Documents of the Department of Industry and Information Technology of Jiangsu Province

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Regarding the printing and distribution of the "14th Five-Year Plan" industrial green development of Jiangsu Province and other planning notices

Industry and information technology departments of districts, cities

and counties (cities, districts):

The "14th Five-Year Plan for Industrial Green Development in Jiangsu Province", "the High-end Development Plan for the Chemical Industry in Jiangsu Province", the "14th Five-Year Plan for the Development of the Pharmaceutical Industry in Jiangsu Province", the "14th Five-Year Plan for the Construction of Industrial Information Security System in Jiangsu Province", the "14th Five-Year Plan for the Development of Big Data Industry in Jiangsu Province", the "14th Five-Year Plan for the Development of Software and Information Technology Service Industry in Jiangsu Province", the "14th Five-Year Plan for the Deep Integration of Informatization and Industrialization in Jiangsu Province", and the "14th Five-Year Plan" of Jiangsu Province Radio Management Development Plan" is issued to you, please carefully organize and implement it.

Jiangsu Provincial Department of Industry and Information Technology

August 25, 2021

Jiangsu Province's "14th Five-Year Plan" industrial green development plan

In order to implement the "Outline of the 14th Five-Year Plan for National Economic and Social Development of Jiangsu Province and the Long-term Goals for 2035" and the "14th Five-Year Plan for the High-quality Development of Manufacturing Industry in Jiangsu Province", and accelerate the green and low-carbon transformation of industry, this plan is formulated.

1. Development environment

(1) Achieve results

During the "13th Five-Year Plan" period, in accordance with the general requirements of "ecological priority and green development", the whole province focused on the main battlefield of industrial energy conservation and green development, accelerated the transformation and upgrading of industrial structure, vigorously implemented green manufacturing projects, focused on building an efficient, clean, low-carbon and circular green manufacturing system, strengthened the comprehensive utilization of resources, cultivated and expanded green industries, and made phased achievements in industrial green development.

1. The industrial structure continues to be optimized. Focusing on promoting the autonomy of core technologies, the upgrading of industrial base, and the modernization of industrial

chains, the manufacturing industry will develop towards high-end. The comprehensive competitiveness of provincial advanced manufacturing clusters continued to strengthen. The province's strategic emerging industries and high-tech industries have developed rapidly, with output value accounting for 37.8% and 46.5% of industries above designated size in 2020, respectively. Key industries have achieved remarkable results in capacity reduction, strictly implementing the regulations and requirements for capacity reduction and replacement of construction projects in steel, cement, flat glass and other industries, and effectively controlling new production capacity. During the "13th Five-Year Plan" period, a total of 17.88 million tons of crude steel production capacity, 19.15 million tons of cement production capacity, and 27 million weight boxes of flat glass production capacity were reduced, exceeding the national and provincial targets and tasks. Carry out the improvement of safety and environmental protection in the chemical industry, and a total of 4,454 chemical enterprises have been closed and withdrawn in the province, and the number of chemical parks (including concentration areas) in the province has been reduced from 54 to 29 in 2020.

2. The green manufacturing system has been initially formed. Accelerate the green development of the industrial field, introduce the

concept of product life cycle management, and continuously improve the level of green development. Create a number of green manufacturing demonstration enterprises, promote a number of green manufacturing system solutions, implement a number of key green manufacturing projects, cultivate a number of excellent green manufacturing service institutions, and initially build a green manufacturing system. During the 13th Five-Year Plan period, a total of 174 national green factories, 14 parks, and 14 green supply chain management enterprises were built, ranking among the top in the country, and the first batch of 97 provincial green factories were successfully cultivated. 19 enterprises undertook the national green manufacturing system integration construction project, 25 enterprises were selected into the national green manufacturing system solution supplier list, and 4 enterprises were included in the national green design demonstration enterprise list.

3. The level of energy conservation and consumption reduction has been significantly improved. During the 13th Five-Year Plan period, the province's energy consumption per unit of GDP and energy consumption per unit of industrial added value decreased by 20.6% and 26.7% respectively, exceeding the target tasks set by the state. The water consumption per unit of GDP and the water

consumption per unit of industrial added value decreased by 28.3% and 31.5% compared with 2015. Energy management continues to innovate, organize and carry out the "millions and thousands" action of key energy-consuming units, implement the "leader" action of energy efficiency and water efficiency in key energy-consuming industries, carry out energy-saving diagnosis services for industrial enterprises, accelerate the promotion and application of new energy-saving technologies and products, organize and implement energy-saving technology transformation projects, carry out energy-saving supervision in accordance with laws and regulations, and achieve full coverage of energy-saving supervision in high-energy-consuming industries. During the 13th Five-Year Plan period, a total of 12 enterprises were selected into the national energy efficiency "leader" list, and 4 enterprises were selected into the national water efficiency "leader" list; 63 third-party service institutions and energy-saving technology and equipment providers carried out energy-saving diagnosis for 605 enterprises; 332 key energy-saving renovation projects have been implemented, achieving annual energy saving of 2.05 million tons of standard coal.

4The level of comprehensive utilization of resources has been steadily improved. Based on the principles of reduction, recycling

and recycling, we will focus on reducing the generation of industrial solid waste and wastewater, and strengthen the efficient recycling of industrial resources.Issued the "Implementation Rules for the Evaluation and Management of Comprehensive Utilization of Industrial Solid Waste Resources in Jiangsu Province", Publish the list of third-party evaluation agencies,Promote the large-scale development of comprehensive utilization of industrial solid waste The province's annual comprehensive utilization of industrial solid waste exceeds 100 million tons,The comprehensive utilization rate of general industrial solid waste is stable at more than 90% The annual sales revenue of comprehensive utilization of solid waste in the province exceeded 75 billion yuan.The remanufacturing industry has begun to take shape, with annual sales exceeding 20 billion yuanZhangjiagang National Remanufacturing Industry Demonstration BaseIt is a representative industrial agglomeration area The first "National Remanufactured Auto Parts Product Quality Supervision and Inspection Center" was established in China. Strengthen the standardized management of the renewable resources industry, and 62 enterprises in the province, including scrap steel, waste plastics, waste grease, and waste tires, have been included in the list of relevant industry standard management announcements of

the Ministry of Industry and Information Technology. Positive progress has been made in the recycling of new energy vehicle power batteries, and the retired power battery recycling, cascade and recycling industry chain has been initially built。

5. The energy conservation and environmental protection industry continues to grow. Focusing on improving the technical level and core competitiveness of the industry, improve policy mechanisms, cultivate and standardize the market, focus on strengthening technological innovation, vigorously improve the level of technical equipment, products and services, and promote the high-quality development of energy conservation and environmental protection industries. In 2020, the province's energy conservation and environmental protection industry achieved main business income of more than 700 billion yuan, with an average annual growth of about 7%, and 27 enterprises were included in the list of national environmental protection equipment manufacturing industry standard enterprises. The innovation ability has been continuously improved, 140 enterprise technology centers at or above the provincial level have been built, the construction of manufacturing innovation centers has been cultivated, and a number of key technologies such as high-power and high-speed magnetic levitation drive technology, serial

pollution-resistant reverse osmosis, and comprehensive utilization technology of cold energy waste heat have been conquered, and industrialization has been realized. The industrial agglomeration effect is becoming more and more significant, with the industrial scale of Nanjing, Wuxi, Changzhou, Suzhou and Nantong accounting for more than 75% of the province, and Yixing and Yancheng have developed into energy-saving and environmental protection industry clusters with great influence in the country. The transformation of backbone enterprises has accelerated, actively exploring the development concepts and ideas of smart energy conservation and environmental protection, and accelerating the transformation to "Internet + energy saving", "Internet + environmental protection" and smart systems.

(2) There are problems

During the 13th Five-Year Plan period, although the province's industrial green development has achieved remarkable results, there is still a certain gap between the level of industrial green development and developed countries and advanced regions in China. **First, structural problems affecting the green development of industry still exist. The industrial structure is heavy, and the energy consumption of high-energy-consuming industries accounts for**

80% of the industrial energy consumption above the designated size. The energy structure is biased towards coal, with coal consumption accounting for more than 50%. **Second, there is still a lot of room for improvement in the level of green production. Ecological design is still in its infancy, the application of digital intelligence in the manufacturing industry is not wide, and there is a gap between the efficiency of energy and resource utilization and the advanced level. The pattern of green consumption leading green production has not yet been formed, and the supply of green products is insufficient. Third, the ability of green technology innovation needs to be further strengthened. There are not many breakthroughs in green core key technologies and equipment, advanced and applicable technologies have not been widely used, the industrial chain is generally at the middle and low end, and the degree of external dependence on high-end green manufacturing equipment, key components, basic materials, core processes, etc. is high.**

(3) Facing the situation

The "14th Five-Year Plan" period is the first five years after China has built a moderately prosperous society in an all-round way and achieved the first centenary goal, and then took advantage of the

momentum to start a new journey of building a modern socialist country in an all-round way and march towards the second centenary goal.

From an international perspective, green and low-carbon development is a major trend of global development, some developed countries have achieved carbon peaking, hundreds of countries around the world have put forward the goal of achieving carbon neutrality at different stages, sharing green development achievements and green and low-carbon technologies, and jointly responding to climate change has become a global consensus. Some regions, such as the European Union, are actively planning or implementing carbon tariff mechanisms. These will affect the global trade pattern and put forward higher requirements for the upgrading of industrial structure and technological progress in our province, but also provide opportunities for the green transformation of our province's industry.

From a domestic point of view, China has shifted to a stage of high-quality development, and is in a period of changing the mode of development, optimizing the economic structure, and transforming the driving force of growth. Industrial green development is an inevitable way to comprehensively promote high-quality

development and achieve the goal of carbon peak and carbon neutrality. Major national strategies such as the construction of the "Belt and Road", the Yangtze River Economic Belt, the integration of the Yangtze River Delta, and the in-depth battle of pollution prevention and control provide opportunities for the industrial field to systematically break the constraints of resources and environment at a deeper level, and explore new ways of ecological priority and green development. Accelerating the construction of a new development pattern with the domestic cycle as the main body and the international and domestic dual cycles promoting each other requires economic development to no longer be at the expense of resources and environment. The above factors provide a rare opportunity for the green development of industry in our province.

From the perspective of the province, a series of achievements have been made in economic and social development, but the contradiction between resource and environmental bottlenecks and constraints has become increasingly prominent. The total energy consumption of the province exceeds 300 million tons of standard coal, and the pollutant emissions per unit of land area are higher than the national average. Among them, industrial energy consumption accounts for more than 70% of the total energy consumption of the

whole society, and sulfur dioxide and nitrogen oxide emissions in the industrial field account for 86% and 52% of the province respectively. Coordinating the green development of the province's industrial sector has a huge impact on achieving high-quality development. The "14th Five-Year Plan" period is a critical period for Jiangsu to deeply implement the requirements of the major strategic deployment of the Party Central Committee and the state, which puts forward new requirements for the green development of the province's industry and brings new opportunities for the green development of Jiangsu's industry.

2. General requirements

(1) Guiding ideology

Guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, thoroughly implement Xi Jinping Thought on Ecological Civilization, fully implement the spirit of the 19th National Congress of the Communist Party of China and the 2nd, 3rd, 4th and 5th Plenary Sessions of the 19th Central Committee of the Communist Party of China, based on the new development stage, implement the new development concept, build a new development pattern, and take the goal of carbon peak and carbon neutrality as the guide, improve the green manufacturing system, accelerate the green

and low-carbon transformation of industry, promote the greening of industrial structure and production process, further promote the construction of beautiful Jiangsu, and unswervingly take the ecological priority, The high-quality development path of green development.

(2) Basic principles

Government guidance, market leadership. Give full play to the guiding role of government pilot demonstrations and factor investment, and strengthen the function of government service supervision. Pay attention to the decisive role of the market in allocating resources, strengthen the initiative of enterprises, and continue to build an enterprise-led and market-led industrial green development promotion mechanism.

Innovation-driven, transformation and development. Improve the technological innovation system with enterprises as the main body, fight the battle of key core technologies, and accelerate the transformation and application of scientific and technological achievements. Accelerate transformation and development driven by innovation, accelerate the green transformation of traditional industries, promote the agglomeration of green emerging industries, and form new sources of economic growth.

Quality and efficiency are prioritized, green and low-carbon. Adhere to the principle of saving first, accelerate the promotion of green transformation and upgrading projects, promote the construction of green industrial bases, and improve the quality of economic development. Promote green and low-carbon production methods, comprehensively promote resource conservation and intensive utilization, improve the efficiency of comprehensive resource utilization and output efficiency, and reduce pollution emissions.

Overall promotion, key breakthroughs. Comprehensively promote the construction of green manufacturing system, accelerate the green development layout of the park, guide and encourage enterprises to create green factories, and strive to improve the overall level of green manufacturing. Solve resource and environmental problems in the development of key industries, regions and enterprises, and give full play to the leading role of pilot demonstrations.

(3) Development goals

By 2025, the industrial structure of the manufacturing industry will be significantly optimized, green and low-carbon technology and equipment will be widely applied, digitalization and intelligence will

promote the rapid improvement of green development level, the efficiency of energy resource utilization will be greatly improved, and the industrial system of green, low-carbon and circular development will be initially formed.

Efficient use of energy resources, carbon peak and carbon neutrality are steadily advancing. The province's energy consumption per unit of GDP decreased by 14.5%, the energy consumption per unit of industrial added value above designated size decreased by 17%, and the carbon dioxide emissions per unit of industrial added value decreased by 20%. The unit energy consumption and carbon dioxide emissions of products in major energy-consuming industries have reached the world's advanced level; The level of cleaner production has continued to improve, the water consumption per unit of industrial added value above designated size has continued to decline, the emission of major pollutants has been further reduced, and the comprehensive utilization rate of general industrial solid waste resources has remained above 90%. Key industries in the industrial field strive to be the first to reach the peak around 2030.

The green industry has gradually grown, and the construction of the green manufacturing system has been fully

carried out. accelerate the green and low-carbon transformation of the industry, use green manufacturing innovation as the engine, and promote the further improvement of the competitiveness of the energy conservation and environmental protection industry; The green manufacturing service system has been continuously improved, and the entire manufacturing industry and industrial parks at or above the provincial level have comprehensively built green factories, green parks, and green supply chains, implemented green design, developed green products, and basically formed a green and low-carbon circular production mode.

The main indicators of industrial green development in the 14th Five-Year Plan

Indicator name	Indicator unit	In 2025
(1) The reduction rate of energy consumption per unit of industrial added value above designated size	%	17
(2) The reduction rate of carbon dioxide emissions per unit of industrial added value	%	20
(3) The reduction rate of water consumption per unit of industrial added value	%	18
(4) The proportion of total emissions of major industrial pollutants is reduced	-	-
Among them: the reduction ratio of volatile organic compounds	%	14
Nitrogen oxide reduction ratio	%	10
Reduction ratio of chemical oxygen demand	%	8
Ammonia nitrogen reduction ratio	%	8

(5) Comprehensive utilization rate of general industrial solid waste	%	>90
(6) The amount of recycling of main renewable resources	-	-
Among them: scrap steel	10,000 tons	3500
Waste paper	10,000 tons	750
Waste plastic	10,000 tons	200
Waste rubber and tires	10,000 tons	30
(7) The main business income of the energy conservation and environmental protection industry	100 million yuan	10000

3. Main tasks

(1) Build a green industrial structure

With the goal of promoting the high-quality development of the manufacturing industry, we will take multiple measures to accelerate industrial restructuring, cultivate and expand advanced manufacturing clusters, deeply implement digital transformation and intelligent upgrading, and promote the industry as a whole to move towards the middle and high-end.

1Accelerate the transformation and upgrading of traditional industries. Accelerate the withdrawal of backward production capacity, strictly implement the national guidance on the withdrawal of backward production capacity, and eliminate backward production capacity and inefficient low-end production capacity in the "two high"

industries in accordance with laws and regulations。 Efforts will be made to promote the green transformation of traditional industries, implement green upgrading projects, implement green management of the whole life cycle of products, and enhance new momentum for green development. Strictly control the rapid growth of energy consumption, and new high-energy-consuming projects must meet the advanced value of the mandatory performance consumption limit standard and the advanced value of the pollutant emission standard. For areas that have not completed the energy intensity target tasks of the previous year, regional high-energy consumption projects will be restricted. Vigorously develop advanced manufacturing, accelerate the cultivation of advanced manufacturing clusters, focus on building trillion-level industrial clusters, implement cluster development promotion institution cultivation plans, and build an open and efficient cluster innovation service system. Promote the progressive cultivation project of the 531 industrial chain and effectively improve the independent and controllable ability of the industrial chain and supply chain. Vigorously develop strategic emerging industries, accelerate technological iteration and industrial upgrading.

2. Optimize the layout of key areas. Systematically plan high-quality development along the river, coastal and northern Jiangsu,

take a new path of ecological priority, green development, and characteristics, and form a new pattern of multipolar growth and two-way support, so as to achieve "strong rivers and sea prosperity" and "north-south balance" development. Improve the green development level of the manufacturing industry along the river, promote the industry to climb to the middle and high end of the value chain, cultivate advanced manufacturing industry clusters with high standards, and build a high-end manufacturing industrial belt in the northern wing of the Yangtze River Delta. Create a growth pole for high-quality coastal development, vigorously develop marine characteristic industries such as new marine equipment, marine drugs and biological products, and seawater desalination equipment, promote the high-end green development of port industries such as chemicals and steel, and strive to build a high-level industrial development demonstration belt. Accelerate the green development of industries in northern Jiangsu, support the strengthening of advantageous industrial chains in northern Jiangsu, develop advanced manufacturing clusters from a high starting point, accelerate the revitalization of characteristic industries according to local conditions, and promote the green transformation and upgrading of traditional industries.

3. Promote the digital and intelligent transformation of industries. Effectively guide enterprises to carry out digital transformation and intelligent upgrading, insist on making up for shortcomings and forging long boards, and stimulate enterprise enthusiasm and endogenous motivation. In-depth implementation of intelligent manufacturing projects, carry out special actions for intelligent manufacturing into parks and clusters, promote the digital networking and intelligence of the manufacturing industry, promote the construction of demonstration intelligent workshops and smart factories, and strengthen benchmarking and demonstration guidance. Accelerate the deep integration of informatization and industrialization, promote the integrated development of advanced technology, information technology and manufacturing equipment, and accelerate the development and iterative upgrading of general and special intelligent manufacturing equipment. Accelerate the construction of digital and intelligent service systems, build a number of intelligent manufacturing and industrial Internet comprehensive service platforms, cultivate a number of leading intelligent manufacturing service institutions, and accelerate the promotion and application of new intelligent manufacturing models.

(2) Improve the level of green manufacturing

With the concept of full life cycle management, we will promote green production methods, green production processes, and green production equipment, systematically improve the green development level of factories, products, parks and supply chains, and accelerate the construction of a green manufacturing system.

1 .**Promote the greening of production methods.** Focus on energy saving, carbon reduction, and pollution reduction goals, and implement pollution control throughout the production process by means of management and technology. Promote the concept of green design, systematically consider giving priority to the use of green and clean energy and raw materials in the product design and development process, promote production enterprises to adopt reduced and harmless efficient clean process technology, improve the green level of production and manufacturing process, and minimize the generation and emission of pollutants. Promote the intelligent perception and control system of key process equipment, multi-objective optimization of manufacturing processes, and optimization of business decisions, and realize the collection and monitoring, intelligent analysis and fine management of information such as material flow and energy flow in the production process. Focus on industrial parks and industrial concentration areas to improve

industrial ecological links, and strengthen waste heat and energy recycling, energy cascade utilization, water resource recycling, and comprehensive waste utilization. Promote the substitution of natural gas and electric energy in industrial coal-fired boilers and kilns. Guide enterprises to replace clean raw materials, promote the restriction of the use of toxic and harmful substances in key industries, and strengthen the management of the restricted use of harmful substances such as lead, cadmium, and hexavalent chromium in electrical and electronic products. In industries with a large impact on the ecological environment, a wide range of products, and high industrial relevance, create green design demonstration enterprises, explore the green design path of the industry, and drive the green synergy of the industrial chain and supply chain.

2Promote the greening of the production process. Implement the cleaner production level improvement project, and carry out the research and development and application demonstration of source control and process reduction collaborative process technology around the process link with large emissions of volatile organic compounds, chemical oxygen demand, ammonia nitrogen, heavy metals and other pollutants, and reduce the intensity of pollutant emissions. Carry out cleaner production audits, implement cleaner

production plans, implement pollutant reduction and upgrading, and achieve comprehensive compliance with organized emissions and effective control of unorganized emissions. Traditional industrial agglomeration areas and industrial parks will build centralized spraying centers and other shared "green islands" according to the characteristics of industrial structure. Implement the upgrading and transformation of terminal treatment facilities, focus on key industries with large flue gas emissions, complex emission components, and difficult treatment, and carry out demonstrations of multi-pollutant collaborative control applications. Further promote the ultra-low emission transformation of key industries such as steel and cement. Focus on key industries with large industrial wastewater discharge and heavy metals and organic wastewater, carry out comprehensive control and application demonstrations in the whole process of efficient wastewater treatment and recycling, and gradually promote the implementation of ultra-low emission transformation in printing and dyeing, papermaking, chemical APIs, coal chemicals, non-ferrous metals and other industries.

3Promote the greening of production equipment. Highlight steel, petrochemical, chemical, building materials, printing and dyeing, machinery and other industries, and increase the promotion of

a new generation of clean, efficient, safe and green production technology and equipment. The iron and steel industry focuses on deepening the research and development and application of hot loading and hot transmission and continuous casting and tiing technology, promoting headless rolling and oxygen-rich metallurgy, and developing short-process processes in an orderly manner. Focusing on the development of manufacturing technologies such as near-net forming, digital moldless casting, additive manufacturing, and waste heat aging heat treatment of castings in the fields of casting and heat treatment. The cement industry focuses on promoting advanced and applicable technologies and equipment such as final grinding of roller presses, high-efficiency and low-nitrogen preheat decomposition and advanced firing, and a new generation of high-efficiency grate coolers. The textile printing and dyeing industry focuses on promoting low-water and waterless processes such as small-bath dyeing, short-process dyeing, counter-flow washing, segmented bath ratio, inkjet printing and low-water level dyeing, and three-in-one yarn rapid bleaching. Promote high-efficiency energy-using equipment such as high-efficiency and energy-saving boilers, power transformers, fans, and air compressors, optimize system matching, implement transformer energy efficiency improvement

plans, and add high-efficiency and energy-saving transformers account for more than 75%.

4．Build a green manufacturing system. Promote the construction of green factories, in accordance with the principles of plant intensification, harmless raw materials, clean production, waste recycling, and low-carbon energy, comprehensively cultivate green manufacturing benchmarks in all fields, give full play to the demonstration and leading role, and improve the overall green level of the industry. Promote green product development, carry out green design demonstration pilots, and systematically consider the impact of each link on resources and environment in the product design and development stage, so as to minimize the consumption of energy resources, minimize the impact on the ecological environment, and maximize the renewability rate of products. Promote the construction of green parks, cultivate a number of green parks with strong innovation ability and good demonstration and leading role, form a green development model of industrial parks with their own characteristics, give full play to the demonstration role of green parks, strengthen the promotion mechanism of green industrial park construction, encourage the use of modern information technology, establish regional energy monitoring centers and environmental

monitoring networks, increase the proportion of green buildings and renewable energy use in parks, improve the efficiency of energy resource utilization in parks, and create green and smart parks. Promote the construction of a green supply chain, with leading enterprises in the industry as the core, supported by green supply standards and extended producer responsibility systems, accelerate the establishment of resource conservation and environmentally friendly procurement, production, marketing, recycling and logistics systems, and establish a green supply chain management system.

Column 1 Green manufacturing system creation project
Green product development projects. Select products with a large quantity, wide range, closely related to consumers, and mature conditions, carry out green design demonstrations, develop green products, and create a number of green design demonstration enterprises. Encourage enterprises to develop and produce green products in accordance with national green product evaluation standards, establish a reasonable mechanism for selection, identification and recommendation of green products, strengthen supervision during and after the event, and ensure the quality of green product supply. **Green factory construction project.** Select a number of well-established and representative enterprises to carry out the creation of green factories in key manufacturing fields such as chemicals, metallurgy, building materials, textiles, and high-end equipment manufacturing, and achieve green development of factories, and create 1,000 national and provincial green

factories by 2025.

Green park construction project. Strengthen the demonstration role of national green parks and provincial green parks, comprehensively build green parks in industrial parks at or above the provincial level, promote the greening, recycling and ecological transformation of parks, build and improve green sharing infrastructure, and realize centralized wastewater treatment, reclaimed water reuse, cascade optimal utilization of waste heat and pressure resources, and comprehensive utilization of solid waste. By 2025, create 10 national green parks.

Green supply chain demonstration project. In industries such as automobiles, electronics, chemicals, machinery, and large-scale complete sets of equipment, select leading enterprises with strong representativeness, industry influence, strong operating strength and high management level, carry out the construction of green supply chain demonstration enterprises, and select the best to create a number of national green supply chain management enterprises.

(3) Accelerate the low-carbon transformation of industries

Guided by the "30•60" carbon peak and carbon neutrality goal, we will strictly implement the target responsibility of "dual control" of total energy consumption and intensity, formulate industrial low-carbon action plans, carry out pilot demonstrations of low-carbon construction around the low-carbon development path of key industries, optimize the industrial energy consumption structure and

production process, and reduce carbon dioxide emissions from key industries from the source.

1. Accelerate the low-carbon transformation of key industries. Thoroughly implement the national and provincial carbon peaking action plans, and prepare carbon peaking implementation plans for key industries such as steel, building materials, petrochemical and chemical industry, and data centers/5G new infrastructure. The steel industry orderly guides the development of short-process steelmaking process of electric arc furnaces, optimizes the raw fuel structure, and promotes the deep coupling of steel production by-product resources and energy with building materials, petrochemical and chemical industries. The building materials industry strengthens the substitution of raw materials and fuels, promotes the collaborative disposal of solid waste technology in cement kilns, and develops and promotes new low-carbon cementitious materials and high-efficiency concrete. The petrochemical and chemical industry has carried out demonstration projects for green hydrogen refining and carbon dioxide coupling to methanol, accelerating oil reduction and chemical increase, and increasing the supply of high-end green chemical products. In the field of new infrastructure, strengthen overall planning and rational

layout, increase the integration and scheduling of infrastructure resources, promote the transformation and upgrading of old infrastructure, accelerate basic research, increase the research and development and promotion and application of key core technologies, and create green and low-carbon new infrastructure. Promote the substitution of non-fossil energy, focusing on promoting the large-scale application of biofuels, waste-derived fuels and other energy in key areas.

2. Carry out pilot demonstrations of low-carbon development. Promote the construction of integrated energy systems, combine the creation of green parks and green factories, carry out the construction of industrial green and low-carbon smart microgrids, encourage parks and factories to develop photovoltaic building integration, diversified energy storage, efficient heat pumps, waste heat and pressure utilization, smart energy management and control systems, etc., and promote the cascade and comprehensive utilization of industrial waste heat and energy complementarity. Carry out low-carbon demonstration projects, focusing on the construction of "photovoltaic +", microgrid applications, hydrogen energy storage and hydrogen refueling station pilots, convenient charging and swapping battery infrastructure, near-zero emissions, large-scale

carbon dioxide capture and high-value utilization pilots and other demonstration projects. Carry out carbon peaking demonstration construction, explore the construction of "near-zero carbon parks (factories)" and "carbon neutral factories", encourage qualified industrial parks to take the lead in peaking, and select qualified areas and industrial parks to carry out demonstrations of the creation of "carbon emission peaking pilot zones".

Column 2 Industrial low-carbon transformation project
Carbon peaking action in key industries: Compile implementation plans for carbon peaking in key industries such as steel, petrochemical and chemical, building materials data centers/new 5G infrastructure, study and propose carbon emission peaks in key industries, clarify peak time, roadmap and policy measures, and take the lead in key energy-consuming industries. **Steel industry:** adopt mature and feasible advanced energy-saving technologies, develop and promote breakthrough carbon reduction technologies, and accelerate the promotion and application of digital and information technologies; Optimize the production process and raw fuel structure, increase the proportion of scrap application, improve the utilization efficiency of waste heat and steam, increase the proportion of self-generation, and promote the electrification of terminal equipment. Explore the application of hydrogen-rich oxygen-rich metallurgy and carbon capture/storage technology in the steel industry. **Petrochemical and chemical industry:** Relying on petrochemical

bases, with large-scale refining and chemical integration projects as the leader, the downstream olefin industry chain, aromatic hydrocarbon industry chain, new chemical materials/fine chemicals industry chain, etc. are coordinated development, combined with carbon capture, storage and utilization projects, to create a near-zero/net-zero carbon dioxide emission demonstration project.

Cement industry: Consolidate the effectiveness of capacity reduction, and strictly implement the industrial policy of reducing excess capacity such as capacity reduction and replacement. Guide the use of new low-carbon cement to replace traditional cement, carry out the substitution of cement production raw materials, and use non-carbonate raw materials such as industrial solid waste to produce cement to reduce carbon dioxide emissions in the production process. Promote the application of final grinding technology of roller press (roll grinding technology), high-efficiency and low-resistance cyclone preheater, energy-efficient cracking furnace and fourth-generation cooling machine and other technologies and equipment in the cement industry.

(4) Deepen energy conservation in the industrial sector

With the goal of improving energy utilization efficiency, accelerate the transformation of energy-saving technology, strengthen key energy management, continue to promote the construction of online monitoring of energy consumption, implement the "leader" action of energy efficiency, strengthen energy conservation

supervision, strengthen the application of results, innovate energy-saving service mechanisms, and comprehensively promote the transformation of industrial energy efficiency.

1Strengthen the main responsibility of enterprises for energy conservation. Key energy-consuming units formulate and implement annual energy-saving plans and energy-saving measures to ensure the completion of total energy consumption control and energy-saving targets. Improve the basic ability of enterprises to save energy, formulate and improve energy-saving management regulations, clarify energy management responsibilities, promote the construction of energy management system and energy consumption online monitoring and control system, strengthen the use of data, and realize intelligent energy management. Improve the energy consumption level of enterprises, dig deep into the potential of energy conservation, carry out energy audits, submit energy utilization reports on time, and actively eliminate outdated production processes and energy-using equipment.

2 . Implement industrial energy-saving technical transformation projects. Comprehensively promote the transformation of energy-saving technologies in traditional industries, and implement a number of key projects in the fields of steel,

petrochemical, chemical, building materials, textiles, and papermaking. Implement energy efficiency improvement projects, focusing on comprehensive improvement of energy conservation and environmental protection of coal-fired boilers, green lighting, energy system optimization, and comprehensive energy efficiency improvement of key energy-consuming units, and promote the comprehensive cascade utilization of energy. Accelerate the application of advanced energy-saving and low-carbon process technologies and equipment, and improve the energy efficiency of key general equipment systems such as boilers, transformers, motors, pumps, fans, and compressors. Carry out in-depth energy efficiency leading actions in the industrial field, select and release the list of energy efficiency "leaders" in key industries, and promote key energy-using enterprises to continue to catch up and surpass.

3 . Improve energy-saving supervision and service mechanisms. Implement the responsibility of energy conservation targets, decompose the total energy consumption control and energy conservation targets to key energy users, and implement the energy conservation target responsibility system and energy conservation assessment and evaluation system for key energy users. Strengthen energy conservation supervision, implement full coverage of energy

conservation supervision of key energy-consuming units and key energy-consuming equipment in high-energy-consuming industries, strengthen the application of results, ensure strict implementation of energy consumption quota standards, and eliminate backward high-energy-consuming energy-consuming equipment in accordance with the law. Promote the development of energy-saving service industry, build a market service platform for technical demand and technological innovation, and actively promote energy-saving technologies and products. Carry out energy-saving services into enterprises, focus on the main processes, key energy-using systems, and key technical equipment, organize industrial energy-saving diagnosis that combines comprehensive diagnosis and special diagnosis, and comprehensively improve the energy efficiency level of enterprises. Vigorously promote contract energy management, and encourage the use of advanced and applicable energy-saving technologies to carry out energy-saving technical transformation of major energy-consuming process equipment.

Column 3 Energy efficient utilization project
Energy-saving renovation and energy efficiency improvement. implement energy-saving transformation of kilns to improve the energy efficiency of industrial boilers; Implement the adjustment mode of motor

(water pump, fan, air compressor) system, and implement energy-saving transformation such as the use of high-efficiency equipment, overall optimization of motor system, steam turbine generator system, etc.; Implement the technical transformation of medium and low-grade waste heat and pressure recycling; Promote the use of energy cascades, carry out pilots of integrated energy systems, and implement collaborative optimization of energy flows, material flows, and information flows in energy systems in accordance with the principles of energy cascade utilization and system optimization. Energy-saving lighting transformation of various places is carried out by adopting high-efficiency lighting products such as semiconductor general lighting products with mature technology, high-efficiency lighting control systems, and using natural light as the light source.

Energy efficiency leads the action. Implement energy efficiency leading actions in key energy-using industries, carry out enterprise energy efficiency benchmarking, regularly release the list of leading enterprises and their indicators, and guide enterprises to implement energy-saving technological transformation. Released the Jiangsu Province energy-saving technology product promotion catalogue.

Online monitoring of energy consumption per unit of key energy consumption. Deepen the construction of online energy consumption monitoring system, realize online monitoring of all energy varieties, promote the deep integration of information technology and energy conservation, promote intelligent energy management of enterprises, optimize production scheduling and production processes, formulate scientific and effective

energy-saving plans, and improve the level of energy management refinement and energy utilization efficiency.

(5) Promote conservation and intensive utilization

With the concepts of reduction, recycling and recycling, promote industrial water-saving transformation and wastewater reuse, promote the comprehensive utilization of general bulk industrial solid waste resources, promote the efficient and high-value recycling of renewable resources, and accelerate the construction of power battery recycling system.

1. Vigorously carry out industrial water conservation actions. Implement the quota water system, implement water-saving transformation for enterprises that exceed the water quota standard step by step and within a time limit, strictly implement the advanced value index of industrial water quota for construction projects, and encourage key water enterprises and parks to establish a smart water management system. Strengthen water management, scientifically formulate water quotas and dynamically adjust them, implement strict planned water management and water reporting systems, and organize special supervision and inspection. Support enterprises to carry out "near-zero discharge" transformation of wastewater, optimize the use of process and circulating cooling water, strengthen process

circulation and terminal reuse, promote enterprises to strengthen the utilization of wastewater resources, and support qualified parks and enterprises to carry out the use of unconventional water sources such as rainwater collection and utilization. Vigorously cultivate and develop industrial water recycling service support systems, actively promote high-water-consuming industrial enterprises to widely carry out water balance testing, water audits and water efficiency benchmarking, regularly select water efficiency leaders, and promote the construction of water-saving enterprises and water-saving parks.

2. Strengthen the comprehensive utilization of solid waste. Promote the reduction of industrial solid waste in key industries, strengthen the development and application of recyclable and degradable materials and products, and reduce the generation of industrial solid waste. Promote the resource utilization of bulk industrial solid waste, focusing on bulk industrial solid waste such as fly ash, industrial by-product gypsum, steel slag, chemical waste slag, etc., and accelerate the promotion of large-scale and high-value comprehensive utilization technology and equipmentActively expand the application of comprehensive utilization products in metallurgy, building materials, infrastructure construction, underground goaf filling, soil treatment, ecological restoration and other fields. Promote

the regional coordinated disposal of bulk industrial solid waste, rely on leading backbone enterprises to promote the construction of a comprehensive utilization base for industrial resources, explore the establishment of an industrial development model based on regional characteristics, connect with the implementation of the integrated development strategy of the Yangtze River Delta, strengthen cross-regional coordination, and expand the scale of comprehensive utilization. Increase technological innovation in the comprehensive utilization of industrial solid waste, and promote the coordinated disposal of general industrial solid waste, domestic waste, urban sludge, silt and other wastes by industrial kilns such as cement kilns, steel kilns, and brick and tile tunnel kilns according to local conditions. Implement the evaluation of comprehensive utilization of industrial solid waste resources, and promote qualified regions to take the lead in realizing the exhaustion of new industrial solid waste and the orderly reduction of existing industrial solid waste.

3. Promote the efficient and high-value utilization of renewable resources. Accelerate the construction of a renewable resource recycling system, promote the agglomeration of resource elements to advantageous enterprises, and guide the standardized development of renewable resource utilization enterprises. Encourage

the construction of renewable resource industrial parks, cultivate and develop leading backbone enterprises, guide small and micro enterprises to enter the park, actively develop high-value recycled products, and strive to extend the renewable resource industry chain. Implement the producer responsibility extension system, accelerate the construction of waste resource recycling system, and promote traditional sales enterprises, e-commerce, logistics companies and other entities to use sales and distribution networks to establish a reverse logistics recycling system. Promote regional cooperation, encourage recycling enterprises to establish strategic cooperation with national "urban mineral" demonstration bases and other utilization enterprises, and promote the effective connection between recycling and utilization. Promote "Internet +" technology and support renewable resource enterprises to use the Internet and Internet of Things technology to establish an offline and online integrated recycling network. Encourage supply chain management, form an industrial chain of recycling networks, Zoomlion logistics, and waste industries for some key varieties, broaden the development space of enterprises, and stabilize and ensure the supply of renewable resources.

4. Accelerate the development of intelligent remanufacturing

industry. Strengthen the standardization of high-end intelligent remanufacturing, and encourage the development of common standards such as general standards, technology, management, testing, and evaluation of high-end intelligent remanufacturing. Cultivate high-end intelligent remanufacturing technology R&D centers, carry out green remanufacturing design, and further improve the comprehensive performance of remanufactured products. Strengthen the industrialization of remanufacturing, focusing on engines, construction machinery and other fields, accelerate the research and development and industrial application of intelligent design, evaluation, testing, intelligent dismantling and cleaning, additive processing and other technical equipment and application. Encourage the construction of a user-oriented quality control and evaluation application system for remanufactured products, promote the large-scale application of remanufactured products, and establish an effective feedback interaction mechanism with new product design and manufacturing.

5. Accelerate the recycling of power batteries. Formulate and promulgate the "Five-Year Action Plan for Power Battery Recycling in Jiangsu Province", establish a power battery recycling network system with regional central stations as the core, covering the whole

province, and realize the recycling of all retired power batteries. Establish a traceability management platform for the whole industry chain to achieve all-round supervision, and incorporate low-speed vehicle batteries into the supervision system. Cultivate a number of backbone enterprises for power battery recycling. Breakthrough in the key common core technology and equipment of retired power battery dismantling, echelon and regeneration. Accelerate the basic capacity building of power battery recycling, build a standard system with local characteristics, and cultivate a number of testing and certification institutions.

Column 4 Resource intensive use project
Industrial water-saving technology upgrading and transformation project. Implement water-saving and pollution control transformation projects for key industries such as steel, textile printing and dyeing, papermaking, and food, implement water efficiency leaders in water efficiency enterprises, promote water-saving technology transformation, and strengthen the use of unconventional water resources. **The development of the remanufacturing industry.** Relying on the Zhangjiagang National Remanufacturing Industry Demonstration Base and with auto parts remanufacturing as the core, we will build a remanufacturing industry demonstration base with international influence and a complete "green industrial chain".

High-level development of renewable resources. Focusing on steel, waste grease, waste plastic, waste tires, and construction waste, promote green production methods and make efficient and high-value use of renewable resources. Form a number of common key core technologies and equipment, and build a number of backbone enterprises for the utilization of renewable resources.

Construction of resource recycling bases. Yangzhou City, Jiangyin Qinwangshan Industrial Park, Changzhou New Taipei, Lianyungang City, Donghai County, Xinyi City, Wuxi City, Huishan, etcXuzhou City and other 7 resource recycling bases are used as the starting point to encourage the construction of resource recycling bases. The base will be built into a resource recycling demonstration base with a complete recycling network, reasonable industrial recycling chain, leading technical level, and shared infrastructure and public services, and a demonstration area for the construction of a green and low-carbon recycling industrial system integrating a variety of resource recycling industries and formats.

(6) Strengthen green manufacturing innovation

With the goal of improving the level of greening in the manufacturing process and improving industrial competitiveness, we will promote the application of green and low-carbon technology innovation, keep up with the direction of a new round of global scientific and technological revolution, stimulate the innovation vitality of market players, and strengthen the supporting role of

scientific and technological innovation in industrial green development.

1. Build a green technology innovation system. Formulate a green manufacturing industry guidance catalogue, a green technology promotion catalogue, and a technology and equipment elimination catalogue to guide the direction of green manufacturing technology innovation and promote the upgrading of technology and equipment in various industries. Implement the system of unveiling the list, issue key core technology guidelines, focus on the key areas and "bottleneck" links of major national and provincial energy conservation and emission reduction needs, clarify the key areas and main directions of supplementing and strengthening the chain, and effectively strengthen the supply of common technologies. Build an industrial innovation system with enterprises as the main body, guide leading enterprises to take the lead in integrating various innovation resources in the upstream and downstream of the industrial chain around the needs of market and industrial development, and strive to solve key common technical problems. Establish a risk protection mechanism for green technology innovation, strive for financial support from policy banks, and guide financial institutions to increase support for enterprises to adopt new technologies for energy

conservation, emission reduction, and pollution control technology application.

2. Strengthen the research of key core technologies of green manufacturing. Implement green technology innovation and encourage in-depth cooperation between enterprises and universities, research institutes, and industrial parks. Promote collaborative innovation between industry, university and research, strengthen the introduction, absorption and re-innovation of international advanced energy-saving and environmental protection technologies, and develop and promote a number of advanced technologies and equipment for cleaner production suitable for the characteristics of our province's industry. Strengthen technical research in the basic field of green manufacturing, aim at the difficulties and pain points in green development from the aspects of materials, processes, equipment, etc., concentrate superior forces to overcome technical difficulties, form a number of technologies at the bottom of the box, transform a number of advanced and applicable technologies, and reserve a number of cutting-edge technologies. Improve the competitiveness of core technologies, focus on key technologies and equipment that restrict the green development of the industry, increase research and development in the fields of high-efficiency motors and

dragging equipment, waste heat and pressure utilization, efficient energy storage, intelligent optimization control, smart grid and other fields, promote the development of a number of key core green technologies with independent intellectual property rights, domestic and international advanced levels, and cultivate a number of backbone enterprises with core competitiveness.

3. Improve the transfer and transformation mechanism of the whole chain of green technology. Build green manufacturing technologies and patent pools, and promote intellectual property protection and contribution. Establish a green manufacturing service industry platform with technical consultation, facility operation, talent training, and information release statistics as the main content, carry out online education, training and consulting services, and accelerate patent transformation and technology transactions. Adopt government procurement services and other methods to improve the public service system for green technology innovation, and support start-ups and achievement transformation. Guide all kinds of angel investment, venture capital funds, local venture capital funds, etc. to support the transformation of green technology innovation achievements, vigorously promote the adoption of energy trusteeship, service outsourcing and other models, and accelerate the

transformation and application of scientific and technological achievements. Implement insurance compensation policies and measures for the first (set) of major technical equipment, and support the demonstration and application of the first (set) of green technology innovation equipment. Vigorously promote the application of new technologies, encourage enterprises to use original, leading and other technologies in the production process, and maximize the transformation of innovative achievements into real productivity.

Column 5 Green Technology Innovation Project
Implement green technology innovation research projects. Encourage enterprises to cooperate with universities, scientific research institutes, and industrial parks in depth, promote collaborative innovation between industry, university and research, and develop a number of key core technologies and equipment for cleaner production suitable for the characteristics of our province's industries around energy conservation and environmental protection, clean production, clean energy, ecological protection and restoration, and green infrastructure. **Green technology innovation talent training project.** Strengthen the training of green manufacturing technology innovation talents, set up a number of green manufacturing technology innovation talent training bases in colleges and universities, strengthen the construction of green technology-related disciplines, continue to deepen the construction of new engineering in

the green field, and actively lay out the training of green technology talents. Select and make good use of innovation leaders and top-notch talents, select some vocational education institutions to carry out green technology professional education pilots, and guide technical and skilled workers to find employment in the field of green technology and serve green technology innovation.

Green technology innovation achievement transformation project. Implement insurance compensation policies and measures for the first (set) of major technical equipment, and support the demonstration and application of the first (set) of green technology innovation equipment. Adopt government procurement services and other methods to improve the public service system for green technology innovation, and support start-ups and achievement transformation.

Green technology innovation financial support project. Guide all kinds of angel investment, venture capital funds, and local venture capital funds to reasonably determine the financing threshold for green technology loans, actively carry out financial innovation, and support the financing of green technology innovation enterprises and projects. Encourage insurance companies to develop insurance products that support green technology innovation and green product applications. Encourage local governments to provide guarantees or other types of risk compensation for the transformation and demonstration application of green technology innovation achievements through guarantee funds or entrusted professional guarantee companies.

(7) Develop energy conservation and environmental protection

industries

With the goal of increasing the supply of green and low-carbon products and services, we will improve the support capabilities of basic raw materials and basic components, major equipment and core technologies, accelerate the research and development and manufacturing of energy-saving and environmental protection equipment, promote the integrated development of manufacturing, the Internet and service industries, and build a leading energy-saving and environmental protection industry highland in China.

1. Support the development of enterprise characteristics. Increase the cultivation of leading enterprises, guide the gathering of high-quality resources, and effectively play the leading role of large enterprises and large groupsEncourage a number of large-scale, new technology and strong leading backbone enterprises and industrial chain "chain master" enterprises to become bigger, better and stronger, further give full play to the advantages of brand, talent, market and capital, develop from equipment manufacturers to comprehensive service providers, and improve the comprehensive competitiveness of domestic and foreign markets. Support differentiated development, guide small and medium-sized enterprises to transform in the direction of "specialization, refinement, and innovation", cultivate a

group of specialized, refined, and new little giants and individual champions around areas urgently needed by the industry, and drive the overall improvement of the level of the whole industry chain through key breakthroughs in a technology, a material, a component and a product. Build a good industrial ecosystem, rely on industry associations and other social organizations, standardize the business behavior of environmental protection enterprises, form a good industrial ecology led by leading enterprises, supporting small and medium-sized enterprises, and coordinated development of the industrial chain, and promote the healthy development of the energy conservation and environmental protection industry.

2. Promote the upgrading of the park. Improve service guarantee and policy supply, give full play to the active role of the park in gathering production factors, optimizing resource allocation, and creating an industrial ecology, further deepen the reform of "decentralization, management and service", strengthen the construction of the park's service system, strengthen the construction of market integrity and industry self-discipline mechanism, and create a fair competition market environment. Continue to carry out precise chain supplementation, aim at subdivided fields and upstream and downstream accurate selection of enterprises to settle in, and

effectively open up the industrial chain by introducing and cultivating a number of innovative enterprises that can fill the gaps in the industrial chain of our province or significantly improve the level of key technologies. Efficiently give full play to the advantages of synergy, use modern information technologies such as cloud computing, big data, and the Internet of Things to build intelligent parks, establish industrial cluster coordination mechanisms, promote collaborative procurement, collaborative manufacturing, and collaborative logistics of regional industrial chain and supply chain enterprises, and promote the efficient flow and effective allocation of various elements such as technology, talents, and capital among enterprises.

Column 6 Energy conservation and environmental protection industry development project
Implement the action plan to strengthen the industrial chain. Focus on four major industrial chains, including water pollution prevention and control equipment, high-efficiency and energy-saving equipment, air pollution prevention and control equipment, and solid waste treatment equipment, and implement the industrial chain strengthening plan. Set up a special class for strengthening the industrial chain, implement the pilot enterprise cultivation plan, support leading enterprises to strengthen innovation, optimize brands, and promote transformation, cultivate a number

of industrial ecological leading enterprises that master the whole industrial chain and key core technologies, enhance the leading ability of industrial chain segments, and promote the linkage development of the upstream and downstream of the industrial chain.

Implement the project of "strengthening enterprises and strengthening enterprises". Focus on the terminal products of the industrial chain, especially the complete equipment, and vigorously cultivate a number of technology-led and market-led "chain master" leading enterprises. Support enterprises to target key links and key areas of the industry, carry out core technology research and development, process upgrading, product iteration, and model innovation, and actively cultivate hidden champions in the industry. Vigorously support small, medium and micro enterprises to take the road of specialized, special and new development, improve the support system and service system for small and micro enterprises and start-ups, and strive to cultivate specialized, special and new "little giants".

Build a cluster innovation system. Rely on key enterprises, universities, scientific research institutes and other R&D institutions to accelerate the construction of technological innovation platforms. Build technological innovation platforms such as the Provincial Environmental Protection Equipment Industry Technology Innovation Center, the Provincial Environmental Protection Equipment Innovation Platform, the Tsinghua Suzhou Environmental Innovation Research Institute, and the Provincial Small and Medium-sized Enterprise Energy Conservation and Environmental Protection Industry Public Technology Service Platform, promote the

research and development of common key technologies and the transformation of achievements, and improve the guarantee capabilities of basic raw materials and basic parts, major equipment and core technologies. Accelerate breakthroughs in key technologies and core components around new energy and energy storage equipment, energy-saving technology and equipment, water pollution prevention and control, air pollution prevention and control, solid waste treatment, resource recycling, greenhouse gas capture and utilization, etc.

Establish and improve the working mechanism for cluster cultivation. Establish a provincial and municipal linkage mechanism, led by the leaders in charge of the Provincial Department of Industry and Information Technology at the provincial level, and implement it in relevant departments; At the municipal level, the leaders in charge of the industry and information technology departments and the specific responsible departments and contacts are clarified. Establish an expert database for energy conservation and environmental protection cluster cultivation, set up an expert consulting service team for cluster cultivation, and regularly carry out industry consultation and physical examination consultation. Give full play to the role of social organizations such as industry associations, intermediaries, and industrial alliances, strengthen industry research, technical exchanges and cooperation, and promote cluster cultivation and development.

4. Safeguard measures

(1) Strengthen organization and implementation

Strengthen coordination and cooperation between provincial departments and provinces and prefectures, and coordinate the promotion of green industrial development. All localities have strengthened policy coordination, clarified responsibilities, increased investment, and effectively implemented various tasks and measures based on their respective realities. Give full play to the role of industry associations, research institutions, third-party institutions, etc. as a bridge to help the green development of key industries and important fields. Regularly carry out follow-up and evaluation of the implementation of the plan to ensure the effective implementation of the plan.

(2) Strengthen supervision and law enforcement

Strengthen energy conservation supervision and law enforcement, improve the connection between energy conservation supervision and enterprise credit evaluation, energy conservation review and other management systems, and strive to build a long-term mechanism to promote the green development of enterprises. Implement a new round of energy-saving supervision to achieve full coverage of high-energy-consuming industries and key energy-consuming units. Promote the improvement of the energy-saving standard system, and accelerate the expansion of the coverage of

energy-saving standards for key industries, products, and equipment. Eliminate backward production capacity in accordance with laws and regulations. Strengthen the basic capacity building of the energy conservation supervision team, and improve the "trinity" energy conservation management system of energy conservation management, supervision and service.

(3) Innovate systems and mechanisms

Improve the evaluation system of industrial green development, strengthen the application of results, and form an incentive and restraint mechanism to promote the development of green industries. Give full play to the role of the early warning mechanism for industrial green development, and guide local governments to reasonably regulate and control the construction of high-energy-consuming projects based on the completion of energy consumption intensity targets. Promote the innovation of price mechanisms and implement the price reform of resource products. Promote government green procurement, prioritize the purchase and use of products and services that meet national green certification standards, and promote enterprises to improve energy utilization and environmental behavior.

(4) Implement factor guarantees

Improve local laws and regulations and formulate supporting systems closely related to industrial green development. According to the positioning of the main functions of different regions in the province, innovate and implement differentiated regional and industrial policies, and strengthen relevant policies for energy conservation, emission reduction and green development of small and medium-sized enterprises. Implement relevant preferential tax policies such as energy conservation and emission reduction, green manufacturing, and comprehensive utilization of resources. Increase financial support for the transformation and construction of green development projects. Vigorously develop green finance such as green credit, green guarantee, and green insurance, and encourage commercial banks to develop green financial products. Strengthen the talent training mechanism, guide and encourage professional institutions, societies, associations, scientific research institutes, etc. to carry out various forms of training and education activities, and cultivate all kinds of talents required for industrial green development.

(5) Strengthen policy publicity

Carry out green publicity for the whole people, make full use of mass media platforms such as the Internet, newspapers and

magazines, radio and television, strengthen the publicity of industrial green development policies, increase the publicity of green products and green technologies, advocate conservation, environmental protection and green lifestyle, enhance people's awareness of resource conservation and ecological environmental protection, and create a good atmosphere for promotion. Encourage diversified participation, and take a multi-pronged approach from family, school, and society to make green culture, concepts and awareness penetrate into all walks of life.

Jiangsu Province's "14th Five-Year Plan" high-end development plan for the chemical industry

China's economy has shifted from a stage of rapid growth to a stage of high-quality development, and is in a period of changing the mode of development, optimizing the economic structure, and transforming the driving force of growth. With the continuous development of economy and society, the optimization and upgrading of related industries, and the acceleration of consumption level and other trends, the downstream industries have gradually improved the requirements for the development quality of the chemical industry.

The chemical industry is one of the pillar industries in Jiangsu Province and an important basic industry in our province, which has formed a multi-category industrial system from oil refining and ethylene production to basic chemical raw materials, synthetic materials, and special chemical manufacturing. Our province is a strong manufacturing province, with chemicals, new materials, energy conservation and environmental protection, new generation information technology and software, photovoltaics, automobiles, marine equipment, biomedicine and other industries in the leading position in the country, providing a strong industrial environment

guarantee for the high-quality development of the chemical industry.

