Case Study Report

Energy Revolution & Territorial Spatial Planning Reform:

The Path Selection and Practice of Chinese Urbans towards "Carbon Neutral"

Chengcheng LIU, Tianjing Planning Formulation Research Center, China

Tao ZHANG, Tianjin Low-carbon Development Research Center, China

Xiangtong SHA, Tianjin Zhong De Engineering & Design Co. LTD, China

Nan HU, Tianjin Institute of Surveying & Mapping Co. LTD, China

Zhiyong, XU, Tianjin Ecology & Environment Bureau, China

Abstract

China will go from carbon peak to carbon neutral in the shortest time in the history of the world. To this end, China will carry out systemic structural change, transformation and innovation. All regions and provinces have made active explorations in policy formulation and implementation, specifically from two aspects of energy revolution action and spatial planning reform, by reducing carbon emissions and increasing carbon sinks, to build "carbon neutral" cities. The main path of energy revolution focuses on key areas such as in the field of industry and people's livelihood, energy supplying, promoting energy-saving and emission reduction technologies, put forward emission reduction measures. The main path of spatial planning reform focuses on the reform of spatial planning system; Create a comfortable living circle with appropriate scale, compact space and rich functions; Reserving development space for medium - and long-term strategic development of renewable energy; Optimize the spatial layout of low-carbon industry to help carbon neutrality. The low-carbon development path proposed by China to adapt to climate change means revolutionary changes in China's economic development model, energy, industry, infrastructure, space planning and even people's way of life.

Keywords

Carbon Neutral, Energy revolution, Reform of spatial planning

1. Policies and practices for achieving carbon peak and carbon neutrality in various regions

Climate change is globally recognized as a long-term systemic risk faced by human beings. The impact range and depth of global warming caused by human activities are gradually increasing. "Carbon Peak" and "Carbon Neutral" are climate commitments to reduce the expected global warming. In the global context, mankind is facing major ecological and environmental threats. To actively tackle climate change, China has committed to achieving the peak of carbon dioxide emissions by 2030 and achieving carbon neutrality by 2060.At present, China has decomposed carbon emission reduction targets from top to bottom, and each urban has put forward corresponding strategies based on the actual situation of its own region, so as to achieve low-carbon transformation and development throughout the country.

