expense of the environment. Instead, it has proactively launched reforms whenever encountering a development bottleneck. In this process, the city has gradually yet resolutely pivoted from the “three-plus-one” trading mix (custom manufacturing with materials, designs or samples by the customer and compensation trade) to high-tech industries, and continued to empower its all-round transformation through green, digital, and intelligent development — a pathway that has systematically overcome the spatial, resource, and environmental constraints.

On a land of less than 2,000 square kilometers, Shenzhen accommodates over 20 million people and has registered a GDP of nearly RMB 4 trillion and a total industrial output value of more than RMB 5 trillion. Within a densely populated and compact urban framework, the city has been searching for a high-level dynamic balance between development and conservation, prosperity and ecology, efficiency and quality, exploring a path of high-quality development characterized by “*Mountain-Sea Vistas, Thriving Together, Green Transition, and Boundless Integration.*” It has provided a comprehensive and replicable solution for densely populated cities worldwide to advance toward sustainable development characterized by prosperity, inclusiveness, and green growth.

CHAPTER II. MOUNTAIN-SEA VISTAS

An Ecological Framework of City-Nature Symbiosis

Mountains, rivers, forests, farmlands, lakes, grasslands, and deserts constitute an interconnected and indivisible ecosystem. Abiding by the principle of “respecting nature, following its ways, and protecting it,” Shenzhen, grounded in its “half nature, half city” spatial framework, has developed an ecological network in which blue waters and green mountains form amazing vistas. By advancing holistic governance from mountain peaks to the sea, Shenzhen has demonstrated to the world a path of modernization that leads a megacity to humanity-nature harmony, with coordinated progress in high-quality development and high-standard ecological conservation.

1. “Half Nature, Half City”

Guiding the city’s high-quality green development with science-based plans. Shenzhen’s successive master plans have all emphasized the foundational role of natural geographic patterns and ecological landscape structures, and played a guiding and coordinating role in the allocation of spatial resources. The *General Planning of Shenzhen Special Economic Zone (1986-2000)* issued in 1986 decided on a spatial structure of “belt clusters” for the original special economic zone, using mountains and water bodies to separate the clusters—a move demonstrating brilliant foresight. The *Urban Master Plan of Shenzhen (1996-2010)* formulated in 1996 incorporated non-construction land into the planning framework, and established a park system and green belts separating urban clusters. The *Urban Master Plan of Shenzhen (2010-2020)* issued in 2010 proposed the development of a city-wide green space system composed of “regional green spaces – ecological corridors – urban green spaces,” ensuring the baseline of green spaces and driving a shift in development model under stringent resource constraints. The *Territorial Spatial Master Plan of Shenzhen (2021-2035)* issued in 2021 established a systematic urban planning framework characterized by “multi-plan integration, multi-level refinement, and multi-domain demonstration.” It further optimized Shenzhen’s “multi-center, cluster-based, and pro-ecology” urban structure to promote sustainable development across economic, ecological, and social dimensions.

Protecting ecological foundation with rigorous institutions. In 2005, Shenzhen issued the *Regulations of Shenzhen on the Management of Basic Ecological Control Lines*, taking the lead in delineating basic ecological control lines in the country, which covered nearly half of its land area. This move allowed the city to keep its mountain ridges, river valleys, and shorelines intact. In 2021, during the new round of territorial spatial planning, Shenzhen delineated well-conceived redlines to protect permanent basic cropland, advance ecological conservation, and control urban development boundaries. With these redlines in place, the city has made rational and holistic planning for production, living, and ecological spaces to promote its intensive development. At present, the ecological conservation redlines cover 477.74 square kilometers of land and 394.28 square kilometers of sea area, accounting for approximately 24% and 19% of the city’s total land and sea areas, respectively.

Integrating urban prosperity with natural beauty. Shenzhen has preserved vast ecological spaces within its urban core, making nature an integral part of urban prosperity. In 1984, the establishment of Guangdong Neilingding Futian Nature Reserve was approved, which was upgraded to a national status in 1988, becoming China’s only national reserve situated in the heart of a city, and an important stopover

site and habitat for international migratory birds. Also sitting in the urban core are Shenzhen OCT National Wetland Park and Shenzhen Bay Tidal Wetland Park. The rivers and wetlands stretching through the city provide not only essential habitats for nearly one thousand species of plants and animals, but also valuable green spaces where people can relax and enjoy a moment with nature.

Panel 1: Futian Mangrove

A Habitat for Migratory Birds in the Heart of a Megacity

The Futian mangrove is the core wetland within the Guangdong Neilingding Futian National Nature Reserve and the only national nature reserve sitting in the center of a megacity. In 1994, the Binhai Avenue was originally planned to pass through the core area of the nature reserve, but was eventually relocated 200-260 meters northward based on in-depth research and careful demonstration. Moreover, an additional RMB 100 million was invested to build China's first sound barrier specifically for bird protection. The mangrove ecosystem was therefore kept intact. Over the subsequent decades, Shenzhen has consistently protected the Futian mangrove, which, together with Hong Kong's Mai Po Wetland, has become a critical node along the East Asian-Australasian Flyway. Today, nearly 100,000 migratory birds overwinter here every year, with more than 270 bird species recorded cumulatively, including 60 nationally protected species such as black-faced spoonbill and great knot.



Fig. 1 Futian Mangrove Wetland

2. A Green-Blue Network Connecting Mountains and Sea

Implementing the mountain-sea vistas initiative. The *Guidelines for Planning and Design of Mountain-Sea Urban Landscape* were issued to coordinate and integrate natural resources across multiple dimensions. The Guidelines proposed to systematically connect and restore Shenzhen's most typical ecological assets, including bays, mountains, rivers, ecological corridors, and green spaces in

parks, with the aim of establishing key ecological barriers and networks. Shenzhen is developing a charming ecological framework consisting of “one ridge, one belt, and 20 corridors.” It comprises a 280-kilometer “Green Mountain Ridge,” a 200-kilometer Blue Coastal Belt, along with eight mountain corridors and 12 water corridors. The seamless integration of the city with mountains and the sea has effectively improved urban ecosystem functions and biodiversity.

Panel 2: The Kunpeng Trail

A Ridge Connecting Mountains and Sea

Along its mountain ridge spanning the city from east to west, Shenzhen has planned and built the Kunpeng Trail as the central route of the “One Ridge” in its Mountain-Sea Vistas Initiative. Through the development of this Trail, Shenzhen has systematically restored ecological gaps and reconnected fragmented habitats, transforming the once isolated mountain ridge patrol paths into green routes that link mountains, parks, communities, and public life. The Kunpeng Trail, running about 200 kilometers, is divided into 20 sections, each varying in length, difficulty, and landscape. It connects more than ten main peaks, 17 suburban parks, and eight large lakes and reservoirs, catering to diverse hiking preferences. It leads hikers to the mountaintop for a bird’s-eye view of the magnificent skyline, where towering skyscrapers meet Shenzhen Bay. Then, in just 15 minutes, hikers can wander through lush greenery right into the bustling CBD—embracing the tranquility of nature and the vibe of the city all in a single day. In 2024, the Kunpeng Trail, the world’s only long-distance mountain ridge trail traversing the urban core of a megacity with a population exceeding 10 million, was recognized as one of China’s Top Ten Distinctive Destinations for mountaineering and outdoor sports.

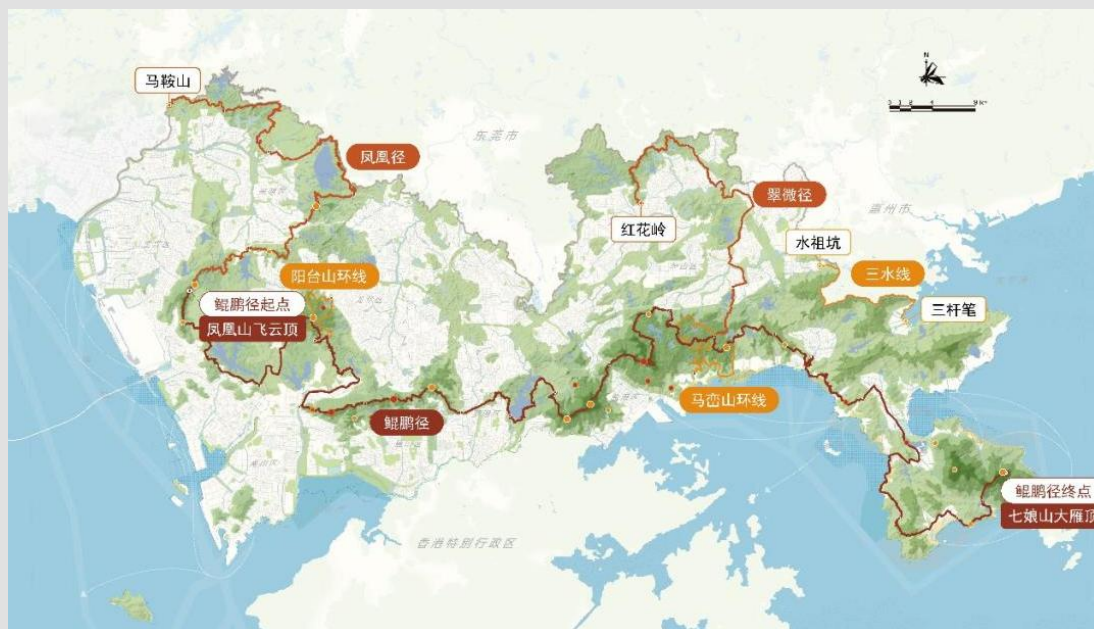


Fig. 2 Map of the Three Trails and Three Rings

Creating pathways to get close to nature. Shenzhen has developed the “Pengcheng Wanli” multi-layered outdoor trail system, which connects greenways, riverside walkways, ancient post roads, coastal boardwalks, and countryside footpaths into a comprehensive network. The trail system is designed with