The Fifth Plenary Session of the 19th Central Committee of the Communist Party of China clearly stated that it is necessary to promote the comprehensive green transformation of economic and social development and build a modernization of harmonious coexistence between man and nature. The Outline of the 14th Five-Year Plan for National Economic and Social Development of Jiangsu Province and the Long-term Goals for 2035 also put forward the development orientation of intelligence, green, and high-end, and build a modern industrial chain with circular development, green and low-carbon, and intrinsically safe. In December 2020, the Central Economic Work Conference clearly listed carbon peaking and carbon emissions as one of the eight key tasks in 2021, and proposed to adjust the energy structure, accelerate the construction of carbon markets, and promote land greening.

In order to implement the spirit of the Fifth Plenary Session of the 19th Central Committee of the Communist Party of China, promote the high-quality development of the chemical industry in our province, promote stable economic growth, and continuously improve people's lives, this plan is specially formulated. The planning period is from 2021 to 2025. In this plan, "chemical industry" refers

to industries that use petroleum, coal and chemical mines as raw materials for one or more chemical processing, mainly including refined crude oil products, basic chemical raw materials, fertilizers, pesticides, coatings, inks and pigments and similar products, synthetic materials, and special chemicals, excluding oil and gas extraction.

Chapter 1 Basic situation of the chemical industry in the province

1.1 Development achievements

1.1.1 Leading the country in advantageous industries

Jiangsu Province is a major chemical province in China, and has formed a multi-category industrial system from oil refining and ethylene production to basic chemical raw materials, synthetic materials, special chemical manufacturing, etc., the scale of the chemical industry ranks in the forefront of the country, occupies an important position in the local industrial system, and has made outstanding contributions to the healthy economic and social development of Jiangsu Province.

From the perspective of the number of enterprises, the existing chemical enterprises in the province account for 7.0% of the national chemical enterprises. From the perspective of production capacity,

many sub-industries in our province occupy an important position in the country. Among them, refining capacity ranks fourth among provinces and cities in the country, accounting for 4.9%, and crude oil processing accounts for 6.5% of the country; ethylene production capacity accounted for 8.8% of the country, ranking fourth; Acetic acid ranks first in China, accounting for about 38% of the country's total production capacity, and other organic raw materials such as bisphenol A, acrylonitrile, propylene oxide, etc. also occupy a large share in China; The polystyrene industry has significant scale and aggregation advantages, with GPPS/HIPS production capacity accounting for 48% of the country's total production capacity, ranking first in the country. The production capacity of polybutylene terephthalate (PBT), polyphenylene ether (PPE), and polymethyl methacrylate (PMMA) in engineering plastics ranks first in the country; The total output value of fluorine chemical production enterprises in our province accounts for about 16% of the total output value of fluorine chemical industry in China; The traditional fine chemical production capacity in the fine chemical industry is leading in the country, especially in pesticides and intermediates, coatings, synthetic additives, multifunctional intermediates, dyeing pigments and intermediates, oleochemicals, etc., and the field of electronic

chemicals in the new field of fine chemicals is the first in the country, and some varieties such as electronic grade hydrogen peroxide, N-methylformamide, lithium hexafluorophosphate and so on are the first in the country.

From the perspective of technical level, our province is a leading region in the national chemical industry technology research and development. It has established a leading position in the development of polyolefin production process and product grade, new polyurethane chain extender process and product development, polyetheramine product development, and GPPS/HIPS process development.

1.1.2 Outstanding industrial structure characteristics

Diversified raw material routes. The production capacity of ethylene and propylene in our province currently accounts for about 10% of the total olefin production capacity in the country, ranking fourth. Our province has built and is under construction 5 sets of diversified raw material ethylene production units, including 3 sets of methanol as raw material (MTO) production units, 2 sets of light hydrocarbon cracking to ethylene production units (1 set of mixed ethylene/propane to ethylene plant and 1 set of ethane cracking production ethylene unit). The diversification trend of propylene raw material routes in our province is also obvious, and the production

capacity of diversified routes accounts for 57% of the total production capacity.

High-end product quality. Driven by multiple factors such as market, technology, talents, and policies, the structure of chemical products in our province continues to upgrade. The production scale of high-end chemical products such as new chemical materials and high-end special chemicals has been further expanded, and a variety of products have achieved breakthroughs in industrialization for the first time in China. High-performance epoxy resins and products (special epoxy resins, wind energy resins) have broken foreign monopolies and entered high-end fields such as electronic information, photovoltaic and wind power. Epoxy asphalt has been successfully applied to high-speed runways that can take off and land aircraft, filling the domestic gap at half the cost of similar products in the United States. Our province has gradually formed a distinctive new material industry cluster, becoming the longest, most complete and highest concentration area in the global fluorine industry chain. In the market segment of new chemical materials, our province has formed a number of hidden champions, which play an important role in the development of various sub-industries.

1.1.3 Improvement of scientific and technological innovation

capabilities

Driven by the innovation-driven strategy, after the development of the "12th Five-Year Plan" and the "13th Five-Year Plan", the chemical industry in our province has highlighted the enhancement of original innovation ability, the enhancement of industrial technical strength and the deep exploration of the potential of scientific and technological resources.

First, while introducing, digesting and absorbing foreign advanced technology, a number of major scientific and technological achievements with independent intellectual property rights have been achieved by continuously increasing investment in science and technology, some of which have reached the international advanced level and exported overseas. A number of new chemical materials and special chemicals have achieved breakthroughs in production technology, breaking the monopoly of foreign technology, promoting the transformation and upgrading of the industry, and ensuring the development of downstream related industries.

Second, the awareness of applied technological innovation in universities and scientific research institutes has been enhanced, and "provincial key laboratories of enterprises" in several fields have been established one after another, accelerating the speed of industrial

application of scientific research achievements and increasing the success rate.

Third, the main position of enterprises in innovation has been further enhanced, and 174 chemical platforms have been built in the province, including 8 science and technology public service platforms, 3 key laboratories of enterprises, and 163 engineering technology research centers.

1.1.4 The development level of the park is leading

The chemical park gathers chemical enterprises and technical talents, and is the main position for scientific and technological innovation and industrial development in the chemical industry. In October 2020, our province identified 29 chemical parks and chemical concentration areas, and nearly half of the parks in the province were canceled from chemical positioning. The agglomeration, integration and coordinated development of parks in Jiangsu Province have a considerable level, and it has performed prominently in the comprehensive strength of domestic chemical parks, and the characteristic industrial development pattern has basically taken shape, and the level of safety and environmental protection has made great progress.

Nine chemical parks in our province were rated as "2020 China's

Top 30 Chemical Parks", and Nanjing Jiangbei New Materials Science and Technology Park, Taixing Economic Development Zone, and Yangzhou Chemical Industry Park ranked 2nd, 5th, and 10th respectively among the top 10 of the top 30. Jiangsu Yangtze River International Chemical Industrial Park, Changzhou Binjiang Economic Development Zone, High-tech Fluorine Chemical Industrial Park, Zhenjiang New Area New Material Industrial Park, Lianyungang Petrochemical Base, and Rudong County Yangkou Chemical Industrial Park are among them.

1.1.5 The spatial layout is initially formed

The main business income of the chemical industry in our province exceeds 100 billion yuan, including Nanjing, Suzhou and Wuxi; Nanjing, Suzhou and Wuxi ranked among the top three in the province in terms of tax revenue; There are also four cities with main business income exceeding 50 billion yuan: Nantong, Taizhou, Changzhou and Lianyungang.

At the end of the 13th Five-Year Plan, the entry rate of chemical enterprises in our province was 42.7% (in terms of quantity, the same below). The districted cities with high enrollment rates are Suqian, Nantong, Nanjing and Zhenjiang, with an enrollment rate of more than 60%; while the admission rate of Wuxi and Changzhou is less

than 20%. There are also some competitive chemical enterprises and projects outside the park.

Nanjing, Suzhou, Wuxi, Changzhou, Zhenjiang and other cities along the river and lake have formed a relatively complete production system of petrochemical, chemical raw materials, fine chemicals, and new chemical materials, which are the areas with the highest concentration in the middle and lower reaches of the industrial chain. Nanjing relies on large state-owned enterprises and foreign-funded enterprises to develop petrochemical and olefin downstream deep processing industries, forming a petrochemical industry chain and a carbon one chemical industry chain; Suzhou has formed a fine chemical industry represented by biomedicine and electronic chemicals, a new chemical material industry represented by fluorine materials and silicon materials, and a petrochemical industry represented by synthetic lubricants. Wuxi has formed a new chemical material industry chain represented by polyester and polyamide and a fine chemical industry chain characterized by electronic chemicals, biomedicine, coating resins, rubber and plastic additives; Relying on the advantages of technology research and development and the advantages of basic raw materials of salt chemicals, Changzhou City has formed a fine chemical industry system featuring coatings,

chlorine downstream products, pharmaceuticals and intermediates; Zhenjiang City has formed industries such as organic raw materials based on acetic acid, fine chemicals represented by environmental protection special chemicals, and new chemical materials represented by new silicone materials.

Relying on convenient transportation conditions and port conditions along the coast, Lianyungang, Yancheng and Nantong have formed a production pattern dominated by petrochemical, organic raw materials and synthetic resins, and at the same time formed pesticide and pharmaceutical industries with important domestic influence. Among them, Lianyungang City has formed petrochemical, organic raw materials and other industries; Yancheng City has formed advantageous industries such as pesticides and medicines; Nantong has formed a fine chemical industry and new material industry represented by pesticides, medicines, and electronic chemicals.

Yangzhou and Taizhou in the central region rely on large petrochemical enterprises to develop the petrochemical industry, and extend the development of fine chemicals and new chemical materials industries. Yangzhou City takes olefin aromatic coupling processing as the path to develop high-performance fiber and other synthetic

material industries; Relying on the leading petrochemical and salt chemical industries, Taizhou City has extended the development of new chemical materials and fine chemical industries.

Xuzhou, Suqian, and Huai'an in the north rely on resource endowments to form an industrial structure dominated by coal chemical industry and salt chemical industry. Xuzhou City develops a new chemical material industry with the deep processing of coal-based raw materials as the path; Suqian City has developed a life science industry chain based on chemical APIs and a new chemical material industry chain based on new rubber and plastic materials; Huai'an City has formed a new chemical material industry chain dominated by new salt materials.

Overall analysis, the province has formed a chemical industry system dominated by fine chemicals, widely distributed petrochemicals, organic raw materials and synthetic materials, and accelerated layout of new chemical materials. However, the problems of scattered layout, low industrial concentration, and insufficient high-end application varieties still need to be optimized during the "14th Five-Year Plan" period.

1.1.6 The rectification and improvement results are remarkable

Since 2016, the whole province has conscientiously implemented the decisions and arrangements of the Party Central Committee and the State Council, adhered to the new development concept, adhered to the problem-oriented, precise policy, and treated both symptoms and root causes, and systematically carried out the "four batches" special actions of chemical enterprises, the improvement of safety and environmental protection in the chemical industry and the special rectification of safety production in the chemical industry. It has laid a good foundation for the high-quality development of the chemical industry in the province.

The regional industrial layout has been significantly optimized. The number of chemical enterprises closed in eight cities along the Yangtze River accounted for nearly 80% of the total number of shutdowns in the province. Chemical enterprises in environmentally sensitive areas such as 1 km along both sides of the main and tributaries of the Yangtze River, Taihu Lake first-class protected areas and urban densely populated areas should be closed. Major projects of Lianyungang Petrochemical Industry Base have been steadily advancing.

The level of safety and environmental protection has been effectively improved. The province has effectively closed and

withdrawn nitrification enterprises that do not meet the conditions for safe production, and completed the reduction target. The number of safety production accidents in the chemical industry has been effectively controlled, and the level of safety production has been significantly improved. The reductions of wastewater, chemical oxygen demand and ammonia nitrogen in the chemical park (concentration) area of the province were 39.5%, 55.7% and 30.0% respectively. The total centralized disposal capacity of hazardous waste basically meets the needs of hazardous waste disposal in the province. Nearly 90% of the water quality section of the chemical park is better than the Class III standard, and the environmental systemic risks are effectively controlled.

1.2 Main problems

1.2.1 The level of industrial structure needs to be optimized

In recent years, our province has implemented the high-end strategy of "base-type" and "leading type", and the development level of industries such as automobiles, electronic information, chemicals, rail transit, aerospace, new energy, medicine, intelligent manufacturing, new materials, energy conservation and environmental protection, shipbuilding and marine engineering equipment has been continuously improved, and the demand for high-

end chemical products has maintained rapid growth. Although the technical level of products in some fields such as new chemical materials in our province has reached the international advanced level, the overall products are still dominated by general synthetic materials, traditional fine chemicals, etc., and the proportion of differentiated products and high-end products is relatively low, extending to the downstream of the industrial chain, especially the extension ability to downstream terminal products, services and solutions is not strong. Engineering plastics, high-end polyolefin plastics, special rubber, electronic chemicals and other new chemical material products are still in the initial development stage, and there is still a certain gap with foreign high-end products, which cannot fully meet the requirements of downstream related industry transformation and upgrading. The horizontal correlation between enterprises is low, the comprehensive and efficient utilization system of by-products is not perfect, and there is still room for optimization of the overall competitiveness of the industry.

1.2.2 The first-mover disadvantage is still prominent

There are a large number of enterprises in the traditional fine chemical field represented by pesticides and dyes in our province, accounting for 24.5% of the total output value of the chemical

industry in the province, but there are problems of dispersion and low industrial concentration. The coating industry in our province also has small and scattered problems, with only 25% of the coating enterprises with an output value of more than 100 million yuan, and the output value contribution of the remaining 75% of the enterprises only accounts for 15% of the total output value of the coating industry. In addition, water pollution and derived environmental risks within 1 kilometer of the Yangtze River still exist, and the moderate transfer of enterprises along the river to the coast and northern Jiangsu still needs to be promoted.

1.2.3 The level of industrial intensification still needs to be improved

The problem of low enrollment rate is more prominent. The reduction in the number of chemical parks has led to a decrease in the "admission rate", and the degree of industrial integration of enterprises in the canceled chemical park (concentration) area is low, making it difficult to supervise.

The problem of many enterprises and small scale still exists. The number of enterprises above designated size in the chemical industry in the province accounts for 78.0%, and the output value of enterprises below 100 million yuan accounts for 60%.

The layout of the chemical industry in the province lacks overall planning, and the positioning of the park is not clear. The renovation and improvement of each chemical park clearly focuses on the development of 1-2 leading industrial chains, but the overall performance is the convergence of functional positioning and the lack of effective guidance for different subdivisions. Some chemical parks are simple agglomeration of enterprises, without intensive and integrated functions, and the management level is not high.

1.2.4 The level of safety and environmental protection needs to be improved

Some riverside parks are close to the Yangtze River, facing severe challenges and constraints from environmental protection requirements such as the protection of the Yangtze River and Taihu Lake. In the future, the new production capacity will be strictly controlled, and it is imperative to adopt water-saving technology, comprehensive utilization of water resources, cleaner production technology, energy-saving technology and comprehensive utilization of by-products.

1.2.5 Land resources restrict sustainable development

Our province has issued a number of documents to standardize the development of parks and the high-quality development of the

chemical industry, and promote the supply-side reform and industrial transformation and upgrading of the chemical industry in the province through strict measures such as reducing the number of chemical parks (centralized) areas, reducing the number of chemical production enterprises along the river, and reducing the number of chemical production enterprises in environmentally sensitive areas. The scale of developable land (including unused land within enterprises) in the province's chemical park (concentration) area accounts for about 35% of the total area. The areas with large development room and suitable for large-scale projects are mainly coastal/northern Jiangsu areas, including chemical parks (concentration) areas in Lianyungang, Huai'an, Yancheng and other cities. The industrial system of some chemical parks (concentrations) has been relatively perfect, land resources are tight, and future development can promote the evacuation of non-chemical enterprises and backward enterprises in a timely manner on the basis of scientific compliance.

Chapter 2 The chemical industry is facing the situation

2.1 Development potential and trend of foreign chemical industry

2.1.1 Asia remains a growth hub

East Asia is an important driver of world macroeconomic growth, and the continuous concentration of manufacturing in the Asia-Pacific region has increased the demand for chemical products. The gap between per capita consumption of chemical products in the Asia-Pacific region and developed countries in Europe and the United States is gradually narrowing, maintaining huge consumption growth potential. In the future, the increase in chemical product consumption will mainly be concentrated in countries with large populations, large economies, high manufacturing proportions, and stable economic growth. In recent years, large chemical groups have continuously expanded their markets to emerging economies in the Asia-Pacific region through cross-border mergers and acquisitions, restructuring, joint ventures or sole proprietorships. East Asia and Southeast Asia have become the world's manufacturing centers, with industrial development potential and urban development space, and will maintain the central position of the growth of the world chemical market.

2.1.2 Accelerate the adjustment of industrial structure

With the gradual maturity of the market in developed countries and the progress of industrial technology, the world's chemical

industry is undergoing a new round of industrial restructuring, transformation and upgrading, with the acceleration of independent innovation capabilities and the continuous optimization of the industrial structure level. On the one hand, the concentration of resource-oriented industries continues to increase, such as energy, biomass, chemical mineral conversion, etc. On the other hand, customer-oriented industries are becoming increasingly refined and differentiated in terms of product types, such as new functional materials, electronic chemicals, membrane materials, nanomaterials and catalysts. The world's developed economies have long paid attention to industrial restructuring, and accelerated the transfer to materials science, life science, and environmental science industries according to the development trends of resources, energy, population, health, and environment.

2.1.3 Enterprises strengthen business focus

Through continuous business integration and optimization, multinational chemical enterprises have gradually withdrawn from the traditional chemical field with low added value and high pollution, developed in a more specialized direction, and further strengthened their dominant position in their fields. Enterprises in advanced economies have turned to investing in resource-rich countries or

regions with market development potential by stopping or reducing local chemical production. Some companies in emerging economies are looking for more overseas development opportunities and M&A targets in developed countries. In the context of the weakening support for global integration in advanced economies, the overseas development path of enterprises in emerging economies is becoming more and more important.

2.1.4 The trend of raw material diversification is deepening

In the context of the complexity of the international energy market, countries around the world have formulated and adjusted energy strategies according to national conditions, and vigorously implemented the diversification of raw material supply has become an important feature of the development of the global chemical industry. Among them, the most prominent performances include: the technology of unconventional oil and gas resource development is gradually maturing, and the proportion of light hydrocarbons, condensate oil and heavy oil in chemical raw materials will continue to increase; The production of olefins, oils, natural gas, ethylene glycol, aromatics and other technologies using coal as raw materials has gradually matured, and its competitiveness and survivability have been verified by the market, and further development will be achieved

in countries rich in coal resources. The substitution role of biomass raw materials has been highly valued, which helps to promote the green and low-carbon development of the chemical industry.

2.1.5 Innovation drive continues to deepen

In the case of overcapacity, rising costs and continuous compression of profit space in the traditional chemical industry, the production of high-tech and high value-added products and the realization of high-end differentiation of products have become the most important way for enterprises to survive and develop. Scientific and technological innovation has become the main driving force for the transformation and upgrading of the chemical industry, and the structural transformation driven by technological innovation has become the key to seizing the commanding heights of future competition. New chemical materials will become the fastest growing and most competitive industry. Among them, the development and application of high-end new chemical materials with higher value and more outstanding performance have attracted much attention, especially biomedicine, packaging materials, automotive lightweight materials, electronic chemicals, functional building materials, etc. will accelerate the development, and the market share of new chemical materials will expand rapidly. The life sciences industry will

make significant progress. With the rapid growth of the population and the acceleration of aging, people are gradually realizing that medical and nutritional security is crucial to people's physical and mental development, so the demand for safer and healthier food and medicines will gradually increase. In the next decade, vigorously developing life sciences is another major strategic goal pursued by powerful multinational companies.

2.1.6 Information technology drives change

The new generation of information technologies such as the Internet of Things, cloud computing, and big data has entered the stage of large-scale commercialization, bringing revolutionary changes to traditional chemical production methods. The first is to deeply integrate and optimize the chemical production process, and further improve the efficiency of resource utilization, production and management on top of the basic requirements of "safety, stability, long-term, fullness and excellence". The second is to change the low supply chain efficiency and high storage demand of traditional chemical enterprises through the introduction of information platforms, and realize the collaborative operation of upstream and downstream enterprises and cross-industry. The third is to strengthen communication and cooperation with customers through the

establishment of an information service platform to promote the transformation of the chemical industry from traditional production mode to new service mode. Fourth, for global operation, comprehensive integration and optimization of production, materials, logistics, manpower, etc. around the world through information means.

2.2 The development potential and trend of China's chemical industry

The "14th Five-Year Plan" is a critical period for the transformation and development of China's petrochemical and chemical industries, and efforts should be made to achieve high-quality development. The overall requirements for the high-quality development of China's petrochemical and chemical industry are to take "reducing production capacity and making up for shortcomings" as the core, "adjusting the structure and promoting upgrading" as the main line, promote supply-side structural reform, vigorously implement innovation-driven and green sustainable development strategies, and actively cultivate strategic emerging industries. Promote the continuous optimization of industrial structure, product structure, organizational structure and layout structure, in accordance with the principle of "emphasizing quality over quantity", focus on

improving the international competitiveness and sustainable development ability of the industry, and promote China to become a petrochemical and chemical industry power.

2.2.1 Rational allocation of resources and optimization of industrial layout

In accordance with the requirements of the national main functional regional planning and industrial layout planning, combined with the national "Belt and Road" strategy, the development strategy of the Yangtze River Economic Belt, and the integration of Beijing-Tianjin-Hebei, the layout of chemical parks will be optimized. On the basis of the orderly promotion of the construction of large-scale petrochemical industry bases and major projects in the 13th Five-Year Plan, the 14th Five-Year Plan will continue to promote and complete, improve the level of refining and chemical integration, enhance the guarantee capacity of basic products such as olefins and aromatics, and no new comprehensive large-scale petrochemical bases will be laid out during the 14th Five-Year Plan period. Taking into account factors such as resource supply, environmental capacity, security guarantees, industrial foundation and economic benefits, in the central and western regions that meet the resource and environmental conditions, combined with the development of large-scale coal bases,

in accordance with the requirements of environmental access conditions, steadily carry out the engineering and industrialization upgrading demonstration of key technologies of modern coal chemical industry, focus on improving the level of resource utilization and environmental protection, improve the competitiveness of devices, and promote the clean and efficient use of coal resources.

2.2.2 Deepen structural adjustment and promote kinetic energy conversion

During the "14th Five-Year Plan" period, continue to control the new production capacity of excess industries such as oil refining, urea, ammonium phosphate, caustic soda, polyvinyl chloride, soda ash, calcium carbide, yellow phosphorus, etc., and implement the policy of "equal or reduced replacement". Strengthen the technological transformation of existing traditional industry devices, encourage enterprises to adopt new technologies, and improve the economic benefits of enterprises. Strengthen product application research and development, open up traditional product application consumption fields, and expand consumption. Encourage enterprises to do a good job in energy conservation and emission reduction, and increase the cost of energy, resources and environment for backward production capacity through differentiated policies such as

differential electricity prices, punitive electricity prices, water prices, and progressive price increases for non-residential water over-quota plans, and differential sewage treatment fees and sewage fees. Through resource integration, we will accelerate the construction of a number of leading large enterprises and enterprise groups, improve industrial concentration, and form a number of world-class enterprises and "single champion" enterprises. It is necessary to strengthen brand awareness, improve product quality, improve the brand management system, and create a number of internationally renowned brands with high popularity and reputation.

2.2.3 Strengthen the construction of the park and encourage technological transformation

In accordance with the principle of "integration, scale, parkization, and intensification", strengthen the construction of parks and improve the level of safety and environmental protection. It is necessary to learn from past experience, comprehensively carry out the cleanup and rectification of existing chemical parks, and implement transformation and upgrading of chemical parks that do not meet the requirements of the norms or withdraw in accordance with the law. When enterprises "relocate to the park", they should prepare enterprise plans according to local conditions, reasonably

arrange product structure and production scale, and do everything possible to improve the economic benefits of enterprises under the premise of ensuring environmental protection and safety. It is necessary to establish a project access management system and a project evaluation system in the park, and implement standardized access condition management. It is necessary to establish an evaluation standard system for the standardized construction of chemical parks, carry out regional quantitative risk assessment of chemical parks and functional areas involving major risks involving hazardous chemicals, and scientifically determine regional risk levels and risk capacity. It is necessary to standardize and certify the park, frequently supervise and inspect the enterprises in the park, and promptly transform or clean up the unqualified enterprises within a time limit. It is necessary to strengthen the construction of public platforms in the park and improve the level of comprehensive services. It is necessary to improve the infrastructure, monitoring, emergency system and other supporting guarantees, and carry out the construction of "smart chemical parks".

2.2.4 Grasp the innovation drive and seize the high point of development

Focusing on meeting the major national projects and the major

needs of the national economy and people's livelihood, accelerate the cultivation of strategic emerging industries in petrochemical and chemical industries, and strive to break through a number of common key technologies and complete sets of equipment. Improve the industrial technology innovation system with enterprises as the main body, market-oriented, and the combination of industry, academia, research and application. Focus on the development of high-performance, high-value-added fine chemical products, and move towards the middle and high-end of the industrial chain. Vigorously promote the coordinated development of new chemical materials and modern rail transit, automobiles, aerospace, military industry, construction and other fields. It is necessary to concentrate on developing a number of major topics related to the national economy and people's livelihood, developing a number of major leading innovation projects that are in the international leading, developing a number of innovative technologies that have a leading role in the industry, and developing a number of practical engineering practices that can solve the common difficulties and blockages of the industry. It is necessary to focus on promoting the development of new product application technology and accelerating the cultivation of new product markets. It is necessary to strengthen the protection of

intellectual property rights and increase the training and introduction of talents.

2.2.5 Adhere to green development and deepen energy conservation and emission reduction

In accordance with industrial policy, implement the elimination of backward production capacity. Actively promote cleaner production technology, renewable resources and process emission control technology, strengthen source and process management, do a good job in circular economy, reduce the "three wastes" and carbon dioxide emissions, and improve the level of comprehensive utilization. Encourage the development of new technologies, new products and new equipment for energy conservation and emission reduction. Focus on developing and promoting the substitution technology of highly toxic raw materials, and promote clean production processes such as catalytic hydrogenation and adiabatic nitrification. Eliminate high-pollution processes such as lead-containing paint open-hearth process to produce potassium permanganate, batch coke method to produce carbon disulfide, and calcium roasting method to produce sodium dichromate. Fully implement the comprehensive remediation of volatile organic compounds (VOCs), accelerate the replacement of organic solvents in

oil refining, coatings, pesticides, adhesives and other fields, and the closed transformation of production processes. Focus on the development of wastewater treatment and reuse technology in coal chemical, dye, pesticide and other industries, and recycling technology of waste plastic, tire and other organic matter. Strengthen the comprehensive utilization of waste heat from process equipment to improve steam grade and energy efficiency. Vigorously promote the comprehensive utilization of solid wastes such as coal ash, alkali slag, phosphogypsum, calcium carbide slag, etc., and encourage the use of coke oven gas, calcium carbide furnace gas, yellow phosphorus exhaust gas and other chemicals to produce. Strengthen the development and promotion of degradable plastics.

2.2.6 Promote the integration of wisdom and improve the level of management

Actively promote the application of industrial Internet, cloud computing and 5G in the industry. Continue to do a good job in industry application pilot demonstrations, carry out the construction of intelligent workshops, smart factories and smart chemical parks in key industries, promote the application of warehousing and logistics, sales services and enterprise management, and promote the integrated development of industry and information technology in enterprises

and parks. Establish and improve the production supervision and product traceability system of fertilizers, pesticides, coatings, etc., establish a product traceability database, promote the construction of commodity coding system for production enterprises, and vigorously promote the application of traceability system. Encourage production enterprises to establish a basic information database of product users, promote the transformation of enterprises to service-oriented and intelligent, and improve the integration between production enterprises and customers.

2.2.7 Strengthen international cooperation and increase the pace of opening up

Adhere to the concept of global development and expand opening up. Strengthen international exchanges and cooperation and expand international trade. Stabilize the import of resource-based products such as oil and gas, natural rubber, and sulfur, and improve the ability to guarantee the domestic market. Increase the export of traditional products, reduce the trade deficit, and reduce the pressure on the domestic market. Taking advantage of the development opportunities of the "Belt and Road", we will increase foreign construction investment in countries rich in oil and gas and coal resources. Leverage the advantages of the domestic market and labor

to attract foreign investment in China, especially encourage foreign investment in high-end chemicals, new chemical materials and high-end equipment, and encourage overseas enterprises and scientific research institutions to establish global R&D centers in China to improve the level of foreign investment at a higher level. Actively encourage domestic enterprises to carry out overseas mergers and acquisitions, participate in shares, establish experimental bases and marketing service systems, and expand the scale and competitiveness of enterprises. Actively participate in the activities of international industry organizations, participate in the formulation of international rules and the settlement of international disputes, improve the status of international organizations, and enhance the power of international discourse.

2.3 Chemical production safety requirements and environmental protection situation

China's chemical industry is in the stage of upgrading and development, and safety and environmental protection issues are becoming increasingly prominent while the industry is developing. At present, the outstanding problems in the safety and environmental protection work of chemical enterprises in China include the backward concept of safety and environmental protection, the safety

and environmental protection workflow of some enterprises, the neglect of safety risk assessment, and the lack of safety and environmental protection mechanism construction.

In order to strengthen production safety, prevent and reduce production safety accidents, ensure the safety of people's lives and property, and promote sustainable and healthy economic and social development, China has formulated a series of laws and regulations. On February 26, 2020, the General Office of the Central Committee of the Communist Party of China and the General Office of the State Council issued the "Opinions on Comprehensively Strengthening the Safety Production of Hazardous Chemicals". This is another time in history that documents on production safety have been issued in the name of the Party Central Committee and the State Council.

While promoting chemical enterprises to enter legal and compliant parks, the governance of "scattered and polluted" chemical enterprises is also being carried out simultaneously. According to incomplete statistics, by the end of 2020, more than 10 provinces have issued phased rectification results and future plans for chemical parks and chemical enterprises in their jurisdictions, involving the cancellation of nearly 1,000 parks and the relocation of tens of thousands of chemical enterprises.

In 2016, our province launched the "two reductions, six governance and three improvements" (i.e., the "263" action) to carry out the "four batches" special action of the chemical industry. In April 2019, the General Office of the Provincial Party Committee officially issued the "Jiangsu Province Chemical Industry Safety and Environmental Protection Rectification and Improvement Plan", proposing measures such as "promoting rectification and upgrading in accordance with laws and regulations", "reducing the number of chemical production enterprises along the river", and "reducing the number of chemical production enterprises in environmentally sensitive areas".

Our province's unprecedented heavy attack on the chemical industry has profoundly affected the transformation and development of the chemical industry. At the Standing Committee of the Provincial Party Committee held on April 8, 2020, it was pointed out that it is necessary to understand the importance of rectifying and improving Jiangsu's chemical industry from the perspective of implementing the new development concept; It is necessary to seek truth from facts, implement policies by category, and accelerate the elimination of chemical parks and enterprises with low safety factors and serious pollution through the implementation of differentiated and precise

governance measures, and accelerate the development level of Jiangsu's chemical industry. It is necessary to make better use of rule of law thinking and market-oriented means to steadily promote rectification and improvement in accordance with laws and regulations. This shows that the rectification and upgrading of the chemical industry is by no means to stop developing the chemical industry, but to develop the chemical industry with high quality, efficiency and safety.

2.4 Development opportunities for optimization and upgrading of the chemical industry

2.4.1 Policies guide the healthy development of the industry

In view of the structural overcapacity of China's chemical industry, weak independent innovation ability, unreasonable industrial layout, increased pressure on safety and environmental protection, the Central Economic Work Conference proposed to adhere to deepening market-oriented reform, focus on stimulating the vitality of micro subjects, continue to implement active fiscal policies and prudent monetary policies, especially to promote the high-quality development of the manufacturing industry as the first key task, and to reduce taxes and fees on a larger scale and reduce the burden on enterprises. It is believed that both active fiscal policy and loose

monetary policy will focus on the real economy and small and medium-sized enterprises, and aim at targeted positivity and targeted easing. Especially after the symposium on private enterprises, the policy effect has gradually emerged, and the vitality and potential of the private economy have been released in a concentrated manner, injecting new vitality into the high-quality development of the chemical industry.

2.4.2 There is great potential for industrial structure optimization

The structural contradiction of "low-end overcapacity and insufficient high-end supply" in China's chemical industry still exists, and the domestic market has been in a state of insufficient supply for a long time for high-end polyolefins, special resins, special engineering plastics, high-end membrane materials and other new chemical materials, functional materials, medical chemical materials, high-end electronic chemicals and other special chemicals, as well as catalysts, special additives (additives) and other special chemicals. This is the real market demand for the transformation and upgrading and structural optimization of the chemical industry, and it is also an opportunity for the future high-quality development of the chemical industry. BASF, ExxonMobil and other leading multinational

companies continue to increase investment in China, enhancing the development momentum of China's chemical market to continue to dominate the global market.

2.4.3 Rectification and upgrading rejuvenate the industry

Many places across the country have promoted the improvement of safety and environmental protection in the chemical industry, so that the chemical industry has begun to rejuvenate. Through the improvement of the safety and environmental protection of the chemical industry, the continuous implementation of new development concepts, the intrinsic safety has been improved, the regional layout has been optimized, the low-end production capacity has been greatly reduced, the rational use of land resources has been made, the development ideas of enterprises and the development positioning of the park have been clarified, and the chemical industry has begun to come to life.

2.4.4 Optimize the development direction in the later stage of the epidemic

The new crown pneumonia epidemic has had a great impact on the economy and society, but on the whole, China's economic growth has remained resilient, and the long-term positive fundamentals have not changed, and the impact of the epidemic is short-term and

generally controllable. In the post-epidemic period, the world's petrochemical industry will be restructured and enter a new period of change and adjustment. China's chemical industry will develop in the direction of raw material diversification, product demand differentiation, marketing e-commerce, industrial green and low-carbon, and industrial intelligence. With the rapid rise of e-commerce, it has an impact on the traditional chemical industry and traditional production and marketing models, and the reform of marketing e-commerce is also the marketing trend of chemical production enterprises. Green development and low-carbon development have become the development trend. The Chinese government attaches great importance to the construction of ecological civilization, revised and promulgated strict environmental protection laws, and raised the standards and requirements for pollutant discharge and carbon emissions.

2.4.5 Domestic circulation increases industry opportunities

China is gradually forming a new development pattern with the domestic "big cycle" as the main body and the domestic and international "dual cycles" promoting each other. The enhancement of the domestic "big cycle" has brought new opportunities for the development of China's chemical industry. On the one hand, the

chemical industry has a good foundation in the domestic economic "cycle", the growth momentum will be driven by factor input to innovation-driven, and the development mode will also be further transformed from extensive scale expansion to intensive green and low-carbon. On the other hand, the chemical industry has great potential in the domestic "big cycle". At present, the industrial chain of China's chemical industry is complete, but some links are still very fragile, and it is necessary to "supplement the chain and strengthen the chain", and the process of "supplementing the chain and strengthening the chain" will generate many new opportunities.

2.4.6 The dual carbon goal brings industry challenges

During the 75th session of the United Nations General Assembly, General Secretary Xi proposed that China's carbon dioxide emissions will peak before 2030 and strive to achieve carbon neutrality by 2060. The carbon peaking and carbon neutrality goals are stricter than previous carbon emission reduction targets. As an important pillar industry of the national economy and raw material supporting industry, the chemical industry has both challenges and opportunities in the process of achieving the national "carbon neutrality" goal, and the domestic energy consumption structure and chemical industry will undergo profound changes.

Chapter 3 High-end Development Goals of the Chemical Industry

3.1 Guiding ideology

Guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, fully implement the spirit of the 19th National Congress of the Communist Party of China and the 2nd, 3rd, 4th and 5th Plenary Sessions of the 19th Central Committee, thoroughly implement the spirit of the important instructions of "two competitions and one front" put forward by General Secretary Xi Jinping's inspection of Jiangsu, scientifically grasp the new development stage, firmly implement the new development concept, do a good job in carbon peaking and carbon neutrality, face the transformation and upgrading of the manufacturing industry and the development needs of strategic emerging industries, seize development opportunities such as international and domestic dual circulation, and develop new chemical materials, optimize petrochemical industry, Enhance the traditional chemical industry as the main development direction, with diversified raw material routes, high-end product structure, green and low-carbon ecology, and intensive industrial layout as the development path, strive to improve

the development quality of the chemical industry in Jiangsu Province, and make every effort to build a world-class green chemical industry cluster with core competitiveness and characteristic advantages, becoming a benchmark for the transformation and upgrading of the national chemical industry and high-quality development.

3.2 Development principles

——**Adhere to innovation-driven.** Adhere to the deep integration of scientific and technological innovation and industrial development, strengthen the main position and leading role of enterprises in innovation, promote the flow of talents and the sharing of scientific research resources, and expand new space for industrial development. Integrate regional innovation resources, jointly carry out key core technology research, build a regional innovation community, jointly improve the technological innovation chain, form a technological innovation system of regional linkage, division of labor and collaboration, and coordinated promotion, and promote the development and growth of the new chemical materials industry into a new pillar industry. Promote the deep integration of the chemical industry with strategic emerging industries, and promote the transformation of production methods to flexible, intelligent and refined.

-- Adhere to the scientific layout. Adopt the development model of intensive agglomeration, guide chemical industry projects into the chemical park (centralized) area, rationally layout, step by step, and advance in an orderly manner. Optimize the layout of large-scale petrochemical industry bases and strengthen the coupling and synergy effect of industrial development in the park. Further give full play to the industrial carrier function of the chemical park, continue to accelerate the relocation of chemical enterprises into the park, improve the comprehensive supporting functions and planning management level of the chemical park, and standardize the development of the park. Strengthen the construction of information infrastructure in the park, establish an information management service platform, build a smart chemical park, and improve the safety, environmental protection and green development level of the park with information application.

-- Adhere to green and low-carbon. Promote green and low-carbon development, improve the green development mechanism, cultivate green development momentum, develop and promote advanced and applicable cleaner production technologies and pollutant treatment technologies, gradually improve pollutant emission standards and increase environmental law enforcement, and

improve the environmental protection level of the chemical industry in Jiangsu Province from both technical and management aspects. Comprehensively save and efficiently use resources, strengthen the management of binding indicators such as energy and water consumption and construction land, promote the establishment of a green, low-carbon and circular development industrial system, and promote the green development of the chemical industry.

-- Adhere to safe development. With the improvement of intrinsic safety as the core, strict safety management of hazardous chemicals, improve relevant policies and systems, and eliminate potential safety hazards in the industry. The system and mechanism of source governance, system governance, comprehensive governance and social governance of safety production are more mature and effective, forming a modern safety production guarantee system with full coverage of responsibility, all-round management and supervision of the whole process.

-- Adhere to open cooperation. Fully integrate into the "Belt and Road", Yangtze River Delta integration and other opening strategies, combine the leading characteristics of Jiangsu's industry, aim at key nodes, carry out close cooperation with major countries and economies, deepen comprehensive docking including space,

technology, culture and services, promote rapid economic growth, better reflect the overall competitiveness of the whole region and the overall improvement of the global economy, strengthen cooperation and linkage, deepen the development of chemical industry clusters, and better integrate with the "Belt and Road" countries. Promote the effective docking of international and domestic markets and resources, promote the implementation of major projects of landmark significance, and actively and effectively use foreign capital to promote high-quality industrial development. Establish diversified, stable and reliable overseas resource supply channels and resource reserve bases. Improve cooperation and exchange mechanisms, promote the combination of investment and intelligence, and give full play to the role of foreign investment as a carrier for introducing advanced technology, management experience and high-quality talents.

3.3 Development goals

3.3.1 Industrial layout goals

Efforts have been made to guide the chemical industry to gather in key parks, and the concentration of chemical enterprises has increased significantly. Build a green, low-carbon, safe and intelligent high-end industry, and become a pivotal developed province in the

chemical industry. By the end of the "14th Five-Year Plan", strive to increase the contribution rate of the output value of chemical parks and concentration areas in the province to more than 70%, and the entry rate of chemical enterprises will increase from the current 42.7% to more than 50%.

3.3.2 Industrial structure objectives

By the end of the "14th Five-Year Plan", the proportion of high-end products (new chemical materials, fine chemicals in new fields) will increase from about 15% to 23% according to product output value. The proportion of high-end chemical products such as new chemical materials and high-end special chemicals has increased significantly, the level of downstream refinement, functionalization and characteristic development has been further improved, and the proportion of traditional products has gradually decreased. Form effective docking with other advantageous industries such as equipment manufacturing, automobiles, household appliances, electronic information, etc., create a complete industrial chain from basic resources to terminal consumption, improve the ability to provide users with overall solutions, and strive to form an industrial structure with perfect structure, rich products, high extension, outstanding circular economy characteristics, and strong

competitiveness.

3.3.3 Innovation-driven goals

The proportion of R&D investment in the main business income of chemical enterprises has increased significantly. The collaborative innovation system of industry, university and research has been increasingly improved, breaking through a number of major key common technologies and major complete sets of equipment, and building national innovation centers and R&D platforms in key areas. A number of pilot demonstration enterprises for the integration of "two modernizations" and smart parks and smart factories have been built.

3.3.4 Green development goals

The level of energy conservation, environmental protection, comprehensive management and comprehensive utilization has been significantly improved. By the end of the "14th Five-Year Plan", the level of risk prevention and control of safety production accidents in the chemical industry in the province has been comprehensively improved. Wastewater, waste gas and solid waste have been fully treated, recycled, and discharged up to standards. Create a number of demonstration green parks, build a number of green factories and green supply chain management demonstration enterprises, and

establish a distinctive green manufacturing system and green manufacturing market-oriented promotion mechanism.

Chapter 4 Overall layout plan

According to the development conditions of various regions in our province and the development characteristics of the chemical industry, the overall layout of the chemical industry is divided into three parts: industrial zones along the river/lake, coastal industrial zones, and industrial zones in northern Jiangsu. Among them, the river/lakeside industrial zones include 8 cities in Nanjing, Suzhou, Wuxi, Changzhou, Zhenjiang, Yangzhou, Taizhou and Nantong (partially), and there are 9 chemical parks and 8 chemical concentration areas. The coastal industrial zone includes three cities: Lianyungang, Yancheng and Nantong (partially), and there are five chemical parks and three chemical concentration areas. The northern Jiangsu region includes Xuzhou, Huai'an and Suqian, and there are 4 chemical concentration areas. From the analysis of the layout of chemical parks (concentrations), 10 of the 14 recognized chemical parks in the province are located along the Yangtze River, and 4 are located in coastal areas, and the layout of concentration areas is

relatively scattered.

During the "14th Five-Year Plan" period, the overall layout of the chemical industry in the province is shown in the figure. In the national "Petrochemical Industry Planning and Layout Plan", Lianyungang Petrochemical Industry Base is one of the new petrochemical industry bases in the key planning layout, and has become an important carrier of the national new round of petrochemical industry layout adjustment and structural optimization and upgrading strategy. The middle and upstream industries such as petrochemicals, organic raw materials, and synthetic materials continue to develop further based on the existing industrial base based on the parks where large petrochemical enterprises are located, such as Lianyungang, Nanjing, Yangzhou and Taizhou; There are many chemical parks (concentration) areas with new chemical materials and high-end fine chemicals as the leading industrial chain, and they are mainly located along the Yangtze River (outside the 1 km range), of which Suzhou, Wuxi and Nantong are more concentrated; The coal chemical industry and salt chemical industry developed with resource endowment will continue to develop in advantageous areas, such as Xuzhou and Huai'an; The number of chemical parks (concentration) areas dominated by these two industries is gradually increasing,

Suzhou, Changzhou, Yancheng, Huai'an, Lianyungang, Yangzhou, etc. have chemical parks (concentration) areas dominated by life sciences and new medicine, and the layout of electronic chemicals is also more extensive, Suzhou, Wuxi, Zhenjiang and Suqian all have layouts. **The overall "1+N" chemical industry development pattern will be formed with the Lianyungang petrochemical industry base and 28 chemical parks (centralized) areas as the main body.**

江苏省“十四五”化工产业总体布局图

化工园（集中）区及主导产业与图中对应示意

1 南京江北新材料科技园（石油化工、碳一化工）
2 江阴临港化工园区（聚酯新材料、合成树脂）
3 常州滨江经济开发区新材料产业园（化工新材料、新医药）
4 江苏扬子江国际化学工业园（功能性新材料、高端精细化工品）
5 江苏高科技氟化学工业园（氟化工、化工新材料）
6 太仓港经济技术开发区化工园区（车用精细化学品、含氟化学品）
7 南通经济技术开发区化工园区（化工新材料、精细化学品）
8 如东县洋口化学工业园（农药医药、化工新材料）
9 连云港石化产业基地（炼化一体化、化工新材料和精细化工）
10 大丰港石化新材料产业园（新医药、化工新材料）
11 江苏滨海经济开发区沿海工业园（新医药、功能新材料）
12 江苏扬州化学工业园区（高性能合成材料、精细化学品）
13 镇江新区新材料产业园（精细化工、功能性新材料）
14 江苏省泰兴经济开发区（精细化工、化工新材料）
15 宜兴市新材料产业园（高端涂料、高端化工新材料）
16 锡山经济技术开发区新材料产业园（高分子材料、专用化学品）
17 新沂市化工产业集聚区（生命科学保障、化工新材料）
18 江苏邳州经济开发区化工产业集聚区（煤基新材料、电子化学品）
19 金坛新材料科技产业园（盐化工、新医药）
20 常熟经济技术开发区化工园区（化工新材料、电子化学品）
21 昆山精细材料产业园（电子化学品、新医药）
22 苏州吴中经济技术开发区化工新材料科技产业园（电子化学品、新医药）
23 如皋港化工新材料产业园（化工新材料、油脂化工）
24 江苏连云港化工产业园区（高端精细化学品、化工新材料）
25 灌云县临港产业区化工产业园（化工新材料、化学原料药）
26 柘汪临港产业区化工园区（化工新材料、专用化学品）
27 江苏淮安工业园区（盐化新材料、新医药）
28 泰州滨江工业园区（石油化工、化工新材料）
29 宿迁生态化工科技产业园（化学原料药、电子化学品）

4.1 Layout principles

4.1.1 Strictly follow the policy guidance

The layout of the chemical industry in the province follows the requirements of the national and provincial industrial planning and layout plans, takes the chemical park as an important development carrier, and serves as the core to lead the development of the chemical industry in the districted cities. The industrial development positioning follows the relevant industrial policy requirements of the state and our province, establishes the development idea led by encouraged industries, and realizes the upgrading of traditional chemical industries and the coordinated development of industries in new fields. Vacate non-chemical enterprises in the chemical park in an orderly manner in accordance with the law, optimize the level of land use, and provide sufficient space for the high-end development of the chemical industry.

4.1.2 Fully combine development conditions

Development conditions are an important basis for affecting industrial layout, through comprehensive analysis of policy requirements, industrial foundation, raw material supply, supporting conditions, technical conditions, surrounding market conditions and other development factors, determine the industrial development

direction and industrial layout, realize the horizontal coupling and vertical extension of the industrial chain, improve chain development, and form high-end agglomeration. By optimizing the layout of the chemical industry, improving and expanding the development level of industrial clusters, and taking the construction and expansion of industrial clusters as an important goal, highlighting the industrial characteristics of each district and city, fully integrating the development of advantageous industries, giving full play to the effect of industrial clusters, enhancing the connection between the chemical industry and related traditional industries and strategic emerging industries, realizing the development of industrial clusters, and promoting the synergy of multiple industries.

4.1.3 Based on the overall layout of the province

The overall layout plan is based on the province, according to the industrial development characteristics of each city, highlight the advantages of industrial development, further expand the development level of characteristic industries, and extend the industrial direction that meets the needs of regional development according to the relevant supporting industries of each city and the local market situation, realize the differentiated development of the chemical industry in the province, and form a complete industrial

system with complementary advantages between cities.

Cities along the river and lake will continue to serve as an important carrier for the development of the chemical industry in the province, integrate the layout of the chemical industry outside the 1-kilometer range along the river and lake, improve the intensive development level of fine chemicals and new chemical materials, further improve production efficiency, and optimize the level of land resource utilization. Take intrinsic safety and green production as the prerequisite for development, and give priority to production projects involving green technology, intelligent manufacturing, and intelligent management.

The coastal area has relatively more land for the development of the chemical industry, and the advantages of land resources and ports are used to improve the level and scale of diversified raw material processing, promote the implementation of major petrochemical and chemical projects, accelerate the development process of high-end petrochemical industry, expand the development level of coastal industrial zones, and form a modern industrial system with the production of basic chemical raw materials as the leader, new chemical materials, high-end fine chemicals and other industries.

During the "14th Five-Year Plan" period, the chemical industry

in northern Jiangsu will improve the level of land intensification in the chemical concentration area through the orderly integration of the development of the chemical industry, further expand and extend the development of coal-based new materials, optimize the development quality of the fine chemical industry, and form a chemical industry system with differentiated development characteristics.

4.1.4 Insist on improving safety and environmental protection

Safety production is the prerequisite for the high-end development of the chemical industry, and the projects involved in the upgrading and extension of existing industries should be advanced in terms of process technology, and priority should be given to the layout of green process projects to achieve the improvement of the overall intrinsic safety level. Encourage the implementation of green and low-carbon projects, give priority to the layout of high-efficiency, low-consumption, recyclable, and low-emission green production projects, and encourage the development of low-carbon resource utilization projects such as deep processing of light hydrocarbon resources, so as to essentially improve the level of greening.

4.2 Layout plan

4.2.1 Coastal industrial zones

The coastal industrial zone is the area with the largest available land area in the province's chemical park (concentration) area, forming a high-end chemical industry cluster with refining and chemical integration and diversified raw material processing as the leader and deep processing of petrochemical raw materials as the link, improving the product varieties and quantities of downstream industries, and building a high-end chemical industry cluster with advanced production technology, high added value and high degree of greening. The coastal industrial zone has obvious location advantages, good transportation conditions, and has the conditions for the development of large-scale petrochemical projects, and is suitable for the development of downstream deep processing of petrochemicals, fine chemicals in new fields, new chemical materials and other industries located in the lower reaches of the industrial chain and the high-end of the value chain.

4.2.1.1 Lianyungang

4.2.1.1.1 Industry direction

Promote the integration of refining and chemical products. Steadily promote the construction of refining and chemical integration projects in the Lianyungang Petrochemical Industry Base, providing rich raw material guarantee for the development of the

chemical industry in Lianyungang area.

Develop high-end polyolefins. Promote the development of ethylene, propylene, and carbon tetrapolymers, lay out and develop long-chain α-olefin copolymers, and build a high-end polyolefin industry chain. Support the deep coupling of ethylene oxide and α-olefins in petrochemical bases with benzyl chloride, acyl chloride, hydrogen, chloroacetic acid and other products, and build a series of surfactant products related to daily chemical health.

Promote the deep processing of raw materials. Promote the industrial chain of organic raw materials such as acrylonitrile and downstream, ethylene oxide and downstream, phenol acetone and downstream, benzene and downstream, vinyl acetate and downstream, and carbon four comprehensive utilization, build a polyester and downstream industrial system, and promote the extension of industrial chains such as high-end special chemicals and special fine chemicals. Focus on the development of basic oil-chemical products such as fatty acids, fatty alcohols, and fatty amines with natural oils, couple with PET/PBT, phenol/ketone, bisphenol A and other products in petrochemical bases, expand the 1,3-propylene glycol-PTT industry chain, and national strategic emerging materials such as special biological nylon materials, aramid fibers, polyimides

and halogenated polyolefins, and strive to build an efficient high-end oleochemical recycling industry chain.

4.2.1.1.2 Industrial layout

Lianyungang Petrochemical Industry Base. The chemical industrial park of Lingang Industrial Zone in Guanyun County and the Lianyungang Chemical Industrial Park in Jiangsu Province will be used as the spatial expansion area of the Lianyungang petrochemical industry base, and the base will be unified with the planning, construction and management to achieve the integration of planning, management and industry. The chemical park of Zhewang Lingang Industrial Zone relies on the petrochemical base to increase the leading role of refining and chemical integration projects.

4.2.1.2 Yancheng

4.2.1.2.1 Industry direction

Develop new medicine. Make full use of Yancheng's existing chemical APIs and intermediate supporting advantages to extend chemical APIs to the terminal and achieve a high-end climb to the value chain.

Develop new chemical materials. Layout and development of new petrochemical materials, starting with existing petrochemical new material projects, extending and expanding upstream and

downstream, mainly layout adipic acid/caprolactam extension projects, light hydrocarbon raw material petrochemical downstream extension projects, aramid industry chain projects, etc.; Develop the functional materials industry, promote the layout of electronic chemicals, papermaking chemicals, water treatment chemicals and other special chemical industries, and develop wet electronic chemicals, electronic special gases, new materials for electronic information and other industrial categories.

4.2.1.2.2 Industrial layout

Dafenggang Petrochemical New Materials Industrial Park. The leading industrial chain is new medicine and new chemical materials. Layout of the chemical industry in the field of new medicine, new petrochemical materials, and wind power. Give full play to the supporting advantages of existing chemical APIs and intermediates, extend the pharmaceutical industry chain, and achieve a high-end climb to the value chain. Based on adipic acid/caprolactam and related supporting raw materials, the downstream extension of nylon 6 and nylon 66, the further extension of the downstream products polyamide engineering plastics and nylon filaments, and the extension of the industrial chain based on benzene hydrogenation to engineering plastics/nylon.

Coastal Industrial Park of Jiangsu Binhai Economic Development Zone. The leading industrial chain is new medicine and new functional materials. Give full play to the supporting advantages of existing chemical APIs and intermediates, extend the pharmaceutical industry chain, and achieve a high-end climb to the high end of the value chain; Use existing high-end new material precursors to develop high-performance rubber materials and new material additives and organic high-performance fiber projects; Relying on the raw material base, develop electronic-grade hydrochloric acid, electronic-grade sulfuric acid, liquid crystal orientation agent, electronic special gas, etc. related to the electronic information industry, develop positive and negative electrode materials, electrolytes, separators, membrane electrodes, etc. related to new energy vehicles, and build an electronic chemicals industry system. Develop papermaking chemicals.