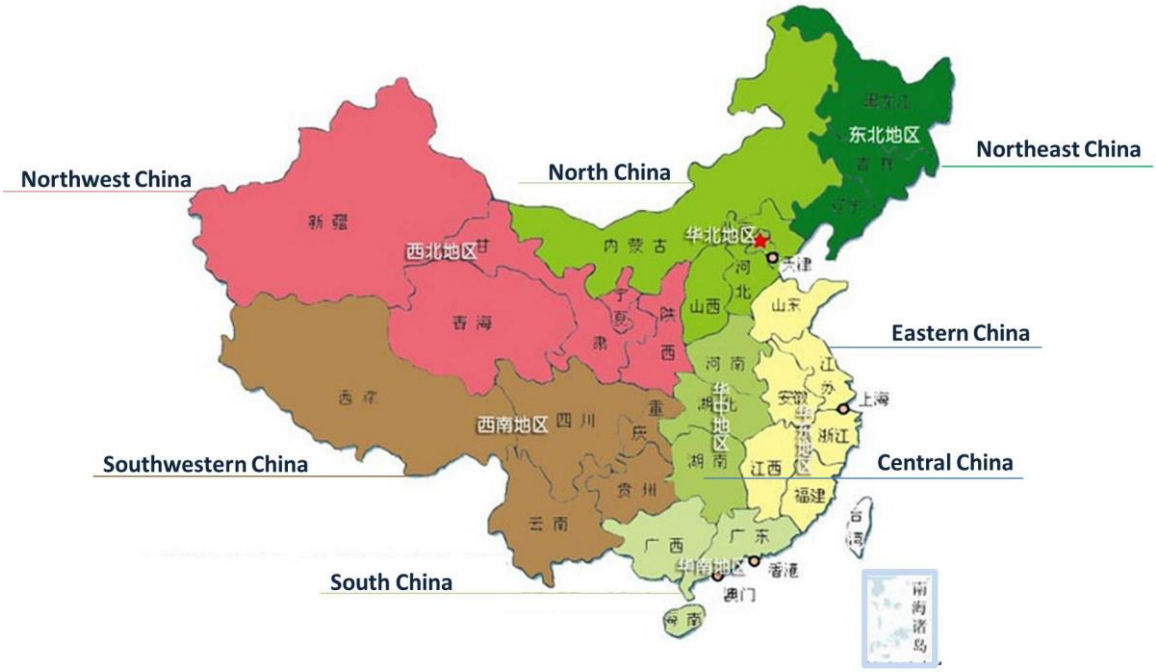

Figure 1. Geographical partition map of China. Source: homemade.

1.1. North China

North China has always been the main coal producing region in China. Shanxi and Inner Mongolia are the two provinces with the largest coal output, accounting for 27.66% and 26.04% of the national coal output in 2020 respectively, accounting for more than 50% in total. In order to achieve carbon peak and carbon neutrality, it is important to accelerate the reform of traditional energy structure and promote safe and efficient coal mining and clean and efficient utilization.

North China also includes the megacities of Beijing and Tianjin.Beijing highlighted the "dual control" of carbon emission intensity and total amount, and clarified the timetable and road map of carbon neutrality. The first of Implementation direction is energy saving, improve energy efficiency; Second, reduce coal, oil and gas consumption to control the growth of fossil energy consumption; Third, vigorously develop local photovoltaic, heat pump technology and other renewable energy; Fourth, support green financial innovation and promote green technology upgrading; Fifth, expand urban green space and continue afforestation. Tianjin has focused on expanding green ecological space, strengthening ecological space governance, and promoting green carbon cycle governance. The first direction is to continue to cut coal, increase the supply of natural gas and the use of local non-fossil energy, and increase the proportion of green electricity; Secondly, optimize industrial, energy and transportation structures and vigorously promote green buildings; Third, we will accelerate the construction of green ecological barriers, strengthen the protection and restoration of ecological wetlands, continue to promote comprehensive coastal management, and improve the capacity of ecological carbon sinks.

1.2. East China

East China is the most economically and culturally developed region in China. But behind the economic development means a high proportion of energy consumption, energy consumption is the largest among the seven regions of China. In order to achieve carbon peak and carbon neutrality, the main measures are

mainly to accelerate the structural replacement of new energy to traditional petrochemical energy and increase the proportion of non-fossil energy. For example, the Shandong Peninsula "hydrogen corridor" will be built to accelerate the development of hydrogen energy. Anhui province and Zhejiang province have set definite quantified targets for the replacement of non-petrochemical energy and the number of units installed. Jiangxi province mainly develops photovoltaic, wind power, biomass and other new energy sources.

In addition, while accelerating the energy revolution in East China, efforts are also being made to improve the carbon sink capacity of the ecosystem. For example, Jiangsu province has coordinated efforts to protect biodiversity and stabilize the carbon sequestration of forests, wetlands, arable land and oceans. In addition to promoting offshore wind power and green industrial clusters, Fujian province has also introduced "Forests into cities", "Windows to see green" and "Gardens to see outside" to increase the carbon sink of the ecosystem.

1.3. Central China

Central China is an important building materials production area in China, so the distribution of factories is also more extensive, adjustment and optimization of industrial structure and energy structure is the main way to alleviate the pressure of carbon emissions. Hubei province mainly develops circular economy, cultivates and strengthens clean energy industry, and promotes green buildings, green factories and green parks. Hunan mainly promotes green transformation in key industries such as steel, building materials, electroplating, petrochemical and paper making, and supports the exploration of zero-carbon buildings. Henan province has strictly controlled the production capacity of industries with high energy consumption and high emissions to build a diversified clean energy supply system.

