



东南大学长三角碳中和战略发展研究院  
YANGTZE RIVER DELTA CARBON NEUTRALITY STRATEGY DEVELOPMENT INSTITUTE



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## “Dual Carbon” Efforts of Suzhou

Report on Carbon Neutrality Progress of  
Chinese Cities



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# Introduction

Since the onset of the Anthropocene epoch, human activities have progressively become the foremost catalyst of global environmental transformations. Today, we find ourselves amidst a climate change crisis. According to the State of the Global Climate report 2022 published by the World Meteorological Organization, the global average temperature now surpasses the period from 1850 to 1900 by approximately 1.15°C, with this warming trend showing no sign of abating. Within the United Nations Sustainable Development Goals, two paramount objectives have been delineated: "Ensuring universal access to affordable, reliable, and sustainable modern energy" and "Taking immediate measures to address climate change and its repercussions". In light of the comprehensive enactment of the Paris Agreement in 2021, nations across the world have introduced cost-effective and scalable climate change mitigation strategies. These measures are designed to safeguard the continuity of progress achieved over recent decades, prevent its stagnation due to the impacts of climate change, and concurrently fortify the economic vitality and resilience of countries. At present, the concept of carbon neutrality stands as a global consensus in the pursuit of sustainable development.

China, as the world's largest developing nation, has consistently and proactively shouldered the responsibility for carbon reduction and emissions reduction. In September 2020, Chinese President Xi Jinping made a solemn commitment to the world during the 75th session of the United Nations General Assembly, pledging that China would strive to peak its carbon dioxide emissions before 2030 and make diligent efforts to achieve carbon neutrality by 2060. In September 2021, the Working Guidance of the Communist Party of China Central Committee and the State Council for Carbon Dioxide Peaking and Carbon Neutrality in Full and Faithful Implementation of the New Development Philosophy was formally issued, signifying the elevation of carbon peaking and carbon neutrality (often referred to as "dual carbon") to the status of a national strategic imperative in China. In 2022, the report to the 20th National Congress of the Communist Party of China emphasized the vision of nurturing a unique Chinese path to modernization that fosters harmonious coexistence between humanity and nature, with a keen emphasis on enhancing the historical initiative in the realm of transformation and reform. Achieving carbon peaking and carbon neutrality represents a profound and extensive systemic transformation taking place across the entire nation of China. It embodies China's active engagement in driving high-quality economic development and advancing the construction of an ecological civilization. This also reflects China's role as a major contributor to the global initiative in building a community with a shared future for mankind.

Suzhou, located on the eastern coast of China, is one of the key central cities in the Yangtze River Delta region. Suzhou is renowned not only as a city with a rich historical and cultural heritage, often referred to as the "Venice of the East" and the "Land of Fish and Rice" in Southern China, but also as a hub for advanced manufacturing and high-tech industries, boasting strong international competitiveness, and often hailed as China's "most powerful prefecture-level city". As a metropolis with a population exceeding ten million, Suzhou has achieved remarkable success in its economic development. In 2022, Suzhou's regional GDP reached CNY2.4 trillion, maintaining its position as the top prefecture-level city in China for several consecutive years. The total output value of industries above designated size in the city also exceeded CNY4 trillion, positioning it at the forefront among Chinese cities. Amidst the backdrop of global efforts to limit warming to 2.0°C or even 1.5°C, Suzhou is actively exploring the transition towards green development, aiming to achieve carbon neutrality. The city has been steadfast in its commitment to reducing carbon emissions during development, implementing carbon peaking during transformation, and achieving carbon neutrality through innovation. Suzhou is thus leading the way in China when it comes to implementing the "dual carbon" goals and forging a path towards sustainable transformation and development. These endeavors hold profound significance for cities with highly-developed industrial economies and limited renewable energy and carbon sequestration resources.

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# About Suzhou

## Exploring Suzhou

Suzhou, founded in 514 BC, is a city with a remarkable history of prosperity spanning 2,500 years, a rarity on a global scale. Situated in the eastern part of China, it borders Shanghai to the east, connects with Zhejiang to the south, embraces the vast Taihu Lake to the west, and leans on the Yangtze River to the north. Suzhou is renowned for its intricate network of waterways, boasting over 20,000 rivers, including the Yangtze River and the Beijing-Hangzhou Grand Canal, earning it prestigious titles like the "Land of Fish and Rice", the "Silk Capital", and "Heaven on Earth". Additionally, Suzhou boasts more than 300 lakes, including the famous Taihu Lake and Yangcheng Lake, leading to its comparison with "Eastern Venice". Suzhou, among China's 691 cities, stands out by contributing nearly 2% of the country's GDP while occupying less than 0.1% of its land area.

**As an economic powerhouse,** Suzhou achieved remarkable growth in 2022, with an annual regional GDP of approximately CNY2.4 trillion, marking a decade-long increase of CNY1 trillion. Furthermore, its per capita GDP exceeded CNY180,000. Under its jurisdiction, counties like Kunshan, Zhangjiagang, Changshu, and Taicang have consistently ranked among China's Top 100 Counties in Comprehensive Strength, with Kunshan maintaining its position at the forefront for 18 consecutive years.

**As a cultural ancient city,** Suzhou has preserved its historical urban layout, which originated during China's Spring and Autumn period (770 BC to 476 BC), characterized by the unique dual-grid pattern of "land and water coexistence" and "rivers and streets adjacency". It is also one of China's first 24 historical and cultural cities. Suzhou is celebrated for its

distinctive charm, characterized by "small bridges, flowing water, white walls, black tiles, and renowned historical sites and gardens". Suzhou is home to seven elements of the Representative List of the Intangible Cultural Heritage of Humanity, including Kunqu opera, guqin music, Dragon Boat Festival customs, and Biluochun tea production techniques. Nine traditional Chinese gardens in Suzhou, such as the Humble Administrator's Garden and the Lingering Garden, have been inscribed in the UNESCO World Heritage List.

**As an industrial hub,** Suzhou boasts a vast industrial scale, with its output value of industries above designated scale exceeding CNY4 trillion in 2022. The city is home to over 160,000 industrial enterprises, covering 35 out of 41 major industrial categories defined by the United Nations, approximately 160 subcategories, and 500 minor industrial categories. Suzhou has established three 1-trillion-yuan industry clusters and several hundred-billion-yuan industry chains in the fields of electronic information, equipment manufacturing, and advanced materials.

**As a front-runner in opening-up,** Suzhou maintains 57 international sister cities and 49 cities for friendly exchanges, welcoming over 100 million domestic and foreign tourists each year. Foreign companies have invested in nearly 20,000 enterprises in Suzhou, with 160 Fortune Global 500 companies participating in over 450 projects. As early as 1994, Suzhou initiated a groundbreaking venture by collaborating with the Singapore government to establish and operate the Suzhou Industrial Park. This landmark partnership set the precedent for mutually beneficial international economic and technological cooperation at the time.

## We have always been in action

**In the past, we have strived to be pioneer of the era.** As a vanguard for high-quality development in China and a leader in modernization, Suzhou has consistently led by example in the country's reform and innovation efforts for decades. Through the transformation from an agricultural civilization to an industrial one, Suzhou successfully pioneered the "Southern Jiangsu Mode"<sup>(1)</sup>, establishing the "Zhangjiagang Spirit"<sup>(2)</sup>, the "Kunshan Road"<sup>(3)</sup>, and the "Industrial Park Experience"<sup>(4)</sup>. These experiences have provided valuable insights and a wealth of knowledge for promoting rural modernization, industrialization, and urbanization in other regions of China. The advent of the ecological civilization era has spurred Suzhou to embark on a new journey towards green transformation. We will continue to play a leading role in "pioneering for China's development", charting a path to high-quality development that is more efficient, equitable, sustainable, and secure.

**Today, we aspire to be practitioners of transformation.** Without innovation, achieving carbon neutrality would be unattainable. To bring about this change, we must rely on emerging technologies, fresh market strategies, innovative models, and a new generation of talents. Through the transformation of our energy structure, industrial layout, spatial organization, urban form, and governance framework, we aim to fundamentally alter the "high-input, high-consumption, high-emission" economic growth model and spatial development pattern. This shift will address the constraints posed by resource and environmental challenges and unlock new drivers for robust economic growth. This transformation also entails a shift in our established modes of production and living. Through this transformation, we will achieve decarbonization while exploring a path of green development driven by innovation.

**In the future, we aim to be pioneers in overcoming challenges.** We will confront challenges head-on, seeking opportunities within crises and nurturing innovation amidst adversity. Suzhou currently faces the following circumstances: a significant total carbon emission, with carbon dioxide emissions reaching approximately 200 million tons in recent years; a skewed energy structure with coal predominating, where fossil fuel consumption exceeds 90%, and coal consumption constitutes nearly 60% of fossil fuel consumption; a pronounced emphasis on heavy industry in the industrial structure, with industrial carbon emissions accounting for over 70% of total emissions; and incomplete urbanization and industrialization processes. While transitioning to a low-carbon paradigm, we must also ensure Suzhou's sustained economic growth and

continually improved living standards for its residents. These unique challenges Suzhou faces lack comparable precedents globally. Thus, we must approach these novel issues with fresh perspectives, develop innovative strategies, and pioneer a path forward. In the absence of precedents<sup>(5)</sup>, we are determined to make a success story uniquely tailored to Suzhou.

At present, to implement the national "1+N" policy framework, we have formulated and issued a series of documents and normative guidelines, including the Low-Carbon Development Plan of Suzhou, the Action Plan of Suzhou for Carbon Dioxide Peaking, and the 14th Five-Year Plan for Energy Development in Suzhou. These measures are aimed at driving the city's efforts towards carbon peaking and carbon neutrality. In our pursuit of constructing a green, low-carbon, and circular economic system, we have undertaken the following actions: (1) Building a green energy system to lead the transformation of energy production and utilization methods; (2) Establishing a green and low-carbon industrial system to accelerate the transformation of green industries; (3) Developing a green technology system to facilitate breakthroughs in green and low-carbon technology; (4) Creating a green consumption system to help individuals adopt eco-friendly, low-carbon, and high-quality lifestyles; (5) Implementing a green investment system to boost investment in green and low-carbon sectors; (6) Instituting a green education system to integrate green development concepts into the national educational framework; and (7) Developing a spatial governance system to achieve a harmonious coexistence between humanity and nature. Overall, through a series of practical initiatives, we are proactively contributing to the realization of China's "Intended Nationally Determined Contributions" (NDCs) towards sustainable development.

Capturing the spirit of the times and riding the wave of the era, Suzhou is moving forward with a sense of urgency. We are actively embracing worldwide opportunities for green development, leading the energy revolution, driving industrial transformation, and breaking through critical technological barriers. Simultaneously, we are increasing green investments, guiding eco-friendly consumption, enhancing governance capabilities, and expediting comprehensive green development. We are fully committed to creating a tangible model of green development for Chinese path to modernization while holding fast to the global wave of green progress.

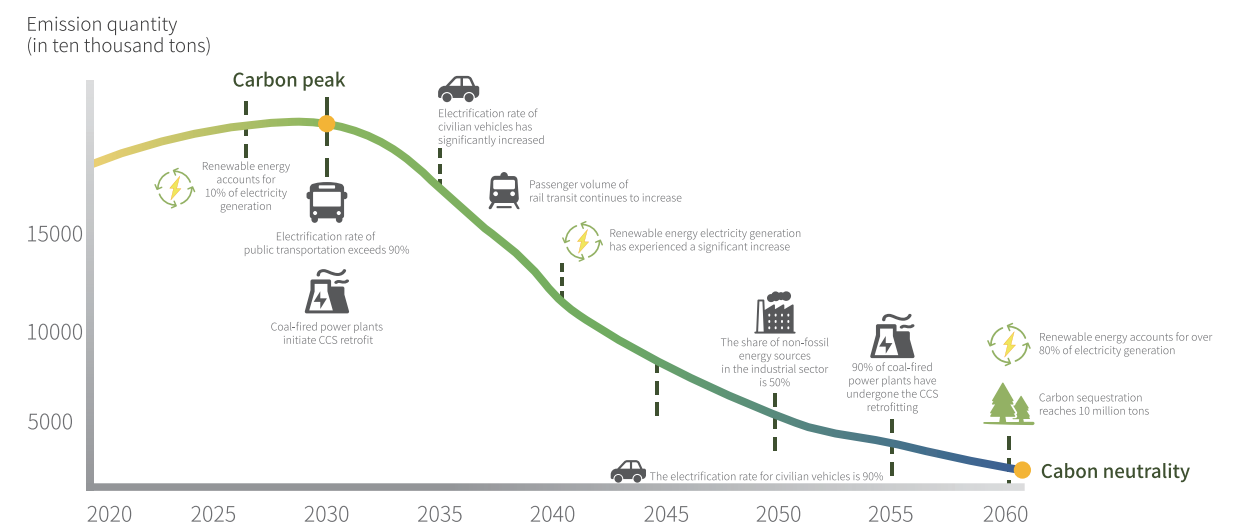


Illustration of Suzhou's Path to Carbon Peaking and Carbon Neutrality





# How does Suzhou promote the green transformation of energy sources?

Constructing a green energy system stands as a pivotal element in the realization of the "dual carbon" objectives. Suzhou, counted among the world's largest industrial cities, confronts a dual challenge characterized by a substantial total energy consumption and a pronounced carbon-intensive energy utilization structure. Fossil fuel utilization constitutes a dominating share, exceeding 90% of Suzhou's energy consumption, thereby asserting itself as the primary source of carbon emissions within the region. As Suzhou's economic and societal development inexorably continues, the city anticipates an enduring upsurge in its energy requisites. However, the region faces the inherent predicament of scarce local non-fossil energy resources and an absence of favorable conditions for the large-scale establishment of centralized photovoltaic facilities, extensive hydroelectric installations, and substantial wind power stations. This intricate scenario engenders substantial challenges for the green energy transformation of Suzhou in the context of its "dual carbon" agenda. Consequently, Suzhou is proactively advancing an energy green transformation strategy that is anchored in green electricity and complemented by a diverse array of clean energy sources, while also integrating the imperative of fossil fuel decarbonization. The overarching objective is to chart an unmistakable trajectory for green energy transformation uniquely tailored to Suzhou's distinctive characteristics.