full respect for local terrain and landform and constructed on the principle of “zero increase in hard paving, zero impact to the environment, and zero harm to living species.” The backbone of this trail system is the “Three Trails and Three Rings,” which refer to the Kunpeng Trail, Phoenix Trail, and Cuiwei Trail, and the Yangtai Mountain Ring, Maluan Mountain Ring, and Sanshui Ring. Connecting Shenzhen’s rolling mountains from east to west, the three trails and three rings form a city-wide network through interconnected main routes, supporting loops, and accessible branch paths, enabling urban dwellers to enjoy the wild fun among mountains and waters. By the end of 2025, Shenzhen had developed more than 4,000 kilometers of trails, 280 kilometers of cycling lanes, 1,000 kilometers of suburban footpaths, and 1,000 kilometers of riverside walkways, providing residents with rich options of outdoor recreation while integrating the development of ecological and urban value.

3. Territory-wide Ecological Restoration and Governance

Steadily improving the quality of forest ecosystems. Shenzhen’s terrestrial forest ecosystems are predominantly composed of south subtropical monsoon evergreen broad-leaved forests, supplemented by other forest communities including ravine monsoon seasonal forests and secondary broad-leaved mixed forests. The city has established a forest conservation and governance mechanism featuring “leadership by forest chiefs, interdepartmental coordination, and broad public participation,” implemented targeted forest quality enhancement initiatives, and carried out an action to plant one million trees in five years. These initiatives are aimed to promote the forest form improvement and forest stand optimization in a science-based way. Coordinated efforts have been made to restore forests, expand greening, and manage abandoned quarry sites, in order to achieve a forest landscape of perennial green and distinctive seasonal splendor. The city’s forest coverage rate has reached 39%, with total forest stock volume reaching 4.8395 million cubic meters. Forest ecosystems across the city have become more stable in structure, offering richer landscapes and more ecological services.

Panel 3: Ecosystem Restoration at Wutong Mountain

From Alpine Azalea to Valley Wetland

Wutong Mountain serves as an important ecological barrier and a core area of biodiversity in Shenzhen. In recent years, Shenzhen has taken targeted measures to enhance the forest quality on Wutong Mountain, removing invasive species and replanting native trees. It has focused on cultivating a large expanse of arbor-type alpine azaleas, which form the southernmost and lowest-elevation natural population of tree-form alpine azaleas, and nurtured multi-layered, colorful, high-quality forest landscapes. The city has systematically restored wetland ecosystems in the Enshang Valley in the southeast of the mountain, and built bird islands and wetland shrubs to provide habitats and foraging grounds for waterbirds. At present, the quality of Wutong Mountain’s forest ecosystems continues to improve, with steadily recovering biodiversity and about 80% forest coverage rate. A total of 1,924 types of vascular plants and 351 types of terrestrial vertebrates have been recorded on the mountain, along with nearly 50,000 wild alpine azaleas and thousands of *Enkianthus quinqueflorus*, commonly known as Chinese New Year Flower. Wutong Mountain has become an ecological showcase integrating forest ecosystem restoration, wetland conservation, eco-recreation, and nature education.

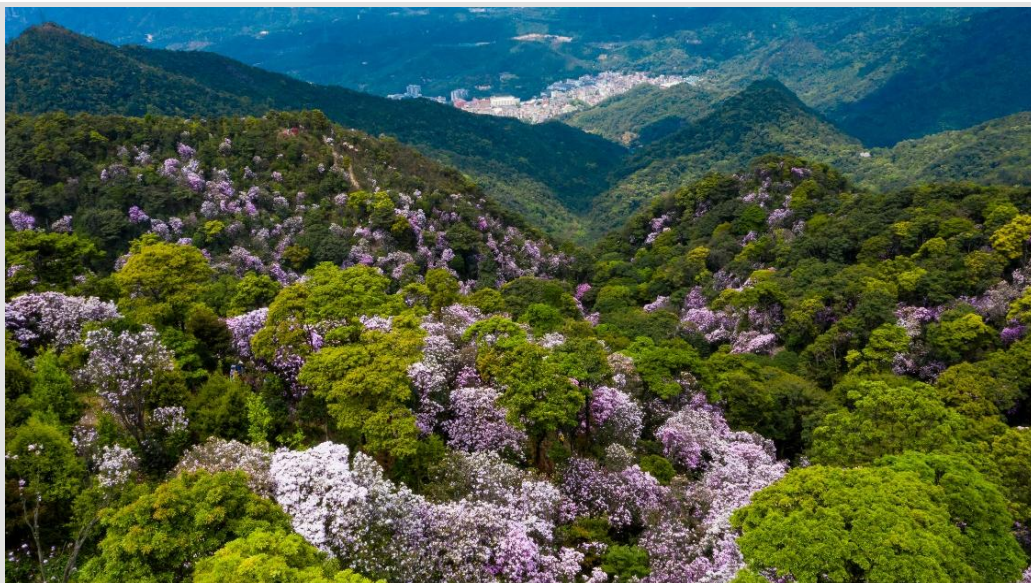


Fig. 3 Alpine Azalea Valley on Wutong Mountain

Consistently restoring the functions of wetland ecosystems. Shenzhen has a total wetland area of 416.29 square kilometers, accounting for 18.29% of its total area. The city is developing an interconnected wetland network centered on coastal wetlands such as the Pearl River Estuary and Shenzhen Bay, supplemented by rivers, reservoirs, and other small-scale wetlands. During the 14th Five-Year Plan period, Shenzhen steadily advanced the cultivation and restoration of 122.28 hectares of mangroves. As a result, wetland biodiversity has been largely enhanced, and the wetlands' carbon sequestration capacity continuously strengthened and ecological regulation functions such as water source conservation and purification steadily improved. Shenzhen has carried out systematic ecological restoration and management of rivers and lakes, with the proportion of their ecological shorelines reaching 65%. The Shenzhen River Estuary Wetland Restoration Project has been recognized by China's Ministry of Natural Resources as an exemplary case of private capital contributing to ecological conservation and restoration.

Advancing marine ecosystem conservation and restoration. Shenzhen has a sea area of approximately 2,030 square kilometers, with a mainland coastline extending about 260 kilometers, including 43.8% natural shoreline. The city has continued to advance initiatives for the development of blue bays, beautiful beaches, and harmonious and beautiful islands, and has strengthened integrated management of key marine areas. Water quality in the eastern coastal waters has consistently remained at Class I standards, while the total nitrogen concentration in rivers flowing into the sea in the western coastal areas has decreased by 41.3% since the beginning of the 14th Five-Year Plan period.

Shenzhen has continuously strengthened the conservation of marine biological resources. The city has established the Guangdong Pearl River Estuary Chinese White Dolphin National Nature Reserve and the Guangdong Dayawan Aquatic Resources Provincial Nature Reserve. It has held the Workshop on Community-Based Conservation and Regional Collaboration for Long-distance Key Migratory Marine Species in APEC Economies and the APEC Blue Citizen Community Summer School. It has released the *Toolkit for Conservation of Long-distance Migratory Marine Species and Integrated Coastal Zone Management*, and set in motion the China-Indonesia and China-Thailand "marine sister community"

cooperation mechanism, launching a new model of community-level marine cooperation within APEC. Shenzhen has also carried out ecological enhancement of seawalls and sandy shorelines in Qianhai Bay, Daya Bay, and Dapeng Bay. During the 14th Five-Year Plan period, a cumulative 23 kilometers of shoreline was restored, with coordinated improvements in the ecological functions, landscape quality, and disaster prevention and mitigation capacity of coastal areas.

Panel 4: Dapeng Bay

A Model “Beautiful Bay” in China

An important bay in eastern Shenzhen, Dapeng Bay is home to almost half of the city’s shoreline. Pioneering a governance model featuring land-sea coordination and Shenzhen-Hong Kong collaboration, Shenzhen has systematically advanced the ecological renovation of seawalls at Shayu Chong and Moon Bay and the improvement of sandy shoreline at Dameisha. It took the lead in designating a bay-based no-fishing zone where fishing is banned all year long, and has consistently implemented summer fishing moratoriums and stock enhancement programs. Shenzhen has established China’s first coral-themed national marine ranching demonstration zone, creating a model that integrates ecological restoration, nature-based recreation, and science popularization. Currently, Dapeng Bay is home to 22 major hermatypic coral clusters, hosting 66 species of reef-building corals. The region has recorded 177 species of nekton—including fish, shellfish, and cephalopods—as well as 185 species of phytoplankton. In 2022, Dapeng Bay was selected as one of the first group of outstanding “Beautiful Bays” in China.