1.4. South China

South China is close to the South China Sea, with abundant Marine resources and superior natural conditi ons for the development of wind energy, marine energy and solar energy. South China is the developmen t area of China's manufacturing industry, with many manufacturing and processing manufacturers and el ectronic equipment manufacturers. Therefore, the key task in South China is the direction of energy cons ervation and emission reduction, mainly promoting the development of clean energy by using coastal res ources, and promoting the ecological and green transformation of traditional industries.

Guangdong province mainly promotes the pilot demonstration of low-carbon cities, low-carbon towns, lo w-carbon parks, low-carbon communities, near-zero carbon emissions and near-zero energy buildings. Gu angxi province will mainly build beibu Gulf offshore wind power base and implement coastal energy proje cts. In addition to its obvious advantages in forest carbon sequestration and ocean carbon sequestration, Hainan province also pays attention to the development and improvement of smart transportation constr uction in the province, and promotes the green transformation development of the construction industry in the province.

1.5. Southwest China

Located in the middle and upper reaches of the Yangtze River and covering the Yunnan-Guizhou Plateau a nd the southern part of the Qinghai-Tibet Plateau, Southwest China has better natural conditions for the development of hydropower, photovoltaic and wind power generation. Among them, Yunnan province, X izang Province and Sichuan Province have proposed the development of "wind, light, water and other en ergy storage integration project" to promote the multi-energy complementary development of water, wi nd, light, storage, hydrogen and other integration.

In addition, Guizhou province focuses on the development of new energy vehicle industry and the constr uction of charging piles. Chongqing proposes the path of "one district and two clusters" to implement diff

erentiated carbon peak. The central urban area establishes low-carbon transformation on the consumpti on side by building low-carbon modern service industry, transportation system and green building system. The new area will be built into an industrial base for green advanced manufacturing, new energy and ne w materials. Ecological protection should be strengthened to increase carbon sink of the three Gorges res ervoir area town clusters in northeast Chongqing.The development of innovative green economy was em phasized in the southeast Chongqing Wuling Mountain town.

1.6. Northwest China

Northwest China lies deep in the interior of northwest China, including xinjiang Uygur Autonomous Regio n, Ningxia Hui Autonomous Region and northwest Gansu Province. This region is characterized by a large area, drought and water shortage, extensive desert, more sand, fragile ecology, sparse population, rich re sources, difficult development, long international border and high average altitude. Due to the geographi cal characteristics of Northwest China, it has sufficient sunshine during the day, less rainfall all year round, more sand and a wide terrain, which is not conducive to the laying of power grid but very conducive to t he development of photovoltaic and wind power projects. Therefore, northwest China is a demonstration area of clean energy construction in China.

1.7. Northeast China

Northeast China is the traditional industrial development area of China. There are three industrial belts in northeast China, namely Shen-Da industrial belt, Chang-Ji industrial belt and Ha-Da-Qi industrial belt. The refore, the energy consumption and carbon emission in northeast China are also serious. Considering the characteristics of regional development, the key tasks of carbon emission reduction in northeast China m ainly focus on energy substitution and construction of green industrial parks.

We will review the policies and practices of each province and urban, and work from two aspects, namely energy revolution action and spatial planning reform, to build "Carbon Neutral" urbans by reducing carbo -n emissions and increasing carbon sinks.