## Elevating the proportion of imported green electricity from outside the region

Suzhou's pursuit of an increasingly substantial share of imported green electricity raises the question of the sources for such energy. China, home to preeminent renewable energy resources encompassing solar, wind, and hydropower, primarily situates them in the northwestern, northeastern, and southwestern regions. Notably, these regions exhibit an incongruity with the heavily concentrated energy consumption centers along the southeastern coastal areas. In essence, the spatial misalignment between the production of green power and the geographical centers of electricity demand poses a significant challenge. To address this pressing issue, China, leveraging its institutional strengths, has implemented a collaborative and large-scale cross-regional energy initiative. This initiative involves the transmission of electricity generated by non-fossil energy from the resource-rich northwestern, northeastern, and southwestern regions to the economically developed southeastern region. Suzhou, over the past decade, has vigilantly seized this opportunity, consistently advancing the scheduling of cross-provincial electricity and the construction of long-distance transmission lines. Through proactive engagement and cooperation with the source provinces, Suzhou has successfully introduced external green electricity into its energy mix. With the integration of three ultra-high-voltage transmission lines, Suzhou has notably improved the overall cleanliness of its electricity supply. Currently, nearly 50% of Suzhou's total electricity is sourced from external regions, a pivotal development that places the city in a favorable position to enhance the proportion of non-fossil energy sources in its energy portfolio.

### Ultra-High Voltage Green Electricity Transmission Project

The Jinping-Sunan  $\pm 800$  kV UHVDC transmission project was inaugurated in 2012 with the primary objective of conveying hydropower generated downstream of the Yalong River in Sichuan to the Suzhou Tongli Converter Station. Over the course of a decade following the project's completion, it has channeled a cumulative total of 361 billion kilowatt-hours of environmentally friendly electricity into the East China region. This quantity of green energy is equivalent to an approximate reduction of 200 million tons in coal consumption and a noteworthy mitigation of over 300 million tons of carbon dioxide emissions.

The Baihetan-Jiangsu  $\pm 800$  kV UHVDC transmission project, which reached its culmination and commenced operation in July 2022, signifies a pioneering endeavor as the world's inaugural hybrid cascaded UHVDC project. This visionary initiative is geared towards transmitting hydroelectric power harnessed from the Jinsha River in Sichuan to the

## Elevating the proportion of local green electricity production

Elevating the proportion of local green electricity production and bolstering regional power supply security constitutes a central focus in Suzhou's pursuit of carbon neutrality. Capitalizing on our abundant rooftop resources, there lies significant potential for the cultivation of distributed renewable energy sources. With the ongoing advancements in photovoltaic technology, Suzhou is witnessing a gradual surge in the proportion of self-generated local green electricity.

In 2022, Suzhou introduced the Working Opinions on Accelerating the Development and Utilization of Citywide Photovoltaic Power Generation (Trial) to stimulate the development and innovative application of photovoltaics in both industrial and public structures. This strategic framework outlined a primary objective: ensuring an additional 2 gigawatts of newly installed and grid-connected photovoltaic capacity by the conclusion of 2025, accompanied by a lofty ambition of achieving 3 gigawatts. A diverse array of market entities in Suzhou have fervently participated in photovoltaic construction endeavors, and the accelerated deployment of advanced technologies, including photovoltaic building integration, has engendered rapid expansion in our photovoltaic installed capacity. In 2022, Suzhou installed close to 750,000 kilowatts of new PV, a year-on-year growth of more than 120%; the cumulative installed PV capacity is about 2.6 gigawatts (GW). From January to September 2023, more than 1 GW of new PV was installed, a year-on-year growth of more than 110%; the cumulative installed PV capacity is about 3.6 GW.



## The Green Port Constructed by Longteng Special Steel

Building-Integrated Photovoltaics (BIPV) stands as a technology that seamlessly incorporates photovoltaic products into the surface of building structures. In the year 2021, Longteng Special Steel in Changshu, a region within Suzhou, marked a pioneering milestone by applying BIPV technology to the curved roof of their cargo yard. This groundbreaking application effectively met the port's electrical demands, earning it the esteemed distinction of a four-star-rated green port. The project ingeniously marries waterproof brackets and photovoltaic modules, supplanting conventional colored steel sheets as the exterior maintenance structure for the curved roof. It is a BIPV project of international acclaim, boasting the world's largest curved truss structure. The photovoltaic system boasts an impressive installed capacity of approximately 50,000 kilowatts, comprising around 70,000 monocrystalline photovoltaic panels that cover a rooftop expanse exceeding 170,000 square meters. The structure achieves an unprecedented maximum span of 223 meters and soars to a peak height of 58 meters above the ground beneath the canopy roof. This endeavor yields an annual output of roughly 48.5 million kilowatt-hours of clean electricity, concurrently mitigating carbon emissions by an approximate 40,000 tons.



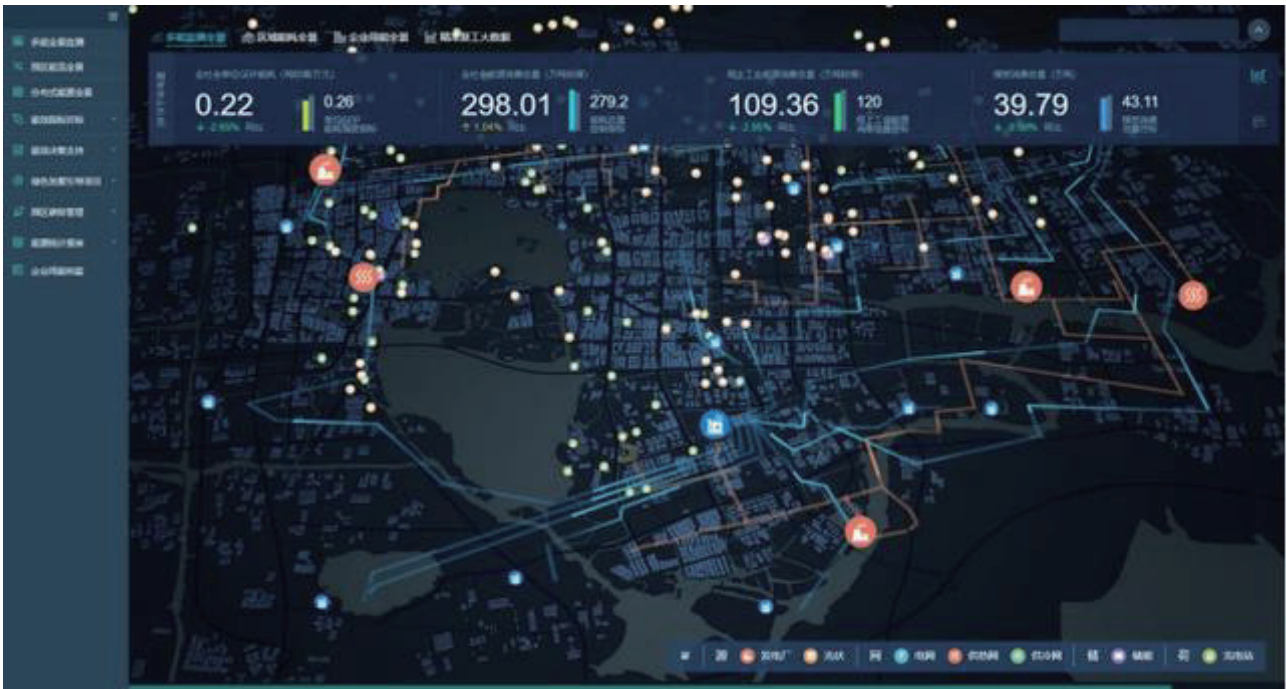
Suzhou Yucheng Converter Station's Exterior View of the Baihetan - Jiangsu  $\pm 800$  kV UHVDC Project



## Increasing the level of intelligent consumption of green electricity

The development of green energy sources has imposed considerable challenges on the coordination and security of Suzhou's local electrical grid. In response, Suzhou has made concerted efforts to advance the digitization of the power grid, aimed at effectively addressing the consumption challenges associated with green electricity. Moreover, Suzhou has expedited the establishment of an integrated energy network with electricity as its focal point, with a primary objective being to enhance the grid's carrying capacity and flexibility. By harnessing pivotal technologies such as distributed microgrids, PEDF (comprehensive application of photovoltaics, energy storage, direct current and flexibility), demand response mechanisms, distributed energy resources, virtual power plants, and intelligent control systems, Suzhou is actively spearheading the profound integration of energy and cutting-edge information technology. This strategic pursuit is geared toward progressively heightening the level of intelligent green electricity consumption.

At present, Suzhou has successfully executed several pivotal energy internet projects, including the City Energy Big Data Center, the Wenchang Smart Energy Station, a cluster of friendly and interactive grid-side energy storage power stations, a multi-optimized coordination control system for the southern grid region, and the Wujiang Active Distribution Network, intentionally designed to accommodate the substantial integration of distributed photovoltaic installations. These initiatives have collectively contributed to a notable enhancement in Suzhou's capability for intelligent green electricity consumption. In the realms of smart grid infrastructure development, the cultivation of an innovative power system, and the augmentation of green energy consumption capacity, Suzhou's local power supply companies have taken a lead role in formulating one international standard, participating in the formulation of two international standards, contributing to the development of three national standards, and playing an active role in the creation of five industry-specific standards.

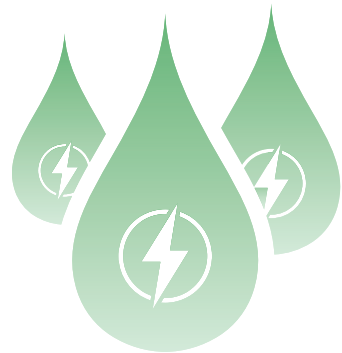


Schematic Diagram of Energy Big Data Center in the Industrial Park

## Empowering the functionality of various clean energy sources as supplementary energy

Hydrogen and biomass are clean energy sources capable of storage and direct transportation, with relatively modest requirements in terms of natural conditions and land space, aligning well with Suzhou's imperative for green energy transformation. As an industrially developed city, Suzhou benefits from a comprehensive natural gas pipeline network, alongside abundant resources in the form of industrial by-product hydrogen and biomass, including municipal solid waste. This advantageous resource landscape positions Suzhou favorably, endowing it with the necessary technical, resource, and market prerequisites for the development and utilization of hydrogen and biomass energy. Suzhou regards hydrogen, biomass, and the already established large-scale use of natural gas as significant complements to its portfolio of clean energy sources. This approach effectively mitigates energy supply pressures and comprehensively propels the city toward a green energy transformation.

Since 2018, Suzhou has proactively advanced its hydrogen energy infrastructure, a commitment articulated in various policy documents including the Suzhou Municipal Guidelines for Hydrogen Energy Industry Development (Trial). This endeavor has catalyzed the harmonious co-development of green electricity and hydrogen energy and initiated the first batch of fuel cell vehicle demonstration projects in China. Presently, Suzhou has commissioned eight hydrogen refueling stations, facilitating the operation of over 300 hydrogen fuel cell vehicles, in addition to inaugurating several hydrogen fuel cell bus routes, thus pioneering decarbonization within the transportation sector.



### Hydrogen Bus and Comprehensive Energy Station in Zhangjiagang

Since 2018, Zhangjiagang has consistently introduced a series of development plans and supportive policies spanning three years. These initiatives have been designed to stimulate the purchase and deployment of hydrogen fuel cell vehicles and the establishment and operation of hydrogen refueling stations. Zhangjiagang Gangcheng Public Traffic Co., Ltd. achieved a significant milestone by pioneering the operational use of hydrogen-powered buses. It stands as the first public transport company in China to successfully introduce and run hydrogen-powered buses. As of 2022, the company boasts a fleet of 60 hydrogen fuel cell buses that have collectively traveled over 5 million kilometers. This accomplishment has resulted in a cumulative reduction of more than 4,000 tons of carbon dioxide emissions, fulfilling the aspiration of local residents for environmentally friendly transportation. In 2022, Suzhou marked a historic moment as Zhangjiagang's Chaoyang district inaugurated the region's first comprehensive energy station for commercial use. This groundbreaking station offers a unified solution that encompasses refueling, hydrogen refueling, charging, and even a convenience store.

Notably, it is equipped with the capability to provide hydrogen refueling at 35MPa and possesses a daily hydrogen refueling capacity of 500 kilograms. Moreover, it caters to domestic standard vehicle models in terms of filling interfaces and pressure requirements. The station adopts a dual-metering mode, allowing simultaneous hydrogen refueling for diverse vehicle categories, ranging from public buses to heavy-duty trucks.



Hydrogen Bus in Zhangjiagang

### Dongwu Gold's New-Style Building Power Distribution System Applying PEDF<sup>(6)</sup> Technology

The PEDF (Photovoltaics, Energy Storage, Direct Current, and Flexibility) project by Dongwu Gold, located within the Suzhou Industrial Park, represents a pioneering zero-carbon renewal demonstration for public buildings in China. In terms of its energy production capacity, the project optimally utilizes rooftop photovoltaic resources in both office and workshop areas, boasting a total installed capacity exceeding 440 kW and an annual power generation output approaching 500,000 kilowatt-hours. This translates to a reduction of over 400 tons of carbon dioxide emissions. In the realm of intelligent energy consumption, the project achieves 100% consumption of new energy through the collaborative optimization of photovoltaics and the heating, ventilation, and air conditioning (HVAC) system. With respect to direct current (DC) power distribution, the project introduces a DC distribution grid and innovatively incorporates a comprehensive DC air conditioning system. This

innovation enables independent control of both the ventilation and cooling systems, incorporating DC magnetic levitation chillers with an outstanding energy saving rate of up to 55%. In the field of flexible control, the project is equipped with approximately 200 kW/2 MWh of virtual energy storage capacity. By actively participating in power system demand response and offering flexible control over air conditioning loads, the project realizes functions such as virtual power plants and load aggregation within the building cluster. Consequently, this enhances the building's flexibility in load adjustment and overall system operational efficiency. The implementation of the direct current distribution system and intelligent building system in this project results in a 6% improvement in energy utilization, a 50% reduction in distribution transformer capacity, and the achievement of 100% renewable energy consumption.



Currently, the disposal of municipal waste is a critical component of Suzhou's efforts to build a "Zero Waste City"<sup>(7)</sup>. In 2022, Suzhou's daily municipal waste disposal needs exceeded 17,000 tons, excluding recyclable materials. These wastes serve as both a source of urban pollution and a significant reservoir of biomass energy resources. By intensifying waste classification management and enhancing the construction of waste disposal facilities, Suzhou has successfully alleviated the pressure associated with waste disposal. This has led to the comprehensive incineration of municipal waste and, as a result, earned Suzhou recognition as an excellent case in the United Nations Human Settlements Programme's "Smart Waste Reduction City" initiative. Presently, Suzhou has completed the construction of eight waste incineration-to-electricity facilities, with a daily disposal capacity approaching 20,000 tons. These facilities collectively generate over 1 billion kilowatt-hours of electricity annually, achieving a 100% rate of harmless treatment for urban and rural municipal waste.