4.2.1.3 Nantong

4.2.1.3.1 Industrial direction

Develop new chemical materials. Layout and development of the new chemical material industry chain dominated by functional polymer materials, relying on the advantages of raw materials and the development conditions close to the target market, laying out and

upgrading the industrial chain of special polyester, special polyurethane, polyamide and other industrial chains.

Improve fine chemicals. Nantong's fine chemical industry related to life and health and plant protection has a strong foundation, and the integration and improvement of the level of pesticide and pharmaceutical industry is the key development direction of Nantong's fine chemical industry. Develop characteristic fine chemical categories, expand the downstream fatty alcohol industry chain of oleochemicals, and promote the basic industrialization of green solvents and new polyurethane crosslinkers.

4.2.1.3.2 Industrial layout

Nantong Economic and Technological Development Zone Chemical Park. The leading industrial chain is new chemical materials and fine chemicals. Moderately expand the production scale of existing functional polymer materials, and lay out new material industry categories such as special polyester, special polyurethane and its additives, and polyamide. The pesticide industry maintains its current scale and can moderately develop fine chemicals for food.

Rudong County Yangkou Chemical Industrial Park. The leading industrial chain is pesticides, medicine, and new chemical materials. The development of the western district is mainly based on integration

and upgrading, and the development of fine chemical industries based on pesticides and medicines. The development of the eastern district is mainly growth-oriented, mainly laying out new chemical materials such as special polyester and polyamide, and high-end special chemicals such as water treatment agents.

Rugao Port Chemical New Materials Industrial Park. The leading industrial chain is new chemical materials and oleochemicals. Promote the implementation of oleochemical projects under construction, continuously extend and add value to the downstream of basic oleochemicals, and focus on the development of dimeric acids and derivative products, daily chemical additives and other products. Upgrade green fine chemicals and transform into new functional materials such as new energy materials, electronic information materials, polyester new materials and special engineering plastics.

4.2.2 Industrial zones along the river/lake

The Yanjiang/Yanhu Industrial Zone is the area with the highest concentration of chemical enterprises, the strongest industrial foundation and the most complete industrial categories in the province, and the area with the highest concentration of chemical parks and chemical concentration areas. The area is suitable for the

development of industries located in the downstream of the industrial chain and the high-end of the value chain, such as deep processing in the downstream of petrochemicals, fine chemicals in new fields, and new chemical materials.

4.2.2.1 Nanjing

4.2.2.1.1 Industry direction

Petrochemical structure optimization. Adjust the industrial structure, optimize leading refining and olefin projects, moderately reduce refined oil production, and increase the proportion of olefin raw materials without expanding the scale of refining. Encourage enterprises to develop high-end products on the basis of existing equipment, develop high-end polyolefins, and extend the downstream industry chain of olefins.

Carbon One Chemical Transformation and Development. Give full play to the advantages of raw materials and develop midstream and downstream projects in the industrial chain, such as further extending acetic acid to vinyl acetate and related fine chemical products. Support R&D and innovation, extend high value-added products, and closely integrate the carbon one chemical industry chain with the downstream fine chemical and new material industries.

4.2.2.1.2 Industrial layout

Nanjing Jiangbei New Materials Science and Technology Park. The leading industrial chain is petrochemical and carbon-first. The layout of Nanjing's chemical industry mainly relies on Nanjing Jiangbei New Materials Science and Technology Park, focusing on the deep processing of olefins and downstream industries, and the transformation and upgrading of carbon one chemical industry. Relying on the base of olefin raw materials, the layout of high-end polyolefin industries, including metallocene polyolefins, ethylene-vinyl acetate copolymers, ultra-high molecular weight polyethylene, polyolefin elastomers, cyclic olefin copolymers, ethylene-vinyl alcohol copolymers, polydicyclopentadiene, etc. Relying on the epoxy and polyether industry foundation, the polyurethane industry is laid out, and the development of thermoplastic polyurethane elastomers and thermoplastic polyester elastomers is extended. Relying on the basic raw material conditions, the layout of the engineering plastics industry, including polymethyl methacrylate, nylon engineering plastics, polyether ether ketone, polyetherimide, etc. Relying on the raw material base of butadiene, the synthetic rubber and thermoplastic elastomer industry is developed, including nitrile butadiene rubber, halogenated butyl rubber, etc. Relying on the foundation of the fine chemical industry, improve the layout of the

special chemical industry, including new food additives, feed additives, high-performance surfactants, high-performance coatings, new adhesives, etc.

4.2.2.2 Suzhou

4.2.2.2.1 Industrial direction

Fine chemical optimization and upgrading. Fine chemicals are the sub-fields with the largest contribution to Suzhou's chemical industry, with many categories, but there are many traditional fine chemicals such as traditional coatings, pesticides and pesticide intermediates. On the one hand, Suzhou Fine Chemicals should increase the proportion of fine chemicals in new fields, and on the other hand, it should be further integrated and optimized to achieve effective industrial agglomeration.

The development of emerging materials is accelerating. Continue to expand the development scale of the new material industry, focus on the development of fluorine chemical industry, strengthen the advantages of the fluorine material industry, and focus on promoting the construction and technical transformation of the fourth-generation refrigerant and fourth-generation blowing agent projects. Promote the development process of engineering plastics, new polyurethane materials and other new material industries.

High-end gathering of advantageous industries. Improve the agglomeration level of advantageous industries, increase the industrial agglomeration of high-end synthetic lubricants, vigorously develop the electronic chemicals industry, consolidate the industry position of high-purity reagents for semiconductors, and improve the development level of wet electronic chemicals.

4.2.2.2.2 Industrial layout

Jiangsu Yangzijiang International Chemical Industrial Park. The leading industrial chain is functional new materials and high-end fine chemicals. Focus on the layout of functional new materials and high-end fine chemicals, and enrich and improve the downstream industrial system by optimizing and improving the level of fine chemicals and new materials industries. Focus on the layout of the silicon material industry chain, and develop silicone resin, special silicone rubber and other products. Lay out the lithium battery new energy industry chain, including electrode materials, lithium battery separators and electrolytes. Lay out the fine chemical industry in new fields, focusing on the layout of special chemical industries used in automobiles, environmental protection, equipment and other fields.

Jiangsu High-tech Fluorine Chemical Industrial Park (Jiangsu Changshu New Materials Industrial Park). The leading industrial

chain is fluorine chemical industry and new chemical materials. Relying on the existing industrial base and technical foundation, we will focus on the layout of the fluorine chemical industry chain, develop the advanced refrigerant industry represented by the fourth-generation refrigerant HFO-1234yf, and further promote the layout of other fluorine materials such as PVDF.

Taicang Port Economic and Technological Development Zone Chemical Park. The leading industrial chain is automotive fine chemicals and fluorinated chemicals. Give full play to the advantages of the high-end lubricant industry, take advantage of the supporting conditions of the port, choose to lay out the layout of the automotive fine chemical industry such as lubricants and base oils, and improve the agglomeration of the lubricant industry. Relying on the foundation of the fluorine chemical industry, the fourth-generation blowing agents and advanced refrigerants such as HFO-1234ze have been developed through technological transformation.

Changshu Economic and Technological Development Zone Chemical Park. The leading industrial chain is new chemical materials and electronic chemicals. The development direction is mainly focused on new chemical materials and electronic chemicals, especially new chemical materials downstream of phenol/ketone, and

give full play to the existing electronic chemical industry base to further improve the industrial concentration in the region.

Kunshan Fine Materials Industrial Park. The leading industrial chain is electronic chemicals and new medicines. Focus on the layout of electronic chemicals and biomedical industries, of which electronic chemicals rely on the consumer market and focus on the layout of high-purity reagent industries. At the same time, by vacating non-chemical enterprises, integrating existing industrial land can achieve optimal utilization of land resources.

Suzhou Wuzhong Economic and Technological Development Zone Chemical New Materials Science and Technology Industrial Park. The leading industrial chain is electronic chemicals and new medicines. Focus on the layout of electronic chemicals, expand the production capacity of high-purity reagents and photoresists for semiconductors, and consolidate the dominant position of electronic chemicals in China.

4.2.2.3 Wuxi

4.2.2.3.1 Industry direction

Strengthen the level of the materials industry. Relying on the existing synthetic resin, polyester and nylon engineering plastics industry base, expand the development scale of engineering plastics,

develop new materials such as special polyester and special nylon engineering plastics, and improve the level of new chemical materials industry.

Improve the quality of fine chemicals. There are many fine chemical enterprises in Wuxi City, with a wide range of categories, but there is a problem that traditional fine chemicals account for a large proportion. In the future, high-end coatings for new applications and rubber-plastic additives for special rubbers and engineering plastics should be laid out.

Serve the electronic information industry. In view of the rapid development of Wuxi's electronic information industry, relying on the current industrial foundation and technical foundation, we will accelerate the layout of electronic chemicals and electronic materials industry.

4.2.2.3.2 Industrial layout

Jiangyin Lingang Chemical Industry Zone. The leading industrial chain is polyester new materials and synthetic resins. Relying on the existing industrial base, laying out the polyester industry chain and its upstream raw material industry, and relying on good transportation conditions, the layout and development of the special polyester industry.

Yixing New Materials Industrial Park. The leading industrial chain is high-end coatings and high-end new chemical materials. Relying on the foundation of the coating industry, the layout of the high-end coating industry, including automotive coatings, industrial protective coatings, UV curing coatings and other products. Rely on the development of the surrounding electronic information industry to promote the layout of the electronic chemical industry.

Xishan Economic Development Zone New Material Industrial Park. The leading industrial chain is polymer materials and special chemicals. Relying on existing advantageous enterprises, the layout of high-end fine chemical products, including high-purity reagents, new polyurethanes and raw materials, cyclic olefin polymers and other product categories with differentiated development characteristics.

4.2.2.4 Changzhou

4.2.2.4.1 Industry direction

Layout of high-end coating industry. Relying on technical advantages and existing industrial foundation, we will adhere to innovation and development to develop new coatings such as industrial protection and heavy anti-corrosion coatings, automotive coatings, and powder coatings. Integrate coating enterprises outside

the park and improve the contribution rate of coating enterprises in the park.

Enrich the downstream industry of salting. Take advantage of the advantages of the salt chemical industry to build a high-end chlorine derivatives industry chain and lay out high value-added chlorine downstream industries.

Promote the development of new materials and health industries. docking with leading enterprises such as new chemical materials to develop the new material industry; Integrate pharmaceutical innovation resources and API enterprises to develop the big health industry.

4.2.2.4.2 Industrial layout

Changzhou Binjiang Economic Development Zone New Material Industrial Park. The leading industrial chain is new chemical materials and new medicine. Focus on the layout of special coatings and adhesives based on unsaturated polyester resins and epoxy resins, chlorine downstream extension products based on toluene chloride, high-performance fiber and composite materials industry based on carbon fiber, electronic chemicals industry based on photoinitiators and electronic-grade high-purity reagents, new pharmaceutical industry based on synthetic drugs and interventional materials, and

layout of degradable materials industry.

Jintan New Material Science and Technology Industrial Park. The leading industrial chain is salt chemical industry and new medicine. Focus on the layout of high value-added chlorine downstream extension products represented by polychloropropylene and new pharmaceutical industry.

4.2.2.5 Zhenjiang

4.2.2.5.1 Industry direction

High-end development of fine chemicals. Relying on the existing industrial base, give full play to the advantages of industrial synergy, focus on the development of fine chemicals in new fields, and lay out special chemicals for energy conservation, environmental protection, new energy and other industries.

Extend to undertake traditional industries. Make use of the advantages of acetic acid and other raw materials to extend and develop the traditional chemical industry chain, produce new downstream varieties, upgrade and transform the development model of the traditional industrial chain, and improve and optimize the chemical industry structure of Zhenjiang.

4.2.2.5.2 Industrial layout

Zhenjiang New Area New Materials Industrial Park. The leading

industrial chain is fine chemicals and functional new materials. Relying on the existing industrial base, the layout and development of high-end electronic chemicals, advanced polymer materials, environmentally friendly fine chemicals, chlorine hydrogen cycle, new energy power battery materials, and silicone new materials. Layout and develop the downstream industry of acetic acid, expand the proportion of local conversion of acetic acid products, and undertake and extend the advantages of Zhenjiang's acetic acid industry.

4.2.2.6 Yangzhou

4.2.2.6.1 Industry direction

Upgrade and develop high-performance polyester. Relying on the existing advantages of PTA and polyester industries, we will further develop the high-performance fiber industry, form an industrial agglomeration advantage, and lay out the special polyester and special resin industries, and expand the production capacity of PTA, PBT, PBST, phenolic ketones, bottle flakes, staple fibers, aramid and degradable plastics, and epoxy resins.

Promote the layout of special chemicals. Relying on the development foundation of the existing olefin/aromatic industry, fine chemicals and new chemical materials industry, the layout and

development of the upstream supporting raw materials ethylene, propylene and ethylene oxide downstream and electronic chemicals represented by the special chemical industry.

4.2.2.6.2 Industrial layout

Jiangsu Yangzhou Chemical Industry Park. The leading industrial chain is high-performance synthetic materials and fine chemicals. Supplement and extend the existing industrial chain, and develop high-performance fiber industries such as special polyester and aramid. Use ethylene oxide raw material conditions to lay out downstream industries such as vinyl carbonate. Timely layout and development of electronic chemical industry.

4.2.2.7 Taizhou

4.2.2.7.1 Industry direction

High-quality development of fine chemicals. Taizhou City has formed production capacity of acrylic acid and ester, styrene, chlor-alkali and supporting ethylene and propylene, laying the foundation for the development of downstream fine chemicals and new materials. Focus on the development of new areas of fine chemical industry represented by electronic chemicals.

Promote the layout of emerging materials. Layout and development of high-end polyolefins, promote the development of α-

olefin industry, and promote the layout of high-end polyolefin industry with α-olefins as comonomers. Relying on carbon 3 and carbon 4 raw materials to develop downstream deep processing industries, promote the layout of the engineering plastics industry, and achieve the improvement of added value in the chemical industry.

4.2.2.7.2 Industrial layout

Taixing Economic Development Zone, Jiangsu Province. The leading industrial chain is fine chemicals and new chemical materials. Lay out the deep processing industry of low-carbon raw materials, expand the amount of olefin raw materials, and provide raw material guarantee for the extension of downstream industries. Chlor-alkali downstream extension industry, development of chlorinated polymers and high-end fluorine material industries. Promote the layout of new materials downstream of olefins and develop high-end polyolefins. Lay out the fine chemical industry in new fields, develop the electronic chemical industry represented by wet electronic chemicals and semiconductor high-purity reagents, and lay out the power battery supporting industry represented by key lithium battery materials. Layout and development of special rubbers and elastomers, including the development of solvent styrene-butadiene butadiene rubber, acrylate rubber, EPDM rubber and other categories.

Taizhou Binjiang Industrial Park. The leading industrial chain is petrochemical and new chemical materials. Relying on the existing industrial base, the layout and development of high-end lubricant industry and high-end polyolefin industry.

4.2.3 Industrial Zone in northern Jiangsu

The salt chemical industry and coal chemical industry in the northern Jiangsu industrial zone have formed a certain level of development and have important influence in the province. During the "14th Five-Year Plan" period, the Northern Jiangsu Industrial Zone mainly upgraded the existing industries, realized the extension of the salt chemical and coal chemical industry chains to the high-end of the value chain, and enhanced industrial agglomeration through industrial integration. Through the layout of the fine chemical industry in new fields, the upgrading and development of the traditional fine chemical industry will be realized, and strive to form the integrated upgrading and development of raw material production and downstream new materials and special chemicals.

4.2.3.1 Xuzhou

4.2.3.1.1 Industry direction

Efficient development of fine chemicals. Combined with the characteristics of existing industries, optimize and improve the

development level of plant protection-related chemical industries, lay out and develop new fields of fine chemical industries, develop daily chemicals, water treatment chemicals, and biochemical industries such as bio-based products.

High-end upgrading of coal-based materials. By improving the utilization efficiency of coking by-products, we will promote the layout of lithium battery materials such as lithium battery anode materials, realize the upgrading of traditional industries, and form differentiated development characteristics.

4.2.3.1.2 Industrial layout

Xinyi Chemical Industry Cluster. The leading industrial chain is life science support industry and new chemical materials. Improve the diversification level of high-efficiency fertilizers, and lay out and develop fine chemical industries such as green pesticides, daily chemicals, biochemicals and life sciences.

Jiangsu Pizhou Economic Development Zone Chemical Industry Cluster. The leading industrial chain is coal-based new materials and electronic chemicals. Improve the comprehensive processing level of coking by-products and improve the utilization efficiency of coking by-products. Layout and development of lithium battery anode and other power battery materials.

4.2.3.2 Suqian

4.2.3.2.1 Industry direction

Optimize the life sciences industry. Optimize and upgrade the life science industry chain dominated by chemical APIs, strive to lay out new varieties with cutting-edge technology, improve industrial level, and improve industrial concentration.

Upgrade the emerging material industry. Upgrade and develop new rubber and plastic materials, layout and development of electronic chemicals, improve the level and competitiveness of the fine chemical industry, and form development characteristics.

4.2.3.2.2 Industrial layout

Suqian Ecological Chemical Science and Technology Industrial Park. The leading industrial chain is chemical APIs and electronic chemicals. On the basis of the existing industry, we will continue to develop the fine chemical industry chain dominated by rubber and plastic additives and the new pharmaceutical industry chain dominated by chemical APIs, lay out the electronic chemical industry chain, tap the interconnection potential between industrial chains, and build an industrial system with coordinated development. The industrial layout in the region is relatively scattered, and it is necessary to integrate the industrial layout and improve the level of

industrial agglomeration while developing the industrial scale.

4.2.3.3 Huai'an

4.2.3.3.1 Industry direction

Develop new salt materials. Make full use of the advantages of salt mine resources, improve the development level of the salt chemical industry, expand the varieties and quantities of key raw materials in the downstream of chlorine, expand the production scale of new fluorosilicon materials, and lay out and develop the new fluorosilicon material industry.

Life science industry chain. Plant protection and biomedicine go hand in hand, combine with the advantages of chlorine resources, develop green pesticides and new chemical APIs, strive to realize the construction of life science industry chain, and form the advantages of upstream and downstream coordinated development.

4.2.3.3.2 Industrial layout

Jiangsu Huai'an Industrial Park. The leading industrial chain is new salt materials and new medicine. Make full use of the advantages of chlorine resources, develop key raw materials for chlorinated hydrocarbons, lay out the new fluorosilicon material industry, and develop in the direction of refrigerants, rubber and plastic new materials. Lay out the life science industry and develop green

pesticides and new pharmaceutical APIs.

Chapter 5 Key Points of Industrial Development

5.1 Overall development ideas

5.1.1 Accelerate the upgrading of the refining industry and promote the integrated development of refining and chemical industry

From the perspective of industry development, the contradiction of domestic refining overcapacity is more prominent, and oil reduction and increasing have become the current key task. It is necessary to accelerate the construction of refining and chemical integration, promote industrial optimization and upgrading, provide raw materials for downstream products, and form new competitive advantages.

5.1.2 Implement raw material diversification and low-carbon extension of downstream deep processing

Relying on various resources provided by the refining and chemical integration industry and the diversified raw material processing industry, give full play to the role of the market's resource allocation, carry out in-depth extended processing, develop various

new chemical materials, special fine chemicals and other high-end petrochemical products, and form high-end product clusters. Through innovation-driven and guided by the improvement of resource utilization value, efforts will be made to improve the scale and depth of the deep processing industry of organic raw materials, make up for the shortcomings of the industrial chain, optimize the structure of the product chain, and increase the proportion of high-end petrochemical products. Focus on the development of the deep processing industry chain of olefins and aromatics, improve the industrial level of by-product resource utilization, and cultivate advantageous product chains and characteristic enterprises.

5.1.3 Meet the needs of new fields and vigorously develop new chemical materials

Give full play to the advantages of industrial cooperation conditions along the river and the chemical foundation of Jiangsu Province, face the development needs of strategic emerging industries and high-end manufacturing, seize development opportunities such as international and domestic dual circulation, comprehensively accelerate the development of the new chemical materials industry, and focus on cultivating and expanding ten subdivisions such as silicon materials, fluorine materials, engineering plastics,

polyurethane and its raw materials, special rubber and elastomers, high-performance fibers, new inorganic chemical materials, key supporting monomers, and other high-performance resins. By 2025, the output value of new chemical materials in our province will increase by 3 percentage points compared with the "13th Five-Year Plan", and the ability of scientific and technological innovation will be greatly improved.

Improve the fine chemical industry system for new materials and new fields. Rely on existing enterprises, products and technology foundations to develop and expand the industrial scale. Expand diversified high-end products and upgrade the industrial level. Strengthen technological innovation and application market development, and improve the research and production system of fine chemicals in new materials and high-end new fields.

Use the chemical industry base to accelerate development. Give full play to the advantages of the chemical industry foundation, organic raw material supply conditions, regional transportation conditions and other advantages in our province, carry out high value-added extension and expansion, and accelerate the agglomeration of fine chemical industries in new chemical materials and high-end new fields.

Supporting development for terminal needs. Guided by the needs of leading industries in the province, especially combined with the needs of national strategic emerging industries and high-end manufacturing industries, a chain or supporting development is formed to realize the coupling and linkage development between different industries in the region.

Highlight the high-end green of the industry according to local conditions. According to the basic conditions of each district, city and chemical park, priority should be given to the development of new chemical materials and high-end new field fine chemical projects with low dependence on raw materials, low resource constraints, environmental friendliness and high added value.

5.1.4 Promote industrial agglomeration and optimize and integrate traditional chemical industries

Optimize the structure of the traditional chemical industry, focus on promoting the high-end upgrading of product brands and quality, and the green upgrading of process technology, increase the proportion of high-end products of traditional chemical products, and meet the needs of increasingly strict environmental protection and the upgrading of consumption structure. Industries with structural overcapacity adhere to stock adjustment, large and small, equal or

reduced replacement. Industries with phased overcapacity will accelerate the cultivation of the consumer market and the transformation of product multi-production. Combined with product upgrading, ecological environmental protection and safe production, implement intensive transformation of existing enterprises, promote industrial agglomeration, and eliminate backward production capacity. Actively guide enterprises to increase the proportion of high-end products and improve the quality of development through technological innovation.

5.2 Key points of industrial chain (cluster) development

5.2.1 Petrochemical industry

5.2.1.1 Accelerate the upgrading of the refining industry and promote the integrated development of refining and chemical development

Adhere to the integrated development idea of refining and chemical industry, build the Lianyungang Petrochemical Industry Base, upgrade the Nanjing Jiangbei New Materials Industry Base, and take the Chemical Industrial Park of Lingang Industrial Zone in Guanyun County and the Lianyungang Chemical Industrial Park in Jiangsu Province as the spatial expansion area of the Lianyungang Petrochemical Industry Base. Relying on the petrochemical base, the

chemical park of Zhewang Lingang Industrial Zone enhances the leading role of refining and chemical integration projects, carrying the transfer of high-end industries and the concentration of petrochemical industries in the province. The high-quality and high-level development and construction of a world-class refining and chemical integration base fully reflects the synergistic potential of integrated construction in the mutual supply of raw materials, optimal utilization of energy gradients, intensive processing of by-products, modernization of storage, transportation and sales, and intelligent industrial services, so as to achieve the overall improvement of competitive advantages. Explore the advantages of large space, good location and complete transportation and logistics conditions in the Tongzhou Bay area of Nantong, and focus on the development of high-end chemical products through international cooperation to meet the needs of the downstream industrial development of the Yangtze River Delta region and the Yangtze River Economic Belt.

Other refineries in the province should combine the characteristics of the industrial structure, extend the industrial chain, rationally build catalytic cracking to olefins and alkane dehydrogenation projects, and develop a fine olefin industry chain with regional characteristics. Encourage existing large-scale

refineries to develop high-value-added refining products such as special oils, high-end lubricants and special asphalt in a differentiated manner based on the nature of raw materials and industrial bases, and reduce the yield of refined oil. Traditional refining and chemical enterprises take quality improvement, energy saving, safety and environmental protection as the criterion to implement oil quality upgrading, safety and environmental protection energy-saving transformation projects. Promote the refining structure adjustment project, improve the adaptability of crude oil processing and improve the quality of refined oil products through new residue hydrogenation, catalytic cracking units, S-Zorb units, gas separation units, alkylation and other devices, and produce more light hydrocarbons and naphtha raw materials for downstream chemical plants.

5.2.1.2 Optimize the industrial structure and promote the rational layout of the petrochemical industry

In 2025, the annual crude oil processing capacity in our province will be controlled below 60 million tons/year, and the proportion of refined oil and olefin raw materials will be reasonably optimized. The optimization of the petrochemical industry along the river has been fully launched, the adjustment and implementation of petrochemical plants in sensitive areas have been launched, and the refining units

and backward production capacity units outside the compliant chemical park have been closed. The petrochemical industry in the river area has developed in a coordinated and dislocation manner, forming a number of influential new material industry bases, special high-end oil production bases, high-end asphalt product production bases, light hydrocarbon comprehensive utilization production bases, petrochemical scientific research and innovation bases and other characteristic industrial functional bases in the country.

Subject to objective constraints such as land resources, energy consumption indicators, and environmental capacity, the construction of the Nanjing 1 million tons/year ethylene project will be promoted in a timely manner to provide more sufficient raw materials for the long-term development of Nanjing Jiangbei New Materials Science and Technology Park. In terms of downstream product selection of olefins, we will give full play to the technical advantages of Sinopec and BASF, focus on developing high-end and differentiated products, and avoid cost competition with other new petrochemical projects in China. Promote the construction of a 600,000 tons/year propane dehydrogenation plant in Yangzhou to provide sufficient olefin resources for Yangzhou Chemical Park.

5.2.1.3 Promote the diversification of raw materials and

accelerate the construction of large-scale petrochemical leading plants

In accordance with the development ideas of raw material diversification, resource globalization and low-carbon processes, we will effectively implement resources and market conditions to rationally develop diversified olefin industries such as light hydrocarbon cracking, alkane dehydrogenation, and methanol to olefins. Under the premise of implementing competitive resources, relying on leading enterprises, we will select key parks with superior coastal port conditions such as Lianyungang Petrochemical Industry Base, and lay out new large-scale light hydrocarbon cracking to ethylene projects, so as to drive the development of first-class refining and chemical industry clusters.

Focus on promoting the diversified development of olefin and aromatic industries under the existing refining capacity. Concentrate chemical light oil and other resources, promote the construction of million-ton ethylene and aromatic hydrocarbon projects, and rationally develop diversified olefin leading projects such as light hydrocarbon cracking, alkane dehydrogenation, and methanol to olefins under the condition of effectively implementing resources. With the main direction of building a basic raw material industry with

comprehensive competitive advantages, we will further encourage enterprise mergers and restructuring, and form a complete refining and chemical integration industrial structure based on petrochemical parks.

Accelerate the filing of diversified raw material processing projects, promote the construction of Lianyungang propane dehydrogenation and light hydrocarbon comprehensive utilization projects, and jointly support the petrochemical raw material production system with Shenghong refining and chemical integration. At the end of the 14th Five-Year Plan, 16 million tons/year of oil refining, 4.05 million tons/year of ethylene, 2.8 million tons/year of paraxylene, 3.08 million tons of propylene and 4.96 million tons of refined oil will be realized, forming an integrated refining and chemical industry agglomeration and providing resource guarantee for the development of downstream industries.

5.2.2 Organic raw material industry

5.2.2.1 Accelerate the construction of faucets and improve the processing depth

5.2.2.1.1 Promote the deep processing of basic raw materials

The downstream of acrylonitrile focuses on the development of acrylamide and other products, the downstream of ethylene oxide

focuses on the development of ethanolamine and other surfactants, the downstream of propylene oxide focuses on the development of polyether polyols, propylene glycol, propylene glycol ether, carbonate and other products, the downstream of vinyl acetate focuses on the development of VAE, polyvinyl butyral, ethylene-vinyl alcohol (EVOH) resin and other products, the downstream of styrene focuses on the development of ABS resin, styrene butadiene rubber and other products, and the downstream of phenol acetone focuses on the development of bisphenol A-polycarbonate, (bisphenol A, Epichlorohydrin)-epoxy resin, phenol-polyphenyl ether/modified polyphenyl ether and other product chains, acrylic acid and butanol downstream development of acrylic acid and esters, superabsorbent resin and other products, PTA downstream focus on the development of PBT, PTT, PETG, TPEE, PBAT and other special polyester products.

5.2.2.1.2 Realize the comprehensive utilization of by-product resources

Comprehensive utilization of mixed C4, mixed C5, mixed C9 and other resources as by-products of refining and chemical integration and diversified raw material processing projects. The C4 components after butadiene extraction are separated and utilized, and

the downstream of isobutene develops polyisobutene, butyl rubber, MMA/PMMA and other products, and the downstream of n-butene develops isononanol, 2-propyl heptanol and other environmentally friendly plasticizer raw materials. Comprehensive use of diolefins such as isoprene, cyclopentadiene, m-prene and other diolefins in mixed C5, the downstream development of isoprene rubber, SIS elastomers, fine chemical products, the downstream development of unsaturated resins, special rubber, petroleum resins, and the downstream development of aliphatic hydrocarbon resins, alkyd resins, adhesive modification and production of lubricating inks downstream of ipentadiene. Mixed C9 is used to produce heavy aromatic hydrocarbon solvent oil, petroleum resin and other products.

5.2.2.2 Excavate resource conditions and connect with downstream demand

Vigorously develop the general engineering plastic α s industry polycarbonate, nylon 6/66, PBT polyester raw materials such as phenol acetone, bisphenol A, ethylene oxide, propylene oxide, caprolactam, adiponitrile, etc., and actively develop functional resins such as high barrier resin EVOH, superabsorbent resin, electronic grade epoxy resin and other required organic raw materials such as epoxychlorohydrin, acrylic, etc., Strengthen the organic raw materials

of special polyurethane series products, such as modified isocyanate, isocyanate adducts, etc., and actively develop into synthetic rubber and elastomer varieties rare earth butadiene rubber, dissolved styrene-butadiene rubber, halogenated butyl rubber, hydrogenated nitrile rubber, styrene series elastomers, TPV/TPU/TPEE/TPA thermoplastic elastomers and other supporting organic raw materials such as butadiene, acrylonitrile and other monomers.

5.2.2.3 Encourage green processes and optimize production systems

Promote the construction of a key supporting raw material supply system, actively develop the weak domestic industrial foundation, directly restrict the development of high-end petrochemical products such as high-end polyolefins, special polyesters, engineering plastics, high-end special chemicals and other key raw materials and chemical intermediates, and focus on promoting the construction of key raw materials such as PETG key raw material CHDM, nylon 66 key raw material adiponitrile, high-end polarizer key raw material PVA and other projects.

Optimize the production system of organic raw materials, highlight green cleanliness and cost optimization, and take into account regional environmental capacity according to market and

technology and other factors, select advanced and green process technologies, lay out relevant industrial chains, and improve the comprehensive utilization rate of resources.

Develop a green new process chemical raw material industry with high matching with surrounding raw materials and industrial development prospects. Ethylene oxide is synthesized into ethylene glycol through vinyl carbonate, and dimethyl carbonate is co-produced, and carbon dioxide recycling is realized. Promote the preparation of propylene oxide (HPPO) by catalytic oxidation of propylene hydrogen peroxide (HPPO) instead of the traditional chlorine alcohol method. Encourage the replacement of traditional acetone cyanol processes with ethylene carbonylation and enal (Alpha) MMA processes. Support the research and development of non-phosgene isocyanates (such as aliphatic isocyanates) and polycarbonate industrialization technologies. Accelerate the development of green processes such as epichlorohydrin and carbonyl synthesis acetic anhydride.

5.2.3 Synthetic materials industry

5.2.3.1 High-end polyolefins

Promote integration and improve industrial concentration. Docking with the upstream industrial development plans of the two

major petrochemical industry bases in Nanjing and Lianyungang, combined with the development of diversified raw materials to olefin projects such as PDH, using olefin raw materials to develop downstream polyolefin products, building two major polyolefin industrial bases in Nanjing and Lianyungang, as well as several characteristic polyolefin development parks such as Taizhou and Xuzhou, and improving the integrated development and industrial concentration of the polyolefin industry.

Connect with strategic industries and achieve high-end development. Focusing on the development of special materials and modified products of polyethylene and polypropylene, and special polyolefin products such as EVA, ultra-high molecular weight polyethylene, POE elastomers, and cyclic olefin polymers/copolymers (COC/COP) to achieve the high-end development of the polyolefin industry.

5.2.3.2 Styrene synthetic resins

Seize the opportunity of upstream raw material supply capacity growth, improve the level of integrated development, and maintain cost competitiveness. Connect with downstream high-end demand, increase R&D investment, aim at import substitution and new application needs, and develop high-end products.

GPPS/HIPS encourages upstream and downstream enterprises to develop collaboratively to control raw material costs while enhancing product value. In terms of EPS, focus on developing special functional products or seeking transformation. In terms of ABS, we will take advantage of the raw material advantages of Lianyungang Petrochemical Base to build a large-scale ABS production unit to achieve efficient utilization of organic raw materials such as styrene, acrylonitrile, and butadiene.

5.2.3.3 Thermosetting resins

Seize the development opportunities of high-end manufacturing, electronic information, new energy, and new infrastructure, and improve the production level and application level of thermosetting resin products such as unsaturated resins, epoxy resins, phenolic resins, and amino resins. Cultivate industry leaders, encourage existing advantageous enterprises to continue to increase R&D investment, expand industrial scale, and improve product competitiveness and market share. Accelerate supply-side structural reforms, reduce the proportion of low-competitive enterprises through mergers and acquisitions, market-oriented elimination, and promote the healthy development of the industry. Strengthen regional concentration of production capacity, and focus on the development

of characteristic thermosetting resin industry bases in cities with good industrial foundations. Promote cross-industry coordinated development, through the coordinated development of unsaturated resin and glass fiber industry and composite material industry, epoxy resin and carbon fiber, high-end equipment, electronic information industry, etc., to achieve high-quality development of thermosetting resin and related industries.

5.2.4 New chemical materials industry

5.2.4.1 Silicon Materials

Focus on the development of silicone downstream products, increase the development of silicone downstream products, market-oriented, develop supporting new silicone downstream varieties, make full use of the formed sealants, high-temperature glue, liquid glue, silicone oil, emulsion, silicone resin and other industrial base advantages, improve the operating rate of the device, and improve the profitability of products, and take downstream products as the source of profit growth points. Increase the market share of special silicone monomers, special silicone rubber, and methylphenyl silicone rubber, achieve mature applications in aerospace and other fields, and drive the promotion and application of silicon materials in nuclear power, high-speed rail, automobiles, and electronics industries.

Focus on the development of methylphenyl silicone resin, phenyl silicone oil, fluorosilicone rubber, special silicone rubber, methylphenyl silicone rubber and other varieties, expand the production scale and improve product quality, enhance the supply level of high-end silicone downstream products in our province, and meet the demand of downstream industries for high-end silicone products.

5.2.4.2 Fluorine materials

Relying on the existing fluorine chemical industry foundation, giving full play to the supporting advantages of raw materials, grasping the historic development opportunities brought by the country's development of new infrastructure and strategic emerging industries, creating a fluorine material industry system integrating raw materials, products and market applications, focusing on high-performance fluoropolymers and products, low-greenhouse effect fluorine-containing ODS substitutes, and electronic special gases, to achieve the high-quality development of the fluorine material industry itself and help the transformation and upgrading of the real economy. Make full use of the industrialization advantages of ultra-high molecular weight PTFE to improve product quality and expand production scale. Focus on the development of domestic blank or

foreign-funded enterprise monopoly products to achieve industrialization or industrial upgrading, and greatly improve the self-sufficiency rate of high-end fluorine material products. Support the industrialization of high-performance fluorine material varieties and grades.

Focus on the development of fusible polytetrafluoroethylene, film-grade and adhesive-grade polyvinylidene fluoride, ethylene-tetrafluoroethylene copolymer (ETFE), high-speed extrusion grade polyperfluoroethylene propylene resin, tetrapropylene fluoroelastomer, perfluoroether rubber and other varieties, improve the effective supply capacity of high-end fluorine material products in our province, and meet the demand for high-end fluorine materials in downstream industries.

5.2.4.3 Engineering plastics

Combined with the technical conditions of engineering plastics at home and abroad, we will deeply integrate the East China regional market and rely on the supporting conditions of the engineering plastics industry in the province to vigorously promote the construction of engineering plastics production system. Improve the production scale and technical level of existing engineering plastics, and optimize the process technology of polyoxymethylene,

polybutylene terephthalate, polyamide engineering plastics and other devices. Give full play to the advantages of petrochemical base integration, accelerate the construction of phenol, bisphenol A and other projects, and extend the development of bulk engineering plastic products such as polycarbonate. Accelerate the construction of engineering plastics with low degree of industrialization or blank in the province, and encourage the development of special engineering plastics such as polyphenylene sulfide, polyimide, polyether ether ketone, and polyethylene naphthalate glycol. Eliminate the bottleneck of the supply of key supporting raw materials, increase the scale of organic raw materials such as 1,4-cyclohexane dimethanol and 1,3-propanediol, promote the development of special polyesters, promote the localization of adiponitrile technology, and promote the development of nylon 66 engineering plastics. Strengthen the development of plastic modification and plastic alloy technology, and improve the applicability and cost-effectiveness of engineering plastics to market segments, especially to meet the development needs of automobile lightweight, energy conservation and environmental protection, and 3D printing.

5.2.4.4 Polyurethane and its raw materials

Optimize polyurethane end products, expand high value-added

advantages, promote the research and development and production of special polyurethane products according to market demand, and focus on the development of automotive polyurethane materials, high-end polyurethane coatings and their curing agents, water-based polyurethane materials and other product categories.

Strengthen the supply system of polyurethane raw materials, and encourage the development of modified isocyanate varieties and project construction. Develop polyurethane additives, realize the transformation of new polyurethane chain extender technology achievements, and expand the domestic leading edge in the field of chain extenders. According to the development needs of new polyurethane application fields such as biomedicine, expand the research and development scope of polyurethane additives and improve the polyurethane raw material supply system.

To do the new polyether industry, according to the variety and performance requirements of new polyurethane products, increase the production ratio of special polyether. Optimize and transform production equipment, improve process control capabilities, realize multi-grade switching production capacity, achieve flexible production scheduling, and gradually improve customized supply capacity.

5.2.4.5 Special rubber and elastomers

Closely follow the development trend of the special rubber and elastomer industry, combined with the domestic and provincial market conditions, raw material conditions and industrial foundation, focus on the development of varieties with large growth space in the domestic market and convenient raw material supply, optimize the structure, enrich product categories, and enhance the overall competitiveness.

5.2.4.6 High-performance fibers

Encourage existing high-performance fiber enterprises to expand their production scale, increase market share, and improve product quality by improving process technology. Strengthen the supporting conditions for high-performance fiber raw materials, and improve the supply capacity of key raw materials such as p-phenylenediamine, terephthalyl chloride, special diaphthalic anhydride and diamine monomer.

5.2.4.7 Miscellaneous

In addition to the above-mentioned new chemical material categories and products, we should continue to give full play to the advantages of existing enterprises and products, expand the scale of related products, expand and add new high-performance resin

products, and encourage the development of potential fields such as bio-based raw materials, bio-based materials, and degradable plastics.

5.2.5 Fine chemical industry

Fine chemicals adopt the "10+10" development model, that is, upgrading and developing the ten traditional fine chemical sectors, and breaking through the development of the ten new fields of fine chemical sectors. By the end of the 14th Five-Year Plan, the development structure and layout structure of the fine chemical industry have been optimized, and the output value of fine chemicals in new fields accounts for more than 30% of the total fine chemicals, and the output value of fine chemical enterprises in the chemical park (centralized) area accounts for more than 75% of the total fine chemicals.

5.2.5.1 Upgrade and develop the traditional fine chemical industry

5.2.5.1.1 Pesticides

Accelerate the research and development of front-end innovative drugs and occupy the commanding heights. Strive for more terminal markets and achieve scale advantages. According to the industrial foundation, environmental carrying capacity and development space, the eight cities in southern Jiangsu and central Jiangsu have

strengthened the leadership of innovative research and development, actively cultivated brands and channels, and gradually realized the leap in the industrial value chain.

The output value of enterprises in the chemical park (centralized) area has increased to 55 billion yuan, and the output value of enterprises outside the chemical park (centralized) area has shrunk to about 10 billion yuan.

5.2.5.1.2 Coatings

Orderly development of environmentally friendly, functional, decorative and high-performance architectural/decorative coatings. Focus on the development of water-based colorful antibacterial interior wall coatings, low VOC and zero VOC interior wall coatings, environmental protection, high weather resistance, anti-staining, elastic exterior wall coatings, long-lasting reflective thermal insulation exterior wall coatings, photocatalytic self-cleaning exterior wall coatings, anti-graffiti and anti-stick building protective coatings, environmentally friendly art architectural coatings, high-performance polyurethane waterproof coatings, high-performance water-based wood coatings, etc.

Encourage the development of water-based, powdered, high-solids industrial protection and heavy anti-corrosion coatings

production and research and development. Focus on the development of environmentally friendly and high-protection sprayed polyurea heavy anti-corrosion coatings, chloride ether anti-corrosion coatings, polyaniline anti-corrosion coatings, low-surface treatment anti-corrosion coatings, high-performance fluorocarbon coatings, graphene anti-corrosion coatings, biological antifouling coatings, etc.

Scientifically develop environmentally friendly, high-performance, fewer coating processes and more economical automotive coatings. Focus on the development of low-VOC cathodic electrophoretic paint (solvent content below 1%), high permeability, high flatness, no need to coat cathodic electrophoretic paint, water-based medium coating, high solids medium coating, powder medium coating, solvent-free water-based top coat, powder cover varnish, high solids content cover varnish, etc.

Gradually form an energy-saving, functional, high-performance, and simple coating process powder coating industry. Focus on the development of low-temperature or fast-curing powder coatings, chromium-free phosphating powder coatings, imitation electroplating powder coatings that replace high-pollution electroplating processes, highly reflective powder coatings for energy-saving lamps, reflective heat insulation powder coatings, ultra-weather-resistant polyester

powder coatings (weather resistance above 10A), fluorocarbon powder coatings, negative ion preservation powder coatings, powder coatings for auto parts, high-temperature resistant powder coatings, heat dissipation powder coatings, etc.

Guide the development of UV curing coatings. Focus on strengthening the research of water-based UV coatings and powder UV coatings, and focus on the development of 3C UV curing coatings, UV curable fiber optic coatings, UV curing 3D printing coatings, etc.

Consolidate and expand the core raw materials of coatings such as synthetic resins. Develop the synthetic resin industry that serves the environmental protection and high performance of coatings, and rely on advantageous enterprises to develop high-performance water-based wood coating resins, water-based industrial coating resins, high molecular weight and low viscosity high-solids coating resins, water-based UV coating resins, etc., to ensure the green and high-end development of the coating industry.

Optimize and improve the process level of the coating industry. Encourage the development of green technology, choose opportunities to develop chlorinated titanium dioxide technology, and fill the gap in chlorinated titanium dioxide technology in the province.

At the end of the 14th Five-Year Plan, the layout of the coating

industry will be optimized, and the output value of the chemical park (concentration) area will increase to about 40 billion yuan, the output value outside the chemical park (concentration) area will drop to about 15 billion yuan, and the output value of the chemical park (concentration) area will rise to more than 70%.

5.2.5.1.3 Synthetic material additives

Guide the synthetic additives industry to develop in the direction of environmental protection, efficiency and high-end. Eliminate toxic and harmful rubber additives, develop green and environmentally friendly additives products, and develop new green plasticizer products to replace phthalate plasticizers. Vigorously develop the cleaner production process of rubber additives, improve the production process route from the perspective of improving the atomic economy of the process, reduce the emission of "three wastes" from the source, and encourage the development of the use of high thermal stability insoluble sulfur continuous process technology, precious metal catalytic hydrogenation method to synthesize p-phenylenediamine anti-aging agents, etc.

Promote enterprises to improve the level of automation and cleanliness, improve labor productivity, achieve intelligent production, benchmark leading enterprises in the industry, and carry

out intelligent transformation work. Horizontally compare the production levels of different types of synthetic additives manufacturers, cultivate advantageous enterprises, and promote the further concentration of production capacity in the province.

Develop high value-added synthetic material additives in key new chemical material supporting fields, develop foaming agents, homogenizers, crosslinking agents for high-end polyurethane materials, epoxy resin curing agents for composite materials, etc.

During the "14th Five-Year Plan" period, further optimize the layout of the synthetic material additives industry, strive to increase the total output value to 35 billion yuan, focus on the chemical park (concentration) area, the output value of the chemical park (concentration) area will increase to 30 billion yuan, and the proportion of enterprise output value in the chemical park (concentration) area will increase to more than 70%.

5.2.5.1.4 Multifunctional intermediates

Integrate the production capacity of multifunctional intermediates with large and dispersed production capacity such as p-benzene chloride, phosphorus trichloride, nitrotoluene, benzotriazole, bisphenol S, etc., increase elimination and integration, and improve industry concentration. Implement the upgrading of continuous

nitrification process for production enterprises using nitrification process to further improve the intrinsic safety level of the device. Optimize the production capacity layout of multi-functional intermediates, increase the output value of enterprises in the chemical park (centralized) area, and reduce the number of devices outside the chemical park (centralized) area.

By the end of the "14th Five-Year Plan", strive to maintain the total output value of the multifunctional intermediates industry at about 20 billion yuan. The output value of multifunctional intermediates in the chemical park (concentration) area increased to 15 billion yuan, while the output value of enterprises outside the chemical park (concentration) area shrank to about 5 billion yuan.

5.2.5.1.5 Dye pigments

Measures should be taken to encourage enterprises whose output value in the chemical park (centralized) area does not reach the average level, support the industry's leading enterprises to integrate existing production capacity through mergers and acquisitions, and take the province's advantageous encouraged technologies and encouraged products as the main development direction.

By the end of the 14th Five-Year Plan, the industrial structure of dyeing pigments and their intermediates has been significantly

optimized, with the output value in the chemical park (concentration) area rising to 14 billion yuan, the output value outside the chemical park (concentration) area dropping to 5 billion yuan, and the proportion of the output value in the chemical park (concentration) area rising to about 75%.

5.2.5.1.6 Special chemicals in other fields

Gradually eliminate small enterprises with low production and management levels outside the chemical park (concentration) area, improve industry concentration, and cultivate special chemical enterprises in other fields with international competitiveness, so that the average output value of enterprises reaches more than 100 million yuan.

At the end of the 14th Five-Year Plan, the total output value of the special chemical industry in other fields will be maintained at 16 billion yuan, the layout structure will be significantly improved, the output value in the chemical park (concentration) area will rise to 11 billion yuan, the output value outside the chemical park (concentration) area will drop to 5 billion yuan, and the output value in the chemical park (concentration) area will rise to about 70%.

5.2.5.1.7 Chemical APIs

Relying on several major chemical drug and intermediate

production bases such as Wuxi, Taizhou, and Lianyungang, as well as CRO/CMO/CDMO resources in Nanjing, Shanghai and even developed countries, we will further enrich product series and product clusters, and promote the upgrading of the pharmaceutical and intermediate industry base and the modernization of the industrial chain. Focus on the development of anti-tumor drugs, cardiovascular system drugs, anti-infective drugs, respiratory system drugs, digestive system drugs, vitamin drugs, psychotropic system drugs, etc. and their key intermediates.

5.2.5.1.8 Oleochemicals

Accelerate the construction process of new projects in the existing chemical park (concentration) area, encourage leading enterprises to expand their production scale, enhance competitiveness and market share, and promote the improvement of industry production concentration. Focus on the development of potential products such as fatty amine, comprehensively utilize by-product glycerol, and extend the production of 1,3-propylene glycol to help the development of high-performance polyester fiber PTT field.

By the end of the 14th Five-Year Plan, strive to reach the total output value of oleochemicals to 15 billion yuan, and the output value of oleochemicals in the chemical park (concentration) area will reach

about 10 billion yuan.

5.2.5.1.9 Adhesives

Relying on the scientific and technological innovation capabilities of existing enterprises, we will develop high-quality, high-performance, and high value-added environment-friendly adhesives, and focus on the development of solvent-free, high-solids content, water-based, light-cured, low-temperature curing, hot-melt and hot-melt pressure-sensitive adhesives from the perspective of product performance. Focus on the development of high-end products such as phenolic resin adhesives, acrylate adhesives, polyurethane adhesives, copolyester adhesives, and copolyamide adhesives. Focus on the development of adhesive products in electronic appliances, rail transit, aerospace, new energy, intelligent manufacturing, green packaging materials and other fields.

At the end of the "14th Five-Year Plan", the total output value of the adhesive industry remained at about 10 billion yuan, the superior production capacity was developed and integrated into the chemical park (centralized) area, the output value in the chemical park (centralized) area increased to about 8 billion yuan, the output value outside the chemical park (concentration) area dropped to about 2 billion yuan, and the proportion of enterprise output value in the park

increased from the current 60% to about 80%.

5.2.5.1.10 Inks

Further enhance the industry concentration in the field of ink production, encourage enterprises with scale and product advantages to further improve product performance and added value, and focus on the development of environmentally friendly ink products such as UV inks and water-based inks.

At the end of the "14th Five-Year Plan", strive to increase the total output value of the ink industry to 8 billion yuan, develop and integrate advantageous production capacity into the chemical park (centralized) area, the output value of the chemical park (concentration) area has risen to about 5 billion yuan, the output value outside the chemical park (concentration) area has risen to about 3 billion yuan, and the output value of enterprises in the chemical park (concentration) area has risen to more than 60%.

5.2.5.2 Breakthrough in the development of new fields of fine chemical industry

5.2.5.2.1 Electronic chemicals

Give full play to the industrial foundation and market conditions of our province, vigorously develop electronic chemicals in the fields of integrated circuits, flat panel displays, new energy batteries, etc.,

expand the industrial scale, improve product quality, fill technical gaps, improve the independent production capacity of key electronic chemicals, and build an internationally competitive electronic chemical industry cluster.

Grasp the market development opportunities brought by national strategies such as new generation information technology and new energy, rely on the existing industrial foundation, vigorously develop electronic chemicals supporting integrated circuits and new display industries, improve the localization supply level of key materials, optimize and upgrade electronic chemicals in the field of PCB and new energy batteries, and promote the development of industrial structure in the direction of high-end and high added value. Optimize and upgrade products that already have a certain production base in the province, such as wet electronic chemicals, electronic gases, advanced packaging materials, hybrid liquid crystals, and lithium battery materials, improve product quality levels, and improve the industrial chain. Accelerate the research of high-end photoresist and key photoresist raw materials, CMP materials, high-performance OLED materials and other blank products in the province, break through key material technologies, and actively fill high-end shortcomings.

In the field of photoresists, we will focus on the development of large-scale and ultra-large-scale integrated circuits and high-generation display panel photoresists, improve the supply level of semiconductor photoresists such as G-line and I-line photoresists, and new display photoresists such as color photoresists, black photoresists, and TFT positive photoresists, break through key technologies such as KrF photoresists, ArF/ArFi photoresists, PSPI photoresists, electron beam photoresists, etc., improve the quality level of raw materials such as photoinitiators and monomers, and strengthen photoresist resins, anti-reflective coatings, etc. R&D support for raw materials such as color paste has been strengthened to improve the localization level of photoresist and its key supporting raw materials as a whole.

Wet electronic chemicals focus on the development of G4, G5 grade and above products, strengthen and expand electronic grade hydrogen peroxide, sulfuric acid, ammonia, nitric acid, developer solution, etching fluid and other advantageous products, and improve product quality level and stability. Accelerate the implementation of electronic grade hydrofluoric acid and other blank product projects in the province, and improve the industrial layout.

Electronic gases focus on the development of large-scale, ultra-

large-scale integrated circuits and high-generation electronic special gases for high-generation display panels, including 5N high-purity Cl2, HCl, HF, germanium, arsenic, phosphorus, silane, CF4, 4N grade trichlorosilicon, dichlorodihydrosilicon, carbon oxysulfide, 3N grade BF3, as well as ultra-high purity germanium alkane mixture, ethylborane mixture and other products.

Lithium battery materials focus on the development of high-performance electronic chemicals supporting a new generation of power lithium batteries, including high-nickel ternary, lithium-rich manganese-based cathode materials, low-cost lithium iron phosphate and other cathode materials, high-specific energy silicon-carbon anode materials, high-performance wet separators and thin-layered, functionalized, new coating systems, new lithium salts, new solvents, and the development and application of positive and negative electrode additives.

At the end of the 14th Five-Year Plan, strive to reach the total output value of the electronic chemical industry to 34 billion yuan, the output value in the chemical park (concentration) area will increase to about 28.5 billion yuan, and the output value outside the chemical park (concentration) area will reach about 5.5 billion yuan.

5.2.5.2.2 Environmental protection chemicals

Relying on the existing industrial foundation, develop efficient, non-toxic, green and environmentally friendly scale inhibitors and corrosion inhibitors. Develop soil remediation chemicals, encourage the development of deep oxidants for organic pollutants, zero-valent iron remediation agents for organic chlorine pollutants, soil remediation agents for heavy metal contaminated farmland, and soil remediation agents for high-concentration heavy metal contamination, and encourage the research and development of nanotechnology in soil remediation chemicals. Improve supporting application services and improve the overall production and service level of the environmental protection chemical industry in our province.

At the end of the 14th Five-Year Plan, the environmental protection chemical industry strives to achieve a total output value of 15 billion yuan, the output value in the chemical park (concentration) area has risen to about 9 billion yuan, the output value outside the chemical park (concentration) area has risen to about 6 billion yuan, and the output value of enterprises in the park has risen to about 60%.