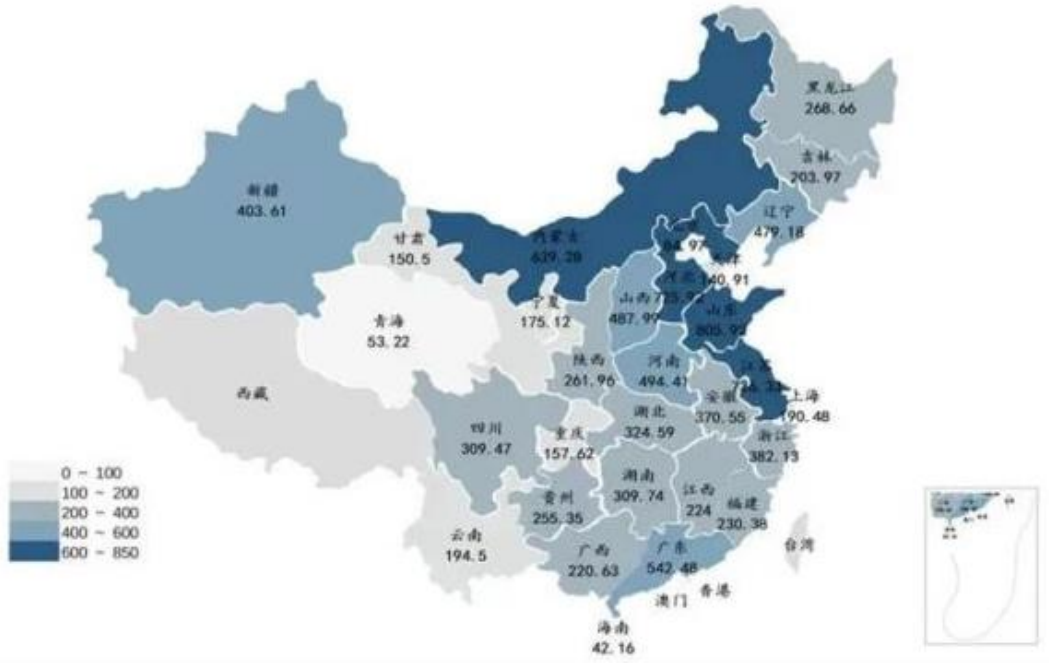

Figure2. Total Carbon Emission Distribution of Provinces and Urbans（2017，Total carbon emission unit: million tons of carbon dioxide）；Tibet, Macao, Hong Kong and Taiwan were not included in the statistics. Source: WIND, Industrial Bank Research.

2. Energy Revolution Action

The energy revolution is the "replacement of new energy", which will go through three stages. The first st age is the "replacement of growth rate", in which the absolute quantities of fossil energy and new energy grow at the same time, but the growth rate of new energy is greater than that of fossil energy. The secon d stage is "incremental substitution", in which new energy sources grow more in absolute quantities than fossil fuels. The third stage is "main substitution", that is, new energy eventually becomes the main ener gy. At present, China's energy revolution is being driven simultaneously by the troika, carrying out the foll owing practical work.

2.1. Plan the emission quota and carbon peak schedule in key areas in advance, and propose the direction of emission reduction

According to the targets of "peaking CARBON dioxide emissions by 2030 and achieving carbon neutrality by 2060", by 2030, China's carbon dioxide emissions per unit of GDP will drop by more than 65 percent co mpared with 2005, and non-fossil energy will account for about 25 percent of primary energy consumptio -n.

At present, all departments are speeding up the formulation of carbon peak roadmap, planning the emiss ion quota and carbon peak timetable in key areas in advance, guiding and strengthening market expectati -ons.

- Industrial measures

  For example, industrial fields include cement, steel, power industry, chemical industry and so on. The National Development and Reform Commission (NDRC) demanded that both total energy co nsumption and energy intensity be controlled. The Ministry of Ecology and Environment made it clear to speed up the construction of a unified carbon trading market nationwide; The central ba nk will improve the green financial system with the goal of promoting carbon peak; The Ministry of Industry and Information Technology continues to focus on the adjustment of steel and other energy-intensive industries.

- Measures on people’s livelihood

  The construction industry in the field of people's livelihood needs to calculate the energy consum ption and carbon emission of the whole life cycle of buildings. According to the relevant definitio n of China Building Energy Consumption Research Report 2020, the total life-cycle energy consu mption of buildings in China accounted for 46.5% of the total energy consumption in 2018, and 5 1.2% of the total energy carbon emission in China. Among them, the energy consumption in the production stage of building materials accounts for 51.3% of the energy consumption in the whol e life cycle of buildings, 23.8% of the total energy consumption in China, 55.2% of the carbon emi ssion in the whole life cycle of buildings, and 28.3% of the national energy carbon emission. The e nergy consumption in the construction stage accounts for 2.2% of the energy consumption in the whole life cycle of the building, 1% of the total energy consumption in the country, 2% of the car bon emission in the whole life cycle of the building, and 1% of the national energy carbon emissi on. Energy consumption in the building operation stage accounts for 46.6% of the energy consu mption in the whole life cycle of the building, 21.7% of the total energy consumption in China, 42.