## Qizishan Waste-to-Energy Incineration Plant

Following the transition of Suzhou's waste management strategy from the combination of landfill and incineration to an exclusive incineration approach, a daily influx of approximately 6,600 tons of non-recyclable waste originating from the urban precinct is channelled to the Qizishan Waste-to-Energy Incineration Plant, situated within the Wuzhong District. Originally designed to process 3,550 tons of waste daily, this facility has undergone extensive overhauls, including the dismantling of outdated infrastructure and improvements conforming to elevated standards. Consequently, its waste-processing capacity has surged to 6,850 tons per day, thus robustly accommodating the urban area's exigencies for waste disposal. This metamorphosis culminates in an environmentally benign and proficient conversion of waste into green electricity. After the incineration process, the leachate undergoes treatment and is subsequently repurposed as plant water. The byproducts in the form of ash are repurposed into bricks, effectively contributing to municipal construction endeavors. Additionally, the emissions originating from the combustion process now adhere to the stipulated

standards for "ultra-clean" discharges. Notably, due to an improvement in energy efficiency following these renovations, this power plant is capable of generating approximately 660 kWh of green electricity per ton of incinerated waste. Furthermore, this commendable transformation leads to a substantial reduction in carbon dioxide emissions, amounting to around 500 kilograms for each ton of waste incinerated.



Qizishan Waste-to-Energy Incineration Plant

Natural gas, as a transitional and clean energy source that efficiently replaces coal, plays a pivotal role in the process of decarbonizing fuel. Suzhou adheres to a strategy of combined centralized and distributed natural gas development, proactively advancing projects for distributed energy generation using natural gas. Moreover, the city has been actively promoting initiatives such as "coal-to-gas" projects. In accordance with the principles of scientific planning and prudent management, Suzhou is fostering the development of natural gas power generation projects. Currently, Suzhou has initiated numerous applications for distributed natural gas usage in various settings, including hospitals, hotels, factories, and industrial zones, effectively facilitating low-carbon fuel supply.

## Enabling thermal power generation to progressively transition towards a zero-carbon era

As a critical cornerstone of local power production in Suzhou, the city boasts a thermal power capacity exceeding 22 gigawatts, accounting for approximately 90% of the total installed capacity. While this high-proportion and large-scale thermal power capacity ensures the stability of Suzhou's electricity supply, it has also led to a significant carbon footprint in power generation. Consequently, the decarbonization of thermal power units assumes paramount importance in Suzhou's pursuit of its "dual carbon" objectives.

Suzhou has taken proactive measures to enhance energy efficiency and emissions control in coal-fired power facilities by intensifying monitoring of energy consumption and emissions. To encourage the adoption of alternative fuels, the city promotes initiatives such as co-combustion of sludge and agricultural and forestry biomass in conjunction with power generation. Additionally, Suzhou is actively driving the transformation and modernization of traditional thermal power by diversifying into multi-generation industries, encompassing heating, cooling, renewable energy, and energy storage. Furthermore, Suzhou is pioneering carbon capture projects as part of its concerted efforts to curtail carbon emissions from thermal power units. All these comprehensive measures are progressively steering thermal power towards an era of zero carbon.

## Carbon Emissions Reduction in the Taicang Power Plant of China Huaneng Group

The Taicang Power Plant of China Huaneng Group, established in 1997 and located in Suzhou Industrial Park, is an infrastructure project developed through a collaboration between the governments of China and Singapore. With a history spanning 25 years, this conventional thermal power enterprise is no longer considered "youthful". However, the Taicang Power Plant has made significant strides in its journey towards comprehensive decarbonization through a series of transformational initiatives. In 2014, the Taicang Power Plant completed its transformation into a combined heat and power (CHP) facility, resulting in the efficient utilization of coal and marking the commencement of its low-carbon transformation. Starting in 2016, the plant shifted its focus to renewable energy

generation, subsequently establishing a 50-megawatt distributed photovoltaic facility within its premises. This development injected a fresh wave of "blood" into Suzhou's green electricity supply. In 2018, the Taicang Power Plant embarked on a biomass co-firing project, facilitating the treatment of over 200,000 tons of sludge, thus meeting Suzhou's sludge disposal needs. In 2022, the plant initiated the second phase of its coal-sludge co-firing project, further advancing the fuel decarbonization process within its coal-fired power units.

While we have made significant progress on our path to clean energy, we are acutely aware that, with Suzhou's development, the future demand for energy will continue to rise. This is particularly true given the local scarcity of non-fossil energy resources, which will lead to a substantial share of fossil energy consumption for some time. Despite Suzhou's efforts to promote the greening of its energy mix through mechanisms like importing green electricity from outside the region, increasing the proportion of locally generated green electricity, implementing intelligent consumption of green electricity, and exploring multi-energy complementation, these are merely the initial steps in our journey. The challenges ahead are manifold. Importing a significant amount of green electricity from outside the region presents issues related to grid coordination and necessitates major breakthroughs in power technology. Despite the formidable obstacles, through pragmatic research and planning, Suzhou has set specific targets, such as the share of installed renewable energy capacity and the deep decarbonization of thermal power units. The aim is to expedite Suzhou's energy transition to a greener future through persistent effort.







# How does Suzhou facilitate the advancement of industrial green upgrading?

Suzhou boasts a vast and diversified industrial landscape. As a leading manufacturing hub, the city holds the top position in China for industrial carbon emissions. The decarbonization of the industrial sector plays a pivotal role in Suzhou's drive to achieve its "dual-carbon" goals. Confronting the dual pressures of urban positioning and carbon reduction, Suzhou has embarked on a path of differentiated guidance for industrial decarbonization. Efforts are being vigorously made to promote the low-carbon transformation of high-carbon industries, electrify industrial energy consumption, digitize production processes, and integrate green industries. These measures are aimed at fostering the green upgrading of the industrial sector.

## Enhancing the level of decarbonization in high-carbon industries

Within Suzhou's industrial structure, industries with high carbon footprints, such as steel production, dominate both in terms of scale and share. Promoting the decarbonization of such high-carbon industries constitutes a formidable challenge in Suzhou's journey towards industrial green transformation. Taking the steel industry as an example, Suzhou is pursuing low-carbon initiatives from three perspectives: 1. Widespread Adoption of Ultimate Energy Efficiency: This involves the development of cutting-edge energy-efficient and low-carbon technologies, followed by their application in production facilities once mature. 2. Greening of Energy Structure: This includes transitioning to green energy sources such as hydrogen and biomass for fuel replacement. 3. Revolutionary Changes in Production Processes: Innovations like streamlining production processes are being undertaken, application of short-flow steelmaking processes. Suzhou hosts several steel conglomerates, such as Shagang Group, Yonggang Group, and Longteng Special Steel, each with annual production capacities exceeding millions of tons. Currently, Suzhou is vigorously driving process reforms for short-cycle steel production. Simultaneously, research is focused on developing long-lasting, high-performance, green, and low-carbon steel products, along with the establishment of scrap steel recycling centers. By implementing solar photovoltaic installations to increase the usage of green energy sources, Suzhou aims to enhance the level of decarbonization in high-carbon industries. Additionally, the shift of high-carbon industries towards low-carbon models may result in increased production costs. To address this issue, Suzhou is working on the development of transformational finance to guide financial resources towards low-carbon transition projects in high-carbon industries. This is achieved by leveraging financial products such as green credit, green bonds, green insurance, and other financial instruments to mobilize funds in support of the transition of high-carbon industries towards low-carbon development.

## Green and Low-Carbon Development

Shagang Group, located in Zhangjiagang, Suzhou, carries out the strategy of "building a green steel city and creating a hundred years of Shagang". In order to realize the goal of "double carbon", Shagang has invested more than 20 billion yuan in scientific research and 10 billion yuan in ultra-low emission renovation, and has made many successful explorations of the ultimate energy efficiency, resource recovery and recycling, short process reform, low-carbon and green power generation and electricity consumption. In recent years, Shagang has invested more than 20 billion yuan in scientific research and 10 billion yuan in ultra-low emission reforms, and has made many successful explorations in extreme energy efficiency, resource recovery and recycling, short-flow process reforms, and low-carbon and green power generation and consumption.

In promoting the ultimate energy efficiency project, Shagang takes resource recovery and recycling as the basic principle, and the utilization rate of coal gas recovery is as high as 99.5%, and over 50% of the company's electricity consumption is supplied by coal gas power generation. Coking by-products such as coal tar and crude benzene can achieve carbon emission reduction of over 600,000 tons through recycling. With the goal of creating a "waste-free group", Shagang's steel slag and wastewater recycling rate is close to 100%, which can reduce carbon dioxide emissions by about 4.5 million tons per year.

Shagang Group, as China's largest producer of electric furnace steel and special steel, with an annual steel output of 8 million tons, has also established a scrap steel consumption system, focusing on building an "urban mine" industry, combining short-flow produc-

tion processes to consume more than 5 million tons of scrap steel annually. As early as 2019, Shagang completed Asia's first and the world's fourth thin strip casting and rolling production line, combined with independent innovation to optimize the iron and steel production process technology, compared with the traditional hot rolling, the technology can reduce fuel consumption by 95%, water consumption by 80%, electricity consumption by 90%, carbon dioxide emission reduction of up to 85%.

In order to increase the amount of self-generated low-carbon green power generation, Shagang has developed a 180 MW CCGT high-efficiency comprehensive utilization of resources generator set project, using gas steam to increase annual power generation capacity of more than 500 million kWh, reducing 250,000 tons of carbon dioxide emissions. At the same time, Shagang has built a 54 MW distributed photovoltaic power station for self-generation and self-consumption, which can realize continuous power generation for 25 years, and provide more than 1.2 billion kilowatt-hours of green power during the whole life cycle, reducing carbon dioxide emissions by more than 850,000 tons, and the 20 MW third-phase photovoltaic power generation project is still under construction. Shagang Group has taken the lead in the national "high-end wire rod whole process intelligent manufacturing new mode application project", which can improve the production efficiency by more than 30% and reduce the energy consumption per unit of output value by about 20%, providing strong technical support for the iron and steel industry to save energy and reduce emissions, improve quality and increase efficiency.

## Elevating the electrification ratio of industrial energy utilization

In the industrial sector, numerous industries rely on electrification to achieve low-carbon or even zero-carbon objectives. Suzhou has introduced the 14th Five-Year Plan for Energy Development in Suzhou, which incentivizes eligible coal-fired enterprises to undergo transformation and upgrade. This involves the integrated development of "power generation+" businesses encompassing heating, cooling, renewable energy, and energy storage. Additionally, Suzhou is proactively promoting advanced technologies such as high-temperature steam heat pumps and heat storage boilers. These innovations replace traditional electrical equipment, enhancing their grid-interaction capabilities. The result is an industrious energy utilization framework that efficiently combines multiple energy sources, encompassing electricity, heat, cooling, and gas. This approach facilitates the substitution of clean energy for traditional sources, effectively advancing industrial decarbonization. Furthermore, Suzhou has comprehensively undertaken "coal-to-electricity" initiatives and other electricity substitution projects. These efforts expand the scope and depth of electricity substitution, leading to the gradual closure of many self-contained coal-fired power plants. Suzhou has also been pivotal in promoting the "coal-to-electricity" transformation of coal-fired kilns and boilers across the entire city. Currently, Gusu District, Suzhou Industrial Park has essentially achieved the goal of becoming "coal-free" within its terminal energy.



## Enhancing the digitalization level of the production processes

Suzhou is advancing the profound integration of digital technologies with its industries through the "Intelligent Reformation & Digital Transformation" initiative<sup>⑧</sup>. This undertaking serves to empower industrial efficiency enhancements, pollution reduction, and carbon emissions abatement across the entire value chain of industries, spanning from the source and production processes to overall operational processes. Up to the present, Suzhou has executed over 20,000 projects under the "Intelligent Reformation & Digital Transformation" framework, with intelligent upgrades and digital transformations encompassing more than 90% of industrial enterprises above the designated size. Notably, Suzhou boasts 14 nationally recognized industrial internet "dual-crossing" platforms and hosts 4 national-level intelligent manufacturing demonstration factories.

### "Intelligent Reformation & Digital Transformation" of Textile Industry in Shengze Town

Shengze Town, situated in Suzhou's Wujiang District, is widely recognized as the "First Town of Chinese Silk" and ranks among the most densely concentrated regions globally for the textile industry. The town is responsible for a substantial portion (1/4) of China's fabric production, with synthetic fabric output constituting a substantial 70% of China's total. Shengze Town is additionally distinguished by its possession of 18 national-level textile development bases. In response to the sweeping wave of global digitalization, Shengze Town has undertaken a green transformation drive through the "Intelligent Reformation & Digital Transformation", accomplishing an impressive tally of over 600 transformation initiatives. A standout exemplar of this drive toward green transformation within Shengze Town is Shenghong Group. As an enterprise with a complete industrial chain in the textile sector, Shenghong Group is ardently aligned with the national "Internet+

Advanced Manufacturing" development strategy. The group has pioneered the establishment of the "Rainbow Cloud" smart management platform, ushering in digitalization within production management and intelligent production scheduling. The consequential outcomes of this innovation have been remarkable, including the attainment of a 100% product tracking rate, an impressive 8% expansion in production capacity, a substantial 15% reduction in labor utilization, and a notable decrease of 15% in energy and resource consumption. The "Rainbow Cloud" smart management platform has not only catalyzed synchronized development across the group's entire value chain but has also fostered a collaborative environment for the exploitation of technology, products, and resources, ultimately resulting in the maximization of enterprise efficiency.

## Elevating the degree of integration for green industries

In response to climate change, adaptive transformations in traditional production methods, lifestyles, and economic growth models have become imperative. Green emerging industries have emerged as a response to this challenge. In March of this year, Suzhou unveiled the Suzhou New Energy Industry Innovation Cluster Action Plan (2023-2025), which outlines the establishment of a "5+1" innovative cluster convergence system in new energy industries. These industries include photovoltaics, wind power, smart grids, power batteries and energy storage, hydrogen energy, and smart energy. Suzhou is in the process of creating nine major new energy industrial parks in regions such as Zhangjiagang, Changshu, Taicang, and Kunshan. As part of its commitment to green industry development, Xiangcheng District has implemented policies such as the "14th Five-Year Plan" for energy internet development.

The carbon-neutral service sector is an indispensable component of the green emerging industries. The Suzhou municipal government is actively engaged in planning and promoting the development of modern service industries focused on carbon neutrality. These services provide specialized support for businesses undergoing low-carbon transformations. They encompass consultation, planning, technology integration, financial solutions, legal guidance, regulatory compliance, and comprehensive integrated services. Furthermore, the municipal government is delivering inclusive services, including education, training, and consumer support regarding low-carbon development for the broader community to enhance society's ability to respond to climate change. This approach allows society as a whole to partake in the benefits of green development.