5.2.5.2.3 Surfactants

Focus on the development of basic oil-chemical products such as fatty acids, fatty alcohols, and fatty amines with natural oils, expand

the production scale of AEO, AES and other products, improve the concentration of industrial scale, and vigorously develop green surfactant products such as amino acid surfactants, cashew carrotol surfactants, fatty alcohol polyoxyethylene ether, fatty alcohol polyoxyethylene ether sodium sulfate, fatty acid methyl ester sulfonate, alkyl sulfonate, betaine amphoteric surfactants, alkyl glycoside surfactants, etc., to improve the quality of industry development. Increase the intensity of enterprises to withdraw from the city and enter the park, and guide enterprises with large scale and large demand for chemical raw materials to withdraw from the city and enter the park for development.

At the end of the "14th Five-Year Plan", the surfactant industry strives to achieve a total output value of 14 billion yuan, the output value in the chemical park (concentration) area has risen to about 9 billion yuan, the output value outside the chemical park (concentration) area has dropped to about 5 billion yuan, and the output value of enterprises in the park has risen to more than 60%.

5.2.5.2.4 Textile chemicals

Focus on the development of green textile chemicals and encourage the provision of customized services for the textile printing and dyeing industry. Increase the research and development of

environmentally friendly green textile chemicals, promote the concentration of production capacity of enterprises and provide comprehensive solutions for textile printing and dyeing enterprises, and promote the coordinated development of the textile chemical industry and the textile industry.

At the end of the "14th Five-Year Plan", the number of textile chemical manufacturers in the province was reduced to less than 40, and enterprises with strong competitive advantages were cultivated in the three major fields of environmentally friendly spinning oils, textile auxiliaries, and printing and dyeing auxiliaries. The textile chemical industry strives to achieve a total output value of 10 billion yuan, the output value in the chemical park (concentration) area has risen to about 5 billion yuan, the output value outside the chemical park (concentration) area has been compressed to less than 5 billion yuan, and the output value of enterprises in the chemical park (concentration) area has risen to more than 50%.

5.2.5.2.5 Concrete admixtures and their raw materials

Continue to rely on existing leading enterprises to develop the production of concrete admixtures and their raw materials, focus on improving the industrial concentration and market share of polyether monomers, polycarboxylic acid superplasticizers, isopropanolamine,

and encourage the research and development and production of potential products such as diethanol monoisopropanolamine.

At the end of the "14th Five-Year Plan", the total output value of concrete admixtures and their raw materials industry will strive to reach 10 billion yuan, the output value in the chemical park (concentration) area will rise to about 9.5 billion yuan, the output value outside the chemical park (concentration) area will drop to about 500 million yuan, and the output value of enterprises in the chemical park (concentration) area will rise to about 95%.

5.2.5.2.6 Food and feed additives

Vigorously develop safe condiments, hydrocolloids, acidifiers, flavor enhancers, sweeteners, emulsifiers, vitamins and minerals, chemical preservatives, antioxidants, etc., and lead the development of biological food additives, enzyme preparations, nutritional fortifiers and other products with great potential. On the basis of further expanding the market share of advantageous products, seek opportunities for the construction of new projects and develop small varieties of amino acid products.

At the end of the 14th Five-Year Plan, we will strive to reach the total output value of food additives to 7 billion yuan, the output value in the chemical park (concentration) area will rise to about 6.5 billion

yuan, the output value outside the chemical park (concentration) area will be about 500 million yuan, and the output value of enterprises in the park will rise to more than 90%.

5.2.5.2.7 Catalysts

Improve the development quality of the catalyst industry in the province, and develop diversified, highly selective, high-stability and long-life catalysts. According to the needs of chemical production enterprises in the province, develop catalyst varieties that meet the needs of production. Encourage the development of catalysts for import substitution, including propane dehydrogenation catalysts, low-pressure non-precious metal catalysts, low-pressure hydrogenation catalysts and other varieties. Strive to closely integrate catalyst production with chemical production in the province, improve the self-sufficiency rate of catalysts in the province, and improve the level of import substitution.

At the end of the "14th Five-Year Plan", the catalyst industry strives to reach a total output value of 6 billion yuan, the output value of the chemical park (concentration) area has risen to about 5.5 billion yuan, the output value outside the chemical park (concentration) area has remained at about 500 million yuan, and the output value of enterprises in the chemical park (concentration) area has risen to 90%.

5.2.5.2.8 Papermaking Chemicals

Improve the application service provision capabilities of leading enterprises, encourage them to further enrich product categories, not only produce products, but also provide papermaking solutions to promote the green development of the paper industry. Strengthen the attraction of global leading paper chemical enterprises and build internationally competitive production equipment.

At the end of the "14th Five-Year Plan", the province's papermaking chemical industry strives to achieve a total output value of 6 billion yuan.

5.2.5.2.9 Lubricating oil additives

Realize the diversification and large-scale development of single agents and high-value compound agents. In addition to the main varieties of detergents, dispersants, and viscosity index improvers, the company also develops high-quality decondensation agents, anti-corrosion and rust agents, oil-based agents/friction improvers, anti-wear agents, extreme pressure agents, antifoaming agents, emulsifiers, sealants, dyeing agents, and odor masking agents. Compounds have developed with the goal of providing integrated solutions for a wide range of machinery and applications.

At the end of the "14th Five-Year Plan", the province's lubricant

additive industry strives to achieve a total output value of 5 billion yuan, and the output value of enterprises in the chemical park (concentration) area has risen to more than 80%.

5.2.5.2.10 Chemical reagents

Focus on the development of analytical reagents, standard reagents, clinical diagnostic reagents, pharmaceutical excipients and other products to support the development of the life and health industry. Encourage enterprises to apply advanced adsorption and separation technology, regional melt purification technology, foam separation technology, conventional column hierarchical separation technology, membrane separation technology and other technologies and their combined processes to strengthen and improve the development level of purification processes, and control the indicators of impurities in chemical reagents to reach the PPT level.

At the end of the "14th Five-Year Plan", 5-10 chemical reagent manufacturers with an annual output value of 1 billion yuan will be trained, and the chemical reagent industry in the province will strive to achieve a total output value of 5 billion yuan, and the output value of enterprises in the chemical park (concentration) area will account for 75%.

5.2.6 Inorganic chemical industry

5.2.6.1 Chlor-alkali industry

Based on the industrial foundation and advantages, through adjustment and optimization, industrial concentration, land utilization rate and factor input-output efficiency have been significantly improved, the proportion of total energy consumption in all industries has been continuously reduced, the pressure on safety and environment has been effectively alleviated, and the core competitiveness of the industry of "optimal allocation of resources, advanced technology and environmental protection, comprehensive utilization of waste, and high-end extension of products" has been cultivated to achieve the high-quality development of the chlor-alkali industry in the province.

5.2.6.1.1 Total control, improve quality and efficiency, optimize allocation, and support the excellent and strong

According to the national industrial policy requirements of "strictly controlling the new production capacity of excess industries, and implementing equal or reduced replacement of advanced process transformation and upgrading projects that meet the policy requirements", the total amount of caustic soda and other production capacities is controlled, and the overall scale remains at the current level. Through mergers and acquisitions, elimination of

backwardness, capacity replacement and horizontal alliances, the implementation of government-guided, enterprise voluntary, investment promotion and market-oriented operation of capacity replacement index transactions, guide their production capacity, resources and markets to concentrate on powerful enterprises, integrate the chlor-alkali industry, form a leading backbone enterprise, optimize the industrial structure and resource allocation, and improve the degree of intensification.

5.2.6.1.2 Adopt advanced energy-saving and emission reduction technologies to transform and upgrade industries and enterprises

Encourage enterprises to benchmark with leading energy efficiency benchmarking enterprises in the domestic chlor-alkali industry, adopt and promote advanced technologies such as zero-pole distance electrolyzers and oxygen cathode electrolyzers to transform and upgrade the chlor-alkali production system with long running time and high energy consumption in an all-round way, so as to achieve energy conservation and emission reduction and comprehensive utilization of resources. At the same time, through the demonstration of industrial waste salt resource utilization, a green chlor-alkali chemical circular economy system focusing on energy

conservation, emission reduction and comprehensive utilization of resources will be formed.

5.2.6.1.3 Further promote the high-end and refined extension of chlorine and hydrogen downstream

Further tap the potential of chlor-alkali chemical industry in undertaking the high-end development of the chemical industry in Jiangsu Province. Actively promote the development of the downstream industry of chlorine and hydrogen in the direction of high-end, functional and refined. With chlorine as a link, comprehensively promote the horizontal coupling and related development of chlorine and fluorosilicon chemical industry, chlorine and petrochemical industry. Give full play to the important role of chlor-alkali chemical industry in undertaking the development of strategic emerging industries, gradually promote the related agglomeration of chlorine and hydrogen resources to new materials, energy conservation and environmental protection, new energy and other industries, and provide some high-quality hydrogen sources for the development of the hydrogen energy industry in the future.

5.2.6.1.4 Extend and expand the regional chlorine industry chain and improve the local conversion rate of liquid chlorine

Focusing on the development of petrochemical, new chemical

materials and fine chemical industries, develop the integrated chlor-alkali-petrochemical and chlor-alkali-fine chemical industry chains, promote the digestion of chlorine in enterprises or "partition wall supply" in the park, and increase the local conversion rate of chlorine to more than 90%, which not only increases the added value of products, but also reduces the safety risks caused by long-distance road transportation of liquid chlorine.

5.2.6.2 Soda ash industry

Promote the integration of millions of tons of underground circulation alkali production. Jiangsu Province produces a large number of salt cavities after mining, which has certain geological risks, and the salt cavities have good sealing properties, which is a good available resource. Strive to establish projects to build national petroleum strategic reserves and commercial reserves, and use the advantages of salt cavity oil reserves to provide raw material guarantee for the development of the chemical industry in our province. Develop downstream organochlorine products such as epichlorohydrin and epoxy resin to support the development of salt chemical bases. Realize the development and utilization of advantageous resources, build the core competitiveness of the industry, increase the proportion of soda ash production capacity in

the green process of underground circulation alkali production, and realize the quality and efficiency of traditional industries and green development.

Implement the relocation of the alkali plant. Some alkali plants in the province are sensitive, the coal gasification process is relatively backward, and the waste liquid and waste residue are easy to cause great social repercussions, so the relocation of such enterprises should be carried out as soon as possible.

5.2.6.3 Inorganic salt industry

During the "14th Five-Year Plan" period, basic inorganic salt products will no longer be developed, but will focus on the development of new inorganic powder materials, create an inorganic new material industry agglomeration area, and promote the optimization and upgrading of the whole inorganic salt industry chain. Focusing on the needs of high-end new materials, new energy industry, national defense and military industry, nuclear industry, electronic information, energy conservation and environmental protection, building materials, food and medicine and other high-end fields, we will focus on the development of functional material products such as nanoscale titanium dioxide, carbon nanotubes (CNTs), nano silicon germanium (SiGe), nano arsenide (GaAs),

calcium carbonate, zinc oxide, magnesium oxide, magnesium hydroxide and other nanomaterials, indium phosphide (InP), gallium arsenide (GaAs), germanium (Ge)/gallium phosphide (GaP), Semiconductor materials such as gallium nitride, ceramics and semiconductor packaging materials such as Al2O3, CaO, SiO2, B2O3, LiF, CaF2, BaO, TiO2 and ZrO2, lithium trifluoromethylimide, lithium bitrifluoromethyl sulfonate, cobalt-free materials, ternary materials, lithium iron phosphate, lithium manganese oxide, lithium-rich multi-materials, titanium-based materials (such as lithium titanate), nitrides (such as lithium nitride), silicon-based materials (nanosilicon, etc.) and tin-based materials and other electronic materials. Upgrade and develop a number of key inorganic salt new material products, and encourage the establishment of customized service systems for user needs.

5.2.6.4 Fertilizer industry

Raw material route adjustment. The nitrogen fertilizer industry continues to promote the transformation and upgrading of raw material routes and increase the proportion of advanced gasification technology routes. Policy promotion, gradually eliminate the atmospheric pressure fixed bed gasification process, and build new advanced gasification devices. In areas with competitive advantages

driven by the market, new synthetic ammonia or coal gasification multi-production projects using non-anthracite coal as raw materials will be built to achieve survival of the fittest.

New type of fertilizer. No longer expand the production of basic fertilizers, compound fertilizer enterprises can develop value-added fertilizers such as modified fertilizers and special fertilizers, forming a product structure based on value-added and efficient fertilizers. Encourage the downstream production of sulfur-based urea, peptide urea, zinc-benic acid urea, lime nitrogen urea, glutamate urea, alginate urea and other quality and efficiency urea products to improve the industry's risk resistance.

Coal gasification multi-generation. Without expanding the scale of existing coal gasification plants, encourage enterprises to develop coal gasification multi-generation projects.

5.3 Output value expectations at the end of the 14th Five-Year Plan

It is expected that by the end of the "14th Five-Year Plan", the total output value of the chemical industry in Jiangsu Province will reach more than 1.4 trillion yuan, with an average annual growth rate of more than 6.0%. Among them, the output value of the petrochemical industry increased by 10.8%, with an average annual

growth rate of 1.7%; the output value of the organic raw material industry increased by 49.2%, with an average annual growth rate of 6.9%; the output value of the synthetic materials industry increased by 86.8%, with an average annual growth rate of 11.0%; the output value of the fine chemical industry increased by 36.0%, with an average annual growth rate of 5.3%; the output value of the new chemical materials industry increased by 137.8%, with an average annual growth rate of 15.5%; The output value of inorganic chemicals and fertilizers increased by 3.9%, with an average annual growth rate of 0.6%.

Chapter VI Safety Production Planning

6.1 Prevent park safety risks

6.1.1 Implement closed management

In accordance with the requirements of "classified control, hierarchical management, and step-by-step implementation", optimize the layout of the park, and realize the overall closed management of the park for the areas where flammable, explosive, toxic and harmful chemicals, hazardous wastes and other materials and personnel enter and exit in the chemical parks and concentration

areas of the province.

6.1.2 Build an information platform

Promote the use of information and intelligent means to establish an integrated management platform for safety, environmental protection and emergency rescue in chemical parks and functional areas involving major risks involving hazardous chemicals, comprehensively improve safety production supervision, early warning and emergency response capabilities, and effectively control and reduce overall safety risks.

6.1.3 Supporting and improving fire protection facilities

Follow the requirements of national and local fire safety laws, regulations, standards and specifications, implement the policy of "prevention first, prevention and elimination combined", and the construction of fire protection facilities and the development and construction of the park are planned and constructed synchronously. Combine the industrial nature, geographical location and surrounding cooperation conditions of each park, optimize the layout of fire rescue stations, and rationally plan and build fire stations, fire water supply, fire truck passages, fire communication and other fire protection facilities.

6.2 Implement industrial source control

6.2.1 Strictly implement industrial policies

further promote the implementation of policies and measures for the transformation and upgrading of the chemical industry, and coordinate the high-quality development of the chemical industry; According to the national industrial structure adjustment guidance catalogue and the elimination of backward safety technology and equipment, the chemical industry policy is formulated in detail, and the withdrawal of non-compliant production capacity is resolutely closed, and the backward production capacity is strictly prevented from settling in different places and risk transfer.

6.2.2 Raise the entry threshold for the industry

Strict entry thresholds in terms of safety, environmental protection, technology, investment, land use, management ability and academic qualifications of employees, and develop chemical projects with good market prospects, high process and technology level, advanced safety and environmental protection, and strong industrial driving force with high standards. In the project approval stage of chemical construction projects, they shall be jointly reviewed by relevant departments of the people's governments of districted cities (except for projects approved by the province).

6.2.3 Carry out in-depth rectification and improvement

Strictly implement the industrial structure adjustment guidance catalogue, and strictly eliminate products, technologies, processes and equipment that have been included in the elimination and prohibition catalogue in accordance with the requirements of controlling high pollution, high energy consumption and backward processes. For areas with prominent chemical safety and environmental protection problems, regional approval restrictions will be implemented in accordance with laws and regulations.

6.2.4 Implement the "three simultaneous" safety and environmental protection

Strengthen safety and environmental protection supervision in the process of project construction and operation, and strictly implement the "three simultaneous" system of safety facilities and environmental protection facilities for construction projects. The design and construction of chemical projects should have the corresponding qualifications, and the design and construction should strictly implement the "Regulations on the Safety Management of Hazardous Chemicals" and the requirements of various regulations such as fire prevention, explosion prevention, leakage prevention, environmental pollution prevention and health protection of chemical enterprises.

6.3 Strengthen industry safety supervision

6.3.1 Strengthen regulatory capacity building

The park should set up a separate safety supervision agency, and the proportion of professional supervisors should not be less than 75% of the in-service personnel. Professionals can be selected through the civil servant appointment system to increase the proportion of law enforcement personnel with professional qualifications and practical experience related to production safety. Conduct regular training on safety knowledge, fire emergency knowledge and safety characteristics of hazardous chemicals for safety supervision personnel to improve their professional and professional capabilities.

6.3.2 Establish a dual prevention mechanism

In accordance with the requirements of the "Guidelines for the Investigation and Management of Safety Risks in Chemical Parks (Trial)" and the "Guidelines for the Investigation and Management of Safety Risks and Hidden Dangers in Hazardous Chemical Enterprises", chemical parks and chemical enterprises have improved the safety risk investigation system, implemented the main responsibility of safety risk investigation and management, and established a long-term mechanism for the investigation of safety risks and hidden dangers. Carry out hierarchical control of enterprises

with different safety risk levels, with the prevention and resolution of major safety risks of hazardous chemicals as the core, build a dual prevention mechanism of hierarchical control of safety risks and hidden danger investigation and management, continuously improve the ability and level of safety assurance, and resolutely curb major accidents.

6.3.3 Improve the level of intrinsic safety

Vigorously promote the application of advanced and applicable safety technologies, and make full use of the Internet of Things, informatization, automation and other scientific and technological means to comprehensively improve the risk prevention and control capabilities of enterprises and government supervision capabilities. Accelerate the promotion and application of advanced and applicable new processes, new technologies and new equipment, and actively promote mechanized substitution and automation reduction. Accelerate the construction of an information management system that integrates major hazard monitoring information, combustible toxic gas detection and alarm information, enterprise safety risk zoning information, on-the-job information of production personnel, and enterprise production management information, and comprehensively improve safety production monitoring, early

warning and emergency response capabilities.

6.4 Strengthen the safety management of hazardous chemicals

6.4.1 Optimize the production and storage layout

The layout of hazardous chemical production and storage in the chemical industry must comply with the requirements of the national economic and social development plan, the overall urban plan, the overall land and space plan, and the planning and layout of the chemical industry. Unless otherwise stipulated in the policy, new hazardous chemical production and storage projects should be strictly controlled in chemical parks (chemical concentration areas and key chemical monitoring points) involving the production of phosgene, chlorine, highly toxic chemicals, and explosive chemicals. By 2025, hazardous chemical production enterprises in densely populated urban areas that do not meet the requirements of safety and health protection distance will fully complete on-site transformation to meet standards, relocate into standardized chemical parks or close and withdraw.

6.4.2 Strict access to chemical parks

The chemical park (chemical concentration area) should be planned and rationally arranged, and the overall layout, enterprise distribution, industrial chain configuration, medium and long-term

planning in the area should be identified and analyzed for safety risks, and the impact of local geographical location, natural conditions, and surrounding sensitive targets on the chemical park should be fully considered. Strictly follow the conclusions of regional safety risk assessment for risk control, establish an access system for hazardous chemical production and storage enterprises, scientifically evaluate the safety capacity of the park, and improve supporting safety facilities. Establish and improve public participation mechanisms for major construction projects involving the public interest and affecting public safety.

6.4.3 Improve the level of process equipment

New hazardous chemical production projects must be equipped with automatic control systems; Production plants involving "two key points and one major" must be equipped with safety instrument systems and regularly carry out hazard and operability analysis (HAZOP); actively promote the automatic transformation and quality and efficiency improvement of hazardous chemical production equipment in service, and reduce the number of operators in high-risk positions and areas; The chemical plant in service that has not been formally designed must be diagnosed and transformed by safety design; Promote and guide enterprises to increase investment in safety

and eliminate backward technologies, processes and equipment.

6.4.4 Reduce the safety risk of hazardous chemicals

Chemical parks should regularly carry out regional safety risk assessments, comprehensively rectify the hidden dangers found in the assessment, strictly control the amount of hazardous chemicals stored and used by enterprises, gradually reduce the number of first-level major hazard sources, and resolve major safety risks in the park. Encourage enterprises to reduce the storage and use of existing hazardous chemicals through technological innovation, replace hazardous chemicals with non-hazardous chemicals, and replace high-risk hazardous chemicals with low-risk hazardous chemicals.

6.4.5 Implement safety management throughout the process

Use the province's hazardous chemicals life cycle supervision information sharing platform to strengthen the supervision of the whole process of production, storage, use, operation, transportation and disposal of hazardous chemicals, and strictly control the flow of highly toxic chemicals and explosive chemicals. Hazardous chemical production and storage enterprises should strictly implement the requirements of "one book and one signature" (safety technical specifications, safety labels), and transmit information such as hazard characteristics and disposal requirements to downstream enterprises,

users, users and emergency response personnel in a timely, accurate and comprehensive manner. Chemical parks (chemical concentration areas) should optimize the road transportation routes of hazardous chemicals, and select suitable areas to build special parking lots for hazardous chemical transportation vehicles with complete functions.

6.4.6 Strengthen the supervision of major hazard sources

Hazardous chemical production and storage enterprises shall register and file major hazard sources, conduct regular testing and evaluation, establish and improve the safety management system of major hazard sources, formulate technical measures and emergency measures for the safety management of major hazard sources, and ensure the safety input necessary for the safe production of major hazard sources. Strengthen the supervision and inspection of major hazard monitoring, urge enterprises to implement the main responsibility, and build a dynamic monitoring and early warning and forecasting mechanism for major hazards through the regulatory information system.

6.5 Strict supervision of hazardous waste

6.5.1 Carry out hazardous waste investigation and rectification

Comprehensively carry out hazardous waste investigation,

identify and identify solid wastes with unknown attributes, and focus on rectifying problems such as illegal storage, random dumping, and private landfill of hazardous wastes in chemical parks, chemical enterprises, and hazardous chemical units, so as to ensure the safety of storage, transportation, and disposal of hazardous wastes.

6.5.2 Improve the hazardous waste supervision mechanism

Establish a regulatory cooperation and joint law enforcement mechanism between departments, closely coordinate and cooperate, realize timely, full and effective sharing of information, form a joint force, and jointly do a good job in hazardous waste safety supervision. Strengthen the linkage of relevant departments, establish a system of regional cooperation, consultation and supervision of major cases, and improve the supervision system covering the whole process of hazardous waste generation, storage, transfer and disposal.

6.5.3 Improve hazardous waste disposal capacity

Rationally plan and build centralized hazardous waste disposal facilities to eliminate bottlenecks in disposal capacity; Urge enterprises to conduct safety assessments of environmental protection facilities and projects such as desulfurization and denitrification, coal to gas, volatile organic compound recovery, sewage treatment, and dust treatment to eliminate potential accidents.

6.6 Improve emergency rescue capabilities

6.6.1 Strengthen the management of emergency plans

Guide chemical parks and chemical enterprises to formulate accident emergency rescue plans, regularly organize and carry out joint drills, revise and improve them in a timely manner according to the results of the drill evaluation, further improve the scientificity, pertinence, practicability and operability of the plan, and ensure that the emergency plan of the enterprise and the relevant plans of the local government and its departments are smoothly connected.

6.6.2 Improve the construction of the rescue system

Efforts will be made to improve the emergency rescue capacity and level of chemical parks, promote the construction of an integrated emergency response platform for emergency, fire protection, medical care, public security and other departments, and implement dynamic monitoring and early warning and forecasting of safety production conditions. Establish an emergency system of "from enterprises to parks" and "parks to society" to achieve 24-hour real-time monitoring and emergency response.

6.7 Strengthen safety education and training

6.7.1 Strengthen safety publicity and education

Carry out various forms of publicity and education activities,

strengthen the publicity of typical experience and safety knowledge and skills, enhance the awareness and ability of safety production in the whole industry, and continuously cultivate a safety culture. Improve the safety production education and training system in the chemical industry, strengthen training and assessment, and promote employees to improve their safety quality and skills.

6.7.2 Accelerate the training of industrial workers

Promote higher vocational colleges to strengthen the construction of disciplines featuring chemical production technology, chemical safety and hazardous chemical safety management, and cultivate high-quality workers with safety production knowledge and ability. Encourage chemical enterprises to speed up the training of industrial workers through targeted training, school-enterprise joint education and apprenticeship system, and ensure that operators involved in "two key and one major" production equipment and storage facilities meet the job skill requirements.

Chapter 7 Key Projects

7.1 Infrastructure supporting projects

7.1.1 Realize the standardized management of the park

According to international and domestic advanced standards, improve the management level of chemical parks (centralized) areas, and use modern concepts to improve the development level of existing parks to achieve resource intensification and maximize benefits. The chemical park should adhere to the construction principle of "high-end, circular, green and safe", learn from the construction experience of chemical industry zones at home and abroad, adopt the "five integration" development concept, and strive to build a green high-end chemical industry base, a chemical science and technology innovation and entrepreneurship base, and a demonstration base for ecological construction and environmental circular economy, so as to achieve professional integration, investment concentration, resource intensification and benefit agglomeration.

Through the continuous transformation and upgrading of the chemical park, the layout of space projects is reasonable, the supporting facilities in the park are improved, the safety early warning and emergency response system of the park is strengthened, the safety and environmental protection facilities and operation level are improved, and the hidden dangers in the park are eliminated. Improve the park management system, establish an effective park assessment

index system, achieve scientific management, and improve the modernization level of the park.

7.1.2 Strengthen the smart upgrading of the park

Accelerate the implementation of smart chemical park construction, in accordance with the scientific park development concept, supported by a new generation of information technology and intelligent application, on the basis of comprehensive information perception and interconnection, fully integrate resources inside and outside the park, realize the seamless connection and collaborative linkage between people, things and park functional systems, intelligent self-perception, adaptation and self-optimization, form a safe, convenient, efficient, green and low-carbon park form with sustainable vitality, and realize infrastructure networking, development and management informatization, Refinement of functional services and intelligent industrial development.

7.1.3 Accelerate the construction of smart logistics

Accelerate the digital and intelligent development of the supply chain, actively promote the development of green supply chains, practice the concept of green development, support and encourage logistics enterprises to make full use of the advantages of resource integration and efficient collaboration of the pilot supply chain,

increase investment in new infrastructure with information technology as the core, accelerate the scientific planning and layout of smart logistics parks, intelligent warehousing, intelligent containers and supply chain technology innovation platforms, and make up for the shortcomings of supply chain hardware facilities. Encourage all kinds of enterprises to accelerate the differentiated development of logistics information platforms, promote the sharing of information in the whole logistics chain, and encourage the construction of regional and third-party logistics public service platforms that integrate functions such as matching transactions, online payment, information release, location tracking, technical consultation, and industrial dynamic analysis.

7.1.4 Improve transportation safety facilities

Strengthen the construction of information infrastructure, and gradually realize the whole process, whole chain and full-time monitoring of the names and quantities of hazardous chemicals in the process of production, storage, transportation and use. Strictly implement the new national standard vehicle technical requirements, promote the use of advanced vans, tanks and containers and other hazardous chemical special transportation equipment to improve the safety and environmental protection of vehicles. Promote the use of

various advanced vehicle safety facilities and equipment such as video surveillance, anti-fatigue warning, anti-collision warning, and automatic accident alarm to improve the level of transportation equipment and prevent safety accidents.

7.1.5 Improve the smart safety supervision system

Improve the construction of the "smart safety supervision" safety production information platform, improve and upgrade the software and hardware configuration, realize the inclusion of all key supervision enterprises, horizontal connection between departments, and vertical penetration within the system, so as to achieve real-time upload of data and information such as spatial geography, safety facilities, item storage, rescue forces, and disposal plans. Promote the interconnection of the "smart safety supervision" safety production information platform with major hazard early warning and monitoring, Internet + law enforcement and other systems.

7.2 Ecological environment protection projects

7.2.1 Continuously improve the atmospheric environment

Strengthen the control of volatile organic compounds (VOCs) emissions. Carry out VOCs investigation in key industries, find out the bottom number, and establish an emission list. Comprehensively strengthen the control of unorganized VOCs emissions, follow the

principle of "collecting all receivables and collecting by quality", and continuously strengthen the management of equipment and places. Strengthen the leakage control of equipment and pipeline components, carry out leakage detection and repair work as required, and fully implement the whole process governance measures of "effective emission reduction at the source + process control + efficient treatment at the end". Carry out oil and gas recovery and management of oil storage, transportation and marketing, and continuously strengthen the ability to accurately control VOCs.

Strengthen research on governance technology to achieve regional joint prevention and control. Promote the preparation of plans for meeting the standards within a time limit for atmospheric environmental quality, strengthen the source analysis of PM2.5 and ozone, and achieve targeted and precise pollution control. Establish and improve the joint prevention and control mechanism of regional air pollution, and strengthen the early warning and forecasting of heavy pollution weather.

7.2.2 Steadily improve the water environment

Strengthen the governance of water resources, water ecology, and water environment systems. Strengthen the overall management of the "three waters", establish a rigid constraint system for water

resources, and adhere to the principle of determining production, city, and people by water. Implement the target management of surface water ecological environment quality, improve the management level of sewage treatment facilities, and ensure the quality of surface water.

Strengthen the prevention, control and monitoring of water environment risk accidents. Strengthen the prevention and control of surface water environmental risk accidents, establish and improve the water environment risk prevention and control mechanism, actively respond to water environmental risk accidents, and realize that accident wastewater does not enter the Yangtze River Basin and Taihu Lake Basin. Regularly carry out groundwater quality tracking and monitoring around key waste production points.

Implement water-saving measures and build a "smart water" platform. Guide enterprises to actively adopt advanced water-saving equipment, implement water-saving technology transformation in the process, carry out water-saving diagnosis, water balance testing, and water efficiency assessment in key industries, strictly manage water quotas, and promote the transformation of water consumption methods to conservation and intensiveness. Strengthen the supervision of water supply and drainage pipelines to ensure that the leakage rate of water supply and drainage pipe networks is reduced to

less than 9%. Accelerate the construction of a "smart water" platform, coordinate the construction of a water data resource sharing system, and realize water resource utilization monitoring, water function area management supervision, water environment early warning and response, and water ecological environment protection.

7.2.3 Ensure the safety of the soil environment

Promote the reduction and resource utilization of industrial solid waste at source. By promoting cleaner production processes, creating green factories, and implementing green supply chain management, we will promote the reduction of industrial solid waste at the source. Guided by market demand, supported by new technologies, new processes, and new products, enterprises are guided and encouraged to actively increase the resource utilization of general industrial solid waste from the aspects of policies and standards.

Build a solid waste resource export system and platform. Support waste production enterprises and logistics and transportation enterprises to transport solid waste resources to areas with market shortages through railway containers, etc., and establish an export platform for the export of solid waste resources and new waste products.

Strengthen the construction of the "three capabilities" of

hazardous waste. Thoroughly investigate the risks and hidden dangers of the whole process and link of hazardous waste generation, collection, storage, transfer, transportation, utilization and disposal, consolidate the main responsibility of enterprises, and strengthen the rectification of problems. Promote the specialization, scale and parkization of hazardous waste classification and collection, carry out third-party professional transportation services, and actively and steadily develop classified collection, storage and pretreatment services. Accelerate the capacity building of hazardous waste disposal, and encourage the implementation of coordinated disposal and resource utilization projects of industrial waste salt and waste acid.

7.2.4 Realize the integrated monitoring of heaven and earth

Accelerate the construction of a monitoring network for atmospheric particulate matter components, photochemistry, and characteristic pollutants, carry out all-round air pollution monitoring and monitoring, and carry out greenhouse gas monitoring. Improve the groundwater environmental quality monitoring network, strengthen the monitoring and evaluation of groundwater environmental pollution risks and changing trends, study and formulate a list of key groundwater pollution sources, and actively

organize and carry out monitoring around groundwater pollution sources. Build a soil environment monitoring system with safety and risk control as the core, supplement the arrangement of soil environment monitoring points, improve the soil environment monitoring system of "regular investigation and dynamic adjustment", and strengthen the monitoring of the whole process of solid waste. Establish a mobile source monitoring system covering motor vehicles and non-road mobile machinery. Build an air quality forecasting and early warning system, strengthen emergency monitoring in industrial parks, and establish a rapid response and guarantee system for emergency monitoring. Promote the construction of informatization, strengthen the sharing and application of monitoring data, and enhance the strength of the environmental monitoring team. Deepen the integration and mining application of monitoring data, improve the level of public services for environmental monitoring information, strengthen the construction of talent teams, and improve experimental testing and analysis capabilities.

7.2.5 Strengthen ecological protection and restoration

Improve the quality and stability of ecosystems, build ecological security barriers, and promote comprehensive remediation.

Strengthen biodiversity conservation, strengthen unified ecological supervision, carry out biodiversity investigation and evaluation and effectiveness assessment, and accelerate the institutionalization, legalization, and standardization of the whole process of supervision in the field of biodiversity conservation. Improve the supervision system of nature reserves and ecological protection red lines. Strengthen the implementation of ecological protection red line supervision, and carry out ecosystem protection, restoration and assessment. Establish a mechanism for restoring ecological space and the integrity of aquatic organisms, and make every effort to ensure the safety of the water ecological environment in the main and tributary basins of the Yangtze River and Taihu Lake basins.

7.3 Dual carbon target support project

7.3.1 Optimize and upgrade the industrial structure

Large-scale refining and chemical projects and large-scale coal chemical industry are leading projects in the local chemical industry, accounting for a large proportion of overall carbon emissions. Optimize the industrial structure and achieve carbon emission reduction mainly through the following three aspects. First, through advanced raw material processing routes, maximize the utilization efficiency of crude oil and coal, make full use of by-products, and

fully extend downstream new chemical material projects, further utilize main and by-product products, and achieve in-depth utilization of resources. The second is to reduce carbon emissions by promoting the route of low-carbon olefin raw materials, reduce carbon input, and give full play to the advantages of high yield and small emissions of lightweight raw materials, so as to achieve carbon emission reduction from the raw material side. The third is to recycle and utilize various hydrogen resources, which can reduce the amount of hydrogen produced by coal gasification on the one hand, and supplement the amount of hydrogen required for coal gasification on the other hand, thereby reducing coal consumption.

7.3.2 Comprehensively promote energy conservation and consumption reduction

Encourage enterprises to promote energy conservation and consumption reduction transformation in the province's existing and planned projects, and choose advanced production technologies with high efficiency and low energy consumption as much as possible for future new projects, and use high-efficiency and energy-saving unit processes and equipment to improve energy utilization efficiency such as coal and electricity and reduce carbon emissions.

7.3.3 Accelerate the deployment of renewable energy

By adjusting the energy structure to achieve renewable energy substitution, optimize the energy consumption structure of the chemical industry in the province, reduce the consumption of coal, electricity and other resources, increase the application of biomass energy, green hydrogen, solar thermal, wind energy, and photovoltaic according to conditions, and gradually promote the subsistence of renewable energy.

7.3.4 Phased use of carbon dioxide

Appropriately deploy CCS-EOR and carbon dioxide-to-chemical projects to achieve industrial carbon sinks. Encourage the development of carbon capture, utilization and storage technologies, and develop the production of chemical products with carbon dioxide as the main raw material, such as ethylene (propylene) carbonate, dimethyl carbonate, carbon dioxide-based degradable plastics, etc.

7.4 Key enterprise cultivation project

7.4.1 Cultivate and develop leading enterprises

Leading enterprises are an important part of the development of the industry, and some leading enterprises have a dominant position in the development of the industry, and cultivating and developing leading enterprises is an important part of the upgrading and development of the industry. Encourage leading enterprises to carry

out equipment transformation, new equipment replacement and intelligent upgrading, improve the level of existing production systems, and consolidate the leading position of leading enterprises. Support leading enterprises to extend the industrial chain in their areas of expertise, make full use of main and sideline products, and achieve comprehensive improvement of industrial level.

7.4.2 Guide the establishment of benchmarking enterprises

The chemical enterprises in the province involve a wide range of categories, and there is no shortage of leading enterprises in subdivisions, which have development advantages in terms of technical level and market share. Especially for enterprises with small production scale but great influence in subdivided fields, encourage them to further optimize their development, and guide them to establish themselves as benchmark enterprises, enhance brand effect, further expand market share, and play a leading role in the industry of benchmarking enterprises in the province and even the whole country by improving enterprise standards.

7.4.3 Vigorously support innovative enterprises

The source of the development of the chemical industry comes from scientific and technological innovation, and innovative enterprises are the main body of scientific and technological

innovation in the chemical industry. Encourage and support the development of innovative enterprises, set up a special support system, give various forms of financial support to innovative enterprises with industrialization potential, and help innovative enterprises become bigger and stronger through policies, funds and other multi-faceted support.

7.5 Technical equipment improvement project

7.5.1 Vigorously promote technological innovation

Encourage enterprises to actively cooperate with colleges and universities and scientific research institutes, improve the industrial technology innovation system with enterprises as the main body, market-oriented, and the combination of industry, university, research and application, strengthen vertical cooperation between industry, university, research and application, strengthen the horizontal coordination of process technology, special equipment and information technology, vigorously promote integrated innovation, develop and reserve a number of high-end chemical product production technologies, and improve the level of autonomy of high-level chemical production technology.

7.5.2 Optimize and improve process technology

Encourage the promotion of the technological upgrading of the

traditional chemical industry, realize the high-end and circularization of the production process through the upgrading of the process and technical route, promote the green transformation of enterprises, improve the production efficiency of the device, improve the level of intrinsic safety, reduce energy consumption, reduce emissions, and realize the high-end upgrading of traditional chemical projects. Encourage the introduction of new materials, high-end special chemicals and other projects with advanced technical level to achieve high starting point planning and high-quality promotion, and drive the overall improvement of the technical level of the chemical industry.

7.5.3 Encourage technological transformation

Encourage chemical production enterprises to upgrade existing products, technologies and processes, adopt advanced and applicable new technologies, new processes, new equipment and new materials to promote product upgrading, cost reduction, energy consumption conservation and emission reduction.

7.5.4 Widely implement equipment upgrades

Encourage chemical production enterprises to transform, upgrade and upgrade existing equipment. For traditional industries, support the renewal of spare parts, overall renewal and process transformation of aging equipment to improve the replacement rate of

high-efficiency equipment. For emerging fields such as new chemical materials and high-end special chemicals, support the functional transformation of equipment and intelligent production level. Through equipment upgrades, expand the production capacity of high-end products, and gradually realize high-end and customized production, laying the foundation for the supply model of providing a full set of products and services.

7.6 Innovate ecological optimization projects

7.6.1 Encourage pilot activities

Encourage the construction of chemical pilot bases, and provide pilot sites and supporting conditions for innovative technologies with pilot test conditions. The pilot base should have a certain public role, focusing on the research and development work of enterprises, and as an important carrier for the amplification of new technologies and processes of enterprises. Increase support for pilot activities by creating industrial funds and special funds.

7.6.2 Coordinated development of industry, academia, research and application

Encourage the development of R&D work in the direction of application, enhance the functionality and pertinence of R&D work, and take the terminal application of products and the practical

improvement of process technology as the starting point of scientific and technological innovation. Increase the connection between production enterprises, universities, scientific research institutes, and downstream consumer users, so that consumer users' demand for related products can be accurately reflected to the research team and production team, realize the integration of production and application collaborative research and development, and improve the actual efficiency of research and development work.

7.6.3 Improve the innovation incentive system

Support and encourage scientific and technological innovation, and provide policy and financial support for new products, new processes, and new technologies that have a significant impact on industrial upgrading and development. Establish a scientific and feasible innovation evaluation system, set reasonable evaluation indicators, comprehensively evaluate the technical level, R&D progress, and significance to the development of the industry, give priority to supporting innovative achievements that have passed the pilot test and have the potential for industrialization, and give corresponding rewards or encouragements to enterprises and individuals who have achieved innovative results.

7.7 Talent team expansion project

7.7.1 Increase the introduction and training of leading talents

Introduce and cultivate chemical industry innovation teams, and strive for more national chemical industry talents to settle in Jiangsu. Support colleges and universities, research institutes, and enterprises to independently attract and select domestic scientific researchers, and improve the way the government and enterprises jointly introduce talents. Relying on various talent plans in the province, we will increase the introduction and training of high-end chemical talents, urgently needed talents, and talents in characteristic industries, and lay an intellectual foundation for the high-end development of chemical industry in the province.

7.7.2 Strengthen the training of professional talents

Focusing on the province's chemical industry to achieve high-end development goals, focus on strengthening the training of high-end chemical administration, high-end chemical entrepreneurs, and high-end chemical professional and technical talents, and further consolidate and enhance the intellectual support for the development of the province's chemical industry. Strengthen the construction of chemical engineering disciplines in colleges and universities, enrich disciplines, do a good job in publicizing the chemical industry, appropriately increase the enrollment ratio of chemical engineering

students in colleges and universities, optimize the postgraduate training plan, pay attention to the training mode that combines theory and practice, and make a good talent reserve for the development of the chemical industry.

7.7.3 Strengthen the strength of skilled workers

Promote higher vocational colleges to strengthen the construction of disciplines featuring chemical production technology, chemical safety and hazardous chemical safety management, and cultivate high-quality workers with safety production knowledge and ability. Strengthen school-enterprise cooperation, formulate training goals, open relevant courses and compile teaching materials, and jointly implement training and improve the quality of training. Promote the construction of chemical vocational colleges and strengthen the training of professional talents. Promote chemical enterprises to accelerate the training of skilled workers through targeted training, school-enterprise joint schooling, and apprenticeships.

7.7.4 Strengthen human resources services

Improve the system of talent appointment, evaluation, incentive and mobility, accelerate the construction of the province's human resources public information service platform and human resources

database, carry out statistical analysis and prediction and early warning of chemical talents, and provide support for human resources services in the chemical industry.

7.8 Standard system construction project

7.8.1 Build a park standard system

The construction of chemical parks (concentration) areas must be standardized, and applicable and feasible park construction specifications and standards should be formulated to improve the development level of chemical parks. On the basis of learning from and absorbing the evaluation and identification of chemical parks, summarize experience, upgrade the results to park standards and norms, strengthen the leading role of standardization, strengthen the application of standards in the daily management and emergency management of chemical parks, and strengthen standards and legislative constraints in accordance with laws and regulations to build a comprehensive safety and security chemical park (centralized) area.

7.8.2 Strengthen the operation standards of enterprises

Strengthen the operation and management of chemical enterprises, and gradually strengthen the operation standard system of chemical production enterprises according to the characteristics of

chemical enterprises. Closely focusing on the improvement and development of the chemical industry, to achieve the goal of safe and stable operation of enterprises, in accordance with the national laws and regulations on standardization, as well as the provisions of national, industry and local mandatory standards for enterprise production, operation, management and service, on the basis of the national promulgation of the "Basic Specification for Enterprise Safety Production Standardization" (GB/T 33000-2016), according to the results of enterprise rating and evaluation, the operation standards of production enterprises in the province are formed, and the production and operation behavior of enterprises is restricted and standardized through standards. Give full play to the systematic effect of standardization and establish and improve the enterprise supervision system.

7.8.3 Improve the industry standard system

According to the requirements of industry development and improvement, selectively revise some provincial standards of the chemical industry, and formulate industry standards and group standards such as industrial equipment, environmental protection, energy consumption, quality, safety, and technology that are higher than national standards as needed. Further use standard means to force

backward production capacity to withdraw in accordance with laws and regulations, and improve the technology and equipment level of the chemical industry in our province.

Chapter VIII Safeguard Measures

8.1 Promote the implementation of key projects

Pay attention to the promotion and implementation of key projects. Based on the scientific and technological advantages of local development of emerging industries, take the emerging industries urgently needed by the country as a breakthrough point, and develop new chemical materials with large market gaps and high-end applications and fine chemicals in new fields. Attract a number of advantageous enterprises to settle in, promote the extension of the industrial chain and value chain and the improvement of the comprehensive competitiveness of the industry. Encourage existing enterprises to achieve process upgrading, quality improvement, and product optimization through technological transformation, and improve the level of intrinsic safety through technological transformation.

8.2 Promote technological innovation and development

Aim at the forefront of world science and technology, strengthen basic research, encourage the construction of pilot projects, optimize the approval and filing process of pilot projects, and achieve major breakthroughs in forward-looking and leading original achievements. Strengthen applied basic research, expand the implementation of major scientific and technological projects, and highlight the important supporting role of key common technologies, cutting-edge leading technologies, and modern engineering technology innovation. Implement the two-wheel drive development strategy of industry and talent, actively build a scientific and technological innovation platform, and pay attention to the tracking, cultivation and reserve of high-end industrial innovative technologies. Increase the introduction of industry-leading talent teams, focus on promoting the growth of endogenous driving forces for regional industrial development, and enhance core competitiveness.

8.3 Improve emergency management capabilities

In accordance with the requirements of the "Guidelines for the Investigation and Management of Safety Risks in Chemical Parks (Trial)" and the "Safety Risk Level Assessment Report in Chemical Parks (Concentrations)", formulate a "one park, one policy" rectification plan, and promote the closed construction of chemical

parks (concentrations) in accordance with the "Guidelines for the Closed Construction of Concentration Areas of Chemical Parks in Jiangsu Province (Trial)". The chemical park (centralized) area further improves the integrated platform for emergency rescue and realizes full data access. Accelerate the construction and upgrading of fire stations, special parking lots for hazardous chemical transport vehicles, public pipe corridors, and public accident emergency pools in chemical park (centralized) areas.

8.4 Strengthen ecological and environmental protection

While promoting the improvement of industrial scale, support and encourage investment in ecological, environmental protection and resource-intensive projects, and strictly restrict the development of high-energy-consuming and high-pollution projects. Increase investment in environmental protection facilities, choose cleaner production processes and practical environmental protection management plans. In accordance with the principles of reduction, reuse and recycling, effectively protect the ecological environment of the chemical park (concentration) area.

8.5 Encourage international capacity cooperation

Pay close attention to the trend of national industrial restructuring, seize the great opportunity of industrial transfer at home

and abroad, and promote the docking of basic industries, leading industries, strategic industries, and supporting industrial projects in the park with the world's developed countries in an all-round, wide-ranging, multi-level, and high starting point. Actively highlight the role of major projects in opening up, actively introduce foreign strategic investors while encouraging enterprises to go global, and strive to attract investment from the world's top 500 and domestic top 100 enterprises.

8.6 Guide enterprise mergers and restructuring

Give full play to the decisive role of the market in resource allocation, respect market choice, play a guiding role, promote mergers and acquisitions between enterprises in an orderly manner, actively promote technology coupling, industrial complementarity, and capital integration, and comprehensively realize the further optimization of the allocation of resource elements in the chemical industry and the further improvement of industrial layout cooperation.

8.7 Expand financing channels flexibly

Give full play to the guiding role of government investment funds, flexibly expand financing channels, and guide social capital investment. Adopt a variety of investment methods such as equity, creditor's rights, combination of equity and debt, and investment-loan

linkage, focusing on industries such as new materials, new energy and energy conservation and environmental protection, new medicine and biochemical industry, and support the construction and development of transformation and upgrading projects such as industrial mergers and acquisitions, industrial chain integration, retreating from the city to the park, and optimizing existing industries.

8.8 Optimize the industry development environment

In the face of the complex and changing external environment, governments at all levels in Jiangsu Province conscientiously control the approval process of chemical projects and play an active role in the standardized management of chemical projects. After several rounds of rectification, various localities and parks have also accumulated certain experience in optimizing layout, controlling scale, adjusting structure, introducing high-end projects, and standardizing management. However, in recent years, the construction of chemical projects in Jiangsu Province has slowed down, and some areas and parks have even stagnated. It is necessary to further optimize project approval, ensure efficient construction of high-end project approval in accordance with laws and regulations, and promote the healthy development of the chemical industry in Jiangsu Province.

Jiangsu Province's "14th Five-Year Plan" pharmaceutical industry development plan

The pharmaceutical industry is an important industry related to the national economy and people's livelihood, and is an important support for meeting people's needs for healthy life, ensuring national health and safety, and building a strong public health system. In order to accelerate the high-quality development of the pharmaceutical industry and build a highland of the modern pharmaceutical industry, this plan is specially formulated in accordance with the spirit of the "Outline of the 14th Five-Year Plan for National Economic and Social Development of Jiangsu Province" and the "14th Five-Year Plan for the High-quality Development of Manufacturing Industry in Jiangsu Province". The planning period is 2021-2025.

1. Development foundation and situation

(1) Development foundation

-- The quality and efficiency of development continue to improve. In 2020, the province's pharmaceutical industry above designated size achieved operating income of 435.68 billion yuan and a total profit of 67.01 billion yuan, with a growth rate of 7.9 and 8.5 percentage points higher than that of the province's above-designated

industries respectivelyThe industrial scale ranks among the top in the country, forming a relatively complete industrial development system covering biological drugs, chemical drugs, traditional Chinese medicine, medical devices, medical excipients and packaging materials, showing a development pattern of value chain, industrial chain, space chain and innovation chain going hand in hand. The competitiveness of enterprises has been continuously enhanced, and a number of leading enterprises with competitive advantages in the country have emerged, and 14 enterprises have been selected as "Top 100 Chinese Pharmaceutical Industry Enterprises". The level of intelligent manufacturing is leading in the country, with a total of 61 provincial-level demonstration intelligent workshops and 4 provincial-level intelligent manufacturing demonstration factories.

-- Obvious advantages in key areas. Outstanding biopharmaceutical innovation capabilities, cell therapy, new vaccines and other fields are running in the world, antibody drugs, small molecule targeted drugs and other technical fields are leading in China, and 2 of the 4 domestic monoclonal antibody drugs (PD-1) approved in the country are from Jiangsu; By the end of the 13th Five-Year Plan, the province had a total of 2,206 Class III medical device registration certificates and 11,764 Class II medical

device registration certificates; The **scale of the chemical preparation industry is leading in the country, with outstanding advantages in anti-tumor drugs, anti-hepatitis drugs, cardiovascular drugs, digestive system drugs, antipsychotic drugs and other subdivisions; The standardization and intelligent construction of traditional Chinese medicine enterprises are at the forefront of the country, with more than 30 kinds of advantageous varieties with sales of more than 100 million yuan.**

-- Innovation ability continues to increase. In 2020, the R&D expenses of pharmaceutical enterprises above designated size in the province accounted for 5.8% of operating income, which was 3.5 percentage points higher than that of the province's industries above designated size, and 8 enterprises were selected as the top 25 industrial enterprises in the "Best Industrial Enterprises in China's Pharmaceutical R&D Product Line". During the 13th Five-Year Plan period, a total of 382 drugs were approved for marketing, accounting for 17% of the national total, including 19 innovative drugs, accounting for 31% of the national total, ranking first in the country for five consecutive years. The innovation carrier has been gradually improved, and the province has more than 300 innovation platforms, and national carriers such as the National Biopharmaceutical

Technology Innovation Center and the University of the China Academy of Chinese Medical Sciences have settled in Jiangsu.

-- The development trend of agglomeration is obvious. During the "13th Five-Year Plan" period, the province initially formed an industrial development pattern of "one valley" (Nanjing Biomedical Valley), "one city" (Taizhou China Medical City), "one port" (Lianyungang China Pharmaceutical Port), "one park" (Suzhou Biomedical Industrial Park), and "multi-pole" (Wuxi, Xuzhou, Changzhou, Nantong, Zhenjiang and other characteristic industrial clusters in the field of biomedicine and medical devices). The spatial layout of differentiated development provides strong support for accelerating the cultivation of Jiangsu advanced pharmaceutical manufacturing clusters.

During the "13th Five-Year Plan" period, although Jiangsu's pharmaceutical industry has made great progress, there are also some outstanding shortcomings and problems: **first, the original innovation ability is insufficient, and the original target discovery and new molecular drug screening need to be improved; second, there are risks in the industrial chain, and some key raw materials, key equipment, core components, etc. rely on imports; Third, the service system still needs to be improved, and there is**

a lack of public service platforms and financial service systems such as drug clinical trial institutions and safety evaluation institutions supporting the industry. Fourth, the level of industrial integration and development needs to be strengthened, the degree of cross-border integration between the pharmaceutical industry and electronics, materials and other fields is not high, and the development level of medical-industrial collaboration, medical and nursing integration, and smart medical care needs to be improved.

(2) Facing the situation

The "14th Five-Year Plan" China is still in a period of important strategic opportunities, and the pharmaceutical industry will continue to maintain a good development trend, but the internal and external environment of the development of the pharmaceutical industry will undergo complex and profound changes.

From the perspective of development opportunities: the people's awareness of health management is increasing. With the further intensification of population aging and the improvement of people's living standards, the people's attention, understanding level and medical demand for the pharmaceutical industry have increased significantly, and the drug structure has been upgraded, and more

diversified and advanced needs such as genetic diagnosis and personalized elderly care and rehabilitation have been born. **The construction of the public health emergency support system has been significantly accelerated.** After the new crown pneumonia epidemic, countries around the world pay more attention to biosecurity and people's life, health and safety, and the state will increase investment in medicine and health and promote the construction of emergency public health systems; **The policy system continues to promote the high-quality development of the pharmaceutical industry.** Since the 13th Five-Year Plan, the reform of the medical and health system has been deepened, and pharmaceutical policies such as the consistent evaluation of generic drug quality and efficacy have been steadily promoted, the implementation of drug procurement, the full implementation of the essential drug system and the drug marketing authorization holder system (MAH), hierarchical diagnosis and treatment, and dynamic adjustment of medical insurance catalogues. The linkage reform of medical care, medical insurance and medicine will accelerate the solution of industry pain points, which is more conducive to ensuring people's livelihood and well-being and promoting the long-term stable and healthy development of the pharmaceutical industry.