8% of the carbon emission in the whole life cycle of the building, and 21.9% of the national energ y carbon emission. Therefore, carbon neutrality in the construction industry requires collaborativ e work among various professionals such as planning, design, construction, operation and demoli tion, covering five implementation measures of source reduction, recycling, energy substitution, energy saving and efficiency improvement, and negative carbon technology.

Transportation industry in the people's livelihood, it is understood that the carbon dioxide emissi -ons of the transportation industry account for about 10% of the total carbon emissions of the co -untry, and the green transformation of the transportation industry dominated by road transport -ation is imperative. The carbon emission sources of transportation industry include road transpo -rtation, railway transportation, air transportation and water transportation. Road transportation accounts for 77% of carbon emission and is the mode of transportation with the highest emissio- ns. The reduction of carbon emission in the transportation industry mainly reduces energy consu -mption intensity through optimization of transportation structure and improvement of energy e -fficiency, and achieves zero carbonization of energy through the use of electricity and hydrogen energy.

2.2. We will promote low-carbon transformation of the energy system

Use the existing styles and fonts without changing the setting. Continue to promote the energy supply re volution, continue to vigorously promote the low-carbon transformation of the energy system, and furth er accelerate the development of renewable energy and the deployment of storage and transportation fa cilities.

China continues to promote innovation in energy science and technology, which has become a basic force driving the reform of China's energy development. At present, China give full play to the north and west wind, light resources advantage, promote can complement each other, to speed up the energy storage technology and facilities deployment, to form a broader and more large-scale clean electricity intelligent scheduling new pattern, has established a complete water and electricity, nuclear power, wind power, solar power and other clean energy equipment manufacturing industrial chain.

Figure 3. The Energy Internet helps go carbon neutral. Source: Dai. L. Q. , *Carbon Neutral Industry Map,* EMR.

According to the forecast data related to energy, China is now about 90% of the carbon emissions from el ectricity and heat production, industrial, and transportation and other fields, to achieve carbon neutrality, China's energy structure will "accelerate transformation scene" : the disruptive changes: by 2050, China's electric power will be 53% of the terminal energy consumption. 92% of the electricity will be provided by zero-carbon energy sources, mainly photovoltaic, wind power, hydrogen and nuclear power. China's ene rgy structure will achieve a low carbon transformation in the future, subversive adjustment, there will be a huge space for growth.

2.3. Accelerate the spread of advanced energy conservation and emission reduction technologies, and vigorously tap the potential of energy conservation and efficiency

Key points of promotion and application include supercritical power generation, onshore wind power gen eration, large-scale ammonia synthesis, green lighting, etc. At the same time increase the power and indu strial using carbon capture and sequestration, fourth generation nuclear power, large-scale energy storag e technology, Marine geothermal power key low-carbon technologies such as research and development strength, and speed up the integrated gasification combined cycle power generation (IGCC), offshore win d, high efficiency, low cost high efficiency solar building integrated heat pump system, pure electric vehicl es and other technical demonstration.

3. Reform of spatial planning

Ecosystem carbon sequestration is to expand the traditional concept of carbon sequestration and innovat ion, not only contains the carbon sink in the past people, through measures such as afforestation and veg etation restoration process of absorbing carbon dioxide in the atmosphere, but also increased the grassla nds, wetlands, ocean ecosystems such as contribution to the carbon sequestration, and soil, frozen soil ca rbon storage of carbon fixed maintenance. Emphasis is placed on the balance and maintenance of the glo bal carbon cycle by various ecosystems and their interrelated wholes. Biological carbon sequestration me asures, mainly forests, grasslands, wetlands, mangroves and seagrasses, can continuously improve the ca pacity of ecological carbon sequestration and play an important role in mitigating global climate change.