The development of green industries necessitates comprehensive integration, such as the fusion of digital and zero-carbon technologies, the convergence of manufacturing and service sectors, the alignment of production and consumption, the harmonization of domestic and international markets, and the amalgamation of technological and institutional innovations. Currently, Suzhou is spearheading the integrated development of advanced manufacturing and modern service industries. The city has initiated national-level "industry-convergence" pilot programs. Presently, Suzhou boasts 64 enterprises participating in provincial and higher-level "industry-convergence" pilot projects and nine leading benchmark enterprises in the province's first batch of "industry-convergence" development. Suzhou has successfully secured a position in China's inaugural list of national-level service-oriented manufacturing demonstration cities.

### Nurturing Green Factories and "Near-Zero Carbon" Factories

To propel the low-carbon development of Suzhou's industrial enterprises, the city has made persistent strides in nurturing green factories and "near-zero carbon" factories. In 2022, Suzhou introduced the "Near-Zero Carbon Factory Evaluation Indicator System (Trial)" for the cultivation of "near-zero carbon" factories and the advancement of green manufacturing practices. In 2023, Suzhou unveiled the Suzhou Green Factory Creation Implementa-

tion Plan (Trial), which delineates the evaluation system for green factories within the city. This initiative aims to stimulate the establishment of a green manufacturing system and the development of green exemplary models in key industries and distinctive sectors. Ultimately, it seeks to enhance the gradient incubation system for green factories at the county, municipal, provincial, and national levels.

Suzhou, as a robust manufacturing hub, has been consistently exploring methods to promote the decarbonization of high-carbon industries, facilitate the transition of industrial energy utilization towards electrification and green practices, enhance the digitalization level of production processes, and encourage the amalgamation of green industries. Despite the progress achieved thus far, achieving an all-encompassing green transformation of industries across the city presents several challenges. Particularly, when enterprises grapple with the dilemma of harmonizing industrial development with low-carbon transformations, it is imperative to provide them with ample time and flexibility for adjustment and correction, with a focus on supporting technological advancements and equipment upgrades. Addressing the issue of increased costs stemming from enterprise research and development and technological improvements necessitates better encouragement of financial institutions to offer a broader array of financial products and service enterprise financing needs, along with providing them with certain tax incentives and fiscal support. Suzhou aspires to achieve the following goals through unwavering efforts: (1) Reduce coal consumption in the industrial sector to around 45% of the 2020 consumption level by 2030, decreasing to less than 15% of the 2020 level by 2060; (2) By 2050, increase the proportion of non-fossil energy sources in the industrial sector to over 50%.







# How does Suzhou develop low-carbon industrial parks?

Industrial parks are a hallmark and crucial practice of Suzhou's reform and opening-up endeavors. Suzhou hosts nearly 30 industrial parks that contribute to over 70% of the local industrial added value. These parks primarily focus on manufacturing, fostering the gathering and development of industrial enterprises while promoting supply chain integration. Consequently, these industrial parks represent the primary source of carbon emissions in Suzhou. Since the beginning of the new century, Suzhou has consistently worked towards enhancing the cleanness of energy structures, the efficiency of energy facilities, the circularity of industrial chains, and the specialization of low-carbon services in these parks, aiming to progress vigorously towards the establishment of zero-carbon industrial zones.

## Making the energy structure cleaner

Cleaner energy structure is crucial for the transition to zero-carbon in the industrial parks. By implementing phased measures such as "coal-to-gas"<sup>(9)</sup>, "electricity replacing oil", and increasing the proportion of self-generated "green electricity" within the parks, Suzhou is making a concerted effort to clean up the terminal energy usage in both industrial production and daily life. Regarding "coal-to-gas", Suzhou has undertaken multiple natural gas cogeneration projects within the industrial parks, using the 2004 "West-East Gas Transmission"<sup>(10)</sup> project to replace outdated coal-fired units. In terms of "electricity replacing oil", Suzhou has accelerated the development of supporting infrastructure for shore power in logistics parks, ensuring the application of electric ships. By 2021, Suzhou had completed nearly 800 sets of shore power facilities. To enhance the proportion of self-generated "green electricity", Suzhou has surveyed and assessed photovoltaic resources within the parks, promoting the construction of distributed photovoltaic, wind power, and energy storage facilities according to the principle of "building as much as possible if conditions allow", thereby increasing the proportion of local clean energy.

## Substitution of Clean Energy in Industrial Parks

In 1994, the Suzhou Industrial Park (SIP) was established with the approval of the State Council, representing a significant cooperative project between the governments of China and Singapore. The park has developed a comprehensive "Photovoltaic-Energy Storage-Electric Vehicle Charging- Distributed Natural Gas" regional energy internet. This achievement has resulted in enhanced energy efficiency, multi-energy synergy, cleaner energy utilization, and efficient energy management. The SIP has constructed two natural gas cogeneration centers (North Plant and Blue Sky Gas), three regional energy centers (Jinji Lake, Sino-Singapore International Research Institute, and Shangmei Distributed Energy Station), ten distributed energy facilities (comprising distributed photovoltaics, natural gas, energy storage, geothermal heating, small-scale wind power, etc.), and an energy internet platform (Open Energy Internet Shared Service Platform). Furthermore, the SIP manages 1,000 electric vehicles as per demand, with approximately 1,000 smart users. By intelligently controlling, analyzing, and optimizing the operation of various energy supply sources, energy storage, and user-side consumption, the SIP effectively and securely ensures the provision of clean energy to its users. Currently, the SIP boasts over 150 energy internet projects, including photovoltaics, energy storage, distributed gas turbines, and smart platforms. It has a cumulative grid-connected and filed distributed photovoltaic capacity exceeding 170 MW, resulting in an annual reduction of nearly 100,000 tons of carbon emissions. Additionally, the park has registered approxi



Rooftop PV in the Suzhou Industrial Park

mately 1,500 charging stations (plugs) and established six energy storage projects, driving the energy utilization efficiency in the park to exceed 60%, with the proportion of clean energy utilization exceeding 80%.

In terms of policy incentives, the SIP has been at the forefront of Suzhou's initiatives by introducing financial support for distributed photovoltaic (PV) projects within the city. The SIP provides subsidies based on project electricity generation for eligible building owners at a rate of CNY0.1 per kilowatt-hour. Moreover, for energy storage projects, the project investors are offered a subsidy of CNY0.3 per kilowatt-hour of discharged electricity. Additionally, distributed PV and energy storage projects are eligible for financial support in the form of loans.



Since 2010, the Suzhou Taicang Nike China Zero Carbon Smart Logistics Park has embarked on the construction of a distributed energy network, promoting the comprehensive utilization of wind, solar, thermal, and biomass energy sources. As of now, the logistics park has successively established a 3.6-megawatt distributed photovoltaic system, a ground-source heat pump system with a depth of 90 meters, a biogas power generation system that recycles 100% of kitchen waste, and two low-wind-speed turbines with an individual capacity of 3 megawatts. The park operates under a "self-generation for self-use, surplus electricity for grid connection" model, where 70% of the generated electricity is utilized for daily production. The self-generated green electricity constitutes 100% of the electricity consumption, making it the first "wind-solar integration" zero-carbon smart logistics park in China.

Suzhou Taicang Nike China Zero Carbon Smart Logistics Park



## Enhancing the efficiency of infrastructure

In Suzhou, industrial parks boast diverse industrial formats and a variety of energy needs. Centralized management of public infrastructure, including energy (electricity, heating, cooling), water supply, and waste disposal, within the industrial parks promotes the shared integration and efficient utilization of multiple energy sources and resources. To advance the tiered utilization of energy, the industrial parks have adopted a public-private partnership (PPP) model to develop diversified energy supply infrastructure, encompassing electricity, gas, cooling, and heating. This includes projects involving combined heat and power (CHP) and combined cooling, heating and power (CCHP) with gas supply. Leveraging waste heat and excess pressure resources from certain enterprises, the industrial parks have also established centralized cooling and heating supply systems. In the realm of comprehensive waste resource utilization, the industrial parks have constructed centralized infrastructure for the treatment and disposal of kitchen waste, waste-to-energy incineration, comprehensive construction waste management, and sludge treatment. These facilities enable on-site treatment, disposal, and resource recovery for sewage, waste, solid waste, and other waste materials.

### Regional Energy Station in the Industrial Park

The Moon Bay Energy Center is a large-scale "non-electric urban central air conditioning" facility in the Suzhou Industrial Park, specifically within the Dushu Lake Science and Education Innovation District. This energy center occupies an area of 10,000 square meters and has been in operation for over a decade, providing stable heat, cooling, and electrical energy to the surrounding 1.2 million square meters of buildings. The center's heating network covers an area of 11 square kilometers within the Science and Education Innovation District, while the cooling network serves Moon Bay and its adjacent areas. Its diverse customer base includes industrial enterprises, office, data centers, hotels, commercial establishments, and more. By recovering waste heat steam from power plants, the center has achieved tiered energy utilization. The center employs a dual backup system using steam and natural gas, along with intelligent group control and an EMC energy management system. As a result, the center has reduced air conditioning installed capacity by over 20%, achieved an energy comprehensive utilization rate of over 70%, and annually saved 16,500 kilowatt-hours of electricity and CNY4 million in operational and maintenance costs. The accumulated carbon reduction exceeds 80,000 tons.



Moon Bay Energy Center

## Making the industrial chain's circular development more efficient

In Suzhou's industrial parks, high industrial concentration, strong interconnectivity, and diverse waste generation make them the most conducive platforms for achieving circular development in industrial chains. These parks in Suzhou are dedicated to building circular networks based on their existing industrial chains. This strategic approach aims to strengthen the linkages between upstream and downstream products of enterprises, facilitate comprehensive energy utilization, and enable resource-based waste management. Currently, Suzhou has established numerous specialized industrial parks across ten city districts and counties. These include electronic information, equipment manufacturing, new materials, biopharmaceuticals, renewable energy, modern logistics, digital cultural creativity, and digital finance, all of which hold significant positions within China's industrial landscape.

### Circular Economy Industrial Park

The Wujiang Textile Circular Economy Industrial Park is situated in the southwestern part of Shengze Town, Wujiang District, covering an area of approximately 6 square kilometers. This industrial park is a specialized textile circular economy demonstration area constructed with the standards of "orderly industrial concentration, intensive land use, advanced equipment and technology, shared infrastructure, and resource recycling". After more than 30 scattered dyeing and printing enterprises in Wujiang District moved into the industrial park, they have been collectively planned and managed. This transformation allowed for centralized water supply, centralized water recycling, centralized heating, and centralized pollution control. Additionally, the park provides municipal services to the dyeing and printing companies in a unified manner, and organizes the corresponding employee living service areas, enabling shared public service infrastructure. The industrial added value of enterprises entering the park has increased by an average of over 15% annually, with a water recycling rate of approximately 40%. It has also led to a 30% reduction in land use and a 10% decrease in energy consumption per CNY10,000 of industrial added value.

The Yangtze River Metallurgical Industrial Park is located in Zhangjiagang City and is one of the first national industrial park circular

economy pilot projects. It covers a planned and controlled area of 36.8 square kilometers. The core industries in this park primarily revolve around steel and metallurgy, featuring core smelting enterprises like Shagang Group. Shagang Group has constructed the world's largest rotary hearth furnace for the recycling of iron and zinc-containing dust, effectively recovering valuable metals like iron and zinc from metallurgical solid waste. This process leads to an annual reduction of 100,000 tons of carbon dioxide emissions. Shagang Group has also established a project with a yearly capacity of 3.3 million tons for the comprehensive utilization of steel slag, realizing a 100% comprehensive utilization of steel slag, with its products replacing some cement. As the largest electric furnace steel production base in China, Shagang Group has set up a specialized sorting center for scrap steel, a regional distribution trading market, and a comprehensive utilization processing base to manage and consume the social scrap steel resources. In terms of waste heat recovery and utilization, Shagang Group has constructed a 40-kilometer-long external steam pipeline to provide centralized heating to over 60 surrounding enterprises, supplying more than 600,000 tons of steam annually. This initiative has resulted in the reduction of coal consumption by 70,000 tons.vv

## Enhancing professional low-carbon services

In China, the establishment of industrial parks by the government was originally aimed at providing enterprises with standardized, legal, and international professional services. Suzhou's industrial parks have consistently been at the forefront in offering specialized services in China, with the SIP serving as a benchmark. To address climate change, a series of international regulations related to carbon trading, carbon accounting, carbon inclusion, carbon footprints, carbon labeling, and carbon inventory have emerged. In response, SIP has taken the lead in initiating training, certification, inclusion, accounting, and trading projects, thereby providing enterprises with solutions for carbon reduction and achieving carbon neutrality.

In recent years, Suzhou has established several professional service organizations, including the Yangtze River Delta Carbon Neutrality Strategic Development (Suzhou) Research Institute, the Yangtze River Delta International Green Development Alliance, and the Suzhou Yangtze River Delta Digital Low-Carbon Innovation Research Center. Suzhou has also formed partnerships with international institutions such as the Energy Foundation, the U.S.-China Green Fund, and Singapore's MVGX Group. These collaborations aim to provide integrated specialized low-carbon services, including industrial low-carbon development planning, technological innovation, consultation, and talent training, offering intellectual support for the development of zero-carbon parks. Additionally, Suzhou has established the "Green Low-Carbon Transformation Financial Service Center" and the "Green Low-Carbon Financial Lab" to provide businesses with green financial services in various areas, such as industrial green low-carbon transformation, green product innovation, and talent development.

### Establishing Carbon Inclusion Platform

The Carbon Inclusion Platform is China's first market-based carbon inclusion trading system, officially launched in the SIP in 2022. This platform focuses on providing conversion services to enterprises and centers around distributed photovoltaics. It allows micro-, small- and medium-sized enterprises within the park to conveniently access carbon emissions

reduction certification and trading services without leaving the vicinity. Furthermore, the platform has established a regional-level market-based voluntary emissions reduction trading system around the certification, trading, and utilization of carbon emissions reduction, creating a SIP Carbon Inclusion System.

Through a series of measures, including adjusting the energy structure, enhancing infrastructure efficiency, strengthening the circular development of industrial chains, and improving professional low-carbon services, Suzhou has made significant progress in promoting low-carbon park construction. In the future, Suzhou will need to develop differentiated low-carbon or zero-carbon park construction plans and action plans for different types of parks, promoting green development on a large scale across the city's park areas. We firmly believe that in the future, all of Suzhou's parks will become low-carbon parks, with some even evolving into zero-carbon industrial parks.