Fig. 4 Beautiful Dapeng Bay

Implementing the most rigorous farmland protection system. Shenzhen has 75,600 mu (50.4 square kilometers) of arable land, accounting for only 2.05% of the city’s total area. It has firmly safeguarded the farmland redline and explored innovative ways for the protection and utilization of arable land and permanent basic cropland in highly urbanized areas, ensuring the quantity, quality, and ecological value of farmland in a coordinated approach. The city has steadily developed high-standard farmland and promoted the integrated development of agriculture, ecology, culture and tourism, and science popularization, fostering green public spaces where residents can rest and relax and traditional farming culture is preserved.

CHAPTER III. THRIVING TOGETHER

Fostering Biodiversity in a Densely Populated Metropolis

Biodiversity brings vitality to the Earth and serves as the foundation for human survival and development. Shenzhen is actively advancing the development of a biodiversity-friendly city by innovating its biodiversity conservation governance system, strengthening the systematic protection of key habitats for wild plants and animals, and creating urban environments that support biodiversity based on local conditions. These efforts are enabling countless wild species to thrive and find a harmonious home within a densely populated urban landscape.

1. Carefully Safeguarding Habitats for Living Species

Building a comprehensive biodiversity conservation system. Shenzhen has taken the lead in establishing an institutional framework for biodiversity conservation, guided by laws and regulations, supported by spatial planning, and strengthened through specialized plans. In 2021, Shenzhen enacted the *Regulations of the Shenzhen Special Economic Zone on Ecological and Environmental Protection*, which includes a dedicated chapter on biodiversity conservation and establishes institutional arrangements for biodiversity surveys and monitoring, species protection, and habitat conservation. In 2025, Shenzhen released China's first wildlife conservation plan for a megacity, improving the top-level design for the protection and management of terrestrial, freshwater, and marine biodiversity. The city continues to strengthen the conservation of endangered species and their habitats while optimizing the spatial pattern of habitat protection across the entire city.

Scientifically and precisely conserving wild species populations. Upholding the principles of respecting nature and scientifically protecting biodiversity, Shenzhen has strengthened efforts in habitat conservation, dynamic monitoring, disease prevention and control, wildlife rescue and breeding, and invasive alien species management in a comprehensive manner. These comprehensive measures have contributed to the steady recovery of various species populations. Shenzhen has been recognized among the world's first group of "Biodiversity Charming City". To date, more than 6,870 species have been recorded across the city, with the number of nationally protected key species reaching 208. A total of 29 species have been named after Shenzhen. Among them, Shenzhen Bay, including Futian Mangrove Nature Reserve, has recorded more than 300 black-faced spoonbills annually, accounting for approximately 4.4% of the global population. The Eurasian otter has returned to Shenzhen Bay after disappearing for more than two decades. The population of Chinese white dolphins in the Pearl River Estuary exceeds 1,000 individuals, representing the largest population worldwide. Populations of the Chinese pangolin and small Indian civet are steadily increasing, the macaque population on Nei Lingding Island remains stable at more than 1,200 individuals, and wild populations of 36 species of endemic Chinese plants, including the Shenzhen cycad, have maintained stable communities.

2. Connecting and Restoring Migratory Corridors

Restoring vital terrestrial wildlife migration routes. Shenzhen has developed a two-tier biodiversity corridor conservation system comprising "habitat corridors" and "wildlife crossings." More than 20 habitat corridors have been planned and constructed, while ecological breaks caused by development

activities have been carefully repaired. In 2023, Shenzhen completed the construction of Kunpeng Trail No. 1 Bridge, China's first large-span prefabricated composite ecological bridge, restoring ecological connectivity between Meilin Mountain and Yinhu Mountain. In 2025, Kunpeng Trail No. 2 Bridge and No. 3 Bridge were successively completed, repairing ecological breaks caused by transportation infrastructure such as Yuping Boulevard and Baogang Interchange, and further optimizing the forest and green space habitat network in central Shenzhen.

Panel 5: Kunpeng Trail No. 1 Bridge

An “Animal Skybridge” in the City

To address the fragmented habitats and reduced ecological connectivity between Meilin Mountain and Yinhu Mountain, Kunpeng Trail No. 1 Bridge was completed and opened in late 2023, reconnecting two forest areas that had been separated for nearly three decades. The ecological bridge accommodates both pedestrians and wildlife. Only one-tenth of the bridge deck is designated for human passage, while the remaining area is covered with soil and planted with more than 80 native plant species, creating diverse habitats including evergreen broad-leaved forests, shrub and grass communities, and pond wetlands. Through vegetated soft barriers, the bridge separates human and wildlife movement routes. It also adopts an “animal-friendly night protection mode,” using low-level, gentle lighting to minimize disturbance to wildlife. Just 23 days after completion, the first wild leopard cat was recorded crossing the bridge. Since then, repeated observations have documented leopard cats, wild boars, and other wildlife species using the ecological passage.



Fig. 5 Kunpeng Trail No. 1 Bridge

Creating bird-friendly stopover sites along the East Asian-Australasian Flyway. As an important stopover site along the East Asian-Australasian Flyway, Shenzhen is guided by wetland conservation planning in developing a conservation and restoration framework for waterbird ecological corridors

featuring “two cores, three belts, multiple corridors, and multiple sites.” By leveraging rivers flowing into the sea, Shenzhen has established freshwater wetland corridors for waterbirds, connecting key ecological nodes including OCT Wetland, the Dasha River estuary, and Xiwan Mangrove Wetland, and creating an interconnected blue-green habitat network for waterbirds. Meanwhile, Shenzhen has released China’s first *Guidelines for Bird-Friendly Urban Planning and Design*, establishing comprehensive measures centered on the Futian Mangrove Nature Reserve. These measures include implementing stepped building height controls from the coastline toward inland areas and adopting bird-collision prevention designs in high-rises.

3. Building Nature-Compatible Urban Environments

Promoting biodiversity-friendly practices throughout the entire project lifecycle. Shenzhen has integrated the biodiversity-friendly approach throughout every stage and every aspect of urban planning, construction, and management. From spatial planning and project site selection to design, construction, and operation, the city has implemented stringent requirements for biodiversity conservation across the full project lifecycle. At the preliminary planning stage, projects are required to avoid ancient and valuable trees, habitats of rare species, and various types of ecologically sensitive areas. During construction, nature-based ecological engineering approaches are promoted, while native plant species are prioritized in urban landscaping to create diverse vegetation communities adapted to local wildlife. At the same time, low-impact management measures, including ecological isolation during construction and time-limited operations, are implemented. Development entities are required to fulfill their ecological restoration responsibilities, minimizing the disturbance of urban development activities on species and their natural habitats.

Scientifically creating small-scale urban habitats. In 2025, Shenzhen released China’s first *Guidelines for the Construction and Management of Biodiversity-Friendly Parks*, proposing biodiversity-friendly improvement strategies and approaches for various park facilities and strengthening the conservation and creation of small-scale habitats. In new development projects, the city promotes small-scale ecological features such as vertical greening, rain gardens, and bioswales, providing microhabitats for birds, insects, amphibians, reptiles, and small mammals.

Protecting nighttime environments in ecologically sensitive areas. Shenzhen has issued local standards, including the *Specification for Lighting Environments in Dark Sky Communities* and the *Regional Limits for Nighttime Lighting Environments*, to establish nighttime lighting zones and implement strict controls on light pollution. To protect migratory birds, areas such as the Shenzhen Bay Super Headquarters Base have strictly implemented the planned “migratory bird season lighting mode.” During the migratory bird season, Shenzhen Bay Park turns off unnecessary lighting to protect birds, while Binhai Avenue has completed an ecological transformation of its street lighting system, creating synergy with the citywide optimization and upgrading of lighting facilities in public parks. Taking Xichong as a pilot area, Shenzhen has developed a dark-sky community to provide suitable habitats for light-sensitive species such as fireflies and preserve the natural day–night rhythms of plants and animals.

Panel 6: Xichong Dark Sky Community

A Starry Sky Park on the Urban Fringe

In 2013, Shenzhen issued its Special Plan for Urban Lighting, designating Xichong in Dapeng District, where the Shenzhen Astronomical Observatory is located, as a light-environment-sensitive area. In 2021, Shenzhen proposed developing the “Dapeng Starry Sky Park” and establishing the “Xichong International Dark Sky Community.” Through categorized and tiered management, the area has established dark-sky protection zones, including a core protection zone, a coordination zone, and a general control zone. By adopting dark-sky-friendly lighting fixtures and strictly controlling color temperature, illuminance, and light trespass, Shenzhen has effectively reduced light pollution. While ensuring the lighting needs for nighttime production and daily life, these measures have improved the nighttime ecological environment, enhanced overall starry sky quality, and promoted the development of dark-sky economy activities such as astronomical observation and firefly watching. The initiative not only preserves the ecological character of the mountains and coastline but also opens a new chapter for dark-sky cultural tourism. In April 2023, Xichong, Dapeng District, was recognized as China’s first International Dark Sky Community (IDSC).