From the perspective of development trends: technological innovation is advancing by leaps and bounds. A new round of scientific and technological revolution continues to deepen, and breakthroughs have been made in life science technology, new generation information technology, and new material technology. The deep integration of interdisciplinary disciplines, the vigorous development of industrial cross-border, and the deepening of the integration, precision and intelligence of the pharmaceutical industry; **The industrial division of labor is more refined.** Productive service industries such as R&D outsourcing (CRO), commissioned production (CMO), and contract sales (CSO) have gradually developed and grown, and the industrial division of labor has developed in depth. **New formats and new models are emerging.** "Internet + medicine" is evolving along the path of technology integration, element integration to ecological integration, and has derived new formats such as telemedicine, mobile medicine, and smart healthcare**.**

From the perspective of challenges: the stability and security of the industrial chain are facing challenges. The international environment is becoming increasingly complex, the world trade and industrial division of labor patterns are accelerating, and the

instability and uncertainty of industrial and supply chains have increased significantly. **Restrictions on technical exchanges and cooperation have increased.** The review of cross-border investment has become stricter, global industrial transfer and technical cooperation are facing restrictions from national policies, and there is a risk of "bottleneck" in the development of the pharmaceutical industry. **The competition for factor resources is becoming increasingly fierce.** As various parts of China compete to lay out the pharmaceutical industry and introduce support policies one after another, the competition for high-end talents, core technologies, financial capital and other resource elements in the pharmaceutical field continues to intensify.

2. Guiding ideology, basic principles and development goals

(1) Guiding ideology

Guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, fully implement the spirit of the 19th National Congress of the Communist Party of China and the 2nd, 3rd, 4th and 5th Plenary Sessions of the 19th Central Committee, firmly grasp General Secretary Xi Jinping's important instructions and requirements for Jiangsu to "strive to be an example, strive to be a demonstration, and walk in the forefront", implement new concepts,

adapt to new stages, build new patterns, adhere to the supremacy of the people and the supremacy of life, take the protection of the health of the people as the fundamental goal, and accelerate the construction of an independent and controllable modern pharmaceutical industry system. Guided by promoting the modernization of the industrial chain and the advancement of the industrial base, we will make every effort to promote industrial innovation capacity building, build a landmark industrial chain, optimize the spatial layout, cultivate leading enterprises, promote the digital, green and service-oriented transformation and upgrading of the pharmaceutical industry, build a "dual circulation" development pattern of the pharmaceutical industry, coordinate development and safety, and make every effort to build Jiangsu into a leading domestic and world-class modern pharmaceutical industry highland.

(2) Basic principles

Adhere to health priority and demand-oriented. Adhere to the supremacy of the people and the supremacy of life, take the protection of the health of the people as the fundamental goal, strengthen the combination of research and development with the application of prevention, diagnosis, treatment, health, care and maintenance, promote the promotion and application, and create an advantageous

industry with sustainable support capacity that responds to the challenges of the times and meets the requirements of the whole population and the whole life cycle of healthy life.

Adhere to innovation-driven and integrated development. Take scientific and technological self-reliance and self-improvement as the strategic support for the development of the pharmaceutical industry, and adhere to the "four aspects" to accelerate the construction of a more innovative modern industrial system. Closely follow the urgent needs of industrial development, give full play to the linkage role of medical care, medical insurance, and medicine, guide the integrated development of medical and health care, life sciences, sports and health, biotechnology and information technology, health big data, etc., and improve the level of industrial development.

Adhere to market leadership and government guidance. Give full play to the decisive role of the market in resource allocation, strengthen the dominant position of enterprises in the market, and stimulate the creativity and market vitality of enterprises. Improve the industrial governance and service capabilities of government departments and create a good market environment.

Adhere to quality and efficiency improvement and ecological

friendliness. Adhere to quality and efficiency as important criteria for the high-quality development of the pharmaceutical industry, comprehensively promote energy conservation and emission reduction, ecological priority, improve resource and energy utilization efficiency and industrial efficiency, and improve the level of green and low-carbon development and intrinsic safety.

Adhere to open cooperation and collaborative promotion. Adhere to the combination of "bringing in" and "going out", strengthen international cooperation, and participate in international competition. Take advantage of the integration process of the Yangtze River Delta to promote cross-regional industrial coordination and accelerate the construction of a new pattern of "dual circulation" development at home and abroad.

(3) Development goals

By 2025, Jiangsu's pharmaceutical industry will achieve world-class industrial quality and efficiency, innovation ability, openness and coordination, leading enterprise strength and industrial ecology in China, and the level of high-quality industrial development in the country, and develop into an advanced manufacturing cluster with global influence and a world-renowned innovative drug highland.

-- **The quality and efficiency of development have been**

further improved. During the "14th Five-Year Plan" period, the average annual growth rate of operating income of the pharmaceutical industry above designated size in the province remained at about 10%, new formats such as precision medicine, smart medical care, and medical and nursing integration continued to develop and grow, and the proportion of innovative products in the industrial structure continued to increase.

-- **Innovation ability has been further enhanced.** R&D investment has continued to grow, enterprises have significantly improved their innovation capabilities, made breakthroughs in the fields of original target discovery and drug molecule screening, and cultivated a number of major achievements. Promote the settlement of national innovation carriers in Jiangsu, and lay out and build a number of R&D pilots, clinical trials, safety evaluation and other service platforms.

-- Openness and coordination have been further deepened. Seize the opportunities of the construction of free trade zones and the integrated development of the Yangtze River Delta, and improve the level of open and coordinated development. Accelerate the internationalization of the pharmaceutical industry and support the global research and development and international registration of

innovative drugs.

-- **The energy level of enterprises has been further strengthened.** Cultivate a number of innovative and advantageous enterprises with international competitiveness, and the number of top 100 enterprises in the pharmaceutical industry is leading in the country. Cultivate a number of leading enterprises with an annual output value of more than 10 billion yuan, form a number of listed companies with strong resource integration and driving capabilities, cultivate a number of innovative small and medium-sized enterprises, and expand a number of backbone enterprises in subdivided fields.

-- **The industrial ecology has been further optimized.** Further optimize the management and evaluation system in the pharmaceutical field, and improve the review and approval mechanism, clinical trial incentive mechanism, and application promotion mechanism of drugs and medical devices. Build a venture capital system for the pharmaceutical industry, develop venture capital funds in the pharmaceutical field, and create a first-class industrial development ecology in China.

-- **Green and low-carbon further development.** Accelerate the application of energy conservation and emission reduction technologies in the pharmaceutical industry, and promote the further

reduction of energy consumption and carbon dioxide emissions per unit of industrial added value. Build a green and low-carbon development system for the pharmaceutical industry, promote the agglomeration of chemical APIs in parks with strong environmental carrying capacity and good production supporting conditions, and build a number of green factories and green parks.

3. Development priorities and main tasks

(1) Development focus

1. Biological drugs. Accelerate the pace of innovation and industrialization around key areas such as antibodies, recombinant proteins and peptide drugs, new vaccines, gene and cell therapy, form a number of new drug achievements in the field of biological drugs, and continue to maintain the leading position in the industry in China.

In the field of antibody drugs: increase the tracking of new targets, focusing on the research and development of monoclonal antibodies, bispecific antibodies, and antibody conjugates for tumors, immune systems, and blood diseases; **Recombinant protein and peptide drugs:** focus on the research and development of a new generation of recombinant insulin, recombinant coagulation factors, enzyme replacement recombinant protein drugs, as well as innovative peptide drugs such as peptide vaccines, anti-tumor peptides, cytokine

mimic peptides, etc., and accelerate breakthroughs in drug route optimization, peptide drug stability, drug sustained release, protein purification, cell large-scale culture and other technologies; **In the field of new vaccines: increase the research and development of new technologies such as** new adjuvants, messenger ribonucleic acid (mRNA) new viral vector vaccines, and mucosal vaccines, focusing on the development of therapeutic vaccines, new coronavirus vaccines, influenza vaccines, AIDS vaccines and other major disease vaccines; **Gene and cell therapy:** Increase the research and development of new technologies for the fusion of cell therapy and genetically engineered drugs, focusing on the development of a number of gene therapy drugs such as immune cell therapy, stem cell therapy, and ribonucleic acid (RNA) interference represented by chimeric antigen receptor T cells (CAR-T).

2. Medical devices. Focusing on key areas such as high-performance diagnosis and treatment equipment, emergency medical equipment, traditional Chinese medicine equipment, health care and rehabilitation equipment, smart medical equipment, and medical consumables, we will actively promote the integration and innovation of medical and engineering, and build a medical device development system covering the whole life cycle of design, research and

development, clinical, industrialization, and medical and health service integration.

High-performance diagnosis and treatment equipment: Focus on the research and development of high-end imaging equipment such as computed X-ray tomography (CT), endoscopic optical coherence tomography system, and liquid-free helium magnetic resonance imaging system (MRI) to promote the development of intelligence, miniaturization, and integration of diagnosis and treatment. accelerate the development and application of high-performance radiation therapy equipment such as linear accelerators and proton therapy systems, as well as various intelligent robots such as laparoscopic minimally invasive and orthopedic joint robots; **In the field of emergency medical equipment:** strengthen the development and application of point-of-the-point inspection (POCT) equipment for the diagnosis of major diseases, and improve the development level of in vitro diagnostic equipment and supporting reagents such as nucleic acid detection, high-throughput gene sequencer, and mass spectrometry analyzer; **In the field of traditional Chinese medicine equipment:** focus on the construction of traditional Chinese medicine health status identification, traditional Chinese medicine diagnosis and treatment, and traditional Chinese

medicine quality assurance equipment and platforms, develop traditional Chinese medicine characteristic equipment that integrates new technologies such as big data and artificial intelligence, and promote the application of health management, disease prevention and treatment, telemedicine and other advantageous fields; **In the field of health care and rehabilitation equipment:** accelerate the development of sports therapy, rehabilitation aids, rehabilitation assessment equipment, rehabilitation robots and other health care and rehabilitation equipment; **In the field of smart medical equipment:** focus on the development of intelligent products such as intelligent imaging, medical-grade wearable mobile devices, and remote ultrasound, and accelerate the construction of 5G smart medical platforms and medical big data centers; **Medical consumables:** accelerate the development of high-end implant interventional products such as brain pacemakers, fully degradable vascular stents, ophthalmic intraocular lenses, new artificial tendons, artificial nerves, and bionic skin tissue; **In the field of life support equipment,** focus on the development of ventilators, respiratory gas monitors, electrocardiogram recorders, artificial hearts, extracorporeal membrane oxygenation (ECMO) systems, etc., and promote the development of products in the direction of miniaturization, desktop

and mobility.

3. Chemical drugs. Accelerate the research and development and listing of innovative drugs with independent intellectual property rights, and develop innovative drugs with new targets and new mechanisms of action, high-quality generic drugs, high-end preparations and clinical shortages around major diseases such as acute infectious diseases and malignant tumors, cardiovascular and cerebrovascular, and central nervous system, and improve the green development level of chemical APIs.

Innovative chemical drugs: focus on the development of innovative drugs for malignant tumors, cardiovascular and cerebrovascular diseases, metabolic diseases, endocrine diseases, psychiatric diseases, neurodegenerative diseases, autoimmune diseases, drug-resistant bacterial infections, viral infections, kidney diseases, digestive tract diseases and other diseases; **High-quality generic drugs:** According to the national "Catalogue of Encouraged Generic Drugs", focus on accelerating the development of generic drugs that are urgently needed in clinical practice and new patents have expired, and improve the quality level of generic drugs in combination with the consistency evaluation of generic drug quality and efficacy. **High-end preparations: focus on the development of**

new injection drug delivery systems such as liposomes, lipid microspheres, nanopreparations, sustained-release preparations, microemulsion preparations, oral modulated release delivery systems such as oral immediate-release, sustained-controlled-release, multi-particle systems, percutaneous and mucosal drug delivery systems, and dosage forms suitable for special groups such as children; **In the field of clinical shortage drugs:** increase the development of clinically shortage drugs such as rare disease drugs and children's drugs, and strengthen the production of commonly used clinical drugs and essential drugs such as systemic anti-infection, anti-cholinergic surgery, and diabetes drugs; **High value-added APIs:** Develop specialty APIs and patented APIs in areas with carrying capacity.

4. Traditional Chinese medicine. Focusing on advantageous fields such as geriatric diseases, gynecology, and pediatrics, as well as new demand areas such as the prevention and treatment of major and emerging infectious diseases, strengthen the research and development of new traditional Chinese medicine drugs and the mining of classic famous prescriptions, cultivate famous prescriptions, and promote the secondary development of listed varieties of proprietary Chinese medicines. Encourage enterprises to build production bases for traditional Chinese medicinal materials.

Strengthen the application of digital technology, accelerate intelligent manufacturing, promote the upgrading of traditional Chinese medicine and pharmaceutical technology, and promote the standardization, modernization and internationalization of traditional Chinese medicine.

In the field of proprietary Chinese medicine: for cardiovascular and cerebrovascular diseases, autoimmune diseases, gynecological and pediatric diseases, geriatric diseases, viral infectious diseases, kidney diseases and other advantageous diseases of traditional Chinese medicine, accelerate the research and development and industrialization of new proprietary Chinese medicines with accurate efficacy and high clinical value, and cultivate famous and excellent proprietary Chinese medicine varieties; **In the field of traditional Chinese medicine decoction pieces:** encourage enterprises to participate in the formulation of national standards in the traditional Chinese medicine industry, promote the standardized and standardized production of traditional Chinese medicine formula granules and traditional Chinese medicine decoction pieces, and encourage the research and development of natural medicines (botanical medicines) in line with international standards; **In the field of traditional Chinese medicine schools:** promote the excavation,

protection and inheritance of traditional Chinese medicine schools in our province, such as Wumen Medical School, Menghe Medical School, Longsha Medical School, Shanyang Medical School, and Chengjiang School; **Classic prescription field:** promote the secondary development and application of classic prescriptions, strengthen the research on the main pharmacodynamic substances or main pharmacodynamic substance groups in the effective parts of the compound, and apply biotechnology to develop new traditional Chinese medicine drugs; **In the field of traditional Chinese medicinal materials:** guide enterprises to optimize the layout of traditional Chinese medicinal materials production bases, and apply information technology to improve the quality management and traceability system construction of the whole process of production and circulation of traditional Chinese medicinal materials.

Column 1 Spatial layout of Jiangsu's pharmaceutical industry
Biopharmaceuticals: **Nanjing has built a public service platform around cell therapy and gene therapy and other characteristic fields**, and built a whole industry chain from cell storage, core reagent and cell culture media product development, clinical research to practical application. **Suzhou focuses on the development of new therapeutic antibodies, antibody conjugates, new structural proteins and peptide drugs, biological reagents, biological big data development, digital biotechnology, etc., and**

accelerates the pace of research and development and industrialization of new vaccines, gene and cell therapies. Nantong accelerates the development of genetic testing products, immunotherapy drugs, stem cell products, etc., and promotes the supporting agglomeration of the industrial chain; **Taizhou further promoted the national new vaccine and specific diagnostic reagent industry agglomeration and development pilot, and strengthened the development of new vaccines and multivalent vaccines; Lianyungang focuses on the development of recombinant protein drugs for diabetes, viral infections, tumors and other diseases, and** promotes the development of new varieties of recombinant protein drugs such as long-acting insulin and premixed insulin.

Medical devices: **Nanjing will accelerate the establishment of 5G smart medical platforms and medical big data centers, focusing on the development of smart diagnosis and treatment equipment such as ventilators, endoscopes,** and wearable mobile devices, and improving the development level of in vitro diagnostic equipment and supporting reagents such as nucleic acid testing and high-throughput gene sequencers. **Wuxi focuses on the development of oral medical devices, disinfection and sterilization equipment, in vitro diagnostic reagents and other products; Changzhou focuses on the development of nuclear magnetic resonance,** orthopedic tools and implants, hygiene materials and accessories, rehabilitation equipment, surgical tools, and in vitro diagnostic equipment and consumables. **Suzhou focuses on the development of in vitro diagnostic equipment and supporting reagents,** biomedical materials and implant

interventional equipment, medical imaging equipment, monitoring and treatment equipment, high-throughput gene sequencing equipment, intelligent wearable equipment, high-end rehabilitation equipment, radiotherapy equipment and other products; **Zhenjiang focuses on the development of imaging diagnosis and treatment equipment, household medical monitoring products, durable instruments and consumables, traditional Chinese medicine diagnosis and treatment equipment and other products; Taizhou focuses on the development of in vitro diagnostic products such as immunodiagnosis, molecular diagnosis, and genetic testing; Yangzhou focuses on the development of imaging diagnosis and treatment, as well as medical consumables products such as anesthesia, dentistry**, and orthopedics.

Chemical drugs: **Nanjing focuses on the development of high-end preparations and accelerates the development of innovative drugs in the fields of malignant tumors and cardiovascular and cerebrovascular diseases; Lianyungang focuses on the development of innovative drugs for malignant tumors, cardiovascular and cerebrovascular diseases, diabetes, mental illness and other diseases; Taizhou focuses on the development of new molecular innovative drugs such as tumor targeted therapy drugs, diabetes, cardiovascular and cerebrovascular, and psychiatric and nervous system drugs; Xuzhou focuses on the development of new chemical drugs in the fields of neurology, psychiatry, anesthesia and other fields; Suzhou focuses on the development of new chemical drugs in the fields of anti-tumor, antibacterial and anti-**

infection, central nervous system, metabolism, etc.; Huai'an focuses on the development of new chemical drugs in the fields of bone and joint diseases, anti-infection, malignant tumors, and mental diseases; **Yancheng focuses on the development** of generic drugs for drugs that are urgently needed in clinical practice and new patents have expired; **Suqian focuses on the development of cardiovascular, anti-infective, and antiviral generic drugs.**

Traditional Chinese medicine: **Taizhou focuses on the development of new varieties of traditional Chinese medicine for geriatric diseases, gynecology, pediatrics,** kidney diseases, etc.; **Lianyungang focuses on the development of modern traditional Chinese medicine varieties for cardiovascular and cerebrovascular diseases, autoimmune diseases, gynecological and pediatric diseases, viral infectious diseases and other fields, and accelerates the standardization and international development of traditional Chinese medicine. Wuxi focuses on the development of traditional Chinese medicine formula granules; Suzhou focuses on the development of innovative traditional Chinese medicine drugs and improved varieties of traditional Chinese medicine with local characteristics**.

(2) Main tasks

1. Advantageous industrial chain cultivation project.

Thoroughly implement the provincial leadership linkage system, implement a three-year action plan to strengthen the industrial chain

around the advantageous industrial chains such as biomedicine and medical devices, and accelerate the construction of an independent and controllable pharmaceutical industry system.

(1) Carry out key core technology research. Highlight the main position of enterprise innovation, encourage enterprises to increase R&D investment, focus on the "stuck neck" short-board technology and weak links such as basic components, basic processes, and key materials, carry out key core technology research, improve the level of industrial base upgrading and industrial chain modernization, and promote the upgrading of the whole industrial chain. Comprehensively use joint bidding, "unveiling the list" and other methods to further improve the organizational level of industrial scientific and technological innovation. Guide enterprises and financial institutions to increase investment in the field of basic pharmaceutical research and strive to achieve breakthroughs in original results.

Column 2 Key core technology research directions
Biologics. Carry out research on key links such as new adjuvants, new viral vectors, serum-free culture media, chromatography packing materials and equipment, filter membrane packs, bioreactors, inspection and testing instruments, centrifuges, etc., and break through key technologies such as target discovery, antibody conjugate drug (ADC) preparation and purification

technology, large-scale high-expression protein production, high-efficiency protein purification, gene synthesis, cell culture, large-scale separation and purification, microbial liquid fermentation, mucosal immune vaccine and other key technologies.

Medical devices. Carry out research on key components such as implanted (interventional) materials such as special chips, sensors, absorbable and degradable materials, electronic array probes, and interventional probes, accelerate the application of artificial intelligence (AI), mixed reality (MR), 3D reproduction technology and other technologies, and break through real-time navigation of the treatment process, force sensing follow-up, remote intelligent image diagnosis and treatment, intelligent monitoring, intelligent control technologies such as digital biotechnology.

Chemicals. Carry out key technical research such as target discovery and validation, lead compound optimization design, drug crystal form research, and drug druggability evaluation, and accelerate breakthroughs in key technologies such as artificial intelligence and computer-aided drug design, in vitro and in vitro drug screening models, early detection of drug toxicity, and clinical translational medical research of new drugs.

Traditional Chinese medicine. Carry out research on key technologies such as innovative drug transformation of academic achievements of clinical advantageous diseases of traditional Chinese medicine, integrated innovation of large varieties of famous and excellent proprietary Chinese medicines, intelligent manufacturing of traditional Chinese medicine, production process analysis and pharmaceutical process knowledge system, accelerate the

research of key technologies in processing, promote the standardization, scale and intensification of processing, and focus on breakthroughs in the discovery technology of traditional Chinese medicine based on systems biology and chemical biology.

(2) Promote the supporting development of the industrial chain. Encourage leading chemical drug enterprises to integrate upstream and downstream as the direction and promote the integrated development of APIs to preparations. Promote the coordinated development of medical and engineering, promote in-depth cooperation between medical equipment and materials, machinery, electronics and other enterprises, and promote breakthroughs in advanced basic materials, cutting-edge new materials, core key components and software through joint innovation, transformation and application. Encourage powerful pharmaceutical enterprises to increase R&D cooperation with pharmaceutical equipment enterprises, focusing on pharmaceutical special equipment such as preparation manufacturing, drug packaging, and drug testing. Promote the cooperation between traditional Chinese medicine manufacturers and traditional Chinese herbal medicine bases, guide the standardized planting and breeding of traditional Chinese medicinal materials, and ensure the quality of traditional Chinese

medicinal materials products. Promote enterprises to actively expand channels such as hospitals, grassroots and community medical institutions, and out-of-hospital retail markets, strengthen strategic cooperation with Internet sales platforms for drugs and devices, accelerate the layout of cold chain logistics and warehousing, and accelerate the development of "Internet + pharmaceutical circulation".

Column 3 Key points of supporting development of the industrial chain
Pharmaceutical excipients and functional materials. Focus on the development of functional pharmaceutical excipients such as cellulose and its derivatives, functional pharmaceutical excipients such as croscarmellose nano, colloidal silica, and pressure-sensitive glue for high-end preparations, functional phospholipids such as synthetic phospholipids and PEGylated phospholipids, polymer materials such as lactide lactide copolymer and polylactic acid, and biocompatible functional materials such as sodium hyaluronate targeted derivatives and chitosan targeted derivatives. Packaging system and drug delivery device. Focus on the development of cyclic olefin polymers, styrene thermoplastic elastomers, high-group separator materials, etc., improve the quality level of pharmaceutical-grade polypropylene, polyethylene and halogenated butyl rubber, develop new packaging systems and drug delivery devices, including powder sprays, soft aerosol special drug delivery devices, pre-filled syringes, automatic drug mixing devices and other new syringes, and develop pharmaceutical

packaging products and technologies combined with blockchain and Internet of Things technology.

Pharmaceutical equipment. Focus on the development of large-scale bioreactors and ancillary systems, chromatography, ultrafiltration and other protein separation and purification, fluidized bed coating, blow filling aseptic filling machine and other high-standard pharmaceutical equipment, continuous manufacturing of oral preparations, production and testing equipment for complex preparations such as sustained-release, transdermal patches, membrane agents, inhalants, etc., micro-reaction continuous synthesis, photochemical reaction devices and other special equipment for the production of APIs, traditional Chinese medicine production equipment, high-end sensors such as dissolved oxygen probes and other core components; Improve the digitalization level of pharmaceutical equipment.

(3) Build a high-level innovation carrier. Closely follow the actual development of the industry, highlight the guidance of clinical needs, and accelerate the resource integration, sharing and use and level improvement of the established platform. Build a number of advanced technology research institutes, cultivate a number of regional innovation platforms and open laboratories, strive for more national innovation platform carriers to be deployed in our province, and build and improve the innovation system integrated into global pharmaceutical research and development. Support enterprises to take

the lead in integrating innovation resources, and build market-oriented, diversified and flexible innovation consortia such as manufacturing innovation centers from a high starting point. Strengthen cooperation between industry, academia, research and medicine, jointly build collaborative innovation platforms such as research centers, laboratories and clinical medical research centers, open up scientific experiments, technology research and development, safety evaluation, clinical trials, business incubation, industrial cultivation and other links, and develop a number of R&D, testing and certification platforms with international qualifications and levels. Support local governments and universities to lay out and build new R&D institutions, achievement incubation institutions, industrialization centers and other carriers in key industrial clusters, and accelerate the industrial application of innovative achievements.

Column 4 Key points of high-level innovation carrier construction
Collaborative innovation platform. Support pharmaceutical enterprises in the province to take the lead in establishing manufacturing innovation centers such as biomedicine, original chemical drugs, high-performance medical devices, and modern traditional Chinese medicine, and encourage and support qualified units to actively create national innovation platforms. Support Nanjing to build a human microbial translational medicine center and biobank, promote the high-level construction of a national biopharmaceutical

technology innovation center in Suzhou Industrial Park, and support Taizhou Pharmaceutical High-tech Zone to actively establish a national new vaccine research technology innovation center.

New R&D platform. Support China Pharmaceutical University to build a preclinical innovative drug research and development platform, Nanjing University to build an artificial intelligence biomedical technology research institute, Southeast University to build a medical and engineering interdisciplinary innovation research institute, and the Provincial Industrial Technology Research Institute to build a biomedical and new medical device application technology platform. Support Changzhou to build a cutting-edge technology research institute for cell therapy in the West Taihu Lake Yangtze River Delta. Support Suzhou United Nations and well-known universities at home and abroad to lay out and build new R&D institutions, focusing on the construction of humanized model and drug screening innovation technology research institute, artificial intelligence-based new drug intelligent screening platform, biochip-based candidate drug high-throughput verification platform, biochip-based drug candidate high-throughput verification platform, new biopharmaceutical continuous production new process platform, and promote the construction of China Academy of Chinese Medical Sciences.

Evaluation certification platform. Support the construction of support platforms such as drug inspection and testing, genetic testing technology application, etc., encourage the construction of large-scale instrument and equipment sharing, new preparation pilot service platforms, small molecule

drug research and development, large molecule drug research and development and other platforms, and provide enterprises with new drug screening, pilot production, analysis and testing and other research and development services. Support the construction of high-level clinical research institutions.

(4) Improve the ability to support emergency medical supplies. Improve the coordination mechanism for the research, judgment, assessment, decision-making, prevention and control of major public health risks, strengthen the construction of infectious disease prevention and control and public health science and technology research systems, and promote collaborative innovation in public health emergency science and technology. Cultivate the industry chain of emergency medical supplies, focus on key raw materials, key components, and key equipment of key emergency medical supplies, and accelerate the strengthening of the industrial chain. Strengthen the supply chain of emergency medical supplies, further optimize the coordinated guarantee of production capacity and regional layout, and enhance the emergency support capacity of medical supplies and equipment.

2. Enterprise competitiveness enhancement project.

Actively cultivate industry leaders, vigorously enhance the

competitiveness of enterprises, build a number of "chain master" enterprises, and cultivate a number of specialized and new "little giants" and hidden champion enterprises in subdivided fields.

(1) Strengthen the cultivation of "chain master" enterprises. Promote the "100 enterprises pilot" action plan, implement the "strong enterprises and strengthen enterprises" project, benchmark global industry benchmarks, and strive to promote leading pharmaceutical enterprises to become bigger and stronger. Increase the development of new products, new processes and new technologies, steadily increase production capacity and expand scale, support the integration of innovation, market, capital, talent and brand resources on a global scale, and form a number of technology-led and market-led "chain master" enterprises rooted in Jiangsu. Give full play to the leading role of leading enterprises, carry out collaborative research on technology and products, and build an industrial ecology of integration and innovation for large and small enterprises.

(2) Create a specialized and new "little giant" enterprise. Implement the "small rise" action of cultivating high-tech enterprises, actively develop maker space, promote mass entrepreneurship and innovation, and cultivate a number of entrepreneurship and entrepreneurship bases and innovative small and medium-sized

enterprises with characteristic technologies and high-end talents. Support small and medium-sized pharmaceutical enterprises to focus on subdivided fields, continue to carry out technology research and development and process upgrading, and form a number of specialized and special new "little giants" and individual champion enterprises with good professional foundation, high market share and strong competitiveness in key links.

(3) Strengthen the quality brand building of enterprises. Guide enterprises to carry out in-depth quality improvement actions to ensure the safety, effectiveness and quality controllability of the whole process of development, production, operation and use. Improve the standard system and quality specifications, carry out in-depth evaluation of the consistency of the quality and efficacy of chemical generic drugs, strengthen the source control of the quality of traditional Chinese medicine, accelerate the quality upgrading of drug excipients and packaging materials, and promote the upgrading of product quality in key areas. In the fields of innovative drugs, proprietary Chinese medicines, traditional Chinese medicine decoction pieces, generic drugs, over-the-counter (OTC), high-end medical devices, etc., a number of "large varieties" brand products with annual sales of more than 1 billion yuan will be developed to

improve the popularity and reputation of medical institutions and patients.

(4) Continue to promote corporate mergers and restructuring. Encourage advantageous enterprises to implement cross-industry, cross-regional, and cross-ownership mergers and restructuring to further improve industrial concentration. vertically aim at the key links and core technologies of the industrial chain, implement high-end mergers and acquisitions, and strong alliances; Horizontally accelerate the merger and acquisition of R&D enterprises with cutting-edge technology and innovative product projects to further provide growth poles for industrial development. Increase financial support for mergers and acquisitions through mergers and acquisitions, convertible bonds and other measures, and encourage all kinds of investors to participate in mergers and restructuring through equity investment funds, venture capital funds, industrial investment funds and other forms.

3. Industrial digital transformation project.

Empower the high-quality development of the pharmaceutical industry with a new generation of information technology, accelerate the digital transformation of all elements, links and chains of the industry, improve the digital level in R&D and design, manufacturing,

operation and management, and accelerate the cultivation of new forms of digital integration.

(1) Improve the level of intelligent manufacturing of enterprises. Encourage enterprises to strengthen the integration of ERP, MES, PLM and other business information systems, optimize data collection and dynamic perception of equipment, operations, environment, etc., realize the simulation and optimization of pharmaceutical manufacturing processes, real-time monitoring, feedback and adaptive control of status information, realize the traceability of raw material procurement, transportation, production, etc., and ensure the uniformity and controllability of product quality. Accelerate the application of modern information technology in the production of traditional Chinese medicine, improve the level of intelligent manufacturing, realize the precise extraction and production control of active ingredients, and accelerate the standardization of traditional Chinese medicine. Encourage enterprises to create demonstration intelligent workshops and smart factories, establish an intelligent manufacturing model for the whole production process, all-round management, and product life cycle, and improve labor productivity and product quality stability.

(2) Develop smart medical equipment. Focus on the needs of

smart medical care, promote the embedding of new generation information technologies such as artificial intelligence, 5G, big data, and cloud computing into medical equipment, and improve the intelligence level and diagnosis and treatment performance of traditional medical equipment such as CT and MR; Create a new form of "3D + medical and health" products, and promote the personalized customization of traditional products such as medical devices, rehabilitation devices, implants, and soft tissue repair. Combined with the needs of the aging population, promote the research and development and manufacturing of new medical equipment such as community-level fitness equipment and rehabilitation aids to meet the health needs of the general public, especially the elderly and the disabled, for home care, rehabilitation, and child care.

(3) Build an Internet platform for the pharmaceutical industry. Deepen the application of cutting-edge new technologies such as 5G, artificial intelligence, and blockchain, explore the establishment of a number of pharmaceutical industry Internet platforms based on databases and microbial genome models, and encourage enterprises to apply digital R&D toolsets in synthesis, screening, pharmacology, efficacy, safety evaluation, clinical evaluation and other links. Accelerate the coordinated promotion of

the application of identification analysis in the pharmaceutical industry and the industrial Internet platform, and realize the expansion of applications such as intelligent production, network collaboration, large-scale customization, and service-oriented extension through "one-code identification, one-code analysis, and one-code traceability". Support the use of industrial Internet platforms to trace the whole process of Chinese herbal medicine production bases, so as to realize that the source of Chinese herbal medicines can be checked, the quality can be controlled, and the destination can be traced. Pharmaceutical companies are encouraged to build a supply chain collaboration platform to provide integrated management services for suppliers, distributors, customers, and offline and online channels.

(4) Develop new models and formats of "Internet +". To adapt to the rapid development trend of smart medical care, medical and nursing integration, and health management, develop a sharing platform for biological big data and medical and health big data, build a precision medical service system that organically combines precision diagnosis technology, precision treatment, and precision medicine, and actively develop a new model of "Internet +" remote health services. Develop a new format of "Internet + medicine" with the participation of drug production and circulation enterprises,

medical institutions, insurance companies, information technology service providers, etc., and explore the construction of digital management from disease diagnosis and treatment, drug distribution, settlement and payment.

4. Industrial green and low-carbon development projects.

Implement the requirements of carbon peaking and carbon neutrality, guide enterprises to adopt energy-saving and low-carbon production methods to transform and upgrade traditional production processes, increase energy conservation and emission reduction, and improve the level of green and low-carbon development of the industry.

(1) Build a green and low-carbon industrial system. Improve the efficiency of comprehensive utilization of industry resources, build a number of green factories and green parks, and play a leading role in benchmarking and demonstrationDrive the improvement of the level of green and low-carbon development of the whole industry. Strictly implement environmental protection, safety and energy-saving access standards, and carry out green and low-carbon transformation of production processes and equipment. Improve the level of green manufacturing of chemical APIs, guide local governments to promote the concentration of API production to

advantageous enterprises through structural adjustment, industrial upgrading, and optimization of layout. Promote the construction of pharmaceutical professional parks such as APIs, and realize public system sharing, comprehensive utilization of resources, centralized pollution control and industrial agglomeration development.

(2) Carry out green and low-carbon technology innovation. Focus on green and low-carbon technology research in the field of chemical APIs, encourage enterprises to develop and apply green chemical technologies such as continuous synthesis of microreactions, biotransformation, and chiral synthesis, and break through a number of key common technologies and equipment. Encourage enterprises to develop and apply advanced energy-saving technologies, use renewable and clean energy, promote low-carbon and zero-carbon technologies, and reduce carbon dioxide and other greenhouse gas emissions.

(3) Improve the level of cleaner production and comprehensive utilization of resources. Promote enterprises to implement the concept of green development, strengthen the development and application of cleaner production processes and equipment, formulate overall pollution control strategies, and eliminate and control pollution from the source. Guide enterprises to

carry out research on common technologies and standards for the treatment of "three wastes" in drug production, develop resource utilization, harmless treatment and evaluation technologies for waste gas, waste liquid and waste residue, strengthen the resource utilization of by-products, and achieve energy saving, cost reduction and environmental impact.

5. Industrial servitization upgrading project.

Guide upstream and downstream enterprises in the industrial chain to strengthen business cooperation, vigorously develop service-oriented manufacturing, support the construction of a number of professional public service platforms, and improve industrial supporting service capabilities.

(1) Promote contract research and development services. Vigorously cultivate professional outsourcing services such as new drug R&D outsourcing (CRO) and customized R&D and production (CDMO), attract well-known professional outsourcing service institutions at home and abroad to set up sub-centers in the province, cultivate a number of contract R&D enterprises with high quality and strong service capabilities, and provide normalized support for industrial innovation and R&D. Support advantageous enterprises to carry out contract research and development services in the fields of

pharmaceutical research, preclinical safety evaluation, and clinical research of new drugs.

(2) Promote customized production services. Support customized production services such as the development and industrialization of innovative drug production processes and large-scale commissioned processing of marketed drugs, explore drug preparation and process technology development, and promote the specialization of services such as clinical drugs, intermediate manufacturing, API production, and preparation production. Relying on industrial Internet platforms and commissioned manufacturing (CMO) institutions, we will build regional "shared factories", build industry resources that meet professional standards and green safety requirements, and develop a new model of pharmaceutical shared manufacturing. Develop new businesses such as new drug screening and molecular building blocks.

(3) Improve clinical service capabilities. Support social forces to invest in the establishment of clinical testing institutions, and encourage qualified medical institutions to undertake research work such as clinical trials of new drugs and bioequivalence tests of generic drugs. Support medical institutions to cooperate with the government, universities, and third-party institutions to create a comprehensive

platform integrating drug discovery, pharmacokinetic research, pharmacodynamic research, medical device design, drug and medical device safety evaluation, quality standard research, etc., and build an open and collaborative clinical service system. Support Gulou Hospital Jiangbei International Hospital, Hengrui Nanjing Innovative Drug Clinical Research and Medical Transformation Center, Suzhou Dushu Lake Hospital and other institutions to build clinical drug research centers that meet international standards.

(4) Build a public service platform. Accelerate the construction of a public service platform system for the pharmaceutical industry, improve various public service platforms such as investment and financing services, technology transfer and transformation services, health and medical big data applications, and pharmaceutical logistics, and build a number of public technical service platforms and open laboratories such as macromolecular drugs and laboratory animals that meet GLP standardsThe results are transformed into full life cycle services for application promotion.

6. Industrial opening and cooperation promotion project.

Actively integrate into the global life and health innovation ecology and pharmaceutical industry manufacturing network, integrate international and domestic market resources, enhance the

supply capacity for the "dual circulation" development pattern, and promote high-level industrial openness and cooperation.

(1) Promote the development of the biomedical industry in the free trade zone. Implement the requirements of the "Overall Plan of the China (Jiangsu) Pilot Free Trade Zone", focus on the entire biomedical industry chain, carry out pilot projects to strengthen government services, deepen investment reform, promote trade transformation and strengthen innovation-driven development in the pilot free trade zone, and support enterprises to accelerate their integration into the middle and high-end of the global industrial chain, value chain and innovation chain.

Column 5 The main content of the pilot project for the open innovation and development of the whole biomedical industry chain
Nanjing area. Actively seek national support to promote pilot trials of stem cell therapy, international multi-center clinical trials, and pilot projects for unmanned sales of over-the-counter drugs. Focus on the development of precision medicine, innovative drugs, cell and gene therapy, traditional Chinese medicine immunology research and other industries, accelerate the layout of stem cell research, human assisted reproductive technology, genetic testing, target discovery, new drug screening, immune cell therapy and other technical fields, and build a gene and cell engineering base with global influence and a regional medical center in the Yangtze River Delta.

Suzhou area. Focusing on the cutting-edge technology fields of immune cell therapy, stem cell therapy and gene therapy, we will actively strive for innovative policies and systems to be piloted and built into a pioneer area for cell therapy and gene therapy. Focus on the development of innovative drugs represented by biopharmaceuticals, new chemical drugs, new vaccines, etc., high-end medical devices represented by high-end imaging equipment, implant interventional devices, in vitro diagnostic equipment and supporting reagents, as well as biotechnology and emerging therapies represented by cell therapy, gene therapy, and synthetic biology, so as to create a world-class source of biomedical innovation.

Lianyungang area. Focus on the development of innovative chemical drugs, improved new drugs, high-end generic drugs, biosimilars, modern traditional Chinese medicine and medical devices representing the advanced level of China, and build a leading and internationally renowned innovative drug industrialization base in China. Encourage qualified medical institutions to coordinate with advanced medical institutions inside and outside the United States to carry out clinical trials. Set up drug and medical device inspection service institutions, optimize the quarantine inspection process, and speed up the customs clearance of pharmaceutical products.

(2) Promote the integrated cooperation and development of the Yangtze River Delta. Seize the strategic opportunity of high-quality integrated development in the Yangtze River Delta, improve the customs clearance mechanism for biological products, biological

materials, and laboratory animals in the Yangtze River Delta, share clinical resources, innovation platforms and other elements in the Yangtze River Delta region, and enhance innovation capabilities. Build the G60 Science and Technology Innovation Corridor in the Yangtze River Delta and the Industrial Innovation Belt along Shanghai-Nanjing, strengthen regional coordination and dislocation development, accelerate the development of the gene editing industry, and cultivate a number of internationally competitive leading enterprises. Support the construction of the Yangtze River Delta Ecological Green Integrated Development Demonstration Zone, adhere to ecological priority and green development, and accelerate the overall layout and coordinated development of the pharmaceutical industry in the Yangtze River Delta. Promote collaborative cooperation between cross-provincial platforms such as the Yangtze River Delta Biomedical Industry Chain Alliance, and strengthen resource docking with high-energy pharmaceutical industry platforms in the Yangtze River Delta.

(3) Improve the level of international development. Deepen multi-level exchanges and cooperation, smooth the channels for international capital and overseas talents, attract world-renowned pharmaceutical companies and medical institutions to set up

production bases, regional headquarters or R&D centers in Jiangsu, and encourage domestic enterprises to acquire overseas R&D institutions. Give full play to the international competitive advantage of chemical preparations in our province, support the global research and development and international registration of innovative drugs, and promote the export of natural medicines, proprietary Chinese medicines, medical devices and other products. Support the establishment of overseas R&D centers, production bases, sales networks and service systems, accelerate the integration into the international market, create a number of well-known brands with international influence, and enhance the competitiveness of our province's pharmaceutical products in the global pharmaceutical market. Strengthen international cooperation in standards, promote the docking of technical standard systems, and enhance the international discourse power of standards in key areas.

7. Industrial safety development guarantee project.

Pay attention to the overall planning of industrial development and safety, guide enterprises to establish a quality management system covering the whole life cycle of products, actively fulfill the main responsibilities of safe production and biosecurity, and improve the level of intrinsic safety of the industry.

(1) Improve the quality and safety level of drugs and medical devices. Implement the "Drug Administration Law", "Vaccine Management Law", "Medical Device Management Regulations" and other laws and regulations, strengthen the awareness of the main responsibility of enterprises, continuously improve the quality management system, implement the post responsibility system for drug production employees, establish a traceability system for drugs and medical devices, strengthen the whole process of quality control management, carry out risk and hidden danger investigation, and improve the level of drug quality management.

(2) Improve the level of enterprise safety production management. Promote enterprises to improve the safety production management system, and integrate the internal requirements of safety production management into the whole process of pharmaceutical enterprise management. Guide enterprises to widely apply technologies such as informatization, the Internet and artificial intelligence, and greatly improve the level of "intrinsic safety" through equipment process upgrades, intelligent control and monitoring. Guide pharmaceutical enterprises to strengthen the investigation and management of potential safety production and fire safety hazards, prevent safety production accidents from the source,

and further strengthen fire safety. Encourage enterprises to establish an effective "environmental, occupational health and safety (EHS)" management system to eliminate potential environmental, occupational health and safety hazards.

(3) Enhance the ability of enterprise biosecurity risk management and control. Carry out publicity on biosecurity laws and regulations and biosecurity knowledge, promote enterprises to strengthen biosecurity risk prevention and control measures, formulate and improve biosecurity training, follow-up inspections, regular reports and other work systems, and strengthen process management. Enterprises engaged in pathogenic microorganism experimental activities shall strictly abide by relevant national standards, laboratory technical specifications, and operating procedures, and take safety precautions. Guide and supervise pharmaceutical enterprises to formulate and implement work systems and measures related to bioinformation security, and strive to improve the information security level of key links and key processes of enterprises.

4. Safeguard measures

(1) Increase policy support. Give full play to the role of existing funds, broaden funding channels, and increase support for industrial

innovation capabilities and emergency capacity building, as well as the development of high-quality drugs and high-end medical devices and key components. Optimize the layout of scientific and technological research and development, and encourage basic research and key technology research for the pharmaceutical industry. Encourage pharmaceutical companies to increase R&D investment, and implement various preferential tax policies such as income tax reduction and exemption for high-tech enterprises, additional deductions for enterprise R&D expenses, and accelerated depreciation of fixed assets. Support local governments to provide policy support for the R&D and industrialization of innovative drugs and high-end medical devices, and increase support for investment projects that have newly obtained registration approvals and production of innovative drugs, improved new drugs, first generic drugs, innovative medical devices, new vaccines, biosimilars, and modern traditional Chinese medicines. Strengthen policy support for rare disease drugs and children's drugs.

(2) Accelerate the promotion and application of innovative products. Strengthen policy support for innovative pharmaceutical products and support the priority of innovative drugs in the national medical insurance catalogue. Encourage innovative drugs to give

priority to applying for listing in our province, simplify the listing process, shorten the listing cycle, and open up a fast lane for innovative drugs to be listed online. Adhere to demand guidance and encourage medical institutions to actively participate in the development of pharmaceutical products. Actively explore new marketing models of large-scale medical equipment, support medical device manufacturers to cooperate with third-party leasing service companies, give full play to the guiding role of the first (set) identification and the first (set) insurance compensation policy, and accelerate the promotion and application of high-end medical equipment.

(3) Broaden industrial financing channels. Expand direct financing channels, support qualified pharmaceutical companies to carry out financing through IPOs, bond issuance, etc., and encourage listed pharmaceutical companies to expand refinancing through additional issuance. Explore innovative insurance product protection, and encourage local insurance institutions to provide customized comprehensive insurance products such as biomedical human clinical trial liability insurance and biomedical product liability insurance. Give full play to the leading role of government industrial investment funds at all levels, guide social capital to increase investment in the

pharmaceutical industry, broaden capital channels, and improve financing capacity. Encourage local financial institutions to increase credit investment in pharmaceutical enterprises, and actively promote innovative financial support methods such as financial leasing, guarantee pledge, and intellectual property pledge.

(4) Strengthen the construction of talent echelons. In response to industrial development and enterprise needs, attract a group of high-end talents in cutting-edge fields from all over the world and support the development of related professional disciplines. Focusing on the basic theoretical research in the frontier field of medicine and the hot direction of cross-integration of medical and engineering, we will cultivate talents urgently needed for industrial development and solve the bottleneck of industrial development。 Give full play to the advantages of medicine, science and education in the province, promote in-depth cooperation between pharmaceutical enterprises and colleges and universities in the province, carry out pilot demonstrations of the integration of industry and education, actively explore new models of "medical and engineering" characteristic talent training, and cultivate high-skilled talents and compound skilled talents. Strengthen the construction of talent training bases, support local governments to establish targeted training mechanisms with

China Pharmaceutical University, Nanjing Medical University, Nanjing University of Traditional Chinese Medicine, Xuzhou Medical University, Nanjing University, Southeast University, Soochow University and other advantageous professional colleges and universities to jointly build talent training bases.

(5) Create a good development environment. Deepen the reform of "decentralization, management and service" in the field of drug and device review and approval, optimize the verification procedures of pharmaceutical development, production and drug clinical trials, and accelerate the transformation and application of innovative achievements. Strengthen the protection of intellectual property rights, strengthen early warning research on intellectual property rights in key areas such as anti-tumor drugs, high-end medical devices, and gene therapy drugs, release research results, guide enterprises and scientific research institutions to reasonably avoid intellectual property risks, and support enterprises to actively respond to foreign-related intellectual property disputes. Promote the construction of a comprehensive legal service platform for intellectual property rights, and provide comprehensive legal services such as legal consultation, search and analysis, rights protection assistance, arbitration and mediation, and evidence notarization for

pharmaceutical enterprises.

(6) Strengthen the organization and implementation of planning. Strengthen the coordination and cooperation of planning and implementation, and departments at all levels of industry and informatization, science and technology, development and reform, health, drug supervision, medical security, education, ecological environment and other departments should strengthen coordination and policy linkage, form a joint force, and fully serve the high-quality development of the industry. Industry associations, industry alliances and other social organizations should give full play to the advantages of being familiar with the industry and close to enterprises, serve as staff assistants to government departments in policy formulation, situation research and judgment, industry self-discipline, etc., and play a bridge role in government-enterprise communication. Relevant localities should put forward specific measures based on local actual research, work hard, and implement relevant requirements.

Jiangsu Province's "14th Five-Year Plan" industrial information security system construction plan

As an important part of network security, industrial information security is an important prerequisite for the implementation of the strategy of manufacturing power and network power, which is related to national security, economic development and social stability. At present, the integration of new generation information technologies such as 5G, artificial intelligence, big data, cloud computing, and blockchain with the manufacturing industry is accelerating, injecting strong impetus into economic and social development, but also bringing increasingly severe industrial information security challenges, and putting forward newer and higher requirements for the industrial information security system in our province. During the "14th Five-Year Plan" period, in order to accelerate the development of the industrial information security system in our province and guide the construction of the industrial information security system in the next five years, in accordance with the "The Cybersecurity Law of the People's Republic of China, the Cryptography Law of the People's Republic of China, the Data Security Law of the People's

Republic of China, the 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Outline of Long-term Goals for 2035, the 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Outline of Long-term Goals for 2035, and the 14th Five-Year Plan for Cybersecurity of Jiangsu Province are formulated.

1. The background of the development of industrial information security in Jiangsu during the 14th Five-Year Plan

(1) Development foundation

During the "13th Five-Year Plan" period, our province actively implemented the State Council's "Guiding Opinions on Deepening the Development of the Industrial Internet of "Internet + Advanced Manufacturing", the Ministry of Industry and Information Technology and other ten departments "Guiding Opinions on Strengthening Industrial Internet Security", and the Ministry of Industry and Information Technology's "Industrial Control System Information Security Action Plan (). 2018-2020)" and other important documents require that with the goal of improving industrial information security assurance capabilities, focusing on ensuring the security of key elements such as equipment, control, network, platform, and data, building mechanisms, systems, standards,

platforms, and teams, promoting the implementation of the main responsibility of enterprises and government supervision responsibilities, enhancing enterprise security protection capabilities, focusing on improving public service capabilities such as industrial information security situational awareness, information sharing, and emergency response, and continuing to promote the innovation and development of the industrial information security industry. The construction of the industrial information security guarantee system has begun to bear fruit.

-- The construction of industrial information security system has been steadily advancing. First, together with the Provincial Communications Administration, the National Development and Reform Commission and other ten departments, formulated and took the lead in issuing the "Implementation Opinions on Strengthening Industrial Internet Security" nationwide to provide an implementation basis for strengthening the security of the industrial Internet in our province. The second is to issue policy documents such as the "Key Points of the Province's Informatization and Industrial Information Security Work", "Jiangsu Province Industrial Information Security Incident Emergency Management Guidelines", and "Jiangsu Province Industrial Information Security Information Sharing and Submission

Notification Guidelines" to provide guidance for the province's industrial information security work. The third is to promote the construction of systems between governments, governments and enterprises, and within enterprises. Strengthen the coordination and linkage with the Cyberspace Administration of the Provincial Party Committee, the Public Security Department and the Communications Administration, establish a cooperation mechanism with the Provincial Communications Administration to jointly promote industrial Internet security, and actively guide 557 enterprises to establish an internal industrial information security management mechanism through the cultivation of industrial information security star protection enterprises.

-- The technical support capacity of industrial information security continues to increase. The first is to focus on promoting the construction of provincial "one network, one pool and one platform" (provincial industrial information security situational awareness network, industrial Internet security service resource pool, industrial security information sharing and emergency service collaborative guarantee platform), and basically build a provincial industrial security information sharing and emergency service collaborative guarantee platform, and a provincial industrial Internet security

situational awareness platform (). Phase I project), which initially has the security monitoring capabilities of the province's low-protection networked industrial control system and industrial Internet platform. The second is to continue to improve the industrial Internet security service resource pool, initially gather data resources such as industrial Internet asset information, industrial protocols, threat information, security vulnerabilities and malicious code, and emergency response measures in the province, and provide basic support services for provincial and municipal industrial and information technology departments and enterprises. The third is to support the construction of industry platforms and basic common technology platforms, organize enterprises and security institutions to establish industrial control system security experimental platforms and industrial Internet security basic common technology platforms in rail transit and power industries, and improve industrial information security technical capabilities.

-- The foundation of industrial information security services has been further consolidated. At the same time, the National Institute of Electronic Standardization has established the largest national industrial control security standard implementation service team in the country, and the industrial information security service

support force continues to grow. The second is to establish the Provincial Network and Information Security Industry Alliance to build a bridge for industrial information security service support institutions, industrial enterprises, and industrial Internet platform enterprises, and the alliance has absorbed the first batch of 64 key enterprises. The third is to actively hold industrial information security technology skills competitions, offensive and defensive confrontation competitions, industrial control security in-depth tours, industrial information security summit forums and other activities to improve the level of industrial information security technology services. Fourth, hold special training on industrial information security, carry out industrial information security emergency drills in key industrial enterprises, improve the emergency response ability of enterprise security service guarantee personnel, and more than 500 heads of industrial and information technology departments and key enterprises at all levels in the province participate in the annual training.

-- The development capacity of the industrial information security industry has been continuously improved. The first is to accelerate the research of key technologies in industrial information security, and support the development of key technologies such as

situational awareness and simulation platforms in key industries such as power and electronics. Second, industrial information security is listed as a key support direction in the provincial special funds for the transformation and upgrading of industrial and information industries, and key enterprises are supported to form a number of key platforms, key products and excellent solutions around enterprise situational awareness, emergency drills, security training and other directions. The third is to build regional carriers such as the Yangtze River Delta Network Security Industrial Park, promote the construction of the Yangtze River Delta urban network security operation center, provide support for the gathering of industrial information security industries in the Yangtze River Delta region, and promote the agglomeration and development of the security industry in Nanjing, Suzhou and other places.

However, we should also be soberly aware that Jiangsu's industrial information security still faces some shortcomings and pain points: the construction of industrial information security public infrastructure lags behind the development speed of integration and industrialization, and the isolated and fragmented security system construction model can no longer meet the requirements of integrated developmentthe "unstable base" of industrial information security

assurance; The industrial information security industry is scattered and not strong, lacking leading enterprises and leading enterprises, and the industry has not yet formed an agglomeration effect. At the same time, the traditional network security industry lacks the ability to support the industrial field; Some enterprises still have the situation of "emphasizing IT construction and neglecting information security", with lack of information security awareness, insufficient investment, lack of systematic design of network and information security guarantees, and face serious security threats. There is a serious shortage of industrial information security talents.