- Carbon storage in terrestrial ecosystems
  China's terrestrial ecosystems stored 79.2 billion tons of carbon, sequestering 201 million tons annually, offsetting 14.1% of fossil fuel emissions during the same period. The carbon sequestration of China's terrestrial ecosphere is mainly due to the carbon sequestration contribution of important forest regions, especially the southwest and northeast forest regions in summer. Grassland is the second largest carbon pool after forest in China, and its carbon storage (including marsh grassland) accounts for 40% of terrestrial ecosystem carbon storage.
- Wetland carbon storage
  According to relevant research data, China's wetland carbon storage (16.87 billion tons) is also one of the important carbon pools in China, accounting for 3.8% of the world's wetland carbon storage. Among them, the wetland plant carbon storage is 220 million tons (1.3% of the ecosystem), the soil carbon storage is 16.65 billion tons (98.7% of the ecosystem); The carbon storage of marshes, lakes, rivers and coastal wetlands is 102.0, 42.0, 19.2 and 540 million tons respectively.
- Potential for ocean carbon sinks
  The ocean is the largest active carbon pool on earth. Marine ecosystems, including plankton, bac teria, algae, salt marshes and mangroves, lock 55% of the global carbon and absorb about 30% of the carbon dioxide released into the atmosphere by human activities every year. Marine carbon

storage is 20 times that of terrestrial carbon and 50 times that of atmospheric carbon. It plays an important role in tackling global climate change, protecting biodiversity and realizing sustainable development.

As a maritime power, China has a continental coastline of 18,000 kilometers and an island coastline of 14,000 kilometers. Vast waters have river port, such as coastal shore of coral reefs and mangrove land types and mangroves, seaweed and salt marshes and coastal wetland ecosystem, the vast, the shelf sea, rich biodiversity and abundant Marine aquaculture and solid scientific research strength, the ocean carbon sink, indicates that China has a large ocean carbon sequestration potential and realistic foundation.

Therefore, in order to achieve the goal of carbon peak and carbon neutrality as scheduled, China has reformed the original urban planning into a national spatial planning that covers all areas and all factors, strengthened national spatial planning and use control, and effectively brought into play the carbon sequestration of forests, grasslands, wetlands, oceans, soil and frozen soil, and increased the increase of carbon sinks in the ecosystem. At the same time, efforts will be made to reduce urban carbon emissions and modernize national governance capacity, starting from the following four aspects.

3.1. The spatial planning system was reformed

The urban planning system has been transformed into the territorial space planning system, which aims to coordinate the relationship between ecology and economy, supply and demand, government and market, etc., as well as urban and rural planning, land and sea planning. The basic principle is to increase the carbon input of the ecosystem and reduce the carbon output caused by disturbance. By demarcating red lines for ecological protection, permanent basic farmland, and urban development boundaries, we will improve the spatial pattern of China's territory, and protect and manage green infrastructure in natural protected areas such as forest land, arable land, and wetlands. We will promote the construction of urban carbon sink centers and suburban ecological barriers through climate-smart agriculture and forestry, increase carbon sinks, and enhance the capacity of urban ecosystems to capture carbon and regulate microclimate. To explore the potential of urban blue carbon sinks, plant Marine carbon sinks such as mangroves and coral reefs in offshore areas, and promote the construction of Marine "forest grassland" projects such as shallow sea seaweed (grass) beds and deep-water macroalgae, so as to actively support the carbon neutralization strategy.

3.2. Create a comfortable living circle with appropriate scale, compact space and rich functions

The carbon emission dynamic database is used as the core quantitative tool for spatial optimization and problem analysis of low-carbon cities, and the carbon emission efficiency of urban production and living is improved from the perspectives of low-carbon industrial system, green transportation system, low-carbon municipal facility system, green infrastructure and other national spatial planning topics.