Fig. 6 The Milky Way Arch at Xichong Astronomical Observatory

CHAPTER IV. GREEN TRANSITION

Steadily Advancing Carbon Peaking and Carbon Neutrality

Green and low-carbon development constitutes the fundamental solution to ecological and environmental problems. Taking the comprehensive green transformation of economic and social development as the core priority, Shenzhen advances the shift from dual control of energy consumption volume and intensity to dual control of carbon emission volume and intensity, develops a green, low-carbon and circular economic system, and fully safeguards blue skies, clear waters and unpolluted soil. The city promotes the coordinated development of six key urban infrastructure networks, including water network and underground pipe network, builds a climate-resilient city, and develops an innovative mechanism for realizing the value of ecological products that delivers both ecological progress and economic benefits, providing solid support for achieving the goals of carbon peaking and carbon neutrality.

1. Unlocking the Impetus for Green and Low-Carbon Development

Fostering and expanding green and low-carbon industrial clusters. Relying on the “20+8” strategic emerging industrial clusters and future industry plans, Shenzhen includes green and low-carbon industries such as new energy, intelligent connected vehicles, and safety, energy-saving and environmental protection into the key tracks for fostering new quality productive forces. The city accelerates the development of green manufacturing and green service systems, and steadily raises the “green content” of its industrial system. In 2025, the output value of Shenzhen’s new energy industry exceeded RMB 400 billion, that of the intelligent connected vehicle industry surpassed RMB 800 billion, and that of the safety, energy-saving and environmental protection industry registered over RMB 200 billion; a total of 134 national-level green factories and 28 national-level green supply chain management enterprises had been established; the energy consumption, water consumption and carbon emission intensity per 10,000-yuan GDP were all at the best levels among Chinese cities.

Accelerating the development of a new type of energy system. Shenzhen comprehensively promotes the multi-energy complementarity and deep integration of conventional and new energy sources, vigorously develops new energy storage, accelerates the integrated development of power sources, grids, loads and storage and the construction of smart grids, and actively explores direct green power connections, so as to build a new type of power system featuring cleanliness, low carbon, safety, sufficiency, economic efficiency, supply-demand coordination, flexibility and intelligence. In 2025, clean energy installed capacity accounted for nearly 80% of the city’s total installed capacity, and electricity consumption took up 48% of terminal energy consumption. A total of 15 high-quality power supply demonstration zones with the capability to restore power within seconds had been built. Shenzhen is capable of providing complete solutions for a new type of energy system under the carbon peaking and carbon neutrality goals, with world-leading products and technologies such as new electrochemical energy storage, microgrid and off-grid systems, and high-power charging, battery-swapping, and discharging facilities.

Building a global pioneer city in digital energy and a world-class “supercharging city.” Shenzhen is accelerating the construction of a high-quality charging infrastructure system, and has become the first city in the world where the number of supercharging stations and supercharging guns for new

energy vehicles exceeds that of gas stations and fuel dispensers. It is accelerating the application, demonstration and promotion of cutting-edge technologies such as megawatt-level flash charging, heavy-duty truck supercharging and battery swapping in various scenarios, and has been selected as one of the first national pilot cities for large-scale vehicle-to-grid (V2G) interaction. It has built China's first integrated network covering photovoltaic power generation, energy storage, charging and discharging, as well as a virtual power plant management platform. To date, the city has built a total of 1,227 supercharging stations with a power of 480 kW or above, 48 heavy-duty truck supercharging and battery swapping stations, 120 passenger vehicle flash charging stations, and 15 integrated energy supply stations. The real-time adjustable load of the virtual power plants exceeds 1.4 million kilowatts.

Panel 7: Supercharging City

“A Cup of Coffee, a Full Charge”

As a global pioneer in new energy transportation transition, Shenzhen's massive new energy vehicle stock generates strong demand for centralized energy replenishment. To address the long waiting time and uneven scenario coverage of traditional charging facilities, Shenzhen leverages its full industrial chain advantages in the new energy sector and launched the “Supercharging City” initiative in 2023 to build a “one-kilometer supercharging circle.” In 2025, the city upgraded the initiative to “Supercharging City 2.0,” focusing on the deployment of facilities for heavy-duty truck supercharging and battery swapping, and passenger vehicle flash charging, forming a full-coverage energy replenishment network covering commercial districts, residential communities, expressways and logistics parks. It took the lead in issuing six local supercharging standards, setting a minimum supercharging power threshold of 480 kW for supercharging services, and scaled up the application of full liquid-cooling and megawatt-level flash charging technologies. Passenger vehicles can be charged to 70% in just 5 minutes, while heavy-duty trucks can achieve a 100-km range with just 15 minutes of charging, making the vision of “a cup of coffee, a full charge” a reality.



Fig. 7 Shenzhen Lianhua Hill Integrated Photovoltaic-storage-charging Supercharging Station

Promoting green buildings and green transportation. All newly constructed civil and industrial buildings in Shenzhen strictly implement green building standards. The city actively advances pilot projects for building-integrated photovoltaics and ultra-low energy consumption buildings, and operates China's first city-level real-time monitoring platform for building carbon emissions. The total floor area of green buildings in the city has reached 230 million square meters, with both scale and proportion ranking among the top Chinese cities. To promote in-depth green and low-carbon transformation in the transportation sector, Shenzhen achieved 100% electrification of buses and taxis as early as 2017 and 2018 respectively, and the penetration rate of new energy vehicles reached 81.7% in 2025. The city has developed an integrated green travel system featuring “rail transit + bus + walking and cycling.” Relying on its densely populated rail network, it continuously improves residents' commuting efficiency. According to the *2025 China Major Cities Commuting Monitoring Report*, 81% of commutes in Shenzhen take less than 45 minutes, making it the only megacity in China with this indicator exceeding 80%.

Panel 8: Low-Carbon Travel

A Green Commuting Network Woven by Rail Transit

Shenzhen put its first metro line into operation in 2004. By June 2026, the total operating mileage of the city's metro network had reached 653.7 kilometers, ranking fifth among Chinese mainland cities. The average daily ridership has remained above 9 million passenger trips, steadily ranking among the top three in Chinese mainland cities. The passenger intensity and network density of the rail transit both rank first among Chinese mainland cities, and the rail transit modal share in public transport exceeds 77%. The well-developed rail network effectively reduces reliance on motor vehicles, continuously cuts carbon emissions in the transportation sector, and has created the Shenzhen model of low-carbon commuting for densely populated megacities.



Fig. 8 Gangxia North Comprehensive Transport Hub

2. Keeping Blue Skies, Clear Waters and Clean Soil

Further advancing the “Shenzhen Blue” sustainable initiative. Adhering to source prevention, control and systematic governance, Shenzhen scales up the collaborative emission reduction of nitrogen oxides and volatile organic compounds (VOCs), and promotes the coordinated control of fine particulate matter (PM_{2.5}) and ozone pollution. It has built an integrated space-air-ground intelligent atmospheric monitoring network, and leveraging technological means, strengthens precise supervision of industrial, mobile, fugitive dust and other non-point sources. In 2025, the annual average concentration of PM_{2.5} in Shenzhen dropped to 16.8 µg/m³, approaching the third interim target set by the World Health Organization, and remaining the best level among Chinese cities with a population of over 5 million. The proportion of days with good or excellent air quality throughout the year reached 97.5%, among which excellent air quality days accounted for over 60%, leading all Chinese megacities in air quality.

Panel 9: “Shenzhen Blue”

Pioneering Exploration of Atmospheric Governance in Megacities

Since 2004, Shenzhen has successively issued the Blue Sky Action Plan, the “40 Measures for Atmospheric Environment Improvement,” and the “Shenzhen Blue” Sustainable Action Plan. It has built a “one street, one station” automatic air monitoring network and a city-wide photochemical monitoring network, and continuously implemented a series of key governance measures that lead the country.

Shenzhen was the first in China to carry out PM_{2.5} source apportionment, the first to impose city-wide restrictions on high-emission “yellow-label” vehicles, the first to promote the use of more eco-friendly water-based coatings, and the first to implement China’s National VI emission standards for motor vehicles and China IV emission standards for non-road mobile machinery. These repeated “first” and “pioneering” measures have formed a clear trajectory of Shenzhen’s systematic pollution control and pilot reforms, safeguarding the “blue-sky happiness” that citizens can tangibly enjoy.



Fig. 9 Visible “Shenzhen Blue” in Daily Life

Systematically advancing the protection and development of “beautiful rivers and lakes.” Shenzhen carries out coordinated governance of water resources, water environments and aquatic ecosystems to address prominent water environment governance challenges in densely populated cities. In 2025, the water quality compliance rate of centralized drinking water sources in the city hit 100%, and 90.1% of the city’s 310 rivers attained good or excellent water quality. The ratio of good and excellent water quality at national and provincial river monitoring sections has remained at 100% for three consecutive years. The Maozhou River and Shiyan River (Shiyan Reservoir) were selected as outstanding cases of China’s beautiful rivers and lakes. The city actively innovates regional collaborative governance mechanisms, promulgated the Ecological and Environmental Protection Plan of Shenzhen Metropolitan Area, and established a Shenzhen-Hong Kong environmental protection cooperation working group. In 2025, the total phosphorus concentration at the estuary of the Shenzhen River, a transboundary watercourse between Shenzhen and Hong Kong, decreased by 6.2% year-on-year, hitting the best level on record.