# How does Suzhou achieve carbon reduction in the fields of construction and transportation?

Construction and transportation represent two sectors with high carbon emissions in urban settings, making them pivotal components in Suzhou's pursuit of carbon neutrality. Currently, Suzhou is concentrating its efforts on creating zero-carbon buildings across their entire lifecycle, as well as developing low-carbon transportation systems through initiatives like green transport networks and sustainable commuting. These strategies comprehensively drive energy conservation and carbon reduction within these two critical domains.

## Creating net-zero carbon buildings

Based on the 2021 report published by the Jiangsu Provincial Bureau of Statistics on carbon emissions throughout the lifecycle of buildings – encompassing the phases of construction, operation, and deconstruction, Suzhou's carbon emissions reached 14 million tons, positioning it as the top city in Jiangsu Province in terms of carbon emissions. This signifies that Suzhou faces an exceptionally challenging task in advancing zero-carbon construction. At present, Suzhou is concentrating on the entire lifecycle of buildings, initiating explorations in carbon reduction during the construction phase, promoting low-carbon energy usage in buildings, emphasizing the recycling of construction waste, and promoting operational energy efficiency in buildings. These efforts aim to propel the synergy of carbon reduction and capacity expansion, ultimately leading to the realization of zero-carbon development in the construction sector.

## Zero-Carbon 5A Office Building

Located on the shores of Jinji Lake in Suzhou, GCL Plaza is a high-end boutique commercial complex created by Golden Concord Holdings Limited in the Hudong CBD of Suzhou. The Plaza has a total floor area of 254,000 square meters, with an office building area of 57,000 square meters. In 2022, the Plaza consumed approximately 3,730,000 kWh of electricity and about 1,800 tons of steam. Through the comprehensive application of new energy-saving technologies and the procurement of green electricity, GCL Plaza managed to offset 2,674 tons of carbon emissions generated by the building during the 2022 monitoring period, making it a true

zero-carbon building. During this period, GCL Comprehensive Energy Company utilized a professional and efficient digital energy management platform to explore the potential for energy-saving improvements in office buildings. They used a big data system to monitor the energy consumption data of various devices in real-time, compared it with historical data, and intelligently optimized and adjusted the energy consumption to achieve the optimal model. Simultaneously, the Company implemented an optimized operating control strategy for the Plaza's chiller units based on constant temperature difference and variable flow, and upgraded the energy-saving variable frequency technology for the cooling water pumps. Through these measures, the auxiliary cooling system saved approximately 30% of electricity consumption.

**Reducing carbon emissions in the construction process.** The construction process of a building involves the use of materials and the actual construction work, and its carbon emissions account for approximately 20-30% of the total carbon emissions across the three stages of building construction. International experience has shown that prefabricated buildings, while ensuring indoor comfort, can significantly reduce the building's heat load and lower carbon emissions by more than 40% throughout the building's lifecycle. In recent years, Suzhou has vigorously promoted prefabricated and green buildings to reduce carbon emissions during the construction process. Currently, prefabricated buildings account for over 45% of the newly started construction area in Suzhou, and the total area of green buildings has exceeded 100 million square meters.

## Large Prefabricated Buildings

Prefabricated buildings primarily include three types: concrete structure, steel structure, and wood structure, all of which can reduce carbon emissions by more than 40% throughout their lifecycle. The 'Second Workers' Cultural Palace in Xiangcheng District, Suzhou, is a large-scale public steel structure prefabricated building. This cultural palace has a total building area of 81,000 square meters, featuring five major functional zones encompassing sports and fitness, cultural and artistic activities, education and training, services for workers, and commercial amenities. Rather than replacing traditional concrete structures with steel structures directly, this building prioritizes architectural function, structural layout, industrialized enclosure, and interior components. This approach enhances the functionality of steel structures while preserving architectural aesthetics, infusing the building with green and low-carbon principles.

Exterior View of the Second Workers' Cultural Palace



**Promoting low-carbon energy usage in buildings.** Energy consumption in buildings accounts for 45-60% of the total carbon emissions across the three stages of a building's lifecycle. Since 2000, Suzhou has consistently prioritized building energy efficiency as a focal point in the development of the green construction sector. The city has promulgated relevant regulations and policy documents, strongly advocating for buildings with ultra-low energy consumption and passive design. In 2008, Suzhou introduced the Regulations on Energy Conservation in Civil Buildings in Suzhou, and in 2010, it established the "Suzhou Building Energy Conservation Incentive Fund". These pioneering initiatives set a precedent among all Chinese cities.

**Promoting operational energy efficiency in buildings.** This is a crucial factor in achieving zero carbon in the construction industry and a significant source of self-generated green electricity. Suzhou recognizes the importance of combining rich application scenarios with innovation, leading to forward-thinking policy documents aimed at the incremental market of photovoltaics (PV) in the construction sector. To promote the widespread application of Building-Integrated Photovoltaics (BIPV) in the construction sector, the above-mentioned policy requires that new public buildings with an area of more than 20,000 square meters prioritize the use of BIPV technology. Industrial enterprises with an annual comprehensive energy consumption of over 3,000 tons of standard coal equivalent or an annual electricity consumption of over 10 million kilowatt-hours must install rooftop PV power generation facilities. For new industrial buildings with rooftop areas exceeding 3,000 square meters, PV power generation facilities must be simultaneously designed and constructed. It is projected that by 2025, Suzhou's cumulative installed and grid-connected PV capacity will reach 4,500 MW.

### Renovation of Tonglihu Jiayuan Residential Community

Tonglihu Jiayuan Residential Community, a residential redevelopment project in Suzhou, is a prime example of passive low-energy building construction. It represents the first existing building renovation project in China to receive comprehensive quality control, jointly provided by the Technology and Industrialization Development Center of the Ministry of Housing and Urban-Rural Development of China and the German Energy Agency (dena). During the renovation process, performance-based design methods were employed to optimize the building envelope's insulation, heat insulation, and shading capabilities. An efficient total heat recovery fresh air system was installed. This transformation significantly reduced the energy demands for heating and cooling, achieving terminal energy needs of 39.7 kWh/m<sup>2</sup>·a and total primary energy needs of 119 kWh/m<sup>2</sup>·a. Furthermore, renewable and recyclable materials were utilized at a rate of 8.1%. The energy savings amounted to an impressive 90%.



Tonglihu Jiayuan Residential Community with Low Energy Consumption

### Building-Integrated Photovoltaics - GOODWE Smart Energy Building

Located in Suzhou High-tech Zone, GOODWE is a globally leading new energy enterprise. Its headquarters building incorporates three major renewable energy application systems: solar photovoltaic power generation system (BIPV and BAPV), solar domestic hot water system, and ground source heat pump system, creating an integrated design. It has been recognized as a Jiangsu Province Green Building Quality Improvement Project (comprehensive application demonstration of renewable energy building).

The photovoltaic power generation in this project contributes to approximately 28% of its electricity consumption. The total installed capacity of photovoltaics exceeds 780 kW, generating approximately 490,000 kWh of green electricity annually, which is equivalent to saving around 157 tons of standard coal and reducing carbon dioxide emissions by about 346 tons each year. In addition, solar thermal water heating provides approximately 22.7% of the domestic hot water, delivering approximately 487 GJ of thermal energy, which is equivalent to saving about 16.6 tons of standard coal and reducing carbon dioxide emissions by approximately 36.6 tons each year. Furthermore, the project utilizes an energy-efficient ground source heat pump system, where the cooling capacity accounts for about 36.1%, and the heating capacity accounts for about 54%. This translates to saving approximately 118.6 tons of standard coal and reducing carbon dioxide emissions by around 261 tons annually. Along with high-efficiency LED lighting controlled by intelligent systems, the building itself achieves more than 30% energy savings, resulting in an overall energy efficiency improvement of over 50%, ultimately balancing energy savings and capacity.



GOODWE Smart Energy Building

**Promoting the recycling of construction waste.** At the end of a building's lifecycle, it is essential to engage in the recycling of construction waste to achieve a dual benefit of resource conservation and low-carbon development. In recent years, Suzhou has been following the general approach of "resource-based utilization, harmless treatment, and industrial development" to establish and enhance a construction waste management system. This effort has effectively elevated the city's level of urban construction waste disposal, management, and resource-based utilization.

According to estimates, Suzhou currently achieves a resource-based utilization rate of 75% for construction waste. The total disposal capacity for urban construction waste has already exceeded the annual production of such waste<sup>[11]</sup>.

### Further enhancing low-carbon practices in the transportation sector

The transportation sector accounts for approximately 7% of Suzhou's total carbon emissions. With the development of new energy transportation, the path towards low-carbon transportation is becoming clearer. Suzhou is actively advancing the green transportation network, promoting low-carbon travel, digitizing transportation services, and achieving balanced transportation facilities.

**Advancing the green transportation network.** The green transportation network is the foundation for achieving low-carbon transportation. As a city with a dense network of waterways, a high population density, and an extensive road network, Suzhou adapts to the local conditions and selects the most suitable transportation modes based on the specific characteristics of different areas. For instance, water transportation facilities are developed where suitable, railway transportation is developed where applicable, rail transit is promoted where needed, and public transportation and pedestrian facilities are expanded where appropriate. This approach has resulted in the creation of a green transportation network. A comprehensive transportation network has been formed with public transportation and rail transit as the core in the urban area, new energy transportation as the supplement, and regional railways, water transport, and road systems as additional means. Presently, Suzhou's rail transit network covers a total operating mileage exceeding 13 million kilometers and has transported over 2.8 billion passengers. It is expected that by 2028, Suzhou's subway system will have 330 kilometers of regional lines and 132 kilometers of urban lines in operation.

**Promoting low-carbon travel.** Suzhou has one of the highest rates of automobile ownership in China. In recent years, the number of motor vehicles in Suzhou has reached 5.21 million. With the production and rapid development of new energy vehicles, Suzhou is actively promoting their use. By 2022, the number of new energy vehicles has increased by 233,000, representing a 101% increase, and 80% of public buses are now new energy vehicles. Within the next two years, the aim is to raise this proportion to 100%. To optimize non-motorized transport system services, Suzhou has improved the construction of pedestrian and non-motorized vehicle lanes and established a continuous network of green pathways for non-motorized transport. In the ancient city area, the proportion of green travel has exceeded 75%, and public transportation stops cover a radius of 500 meters for nearly 70% of the area. There is a ratio of 30 public transportation vehicles per 10,000 residents. As a result, Suzhou has created a city-based zero-carbon travel system, primarily revolving around rail transit and ground public transportation, supplemented by new energy private cars and taxis.



Suzhou's Shared Bicycles

### Shared Bicycles in the Urban Area

Since 2010, public bicycles have been a common sight in Suzhou. Currently, there are nearly 100,000 "Little Green Bicycles" in the urban area, meeting the green travel needs of its residents. In accordance with the plans set by the Suzhou Municipal Party Committee and Government, an additional 68,000 shared bicycles will be deployed for use within the urban area. Over the past decade, Suzhou's shared bicycles have collectively reduced carbon emissions by 2.1 million tons.



Suzhou-style Classical Garden Using 3D Printing Technology

### Resource-based Utilization of Construction Waste

Using 3D technology to print buildings serves the mission of resource-based utilization of construction waste. As early as 2015, Suzhou Yingchuang Technology Company successfully printed the world's first 6-story building located in the Industrial Park. The construction process involved printing one floor each day, with an installation rate of one floor every two days. This innovative approach allowed for the entire construction to be completed within two weeks, effectively overcoming the global technological barrier that previously limited the application of 3D printing to multi-story buildings. The "ink" used in the construction of this 3D printed building was sourced from industrial waste, tailings, and construction debris, demonstrating a sustainable approach to materials utilization. During this period, Yingchuang also introduced an integrated 3D printing method for both interior and exterior decorations and unveiled the world's first 3D printed villa in Suzhou. This three-story villa covers an area of 1,100 square meters and achieved a significant 50% reduction in construction costs.



**Digitizing transportation services.** Ensuring smooth traffic flow and promoting effective intermodal transportation is crucial for improving transportation efficiency. Big data and cloud computing are the optimal means to support substantial enhancements in transportation efficiency. Suzhou Public Transport Company utilizes big data to analyze passengers' travel needs and flows, exploring diverse public transportation services and creating 86 distinctive functional routes. Additionally, through intelligent methods such as video assistance and data monitoring, Suzhou has improved the efficiency of road traffic incident handling. During a certain long holiday period, the rate of reaching the scene for fault resolution within 30 minutes exceeded 98%, and the rate of clearing incidents within 60 minutes was nearly 100%.

### Establishment of Smart Transportation Management System

Suzhou Shishan Road Smart Transportation System serves as a model project for smart road applications by achieving data integration and application fusion across multiple departments, including urban planning, traffic police, traffic management, and city management. This system leverages a big data intelligent traffic management system to enhance efficiency in management. It has already implemented networked control and timing optimization for traffic signals at 426 intersections and coordinated signal control for green waves on 41 routes. The system is currently connected to 80 public and commercial parking lots, providing 45,000 parking spaces. Additionally, it has established a parking guidance system, enabling features like parking navigation, contactless payment, and parking space reservations. Furthermore, the system has completed the upgrade and renovation of barriers at 14 public parking lots. This project utilizes digital services to strengthen energy efficiency, harnessing the innovative power of data and technology.



**Achieving balanced transportation facilities.** Suzhou's balanced deployment of charging and battery-swapping facilities is crucial for the widespread adoption of new energy vehicles. Adhering to a strategy of achieving equilibrium in facility distribution, Suzhou is gradually and strategically advancing the development of these facilities. Currently, public charging stations are positioned with an average service radius of 2 kilometers. Within the coming two years, this radius is expected to be reduced to an average of less than 1.2 kilometers. The core urban area, in particular, aims for an average service radius of less than 1 kilometer, while other regions should see a reduction to below 1.5 kilometers on average. By the year 2025, Suzhou has ambitious plans to inaugurate 122 dedicated electric vehicle battery-swapping stations. This will encompass 75 stations in the urban area, 6 in Zhangjiagang, 12 in Changshu, 18 in Taicang, and 11 in Kunshan.