- Establish dynamic database of carbon emissions from various land uses
  Following the "one map" of territorial space planning and the construction of urban information system, and following the idea of "multi-source data - accounting rules - land accounting", the construction is based on multi-source spatio-temporal data such as land use, facility point distribution, transportation routes, population density and energy consumption.

  The carbon emission accounting rules of energy consumption such as IPCC Guidelines for National Greenhouse Gas Inventory and Guidelines for Compilation of Provincial Greenhouse Gas Inventory were used to calculate carbon emission and carbon sink of different land uses such as

industrial land, road land, arable land and forest land, and build a dynamic carbon emission database.

It provides data support for industrial layout, facility location and improvement of living environment, and helps optimize green infrastructure layout and regional multi-functional mixed development to achieve micro-scale carbon neutrality and climate improvement.

- Improve the compactness of urban space layout

  Research shows that compact cities can help reduce per capita carbon emissions and carbon emission intensity. The construction of "carbon neutral" cities should focus on public transportation priority, low-carbon travel and reducing commuting, so as to reduce unnecessary commuting caused by going out to seek life services and reduce urban commuting carbon emissions. The basic principle is to increase the carbon input of the ecosystem and reduce the carbon output caused by disturbance.

  Advocate the construction of "narrow blocks, dense road network" urban grid, improve the compact urban space layout.

  The complex functions of the area will be enhanced to create a comfortable living circle with appropriate scale, compact space and rich functions.

  Follow the idea of "public transport pilot area - service center - urban grid" to optimize the urban spatial pattern, build the urban slow travel system and green infrastructure, optimize the "last mile" traffic and improve the proportion of high-carbon travel, and transform into a bicycle-friendly city.

  "300 meters to see the green, 500 meters to see the garden", in the "narrow road, dense road network" in the city grid layout reasonable street green space, pocket park and other sites, advocate residential greening, roof greening and other building three-dimensional greening, increase the living community green coverage, effectively adjust the community microclimate, optimize the living rest experience.

Figure 4. Case study: Low-carbon development model of China-Singapore Eco-city. Source: Tianjin Eco-city planning

- Carbon sequestration and purification to improve the capacity of urban carbon sink
  Urban parks, wetland parks, country parks and other open space systems and ecological protection areas are carbon sink centers. The construction of carbon sink centers in urban centers and marginal areas will play a role in carbon capture, climate regulation, pollution control and ecological conservation. With the help of suburban agriculture and forestry areas to create ecological barriers, realize the "eco-economic" composite function of carbon capture, carbon sink economy and soil and water conservation. With river and lake banks, green mountains and green gardens and urban roads as carriers, safe flood passage, natural ecological corridor and cultural leisure corridor will be constructed to integrate carbon sink, ecology, landscape and rest, an which can effectively absorb carbon dioxide and air pollutants generated by adjacent traffic. Play important role in slow passage, passage breeze, protective corridor, noise barrier and so on.

3.3. Reserve development space for mid - and long-term strategic development of renewable energy

- Systematically evaluate the development conditions of various renewable energy resources
  Solar energy and wind energy have low energy density, and their space demand will be much higher than that of traditional energy generation when they are developed and converted into secondary energy such as electricity.

  According to the Control Index of Photovoltaic Power Station Engineering Land Use, the land demand for photovoltaic power generation includes the land for photovoltaic array, substation, operation management center, power collection line and field road. Compared with traditional power generation, the land demand for photovoltaic power generation is 40 times that for typical coal-fired power plants and 75 times that for typical gas turbine power plants.

  According to the Construction Land Index of Power Engineering Projects (Wind Farm), wind power generation projects include wind turbines, unit substations and operation management centers, etc., and the land demand of a single unit is equivalent to that of traditional power generation. However, in addition to the land demand of the wind turbine itself, the unit also needs to meet the spacing requirements ranging from 500 meters to 800 meters. Wind farms and their surrounding areas of land use will be greatly restricted.