Panel 10: Shenzhen-Dongguan Joint Governance of the Maozhou River

A Model of Transboundary River Basin Collaborative Water Governance

The Maozhou River traverses Shenzhen and Dongguan. In recent years, under the leadership of the Guangdong Provincial Party Committee and the Provincial Government, Shenzhen and Dongguan have established a transboundary collaborative governance mechanism, featuring basin-wide coordination, unified planning and standards, and coordinated management of upstream and downstream waters as well as river banks on both sides. In 2025, the two cities simultaneously issued special regulations on collaborative protection, solidifying the long-term mechanism of transboundary joint governance through legislation. Now, the main stream of the Maozhou River meets the Class III surface water quality standard, with clear water, green banks, and thriving aquatic and avian life. The remarkable transformation of the Maozhou River vividly embodies the profound truth that lucid waters and lush mountains are invaluable assets. The sustained improvement of the water environment has galvanized development momentum on both banks, driven the iterative upgrading of urban functions along the river, and turned the waterfront ecological corridor into a public space where citizens can share ecological dividends and embrace a green and beautiful life.



Fig. 10 Sci-tech Section on the Left Bank of the Maozhou River

Taking the lead in exploring the construction of a “zero-waste city.” As one of China’s first pilot cities for zero-waste city development, Shenzhen has steadily improved its solid waste disposal capacity and built five major eco-energy parks. The city’s daily domestic waste incineration treatment capacity exceeds 19,000 tons, making it the first mega-city in China to achieve full incineration and power generation of domestic waste. It vigorously promotes the resource utilization of construction waste, with 61 comprehensive utilization facilities in operation, achieving a construction waste resource utilization rate of over 50%. Shenzhen pilots a recycling system for renewable resources, with intelligent recyclable collection bins covering 82.3% of residential communities, and a domestic waste recycling rate exceeding 50%. Shenzhen’s zero-waste city construction practices have been incorporated into China’s *Progress Report on the Implementation of the 2030 Agenda for Sustainable Development (2025)*, and Yantian District’s domestic waste reduction and classification practices were selected as an outstanding case in UN-Habitat’s “Waste Wise Cities” initiative.

Panel 11: Longgang Eco-Energy Park

A “Green Factory” for Resource Recycling

Adhering to the principles of waste reduction, resource recycling and harmless treatment, Shenzhen has built a city-wide disposal system with zero landfill of raw waste, and constructed five eco-energy parks across the city. As the core hub for waste incineration and disposal in eastern Shenzhen, the Longgang Eco-Energy Park was completed and put into operation at the end of 2019. With a designed daily disposal capacity of 5,000 tons, it handles about one quarter of the city’s domestic waste disposal task and generates an average of 3.2 million kWh per day, ranking among the world’s largest waste-to-energy plants in terms of single-plant capacity. Its emission limits for flue gas pollutants and dioxins are stricter than EU standards. Integrating the architectural aesthetics of Hakka walled villages and blending harmoniously with surrounding mountains and green spaces, the park has been built into a park-style ecological base and a low-carbon popular science education platform, serving as an on-site classroom for public awareness of green low-carbon development and resource recycling.



Fig. 11 Longgang Eco-Energy Park

3. Forging a Safe and Resilient Urban Foundation

Panel 12: Eastern Ecological Seawall

A Blue Resilient Coast

In September 2018, Super Typhoon Mangkhut damaged part of the coastal seawalls in eastern Shenzhen. Adhering to systematic and bottom-line thinking, Shenzhen launched the Phase III Reconstruction Project of Eastern Seawall, covering 15.6 kilometers of eastern coastline and upgrading the defense standard to a 1-in-200-year event. The project adopted innovative multi-dimensional ecological resilience governance measures: on the seaward side, reef flats and artificial submerged dikes were deployed to dissipate wave surges and mitigate direct impact on seawalls; in the middle coastal zone, tidal flats and mangrove ecological buffer zones were constructed to systematically restore coastal wetland ecosystems; on the landward side, ecological grass ditches and storage depressions were built to efficiently purify land-based non-point source runoff. Along the entire line, the use of rigid concrete retaining walls was significantly reduced, and native salt-tolerant vegetation was used to soften the embankment landscape, connecting coastal walkways, sea-view platforms and ecological science education nodes, achieving multiple functions of flood and storm surge prevention, ecological restoration, and public recreation.



Fig. 12 Yangmeikeng Section of the Phase III Reconstruction Project of Eastern Seawall

Enhancing disaster prevention and mitigation capacity of infrastructure across the city. Shenzhen further advances the “sponge city” development plan, continuously elevating the city’s flood control, waterlogging drainage and climate resilience. The city’s flood and storm surge defenses are designed to withstand a 1-in-200-year event, and its waterlogging prevention capacity is designed for a 1-in-50-year event. A dual water supply system with mutually supplementary water sources from the Dongjiang and Xijiang rivers has been established, with an emergency reserve capacity of 90 days. Traditional seawalls are upgraded into ecological and resilient seawalls, realizing a shift from pure engineering defense to symbiotic coexistence with natural resilience. A land-sea integrated precise meteorological observation network has been completed, enabling accurate pre-disaster assessment and early warning of severe weather. A key laboratory for geological safety risk prevention and control in territorial space

development has been established, along with a municipal geological big data sharing platform. The city continues to strengthen the development of urban lifeline projects such as underground pipe networks, advancing the coordinated development of traditional and new infrastructure, as well as physical and digital infrastructure. The average annual power outage duration per user in the city has been reduced to less than 7.5 minutes, with power supply reliability ranking among the world's highest levels.

**Panel 13: Shenzhen-Hong Kong Joint Governance of the Shenzhen River
A Climate-Resilient Transboundary River Governance Practice**

The Shenzhen River has a total length of 37 kilometers, of which 22 kilometers serve as the boundary river between Shenzhen and Hong Kong. As a typical tidal river, it is exposed to multiple climate risks including extreme rainstorms, storm surges and saltwater intrusion. Since 1982, Shenzhen and Hong Kong have carried out collaborative governance in flood control, drainage and water environment improvement through platforms such as the Guangdong-Hong Kong Environmental Protection and Climate Change Cooperation Working Group. Through four phases of joint renovation, the flood protection standard for the Shenzhen River has been raised from a 2- to 3-year return period to a 50-year return period. In terms of water environment improvement, the two sides have established a coordinated mechanism for joint monitoring and synchronous pollution control. Shenzhen has implemented whole-basin source remediation and pipe network quality upgrading, while Hong Kong has renovated sewage treatment plants to ensure stable up-to-standard effluent discharge. In 2023, the water quality at the national monitoring section of the Shenzhen River estuary reached the Class III surface water standard.



Fig. 13 Aerial View of the Shenzhen River

Building a global model climate-resilient city. As a national pilot city for deepening climate-resilient urban development, Shenzhen took the lead in formulating China's first municipal medium- and long-term special plan on climate adaptation, the *Shenzhen Climate Change Adaptation Plan (2023-2035)*, issued the *Regulations on Natural Disaster Prevention and Control*, and promulgated the *Implementation Plan for the Pilot Program of Deepening Climate-Resilient Urban Development in Shenzhen*. This forms an institutional system integrating laws, plans and action schemes. The city actively carries out international cooperation on climate governance, and through international

organizations such as the C40 Cities Climate Leadership Group, exchanges experience and exemplary practices in climate-resilient urban development with other cities. At the 30th Session of the Conference of the Parties to the *United Nations Framework Convention on Climate Change* (COP30) held in Brazil, Shenzhen's climate resilience practice of "Mountain-Sea Vistas plus Nature-based Solutions (NbS) Communities" was selected as a national exemplary case of climate-resilient urban development, contributing Chinese solutions for megacity climate governance in institutional improvement, technical support and ecological restoration.

4. Innovating Mechanisms for Ecological Product Value Transformation

Establishing a Gross Ecosystem Product (GEP) accounting system. Shenzhen takes the lead in China in developing a city-wide standardized GEP accounting system and establishing a long-term mechanism for dual accounting, dual operation and dual improvement of GDP and GEP. The city conducts regular refined GEP accounting at municipal, district and key ecological zone levels. GEP assessment is embedded into governance processes such as planning formulation, ecological monitoring, performance appraisal, regional environmental impact assessment, project decision-making, and judicial appraisal of ecological damage, forming a full-chain ecological product value management mechanism. It provides measurement support for the realization of ecological product value through pathways such as mangrove blue carbon trading, watershed ecological compensation and ecological asset financing.