### Inaugural Voyage of China's First Battery-Swapping Vessel

In October 2022, Jiangsu marked the advent of an “electric era” in inland transportation with the departure of the “Jiangyuan Baihe”, the nation’s first 120-standard container fully electric battery container ship developed through a joint effort between Qiyuan Green Power Technology Co., Ltd., an affiliate of Suzhou Power Investment, and Jiangsu Ocean Shipping Co., Ltd. Departing from the “Number One Pier” at the Changjiang Taicang Port Terminal, this electric vessel heralds a transformative phase in inland waterway transportation. The Jiangyuan Baihe is a battery-powered container ship featuring dual electric propulsion motors. It boasts a total length of 79.92 meters and a width of 12.66 meters. The vessel is equipped with a high-capacity, mobile, and modular power system using 20-foot standard containers as the integrated units. It has a cruising speed of 17 kilometers per hour and a range of up to 220 kilometers. Moreover, the battery-swapping process on this vessel operates on a “plug-and-play” mode, requiring a mere 20 minutes for a single battery exchange, demonstrating significantly faster refueling compared to traditional fuel-based counterparts. The Jiangyuan Baihe is currently operational on an 80-kilometer stretch of the Taicang Port to Suzhou Industrial Park Terminal along the Beijing-Hangzhou Grand Canal. It is expected to replace 500 tons of fuel oil annually, reducing carbon emissions by 1,520 tons. Beyond its considerable operational cost savings, this battery-swapping vessel holds immense demonstrative significance for projects related to the preservation of the Yangtze River and the development of green maritime transportation.



Jiangyuan Lily

In the realm of the construction sector, Suzhou has embarked on a low-carbon exploration across the entire lifecycle of buildings. Concerning the transportation, the city has launched initiatives focusing on green transportation networks, resident mobility, digitalized transportation services, and infrastructure development. It is evident that Suzhou's forays into zero-carbon construction and low-carbon transportation have positioned it at the forefront of many Chinese cities. Nevertheless, Suzhou faces several challenges. For instance, with respect to the design of zero-carbon buildings, Suzhou must address questions like how to make buildings more intelligent and create more scenarios for the application of new technologies in zero-carbon buildings. The evolution and innovation of building materials and their impact on zero-carbon buildings are future concerns to be considered. In the face of these unknown challenges, Suzhou is committed to dedicating its full effort. In the field of transportation, Suzhou's plan through 2030 is primarily centered on peaking carbon emissions, aiming to control the peak at or below 13.5 million tons. From 2030 to 2045, the main objectives are rapid decarbonization, including achieving a public transport electrification rate of over 90% by 2030, substantial increases in the electrification of civilian vehicles by 2035, continued growth in rail transit passenger volume by 2040, and reducing carbon emissions to below 7.5 million tons. From 2045 to 2060, the primary goal is deep decarbonization, with the expectation that by 2050, the electrification rate of civilian vehicles could reach 90%, culminating in the “carbon neutrality” target in the transportation sector by 2060. In the construction sector, by 2040, new constructions will utilize renewable energy sources, and photovoltaic and low-grade thermal sources will be utilized on a large scale, raising the level of building electrification to around 75%. By 2060, full electrification in the construction sector will be achieved.



# How does Suzhou improve the quality of residents' green living?

To create a green lifestyle for urban and rural residents, the key lies in transforming both the way of life and production. The focus here is on ecological agriculture for carbon reduction, greening the restaurant industry, and constructing low-carbon villages and towns. Suzhou promotes green living by undertaking rural environmental ecological management, transforming infrastructure to be eco-friendly, widely implementing natural farming techniques in agriculture and animal husbandry, and fostering the development of environmentally friendly dining establishments. These efforts collectively elevate the quality of green living for both urban and rural residents.

## Making agriculture more organic

Suzhou has consistently been promoting the development of organic, environmentally friendly and low-carbon agriculture, striving to introduce ecological farming techniques, advanced modern equipment, and the concept of green and low-carbon agriculture into the practice of agricultural development. This has placed Suzhou at the forefront of ecological civilization and high-quality development, not only within Jiangsu but also among provinces throughout China.

**Developing organic and green agriculture.** Suzhou has actively promoted green food, organic agricultural products, and geographical indications for agricultural products. In this context, the development of green and organic agricultural products with geographical indications has significantly accelerated, both in terms of speed and total quantity. In 2021, the proportion of high-quality green agricultural products reached 69.4%. Suzhou has fostered 28 regional public brands for agricultural products and possesses 15 geographical indications for agricultural products. There are a total of 79 national standardized production bases for green food raw materials, provincial high-quality green agricultural product bases, and organic agricultural product production bases. The area of land dedicated to green food production covers 1.04 million mu (approximately 693.33 square kilometers), accounting for 61.5% of the total arable land area for edible agricultural products. Furthermore, Suzhou actively practices the concept of green and low-carbon development, resulting in a set of mature, replicable examples of green ecological agricultural production. Among them, five project entities have been selected in the first batch of 132 national ecological farms, ranking Suzhou among the top cities nationwide.

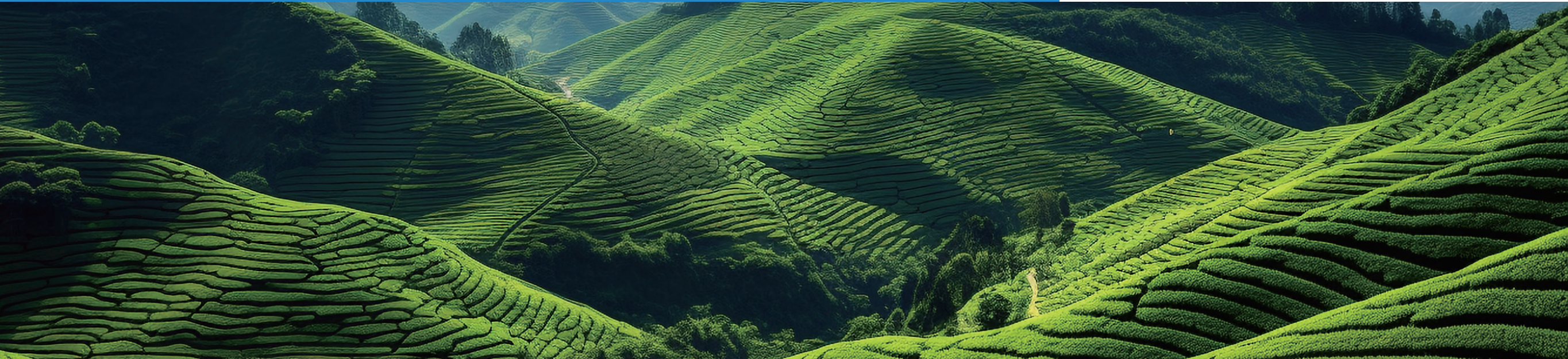
**Advancing low-carbon practices in modern agriculture.** Suzhou places great emphasis on the integration of agriculture, cultural tourism, and green and low-carbon development. The Suzhou Green and Low-Carbon Integration Development Demonstration Project for Agriculture, Culture, and Tourism on the Taihu Lake Ecological Island has been included in the list of national pilots for the "Second Batch of Eco-Environment-Oriented Development (EOD) Models". In addition to this, Suzhou has implemented specific measures including: (1) Initiating actions for green agricultural development, establishing low-carbon agricultural pilot demonstration projects, and promoting agricultural circular production methods. (2) Actively researching and developing biomass charcoal soil carbon sequestration technology, demonstrating and promoting the mode of crop rotation and fallow for soil fertility that integrates land cultivation and comprehensive management to maintain the long-term carbon sequestration capacity of farmland soil ecosystems. (3) Enhancing the selection of crop varieties with high carbon capture and sequestration capabilities and implementing crop variety substitutions. (4) Continuing efforts to reduce the use of chemical fertilizers while improving their efficiency to effectively reduce and control agricultural pollution, thus harnessing the carbon reduction and sequestration potential of agricultural systems.



Zero-Carbon Farm Product Certification of Haiming Agriculture

### Haiming Modern Agriculture's Zero-Carbon Agricultural Products

Founded in 2002, Haiming Agriculture, situated in Meili Town, Changshu City, is a health-oriented agricultural enterprise committed to establishing a comprehensive industrial chain from the field to consumers' tables. While developing an internal recycling-oriented organic ecological farm to safeguard the environment, Haiming Agriculture harnesses the region's rich land resources to cultivate wholesome vegetables and agricultural products for consumers, concurrently raising awareness about the ecological environment. At present, Haiming Agriculture has established cooperative bases covering 24,000 mu (approximately 16 square kilometers) in key vegetable-producing regions nationwide, with a local production base encompassing 2,800 mu (approximately 1.87 square kilometers) in Meili Town, Changshu City. Following over two decades of unwavering effort since its inception, Haiming Agriculture has transitioned from being a green vegetable production facility to an eco-organic farm certified by China's Ministry of Ecology and Environment, recognized for the production of organic food. Its products have been granted organic food certification by China's environmental organic certification body. In June 2022, the 700-mu agricultural produce at Haiming Changjiang Base, located in Meili Town, Changshu City, Suzhou, was awarded zero-carbon farm product certification. This included a range of crops, such as various vegetables, chili, eggplants, tomatoes, and baby cabbages. Haiming Agriculture is the sole Suzhou-based company among the first five enterprises in the nation to receive zero-carbon farm product certification. Over the years, Haiming Agriculture has consecutively received organic cultivation certification for 15 years, with 42 of its products earning recognition as China Organic Products. These organic vegetables, bearing "zero-carbon certification", will be available to the general public through Freshippo's nationwide retail outlets, making their way onto the dining tables of consumers.







## Enhancing green practices in the catering industry

The potential for the catering sector to achieve low-carbon development plays a pivotal role in determining the establishment of eco-friendly consumption practices. As per statistics from the European Commission, human dietary choices contribute to a substantial 18% of total global greenhouse gas emissions. The concept of green dining, which we advocate, not only necessitates food to be natural and nutritious but also mandates that the production and consumption processes of food adhere to stringent low-carbon and environmentally-friendly standards. In Suzhou, an extensive approach to green transformation within the food industry is implemented covering the food source, processing, and consumption, with the primary goal of reducing energy consumption and curbing carbon emissions right from the source of food production and throughout the service provision.

**Prioritizing organic ingredient sourcing.** Suzhou commenced its journey towards green food development as early as 1990. As per data from the Department of Agricultural Product Quality and Safety Supervision, Suzhou currently houses 273 green food enterprises, producing a diverse array of 648 products, and 88 organic food enterprises, offering 394 organic agricultural products. Both green and organic food production processes strictly prohibit the usage of chemical fertilizers and pesticides. This stringent regulation significantly contributes to soil enhancement, thereby increasing the carbon sequestration capacity at the very source of food production.

**Ensuring low-carbon standards in food processing.** Suzhou has been actively promoting the adoption of a "full electric kitchen". This initiative entails the installation and utilization of energy-efficient and emission-reduction equipment such as fume purifiers, energy-efficient stoves, and central dimming systems within the catering sector. The objective is to minimize production energy consumption, elevate energy efficiency, and effectively transition food processing into a cleaner, greener, and low-carbon paradigm.



### “Full Electric Kitchen” Initiative in Zhangjiagang

Zhangjiagang has taken robust measures to promote the extensive transformation of traditional kitchens into "full electric kitchens". This initiative has effectively addressed several issues, including the aging of gas pipelines and loose connections, which posed potential safety hazards in the catering industry. Simultaneously, it has resolved problems associated with conventional open-flame kitchens, such as inefficient and high-carbon emission combustion operations, elevated energy consumption, and heightened pollution levels. Consequently, kitchen environments have transitioned from being clouded with

smoke and intense heat to adopting a clean and eco-friendly ambiance. The "full electric kitchen" approach boasts numerous advantages, notably a shorter construction timeline and minimal site restrictions. For instance, the construction period for a 100-square-meter "full electric kitchen" does not exceed one week, resulting in significant cost savings. Calculations indicate that in comparison to conventional gas stoves, the adoption of "full electric kitchens" reduces carbon emissions by over 30% and offers annual operational cost savings ranging from 14% to 22%.

**Reducing food waste.** Encouraging diners to participate in the "Clean Plate Campaign" is a vital initiative. According to statistics, wasting 1 kilogram of rice is equivalent to emitting 0.8 kilograms of carbon dioxide. In China, annual greenhouse gas emissions from food wastage amount to approximately 1.1 billion tons. By reducing food waste, it is possible to cut emissions by as much as 11%. In line with the principles of the Anti-Food Waste Law, Suzhou actively fosters a favorable atmosphere of "honoring thrift and opposing waste". The city has also implemented measures such as offering "small portion" and "half portion" dishes and providing clear indications of food weight on online menus to provide a variety of serving sizes for diners. Suzhou's various departments have jointly issued an advocacy document to advance the "Clean Plate Campaign", aiming to curb food waste in the catering industry. The document emphasizes that all professionals in the food service industry should actively advocate for responsible eating habits among citizens, practice what they preach, discourage extravagance, and promote healthy family traditions. This initiative is intended to promote the adoption of "cultivated and health-conscious dietary" practices among family members and friends. Its goal is to minimize household kitchen waste and collectively cultivate a lifestyle that embodies civility and well-being.<sup>(12)</sup>

**Promoting waste recycling.** China, as a country rich in culinary culture, is faced with mounting pressure from kitchen waste. To address this issue, Suzhou is implementing a "Waste Reduction" program that considers both "resource-based utilization" and "low-carbon processing". The city is actively engaged in the harmless, reduced, and resource-based treatment of kitchen waste, establishing a circular system for the utilization of kitchen waste. Starting from the year 2010, Suzhou has been diligently implementing the segregation of kitchen waste and organic waste from local farmers' markets. This initiative includes the construction of diverse disposal facilities, comprising centralized anaerobic processing units, decentralized on-site disposal setups, and aerobic composting facilities. As of the year 2023, Suzhou has successfully achieved a kitchen waste separation rate of 28%, generating a daily separation volume exceeding 2,100 tons. The city has effectively established and now operates 259 kitchen waste treatment facilities, boasting an impressive daily processing capacity exceeding 5,400 tons.

## Urban and Rural Organic Waste Treatment Center within the Taihu Lake Region in Wuzhong District, Suzhou, Jiangsu Province

The Urban and Rural Organic Waste Treatment and Utilization Demonstration Center in Linhu Town, Wuzhong District, Suzhou stands as a pioneering national example of urban and rural organic waste treatment and utilization. This center has been successfully constructed and is currently in operation. The facility is tailored to address various forms of organic waste, including kitchen waste, garden waste, Taihu Lake aquatic plants, reeds, blue-green algae, river sediment, and rice straw. By carefully mixing these organic waste materials and introducing high-efficiency composite microbial agents, the center utilizes a combined continuous biological drying and aerobic fermentation process, culminating in the production of solid organic fertilizer within a remarkable timespan of seven days. Annually, this facility

yields 5,000 tons of solid organic fertilizer, thereby facilitating eco-friendly agricultural practices on 6,000 mu (approximately 4 square kilometers) of land. Estimating from the annual 50 million tons of organic waste generated within the Taihu Lake region, it can be anticipated that this processing center annually generates 18 million tons of organic fertilizer, enriching the soil with organic matter amounting to around 6 million tons. The projected impact of this organic fertilizer is substantial, potentially meeting the needs of eco-friendly production on 18 million mu (approximately 12,000 square kilometers) of arable land. This could lead to a yearly sequestration of roughly 25 million tons of carbon, contributing significantly to a reduction of approximately 5 million tons of carbon emissions.