(2) Development trend

At present, the situation of industrial information security is grim, the security risks of industrial control systems and platforms are becoming more and more prominent, and the work of industrial information security is facing huge challenges and opportunities.

-- Cyber attacks in the industrial sector are high. Industries such as manufacturing, energy, and transportation have become important targets, and ransomware, advanced persistent threat (APT) attacks have seriously affected the normal production and operation of industrial enterprises. The game of interstate cyber confrontation targeting important industrial control systems and equipment is

becoming more complex and changeable, seriously threatening national security.

-- The exposure of industrial information security risks has expanded rapidly. The digital transformation of industry has promoted the transformation of the production and service model of industrial enterprises, and the scale of industrial equipment on the "cloud" and "platform" has increased significantly, which has not only promoted the high-quality development of the manufacturing industry, but also broken the relatively closed manufacturing environment of the traditional industry, so that traditional network security threats have penetrated into the industrial field. At the same time, due to the inadequate security protection measures of some industrial enterprises, the number of industrial control systems exposed to the Internet has increased significantly, the security risks have increased, and the difficulty of guarantee has increased sharply.

-- Supply chain security risks in the industrial sector are prominent. At present, key industrial control equipment and systems in China's key industries are highly dependent on foreign countries, and key technology products face the risk of "supply interruption", while security vulnerabilities, open source risks, backdoors, dark functions and other security risks are prominent. For example, in

recent years, the number of security vulnerabilities in industrial control systems has grown rapidly, and the proportion of high-risk vulnerabilities has remained high, with various types of vulnerabilities and a wide range of distribution, basically covering mainstream equipment manufacturers.

-- Policy-driven improvement of industrial information security capabilities. In order to cope with the increasingly severe industrial information security situation, the Party Central Committee and the State Council attach great importance to industrial information security work, and intensively issue relevant policy documents around industrial control system security, industrial Internet security, industrial big data security protection, etc., accelerate the pace of standard development and application promotion in key areas, guide all regions and industries to implement relevant protection requirements, and comprehensively strengthen industrial information security.

-- Industrial digital transformation promotes security technology innovation. Industrial digital transformation is accompanied by a series of security issues that need to be solved urgently, which has led to a surge in security demand, increased security investment, continuous innovation and optimization of

security protection technology, and gradual enrichment of security protection products and services. At the same time, with the integration and application of new technologies such as big data and artificial intelligence and industrial information security protection technology, it will help improve security protection capabilities such as unknown threat detection, intelligent defense, and security situation prediction.

-- Independent and controllable strategies promote the improvement of safety product supply capacity. The state regards the independent and controllable key technologies as a major strategic direction, and clearly proposes to adhere to the principle of independent controllability, safety and efficiency, accelerate the process of localization and substitution in key information infrastructure fields such as manufacturing and energy, promote the improvement of the security performance of key industrial control equipment and systems, promote the research and development and application of equipment products with embedded security functions, and fundamentally reduce the risks caused by security vulnerabilities and backdoors.

With the continuous acceleration of the digital transformation process of Jiangsu enterprises, industrial Internet security and

industrial control system security have become an important basic support for the comprehensive implementation of the strategy of strengthening manufacturing provinces and network provinces, and the construction of information security guarantee system in the industrial field of the province needs to be strengthened urgently. Jiangsu is a major manufacturing province, a major software and information service province, with rich network and information security talents and strong basic support capabilities for the information security industry, which has laid a good foundation for the innovation and development of industrial information security in Jiangsu.

2. The overall requirements for industrial information security construction in Jiangsu during the 14th Five-Year Plan

(1) Guiding ideology

Guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, especially General Secretary Xi Jinping's important thought on network power, fully implement the spirit of the 19th National Congress of the Communist Party of China and the 2nd, 3rd, 4th and 5th Plenary Sessions of the 19th Central Committee of the Communist Party of China, as well as the spirit of General Secretary Xi Jinping's series of important speeches on

network security and informatization, and thoroughly implement the spirit of General Secretary Xi Jinping's important speech on inspecting Jiangsu. Cyber power and cyberspace security strategic deployment requirements, fully implement the requirements of important documents such as the "Guiding Opinions on Deepening the Development of the Industrial Internet + Advanced Manufacturing", the "Guiding Opinions on Strengthening Industrial Internet Security" and the "Industrial Internet Innovation and Development Action Plan (2021-2023)"With the goal of improving the level of industrial information security in Jiangsu Province, strengthen the efficiency of industrial information security infrastructure, strengthen the industrial information security industry, improve the industrial information security management system, improve the security protection level of industrial enterprises and industrial Internet platform enterprises, improve the industrial information security service system, and "strive to be an example, strive to be a demonstration, and walk in the forefront" in industrial information security, so as to provide strong support for the construction of a strong manufacturing province and a strong network province.

(2) Basic principles

Strengthen overall planning and consolidate responsibilities. Form an industrial information security management bureau with unified deployment, information sharing, and coordinated disposal, implement the main responsibility of enterprises and the supervision and management responsibilities of government departments, and ensure that safety work is in place.

Balanced coordination and precise policy implementation. Accurately grasp the characteristics of different industries and regional development foundations, combine factors such as enterprise scale and security risks, implement classified and hierarchical management of enterprises, and coordinate to promote the improvement of enterprise information security capabilities and levels.

Active defense and comprehensive prevention. Strengthen the construction of industrial information security situational awareness network and service system. Strengthen cooperation between departments, regions and industries, accelerate the formation of technical support capabilities for government-enterprise collaboration and multi-party linkage, and jointly promote the construction of industrial information security guarantee system.

Innovation-driven, key breakthroughs. Implement an

innovation-driven strategy, encourage the development of new technologies and products, and cultivate new formats and models. With major scientific and technological projects and major projects as the starting point, we will increase investment in research and development, and strive to overcome a number of core technologies in key areas.

(3) Target positioning

By 2025, the province's industrial information security guarantee system will be basically completed, the information security protection capabilities of important industrial control systems and key industrial Internet platforms will be significantly enhanced, and the level of industrial information security management, technical support and public service capabilities in the province will be significantly enhanced.

Specifically, it is manifested as:

Establish and improve policy planning and standard systems. Improve systems and norms such as industrial information security risk assessment, information sharing and notification, and emergency response, establish working mechanisms such as industrial information security inspection and assessment, data protection, classification and grading, and strengthen the implementation of

policies, systems, and mechanisms.

Comprehensively build a basic platform for industrial information security. Build "one network, one pool, one platform", greatly improve industrial information security monitoring capabilities, realize orderly data sharing between platforms, build key industry platforms and basic common technology platforms such as rail transit, power energy, petrochemical industry, etc., and cover more than 50% of enterprise-side risk monitoring and safety management platforms in key industries.

Greatly improve network security service capabilities. The scale of industrial information security service support teams has reached 50, and the number of key enterprises that have joined the network and information security industry alliance has reached 300, and the service capabilities of testing and evaluation, security consulting, and technical services have been continuously enhanced. Every year, multi-level and diversified security training, emergency drills and skills competitions are carried out on a regular basis, and the total number of participants in emergency drills and industrial information security training has reached 10,000.

Promote enterprise network security protection to be at the forefront of the country. Cultivate more than 500 star-rated enterprises

for industrial information security protection. Key industrial enterprises and industrial Internet platform enterprises have basically established and implemented security management systems and internal control systems, and the pilot work of network security classification and grading of industrial Internet enterprises has been fully completed, and the number of key industrial Internet enterprises that have implemented network security classification and grading management has reached 200.

Build a highland for the development of industrial information security industry. Cultivate and form 5 leading enterprises in the network and information security industry with revenue of more than 1 billion yuan and 20 benchmark enterprises in industry segments, and strive to double the scale of the province's network security-related industries. Build a number of industrial information security enterprises, information security industry bases and industrial information security application demonstration bases with a certain influence in China, build a number of key laboratories and enterprise R&D centers, attract a group of industrial information security talents, and become a new highland for the development of the national network security industry. Major breakthroughs have been made in the core technology of industrial information security, and the

localization rate of core software and hardware such as industrial control systems and real-time databases has continued to rise.

3. Key tasks of industrial information security construction

Improve the efficiency of industrial information security infrastructure construction, optimize the industrial information security industry ecology, improve the industrial information security management system, improve the level of enterprise security protection capabilities, and improve the industrial information security service system. Vigorously improve the construction of industrial information security infrastructure, technical support capabilities and security management services in the province.

(1) Improve the efficiency of safety infrastructure construction

Jointly improve the provincial industrial information security situational awareness network, establish an industrial information security service resource pool, build a provincial industrial security information sharing and emergency service collaborative guarantee platform, build a public service infrastructure of "one network, one pool, one platform" for industrial information security in Jiangsu Province, support the construction of industrial Internet security basic common technology platform and industrial Internet security platform for key industries, and build a basic foundation for industrial

information security.

Build a provincial-level industrial information security situational awareness network. Build and improve the provincial industrial information security security general platform, the Jiangsu sub-platform of the national industrial Internet security technology guarantee platform, and the security technology service platform of key industries, strengthen data exchange and information sharing between platforms, and build a provincial industrial information security situational awareness network. Implement the relevant technical requirements of the Ministry of Industry and Information Technology's "Guidelines for the Construction of Provincial Industrial Internet Security Monitoring and Situational Awareness Platforms", continue to improve technical means such as active monitoring, threat perception, passive trapping, enterprise operation monitoring, and data fusion analysis, so as to realize real-time perception, analysis, research and judgment and accurate decision-making of the province's networked industrial control equipment and systems, industrial Internet platforms, industrial enterprise operation status, and hidden risks. Incorporate the situational awareness resources of our province into the national industrial information security network, and achieve system docking, data sharing, and

business collaboration with the national platform to form systematic situational awareness capabilities. Through the establishment of a collaborative management and control mechanism for industrial information security in the Yangtze River Delta, the sharing of major industrial information security situational awareness information across regions will be realized, and the construction of the industrial information security linkage guarantee system in the Yangtze River Delta will be promoted.

Establish an industrial information security service resource pool. Establish a provincial industrial information security service resource pool to bring together asset information, industrial protocols, threat information, security vulnerabilities and malicious code of industrial enterprises and industrial Internet platform enterprises in the province Industrial data resources such as information security and various service provider resources support provincial platforms to carry out multi-dimensional research and judgment such as threat intelligence correlation analysis, asset analysis, vulnerability analysis, and comprehensive situation analysis, and provide higher quality and more effective service support for information sharing and multi-level linkage of provincial and municipal authorities and key enterprises. Organize enterprises in the province to strengthen technical research

and product research and development, develop a number of technical tools around information security situation awareness, monitoring and early warning, security protection, emergency response, audit and evidence collection, etc., and enrich the reserve of industrial information security technical resources.

Build a provincial-level industrial safety information sharing and emergency service collaborative guarantee platform. Build a provincial-level industrial Internet security information sharing and emergency service collaborative guarantee platform at the provincial, municipal and county levels, covering key industrial enterprises, key industrial Internet platform enterprises, and key industrial information security support service institutions, bring together different industries, different regions, and different types of security information, and carry out cross-departmental, cross-regional, and cross-industry security information sharingEstablish a sharing mechanism for security information such as vulnerability risks, threat information, and disposal plans, improve emergency plans and drill systems for information security emergencies in key industrial enterprises at the provincial, municipal, and county levels, and form a multi-party linkage and rapid response information notification, early warning, and emergency response system.

Build a basic common technology platform for industrial Internet security. Support key enterprises, scientific research institutes, and technical institutions to build provincial-level industrial information security offensive and defensive drills, testing and verification for rail transit, power energy, petrochemical, machinery manufacturing, electronic information, aerospace and other industries, and rely on the platform to carry out industrial Internet security offensive and defensive drills, security risks and security solutions testing and verification, and further improve the ability to identify potential security hazards, prevent security threats, and resolve security risks. Support key cities to accelerate the construction of "5G + Industrial Internet" security brains.

Build an industrial Internet security platform for key industries. Support enterprises in key industries such as rail transit, machinery manufacturing, electronic information, aviation, electric power, and chemical industry to build industry-level and enterprise-level safety platforms, realize real-time monitoring, research and judgment and early warning of safety risks in key industries and enterprises, strengthen system docking, data sharing and business collaboration between industry-level and enterprise-level platforms and provincial platforms, form an overall safety monitoring network that connects from top to bottom and coordination between

government and enterprises, and improve the safety situation awareness and emergency response capabilities of key industries. Support the construction of an Internet of Vehicles security monitoring platform integrating online monitoring, vulnerability detection, intrusion detection, multi-layer defense, situational awareness, and big data analysis to improve security service capabilities.

Column 1 Industrial Information Security Infrastructure Efficiency Improvement Project
Accelerate the promotion of industrial information security situational awareness platforms to the enterprise side, expand the monitoring scope of provincial platforms, continue to improve the functions of provincial platforms, and upgrade the monitoring system of basic telecommunications enterprises. Accelerate the in-depth docking of provincial platforms and national platforms, open up national, provincial, industry, and enterprise platforms, realize resource sharing at all levels, improve the level of security risk monitoring and analysis, comprehensive research and judgment and early warning, and coordinated handling of incidents, and promote the effectiveness of industrial information security infrastructure. Build and improve the functions of the industrial information security public service platform to provide high-quality and efficient security services for industrial enterprises.

(2) Optimize the industrial information security industry ecology

Breakthrough key technologies in industrial information

security, improve the network security protection capabilities of new infrastructure, innovate industrial information security service models, promote the application of industrial information security technology, strengthen innovative breakthroughs in network security supply, promote "strong chains" and "supplementary chains", cultivate leading enterprises, incubate characteristic enterprises in subdivided tracks, create information security industry bases, and encourage the development of the whole industrial chain, accumulation and cooperation, to build an industrial information security industry development ecology of "demand docking, business association, market integration, and business coordination".

Breakthrough in key technologies of industrial information security. With the goal of building an advanced and complete network and information security product system and ensuring the network security of new infrastructure, we will focus on breaking through key information security technologies such as asset mapping, intelligent monitoring and early warning, threat analysis, intrusion prevention, vulnerability discovery, virus detection, border protection, source code detection, and data protection, and accelerate the improvement of hidden danger investigation, situational awareness, emergency response, and traceability capabilities. Strengthen the network

security layout and top-level design of new infrastructure in our province, do a good job in synchronizing the connection with new infrastructure, accelerate the research on security technology in various convergence fields, and build a converged application security protection architecture. Actively explore the application of new technologies such as cloud computing, big data, artificial intelligence, quantum computing, and new network security concepts and architectures such as mimic defense, trusted computing, and zero-trust security in industrial Internet scenarios, empower security, establish an automated, intelligent, and adaptive security defense system, build an independent, controllable, and reliable security system architecture, and improve the independent research and development of core technologies and components.

Column 2 The application of new technologies improves the ability to ensure industrial information security
Use artificial intelligence technology to empower industrial information security threat detection, situational awareness, emergency response, and auxiliary decision-making analysis. Use blockchain technology to ensure industrial Internet data security, realize trusted sharing and cooperation of the industrial Internet, support industrial Internet supervision and audit, promote linkage response to industrial Internet security incidents, improve industrial Internet attack recovery capabilities, and combine domestic cryptography to

ensure core technology security. Build an industrial information security protection system based on trusted computing technology to enhance the ability of industrial equipment, hosts, networks, and applications to resist unknown threats. Use mimic defense and zero-trust security to solve the pain points of industrial Internet information security. synchronize with the new infrastructure, accelerate the research of security technology in various convergence fields, and build an independent, controllable and reliable security system architecture.

Innovate industrial information security service models. Advocate the concept of "security as a service" and encourage information security enterprises to transform from providing security products to providing security services and solutions. Support information security enterprises and technical service institutions to carry out security services such as network and information security planning and consulting, threat intelligence, risk assessment, testing and certification, security integration, and emergency response. Vigorously develop a cloud-based network and information security public service platform to provide remote and real-time vulnerability discovery, website protection, anti-denial of service attacks, domain name security, and other services. Concentrate the advantageous basic resources of basic operators, large Internet enterprises, security enterprises, etc., encourage external empowerment, and provide

value-added services such as network security monitoring and early warning, attack protection, and emergency support for enterprises, so as to escort the security of new infrastructure in various industries and application scenarios. Encourage the development of network security integrated operation outsourcing services for the industrial Internet field.

Promote the application of industrial information security technology. Promote innovation in the application of information technology in the industrial field, and encourage industrial enterprises and industrial Internet platform enterprises to apply information technology products and services that meet national requirements; Promote the application of domestic commercial cryptography technology in the industrial field, support technical research, product research and development, application demonstration, testing and certification of cryptography applications in the industrial field, accelerate breakthroughs in core technologies and standard development of cryptography applications, promote the application of cryptographic technology products that meet national requirements in industrial information security, and support the research and application of secure and reliable cryptography in intelligent networking and vehicle-road collaboration; Promote the

transformation and application of industrial information security technology achievements, integrate resources from key industries and regions, and build a platform for the transformation of industrial information security innovation achievements that coordinate government, industry, academia and research funds; Promote best practices in industrial information security, organize and carry out pilot demonstrations of the application of safe and reliable network information security products and services in industrial enterprises and the industrial Internet, and create a number of industrial information security application demonstration bases.

Improve the supply capacity of network security products and services. Strengthen collaborative innovation, encourage key network security enterprises and industrial enterprises to jointly tackle key core technologies in key areas such as programmable logic controllers (PLCs), data acquisition and monitoring control systems (SCADA), and telematics processors (T-BOX), and create equipment products with embedded security functions. Optimize service supply, support cloud service enterprises and network security enterprises to jointly build security operation service centers in key cities, implement the "Industrial Internet Innovation and Development Action Plan (2021-2023)", and implement the "secure cloud

migration" project for small and medium-sized enterprises. For key industries such as equipment and electronic information, support leading industrial enterprises to build a number of safe public service platforms with extensive influence. In view of the differentiated characteristics of process industry and discrete industry, accelerate the formation of excellent safety solutions and supplier catalogs in key industries to achieve accurate connection between supply and demand.

Column 3 "Safe Cloud" project for small and medium-sized enterprises
In accordance with national standards such as the "Cloud Computing Service Security Guidelines" and "Cloud Computing Service Security Capability Requirements", select and cultivate cloud platforms and cloud computing service providers, guide professional cloud platforms to strengthen the construction of cloud computing security professional service teams, and ensure the information security of small and medium-sized enterprises "going to the cloud". Implement the "safe cloud migration" of small and medium-sized enterprise infrastructure, business applications, and platform systems by category. Formulate service standards, standardize service processes, and orderly access and exit, forming a service system that effectively supports the "safe cloud migration" of small and medium-sized enterprises in our province.

Cultivate the industrial information security industry ecology. Promote the development of industrial agglomeration,

optimize the layout of industrial parks, and create an industrial information security "entrepreneurship and innovation" environment and incubation base with resource convergence and factor sharing. Give full play to the enthusiasm and initiative of various entities such as industrial parks, enterprises, scientific research institutes, and financial institutions. Cultivate and build a number of industrial information security technology and product collaborative innovation platforms, supply and demand docking platforms and laboratories, carry out joint research on common problems and urgently needed market directions, promote the research and development, popularization and application of industrial common technologies, and guide the gathering of innovation resources. Focus on cultivating leading industrial information security backbone enterprises with large market size, strong technical strength and high service level, incubate a number of "high-precision" characteristic security enterprises in intelligent manufacturing, Internet of Vehicles and other subdivisions, and actively build an industrial information security industry ecosystem. Strive to build a number of industrial information security small and medium-sized enterprises with outstanding main business, distinctive characteristics, strong competitiveness and good growth, and encourage cooperation with large enterprises through

professional division of labor, service outsourcing, shared research and development, etc., to form a collaborative and win-win pattern.

Column 4 Industrial information security industry cultivation project
With industrial enterprises, industrial Internet platform enterprises, and information security enterprises as the main body, build an enterprise collaborative cooperation platform and cultivate an industrial information security technology innovation and application ecology. Guide industrial enterprises and industrial Internet platform enterprises to improve their information security capabilities, embed information security capabilities endogenously into the operation and management process of enterprises, and strengthen security risk monitoring, early warning, sharing and response. Support information security enterprises to strengthen the research and development of key technologies of industrial information security, establish closed-loop service capabilities for industrial information security, and guide the development of security services in the direction of cloud and platform.

(3) Improve the industrial information security management system

Improve the industrial information security management system, consolidate the industrial information security responsibilities of all parties, strengthen industrial information security emergency response, promote the implementation of industrial information security standards, and build an industrial information security

management system with "sound systems, clear responsibilities, and strong supervision".

Improve the industrial information security management system. Jointly improve the industrial information security guarantee system with the Provincial Communications Administration, and establish and improve the coverage of supervision and inspection, situational awareness, risk assessment, information sharing and notification, emergency response, data protection, etcEstablish a list of key networked industrial enterprises and important data protection catalogues in Jiangsu Province, strengthen security guidance for industrial enterprises, industrial Internet platform enterprises and related institutions, compile industrial Internet protection guidelines for key industries, and guide and urge enterprises to establish security management systems and internal control systems and strengthen supply chain security management by means of evaluation and evaluation.

Consolidate the industrial information security responsibilities of all parties. Tighten the main responsibility of enterprises for industrial information security, cooperate with the Provincial Communications Administration to implement a classified and hierarchical management system for network security of

industrial Internet enterprises, guide enterprises to implement security protection work by field and scenario, and continuously improve the network security guarantee system ; Industrial enterprises and industrial Internet platform enterprises in the province shall establish an industrial information security responsibility system in accordance with the law, set up special institutions and full-time management personnel for network security, establish implementation measures or detailed rules for the internal network security responsibility system of enterprises, establish security incident reporting and accountability mechanisms, continue to increase investment in security, implement special funds such as technological transformation, and deploy effective security technical protection means to ensure enterprise industrial information security. The government performs its responsibility for guidance, supervision and management, in accordance with the "Implementation Opinions on Strengthening Industrial Internet Security in Jiangsu Province"The Provincial Department of Industry and Information Technology is responsible for coordinating the construction of the provincial industrial information security guarantee system, and strengthening the role of the industrial Internet in safety production supervision with the Provincial Emergency Management Department. The Provincial

Communications Administration is responsible for supervising the security of the province's identification resolution system and the industrial Internet platform that provides public services to the society. The Provincial Development and Reform Commission, the Department of Ecology and Environment, the Health Commission and other departments shall carry out safety guidance and supervision of the promotion and application of the industrial Internet in their respective industries according to their respective responsibilities. The relevant departments of each districted city are responsible for industrial information security work within their jurisdiction according to the division of responsibilities of provincial departments.

Column 5 Promote the classification and grading of network security of industrial Internet enterprises
According to the national requirements for the classification and classification of industrial Internet enterprises, establish a classification and grading management system and mechanism that is in line with the actual situation of our province, formulate a list of key enterprises in Jiangsu Province, promote key enterprises to carry out classification and grading, organize industrial Internet enterprises to carry out independent grading, organize third-party professional service institutions to carry out grading verification, and guide industrial Internet enterprises to implement security

protection measures suitable for their own level according to a series of specifications for network security classification and grading protection, implement the main responsibility of enterprise network security, and implement differentiation, Precise management, form a number of typical solutions for industrial Internet network security, select a number of excellent demonstration enterprises, and cultivate a number of professional service institutions.

Strengthen industrial information security emergency response. Jointly build an industrial information security emergency management mechanism with unified command, special and regular, responsive, and linkage between the upper and lower levels to ensure rapid response and effective handling of industrial information security emergencies. Guide key industrial enterprises and industrial Internet enterprises to improve emergency response and recovery capabilities by completing special tasks such as completing emergency plans, carrying out emergency drills, and organizing emergency training, so as to ensure that the normal operation of on-site industrial control equipment, systems, networks, industrial Internet platforms, industrial software, etc. can be restored as soon as possible when an incident occurs, so as to prevent the loss of important data, and to update and optimize protective measures in a timely manner based on the collection and analysis of incident data.

Form a closed loop of defense for continuous improvement.

Promote the implementation of industrial information security standards. Organize enterprises and technical institutions in the province to actively participate in standard formulation and standardization activities, strengthen research on key technical standards for industrial information security, support enterprises and technical institutions in the province to take the lead in formulating relevant group standards, industry standards, national standards and international standards, organize standardization verification in key areas such as industrial Internet equipment, control, network (including identification resolution system), platforms, and data, and promote the pilot trial of relevant security standards.

Column 6 Promote the standardization of industrial information security
Strengthen the top-level design of the industrial information security standard system to ensure that industrial information security standards and specifications are dynamically adjusted and improved with the development of industrial information security technology and industry. Strengthen the research and formulation of standards and specifications, and organize professional institutions and key enterprises to carry out the development and standardization verification of security standards in key areas such as industrial Internet equipment, control, network (including identification resolution system), platforms, and data. Strengthen the publicity and

implementation of standards, and encourage industrial enterprises and industrial Internet platform enterprises to apply information technology products and services that meet the requirements of security and reliability.

(4) Improve the level of enterprise security protection capabilities

Focus on building four major capabilities: equipment and system security protection capabilities, network and application security protection capabilities, industrial data security protection capabilities, and enterprise information security monitoring and perception capabilities, and improve the level of enterprise network and information security assurance.

Consolidate the safety protection capabilities of equipment and systems. Establish a regular inspection mechanism to notify and supervise rectification of enterprises that do not meet information security requirements. Promote industrial enterprises to further implement the relevant requirements of the "Guidelines for the Security Protection of Industrial Control Systems", deploy targeted protection measures, strengthen the safe access and border security protection of industrial production, hosts, intelligent terminals and other equipment, and strengthen the security guarantee of control networks, devices and equipment, industrial software, etc. Encourage security enterprises to cooperate with equipment manufacturers and

automation system integrators to strengthen the application and promotion of industrial control system information security solutions.

Strengthen platform and network security protection capabilities. Jointly with the Provincial Communications Administration, establish a daily testing and evaluation system, clarify the standard requirements that should be implemented by the construction and operation units of industrial Internet platforms in the province, regularly conduct security testing and evaluation of industrial Internet platforms and industrial APPs, and take security as an important indicator for evaluating industrial Internet platforms and industrial APPs. Clarify the security standard requirements, security testing and evaluation requirements, and security facility deployment requirements of industrial enterprises and basic telecommunications enterprises in the province in the process of digital transformation and deployment of IPv6 and 5G application, ensure the security of "5G + industrial Internet", and improve the security protection capabilities of internal and external networks of enterprises. Clarify the information security protection capability requirements of the construction and operation unit of the identification resolution system to ensure the safe operation of the identification resolution system.

Column 7 Endogenous safety reengineering project of industrial Internet
Based on the integrity and security needs of China's information

technology industry chain, guided by the key core technologies and "bottleneck" technology research in the field of information technology, synchronously plan and design endogenous security mechanisms, strategies, interfaces, resources, etc. in the industrial Internet software and hardware system, and simultaneously promote the aggregation of industrial Internet information systems and security systems such as production equipment and control systems, and the aggregation of industrial Internet data and security data. Build and form adaptive security capabilities and independent security capabilities of industrial Internet systems.

Improve enterprise data security protection capabilities. Cooperate with the Provincial Communications Administration to organize and carry out important data security assessment and monitoring, establish a provincial industrial Internet data leakage trigger response mechanism, and promote the pilot work of industrial data classification and grading. Clarify the data security standards and data protection requirements that industrial enterprises and industrial Internet platform enterprises in the province should uniformly follow in data collection, storage, processing, migration and other activities, strengthen the protection of key sensitive data such as enterprise R&D and design, industrial production, operation and maintenance management and digital models, and deploy security protection measures such as anti-theft, anti-tampering and data backup in a

targeted manner.

Column 8 Industrial Data Security Assurance Project
Incorporate data life cycle security protection into the whole process of construction, operation and management of industrial Internet big data sub-centers. Establish a trigger response mechanism for major industrial data security events with "vertical linkage between provinces and cities, and horizontal coordination between departments", further promote the classification and grading of industrial data, take industrial data security as an important part of industrial information security situational awareness, and strengthen the security monitoring and protection of industrial data covering the entire industrial chain, the whole supply chain, and the whole life cycle covering all links such as demand analysis, R&D and design, manufacturing, and marketing services.

Improve the ability of enterprise information security monitoring and perception. Encourage and support key enterprises to build intensive information security situational awareness and comprehensive protection systems, through the collection of various data in industrial site networks and industrial Internet platforms, gather key data of industrial control systems and application systems such as SCADA, MES, ERP, etc., and carry out horizontal big data analysis and multi-dimensional correlation analysis based on the extraction, screening, classification, sorting and other processing of

key data, and timely detect abnormal states of networks and systems. Realize the overall perception of network operation laws, abnormal conditions, security status, major risks, etc. of industrial enterprises and industrial Internet enterprises.

(5) Improve the industrial information security service system

Improve the level of industrial information security services, carry out industrial information security testing and evaluation, expand the team of industrial information security service talents, strengthen industrial information security publicity and education, and create an industrial information security service system with "standardized service, outstanding capabilities, and timely response".

Improve the level of industrial information security services. Continue to promote the annual selection and identification of industrial information security service support institutions, and support support institutions to improve the service quality of diagnosis and evaluation, data protection, code inspection, system reinforcement, cloud protection, cryptographic application security assessment, and security consulting. Organize industrial enterprises, industrial Internet enterprises and security enterprises, basic telecommunications enterprises, Internet enterprises, system solution providers, etc. to connect their needs. Give full play to the role of a

network security public service platform, and continue to provide enterprises with vulnerability discovery, website protection, anti-denial of service attacks, domain name security and other services.

Carry out industrial information security testing and evaluation. Strengthen industrial information security testing and evaluation, support industrial information security evaluation institutions to improve industrial control systems, 5G+ industrial Internet, new infrastructure networks and information security testing and evaluation capabilities, compile industry industrial information security protection guidelines, and carry out security protection capability maturity assessments around the whole life cycle of industrial control systems and industrial Internet planning, design, construction, operation, and maintenance. Guide and urge enterprises in the province to do a good job in industrial information security protection.

Cultivate a team of industrial information security talents. Accelerate the implementation of industrial information security talent projects, and accelerate the training and introduction of a group of leading industrial information security talents. Establish a talent resource pool for industrial information security experts. Deepen the integration of industry and education, school-enterprise cooperation,

establish a joint training mechanism for safety talents, strengthen the construction of industrial Internet innovation practice platforms, and vigorously cultivate compound and innovative high-skilled talents. Give full play to the role of enterprises as the main force in the industrial information security guarantee system, implement the industrial information security officer system in key industrial enterprises and industrial Internet platform enterprises, and form a team of industrial information security officers who are directly positioned as the specific person in charge of industrial information security.

Strengthen publicity and education on industrial information security. Organize special activities on industrial information security during the network security publicity week, encourage relevant alliances and associations to carry out knowledge lectures, skills training and other publicity and education activities, and comprehensively popularize industrial information security knowledge and skills for enterprises. By organizing and carrying out major activities such as offensive and defensive drills and skill competitions, we will broaden the channels for discovering, cultivating and selecting industrial information security professionals.

Box 9 Industrial Information Security Talent Education and Training Project

In accordance with the principles of hierarchical management, classified implementation, full coverage, and highlighting key points, carry out planning and systematic education and training for all types of industrial information security talents. Implement the industrial information security engineer training plan, focusing on cultivating innovative, applied and compound industrial information security talents. Rely on scientific research institutes, colleges and universities and large enterprises to build a number of industrial Internet talent training bases. Support the establishment of national industrial information security comprehensive training bases and emergency training bases, and orderly promote the construction of industrial information security training and training bases in key industries.

Fourth, strengthen the guarantee of planning implementation

(1) Strengthen organizational coordination and consolidate safety responsibilities

Based on the strategic requirements of manufacturing power and network power, fully understand the importance of industrial information security, strengthen organizational leadership and overall planning, highlight the three-level linkage of "province-city-county (district)", the "inter-departmental" support interaction, and the tripartite coordination of "government departments-key enterprises-service institutions", strengthen the liaison and docking between departments, and increase supervision and evaluation. Establish a

team of industrial information security officers covering key industrial enterprises and industrial Internet platform enterprises, implement the "Cybersecurity Law of the People's Republic of China", "Cryptography Law of the People's Republic of China", "Data Security Law of the People's Republic of China" and other laws and regulations, consolidate the responsibilities of all parties involved in industrial information security security, and ensure the smooth implementation of the construction of the industrial information security system.

(2) Improve policy support and increase financial support

Give full play to the guiding role of government funds, and focus on supporting projects such as key core technologies (equipment) research on industrial information security, industrial information security infrastructure construction, industrial chain construction, major application demonstrations, excellent solutions, standard specification formulation and public service platform construction, and the cultivation of leading industrial information security backbone enterprises in the provincial special funds for the transformation and upgrading of industrial information security. Increase government procurement of services, innovate industrial information security investment and financing mechanisms, and

implement policies conducive to commercial operation and sustainable operation. Comprehensively use fiscal, tax, financial and other means and channels to promote the construction of demonstration bases and innovation bases in qualified industrial parks, and promote the agglomeration and development of the network security industry.

(3) Expand training channels and increase the supply of talents

Encourage universities, scientific research institutes and enterprises to cooperate to establish industrial Internet security talent training mechanisms and platforms, encourage enterprise technical experts to teach in colleges and universities, and students to enter enterprises for internship and practical training, and enrich the forms of talent training based on project cooperation and scientific research achievement transformation activities. Explore the establishment of personnel systems and salary systems suitable for the characteristics of the industrial information security industry, and gather more outstanding industrial information security talents. Build provincial-level industrial information security expert think tanks and teams, implement high-end talent training projects, and vigorously introduce a group of high-end compound and urgently needed industrial information security talents. Focusing on cyberspace security,

industrial control security, new technology applications and other fields, make full use of the resource advantages of universities and scientific research institutes in our province, support the creation of first-class colleges and first-level disciplines, accelerate the training of compound industrial information security talents, and increase the supply of network and information security talents.

(4) Gather resources from multiple sources and create a good environment

Give full play to the role of third-party institutions such as associations and alliances, support third-party institutions to use their own advantages to organize and carry out technology research and development, skills competitions, training publicity, standard promotion, public services, international cooperation, etc., strengthen communication between all parties, promote technical exchanges, and form a development environment for efficient linkage between government, industry, academia, research and application. Make full use of new media and other means to carry out publicity and guidance in various forms and channels, improve the awareness of industrial information security among enterprises, scientific research institutions, the public and other groups, and provide support for the smooth development of industrial information security work.

Jiangsu Province's "14th Five-Year Plan" big data industry development plan

The big data industry is an emerging industry based on data generation, collection, storage, processing, analysis, and service, and is a key support for activating the potential of data elements. Developing the big data industry and deepening the integration and application of big data is an important driving force for the digital era and driving the comprehensive digital transformation of the economy and society. During the "14th Five-Year Plan" period, it is necessary to seize development opportunities, concentrate advantageous resources to accelerate the development of big data in our province, promote the construction of digital economy, digital society and digital government, and drive the transformation of production methods, lifestyles and governance methods in our province as a whole with digital transformation. In order to promote the sustainable and healthy development of the big data industry and application in our province, according to the Ministry of Industry and Information Technology's "14th Five-Year Plan for the Development of Big Data Industry", "Jiangsu Province's 14th Five-Year Plan for National Economic and Social Development and Outline of Long-term Goals

for 2035", and "Jiangsu Province's 14th Five-Year Plan" "Digital Economy Development Plan", combined with the actual situation of our province, formulated this plan. The planning period is from 2021 to 2025.

1. Development foundation

During the "13th Five-Year Plan" period, our province fully implemented the State Council's "Action Outline for Promoting the Development of Big Data", the Ministry of Industry and Information Technology's "Big Data Industry Development Plan (2016-2020)" and other policy documents, and implemented policies such as the policy environment, institutional mechanisms, infrastructure, technological innovation, enterprise cultivation, carrier construction, integrated application, and Ecological construction and other directions continue to make efforts, and the big data industry has started rapidly and gradually grown. In 2020, the province's big data core business revenue exceeded 130 billion yuan, and the application empowerment achieved remarkable results.

The policy environment is becoming increasingly perfect. The provincial government issued the "Action Plan for the Development of Big Data in Jiangsu Province" (Su Zhengfa [2016] No. 113) to make comprehensive arrangements for the development

of big data in our province. The Provincial Department of Industry and Information Technology and the Big Data Development Office of the Provincial Informatization Leading Group jointly issued the "Jiangsu Province Special Action Plan for Strengthening Big Data Leadership and Promoting Integrated Development" (Su Jingxin Software [2018] No. 498) to implement the special action of "Digital Future" to promote the deep integration and development of the digital economy and the real economy. Relevant provincial departments and localities have issued more than 30 policy documents to promote the development of big data in their respective departments and regions.

The system and mechanism have been continuously optimized. Under the provincial leading group for informatization, a big data development office has been established to form a normalized collaborative working mechanism for 27 provincial departments to closely cooperate and jointly promote the development of big data in the province. Districts and cities have successively established big data management institutions. The Jiangsu Big Data Alliance has been established, and three special committees have been set up: industrial big data, health and medical big data, and government big data, with more than 200 member units.

The data infrastructure is strongly supported. The urban and rural optical fiber network has achieved full coverage, with 43.19 million fixed broadband subscribers, a fixed broadband household penetration rate of more than 150%, and an average access rate of 155.5Mbps. A total of 71,000 5G base stations have been built, basically achieving full coverage of major urban areas and central towns in cities and counties. Large-scale and ultra-large data center projects have been steadily advancing, and the number of standard racks of data centers in use in the province[1] has reached 350,000. The national top node of the industrial Internet (Nanjing disaster recovery node) was launched, and a total of 14 secondary nodes of industrial Internet identification analysis were built, with 620 million logo registrations and more than 2,600 access enterprises.

The industrial energy level continues to improve. It has formed a relatively complete big data industry chain, with representative enterprises and products at all levels of the industrial chain such as infrastructure layer, data resource layer, general software layer, industry application layer, and security layer. During the "13th Five-Year Plan" period, 52 software enterprise technology centers in the direction of cloud computing and big data, 36 "digital future" integration and innovation centers in Jiangsu Province were

[1] Standard rack: A single rack with a power of 2.5KW is a standard rack.

cultivated, and 26 key core technology research in the field of big data was organized and implemented. A total of 16 companies have been shortlisted for the top 100 Internet enterprises, 7 companies have been shortlisted for the top 20 Internet growth enterprises in China, and the number of growth enterprises shortlisted in 2020 ranks first in the country.

The construction of the park has achieved remarkable results. Cultivate 10 provincial-level big data industrial parks. Nantong International Data Center Industrial Park and Kunshan Huaqiao Economic Development Zone have been recognized as national new industrialization industry demonstration bases (data centers). Cultivate 3 Jiangsu Province Industrial Big Data Application Demonstration Zones and 5 Jiangsu Province Regional Big Data Open Sharing and Application Pilot Zones. Accelerate the transformation of provincial Internet industrial parks to specialized, platform-based, and service-oriented, cultivate 17 Internet industrial parks and 43 Internet maker parks, and promote the integration and innovation of big data and the Internet.

The integration and application continue to deepen. Big data applications have penetrated into nearly 20 fields such as industry, government affairs, finance, transportation, health, and cultural tourism. During the 13th Five-Year Plan period, a total of 166

provincial-level big data application projects were selected, of which 34 projects were selected as pilot demonstration projects (excellent cases) for the development of big data industry by the Ministry of Industry and Information Technology. Implement the "Internet Big Data Enterprise Transformation and Upgrading Plan", cultivate "Tengyun Driving" excellent products, and integrate more than 300 innovative cases.

Strong industrial support guarantee. It took the lead in setting up a provincial software and information technology service standardization technical committee in the country, and set up a working group on cloud computing, big data, and blockchain. Led the formulation of "Information Technology, Big Data, Core Metadata of Industrial Products" (GB/T 38555-2020) was approved as a national standard, filling the gap in national standards in this field. In the first batch of industrial data classification and grading pilots and data management capability maturity assessment pilots in the country, 4 enterprises were selected into the excellent case collection of industrial data classification and grading pilots of the Ministry of Industry and Information Technology, and 15 enterprises participated in the data management capability maturity assessment. 69 colleges and universities have been approved by the Ministry of Education to set up big data-related majors, ranking second in the country.

The development of big data in our province still faces many challenges. **First, the foundation for industrial development is not solid enough.** The opening of public data in our province is insufficient, the scale of openness is small, the quality is not high, and the exploration of enterprise data sharing and opening has just begun, which cannot provide high-quality basic resources for industrial development. **Second, the core competitiveness is not strong.** Big data enterprises in our province are small in scale, low in popularity, and lack of leading platform enterprises with ecological construction capabilities. The general underlying technology reserves of big data are insufficient, and the innovation ability of business models is weak. Government departments take the initiative to open up application scenarios and release applications to enterprises in the province, and there are few opportunities for enterprises in the province to take on major projects, making it difficult to form a competitive first-mover advantage. **Third, the talent structure needs to be optimized.** Industrial talents are facing the development bottleneck of "not being able to recruit and retain". There is a serious shortage of leading talents and high-end compound talents in the field of big data, and there is a large gap in practical talents such as data cleaning and platform maintenance. **Fourth, the traction role of the digital**

economy needs to be strengthened urgently. Traditional enterprises are not sensitive to new technologies and models, and the active use of new generation information technologies such as "digital intelligence cloud network chain" to achieve transformation and upgrading is insufficient. The conservative investment concept of institutions in the province and the inactive investment and financing of digital industry development have restricted the rapid growth of big data enterprises to a certain extent.

2. Facing the situation

The "14th Five-Year Plan" period is the first five years after China has built a moderately prosperous society in an all-round way and achieved the first centenary goal, and has taken advantage of the momentum to start a new journey of building a modern socialist country in an all-round way. Accelerating digital development and building a digital China has become an important national strategic deployment. The new round of scientific and technological revolution has entered a new stage of extensive empowerment by digital technology, industrial interconnection upgrading and reconstruction, and intelligent driving acceleration, driving the development of big data into a period of deep change of large-scale data agglomeration, technological collective breakthroughs, and model chain innovation.

The value of data elements continues to be highlighted, stimulating the potential of data elements, and promoting the realization of the value of data elements is an important direction for the development of big data.

Data has become an important factor of production for the development of the digital economy. Data has become a basic strategic resource and core production factor in the digital economy era, and it is of great significance to promote the quality, efficiency and power change of economic development. **Big data technology has become a key technology in a new round of scientific and technological revolution.** After the development of the "13th Five-Year Plan", the big data technology system has been continuously improved, and the core technologies around data collection, storage, processing, analysis, application and other links have become increasingly mature, and a new generation of information technologies such as cloud computing, 5G, Internet of Things, artificial intelligence, and blockchain have been widely connected, giving birth to deeper integration, integration and innovation. **The development of big data has become a practical need to build a new development pattern.** Accelerating the development of big data, leading the flow of technology, material, capital and talent with data

flow, and opening up all links of production, distribution, circulation and consumption, will help to realize the smooth circulation of economic circulation and industrial correlations, and serve to build a new development pattern with the domestic cycle as the main body and the domestic and international dual cycles promoting each other. **Big data has become an effective way to modernize the national governance system and governance capacity.** The application of big data runs through all aspects of the government governance system such as decision-making, implementation, evaluation, and monitoring, optimizing the governance model and improving the governance effect. The "14th Five-Year Plan" period is a critical period for Jiangsu to move from a high-level and all-round construction of a moderately prosperous society to a new journey of basic realization of socialist modernization, and it is also a key stage in building a "strong, rich, beautiful and high" new Jiangsu. Fulfill the major mission of "striving to be a demonstration, striving to set an example, and walking in the forefront".

3. General requirements

(1) Guiding ideology

Guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, thoroughly implement the spirit of the

19th National Congress of the Communist Party of China and the 2nd, 3rd, 4th and 5th Plenary Sessions of the 19th Central Committee, with the theme of promoting high-quality development and releasing the value of data elements as the main line, focus on consolidating data infrastructure, cultivating the data element market, enriching big data technology products, deepening the integration and application of big data, strengthening big data security guarantees, and creating a solid foundation, rich resources, active innovation, and prosperous applications. Governing an orderly big data development ecology will provide strong support for building a digital economy with data as the key factor of production and building a "strong, rich, beautiful and high" new Jiangsu.

(2) Basic principles

Value leading. Facing the digital era, strengthen data governance, enhance the value of data resources, accelerate the productization of data, and enhance the endogenous driving force of industrial development. Promote the orderly circulation and efficient allocation of data elements, give full play to the multiplier effect of big data, drive the improvement of all-factor production efficiency with data, and realize the recreation of data value.

Innovation-driven. Deeply implement the innovation-driven

development strategy, fight the battle of upgrading the industrial base and modernizing the industrial chain, take the promotion of key technological innovation of big data as a breakthrough, accelerate the integration and innovation of big data and the new generation of information technology, and create an independent and controllable big data industry system.

Application traction. Based on the needs of comprehensive digital transformation, explore application scenarios and deepen integrated applications. Focusing on advantageous areas and key directions, steadily promote the orderly opening of public data and the integration and application of government and enterprise data, and promote big data applications to a wider scope, deeper level, and higher level.

Safe and orderly. Adhere to the principle of ensuring development through safety and promoting safety through development, promote the implementation of laws and regulations, improve standards and market rules, establish a multi-party participation and clear security protection system, promote the orderly development and rational use of big data, and comprehensively improve the sustainability and stability of development.

(3) Development goals

By 2025, a new pattern of big data development will be basically formed, with strong data infrastructure support, significantly improved data governance capabilities, standardized and orderly circulation of data elements, increasingly active technology and product innovation, and deepening integration and application. Promote Jiangsu to become an advanced computing power support area that actively integrates into the Yangtze River Delta, faces the whole country, and has international competitiveness in advantageous and characteristic fields, a pilot area for efficient allocation of data elements, a big data industry innovation and development zone, and a big data integration and application demonstration area.

Strong infrastructure support. High-speed ubiquitous network infrastructure and green and efficient computing power infrastructure have been continuously improved. By 2025, there will be 255,000 5G base stations, achieving full coverage of cities and towns. An all-optical broadband network has been built, and the bandwidth of the backbone network has reached 100T. The total scale of standard racks of data centers in use in the province has reached 700,000, and the proportion of new data centers such as intelligent computing centers, cloud data centers, edge data centers, and industry data centers has steadily increased. The level of intensive, green and intelligent data

centers has been greatly improved, and the design power utilization efficiency (PUE) of new large and ultra-large data centers is less than 1.3. Create no less than 10 national green data centers and cultivate 4 provincial data center industry demonstration bases.

Efficient allocation of data elements. The awareness and ability of data governance of various entities have been significantly enhanced, the level of market-oriented allocation of data elements has been greatly improved, the relevant standards and specifications, products and services of the data element market have been gradually improved, and new formats such as data cleaning, labeling, evaluation, and pricing have gradually emerged. By 2025, more than 200 companies will participate in the "Data Management Capability Maturity Assessment Model" (hereinafter referred to as DCMM), cultivate 2-3 data resource circulation and trading institutions, basically complete the public data resource aggregation, management, circulation, and open system, and build a number of public data resource aggregation platforms. A multi-party data integration platform for government and enterprises.

The level of industrial development has jumped. By 2025, the revenue of big data core business will exceed 250 billion yuan. Create a number of big data products with core competitiveness, independent

and controllable in the direction of data collection and labeling, storage management, analysis and mining, and security assurance. Cultivate 3-5 leading big data enterprises with a certain ecological dominance in China, 50 big data characteristic enterprises that are deeply involved in industry applications, and create a number of professional big data service platforms. Cultivate no less than 10 provincial-level industrial big data application demonstration zones and 5 provincial-level regional big data open-sharing and application pilot zones to form an influential big data industry cluster in China.

The integration and application have achieved remarkable results. The deep integration of big data and economic and social development has further highlighted the role of empowerment and intelligence. By 2025, no less than 200 big data industry development demonstration projects with outstanding innovation, wide range of applications, new business models, and great promotion value will be cultivated in industry, government affairs, finance and other characteristic directions, and a number of influential pilot projects will be formed in the integration of government and enterprise data and cross-industry integration.

4. Main tasks

(1) Optimize the layout and improve capabilities, and

consolidate data infrastructure

Improve network facility capabilities. Accelerate the construction of 5G networks, promote the full coverage of 5G independent networking in the province, and promote virtual private networks in the 5G industry. Optimize the structure of backbone networks, metropolitan area networks, and access networks, accelerate the large-scale deployment of 10G PON networks and IPv6, and improve the overall network capacity and comprehensive service carrying capacity. Promote the extension of all-optical network access to the user side, and achieve full coverage of fiber optic gigabit home and 10,000-gigabit commercial building access capabilities. Combined with the digital transformation of urban infrastructure and the needs of intelligent development of the industry, promote the planning and layout of the Internet of Things such as intelligent pipe networks, smart grids, and Internet of Vehicles, and promote the efficient collection and transmission of global data. Transform and upgrade the internal and external networks of the industrial Internet, smooth industrial data transmission channels, improve the secure and controllable industrial Internet identification and resolution system, and realize the intelligent association of different masters, different places and heterogeneous industrial data.

Optimize data center layout. Guided by market demand, strengthen overall planning, combine the development foundation and positioning of various regions, and comprehensively consider the current construction scale, utilization rate, energy consumption level, etc., to create a development layout system of "dual-core, three zones and four bases" of data centers in the province (i.e., 2 computing power resource scheduling cores, 3 computing power support areas, and 4 provincial-level data center industry demonstration bases), forming a data center development pattern that adapts to supply and demand, is moderately advanced, and is developed by agglomeration. Accelerate the construction of high-performance computing infrastructure such as supercomputing centers and artificial intelligence computing centers, and improve the storage and computing capacity of massive data. Strengthen the overall intelligent scheduling of computing power, promote the serviceization of computing power resources, actively promote the direct connection of data centers between major cities in the Yangtze River Delta, and jointly build a national hub node in the Yangtze River Delta for the collaborative innovation system of national integrated big data centers. Actively lay out edge data centers, promote the evolution of data centers from "cloud + end" centralized architecture to "cloud + edge

+ end" distributed architecture, and focus on application scenarios with large data volume and high real-time requirements. Prioritize the deployment of edge data centers. Accelerate the construction of big data centers for industry, finance, medical and health industries, and improve industry application support capabilities. Strive to create a national demonstration base for new industrialization industry (data center).

Improve data center efficiency. Promote data-network collaboration, promote the effective docking of data center data interaction needs and network supply, and optimize data center interconnection capabilities. Accelerate the green development of data centers, guide data centers to apply green energy-saving technologies and products such as liquid cooling, hyper-convergence, and intelligent lossless networks, and actively create national green data centers. Promote the upgrading and transformation of low-efficiency data centers in an orderly manner, and eliminate some "old and scattered" data centers with low utilization rate and no conditions for transformation. Encourage the use of prefabricated construction models, improve the large-scale, rapid and efficient deployment capabilities of data centers, strengthen the application of big data and artificial intelligence in data center construction, operation and

maintenance, and improve the intelligent level of data centers.

Column 1 Data infrastructure upgrade project
Promote the construction of gigabit optical fiber networks. Improve end-to-end network capabilities and user experience, popularize 10G PON access devices, and gradually evolve to 50G PON and higher rates. By the end of 2025, the bandwidth of the backbone network will reach 100T. The coverage rate of optical network in urban households is 100%, and the coverage rate of household optical network in administrative villages is 95%. **Accelerate the large-scale deployment of 5G networks.** Priority will be given to the construction of 5G networks in key industrial development areas such as urban areas of districted cities, development zones at or above the provincial level, and high-tech zones, and accelerate the construction of virtual private networks in the 5G industry. Support basic telecommunications enterprises to accelerate the construction of 5G independent networking networks. By 2025, the province will build 255,000 5G base stations to achieve in-depth coverage of 5G networks. **Build super-large and large-scale data centers.** Promote the construction of super-large and large-scale data centers such as Alibaba Jiangsu Cloud Computing Center, Tencent East China Cloud Computing Base, Tencent Yizheng Dongsheng Cloud Computing Data Center, JD Cloud East China Data Center Phase II, Mobile Yangtze River Delta 5G Data Center, and Telecom Tianyi Data Center, and create a data center industry development cluster.

Layout of new data centers. Moderately advance the layout of intelligent computing power centers in Nanjing, Wuxi, Suzhou and other places, and promote the construction of China (Nanjing) Zhigu Artificial Intelligence Computing Power Data Center, Nanjing Advanced Computing Center, Nanjing Jiangbei Ascend Artificial Intelligence Computing Center and other projects. Deploy a number of edge data centers on demand in key application scenarios such as the Internet of Vehicles. Promote the construction of industry big data center projects such as the province's government integration big data center, the Jiangsu branch of the National Industrial Internet Big Data Center, and the National Health and Medical Big Data (Eastern) Center.

Carry out data center operation monitoring. Rely on the online monitoring system of energy consumption of key energy users in the province, build a data center monitoring platform, and organize data center operation monitoring.

(2) Strengthen governance to promote coordination and cultivate the data element market

Improve the public data governance system. Improve the public data governance system and norms. Continue to promote the construction of five basic databases, including the population comprehensive database, the legal person comprehensive database, the electronic license database, the credit information database, and the

natural resources and spatial geographic information database. Accelerate the convergence of data resources in key areas such as education, medical care, and transportation, and build a number of thematic databases. Improve the list of departmental data sharing responsibilities, expand the scope of public data resource sharing, promote cross-level, cross-regional, cross-departmental, and cross-business data aggregation and sharing collaboration, and promote the compliance and opening of public data in an orderly manner. Promote the localized return of provincial and ministerial business system data.