Developing a carbon market trading system. As one of China's first carbon trading pilot cities, Shenzhen's carbon market has been in operation for more than 13 years, with a cumulative trading volume of approximately 110 million tons and a total transaction value exceeding RMB 2.5 billion. In 2023, Shenzhen completed China's first auction of mangrove protection carbon sinks. In 2026, in accordance with the work arrangements of the Ministry of Natural Resources and the National Forestry and Grassland Administration, Shenzhen took the lead in establishing the China Blue Carbon Trading Alliance, which, by pooling multiple entities, has advanced the standardized and large-scale development of China's blue carbon market, and builds a full-chain mechanism that channels carbon sink trading revenues back into conservation, covering investigation and monitoring, right confirmation and registration, carbon sink accounting and market trading. Starting from a patch of mangroves, and relying on the China Blue Carbon Trading Alliance, Shenzhen's blue carbon trading practices are expanding from Shenzhen Bay to the Guangdong-Hong Kong-Macao Greater Bay Area, and radiating to the whole country and the world.

Innovating the green financial service system. Shenzhen continues to promote innovation in green financial products and services, guiding capital to flow to clean energy, energy conservation and environmental protection, green technology and low-carbon industries. It has enacted China's first comprehensive local regulation on green finance, the *Shenzhen Special Economic Zone Green Finance Regulations*, taken the lead in carrying out climate investment and financing reform and green foreign debt pilot programs, innovated an integrated service model of "equity, loan, bond, insurance, and foreign exchange," launched a series of credit products such as "Carbon Reduction Loan," and expanded pledge financing channels for environmental rights, ecological product value and green intellectual property, forming a multi-level green financial service system covering credit, bonds and other instruments. By the end of 2025, the balance of green loans in Shenzhen reached RMB 1.46 trillion, and the Shenzhen Stock Exchange had issued 540 green bonds with a total scale of approximately RMB 300 billion.

CHAPTER V. BOUNDLESS INTEGRATION

Integrating the Forces of Nature, Technology and Humanity

A sound eco-environment is the fairest public product and the most inclusive public benefit. Shenzhen upholds the philosophy of ecological development for the benefit, wellbeing and interests of the people. It integrates green principles into the city's physical texture and residents' daily life, builds a beautiful homeland featuring boundless integration of production, living and ecological spaces, and mobilizes the enthusiasm, initiative and creativity of all citizens. This enables residents to appreciate the beauty of nature, life and living in a prosperous modern metropolis.

1. Building a Park City to Foster a Livable Homeland

Further developing the “City of a Thousand Parks.” The number of parks in Shenzhen increased from merely 2 before the founding of the Shenzhen Special Economic Zone to 1,350 by the end of 2025. A three-tier park system consisting of 39 natural country parks, 206 urban parks and 1,105 community parks has been established. The city advances the development of park-like public spaces. With meticulous urban refinement efforts, it carries out urban renewal and co-created community gardens, transforming idle urban marginal lands into shared small and micro community parks. This enables green spaces to be embedded evenly and densely into the densely populated urban living environment. By the end of 2025, the per capita park green space in Shenzhen reached 14.8 square meters, and the service radius coverage rate of parks, green spaces and recreational areas exceeded 91%, basically realizing the vision of “green scenery within sight and parks within walking distance.”

Promoting boundary-breaking and integration between urban areas and parks. Shenzhen vigorously promotes the connectivity of park clusters. In Futian District, Lianhua Hill, Bijia Mountain, Central Park, Meilin Mountain and Yinhu Mountain have been connected through ecological corridors and pedestrian trails, realizing the connectivity of five major parks. In Luohu District, the 63.6-kilometer ecological slow-traffic network links eight parks from Yinhu Mountain to Honghu Park. In the Qianhai Cooperation Zone, Qianhai Stone Park, Guiwan Park and Binhai Cultural Park have also formed an interconnected park network. The city is advancing the high-standard development of key areas such as the Xili Lake International Science and Education City, promoting the connectivity and integration of campuses, industrial parks and communities, and building a “boundless city” where education, science and technology, and industry develop in synergy. It systematically promotes urban practices that transition from spatial barrier-breaking to integrated development, removing walls and road network barriers. By enhancing the publicness of spatial environments, improving transport and mobility, and innovating urban operation mechanisms, the city advances its seamless integration with stations, campuses, parks, ports, and industry, creating high-quality public spaces that offer free access and leisurely experiences.

Panel 14: UpperHills

An Urban Living Room Connecting Two Parks

Located in central Futian District, UpperHills connects Lianhua Hill Park and Bijia Mountain Park, two major urban green lungs. Two elevated landscape corridors organically link the mountain parks, urban blocks and commercial spaces, breaking physical and experiential barriers between mountain greenery, commercial districts and residential communities. Residents can stroll from urban blocks into mountain landscapes and enjoy greenery in commercial districts, extending ecological spaces to urban public life, daily consumption, and leisure and social activities. Today, UpperHills serves not only as a commercial complex, but also as a public urban living room where citizens can get close to nature, linger, socialize and stroll at leisure.



Fig. 14 Lianhua Hill Ecological Corridors at UpperHills, Shenzhen

Creating a comfortable, convenient and livable environment. Shenzhen extends the green ecological philosophy from parks to housing construction and community development, continuously exploring new models of livable urban life suitable for densely populated cities. It promotes the coordinated development of “quality housing, neighborhoods, communities and urban areas,” and innovatively proposes a strategy for affordable housing layout -- locating affordable housing alongside industrial parks, large institutions, rail transit lines while leveraging revitalized resources for housing development. In 2023, the Xinzhou Mangrove Waterfront Greenway, Ganquan Road Near-Zero Carbon Demonstration Community and Qiaoxiang Livable Community were selected for the China Human Settlements Environment Award, showcasing Shenzhen’s systematic exploration from housing security and green community development to low-carbon living scenarios.

2. Synergizing Technological Innovation and Ecological Governance

Gathering innovation factors in green spaces. A sound ecological environment and high-quality urban livability constitute Shenzhen's unique strengths in attracting scientific and technological innovation talents, nurturing innovative enterprises, and hosting research activities. In the planning and construction of major platforms such as Guangming Science City, Xili Lake International Science and Education City, and Hetao Shenzhen-Hong Kong Science and Technology Innovation Cooperation Zone, Shenzhen takes a holistic approach to integrating ecological resources in these areas — including mountains, rivers, lakes, bays, parks and greenways — and deeply embedding them into innovation spaces, so that lucid waters and lush mountains become quality carriers for gathering innovation activities and facilitating the flow of innovation factors. To date, Shenzhen is home to 28,000 national high-tech enterprises and 1,333 “Little Giant” enterprises that use specialized and sophisticated technologies to produce novel and unique products. The city's overall R&D investment intensity reaches 6.67%, and the full-time equivalent of R&D personnel exceeds 474,000 person-years, ranking first among Chinese cities. The Shenzhen-Hong Kong-Guangzhou innovation cluster ranks first worldwide in the Global Innovation Index (GII) 2025 released by World Intellectual Property Organization.

Panel 15: Guangming Science City

Green and Low-Carbon Development Boosts Innovation Growth

Shenzhen launched the planning and construction of Guangming Science City in 2018. Leveraging Guangming District's inherent mountain-water ecological landscape, the city integrates the layout of major scientific facilities and research platforms with ecological resources including forest parks, pastoral landscapes, Science Park, Guangming Lake and Hongqiao Greenway. High-quality ecological spaces are built to attract top-tier talents, making green development a core advantage for gathering research talents and supporting innovative development. Major scientific facilities are nestled among lush landscapes, with research laboratories overlooking natural wilderness. The in-depth integration of ecological and innovation spaces has forged a high-quality development path featuring mutual empowerment and coordinated progress between green low-carbon development and scientific and technological innovation. The science city is accelerating the agglomeration of global high-end innovation factors and advancing toward a world-class high-level scientific hub.



Fig. 15 Hongqiao Park in Guangming Science City

Connecting innovation nodes through green corridors. Shenzhen systematically builds coastal and riverine ecological corridors along Shenzhen Bay, Qianhai Bay, Dasha River and Maozhou River. Continuous waterfront greenways connect industrial and technological innovation clusters along the routes, making ecological corridors key links for integrating urban-wide innovation resources. The 13.7-kilometer Dasha River Ecological Corridor connects core hubs of educational and technological industries, including Xili Lake International Science and Education City, Shenzhen High-Tech Industrial Park and Shenzhen Bay Super Headquarters Base. Along the corridor are clustered prestigious universities and research institutions such as Southern University of Science and Technology, Shenzhen University, Peking University Shenzhen Graduate School, Tsinghua Shenzhen International Graduate School, Harbin Institute of Technology (Shenzhen), and Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, as well as leading tech enterprises including Tencent, DJI and ByteDance.

Panel 16: Dasha River

Clear Waters and Green Shores Nurture a Sci-Tech Innovation Corridor

Stretching 13.7 kilometers with a watershed area of 93 square kilometers, the Dasha River flows through Xili University Town and Nanshan High-Tech Park before emptying into Shenzhen Bay, bearing witness to the development of surrounding areas. In recent years, a series of projects have been progressively implemented on the Dasha River, including stormwater-sewage separation, initial rainwater interception, ecological water replenishment and bank slope greening, tackling water pollution at the source and gradually restoring the river's ecological foundation. The fundamental improvement in water quality has not only revitalized the river and integrated it into residents' daily lives, but also fostered a distinctive pattern of “symbiotic innovation on both banks of the river.” From reserved spaces for ecology to green corridors and further to innovation watersheds, the Dasha River epitomizes the city's evolution from conflicting coexistence to harmonious integration with nature. The restored natural ecology provides high-quality spatial carriers for innovation agglomeration, while ecological improvement further stimulates innovation vitality along the river basin.