Organic Recycling Research Institute in Wuzhong District



## Empowering villages and towns for low-carbon impact

With a strong focus on carbon neutrality objectives, Suzhou is actively promoting green living practices to develop low-carbon villages and towns. This transformation encompasses greening infrastructure and construction processes, the utilization of clean energy sources, as well as the efficient recycling and conservation of resources.

**Embracing low carbon in rural architecture.** Suzhou encourages the utilization of eco-friendly construction materials and promotes the application of prefabricated building technologies in rural construction. This comprehensive approach raises the bar for sustainable building practices in terms of land use, material efficiency, water conservation, and energy consumption. The drive towards green rural housing is a key strategy to reduce energy consumption and carbon emissions. For example, in Kunshan, we have initiated projects to recycle and repurpose discarded construction materials like old bricks, tiles, and millstones from villages to naturalize parts of underlying surface of the road network. This endeavor prevents rural areas from developing hardened surfaces and paves the way for the construction of low-carbon villages.



Shushan Village, Tong'an Town, High-tech Zone

**Fostering green transformation in microenvironments.** Suzhou is actively pursuing the green transformation of microenvironments through strategic measures such as the rational placement of forest belts, riverbank vegetation zones, road landscape areas, and greenways. We make efficient use of idle or neglected land, areas along roadsides, riverbanks, and courtyard gaps to carry out beautification and landscaping efforts. These initiatives aim to enhance the carbon sequestration capabilities of rural areas. As of now, Suzhou boasts a green coverage of 220,000 mu (approximately 146.67 square kilometers) in rural areas, with a green coverage rate exceeding 30%. Furthermore, we have successfully established over 600 provincial-level green and beautiful villages.

**Promoting cyclic utilization of resources.** The advancement of projects related to rural wastewater treatment, livestock and poultry manure management, and the resource-based utilization of rural domestic waste forms a critical element in the development of low-carbon rural areas. Suzhou has undertaken comprehensive measures to effectively address these challenges. Initially, Suzhou promotes integrated farming methods combining crop and livestock farming to efficiently harness methane, nitrous oxide, and other gases produced by livestock and poultry waste. This includes the fixed-point and quantified disposal of such waste on a regular basis for agricultural and husbandry purposes, while actively promoting the application of organic fertilizers to ensure the sustainable development of the rural ecological environment. Presently, the comprehensive utilization rate of livestock and poultry waste exceeds 99%. Secondly, Suzhou has adopted power-driven or micro-power sewage treatment equipment, and constructed ecological sewage treatment ponds and associated infrastructure. This enables the city to achieve substantial removal of phosphorus and nitrogen from rural wastewater. Following treatment, the wastewater is either reused for agricultural irrigation or allowed to naturally enter river systems for further natural purification. Furthermore, Suzhou has been proactive in advancing the packaging and categorization of domestic waste, and implementing the circular utilization of organic matter such as household garbage and kitchen waste. The city has established 240 town and village-level organic waste resource-based utilization stations, with a daily processing capacity exceeding 700 tons. Presently, all administrative villages within the city have enforced domestic waste categorization, with a compliance rate of approximately 95%.

**Greening the energy utilization process.** Suzhou encourages the widespread application of clean technologies in rural residential areas, daily life, and transportation, with a particular emphasis on biomass, solar, and wind energy. For instance, Suzhou has strategically deployed distributed photovoltaic and wind power generation facilities to increase the proportion of self-generated electricity in rural areas, thereby promoting electrification in rural production and daily life. Furthermore, Suzhou actively promotes the use of solar water heaters, solar cookers, biogas, and other technologies to enhance the environmental sustainability and low-carbon profile of rural energy utilization.

**Promoting a green lifestyle.** Suzhou actively engages in rural ecological civilization promotion and public awareness campaigns, aiming to enhance the ecological ethics and values of the rural population. This, in turn, guides villagers to choose low-pollution, low-resource-consumption green products and reduce their usage of plastic products. Suzhou advocates for a green and frugal lifestyle, contributing to the joint development of low-carbon rural communities.

## Enhancing livability of the environment

Water and air are vital natural resources that sustain human existence. To advance the development of livable urban environments, Suzhou comprehensively coordinates governance efforts related to water resources, atmospheric conditions, and ecological environments within its city boundaries. Suzhou has implemented a series of water environment remediation measures aimed at its lakes, rivers, and other water bodies, achieving continuous improvement in water ecological quality. Over the past five years, the proportion of water quality grades at sections reaching level I-III according to national and provincial assessment standards has increased by 28%, with a 100% compliance rate for surface water quality in functional zones. By 2022, the water quality of the Suzhou section of the Yangtze River and the Suzhou domain of Taihu Lake had met or exceeded level I-III standards[13 Report on the State of the Ecology and Environment of Suzhou in 2022]13. In 2023, Suzhou leads Jiangsu province in terms of the proportion of water quality reaching level I-II.

### Water Environment Remediation of Shengze Lake

Shengze Town, renowned as a prominent hub for the textile industry in China, simultaneously holds the distinction of being a quintessential ancient water town, characterized by an intricate network of lakes and river ports. Situated within the jurisdiction of Shengze Town, Shengze Lake plays a pivotal role in this landscape. The present scenario witnesses Shengze Town as the confluence of more than 5,000 textile production enterprises and in excess of 7,000 textile trading firms, effectively shaping a textile industry base and trading market of substantial multi-billion-dollar magnitude. However, this robust economic activity has imparted significant stress on the water environment of Shengze Lake. Nevertheless, in recent years, Suzhou has displayed unwavering dedication to rectifying and enhancing the water environment. It is actively engaged in transforming Shengze Lake into an exemplar of an ecologically pristine river and lake. As per the prevailing water quality standards, Shengze Lake presently displays remarkable water quality, conforming to the criteria for Class II water quality.



The Picturesque Shengze Lake

Greenhouse gas emissions and atmospheric pollutants share a common source, and there exists a discernible interrelation between climate change and atmospheric pollution, both of which exert adverse effects on areas including public health. In the realm of atmospheric environment, Suzhou has embarked on a remarkable seven-year "Anti-Pollution Battle" initiative, undergoing significant transformations. Since 2013, PM2.5 concentration has plummeted from 57 micrograms per cubic meter to 28 micrograms per cubic meter in 2022, marking a substantial 50% reduction. Presently, air quality has consecutively met national Grade II standards for two years. The enhancement of urban water and atmospheric environments has substantially elevated residents' quality of life. Guided by the principles of green and low-carbon development, Suzhou has emerged as a globally renowned eco-friendly and habitable city.

People have consistently remained the focal point of our efforts. Augmenting the standard of green living for urban and rural residents constitutes a pivotal component in our quest for carbon neutrality. Suzhou has endeavored to enhance the well-being of the populace by focusing on organic agriculture, green dining, low-carbon villages, and habitable environments, among other avenues. We fully recognize that the green and low-carbon development in urban and rural areas necessitates the abandonment of the mindset favoring urban over rural, and industry over agriculture. Nevertheless, due to significant disparities in urban and rural development and the wide-ranging daily behaviors of residents, the overall carbon emissions and pressures are relatively high. Consequently, in the process of promoting green and low-carbon lifestyles, we confront an array of challenges. In the future, a scientific guidance for daily life, together with incentives for the active participation of all stakeholders in the development of green and low-carbon urban and rural living, is indispensable to bridge the gap in green and low-carbon development between urban and rural areas. This endeavor aims to ensure that all the people residing in this region share in the blessings of a beautiful and prosperous life.





# How does Suzhou optimize its spatial structure?

Space serves as the fundamental platform for accommodating carbon sources and carbon sinks. Suzhou, through its continuous efforts in carbon source control, carbon sink construction, and carbon balance, is committed to creating highly intensive and efficient production space, habitable and moderate living space, and fresh and beautiful ecological space. The goal is to establish a national land spatial pattern that is safe, harmonious, competitive, and sustainable, ultimately working towards achieving carbon neutrality. Suzhou is dedicated to enhancing its spatial governance capabilities to ensure the realization of carbon neutrality targets.

## Reshaping space

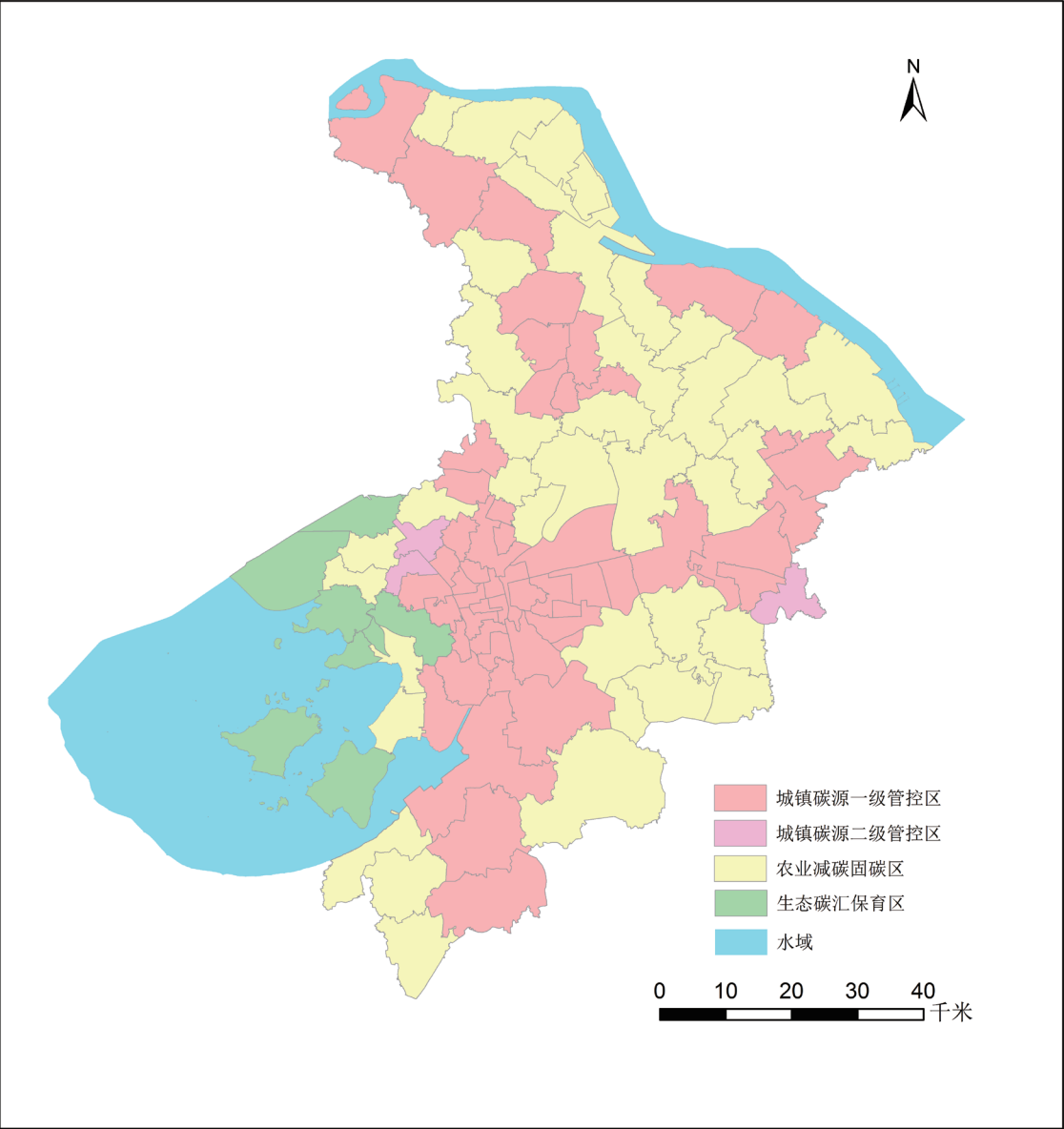
Suzhou's spatial structure exhibits distinct characteristics of its era and evolves in conjunction with economic development. In the early stages of reform and opening up, Suzhou proactively developed township industries targeting the market gap of shortage economy to address the surplus rural labor force. This led to a production and employment model known as "leaving the farmland but not the village",<sup>(14)</sup> while concurrently constructing a decentralized spatial structure characterized by "igniting in every village and emitting smoke from every household"<sup>(15)</sup>. However, this model resulted in the occupation of carbon sink spaces and a decline in ecological functions. Furthermore, decentralized rural industries scattered carbon sources, making it challenging to control high carbon emissions effectively.

By the 1990s, Suzhou seized the strategic opportunities presented by the international transfer of manufacturing and the development and opening-up of Pudong. It vigorously promoted an open economy and established a series of development zones. This led to the occupation of green and open spaces and carbon sink spaces around the city and turned the urban areas into the primary aggregators of carbon emissions. With the implementation of national strategies such as ecological civilization construction, macroeconomic resource regulation, the rural revitalization strategy, and new requirements to address the "dual carbon" goals, Suzhou's spatial structure is undergoing three evident reshaping trends: (1) The structure of urban, agricultural and ecological spaces is becoming clearer, necessitating strengthened control over the scale and boundaries of urban areas, driving the development of existing urban spaces, and preserving more agricultural and ecological spaces. (2) The central city is expanding from a single center to multiple centers, rendering the agricultural spaces around the city more contiguous and open. This increases the retention of carbon sink spaces and aids in relieving high carbon emissions in the city center. (3) The withdrawal of decentralized rural development and the construction of standardized factories enable rural areas to restore traditional spatial structures and ecological service functions while enhancing carbon sink capacity.