Improve enterprise data governance capabilities. Guide enterprises to establish sound data governance organizational mechanisms, management systems, and technical capabilities. Promote capacity building in enterprise data model design, data application technology and capabilities, data security policies and controls, and data quality management throughout the process. Carry out the implementation of DCMM national standards, guide enterprises to actively participate in DCMM evaluation, and select and publicize a number of excellent enterprise data governance cases. Comprehensively promote the enterprise chief data officer (CDO) system, encourage leading backbone enterprises to improve their data governance capabilities in all fields, plan top-level data strategies, set up

special data governance departments, actively participate in the construction of industry data standard systems, and improve the level of industry data standardization. Encourage small and medium-sized enterprises to gradually promote data governance capacity building based on their own business characteristics and digital construction projects, and gradually form departmental and company-level data governance systems and technical means.

Promote collaborative innovation of government and enterprise data. Promote the application of multi-source data integration and collaborative innovation pilots for governments and enterprises. Establish a cooperation mechanism for government and enterprise data docking, clarify the rights and responsibilities of both parties, and explore and formulate relevant systems and specifications for the sharing and application of government and enterprise data. Guide enterprises and governments to jointly build data security sharing and development service platforms and security sandboxes, and encourage pilot applications of government and enterprise data integration based on specific scenarios.

Column 2 Data governance capacity improvement project
Promote the implementation of DCMM evaluation standards. Guide enterprises and institutions to participate in the DCMM evaluation, and by

2025, strive to achieve no less than 200 companies participating in the evaluation, and 100 companies will reach the level 3 (robust level) standard for data management capabilities. A number of excellent data management cases have been formed in key areas such as communications, manufacturing, energy, and finance.

Promote data quality assessment. Use data quality management tools or platforms to test the quality of data throughout the life cycle around dimensions such as standardization, completeness, accuracy, consistency, timeliness, and accessibility, and help improve data quality.

Vigorously cultivate the data element market. Promote enterprises, universities, and scientific research institutes in the province to carry out data value research such as data rights confirmation, data quality assessment, and data asset pricing, and establish and improve data circulation and transaction standards and specifications. Innovate data service models, strengthen the supply of data services such as data cleaning, data annotation, and data processing, encourage emerging service formats such as data banks, data trusts, and data intermediaries, and cultivate data trading institutions with data asset registration and data transaction circulation as their main business. Encourage qualified regions to carry out data trading pilots and actively participate in the pilot demonstration of national market-oriented allocation reform of data elements.

Column 3 Data element market cultivation project

Formulate data circulation standards and specifications. Encourage enterprises in the province to actively participate in the development of key standards in the fields of data resource property rights, transaction circulation, and security guarantees. Build a big data standardized compliance evaluation system, explore the construction of a big data standard test verification and compliance evaluation platform, and improve the test verification and compliance evaluation capabilities for data open sharing and data asset evaluation. Explore and participate in the formulation of laws and regulations on the value of data elements.

Cultivate new businesses in the data industry. Rely on Yancheng, Suqian and other places to develop data service industries such as data annotation and cleaning. Accelerate the technological innovation of data annotation, promote the iterative upgrading of data annotation from pure manual annotation to "machine + manual" annotation and machine intelligent annotation, and build a high, medium, and low-level data annotation industry.

Carry out data trading pilots. Promote the construction of data trading institutions in Nanjing, Wuxi, Suzhou, Yancheng and other places, explore data trading mechanisms and data trading models, and develop supporting services such as data asset evaluation and big data credit investigation. Gradually establish mechanisms such as data ownership determination, value assessment, resource exchange, benefit sharing, and dispute negotiation, strengthen risk prevention and control, and ensure the healthy and orderly development of the data trading market.

Promote the open sharing of public data resources. Promote the pilot development and utilization of public data resources, and issue the "Measures for the Management of Public Data in Jiangsu Province". Further improve the province's integrated big data sharing and exchange platform and improve data service capabilities. Promote the construction of the province's public data open platform system, and promote the pilot of public data opening and government data authorization operation in the Yangtze River Delta region. Hold big data development and application competitions, strengthen the application and transformation of competition results, promote departments and society to open data samples, mobilize social forces, propose algorithms and creative applications, and release data value.

Pilot industrial data space construction. Promote the province's leading enterprises to strengthen cooperation with upstream and downstream enterprises and third-party institutions in the industrial chain, form strategic partnerships around data cooperation and sharing, establish a mutually beneficial and win-win sharing mechanism, realize the efficient allocation of data resources, and create 2-3 safe and credible industrial data spaces in key areas such as construction machinery and electric power.

(3) Concentrate on innovation to optimize supply and forge the core capabilities of the industry

Strengthen key technological innovation. Consolidate the basic technology of big data, and strengthen technical research such as high-performance data collection, high-capacity storage, massive

data processing, heterogeneous data management, and data visualization. Focus on improving big data platform technologies such as processing computing, resource scheduling, and access control, as well as big data application technologies such as data mining analysis and data modeling. Accelerate the integration of technologies in cutting-edge fields, and promote the integration and innovation of big data and next-generation mobile communication technology, artificial intelligence, blockchain, immersive technology (AR/VR/MR), brain-like computing, edge computing, and other technologies.

Improve the big data product system. With application as the traction, strengthen the transformation of technological innovation achievements, enrich the supply of software and hardware integrated big data products, and build a complete big data product system. Focusing on the general underlying technology of data, support the research and development and application of basic products such as data centers, data lakes, and distributed databases. Focusing on the whole life cycle management of data, promote the research and development and application of products such as data collection, data cleaning, and unstructured data management. Focusing on data security and circulation, we will focus on promoting the research and

development and application of products such as data desensitization, multi-party secure computing, federated learning, homomorphic encryption, and trusted execution environment. Focusing on the empowerment of the big data industry, promote the research and development of big data development tools and platforms that meet the needs of the industry, and combine industry knowledge to form industry big data algorithms and models.

Improve the quality of big data services. Focusing on the needs of digital economy, digital government, and digital society construction, improve the comprehensive service capabilities of the whole life cycle of big data projects, increase the supply of overall solutions and customized solutions, and accelerate the development of big data services to specialization, engineering, and platformization. Promote the innovation of big data service models and formats, develop new service models such as intelligent services, value network collaboration, and integration of development and operation, and explore new formats such as value-added development of data derivatives and data asset evaluation.

Improve the modernization level of the industrial chain. Give full play to the advantages of the system of provincial leaders linking the industrial chain, improve the work promotion mechanism of the

"big data + industrial chain" special class, and strengthen departmental linkage and provincial and municipal coordination. Promote the warehousing of big data enterprises and compile a list of long and short boards of the industrial chain. In view of the missing links in the industrial chain, carry out precise investment promotion, introduce key projects and accelerate the implementation. In view of the weak links of the industrial chain such as data storage, processing, and modeling, we will take key big data projects as the traction to solve the outstanding problems restricting industrial development, concentrate capital, technology, talents and other resources, encourage enterprises to cooperate, strengthen the chain, and work together to enhance the overall competitive advantage of the industrial chain.

Column 4 Big Data Innovation Capability Leap Project
Carry out research on key technologies of big data. Promote the research of big data basic technology and breakthroughs in industrial shortcomings, encourage scientific research institutes and enterprises to take the lead or participate in the implementation of various national and provincial science and technology plans, and organize the implementation of a number of forward-looking industrial technology research projects and key core technology research projects. **Create a high-level innovation platform.** Promote the construction of industrial innovation centers, enterprise technology centers and other

innovation carriers in the field of big data. By 2025, no less than 20 provincial software enterprise technology centers in the direction of cloud computing and big data will be added. Encourage all parties involved in industry, academia, research and application to cooperate in building integrated innovation centers around new technologies, new products, new formats, new models, and new standards, and cultivate no less than 15 "digital future" integrated innovation centers in Jiangsu Province.

(4) Improve the energy level and strengthen support to prosper the industrial development ecology

Cultivate and expand the famous brands of famous enterprises. Strengthen the tracking service of big data enterprises and implement policies by category. Encourage leading big data backbone enterprises to benchmark against international and domestic first-class, improve core technology level and product competitiveness, give full play to their demonstration and leading role, actively participate in well-known open source projects at home and abroad, gradually improve from participants to contributors and leaders, strengthen the ability to build industrial ecology, build brands, and enhance brand influence. Promote the accelerated growth of big data unicorn enterprises, coordinate and dock the resources required for development, strengthen policies, funds and technical support, and make full use of the capital market to become bigger and stronger.

Encourage big data small, medium and micro enterprises and start-ups to give full play to their characteristic advantages, develop in the direction of specialization, refinement, and innovation, strengthen cooperation with large enterprises through professional division of labor and service outsourcing, promote the integrated development of large and medium-sized enterprises, and collaborative innovation in the upstream and downstream of the industrial chain. Support qualified enterprises to carry out big data business divestiture and restructuring, and improve specialized, large-scale and market-oriented service capabilities.

Column 5 Big data industry entities strengthening projects
Cultivate big data brand enterprises. Establish a "digital intelligence cloud network chain" enterprise database, sort out the list of key big data enterprises and brand products, focus on monitoring enterprises with strong innovation, good growth and distinctive characteristics, and provide detailed support for "one enterprise, one policy". In the fields of intelligent manufacturing and digital consumption, we will build a number of platform-based enterprises with ecological construction capabilities. **Coordinated development of small and medium-sized enterprises.** Strengthen the resource docking and support of unicorn enterprises and provide tracking services. Relying on platforms such as the "iChuang Cup" Internet Innovation and Entrepreneurship Competition and the Jiangsu Big

Data Development and Application Competition, we will deepen the integration of competition and industry, tap a group of innovative and entrepreneurial talents and teams in the field of big data, and cultivate a number of big data start-ups.

Promote the development of industrial clusters. Optimize the spatial layout of the industry, build an industrial innovation and development highland with Nanjing, Wuxi and Suzhou as the core, focus on cultivating a number of industrial parks with strong innovation ability and high agglomeration, and give full play to the leading and radiation role. Build an application base auxiliary to central Jiangsu and northern Jiangsu, focus on cultivating a number of application demonstration parks with distinctive characteristics and remarkable integration and application results, and form an overall layout of complementary advantages in industrial chain resources, mutual promotion of production and use integration, and multi-level differentiated development of various carriers. Encourage qualified parks to set up "parks within parks" and lay out big data-related industries such as blockchain and artificial intelligence. Promote various parks to take the lead in industrial agglomeration, technical research, industry application, talent training, institutional innovation, etc., and encourage qualified regions to strive for national new

industrialization industry demonstration bases in the direction of big data.

Optimize the development environment of big data. Build a big data industry operation monitoring system, strengthen operation analysis, trend research and judgment, and scientific decision-making capabilities, establish expert think tanks in the field of big data, and support industrial development trend research and policy formulation. Promote the construction of big data standard system, give full play to the role of the Provincial Software and Information Service Industry Technical Standards Committee, support and encourage enterprises in the province to actively participate in the development of standards such as data products, data governance, circulation transactions, and data security, and actively promote the localization of big data standards. Improve the level of industrial public services, promote the construction of a number of integrated public service platforms for the big data industry that provide common technical support, data element supply, product testing and certification services, focus on building a public data training platform, and form no less than 1,000 sets of industry data training sets. Give full play to the role of the Jiangsu Big Data Alliance and its special committees, regularly release the map of Jiangsu's big data industry, hold summit

forums, technology salons and sharing meetings, integrate the forces of industry, academia, research and use, promote the opening up of advantageous resources, and build industry consensus.

Column 6 Big Data Industry Ecological Optimization Project
Cultivation of industrial carriers. Focusing on the data center agglomeration area, develop upstream and downstream supporting industries such as data center design and planning, data analysis, operation and maintenance, etc., and build four provincial-level data center industry demonstration bases. Continue to carry out the evaluation of industrial big data application capabilities, and cultivate no less than 10 provincial-level industrial big data application demonstration zones with high industrial agglomeration, good digital foundation, strong willingness to upgrade and transformation, and large demonstration and driving role. Carry out regional big data openness, sharing and application capacity assessment, encourage local governments to strengthen data supply, improve data management levels, promote orderly data flow through innovative systems and mechanisms, and cultivate no less than 5 provincial-level big data open, sharing and application pilot zones.

(5) Deepen the integration of mining scenarios and stimulate the release of data value

Promote the application of big data for collaborative governance. Data innovation and application innovation force

concept innovation and management innovation to drive scientific macro decision-making, accurate social governance, and efficient people's livelihood services. **Big data for government services:** Strengthen the data thinking of government departments, establish data decision-making mechanisms, and improve scientific decision-making capabilities. Focus on the difficult and pain points in the field of social governance, promote business collaboration and process reengineering, and improve the ability of refined social management. Deepen the application of data resources in the reform of "decentralization, management and service", realize "more data and less errands for the masses", and promote the improvement of government services from "one network to one network". Expand the scope of audit big data application and continuously improve audit quality and efficiency. **Public security big data:** Promote the digital transformation of public security work and create a new engine for Jiangsu's modern police system. Continue to improve police cloud computing and network support capabilities, deeply integrate and correlate data resources inside and outside public security, connect data resources into a "network" through governance services, vigorously carry out the construction of Xueliang technical defense, and improve the level of wisdom empowerment. **Ecological and**

environmental big data: Strengthen the convergence, integration and governance of the whole province, the whole network and all ecological and environmental data resources, build a "1+13" ecological environment big data center system, and unify the ecological environment command and dispatch system shared by provinces, cities, counties and townships, and form a joint force for the province's ecological environment linkage command and dispatch work. Use modern "off-site" monitoring technology and three-dimensional integrated communication technology to promote the transformation of ecological environment monitoring and perception networks. Strengthen the construction and application of Jiangsu's "environmental protection face" system, and continuously improve the service level of convenience and enterprises and the transparency of social supervision. **Market supervision big data:** build market supervision panoramic view analysis and display, regional quality development level analysis and decision-making, market supervision risk comprehensive analysis and early warning, enterprise holographic portrait analysis, business environment analysis and decision-making, credit risk early warning, food safety analysis and decision-making, special equipment safety risk early warning and other application systemsExplore the construction of a new pattern of

smart supervision based on big data. **Civil affairs big data:** Strengthen the construction of the province's civil affairs big data resource system, build a full-field and full-life cycle database covering natural persons, families, village (neighborhood) committees, social organizations, and civil affairs service institutions, and promote assistanceThe development and utilization of data resources such as marriage, children, pension, and funeral, improve the active discovery mechanism based on big data, build a smart brain for civil affairs decision-making, and form an open, diversified and integrated intelligent civil affairs data ecology.

Promote the in-depth empowerment of big data in the industry. Support the construction of industry big data platforms for key areas such as industry, agriculture, health, transportation, finance, and commerce, improve industry situational awareness, industrial collaboration, and accurate decision-making capabilities, and encourage industry big data platforms to open up basic resources such as platform data, computing power, and development environment, drive the improvement of industry data acquisition, analysis and application capabilities, and reduce the cost of innovation and entrepreneurship. **Industrial big data:** promote the digital transformation of industrial enterprises, promote the interconnection

and protocol conversion of multi-source heterogeneous data in all links of human, machine and objects, promote the collection, aggregation and analysis of data in industrial product research and development, manufacturing, operation and maintenance management, sales and operation, and deepen the application of industrial Internet identification analysis data. Expand industrial big data application scenarios such as economic forecasting and risk control, demand analysis and independent design, personalized customization and flexible production, equipment health management and remote operation and maintenance, stimulate new industrial changes, and promote the transformation of the industrial economy to a data-driven development model. **Agricultural and rural big data:** Guided by promoting the efficient application of agricultural data, deepen the application and exploration of big data in the fields of planting, animal husbandry, fishery, agricultural mechanization, rural resource management, and rural development, improve service capabilities such as monitoring, analysis, and early warning, and promote the refinement, intelligence, and intensification of agricultural and rural production, operation, management and services. **Traffic big data:** Develop applications such as traffic network analysis, real-time travel plan selection, intelligent assisted driving,

and self-service transportation services based on big data. Promote big data to support comprehensive three-dimensional network planning in the transportation field, strengthen the monitoring and management of safety production risks in key areas such as ports and shipping, roads and bridges, and improve the monitoring and scheduling capabilities of road network traffic operation. Develop new models and formats of "Internet + freight" such as road freight, vehicle-cargo matching, and intelligent shipping. **Education big data:** Establish an education big data analysis model to support applications such as sunshine enrollment, self-service teaching, safety prevention and control, comprehensive student evaluation, early warning of education hotspots, and teaching evaluation and monitoring. Promote the deepening of cooperation between big data enterprises and educational institutions, carry out classroom teaching based on online intelligent environments, expand the coverage of high-quality educational resources, and build a "networked, digital, personalized, intelligent, and lifelong" education system. **Medical big data:** Strengthen data aggregation and governance in the medical and health system, actively promote the classification, opening and sharing of health and medical big data, gradually realize the integration of data in the fields of population, medical care, medical insurance, medicine

and public health, and improve the capabilities of artificial intelligence-assisted diagnosis, health management, pharmaceutical research and development, and normalized monitoring and early warning of epidemics. **Financial big data:** Promote financial innovation in an orderly manner under the premise of prudential supervision, encourage financial institutions to use big data to improve dynamic decision-making efficiency, promote the construction of financial risk control models, help customer portrait analysis, financial risk monitoring, prevent and resolve financial risks, and achieve early identification, early warning, and early disposal of risks. Improve the regulatory data collection mechanism, strengthen the application of regulatory technology, explore inclusive, prudent, and flexible financial technology innovation regulatory tools, and enhance the professionalism, unity, and penetration of financial supervision. **Cultural tourism big data:** Develop the platform economy of the cultural industry and accelerate the digital transformation and upgrading of offline formats of traditional cultural industries. Improve the tourism integrated public service system of "facilities, information, services and transportation". Integrate tourism industry data such as tourism authorities, catering and accommodation enterprises, scenic spots, and tourist consultation,

connect transportation, meteorology, and telecommunications data, and provide various services such as virtual tourism. **E-commerce big data:** Promote the integration of data in the e-commerce industry, open up data between e-commerce and logistics enterprises, and provide "one-stop" services. E-commerce enterprises are encouraged to use big data to carry out applications such as order prediction, product recommendation, customer portrait and classification, delivery channel analysis, and shopping habit analysis. **Communication big data:** Gather basic data resources such as 5G, industrial Internet, and Internet of Things to form a "1+1+N" construction and application model. Improve the comprehensive service capabilities of communication big data, and promote the integration of communication big data with health, transportation, meteorology, cultural tourism and other industries. Strengthen the source governance of telecommunications network fraud and improve the ability to supervise APP security. **Geospatial big data:** Accelerate the construction of 3D geospatial large databases of natural resources and basic geographic realities, and improve national service platforms for geospatial information such as "sky map" and "spatio-temporal information cloud". Expand the field and mode of "geospatial information + industry application services", and explore new

applications and new formats such as virtual tourism and autonomous driving navigation supported by real-life 3D geospatial data.

Accelerate cross-industry data integration and innovation. Priority will be given to cross-industry and cross-field data fusion application pilots in fields with good digital foundations such as communications, the Internet, finance, and energy, and promote the comprehensive application of big data. Promote industry authorities and leading enterprises to build multi-party data fusion application innovation platforms, and explore collaborative data mining between industries through multi-party secure computing, federated learning, and other technical means to achieve data value enhancement and recreation.

Explore new formats and models of big data. Give full play to the multiplier role and multiplier effect of data as a key factor of production, and cultivate new formats and models in application fields such as digital trade, online and offline integration, and digital twins. Strengthen the application of big data technology in the field of service trade, encourage the integration of digital trade and the real economy, and improve the digital trade market system. Vigorously develop the "online +" model, accelerate the integration and application of the same offline entity, and improve the seamless user

experience between online and offline. Promote multi-scenario applications based on digital twin technology, integrate and gather data such as geographic space, building sites, character actions, and time lines, and build multi-domain digital application models.

Column 7 Big Data Integration Application Demonstration Project
Government service big data application project. Unified construction of the general entrance of Jiangsu government affairs "Sufu Office", hierarchical integration of various applications, construction and promotion of "Sufu Code", association of basic information and electronic licenses and other relevant data, to achieve one person, one code, one enterprise, one code, one code pass. Upgrade the integrated government service platform and the integrated online supervision platform to improve the effectiveness and convenience of key usage scenarios. **Public security big data application project.** Create a "network" of public security data resources, build a new generation of police comprehensive platform and big data empowerment platform, promote the construction of the "Sutong +" mobile empowerment system, carry out the construction of Xueliang technical defense, and accelerate the mobility and handheld of police applications. **Ecological environment big data application project.** Build a "1+13" integrated ecological environment data resource platform in the province and an ecological environment command and dispatch platform shared by provinces, cities, counties and townships. Improve the ecological

environment monitoring network, realize environmental quality monitoring and early warning, pollution source monitoring and early warning, comprehensive environmental law enforcement, and intelligent supervision of parks. Promote the construction and application of Jiangsu's environmental protection face system, build a unified ecological and environmental public service portal in the province, and support intelligent services such as environmental quality, enterprise services, and online services.

Civil affairs big data application project. Improve the civil affairs theme database for all-element, full-caliber, and full-life cycle management, carry out the construction of provincial-level civil affairs data centers, deepen big data applications such as social assistance, social organizations, smart elderly care, and community governance, build a "large screen for perception and scheduling", and create a "data empowerment brain".

Industrial big data application engineering. Implement the "Implementation Opinions on the Development of Industrial Big Data in Jiangsu Province", explore typical application scenarios of industrial big data, and collect a number of application cases of industrial big data and artificial intelligence, blockchain, industrial Internet and other technologies. Compile the "Industrial Big Data Industry Application Guide", create no less than 15 typical application scenarios of industrial big data, and cultivate no less than 100 industrial big data application demonstration projects.

Agricultural and rural big data application project. Focusing on the overall structure of "six 1+N", improve the Jiangsu Agricultural and Rural Big Data Cloud Platform ("Sunong Cloud"), comprehensively integrate and

gather agricultural and rural informatization and intelligent management resources, increase the promotion and application of the province, and build an agricultural and rural intelligent management decision-making system linked by provinces, cities and counties.

Transportation big data application project. Build a unified highway network operation monitoring and service cloud platform in the province, create a comprehensive three-dimensional transportation network planning and management map, and improve traffic operation monitoring and scheduling capabilities. Relying on the province's public service APP to create a "transportation butler", providing real-name authentication, connecting car rental, merchant consumption and AI tour guide and other "transportation and tourism" special services.

Education Big Data Application Engineering. Improve the Jiangsu Province smart education cloud platform, establish a provincial and municipal education basic data exchange system and education basic database, promote online education and teaching forms such as "famous teacher air classrooms", and achieve customized and personalized teaching.

Medical and health big data application engineering. Build an infectious disease monitoring and early warning information system and a health cloud imaging platform for medical and health institutions in the province. Promote the construction of clinical application demonstration projects of health and medical big data in the province, improve the level of clinical data mining and analysis, promote the application of big data technology in artificial intelligence-assisted diagnosis, new drug research and

development, and drive the development of the health industry.

Cultural tourism big data application project. Build a data aggregation platform for the province's cultural industry, and create a digital chain of "digital collection, network transmission, and intelligent computing". Carry out the construction of the East China Regional Center and the National Cultural Private Network of the National Cultural Big Data System, build a Chinese cultural heritage specimen bank, a Chinese national cultural gene bank, and a Chinese cultural material library, and develop smart tourism products such as tourism digital management, tourism emergency treatment, tourism information services, visual display and recommendation.

E-commerce big data application engineering. Strengthen the research and development of e-commerce big data products such as customer insights, marketing, operation strategies, business intelligence, intelligent customer service, intelligent portraits, supply chain optimization, and e-commerce logistics. Build a cross-border e-commerce service platform, strengthen the management and monitoring of e-commerce channels, and build a leading e-commerce industry demonstration province in the country.

Communication big data application engineering. Focusing on the "1+1+N" construction and application model, we will build a big data platform for the province's communications industry, gather basic data resources such as 5G, industrial Internet, and the Internet of Things, and realize the decoupling of data and services and the micro-service of resources. Promote the application of communication big data in public health governance, demographics, transportation, cultural tourism, emergency management and other fields.

(6) Improve the system to strengthen guarantees and build a solid line of defense for data security

Improve the big data security management system. Implement the Cybersecurity Law of the People's Republic of China, the Data Security Law of the People's Republic of China, and other relevant laws and regulations, and establish a supervision and cooperation mechanism for data security work. Strengthen the protection of data related to national interests, social security, trade secrets, personal information, etc., establish a data classification and hierarchical protection system, promote the compilation of important data catalogs, and strengthen the protection of core data. Strengthen the establishment and implementation of security systems such as information security level protection, data security risk assessment, data security emergency response, and data security review.

Innovate data security technology means. Strengthen theoretical research on data security protection, promote the application of big data technology in information security protection, deepen the understanding of the mechanism of data security risks, and formulate targeted technical solutions. Encourage big data enterprises and universities to complement each other's advantages, and establish joint laboratories to carry out data security protection technology research and product research and development. Actively promote cloud security level assessment, encourage cloud service providers to

participate in third-party evaluation, ensure the security and credibility of the cloud environment, encourage professional institutions such as data security assessment and certification to carry out services in accordance with the law, and guide big data product and service providers to actively participate in security evaluation. Promote enterprises to strengthen data security capacity building, strengthen data security planning, data classification and hierarchical management, and data security incident emergency response capacity, and build a full-scenario, full-life cycle intelligent perception and active protection system.

Strengthen data security supervision and self-discipline. Promote data security law enforcement, strengthen security supervision of data collection, use, circulation and other links, and increase law enforcement and punishment for excessive data collection, abuse of data resources, infringement of personal privacy, violation of data ethics, and cross-border data violations. Regulate the market behavior of large platform enterprises, severely crack down on big data "killing", algorithm discrimination, algorithm abuse, data monopoly and other behaviors that undermine market fairness, and guide the orderly development of the big data industry. Encourage the industry to formulate data security self-discipline conventions, and promote enterprises to sign the convention and accept social supervision.

Column 8 Big data security guarantee construction project

Strengthen data security management capabilities. Promote the establishment of relevant systems for data security management, formulate data security management methods and standards, organize and carry out data classification and hierarchical management, formulate important data protection catalogs, and regularly evaluate and focus on important data protection.

Carry out pilot projects for industrial data classification and grading. According to the deployment of the Ministry of Industry and Information Technology, organize the publicity and implementation of the "Guidelines for Industrial Data Classification and Grading (Trial)", strengthen the application and promotion of industrial data classification and grading management tools, expand the coverage of industrial data classification and grading pilots, cultivate no less than 30 industrial data classification and grading benchmark enterprises, and encourage the development of data classification and grading in the fields of finance, electric power, telecommunications and other fields.

Promote the development of the data security industry. Guide enterprises to carry out technical research in the direction of sensitive data identification, data desensitization, data encryption, and privacy computing. Focusing on improving the quality of products and services such as hidden danger investigation, situational awareness, traceability, and emergency response for data security pre-protection, in-process monitoring, and post-event disposal, we will expand and strengthen the data security industry.

5. Safeguard measures

(1) Improve the overall coordination mechanism

Give full play to the role of the Big Data Development Office of the Provincial Informatization Leading Group, strengthen the overall coordination of the province's big data development work, and promote the establishment of a collaborative mechanism for cross-departmental data application. The big data development management departments in all regions should establish a regular evaluation system for planning tasks, promote the development of big data with the construction of digital economy, digital government, and digital society, and ensure the implementation of the main tasks and projects of the plan.

(2) Increase financial guidance

Special funds at all levels will give priority to supporting big data projects that meet the planning direction under the same conditions. Give full play to the guiding role of government investment funds, drive social capital to increase investment in data infrastructure construction, key technology research and development, industrial development and integrated application projects, and support big data enterprises to actively apply for listing on the Science and Technology Innovation Board and the ChiNext Market.

(3) Accelerate the training and gathering of talents

Encourage colleges and universities in the province to optimize the setting of big data disciplines, further promote the construction of "new engineering", and train data scientists and data engineers. Promote vocational colleges to deepen school-enterprise cooperation, encourage big data-related enterprises to actively carry out job skills training, build a number of provincial big data talent training bases, and cultivate professional skills and applied innovative talents. Implement the provincial "Entrepreneurship and Entrepreneurship Plan" and "333 Project" to promote the introduction and training of scientific research talents, basic research talents, and engineering and technical talents in key areas of big data. Actively promote the implementation of entrepreneurship plans for high-end big data talents in the province, and further implement income distribution and incentive policies for talent introduction, as well as supporting policies such as housing, social insurance, social welfare, spouse employment, and children's enrollment.

(4) Expand foreign exchanges and cooperation

Adhere to the simultaneous promotion of "bringing in and going out", promote all localities to further optimize the business environment, strengthen the precise attraction of strong chain and chain supplementary projects, and actively integrate into the integration strategy of the Yangtze River Economic Belt and the

Yangtze River Delta. Relying on the province's foreign cooperation tasks, support big data-related enterprises in the province to actively participate in international and domestic market competition, export advantageous technologies, products and services, and use high-end cooperation and exchange platforms at home and abroad such as China Soft Expo, World Expo, and World Intelligent Manufacturing Conference to strengthen exchanges and cooperation in big data technology research, product research and development, and standard formulation. Implement the national strategy of "East Data and West Computing", and guide some big data applications that do not require high latency to transfer to the west in an orderly manner.

Jiangsu Province's "14th Five-Year Plan" software and information technology service industry development plan

Software is the soul of information technology, the shield of network security, the engine of economic transformation, and the foundation of digital society. "Software definition" has become an important direction of a new round of scientific and technological revolution and industrial transformation. The "14th Five-Year Plan" period is a new period of accelerated innovation, rapid iteration and group breakthrough in the software industry, in order to lead the high-quality development of the province's software and information technology service industry in the new era. This plan is prepared according to the "Outline of the 14th Five-Year Plan for National Economic and Social Development of the People's Republic of China and the Long-term Goals for 2035", "Notice of the State Council on Printing and Distributing Several Policies to Promote the High-quality Development of the Integrated Circuit Industry and Software Industry in the New Era", "The 14th Five-Year Plan for National Economic and Social Development of Jiangsu Province and the Outline of the Long-term Goals for 2035", and the planning period is

2021-2025.

1. Development foundation and situation

(1) Development foundation

Since the 13th Five-Year Plan, under the decision-making and deployment of the provincial party committee and the provincial government, the software and information technology service industry in Jiangsu Province has developed well, the industrial scale and efficiency have grown steadily, the strength and innovation ability of enterprises have been improved simultaneously, the integration and application of the industry have continued to deepen, and the supporting and leading role of economic and social development has been continuously enhanced, providing strong support for the construction of a strong manufacturing province, a strong network province, the construction of smart Jiangsu and the development of the digital economy.

The scale of the industry has expanded steadily. Since the 13th Five-Year Plan, the development of Jiangsu's software and information technology service industry has shown a good trend of steady improvement and steady progress. The province's software business revenue increased from 816.6 billion yuan in 2016 to 1.08 trillion yuan in 2020, and the industrial scale has always ranked

among the top in the country. Since 2018, the province's information technology service revenue has accounted for more than 50% of software business revenue for three consecutive years, and the transformation of industrial structure to service has achieved remarkable results. The number of employees in the whole industry remains above 1.1 million, the proportion of employees with a master's degree or above is gradually increasing, and the quality of personnel continues to improve.

The construction of the carrier has achieved remarkable results. After Nanjing became the first famous software city in China, Suzhou was rated as a famous city with Chinese software characteristics in the direction of industrial software in 2019, and the construction of a characteristic city in the direction of Wuxi Internet of Things and platform software completed the self-evaluation. The province has 7 national software parks such as China (Nanjing) Software Valley and Suzhou Software Park, and 25 provincial software parks such as Nanjing Xuzhuang Software Industry Base and Kunshan Software Park.

The strength of the enterprise has been steadily improved. The number of software enterprises in Jiangsu has long ranked first in the country, and the number of software enterprises included in the

statistics in the province has increased from 4,844 in 2016 to 6,225 in 2020, with an average annual growth of 6.5%. The development of key software enterprises in the province has continued to grow, with 9 enterprises selected as one of the top 100 software business revenue in China, and 50 enterprises becoming key software enterprises in the national planning layout. There are 34 software companies listed on the main board and the Science and Technology Innovation Board at home and abroad, and 124 software companies are listed on the New Third Board. There are 201 key software enterprises and specialized and special new software enterprises in the provincial planning layout that have been cultivated.

The industrial layout has distinctive characteristics. Jiangsu has seized the opportunities of a strong manufacturing province, a strong network province, a smart Jiangsu construction and the development of the digital economy, and has formed a head effect in some fields. The competitive advantages of industrial software and application software in industries such as electric power, communications, and transportation are prominent. In 2020, the province's industrial software industry chain related revenue was 221.7 billion yuan, a year-on-year increase of 12.2%. The industrial layout is highly concentrated, and Nanjing, Wuxi, Suzhou and other

places have increasingly played an increasingly strong role in driving the development of the province's software industry, and the embedded software in Changzhou, Zhenjiang, and Nantong, and the information technology service industry in Suqian and Yangzhou have maintained rapid growth.

The momentum of innovation continues to increase. During the "13th Five-Year Plan" period, Jiangsu actively implemented key software core technology research, and supported 4 key core technology breakthroughs in key software fields such as basic software and industrial software. The number of software enterprise technology centers in the province has increased to 143. It took the lead in establishing a provincial software and information technology service standards committee in the country, and promoted the release of 1 national standard for software and information technology services, 3 provincial local standards and 6 group standards. By the end of 2020, the province has obtained 494 ITSS conformity assessment certificates of national information technology service standards, initially forming a good trend of standards leading innovation.

The integration and application continue to deepen. Jiangsu actively accelerates the application and promotion of new technologies, new products and new services through application

traction, and has achieved fruitful results in deep integration and application, leading the country in the integration of industrialization and industrialization and the construction of smart Jiangsu. Continue to deepen the core supporting role of software in the construction of intelligent workshops, smart factories, industrial Internet platforms and benchmark factories, build an industrial Internet APP aggregation platform, and gather more than 2,000 industrial APPs of various types such as industry, basic, general, and specialized. Promote the development of personalized customization, networked collaboration, and service-oriented manufacturing. Actively cultivate new models, new applications, and new formats of integrated development for government affairs, medical care, transportation, education, pension, agriculture and other fields, and effectively improve government management, social governance, and people's livelihood service capabilities.

There are many highlights of the special activities. The Nanjing International Soft Expo has been held for 16 consecutive years, effectively attracting industrial resource agglomeration, and the 2020 Nanjing Soft Expo attracted nearly 1,000 enterprises to participate. Continue to carry out public welfare services such as "Jiangsu Software Scholarship" and "Aiying Journey" campus

recruitment, and implement the "Eagle Breeding Plan" to cultivate industry leaders. The provincial government, together with the Ministry of Industry and Information Technology and the Ministry of Education, has held 9 consecutive "China Software Cup" college student software design competitions, attracting more than 1,000 colleges and universities, more than 30,000 teams, and more than 120,000 college students to participate. Help software companies solve more than 100 common technical problems.

During the "13th Five-Year Plan" period, the software and information technology service industry in Jiangsu Province has achieved rapid development, but there are also old problems and new problems restricting high-quality development: First, there are still technical shortcomings and weaknesses in key software fields such as basic software and industrial software, and most application software has not yet adapted to the technical route of information technology application innovation. Second, there is a lack of leading enterprises with industry leadership and ecological cultivation capabilities, and a good pattern of integrated development of large and medium-sized enterprises has not yet been formed. Third, the talent gap is still large, and the structural contradiction between supply and demand is prominent. There is a scarcity of leading talents in the industry and

insufficient number of high-end compound talents. Fourth, the value of software is imbalanced. A large number of software products rely on hardware to reflect value, and a software value evaluation system with market credibility has not yet been established, and the problem of "focusing on hard and light soft" still exists. Fifth, the level of standardization construction is not high. There are few software companies that actively participate in the development and application of standards, and the discourse on international standard formulation is weak.

(2) Facing the situation

With the rapid development and widespread penetration of new generation information technologies such as 5G, artificial intelligence, quantum information, Internet of Things, big data, and blockchain, software has entered a critical period of comprehensive innovation and adjustment from basic technologies, algorithms, platforms and applications. The product form, technical architecture, development model, pricing model and business model of software are constantly being reconstructed. From the perspective of technology trends, open collaboration based on open source has broken through the spatio-temporal boundaries of innovation, efficiently gathered intellectual resources, industrial resources and

service resources, and open source software has become the main driving force of current software technology innovation. From the perspective of application prospects, the integration and development of software products and information services with the physical world and human society has been further accelerated, and the role of software in "empowering, valuing and empowering" the whole field has continued to amplify. From the perspective of competition, the competition in the software industry is shifting from the competition of a single product or enterprise in the past to the industrial ecological competition formed by the software platform system, and the ability to build an ecosystem has become the commanding heights of the competition in the software industry.

The development of China's software industry is still in a period of important strategic opportunities, but the domestic and foreign environment is undergoing profound and complex changes. From the perspective of the external environment, industrial transformation and the game of great powers are deeply intertwined, and the software industry has increasingly become a key area for China's breakthrough and catch-upThe competitive situation. From the perspective of the internal situation, the slowdown in economic growth and the intensification of competition have superimposed resonance, and the

software industry has gradually become a hotbed of innovation that breeds new momentum. At present, China's economic development is in a critical period of gear shifting, and the software industry has become a strong endogenous driving force to support economic development.

The "14th Five-Year Plan" period is an important period of the historical intersection of the "two centenaries" and the overlap of the "two overall situations". Taking into account industrial transformation and upgrading and security system construction, promoting the construction of a "strong, rich, beautiful and high" new Jiangsu, the high-quality development of Jiangsu's software and information technology service industry should start a new journey in four aspects: **casting the soul of core technology.** With software as the "propeller" of scientific and technological innovation, it completely activates the new driving force for the development of scientific and technological innovation in the province. **Pull the engine of economic transformation.** Use software as an "accelerator" for quality improvement and upgrading, and comprehensively promote the construction of domestic demand system and industrial modernization. **Establish a security shield.** Use software as the "ballast stone" for social operation to effectively ensure the safe

operation of cyberspace and key lifeline industries. **Solidify the foundation of the digital society.** With software as the "catalyst" for a better life, we will solidly promote the modernization of the government governance system and governance capacity, and continuously improve the people's high-quality life and well-being.

2. General requirements

(1) Guiding ideology

Adhere to the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, thoroughly implement the 19th National Congress of the Communist Party of China and the 2nd, 3rd, 4th and 5th Plenary Sessions of the 19th Central Committee, General Secretary Xi Jinping's important speech on inspecting Jiangsu, and the spirit of the 9th and 10th Plenary Sessions of the 13th Provincial Party Committee, fully understand the overall situation of the great rejuvenation strategy of the Chinese nation and the great changes unseen in the world in a century, and deeply practice the general secretary Xi Jinping's encouragement to Jiangsu to "strive to be an example, strive to be a demonstration, and walk in the forefront." Unswervingly implement the new development concept and build a new development patternWith deepening supply-side structural reform as the main line, with a strong manufacturing

province, a strong network province, the construction of smart Jiangsu and the development of the digital economy as the fulcrum, accelerate the optimization of the layout of the software industry, strengthen the leadership of backbone enterprises, continuously improve the supply capacity of independent and controllable software products, focus on making up for shortcomings, highlight advantages and forge long boards, improve the level of industrial base advancement and industrial chain modernization, accelerate the construction of software industry clusters and ecological construction, and actively build a new highland for the development of the national software and information technology service industry. Establish a new model of coordinated regional development and comprehensively support the "strong, rich, beautiful and high" new Jiangsu to a new level.

(2) Basic principles

Innovation leads. Adhere to the concept that innovation is the first driving force for development, promote institutional innovation and model innovation in accordance with the requirements of independence, controllability, safety and efficiency, gather high-end talents leading industrial development, strengthen the main position of enterprise innovation, and maximize the innovation vitality of market players.

Application traction. Strengthen the decisive role of the market in resource allocation, and drive R&D investment and market expansion with typical applications. Open up application scenarios, strengthen supply and demand docking, deploy industrial and supply chains to strengthen and extend chains, improve the matching of software research and development needs, and improve the application efficiency of software products.

Integration and empowerment. Strengthen the promotion of independent technology systems and promote the integration and adaptation of software and hardware. Take the major national strategy as an opportunity to promote the in-depth integration of software technology, information services and various fields of economy and society, use "software definition" to empower the transformation and upgrading of traditional industries, help realize modern governance, promote the derivation of software from providing "services" to providing "services + manufacturing", improve the leading ability of software and information services, and comprehensively promote the development of the digital economy and the construction of smart Jiangsu.

Value oriented. Improve the pricing mechanism of software and information services and guide the return of software value. Actively

protect software technology innovation and intellectual property rights, give full play to the role of standardization construction, promote software cost measurement and value assessment, improve the quality of software products and information technology services, and standardize the market order of the software industry.

Open collaboration. Actively grasp the development opportunities of the Yangtze River Delta integration and the "Belt and Road", comply with the requirements of the new development pattern, make overall use of various innovative elements and market resources, strengthen exchanges and cooperation in technology, industry, talents, capital and other fields, and create an open and high-quality software industry development ecology.

(3) Development goals

By 2025, the province's software independent innovation ability will be greatly improved, the leading role of leading enterprises will be further strengthened, the industrial layout will be more scientific, the industrial ecology will be more optimized, and the high-quality development level of software and information technology service industry will be at the forefront of the country.

-- The scale has grown steadily and the structure has been more optimized. By 2025, the scale of the province's software and

information technology service industry will strive to reach 1.6 trillion yuan. The proportion of software and information service business revenue in new formats such as cloud computing, big data, artificial intelligence, 5G applications, VR/AR/MR (VIRTUAL/AUGMENTED/converged reality), and blockchain has increased significantly.

-- The strength of enterprises has been enhanced, and the results of clusters have been remarkable. By 2025, cultivate 10 tens of billions of head goose software enterprises, 30 national key software enterprises, 300 provincial key software enterprises, and build a national software industry cluster around high-end software and key industry application software.

-- Innovation ability is improved, and the independent system is sound. By 2025, the proportion of R&D investment in backbone software enterprises will exceed 7%. The province's software enterprise technology centers have reached 200, built 2 key software collaborative research and experience promotion centers, deployed and implemented 20 key software research and development projects, and created a number of Jiangsu software brand products. Promote the construction of characteristic demonstration software colleges, improve the software talent training

system, and the number of employees in the software industry exceeds 1.2 million.

-- The carrier construction is strong and the development pattern is clear. By 2025, the industrial development pattern of "no shortcomings in the province and long boards in each city" will be further formed, and the construction level of "one core and two hearts" software cities in Nanjing, Suzhou and Wuxi will lead the country in construction, and the province will create at least 1 famous Chinese software park and cultivate 5 famous Jiangsu software parks to create a "famous city- Famous Garden-Famous Enterprise" leads the modern software industry system with high-quality development.

3. Development layout

(1) Overall layout

Based on the existing foundation of Jiangsu Province's software and information technology service industry and the characteristics of various regions, and in accordance with the development ideas of improving the development quality of the software industry and promoting the integration and coordination of the Yangtze River Delta, efforts will be made to build a development layout of the province's software industry of "one core, two hearts, two-way linkage, one corridor traction, and multiple places going hand in

hand". Where:

"One core and two hearts" refers to the core area of Nanjing software industry comprehensive development, Suzhou industrial software development center area, and Wuxi platform software development center area.

"Two-way" includes "Jiangsu and Anhui" and "Jiangsu, Shanghai and Zhejiang".

"One corridor" refers to the "software innovation corridor along the Yangtze River" from Nanjing in the west to Nantong in the east, connecting Zhenjiang, Yangzhou, Changzhou, Taizhou, Wuxi, Suzhou, Kunshan and other places along the way.

"Many places" include Xuzhou, Suqian, Lianyungang, Huai'an, Yancheng and other new growth bases for the software and information service industry with development potential in the province.

(2) Specific layout

"One core, two hearts, two-way linkage". Thoroughly implement the concept of integrated development, focus on the advantages of "one core, two hearts", take Nanjing as the regional core to form a Jiangsu-Anhui linkage development in close cooperation with some cities in Anhui, and at the same time form a coordinated development

with some cities in Shanghai and Zhejiang with Suzhou and Wuxi as the main body. Give full play to the complementary role of the region and effectively promote the integration and mutual promotion of industrial chain resources in a larger region. Among them, **relying on the existing industrial foundation and scientific and technological innovation resources, Nanjing focuses on promoting the independent development of the ecological chain of basic software, industry application software, and security software industry chain, building a leading comprehensive development ecology of the software industry in China, and becoming the core area leading the independent innovation of the software industry. Relying on its significant advantages in the industrial field, Suzhou focuses on improving the construction of the whole industrial chain of industrial software, continuously improving the role of industrial big data, industrial Internet, artificial intelligence, blockchain, etc. in empowering and enriching the manufacturing industry, and building a central area for industrial software development. Relying on the national sensor network innovation demonstration zone and the Internet of Vehicles pilot zone, Wuxi focuses on breaking through the development of platform software such as the Internet of Things**

and the Internet of Vehicles, cultivating and building characteristic advantageous industrial clusters, and building a central area for platform software development.

"A corridor traction". Coordinate the resources of cities along the Yangtze River in the province, smooth the circulation channels of innovative resources in both the east and west, build a software innovation service system with talent services, technical services, market services and capital services as the core, and continuously drive the improvement of the innovation and development level of the software industry in cities along the Yangtze River. Among them, **Zhenjiang focuses on the opportunities of smart agriculture and smart city construction, develops industry application software in the fields of agriculture, transportation, urban management, education, etc., and cultivates software and information services for smart agricultural machinery, intelligent electrical, shipbuilding and marine engineering, aerospace, medical equipment and other fields. Relying on the information industry base, Yangzhou gives full play to the advantages of cultural and tourism resources, focuses on the development of high-end information technology services such as geographic information, digital content services, platform operation, data mining and**

analysis, and focuses on strengthening research and development around smart cultural tourism, core equipment software and information innovation software and hardware. Relying on Changzhou National Software Park, Creative Industry Park, Medical Big Data Center, etc., Changzhou accelerates the development of software and information technology services in the fields of smart medical care and intelligent manufacturing, and continuously cultivates new formats and models of the digital economy. Taizhou focuses on industrial measurement and control software, high-end CNC machine tool software, automotive electronics and energy software, and further promotes the development of embedded system software. Relying on the Yangtze River Delta Network Security Industrial Park and the Xinchuang Industrial Park, Nantong has gradually cultivated and improved the integrated information and innovation industry chain of complete machines and accessories, integrated circuits, information security, and industry applications, and combined with the traditional advantages of the construction and home textile industries to accelerate the development of software and information technology services in the fields of smart housing construction and smart home textiles. Relying on software parks,

development zones and Huaqiao Economic Development Zone, Kunshan accelerates the agglomeration of software enterprises, strengthens the core technical strength of embedded software, and lays out and develops information technology services.

"Advance in many places". Support new industrial growth bases to fully tap their own advantages, rely on key enterprises and key parks to achieve differentiated and characteristic layout, and actively cultivate new momentum for the growth of the software industry. **Xuzhou gives full play to its basic advantages in the field of construction machinery, relying on backbone enterprises, focusing on the development of industrial software, industrial big data and industrial Internet platforms. Relying on e-commerce parks, Suqian focuses on developing emerging information technology services represented by Internet platform services. Relying on the provincial software park of the high-tech zone, Lianyungang focuses on promoting the development of ship embedded software and smart logistics industry application software. Huai'an actively builds industry general software in the fields of transportation, construction, leisure and entertainment, food safety, culture and creativity, as well as Internet and big data platform services for smart cities, health care and other fields.**

Yancheng focuses on the development of artificial intelligence software such as smart homes, wearable devices, drones, and robots, as well as new generation information technology products and services such as 5G commercial products and Internet of Vehicles.

Fourth, the focus of development

(1) Basic software

High-performance basic software. Accelerate the coordinated development of independent innovation software and hardware, focus on tackling key problems and basic software that is highly compatible with independent technology architecture hardware (such as Shenwei chips) and new special hardware (such as FPGA), and strive to improve independent innovation operating systems, databases, middleware, etcThe performance of basic software such as tool software and office software has moved from usability to ease of use, ensuring high reliability and security while achieving high performance, actively developing the basic application framework and API (application programming interface) of the operating system, and promoting the integration of basic support software.

New basic software. Actively promote the evolution of artificial intelligence algorithms and quantum information basic software in the fields of intelligent speech, computer vision, natural language

processing, and intelligent connected vehicles, and actively promote the research and development and industrialization of new basic software such as Internet of Things operating systems, cloud operating systems, and distributed databases.

Column 1 Information Technology Application Innovation Project
Promote the innovation chain of information technology applications. Cultivate the industrial ecology of independent technology such as Shenwei and UnionTech, organize collaborative research and adaptation, optimize a series of application software, make up for shortcomings, and build an innovative industrial chain for information technology application. Compile a map of innovative products for information technology application in Jiangsu Province, promote the in-depth connection between supply and demand, promote Jiangsu Xinchuang famous products and Jiangsu solutions in the Xinchuang industry, and continue to improve the ease of use, safety and reliability of Jiangsu Xinchuang products and information services. **Build a pilot area for information technology application innovation.** Combined with the development foundation and development tasks of various regions, clarify the key directions and build and cultivate a number of information technology application innovation pilot areas. Integrate the resources of government, industry, academia, research, use and finance, enhance the joint research capabilities, application verification capabilities and display and promotion capabilities of enterprises in the pilot zone, and produce a number of pilot demonstration application results and information innovation technology standards in key areas to further serve the national

market.

Promote the joint construction of "Jiangsu Xinchuang Laboratory" between schools and enterprises. Guided by national strategy and industry needs, support the province's backbone information and innovation enterprises to jointly build information technology application innovation laboratories with industrial ecological enterprises and universities in the province, use the information innovation laboratory as the carrier to carry out collaborative innovation research and solve the bottleneck problem, and at the same time open information and innovation characteristic courses, establish a standard system for information and innovation talents, accelerate the training of talents in the information and innovation industry, and effectively solve the problem of information and innovation talent gap.

(2) Industrial software

Industrial support software. Breakthroughs in EDA (Electronic Design Automation), Engineering Design and Computing, Simulation and Simulation Design Integration, Industrial Middleware, Industrial Intelligence, BIM/CIM (Building Information Modeling/Urban Information Modeling) and other key technologies to accelerate the research and development, adaptation and optimization of industrial basic software such as real-time operating systems and real-time databases. Support the research and development of low-code and no-code programming tools such as modular and visual design, deepen the engineering management of

industrial knowledge and experience, accelerate the development of industrial support software such as test tool software, and support industrial software integration driven by data models.

Management control software. Focus on breakthroughs in APC (Advanced Process Control), DCS (Distributed Control System), PLC (Programmable Logic Control), SCADA (Data Acquisition and Monitoring System), MES (Manufacturing Execution System), DNC/ Industrial control core technology software such as MDC (distributed numerical control and machine data acquisition), as well as equipment operation and maintenance software such as MRO (operation and maintenance) and PHM (fault prediction and health management), strengthen the research and development of control system software with equipment, automated production lines and data management and control functions, and can operate safely and stably. Realize SCM (supply chain management), ERP (enterprise resource planning), CRM (customer relationship management), HCM (human asset management), and BI (business intelligence analysis) and other management software.

Embedded software. Accelerate the construction of embedded software development platforms in the industrial field that meet open standards for core components such as computing chips and sensor

chips required for industrial production automation, tackle key problems with embedded operating systems and application software supporting edge computing chips and sensors equipped with chips for automation equipment, and develop embedded system software for 5G, edge computing, and industrial Internet application scenarios.

New industrial software. Accelerate the modeling of industrial knowledge and application scenarios, support the integration of traditional industrial software and new generation information technology, focus on the development of industrial Internet software and security protection software for 5G application scenarios, support the research and development of high-quality industrial Internet APPs that can be widely used in advanced manufacturing clusters, and create a number of "killer" level industrial APP products.

Column 2 Industrial software independent innovation project
Promote the strong chain of industrial software. Focusing on the key development of the industrial software industry chain, focusing on key core technology links such as industrial R&D and design, production control, and operation and management to strengthen the chain and supplement the chain; Give full play to the role of the 14 institutes of China Electric Power Technology in undertaking the collaborative research platform and experience promotion center of industrial software of the Ministry of Industry and Information Technology, and accelerate the research and development and

industrialization of collaborative research results; Implement the "Soft Power Enhancement Plan for Leading Enterprises", hold the industrial software industry chain supply and demand docking conference and the docking seminar of leading enterprises in different industries, promote the docking of supply and demand, encourage industrial enterprises to release industrial software research demand lists, open application scenarios, and promote the application of high-quality industrial software in Jiangsu in industrial enterprises.

Strengthen the support of intelligent manufacturing. For typical intelligent manufacturing application scenarios such as intelligent equipment, smart factories, and intelligent units, we will actively guide industrial enterprises to improve the utilization rate of independent industrial software such as HarmonyOS operating system, Yihui operating system, Tongyuan simulation software, and Haochen CAD. Promote the application of the first version of industrial software products in the province's advanced manufacturing clusters, deepen independent innovation of industrial software, and promote the development of intelligent manufacturing.

Improve the construction of platforms and standards. Promote the construction of innovation platforms such as industrial software enterprise technology centers, industrial software innovation centers, and industrial software collaborative research bases, and support technical institutions such as industrial software adaptation verification centers, experience promotion centers, and quality and safety testing service institutions to carry out services. Strengthen the strength of the industrial software standard group of the

Provincial Soft Beacon Committee, and support industrial enterprises in the province to participate in the development and implementation of national standards.