Fig. 16 Dasha River Ecological Corridor

Empowering ecological governance through technological innovation. Shenzhen makes full use of cutting-edge technologies, including digital twins, AI perception and HarmonyOS, to empower ecological environment monitoring, ecosystem protection and restoration, and ecological value transformation, driving ecological governance toward full-domain perception, intelligent analysis and proactive prevention. Leveraging HarmonyOS, the city has built a full-basin smart water system for the Dasha River, realizing a full-process intelligent closed-loop management covering water quality traceability, flood drainage scheduling and pollutant discharge supervision. The Shenzhen Bay Mangrove Smart Carbon Sink and Biodiversity Monitoring System adopts LiDAR, AI bird recognition and remote sensing digital twin technologies to achieve round-the-clock monitoring of mangrove ecology, migratory bird habitats and blue carbon reserves. The Longgang smart forestry system builds a district-wide intelligent forest management and control system integrating drone multi-spectral monitoring, AI diagnosis and “one tree, one file” digital archives, enabling dynamic identification and precise response to tree growth, species activities and forest safety hazards.

3. Integrating Ecological and Cultural Contexts to Nourish the Spiritual Home

Panel 17: Park Book Bars Reading with Nature in Parks

Park book bars are miniature public reading facilities embedded in green open spaces such as parks and greenways, integrating book lending, cultural salons and nature education services. They represent Shenzhen’s innovative practice of integrating public cultural services with natural ecological spaces. Launched on a pilot basis in 2019, the park book bar program has developed into a citywide reading service network. By December 2025, 100 park book bars had been completed and put into operation across the city, serving over 5 million visits annually. Today, park book bars serve as multi-functional spaces for reading, landscape appreciation and leisure, allowing citizens to enjoy reading while immersing themselves in nature.



Fig. 17 Zimo Book Bar in Lianhua Hill Park

Embedding public cultural facilities in green open spaces. Shenzhen precisely integrates cultural services including reading, exhibitions, lectures, performances and nature education into citizens' leisure and recreational spaces. It meticulously builds miniature cultural facilities in parks, greenways, beaches and riverfront areas, and innovatively launches lightweight cultural activities such as cultural and creative fairs, music festivals, reading salons and art exhibitions. These efforts transform green spaces into urban public venues that integrate ecological conservation, cultural experience and social interaction functions.

Promoting symbiosis of ecological and cultural contexts. Shenzhen adheres to the coordinated protection of natural ecology and historical and cultural heritage. It systematically advances the protection and utilization of historical relics such as ancient villages, ancestral halls and ancient trees, as well as natural landscapes. It promotes the organic connection of historical and cultural spaces such as Nantou Ancient City, Dapeng Fortress and Yanzao Ancient Village, and urban parks and ecological green spaces. It holds public cultural events such as the Shenzhen-Hong Kong Bi-City Biennale of Urbanism/Architecture, and fosters the deep integration of historical culture, natural ecology and contemporary urban vitality, allowing natural ecology to carry historical memories and urban cultural heritage to nourish green development.

Panel 18: Nantou Ancient City

Inheritance, Protection and Vitalization of a Millennium Ancient City

With a history dating back more than 1,700 years to the Eastern Jin Dynasty, Nantou Ancient City is the cradle of Shenzhen-Hong Kong history and culture and a precious historical and cultural treasure of the city. In recent years, adhering to the concept of organic renewal that balances protection and utilization, Nantou Ancient City has strictly upheld the bottom line of cultural protection, fully preserving the traditional street layout, strengthening the protection and restoration of cultural heritage protection units and historical buildings, including the ancient city wall and Wen Clan Ancestral Hall of the Duke of Xinguo, preserving the ancient city's historical features and cultural heritage to the greatest extent, and introducing public culture, community life and distinctive business formats, revitalizing historical spaces. Meanwhile, the adjacent Zhongshan Park is connected and complementary to the ancient city, with integrated spatial textures, forming a unique urban pattern where the ancient city inherits cultural context and the park embodies ecological values.



Fig. 18 Central Axis Square of the North-South Main Street, Nantou Ancient City

4. Fostering Green Awareness and Promoting Public Participation

Building a nature conservation system of co-construction, co-governance and shared benefits.

Shenzhen actively carries out citywide initiatives to build a beautiful city, encouraging enterprises, schools, communities and social organizations to launch green, clean and zero-carbon demonstration actions. It improves the volunteer service system for ecological and environmental protection, guiding citizens to actively participate in mangrove protection, coral conservation, bird protection, ecological restoration and other volunteer services. This drives the public to evolve from nature experiencers to ecological guardians. At present, Shenzhen has 352 environmental protection organizations and over 520,000 registered environmental volunteers, forming a multi-stakeholder and multi-channel collaborative nature conservation network.

Developing a full-coverage, all-age and all-time science popularization and education system.

Shenzhen continuously improves its nature education service system, develops ecological civilization science popularization materials tailored for different age groups, and incorporates ecological education into the curriculum of nearly 3,000 schools at all levels across the city. Leveraging diverse ecological spaces including forests, wetlands, parks and shorelines, the city builds a multi-level and wide-ranging nature education network, comprising 22 nature schools, 53 nature education centers and 55 environmental education bases. Shenzhen advocates simple, moderate, green, low-carbon, civilized and healthy lifestyles and consumption patterns. Centering on daily scenarios such as green travel, water and electricity conservation, and waste sorting, the city promotes green concepts, guides behavioral changes and implements incentive evaluation mechanisms, making green living a universal social consensus and conscious public action.

CHAPTER VI. A SHARED PATH

Building Global Ecological Civilization Together

Building an ecological civilization is essential to the future of humanity. As the host city of the International Mangrove Center, Shenzhen will fully leverage the Center's role as a platform and bridge to foster a global network for green cooperation, covering experience exchange, technology sharing, and industrial collaboration. Shenzhen will promote deeper and more practical cooperation across the Asia-Pacific region and beyond in areas such as ecological governance and green development, contributing its knowledge and efforts to building a community of life on Earth and creating a better future of global sustainable development.

1. The IMC: A Global Platform for Ecological Governance Cooperation

Fostering a global hub of mangrove governance. The International Mangrove Center serves as a key platform for Shenzhen's active engagement in global wetland conservation, biodiversity governance, and climate action. Leveraging this platform, Shenzhen regularly conducts international policy dialogues, joint research initiatives, and the sharing of think tank outcomes, transforming local practices in mangrove conservation and restoration into replicable and scalable models for global ecological governance. By collaborating with international organizations and research institutions, Shenzhen carries out capacity-building initiatives in key areas, including resource surveys and monitoring, ecological and hydrological restoration, the cultivation of suitable native vegetation, and community-based collaborative management. Through these efforts, Shenzhen continues to provide technical solutions and intellectual support for global mangrove conservation.

Aligning ecological conservation mechanisms with international rules and standards. Shenzhen actively participates in international research on blue carbon standards and in developing standards for mangrove restoration, promoting alignment of conservation and restoration outcomes with mechanisms such as blue carbon accounting, monitoring, reporting, and verification (MRV), green finance, and ecological compensation. These efforts enable conservation initiatives to secure sustained investment and long-term incentives. Shenzhen continues to improve a full-chain institutional framework covering mangrove ecological conservation and restoration planning, project implementation, effectiveness evaluation, and approval procedures for harvesting and transplantation. By establishing a closed-loop and standardized workflow for conservation and restoration, Shenzhen has developed technical guidelines and promoted their application globally.

Jointly building a global community of mangroves conservation. Shenzhen actively participates in international cooperation on coastal wetland conservation, coordinating efforts to promote the scientific conservation, systematic restoration, and sustainable use of mangroves and coastal wetlands. Focusing on the protection of rare migratory waterbirds such as the black-faced spoonbill and black-tailed godwit, Shenzhen has deepened efforts to safeguard global migratory bird flyways. Shenzhen continues to expand the scope of mangrove conservation, extending ecological governance beyond vegetation

restoration to broader dimensions, including coastal resilience enhancement, public ecological benefits, and nature education. Through these efforts, mangroves are becoming a green bond that connects coastal cities worldwide, builds ecological consensus, and benefits communities around the world.

Panel 19: International Mangrove Center

An Ecological Governance Platform from Shenzhen Bay to the World

Mangroves connect land and sea, as well as cities and nature, and serve as vital ecosystems for addressing climate change, coastal risks, and biodiversity loss. In 2022, China proposed establishing the International Mangrove Center in Shenzhen at the 14th Meeting of the Conference of the Contracting Parties to the *Ramsar Convention* on Wetlands (COP14). In November 2024, the International Mangrove Center was officially inaugurated in Shenzhen, with 18 founding member countries signing the establishment agreement. By June 2026, the number of signatory countries had increased to 21, with the cooperation network extending across major mangrove regions covering Asia, Africa, Latin America, and Oceania. The Center focuses on cooperation in mangrove conservation and restoration, blue carbon research, climate adaptation, long-term monitoring, and capacity building. It promotes the connection between Shenzhen Bay's mangrove conservation practices and global needs for mangrove protection, providing an open cooperation platform for coastal cities to safeguard the “forests of the sea.”