Enhancing spatial governance effectiveness

Suzhou has emerged as a trailblazer in China, actively pioneering and implementing a robust spatial governance system that emphasizes comprehensive planning for spatial conservation and development. This initiative forms the bedrock of effective spatial governance in the context of green development. As far back as 2005, Suzhou introduced a scheme categorizing development areas into four distinct primary functional zones: optimization development areas, key development areas, restricted development areas, and prohibited development areas. These zones were accompanied by a comprehensive suite of policies aligned with their primary functions. The policies encompassed various aspects, including land-use indicators allocation, industrial entry standards, investment and fiscal incentives, ecological space management, and performance evaluations for local leadership. These measures proved instrumental in strictly delineating the boundaries of urban development, the redlines for permanent essential farmland, and the ecological protection redlines. This strategy effectively promoted high-efficiency, intensive urban development while safeguarding the crucial carbon sequestration functions of agricultural and ecological spaces. In recent years, Suzhou has been proactive in responding to the "dual carbon" objectives. The city introduced a conceptual framework for spatial functional zoning to facilitate carbon peaking and carbon neutrality. Suzhou divided its territory into urban carbon source control zones, agricultural carbon reduction and carbon sequestration zones, and ecological carbon sink conservation zones, each tailored to specific objectives. This approach seeks to provide targeted development pathways and the corresponding policy measures required to meet the "dual carbon" objectives. Suzhou's visionary approach places it at the forefront in China.



Major Functional Zones for Carbon Peaking and Carbon Neutrality

Enhancing the green aspect of urban renewal

In response to the imperatives of climate change, urban spatial organization will move towards a stage of controllable management, safety and resilience, and urban-green integration. Suzhou has embarked on a trajectory of urban development that necessitates a shift from the conventional "incremental expansion" model to a more sustainable approach characterized by "stock excavation". The urban renewal process has emerged as an imperative in the context of stock urban development. Suzhou's commitment to this transformation is underscored by its pioneering "Urban-Green Integration" project<sup>(16)</sup>, which has resulted in the enhancement of urban green spaces, city parks, wetland parks, and forest parks. This initiative encompasses a wider promotion of greening practices on balconies and rooftops. It is further marked by the continuous expansion of green areas within old urban districts and the creation of new green spaces in developing urban areas. The overarching goal is to bolster the region's capacity for carbon sequestration and ecological functionality. As urban renewal unfolds, an increasingly prominent aspect is the consideration of residents' aspirations. This entails a recognition of their desires for high-quality living environments and a predilection for green, low-carbon lifestyles. Suzhou has initiated projects focusing on the construction of low-carbon communities in specific localities. In tandem with this, the urban renewal process is characterized by Suzhou's active facilitation of multi-stakeholder collaborations, which are essential for driving forward the agenda of low-carbon urban development. Through partnerships with social capital, Suzhou encourages the effective coordination among financial funds for ecological restoration and low-carbon development, social green funds, and other resources in specified regions. This holistic approach serves to augment the region's carbon sequestration capacity while simultaneously mitigating high-carbon emissions during the urban renewal process. As a result, Suzhou effectively upholds and elevates ecological functionality within its urban areas.



Senlu Park in Suzhou Industrial Park

### Low-Carbon Transformation of Jinji Residential Complex

The Jinji Residential Complex, located on Jinji Road in Suzhou's Gusu District, is a residential area dating back to the 1970s. Due to its aging infrastructure and facilities, residents' living and working conditions were significantly affected. To address these challenges, the Suzhou Municipal Government collaborated with resident representatives to develop a green and environmentally responsible renovation plan aimed at implementing a low-carbon upgrade of the complex. The specific renovation measures included the following:

1. Exterior Wall Insulation: Renovation efforts encompassed the addition of thermal insulation layers to the complex's exterior walls, mitigating energy losses caused by indoor temperature fluctuations.
2. Energy Management Enhancement: Outdated electrical equipment underwent renewals and upgrades. Energy-efficient control systems were introduced, and a central heating system was established to curtail the complex's energy consumption.
3. Green Space Augmentation and Environmental Improvements: Green areas and eco-friendly facilities were expanded to elevate the environmental quality and overall comfort within the complex.
4. Community Education: Environmental training and awareness campaigns were conducted to raise residents' consciousness and engagement in eco-friendly practices.

Through the implementation of these renovation and upgrade measures, the Jinji Residential Complex made significant strides in reducing energy consumption, enhancing environmental standards, and markedly improving the quality of living conditions. Consequently, this complex has become a shining example of green residential renovations within Suzhou.



### Revitalizing rural areas at their core

Rural areas play a pivotal role as carbon sink spaces in achieving carbon neutrality goals. In the active pursuit of carbon neutrality objectives, Suzhou has been committed to revitalizing rural areas, aligning them with their ecological, agricultural, and cultural roots. To realize this vision, Suzhou has undertaken a series of vital projects, including the "Four Million Mu" Initiative, which encompasses projects focused on "high-quality grains and oils, efficient horticulture, specialty aquaculture, and ecological woodlands". These initiatives have expanded the agricultural and ecological spaces in Suzhou's rural regions, continually enhancing their ecological service functions and reinforcing their carbon sink capabilities. Furthermore, in the spirit of preserving and promoting agricultural traditions, Suzhou promotes the concept of farming in accordance with timeliness, suitability, adherence to guidelines, and harmony. The municipal government encourages farmers to employ local and original farming techniques and practical knowledge to promote the ecologically sustainable development of agriculture, maintain the balance of agricultural ecosystems, and ensure soil health, thereby reducing the carbon footprint of agriculture. In addition, Suzhou actively draws wisdom from traditional rural construction practices, guiding micro-design, micro-renovation, and micro-construction in rural areas. This approach involves the prudent use of local building materials, promoting the widespread adoption of distributed renewable energy sources, and ensuring that newly constructed residences, public buildings, and village environments adhere to the concept of "harmony between humanity and nature"<sup>(18)</sup>.

Wangshan Village, Yuexi Sub-district, Wuzhong District

### Pursuing ecosystem conservation

Suzhou has demonstrated unwavering commitment to the conservation and improvement of its ecological spaces, cognizant of their relatively diminutive scale yet profound ecological value and carbon sequestration potential. In pursuit of this objective, Suzhou has enacted an array of measures, notably the comprehensive management of mountains, waters, forests, fields, lakes, and grasslands. Spanning the years 2016 to 2020, Suzhou strategically designated a substantial expanse measuring approximately 3,260 square kilometers as ecological conservation areas, which translates to over 37% of Suzhou's total land area. This comprehensive approach encompassed extensive afforestation initiatives, covering roughly 45,000 mu (approximately 30 square kilometers), and the integration of nearly 9,000 mu (about 6 square kilometers) of novel ecological landscape protective forests bordering the Yangtze River, leading to a terrestrial forest coverage that now surpasses 30%. Moreover, Suzhou has embarked on the implementation of the Rural Standardized Factory Construction Project, resulting in the generation of an extensive development space exceeding 50 square kilometers. Within this allocation, nearly 8 square kilometers have been expressly designated for the restoration of arable land and afforestation. Furthermore, Suzhou has harmonized these endeavors with major infrastructure projects spanning transportation, water resources, and more. The city has adopted a soil extraction methodology in the development of artificial lakes, wetlands, and forests, which has been instrumental in expanding ecological conservation areas and augmenting carbon sequestration capacity.



Suzhou Jiyang Lake

### The Jiyang Lake Construction Project

The development and expansion of the Jiyang Lake Ecotourism Zone serve as a remarkable illustration of Zhangjiagang City's proficient practices in the sustainable utilization of land resources and ecological restoration. What was once dormant land, previously left untapped, has been ingeniously repurposed to meet the soil requirements for highway construction. Subsequently, meticulous planning and execution transformed this area into the Jiyang Lake Ecotourism Zone, yielding a symbiotic and mutually beneficial outcome. This ecotourism zone spans approximately 200 hectares, encompassing extensive artificial wetlands (20 hectares), lakes (66 hectares), islands (4 hectares), canals (800 meters), and three-dimensional landscape green belts, boasting a remarkable green coverage of over 90%. Since its inception in the planning and construction phases in 2001, this tourism zone has steadily unveiled various attractions, including Luozhou Island, Mirror Lake, the Waterside Resort Area, wetlands, and Joy World, all of which are accessible to visitors. This area has played a pivotal role not only in urban ecological restoration and resource conservation but has also metamorphosed into a versatile urban wetland park. This evolution has expanded its functional repertoire to include tourism, leisure, and entertainment. Additionally, the tourism zone has garnered esteemed accolades, including the "National Ecological Park (Pilot Zone)" and the "National AAAA-Level Scenic Area" titles.

Suzhou, in its pursuit of carbon neutrality, has implemented a range of spatial optimization measures encompassing space reshaping and space governance. These strategies encompass urban renewal with a focus on sustainability and ecological conservation efforts in rural areas. In addition, Suzhou has introduced a concept of carbon-neutral spatial zoning. In light of this spatial zoning framework, Suzhou is confronted with certain unknown challenges in the concrete implementation, necessitating the dynamic identification of areas at risk for carbon emissions and considering changes in these carbon risks as a reference point for the dynamic adjustment of its national spatial layout. Moreover, the integration of carbon neutrality goals into the legal, regulatory, and technical standard systems of national spatial planning allows for the inclusion of carbon emission constraint indicators and thresholds into spatial management. This facilitates more rational spatial planning and the preservation of more high-quality carbon sink areas. Projections indicate that by 2030, Suzhou's cumulative carbon sink capacity will exceed 8 million tons, and by 2060, it will surpass 10 million tons. These measures and strategies will significantly contribute to the comprehensive assurance of carbon neutrality goals.



## Explanatory note

1 The “Southern Jiangsu Mode”, first proposed by the sociologist Xiaotong FEI in the early 1980s, refers to the model that farmers in Suzhou, Wuxi, Changzhou, Nantong and other areas in southern Jiangsu Province develop township enterprises by relying on their own strength to achieve non-agricultural development.

2 “Zhangjiagang Spirit” means the spirit of “unity and diligence, struggling forward, self-motivation, and daring to contend for first place” proposed at the national meeting for experience exchange of spiritual civilization construction jointly held by the Publicity Department of the Communist Party of China and the General Office of the State Council in Zhangjiagang in 1995.

3 “Kunshan Road” was put forward for the first time in the front-page commentary of the People’s Daily in 1988, with “working diligently, making bold innovation, and striving for excellence” as the main spiritual connotation.

4 “Industrial Park Experience”, proposed at the beginning of the development and construction of industrial parks in 1994, is characterized by “mutual-learning, innovation, harmony and cooperation”.

5 “In the absence of precedents” was proposed at the Ninth Plenary Session of the 13th CPC Jiangsu Provincial Committee: Suzhou strives to build a strong modern socialist city that presents the new picture of “powerful economy, affluent people, beautiful environment, and high degree of social civilization”, taking the lead in making a success story in the areas that are “in the absence of precedents”, and performing better and faster in the aspects “that attract universal efforts”.

6 “PEDF” refers to an integrated technology in buildings that applies direct current as the core architecture, connects distributed solar PV, distributed energy storage and adjustable load, and achieves interaction with the power system through user-side flexible technology.

7 As an innovative urban development model, the concept of a "Zero Waste City" is guided by the principles of innovation, coordination, green development, openness, and shared growth. It aims to continuously reduce the generation of solid waste at its source and promote resource-based utilization by fostering a green and sustainable economic development model and lifestyle. The ultimate goal is to minimize landfill waste, thus reducing the negative environmental impact of solid waste to the lowest possible extent.

8 "Intelligent Reformation & Digital Transformation" refers to a strategic initiative driven by innovative digital technologies. Its primary objective is to facilitate the convergence of next-generation information technology with advanced manufacturing, leading to comprehensive advancements in the intelligence levels across various facets of enterprises. These include but are not limited to design, production, management, and services.

9 The “coal-to-gas” project refers to substituting natural gas for the coal used in coal-fired boilers, industrial kilns, and coal-fired facilities as well as the bulk coal. It is an important lever for China to promote the adjustment of energy mix and the control of air pollution.

10 The “West-East Gas Transmission” project has the longest natural gas pipeline in China, with a total length of over 20,000 kilometers, benefiting more than 400 cities and 500 million people in Western China, the Yangtze River Delta, the Pearl River Delta, Central China and the Central Plains.

11 The Suzhou Municipal People's Government - The regulation of informal waste stacking sites has completed, and the decoration waste disposal terminal has been put into operation.

12 The Suzhou Municipal People's Government, in collaboration with the Suzhou Municipal Market Supervision Administration and other relevant authorities, has jointly issued an advocacy to promote the "Clean Plate Campaign" and curtail food waste in the catering industry.

13 Report on the State of the Ecology and Environment of Suzhou in 2022.

14 “Leaving the farmland but not the village” refers to the status and form that the rural surplus labor force, following China’s reform and opening up, transfers from the agricultural sector to non-agricultural industries in the ways such as employment in local enterprises.

15 “Igniting in every village and emitting smoke from every household” is, in fact, a rural industrialization situation. At the early stage of reform and opening up, a large number of township enterprises emerged supported by national policies. However, the lack of reasonable planning and effective management resulted in the phenomenon of “igniting in every village and emitting smoke from every household”.

16 “Urban-Green Integration” project refers to the perfect integration of urban and green development through green construction actions such as greening every place as conditions allow, growing green plants across the whole society, regulating green spaces, planning the expansion of green spaces during the urban construction.

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## Conclusion

Suzhou is currently making an all-out effort to steer various sectors towards green development. Although the task of achieving carbon neutrality is formidable, Suzhou has been diligently exploring and implementing strategies. The Energy Foundation commissioned the SEU-Yangtze River Delta Carbon Neutrality Strategy Development Institute to conduct research on Suzhou's carbon peaking target and carbon neutrality pathway, resulting in preliminary research findings. With the continuous evolution of the economy, society, and advancements in science and technology, Suzhou will adaptively adjust its "dual carbon" pathway. Moreover, the research on Suzhou's carbon peaking target and carbon neutrality pathway will be reviewed and adjusted every five years.

Addressing climate change is an essential element of China's high-quality development. It is not only a reflection of the Chinese people's aspirations for a better life but also relates to global development. Throughout the ongoing global response to climate change and in alignment with China's carbon neutrality goal, Suzhou remains steadfast in implementing national “1+N” policy system for low-carbon development. The city is constructing a multi-dimensional green development system, encompassing various areas, including energy, industry, technology, investment, consumption, education, and spatial governance. Simultaneously, Suzhou has integrated carbon peaking and carbon neutrality into its comprehensive economic and social development strategy, making carbon reduction a central component of ecological civilization construction and propelling a green transformation of the economy and society. The aim is to construct a new Suzhou characterized by harmonious coexistence between humans and nature, reflecting a Chinese-style modernization.

China will continue to exert its utmost effort in the comprehensive, balanced, and effective implementation of the United Nations Framework Convention on Climate Change and the Paris Agreement. Suzhou will fulfill its responsibilities diligently, actively aiding in the achievement of China's nationally determined contributions, making greater efforts and contributions towards the construction of a community with a shared future for humanity, all in pursuit of creating a more beautiful planet.