  Therefore, the development conditions of various renewable energy resources should be systematically evaluated. Rich solar energy resources are concentrated in the western Tibetan Plateau, central and northern Tibet, most of Qinghai, northern Gansu, eastern Xinjiang and central and western Inner Mongolia. The land wind resources are concentrated in Inner Mongolia, Gansu, Xinjiang, Qinghai-Tibet Plateau and northeast China. Although the wind energy resources are high in some parts of eastern coastal areas, the development space is limited due to the restrictions of population density, vegetation coverage and other factors, and the development potential of wind energy is limited. China's energy consumption centers are densely distributed along the eastern coastal areas.

- We will create more space for renewable energy development in light of local conditions
  As a result, China's proposed adjust measures to local conditions, combing the region (including pumped storage, similarly hereinafter) of water and electricity, wind power, solar, biomass energ y, geothermal energy and other renewable energy development layout and the relationship betw een the national spatial planning, system analysis of ecological, environmental protection, forestr y and grassland, brigade, military and other factors restricting the renewable energy developmen t and construction land. Research and put forward various renewable energy development space.

Combined with the development trend of various renewable energy technologies, the development potential and distribution of various renewable energy resources in this region are deeply evaluated.

At the same time, considering the implementation of China's energy revolution strategy and the need for large-scale development of renewable energy in the future, coordination with territorial space planning should be done to reserve development space for medium - and long-term strategic development of renewable energy. Territorial planning needs to pay special attention to and strictly implement the use of energy corridors and major facilities located outside the urban boundaries, as this is the guarantee of the entire urban life system.

From the perspective of demand, we need to study the upper limit of urban or regional energy demand under low carbon constraint and carbon neutral scenario, and also from the perspective of supply, we need to study the supply system to guarantee urban or regional energy security, and balance and optimize the substitution relationship and supply structure of various kinds of energy. On this basis, complete the layout and land use of electricity, natural gas, oil products, coal, renewable energy and other supply channels and facilities.

3.4. Optimize industrial spatial layout to help carbon neutrality

The core industrial structure of China's carbon neutrality industry chain can be roughly divided into three parts from carbon emission to carbon absorption. The front end strengthens the adjustment of energy structure, replaces high carbon with low-carbon, and replaces fossil energy with renewable energy. Upgrading energy conservation and emission reduction at the middle end, including industrial structure transformation, improving energy efficiency, strengthening low-carbon technology research and development, and improving low-carbon development mechanism; At the back end, the level of resource recycling is strengthened, the producer responsibility system is implemented, and the recycling and reuse of resource products is promoted. The natural cycle combines carbon trading to achieve carbon neutralization through carbon sequestration and carbon offsetting.

Therefore, focusing on the carbon neutral industrial chain also needs to optimize the spatial layout of the carbon neutral industry. Based on understanding the demand for industrial land, land use policies should be formulated and the forward-looking layout should be incorporated into the actual situation. The layout and development of high-carbon and high-carbon industries will be limited through territorial and spatial planning. The plan should reflect the concept of green development and low-carbon and zero-carbon transformation, and strengthen control of the use of national space driven by the goal of "carbon neutrality". Coordinated with ecological environment department management, through the establishment of carbon intensity standard measures such as various types of land, on the basis of detailed planning, land supply control "play dates" and high carbon industry, develop the natural resources development and utilization of "carbon friendly" project list, the project examination and approval of construction projects, planning and design, and construction for the operations such as the whole process of implementation of carbon emissions verification management. In terms of land use and access to the environment, we will support the establishment of a new type of power system dominated by new energy sources. Encourage the use of carbon capture, application and storage (CCUS) technologies in key industries such as cement and steel production, hydrogen production from fossil fuels, waste incineration and power generation.

Conclusion: China's proposed from “Carbon Peak” to “Carbon Neutral”, carbon transition only 30 years, while developed countries need to 60 years to 70 years, is a very powerful positive goals, means from the development mode to the sources of energy, industry, infrastructure, space planning, and even the trade and consumption, China will conduct systematic structural change, transformation and innovation.

China's move to a low-carbon development model that is carbon neutral and adaptable to climate change can make an important contribution to boosting global confidence in climate.

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