Fig. 19 Signing Ceremony of the International Mangrove Center

2. Regional Co-governance for a Green and Beautiful Greater Bay Area

Strengthening Shenzhen-Hong Kong cooperation: jointly protecting an ecological link. Shenzhen and Hong Kong have established cooperation and joint conservation mechanisms to advance collaborative protection of wetlands and migratory birds. In 2023, the two sides signed the *Framework Agreement for the Conservation of Shenzhen Bay (Deep Bay) Wetlands*, designating Futian Mangrove

Wetland in Shenzhen and Mai Po Nature Reserve in Hong Kong as “sister protected areas.” The agreement has promoted a shift in cross-border wetland conservation from separate management to coordinated protection of the bay as a whole. Shenzhen and Hong Kong are also systematically advancing connectivity restoration among key ecological nodes, including Wutong Mountain and Honghualing, to enhance ecological linkages and restore wildlife migration corridors. The two sides are deepening joint prevention and coordinated management of water environments in cross-border rivers such as the Shenzhen River, jointly promoting ecological compensation for drinking water source protection areas and the development of water conservation forests, and implementing estuarine wetland restoration projects. These efforts provide strong support for the regional biodiversity conservation landscape.

Enhancing Greater Bay Area coordination to jointly build a green foundation. The Greater Bay Area is advancing ecological conservation from isolated breakthroughs toward integrated regional coordination. Efforts are being coordinated to promote the development of key ecological function zones and priority areas for biodiversity conservation, while strengthening the protection, restoration, and management of critical ecological nodes, including the Dapeng Peninsula, Nei Lingding Island, and the Wanshan Archipelago. Mechanisms for mutual recognition of ecological and environmental standards, data sharing, and emergency response coordination among Guangdong, Hong Kong, and Macao are being established. The three regions are jointly conducting surveys and assessments of regional ecological conditions and biodiversity inventories, while promoting coordinated cross-border conservation of flagship species such as the Chinese white dolphin and the Chinese horseshoe crab. In response to climate change and marine ecological risks, the Greater Bay Area is jointly developing conservation networks for representative ecosystems, including mangroves and coral reefs, to enhance regional ecosystem resilience and stability. These efforts will lay a solid green foundation for building an internationally leading bay area and a world-class city cluster.

3. Toward Harmony between Humanity and Nature

Taking this APEC Ministerial Meeting on Forestry as an opportunity, we hope to bring together the wisdom and strength of cities and organizations in Asia-Pacific and around the world. By building on the foundation of symbiosis, strengthening development through shared prosperity, and advancing long-term progress through collaborative governance, we will work hand in hand to create a better home for all in which humanity and nature coexist in harmony.

SYMBIOSIS: Making natural resources the foundation for the sustainable development of human civilization. Cities have never been isolated entities above nature; rather, they are organic components embedded within the Earth’s life-support system. As more than half of the global population now lives in cities, and as urban development and economic activities increasingly approach the limits of nature’s carrying capacity, cities must reconsider their relationship with nature. Clean water sources, healthy soils, a stable climate, and rich biodiversity are the fundamental foundations that support sustainable urban development. We should also uphold the principles of “respecting nature, adapting to

nature, and protecting nature” and integrate resource conservation and environmental protection throughout the entire process of urban development, securing an environment with blue skies, green landscapes, and clean waters for future generations.

CO-PROSPERITY: Making green development an effective pathway to long-term prosperity.

Ecological conservation has never been a constraint on growth; rather, it is an effective pathway toward higher-quality development. Amid the new wave of technological revolution and industrial transformation worldwide, green and low-carbon development has shifted from a cost constraint to an opportunity for innovation. Lower resource consumption means higher production efficiency, while a healthier ecological environment fosters stronger innovation vitality. We should more consciously advance green development, circular development, and low-carbon development, accelerate the cultivation of new quality productive forces in the green sector, expand pathways for transforming lucid waters and lush mountains into invaluable assets, and make green development the defining feature of high-quality development.

CO-GOVERNANCE: Making open cooperation a shared choice for addressing future challenges. Ecosystems have never recognized human-defined administrative boundaries. Mangrove root systems are interconnected, migratory birds cross borders freely, and threats such as climate change, biodiversity loss, and ocean pollution transcend national boundaries. No city or country can stand alone in isolation. Only through open cooperation and joint efforts can we maintain the overall ecological balance of the Earth and safeguard our shared home. We should uphold the vision of a community with a shared future for humanity, work together in solidarity, and ensure that policy dialogue and technology sharing transcend borders. Together, we can advance harmonious coexistence between humanity and nature and build a prosperous, clean, and beautiful world.

CONCLUSION

With more than half of humanity now living in cities, cities have become the most striking imprint of civilization on our blue planet.

For more than four decades, Shenzhen has pioneered bold change and remained at the forefront of the times, transforming this vibrant land into an international city full of charm, dynamism, vitality and innovation, with “green” being its defining feature. Here, urban prosperity and nature complement one another: mangroves flourish beside soaring skyscrapers, while myriad forms of life thrive in the heart of the metropolis. Shenzhen’s remarkable achievements in development serve as both a vivid testament to China’s reform and opening-up and modernization drive, and a powerful demonstration of harmonious coexistence between humanity and nature as well as green development. Shenzhen’s experience shows that urban progress and a flourishing natural world can reinforce one another for win-win results.

The pursuit of ecological civilization has no finish line, and Shenzhen’s green story continues to unfold. Looking ahead, Shenzhen stands ready to advance harmony between humanity and nature with cities across the Asia-Pacific and around the world, with mangroves as bridges and the mountain–sea landscape uniting us. Together, we will help lay a stronger foundation for ecological civilization and advance green and low-carbon transition, so that high-quality development and high-standard protection reinforce each other, and ecological well-being will be shared by all.

Let us join hands and move forward together toward a vibrant and beautiful future!

APPENDIX: Sources of Key Data

The White Paper follows the principles of authority, transparency, and verifiability. Its content is primarily based on publicly available planning documents, policy documents, statistical bulletins, thematic white papers, departmental statistical materials, government work reports, and publicly released materials from international cooperation platforms at the national, provincial, and municipal levels.

The data and cases presented in this White Paper, covering areas such as socioeconomic development, territorial spatial patterns, ecological and environmental quality, biodiversity conservation, green and low-carbon transformation, urban public spaces, and the development of the International Mangrove Center, are systematically compiled with reference to relevant sections of Shenzhen Municipal Government Work Reports from 2021 to 2026. These include policies, initiatives, and phased achievements related to ecological civilization development, enhancement of urban functional quality, the Linking Mountains and Sea initiative, Park City development, green and low-carbon transformation, climate adaptation. Unless otherwise specified, statistical data are compiled according to the methodology and definitions used in the original published documents.

Data in Chapter II are primarily sourced from the Coastal Line Survey and Revision Results of Guangdong Province approved by the Guangdong Provincial People's Government in 2022, the *Shenzhen Territorial Spatial Master Plan (2021–2035)*, and relevant materials provided or released by institutions including the Urban Management and Law Enforcement Bureau of Shenzhen Municipality, the Urban Planning and Natural Resources Bureau of Shenzhen Municipality, the Shenzhen Wildlife and Wetland Conservation Administration, the Wutong Mountain Scenic Area Management Office, and the Administration Bureau of Guangdong Neilingding Futian National Nature Reserve.

Data in Chapter III are primarily sourced from the White Paper titled *Biodiversity Conservation in Shenzhen (2026)*, as well as publicly available materials from Shenzhen Government Online, the Ecology and Environment Bureau of Shenzhen Municipality, the Urban Management and Law Enforcement Bureau of Shenzhen Municipality, the Water Authority of Shenzhen Municipality, the Guangdong Pearl River Estuary Chinese White Dolphin National Nature Reserve, the Guangdong Neilingding Futian National Nature Reserve, and other relevant official websites.

Data in Chapter IV are primarily sourced from the *2025 Shenzhen Ecological Environment Status Bulletin*, the *2025 Shenzhen Digital Energy White Paper*, the *Shenzhen White Paper on*

Climate Change Response (2025), together with relevant materials from the Ecology and Environment Bureau of Shenzhen Municipality, the Development and Reform Commission of Shenzhen Municipality, the Housing and Construction Bureau of Shenzhen Municipality, the Planning and Natural Resources Bureau of Shenzhen Municipality, the Emergency Management Bureau of Shenzhen Municipality, and other government departments.

Data in Chapter V are primarily sourced from the World Intellectual Property Organization (WIPO) *Global Innovation Index 2025*, publicly available information released by the Shenzhen Municipal Government, and publicly available materials from the Shenzhen Municipal Ecology and Environment Bureau, the Shenzhen Municipal Development and Reform Commission, and the Urban Management and Law Enforcement Bureau of Shenzhen Municipality.

Data in Chapter VI are primarily sourced from the annual reports, official introduction documents, and relevant publicly available materials of the International Mangrove Center.