(3) Security software

Focus on network security pre-protection, in-process monitoring, post-event disposal, investigation and evidence collection, etc., and strive to improve the technical level of security software such as hidden danger investigation, situational awareness, traceability, and emergency response, and strengthen network security defense capabilities such as threat intelligence analysis, intelligent monitoring and early warning, incident emergency response, and password application. Strengthen risk analysis, judgment, prevention and control of network security threats in fields such as production safety, industrial control, industrial Internet, 5G, next-generation Internet, cloud computing, big data, artificial intelligence, Internet of Things, and Internet of Vehicles, and vigorously promote the research and development of network security software in relevant scenarios. Strive to improve the independent innovation strength of blockchain, quantum information, and commercial cryptography technology, actively explore new network security technologies such as mimic defense, trusted computing, zero trust, and security intelligent

orchestration, and create a comprehensive security software protection system.

Column 3 Autonomous and controllable engineering of security software

Actively innovate network security service models. Advocate the concept of "security as a service" and guide enterprises to transform from providing security products to providing security services and solutions. Increase efforts to support key core technology research in the field of network security, encourage the construction of network security public service platforms based on cloud models, and encourage the development of integrated network security operation outsourcing services.

Accelerate the construction of network security infrastructure. Encourage the construction of security situational awareness platforms, monitoring and early warning platforms, information sharing platforms, and emergency command platforms, and promote cross-regional and cross-industry information sharing and coordination. Encourage the construction of a comprehensive guarantee platform covering industrial support services such as security testing and verification, product inspection, commercial cryptographic applications, and monitoring and certification. Encourage the construction of network identity authentication systems and device security access authentication systems based on commercial passwords, fingerprint recognition, face recognition and other technologies, as well as the construction of offensive and defensive confrontation and practical training training bases.

Vigorously promote the application of network security technology. Industrial field: Focus on promoting the application of network security products in intelligent manufacturing scenarios such as industrial control systems and industrial Internet, and strengthen the network security management capabilities of industrial enterprises. Smart city field: Promote the application of network security products in smart city construction projects such as urban brain, smart energy, smart transportation, and smart security. New infrastructure field: Increase the proportion of network security products in the construction of new infrastructure, and actively respond to network security threats faced by information infrastructure, convergence infrastructure, and innovative infrastructure.

(4) Emerging platform software

Industrial Internet platform software. Focus on the research and development of protocol conversion, edge computing and other platform software to improve multi-source heterogeneous data collection capabilities. Accelerate the research and development of platform software such as data cleaning, data identification, and data analysis, and improve massive data processing capabilities. Support API interfaces, development tools, industrial mechanism models and microservice components required by R&D platform software to improve the precipitation capabilities of industry mechanism models. Support the development of third-party application stores such as industrial APP aggregation platforms to improve industrial

application cultivation capabilities.

Intelligent connected vehicle platform software. For localized equipment such as lidar, vehicle sensors, controllers, and actuators, focus on breaking through key system software such as intelligent information exchange and sharing, intelligent driving algorithms, on-board operating systems, complex environment perception, road fusion perception, intelligent identification, decision control, and collaborative execution, improve the stability, compatibility, and reliability of automotive traffic safety, information security, and various software and hardware equipment management systems, and promote data sharing on the Internet of Vehicles platform. For human-computer interaction, driving navigation, film and television entertainment, life consulting and other links, develop a number of intelligent in-vehicle APPs to continuously improve the richness and convenience of in-vehicle applications.

AI platform software. Promote deep learning algorithm frameworks with independent architectures such as deep forests, as well as technological breakthroughs and achievement transformation of key artificial intelligence platforms such as computer vision, speech semantic analysis, and intelligent human-computer interaction. Accelerate the development of artificial intelligence

platform software and applications, focusing on the layout of a number of intelligent and customized software products and solutions in the fields of government affairs, energy, security, transportation, medical care, and education. Actively create artificial intelligence integration formats, dig deep into high-value application links, and promote the application of machine vision, intelligent control, human-machine collaboration, autonomous decision-making and other technologies in intelligent manufacturing, smart warehousing and other scenarios, and provide effective support for the quality and upgrading and development of the manufacturing industry. Accelerate the adaptation of artificial intelligence platform software and independent innovation chips, and establish a sound and perfect application ecosystem.

Other platform software. Carry out pre-research on quantum information platforms, focusing on breakthroughs in key technologies in four core areas: computing, simulation, communication and sensing. Accelerate the development of IoT platform software, focusing on breakthroughs in IoT communication solutions, unique hardware support, IoT operating systems and application software. Accelerate the development of cloud computing and big data platform software, focus on breaking through the shortcomings of data storage

management, data analysis and processing, data disaster recovery and backup, and cloud platform operation and maintenance management software, develop IDC service software that supports the underlying infrastructure of cloud platforms, and develop cloud platform SDKs (development kits) and APIs dedicated to government affairs, finance, and industry. Accelerate the implementation of edge computing applications and support edge applications dedicated to scenarios such as IoT, 5G, smart cities, and privacy management. Continue to guide the development of AR/VR/MR platform software, focus on breakthroughs in key technologies and product research and development such as holograms, dynamic environment modeling, and VR operating systems, and promote the application of virtual reality in manufacturing, education, medical care, tourism, commerce and other fields. Accelerate the development of blockchain platform software, focusing on breakthroughs in distributed ledger management, consensus mechanism algorithms, smart contract implementation, and encryption software.

Column 4 Platform software ecological integration project
Create an integrated development pattern of "platform + ecology". Guide platform software enterprises to break through the barriers to the use of data content services, support qualified enterprises to integrate industry

innovation resources, lead the construction of open innovation service platforms, open digital content and platform service capabilities to small and medium-sized enterprises, carry out professional incubation services, and steadily form a "platform + ecology" integrated development pattern for large and medium-sized enterprises.

Improve software capabilities supporting the "new infrastructure". Focusing on new information infrastructure such as cloud computing, industrial Internet, Internet of Vehicles, and the Internet of Things, strengthen corresponding support for software development, standard formulation and application. Accelerate the development of the National Supercomputing (Wuxi) Center and the National Supercomputing (Kunshan) Center, deepen major application research on high-performance computing technology, and promote the integrated development of industry, academia, research and application of the supercomputing center.

Deepen the role of industrial APP aggregation platforms. Relying on the industrial APP aggregation platform, we will gather excellent industrial APP resources in the Yangtze River Delta region and cultivate a number of industrial Internet demonstration application enterprises. Relying on various innovative application competitions such as industrial APP development and testing competitions, we will collect application cases and industry solutions from the Yangtze River Delta to improve the effectiveness of industrial APP in supporting the transformation and upgrading of industrial enterprises.

(5) Industry application software and services

Industrial convergence application software and services. Increase the research and development of "5G + Industrial Internet" integrated application software, and promote the research and development of OT and IT integration application software in typical industrial application scenarios such as production scheduling, processing and assembly, and production control. Focus on application scenarios such as "logo +" intelligent production traceability, and explore the integration and application of technologies such as "logo + big data", "logo + 5G", and "logo + artificial intelligence", as well as "logo + platform" and "logo + terminal", "logo + supervision" and other logo promotion paths, support relevant enterprises to jointly develop industrial software based on logo analysis and logo analysis value-added services, realize the comprehensive digitization and interaction of design, production, market, and after-sales information, effectively optimize the allocation of enterprise resources, and comprehensively reduce the management cost of the whole life cycle of industrial products.

Key industry application software and services. Encourage the supply side and the demand side of the industry to jointly build innovation carriers such as collaborative R&D and innovation centers for industry application software, enterprise technology centers, and

industrial innovation platforms. Focusing on advantageous application fields such as transportation, communications, energy, environmental protection, and health, support the research and development of a number of industry-wide software and information technology service solutions for application scenarios such as smart transportation, intelligent communication, smart environmental protection, smart energy management, and smart medical and health, and enhance integration and systematic innovation capabilities.

Advantageous industry application software and services. Continue to deepen the efficiency of software integration and application and information technology services, and actively cultivate new models, new applications and new formats of the digital economy. Promote the development of financial technology supported by software development and improve the level of inclusive financial services. Develop intelligent terminal software, industry-wide software and information services for smart government affairs, smart education, smart elderly care, smart community, smart radio and television, smart emergency response and other fields. Strengthen the research and development of software applications such as embedded software for logistics equipment and intelligent warehousing management, improve the service quality of logistics

service platforms, and improve the level of logistics intelligence. Accelerate the development of industry application software and information services for special agricultural and rural scenarios, and help improve the level of networked, digital, and intelligent development of agricultural production.

5. Main tasks

(1) Strengthen core technical capabilities

Enhance "software-defined" innovation capabilities. Accelerate the development of software-defined computing, software-defined storage, and software-defined networks, and deepen the integration and application innovation of new technologies such as cloud computing, big data, Internet of Things, artificial intelligence, blockchain, 5G, and quantum communication. Support the construction of software engineering development platforms, encourage the integration of software development and operation and maintenance, promote the in-depth application and widespread deployment of new development platforms such as software development cloud and enterprise-level rapid development frameworks, and vigorously develop new software development models. Support software development capability training to comprehensively improve software code quality, engineering

documentation specifications, and collaborative development efficiency. Relying on third-party institutions to develop consulting and evaluation services, we continue to improve the performance evaluation and quality assurance capabilities of software development.

Accelerate the transformation of technological innovation achievements. Deploy and implement a number of key core technology research projects, regularly collect and release a list of key research tasks for the "stuck neck" field, and clarify the timetable and roadmap. Strengthen the main position of enterprise innovation, promote the establishment of a long-term docking and cooperation mechanism between enterprises and ecological partners, universities, and scientific research institutes, open up channels for enterprises to undertake and transform major innovation projects, and drive collaborative innovation in the upstream and downstream of the industrial chain. Promote new software operation models such as software subscriptions and metered fees, improve the market-oriented mechanism of technological innovation, strengthen scientific and technological financial support, build professional investment and financing and intellectual property service channels for enterprises and scientific research institutes, improve the promotion system of

innovative projects, and accelerate the transformation of achievements.

Create a high-level industrial innovation platform. Encourage enterprises and industry-university-research units to jointly build innovation carriers such as key software collaborative innovation centers and software enterprise technology centers, and build a core software industry innovation system. Focusing on key development areas, we will select backbone enterprises with the ability to integrate the upstream and downstream of the industrial chain, and accelerate the construction of a provincial-level manufacturing innovation center with enterprises as the main body, alliances as the support, and industry-university-research cooperation efforts. Support the creation of a comprehensive innovation platform for high-end software, and accelerate original and integrated innovation. Promote service model innovation, and guide small and medium-sized manufacturing enterprises to reduce costs and increase efficiency by improving the penetration rate of software and information service applications. Continue to give full play to the brand effect of the "iChuang Cup" Internet Innovation and Entrepreneurship Competition, and further shape the incubation and growth platform of "new technologies, new products, new models and

new formats".

(2) Improve the industrial chain and supply chain

Accelerate the strengthening of the industrial chain and extend the chain. Formulate a list of shortage enterprises, support a number of key enterprises to settle in the province, and fill the shortcomings and weaknesses of the industrial chain. Focus on key links and strengthen the chain, encourage leading software companies to establish long-term cooperation mechanisms with enterprises in related industries, and jointly improve the performance and platform adaptation capabilities of key core software. Focus on major areas to extend the chain, continuously strengthen the coordination between industrial chains, and take the lead in forming a number of high-quality core product providers and solution integration service providers in industry, government affairs, transportation, environmental protection, medical care, agriculture and other fields.

Improve the product application and promotion system. Promote the software development of knowledge and technology in traditional industries, and accelerate the business restructuring of traditional advantageous fields such as digital government, e-commerce logistics, and energy and power. Combined with the technical development direction of the industrial chain of advanced

manufacturing clusters in the province, original achievements in key basic areas, industry shortage areas, and industrial frontier fields will be collected, and the first version of the software product application promotion guidance catalog in key areas will be formulated and released. Lay out and build a number of key industry application demonstration display and promotion platforms, and carry out a wide range of application and promotion activities.

(3) Promote the development of industrial clusters

Improve the gradient cultivation mechanism of enterprises. Formulate a classification and sub-policy cultivation plan for backbone enterprises, build a cultivation library for key software enterprises and specialized and special new software enterprises in the planning layout, and provide precise support by classification and sub-policies to form a brand benchmark. Encourage universities, research institutes and advanced manufacturing cluster enterprises to divest their internal software research and development departments or merge and acquire small software enterprises in their own industries to establish software enterprises with industry champion potential. Encourage qualified regions to increase the attraction of unicorn enterprises, leading enterprises, and key projects, and provide support based on the actual situation. Actively promote the listing of

qualified software enterprises, smooth the exit channels of original shareholders, support high-quality enterprises to carry out benign industrial resource integration in accordance with market-oriented mechanisms, and accelerate the cultivation of tens of billions of head goose software enterprises.

Create a goose formation group of backbone enterprises. Support the cluster development of characteristic software enterprises such as Nanjing high-end software, Suzhou industrial software, and Wuxi platform software. With tens of billions of enterprises as the head goose, focus on subdivided fields to create specialized "little giant" enterprises and single champion enterprises, and connect to drive "specialization, refinement, and innovation"Cultivate relevant enterprises in the library, form a group of software enterprises, and continue to promote the integration and development of large and medium-sized enterprises. Relying on the synergistic relationship between the industrial chain and supply chain of enterprises, we will lay out and develop a number of demonstration software innovation projects with large and small and strong with weak, improve the level of regional openness and cooperation, and promote the software cluster in our province to climb to the high end of the value chain.

(4) Optimize the construction of park carriers

Support the development of industrial carriers. Continue to increase support for China's famous software cities, steadily improve the development level of Nanjing and Suzhou software cities, and support the creation of Wuxi China's famous software cities. With reference to the construction standards of China's famous software parks, optimize the evaluation mechanism of Jiangsu famous software parks, accelerate the cultivation of provincial-level characteristic software parks, and actively strive to create famous software parks in China. Encourage all localities to guide advantageous enterprises and key projects to gather in characteristic software parks to enhance the effectiveness of industrial carriers in leading high-quality development. Support the dislocation development of various industrial innovation carriers such as Internet industrial parks, Internet maker parks, and big data industrial parks, and accelerate the creation of a new pattern of integrated development of industry and city.

Improve public service capabilities. Improve the functions of Jiangsu software government and enterprise service platform, open policy calculators and four major public service supermarkets of finance, talent, market and technology, provide policy service packages with classified and precise support for the majority of software enterprises, and strive to push core policies in one stop,

implement policies in one network, and effectively enhance the sense of gain of enterprises. Pay attention to industry safety production and confidentiality education, guide enterprises to carry out safety production self-inspection and self-evaluation activities, continuously strengthen industry self-discipline, and effectively prevent and resolve major safety risks.

(5) Gather talents in the software industry

Strengthen talent training at multiple levels. Strengthen basic software education, encourage colleges and universities to face cutting-edge fields and industrial hotspots, accelerate the construction of new engineering majors in information technology, effectively promote the docking of learning and research, and improve the supply of software talents. Promote the construction of characteristic demonstration software colleges, innovate the training mode of vocational education talents, and actively cultivate technical talents in scarce and compound industries. Increase the training of industry leaders in the "Eagle Breeding Plan", cultivate and publicize a group of outstanding CEOs, CTOs, and CSOs (CEOs, Chief Technology Officers, and Chief Standards Officers) of Jiangsu Software, and cultivate a group of industry leaders with outstanding leading and driving capabilities.

Refined deployment of talent introduction. Consolidate and deepen the working mechanism for promoting the integration of industry and talent in software clusters, and simultaneously compile talent maps around the industrial chain. Based on the existing preferential policies for universal software talents, further encourage the implementation of differentiated and gradient talent incentive programs, combined with the policy support of the provincial "entrepreneurship and entrepreneurship plan", and actively strive for key software talents and teams to come to Suzhou and stay in Suzhou. Continue to introduce merit-based awards to students and fresh graduates majoring in software-related majors across the country through the "Jiangsu Software Scholarship". Support the development of the "China Software Cup" college student software design competition and the "Aiying Journey"and other competitions and recruitment activities to attract college students across the country to take Jiangsu as the first stop for employment and entrepreneurship. Relying on public welfare organizations such as the Jiangsu Software Industry Talent Development Foundation, advocate the establishment of personnel systems, salary systems and talent evaluation systems that adapt to the development of the software industry, and continue to strengthen the support and guarantee capabilities of software

practitioners, especially the backbone forces. Efforts will be made to expand the influence of brand activities such as the Jiangsu Software Industry Leading Talent Salon and the "Public Welfare Lecture Hall", and effectively enhance the sense of responsibility, participation, identity and gain of leading talents in Jiangsu entrepreneurship and employment.

(6) Create an independent open source ecosystem

Enhance the enthusiasm of enterprises for open source. Encourage qualified enterprises or individual developers to increase their contributions to mainstream open source foundations, actively donate code, funds, or provide various types of software licenses. Support for outstanding projects, enterprises and outstanding open source achievements in key areas that have strong industry influence in domestic or internationally leading open source communities. Encourage active participation in various well-known open source projects and the use of open source platforms for software research and development, and promote the improvement of innovation leading capabilities.

Improve the development environment of open source software. Establish the Jiangsu Open Source Ecological Alliance to guide key enterprises in the province to correctly integrate and utilize

open source, give full play to the link effect of open source projects, and realize joint innovation between enterprises. Support the construction of open source infrastructure such as open source software code hosting platforms and open source software laboratories, and support the development of open source business model cases. Provide professional legal guidance to enterprises in the province, especially small, medium and micro enterprises, to help them avoid intellectual property risks that they may face when learning from open source achievements. Strive to create a national open source innovation space, support the holding of various open source software competitions, and create an open source software development ecology.

(7) Improve the literacy of the software industry

Accelerate the construction of software standardization. Strengthen the effective connection between software standardization related policies and scientific and technological policies and industrial policies. Actively promote enterprises to participate in the formulation of software and information technology service standards. Continue to strengthen the cultivation of standardization talents, rely on the Provincial Software and Information Technology Service Standardization Technical Committee, and regularly organize

and carry out various activities such as standard publicity, standard revision and demonstration promotion. Improve the construction of the provincial software and information technology service standardization platform, continue to promote the implementation and promotion of national key standards such as ITSS (Information Technology Service Standards) and DCMM (Data Management Capability Maturity) in Jiangsu, and continuously drive the development and application of standards in key areas such as industrial software, big data, cloud computing, and artificial intelligence.

Pay attention to the protection of software intellectual property rights. Increase the publicity and implementation of software intellectual property protection, and steadily increase the public's awareness of "paid purchase" and "on-demand subscription"advocate the formation of correct software research and development, deployment, application and maintenance habits. Relying on third-party institutions, cooperate with software companies and individual developers to jointly establish a common code base and shared patent pool, and form a joint creation, collaborative application, joint protection, mutual supervision and risk sharing mechanism around intellectual property rights. Severely

crack down on intellectual property infringement in the software field, and fully implement the legalization of domestic software in party and government organs, financial institutions, state-owned enterprises and institutions, and key industries.

Promote the evaluation of software product value. Actively carry out software value enhancement actions to accelerate the improvement and promotion of software cost measurement standards. Explore the establishment of new software value evaluation specifications, focusing on the research and development cost, technical strength, adaptation ability, market potential and other intangible values of software products, and form a scientific and reasonable value evaluation system. Explore the scientific pricing mechanism of software projects, support third-party asset appraisal institutions to evaluate original software products in the province, and gradually promote the transformation of users from "focusing on hard and soft products" to "paying equal attention to software and hardware".

(8) Digital Yangtze River Delta integration

Accelerate the interoperability of new digital infrastructure. Seize the development opportunities of "new infrastructure" and promote the integrated development of major scientific and

technological infrastructure clusters. Actively promote the construction of high-quality extranet (private network) of the industrial Internet identification analysis national node (Nanjing disaster recovery node) and the integrated industrial Internet in the Yangtze River Delta, and improve the protocol compatibility and interface call mechanism between industrial Internet platforms. Coordinate the layout and construction of data centers, promote collaborative innovation of data centers, optimize the computing power resource service system, and promote the integrated development of industries. Accelerate the construction of private Internet of Things in the metropolitan area, explore the construction of quantum secure communications and future networks, further promote the deployment and application of IPv6, and jointly guide basic telecom operators to improve the service quality of 5G communication networks in the Yangtze River Delta region.

Promote the effective linkage of various resources. Accelerate the construction of the Yangtze River Delta industrial Internet service resource pool and further improve the industrial Internet development ecology. Support the establishment of industrial Internet big data sub-centers to improve big data management, analysis and application capabilities. Pilot innovation of various flexible employment systems,

rely on the Shanghai-Nanjing (He) Industrial Innovation Belt to coordinate and integrate the advantageous software innovation resources in the Yangtze River Delta region, and improve the collaboration level of outstanding software researchers and industry leaders in the Yangtze River Delta region.

Create a high-level innovation cooperation platform. Enhance the level of regional cooperation in the digital economy in the Yangtze River Delta, encourage the establishment of open laboratories and industrial incubation platforms in key areas and linkage between the four regions, continue to promote the research and development of key software technologies, and continuously accelerate the implementation of various innovative applications. Encourage software enterprises in the province to carry out joint project declaration and technical research for the Yangtze River Delta region.

(9) Build international competitiveness

Integrate into the global industrial division of labor. Strengthen industrial exchanges and market development for the "Belt and Road" countries, and explore international cooperation mechanisms in the division of labor and open source collaboration in the industrial chain. Actively encourage the overseas development of

enterprises in the province, support high-quality industries such as power and energy to apply software to serve foreign high-end markets, and promote the transfer of software products in the province to the upstream of the value chain. Support enterprises in the province to deeply integrate into the global software industry chain through various modes such as mergers and acquisitions, equity participation, and joint development, and explore the establishment of software export customs clearance models for network delivery and media-free delivery. Give full play to the demonstration role of the China (Nanjing) Software Valley National Digital Service Export Base, carry out provincial digital service trade bases and gradient cultivation of key enterprises, vigorously develop high-end software service outsourcing for the new generation of information technology, and continue to expand new formats and models of digital service trade.

Actively connect with international resources. Support the holding of professional software brand exhibitions such as the China (Nanjing) International Software Products and Information Services Trade Expo, create a window for the two-way flow and display of technology, capital and talents, and continuously improve the opening up of the province's software industry. Establish a foreign exchange and cooperation platform to help enterprises undertake the transfer of

overseas high-quality innovation resources, establish a multi-dimensional cooperation model, and accelerate the brand influence and international popularity of enterprises in the province while absorbing advanced technology, management models, and market intelligence. Support third-party consulting institutions to regularly carry out tracking research on overseas market segments, and provide customized overseas solutions for backbone software enterprises.

6. Safeguard measures

(1) Strengthen organization, coordination and coordination

Strengthen the docking between provinces and ministries, closely track the national planning and layout of the software industry, and actively undertake major technical research, implementation of key projects, and cultivation of key enterprises. Promote a better combination of effective markets and promising governments, optimize the work communication mechanism of various localities and departments, and coordinate and promote the high-quality development of the province's software and information technology service industry. Guide social organizations such as the Provincial Software Industry Association, the Provincial Artificial Intelligence Society, and the Provincial Software Industry Talent Development Foundation, as well as technical organizations such as the Provincial

Software and Information Technology Service Standardization Technical Committee, integrate and gather public service resources, jointly carry out various exchanges and cooperation, and jointly promote the quality and efficiency of the province's software industry.

(2) Increase fiscal and tax support

Give full play to the role of all types of special financial funds and major industrial funds at all levels, and increase efforts to support the research and development and application of industrial software, basic software, security software, emerging platform software, and application software in key industries. Encourage and support user units to open up innovative application scenarios, actively pilot applications, and publicize and promote the first version of software and information innovation products. Support software enterprises to actively undertake major software research and key application demonstrations and other national projects. Strengthen policy publicity and interpretation and consulting and counseling services for enterprises, and effectively promote and ensure the implementation of preferential policies for value-added tax on software products and software enterprise income tax.

(3) Broaden corporate financing channels

Smooth inclusive financial services, actively explore the

establishment of "Su Credit" products with the support of the Inclusive Financial Development Risk Compensation Fund, encourage banks and insurance institutions to carry out new inclusive financial services such as salary loans, intellectual property pledge financing and insurance for software enterprises, and guide financial institutions to increase credit support for software enterprises. Support enterprises to obtain commercial loans through equity pledge financing, accounts receivable pledge financing, supply chain finance and other means. Do a good job in the construction of the listing reserve resource pool echelon, and encourage qualified enterprises to go public and raise funds. Encourage eligible enterprises to issue corporate bonds, corporate bonds, short-term financing bonds and medium-term notes, and support enterprises to raise funds through medium and long-term bonds.

(4) Deepen industrial tracking and guidance

Improve the operation monitoring and evaluation of the implementation of plans in the province's software and information technology service industry, strengthen statistical data verification, make full use of online platforms to establish a direct reporting mechanism for industrial data, shorten the process of enterprise information submission, and improve the quality of data statistics.

Explore the establishment of a high-quality development index system for the software industry, regularly organize third-party research institutions to carry out industrial research, track and evaluate the development level of the software industry in various places, explore development advantages and potential problems, and give timely development guidance and policy suggestions.

Jiangsu Province's "14th Five-Year Plan" informatization and industrialization deep integration development plan

The "14th Five-Year Plan" period is a critical period for China to thoroughly implement the new development concept, start a new journey of modernization, and accelerate the construction of a new development pattern. In order to promote the integrated development of informatization and industrialization on a wider scale, deeper and higher level, accelerate the deep integration of new generation information technology and manufacturing such as 5G, Internet, big data, and artificial intelligence, and empower Jiangsu to take the lead in building a new development pattern, according to the "Guiding Opinions on Deepening the Integrated Development of a New Generation of Information Technology and Manufacturing" and the "14th Five-Year Plan for the Deep Integration of Informatization and Industrialization"The "Outline of the 14th Five-Year Plan for National Economic and Social Development of Jiangsu Province and the Long-term Goals for 2035", etc., prepare this plan.

1. Development environment

During the "13th Five-Year Plan" period, the province

thoroughly implemented the national "Guiding Opinions on Deepening the Development of the Industrial Internet of "Internet + Advanced Manufacturing", adhered to the system layout, demonstration and guidance and model innovation, actively promoted the integration and innovation of industrialization and industrialization, continued to improve the digitalization, networking and intelligence of the manufacturing industry, and helped the high-quality development of the economy. At the end of 2020, the province's integrated development level of industrialization and industrialization reached 63.2, maintaining the first place in the country for six consecutive years.

(1) Development foundation

The digital level of enterprises has gradually improved. The initiative of digital transformation of enterprises is increasing, and a new mechanism for leading strategic transformation, organizational change and management innovation with the integration of industrialization and industrialization management system has gradually been formed. The province has promoted more than 25,000 enterprises to carry out self-assessment, self-diagnosis and self-benchmarking of the integration of industrialization and industrialization, selected 2,055 pilot enterprises for the

implementation of the management system, and 2,564 enterprises passed the standard implementation assessment; Promote 300,000 enterprises to the cloud around the direction of core business to the cloud, data and equipment to the cloud, and innovative applications based on "data + model", focusing on building 7,366 star-rated cloud enterprises; Actively promote intelligent manufacturing, carry out intelligent workshop demonstration and promotion by industry, and build a total of 1,307 demonstration intelligent workshops. At the end of 2020, the penetration rate of digital R&D and design tools in enterprises in the province reached 87.1%, and the numerical control rate of key processes reached 58.0%, ranking first in the country.

The infrastructure system has been continuously improved. The province's new information infrastructure construction of "broadband, integration, ubiquity, sharing and security" has achieved remarkable results, and the overall development level ranks among the top in the country. The optical fiber broadband access capacity of the province's industrial parks has reached 100G, and the optical network city has been basically completed; A total of 71,000 5G base stations have been built, and the main urban areas of districts and cities have basically achieved full coverage; Telecom operators have completed IPv6 upgrades for wireless networks, fixed broadband

networks, large data centers, and related systems. The "1+1+40+N" industrial Internet identification resolution architecture has been continuously improved, with 14 secondary nodes built and a cumulative number of identification registrations exceeding 2 billion. The scale of data center racks exceeds 260,000, and a number of cloud computing and supercomputing centers have been put into operation. The first phase of the "one network, one pool, one platform" project for industrial information security has been completed, and the security monitoring and situational awareness of the risks and hidden dangers of the province's networked industrial control equipment and systems and industrial Internet platforms have been initially realized.

The pace of industrial Internet development has accelerated. The industrial Internet innovation and development project has been steadily advancing, and the industrial Internet platform has become a key starting point for the exploration of digital transformation of enterprises. took the lead in formulating and publishing guidelines for the construction of industrial Internet benchmark factories in China, built 95 industrial Internet benchmark factories, and cultivated a model for the digital transformation of the manufacturing industry; For industrial clusters such as construction machinery, new power equipment, biomedicine, energy conservation and environmental

protection, 86 provincial key industrial Internet platforms have been built; The first third-party industrial APP aggregation platform in China has been built, bringing together 1,762 industrial APPs across the country (1,528 in Jiangsu), and functions such as supply and demand docking, application promotion, and statistical monitoring have been gradually improved. The National Integration of Industrialization and Industrialization and Industrial Internet Platform Conference, the National Industrial Internet Platform Application Conference, and the Industrial Information Security Skills Competition were successfully held. The Yangtze River Delta Industrial Internet Integration Development Demonstration Zone has achieved positive results. At the end of 2020, the scale of the industrial Internet industry in the province accounted for about 12% of the country.

The integrated development model continues to innovate. The new generation of information technologies such as cloud computing, big data, Internet of Things, artificial intelligence, and blockchain have been deepened in industry, forming a number of representative innovative models and new formats. The province has signed a total of 1,100 5G convergence application projects, and carried out innovative scenario applications in the fields of industrial

Internet, smart city, and smart healthcare; Artificial intelligence is rapidly applied in industrial machine vision intelligent detection systems, intelligent networked vehicles and other fields; The application of blockchain technology in finance, government affairs, logistics, big data, information security and other fields has been accelerated, and the application ecology has been gradually built. 30 leading enterprises have emerged as leading international and domestic industry B2B key platforms, 25 comprehensive trading platforms for bulk commodities, and the penetration rate of industrial e-commerce in the province has reached 75.3%, ranking first in the country.

The construction of innovation carriers has achieved initial results. China Academy of Information and Communications Technology, National Industrial Information Security Development Research Center, China Industrial Internet Research Institute, Fifth Institute of Electronics of the Ministry of Industry and Information Technology, and China Electronic Information Industry Development Research Institute, China Institute of Electronics Standardization and other national core think tanks in the field of information and communication have set up branches in the province to focus on different fields to support the integration and innovation of

industrialization and industrialization in Jiangsu Province. Nanjing and Suzhou have built national industrial Internet platform application innovation experience centers, Southeast University, Purple Mountain Laboratory, and Changzhou Tianzheng have built industrial Internet public service platforms, and Wuxi Hongdou and Jiangsu Electric Power have built national industrial Internet platform application innovation and promotion centers. The province has created 16 provincial "Internet + advanced manufacturing" characteristic bases and 5 key cultivation bases to promote the linkage development of "platform + park". Special construction and actions such as the Internet of Vehicles Pilot Zone, the Industrial Big Data Application Demonstration Zone, the Regional Big Data Open Sharing and Application Pilot Zone, and the "Digital Future" have achieved remarkable results.

(2) There are problems

During the "13th Five-Year Plan" period, although the province's deep integration of industrialization and industrialization has achieved remarkable results, there are also some outstanding shortcomings and problems. **First, enterprises are still facing the dilemma of "comprehensive integration".** The digital infrastructure of core business links such as design, manufacturing, procurement

and sales of manufacturing enterprises in the province has made significant progress, but the level of data integration and sharing across departments and business links still needs to be improved, the degree of integration of internal management and control and the ability of cross-enterprise collaboration need to be strengthened, and the connection between the upstream and downstream of the industrial chain is still not smooth enough. **Second, the supply capacity of independent and controllable integrated development technology is insufficient.** There are a large number of information technology service providers in the province, but there are relatively few leading service providers with core technology, capabilities, and industry reputation, independent and controllable software and hardware supply capacity needs to be improved, integrated and holistic solution service supply capacity is still insufficient, and industrial software, cyber-physical system (CPS) and other integrated support and industry solutions need to be developed and grown. **Third, the efficient and coordinated integrated development ecosystem is not perfect.** **The** mechanism for promoting the linkage development of the industrial chain, innovation chain and capital chain in the province is not perfect, and the mechanism to promote the benign interaction of technology, products, safety and

application is not perfect. **Fourth, the cultivation of leading enterprises in the industrial Internet needs to be strengthened urgently.** The number of outstanding enterprises in the field of industrial Internet in the province is increasing, but there is a certain gap between the overall development quality and influence ability of leading goose and vanguard enterprises and the requirements of accelerating the construction of a strong manufacturing province.

(3) Facing the situation

The "14th Five-Year Plan" period is an important stage for building a manufacturing power, building a modern industrial system and achieving high-quality economic development.

A new round of scientific and technological revolution is accelerating, and disruptive innovation and cross-border integration have brought new opportunities for the integration of industrialization and industrialization. **The** new generation of information technology such as the Internet, big data, artificial intelligence, and blockchain is the most active, intersecting, and penetrating field in the new round of scientific and technological revolution. At present, 14 advanced manufacturing clusters such as cutting-edge new materials, Internet of Things, and core information technology in Jiangsu have accelerated their agglomeration, and the

supply capacity of the manufacturing industry has risen rapidly from low-end to high-end. Machinery, textiles, automobiles and other fields are cross-integrated with information technology, and new models and new formats such as industrial Internet, digital twins, personalized customization, service-oriented manufacturing, and networked collaboration have accelerated breakthroughs, and the deep integration of informatization and industrialization has ushered in new opportunities.

The construction of a new development pattern of "dual circulation", the stimulation of domestic demand potential and supply-side structural reform put forward new demands for the integration of industrialization and industrialization. Stimulating the huge potential of domestic demand and establishing a high-end supply system that matches demand is a practical need to build a new development pattern of "dual circulation". As a major manufacturing province, Jiangsu has vigorously developed the integrated development of new products, new models and new formats such as personalized customization, network collaboration, intelligent manufacturing, service-oriented extension, digital management and intelligent new products to stimulate new consumer demand; Continue to deepen the integrated application of information

technology in R&D and design, manufacturing, marketing services and other links, promote the extension of the manufacturing industry from the low end of the value chain to the high value-added ends, create a mid-to-high-end supply system, and comprehensively build a new development pattern of "dual circulation", which puts forward new requirements for promoting the deep integration of industrialization and accelerating development.

Promote the high-quality development of the manufacturing industry, build a new manufacturing system, and enhance the competitiveness of the industrial chain and supply chain. Promoting the high-quality development of the manufacturing industry is a major strategic task of the country at present and in the future. At present, the reform task of key links in key manufacturing fields in Jiangsu is still arduous, scientific and technological and industrial innovation needs to be broken through urgently, and the independent and controllable ability of the industrial chain and supply chain needs to be improved. Jiangsu needs to deepen the digital transformation of the manufacturing industry, stimulate the vitality and application potential of a new generation of information technology innovation, and build a new manufacturing system that is software-defined, data-driven, platform supported, value-added and

intelligence-led; Accelerate the ubiquitous connection, flexible allocation and social sharing of manufacturing resources and manufacturing capacity, and build a flexible, flexible, stable and safe industrial chain and supply chain; Accelerate the transformation of traditional industrial models to green manufacturing, promote energy conservation and emission reduction, green development and safe production, and help achieve the goals of carbon peak and carbon neutrality.

2. General requirements

(1) Guiding ideology

Thoroughly implement the spirit of the 19th National Congress of the Communist Party of China and the 2nd, 3rd, 4th and 5th Plenary Sessions of the 19th Central Committee, implement the spirit of General Secretary Xi Jinping's important speech on Jiangsu's work, closely follow the requirements of high-quality development of the manufacturing industry, and promote the deep integration of informatization and industrialization as the main line, intelligent manufacturing as the main direction, industrial Internet innovation and development as the breakthrough, and reform and innovation as the fundamental driving forceAccelerate the upgrading of information infrastructure, the integration and innovation of the industrial Internet,

and the cultivation and growth of digital industries, comprehensively promote the upgrading of the industrial base and the modernization of the industrial chain, accelerate the construction of a new development pattern, provide a solid foundation for the construction of an internationally competitive advanced manufacturing base, and realize the comprehensive leap from a large manufacturing province to a strong manufacturing province.

(2) Basic principles

Overall coordination and integrated development. Establish an overall coordination mechanism, strengthen the cooperation between relevant provincial departments and cities, counties (districts) to jointly promote the integration of enterprises and industrialization, and promote the comprehensive integration of the new generation of information technology and manufacturing in terms of development concepts, technological innovation, and industrial ecosystem construction. Strengthen regional coordinated development, promote the integrated and high-quality development of the Yangtze River Delta, and form a new pattern of coordinated development.

Consolidate the foundation and drive innovation. Continue to improve the innovation mechanism of industry, university, research

and application, and accelerate breakthroughs in key core technologies and the construction of new information infrastructure. Give full play to the advantages of the new generation of information technology with strong penetration and driving force, stimulate the potential of data drive, and use the Internet to innovate concepts, innovative elements, and innovative systems to drive innovation in manufacturing technology, products, models, and mechanisms.

Supply and demand matching, ecological co-construction. Smooth the information channels on the supply side and demand side of information technology, strengthen the precise docking of supply and demand, adhere to resource sharing and local support, promote efficient communication, and promote the transformation of achievements. Strengthen the comprehensive layout of the industrial chain, integrate high-quality resources, form an overall joint force, and prosper the integration of industrialization and innovation ecology.

Classified policies and keep pace with the times. In view of the differences in the development foundation and process of the integration of industrialization and industrialization in different regions, industries and enterprises, a system of policy division and classification has been formed. Fully grasp the development trend of

the new generation of information technology, adhere to the development concept of open source and openness, use domestic and foreign innovation elements and market resources, innovate cooperation methods, expand cooperation fields, and form new advantages in participating in international cooperation and competition.

(3) Main objectives

By 2025, the province's informatization and industrialization will achieve integrated development on a wider scale, deeper and higher level, and the pace of "6+3+1" layout promotion of comprehensive digital transformation of the manufacturing industry will be significantly acceleratedThe six major tasks of industrial Internet empowerment, digital transformation service providers, and new model leader cultivation have been fully implemented, and the overall level of digitalization, networking, and intelligence of 30 advantageous industrial chains has been greatly improved The integrated development ecology of mutual benefit and win-win results has been continuously improved. The development level of the integration of industrialization and industrialization in the province has reached about 70.

-- The overall process of digital transformation of enterprises

has been significantly accelerated. Industrial enterprises above designated size have generally carried out the implementation of the integration of industrialization and industrialization management system and self-assessment and self-diagnosis, and the province has passed the implementation of the integration of industrialization and industrialization management system of more than 5,000 enterprises. Major breakthroughs have been made in the research and development and industrialization of key technologies, complete sets of equipment, and intelligent products in independent and controllable intelligent manufacturing, and the service capabilities of intelligent manufacturing systematic solutions have been significantly improved. The digitalization, networking, and intelligence of the manufacturing industry have accelerated, the penetration rate of digital R&D and design tools and the numerical control rate of key processes have increased significantly, and the evolution of new business models, business models and industrial forms has accelerated, forming a new economic growth momentum.

-- The upgrading of the foundation of integrated development has been steadily advanced. The construction of 5G, identification analysis, and big data centers is at the forefront of the country, the new information infrastructure system serving the

integration and innovative development of industrial parks and enterprises has been basically completed, and 5G and high-quality broadband have basically realized "enterprise-enterprise communication". The province has built a total of 255,000 5G base stations, which are widely used in key industries; the number of secondary nodes has reached more than 40, and the cumulative number of identification registrations has exceeded 30 billion, forming a cascade layout of big data centers and edge data centers in the province, and building a new data center development pattern that is compatible with the scale of computing power and the growth of the digital economy. The foundation for the industrialization of blockchain has been continuously consolidated.

-- The level of industrial Internet empowerment has been comprehensively improved. The ability of key industrial Internet platforms to serve enterprises has been generally improved, and the number of enterprises, APPs, and devices accessed by key platforms has doubled during the 14th Five-Year Plan period. Information technologies such as 5G, intelligent sensing, big data and artificial intelligence are widely used in the field of industrial Internet, and the scale of the industrial Internet industry continues to grow. The province strives to promote a total of 400,000 enterprises to the cloud,

build 10,000 star-rated cloud enterprises, 200 industrial Internet benchmark factories, achieve comprehensive coverage of key industrial chain industrial Internet platforms, and basically form a pattern of "one industry, one key platform and one benchmark factory". Vigorously cultivate demonstration platforms and leading enterprises with strong innovation capabilities and great industry influence, promote the online and platformization of innovation resources and services, achieve a significant improvement in the level of sharing, and continuously give birth to new growth points.

-- The information security system has been basically completed. Build an industrial information security guarantee "one network, one pool, one platform" to realize security monitoring and situational awareness of the risks and hidden dangers of the province's networked industrial control equipment and systems and industrial Internet platforms. The security monitoring and early warning of basic information networks and important information systems are fully covered, the security protection capabilities of networks and information systems in key areas are significantly enhanced, the security and controllability level of information equipment is significantly improved, 100 excellent industrial information security products and solutions are cultivated, and 10 information security

industry bases and industrial Internet security application demonstration bases are built.

-- The integrated development ecosystem continues to be optimized. The digital level of key industrial clusters, industrial chains, and supply chains in the province and the collaborative sharing level of major business information in the industrial chain have been significantly improved, and a number of industrial clusters with high digital levels and a number of industrial Internet innovation service platforms and application service platforms have been built, so as to create an industrial chain, technology chain, talent chain, capital chain, and industrial Internet with good technological innovation and application services. The service chain integrates and develops the ecology.

Table 1 The main expected indicators for the deep integration of industrialization and industrialization in industrial enterprises above designated size in Jiangsu Province

Serial number	Category	Indicators	In 2020	In 2025
1	Overall goal	The level of integrated development of industrialization and industrialization	63.2	About 70

2	Operation and management	The penetration rate of digital operation and management	79.9%	85%
3	R&D and design	The penetration rate of digital R&D and design tools	87.1%	90%
4	Manufacturing	The numerical control rate of key processes	58.0%	63%
5	Platform application	The penetration rate of industrial Internet platforms	17.8%	48%

3. Main tasks

(1) Consolidate the foundation for the integration and innovation of industrialization and industrialization

The first is to promote the construction and upgrading of internal and external networks of enterprises. Support telecom operators, network construction service providers, cloud service providers, etc. to accelerate deployment by leveraging technologies such as 5G, edge computing, narrowband Internet of Things (NB-IoT), software-defined networking (SDN), network function virtualization (NFV), time-sensitive networking (TSN), and space-based networkingAccelerate the large-scale deployment of IPv6

(Internet Protocol Version 6) with "low latency, high reliability, and wide coverage", deepen the speed and fee reduction of Internet high-bandwidth private lines, and reduce the cost of enterprise private line access and cloud services. Support manufacturing enterprises to transform the interconnection capabilities of "dumb equipment" on industrial sites, support diversified industrial data collection, promote the IP, flattening, and flexible transformation and upgrading of enterprise internal and external networks, and build a "internal and external collaboration, flexible, efficient, safe and reliable" internal and external network inside and outside the factory, so as to realize the extensive interconnection and data interoperability of production equipment.

The second is to promote the construction and application of the identification resolution system. Accelerate the construction and promotion of national industrial Internet top disaster recovery and service hosting centers, industrial Internet recursive resolution nodes, and key industry nodes, further increase the guarantee of key basic resources of industrial Internet resolution systems such as addresses, spectrum, and identification, build a compatible and open identification analysis service system that serves the whole country, promote technological integration and innovation, and improve

comprehensive data service capabilities. Deepen the application of logos in design, production, service and other links, promote the integration and development of logo resolution systems with industrial Internet platforms and industrial APPs, and accelerate the innovative application of analysis services in various industries.

The third is to promote the innovation and development of industrial big data. Promote the construction of industrial basic databases, organize and carry out industrial data resource surveys, rely on the database of the industrial Internet public service platform, and use statistical data and monitoring data in key areas to build provincial data resource databases in key industries. Accelerate the construction of provincial-level industrial Internet big data centers, build a closed loop of value for industrial big data collection, aggregation, circulation, analysis, and application, accelerate the efficient flow of data elements, drive the optimal allocation of manufacturing resources, and build a cross-regional and cross-industry industrial big data support service system. Accelerate the construction of a computing power infrastructure architecture with reasonable layout, edge-cloud collaboration, and cloud-network integration.

(2) Improve the supply capacity of technology and services for

the integration of industrialization and industrialization

The first is to accelerate the softwareization of industrial technology. Promote breakthroughs in core technologies of industrial software such as intelligent design and simulation, production control operation management, and market services, promote the softwareization of industrial knowledge such as industrial technology, principles, processes, and experience by industry and field, accelerate the integrated application, cloud migration and iteration of traditional industrial software, and form a microservice resource pool covering the entire industrial process. Create a number of industry-wide industrial APPs with high economic value and strong promotion role, cultivate a number of enterprise-specific industrial APPs for specific fields and specific scenarios, support the construction of open source communities and developer communities, develop industrial APP stores, and promote the promotion and application of industrial APPs. Promote the promotion and use of product research and development, operation management, and production control industrial software such as product life cycle management (PLM) systems, enterprise resource planning (ERP) systems, and manufacturing execution systems (MES) in small and medium-sized enterprises.

Column 1 Major industrial software

1. Product research and development industrial software

PLM: Product life cycle management, applied to enterprises with collaborative relationships within the enterprise or in the field of product research and development, supporting the creation, management, distribution and application of information throughout the product life cycle.

PDM: Product data management, software for managing all product-related information (including part information, configuration, documentation, CAD files, structure, permission information, etc.) and all product-related processes (including process definition and management).

CAD: Computer-aided design, industrial design software that uses computers and their graphics equipment to help designers carry out auxiliary design work.

CAE: Computer-aided engineering, which uses computer-aided solutions to solve, analyze, and optimize the structural mechanical properties of complex projects and products, and organically organizes all aspects of engineering (production).

CAPP: Computer-aided process design, using computer numerical calculation, logical judgment and reasoning and other functions to help process designers carry out process auxiliary design work.

EDA: Electronic design automation, using computer-aided design (CAD) software to complete the functional design, synthesis, verification, physical design (including layout, wiring, layout, design rule check, etc.) of the design method of the very large-scale integrated circuit (VLSI) chip.

2. Industrial software for operation and management

ERP: Enterprise resource planning, based on information technology,

with systematic management ideas to provide decision-making and operation methods for enterprise managers and employees.

CRM: Customer relationship management, using information technology and Internet technology to coordinate the interaction between enterprises and customers in sales, marketing and service, and provide customers with personalized services.

SCM: Supply chain management, used to improve the relationship between upstream and downstream supply chains, integrate and optimize information flow, logistics, and capital flow in the supply chain.

3. Production control industrial software

MES: Manufacturing execution system, facing the workshop execution layer of manufacturing enterprises, provides operators/managers with plan execution, tracking and the current status of all resources (people, equipment, materials, customer needs, etc.) production information management system.

CAM: Computer-aided manufacturing, which uses computer-aided control systems to complete the entire process from production preparation to product manufacturing.

SCADA: Data acquisition and monitoring control, a control system that collects on-site data in real time based on computers and provides necessary data acquisition and monitoring for production and management.

CPS: Cyber-physical system, comprehensive computing, network and physical environment, through the organic integration and deep collaboration of communication technology, computer technology and control technology, realizes the real-time perception, dynamic control and information service of large-scale engineering systems multi-dimensional complex system.

The second is to accelerate the research and development of basic hardware technology and products. Accelerate the research and development of basic hardware such as highly sensitive digital intelligent sensors, modules, gateways, programmable logic controllers (PLCs), frequency converters, servo controllers, automated production equipment, and industrial robots. Build a self-sufficient supply chain for integrated development of leading industries, encourage technical research and large-scale production of electronic components such as communication chips, industrial control chips, and sensor chips, increase the promotion of domestic hardware products, and improve the readiness and maturity of hardware products through large-scale applications. Encourage enterprises to accelerate the intelligent transformation of production equipment and production lines, popularize and promote automation technologies and edge computing systems such as programmable logic controllers (PLC), distributed control (DCS), and advanced process control (APC), and promote new intelligent equipment.

Box 2 Main industrial hardware
Digital intelligent sensor: The function of sensor detection information is organically integrated with the function of microprocessor processing information, which not only has the functions of digital sensor data collection,

A/D conversion, but also has the function of processing, storage and wireless transmission of collected data information.

Module: A specific functional component consisting of several basic functional components that can be used to form a fully functional system, device, or program.

Gateway: A hardware device that realizes network interconnection above the network layer, which is only used for the interconnection of two networks with different high-level protocols, and can be used for both WAN interconnection and LAN interconnection.

Automated production equipment: through numerous functional modules and perfect embedded solutions, the production equipment to meet the individual needs of many users to the greatest extent.

Industrial robots: machines and devices with a certain degree of automativity and can rely on their own power energy and control capabilities to realize various industrial processing and manufacturing functions.

Programmable logic controller (PLC): based on programmable memory storage to execute operation instructions such as logic operation, sequence control, timing, counting and arithmetic operations, and control various mechanical equipment or production process digital operation electronic system through digital or analog input and output.

Frequency converter: The power control equipment of the AC motor is controlled by changing the frequency of the working power supply of the motor using frequency conversion technology and microelectronic technology.

Servo controller: a control device that outputs the pulse signal or analog signal input from the controller to the motor after internal calculation and amplification, consisting of a servo control unit, a power drive unit, and a communication interface unit, which is widely used in automation equipment such as industrial robots and CNC machining centers.

The third is to accelerate the research and development and application promotion of system solutions. Focusing on new needs such as collaborative research and development, lean production, intelligent operation and maintenance, and industrial chain collaboration, we will support key enterprises and service providers to develop and promote system solutions that integrate product research and development, production control, and operation and management, improve the flexible deployment and comprehensive integration capabilities of solutions in different scenarios, and continue to improve the level of digitalization, networking, and intelligence in key industries. Promote the testing, verification and application promotion of integrated development solutions, increase the promotion of software and hardware technology innovation and application, form a precise docking mechanism between market service resources and enterprise needs, and promote the gathering, sharing and opening of solution resource elements. Encourage leading

enterprises in the industry to open up advanced technologies and application scenarios, and transform digital transformation experience into standardized solutions to radiate and promote to industry enterprises.

(3) Improve the empowerment level of industrial Internet platforms

The first is to improve the industrial Internet platform system. Vigorously promote the construction and development of cross-industry and cross-field comprehensive industrial Internet platforms, characteristic industrial Internet platforms for key industries and regions, and professional industrial Internet platforms for specific technical fields, and establish an industrial Internet platform system covering key industrial clusters and advantageous industrial chains in the province. Support the construction of industrial Internet platforms in the open source model, further expand the platform development ecology, and cultivate application scenarios. Establish and improve industrial Internet security supervision and inspection, risk assessment, information sharing and notification, emergency response, data protection and other legal systems and working mechanisms. Support key industrial parks in the province to create "Internet + advanced manufacturing" characteristic

bases.

Box 3 Industrial Internet platform
Cross-industry and cross-field comprehensive platform: refers to a type of platform that covers multiple industries such as raw materials, equipment, electronics, R&D and design, manufacturing, operation and maintenance services, and provides services such as industrial resource agglomeration and sharing, industrial data integration and utilization, industrial production and service optimization and innovation. Characteristic platforms for key industries and regions: refers to a type of platform that provides a driving role for industry transformation and regional coordinated development based on its own industry knowledge for certain key industry scenarios or regions. Professional platforms in specific technology fields: refers to a type of platform that focuses on key technologies such as cloud simulation, equipment cloud migration, and big data modeling, and carries the integration and innovation of cutting-edge technologies and industrial mechanism models around specific industrial scenarios and cutting-edge information technology applications.

The second is to deepen platform empowerment and services. Adhere to the division of industry policies, demand traction and scenario-driven, promote key industrial Internet platforms to gather industry resources and industrial APPs, develop digital

transformation solutions for enterprises, and quickly improve the digital transformation capabilities of platforms to empower enterprises. Give full play to the advantages of platform + intelligent production, improve the intelligent level of enterprise equipment, production lines and services, and form a new production mode with perception, self-learning, self-decision-making, self-execution and adaptive functions. Promote deepening cooperation between key industrial Internet platforms, promote cooperation in the promotion of platform products and services, carry out experiments and verifications on the adaptability, reliability, and security of industrial Internet platforms, and promote the continuous improvement of platform functions. Support industrial Internet enterprises to take the lead in organizing key technology research such as data integration, platform management, development tools, microservice frameworks, modeling and analysis, improve the integration and application and promotion service capabilities of emerging cutting-edge technologies such as big data, cloud computing, edge computing, artificial intelligence, blockchain, digital twins, virtual reality, and augmented reality, and improve the level of platform empowerment.

The third is to promote the innovation and application of "5G + industrial Internet". Focus on the province's advanced

manufacturing clusters and key industries, organize close cooperation between key enterprises, basic telecommunications enterprises, equipment vendors, etc., and promote the typical application of "5G + industrial Internet" from visual inspection, remote operation and maintenance, unmanned inspection, safety monitoring and other production peripheral links to auxiliary assembly, precise control and other core links, cultivate a number of replicatable and generalizable typical application scenarios, and create a number of benchmarks and models for network construction and application innovation, expand the development space of the industrial Internet. Carry out the construction of "5G + Industrial Internet" public service platform and industry test beds, and provide technical support such as consulting and design, talent training, testing and verification, evaluation and evaluation for industry enterprises. Explore the promotion path of "5G + Industrial Internet" integration and application, and build construction, application, business and profit models.

(4) Cultivate and integrate the development of new products, new models and new formats

The first is to vigorously develop new intelligent products. Promote the integration and innovation and industrialization of information technology and industry technology, support joint

research between manufacturing enterprises and information technology enterprises, promote the deep integration and application of artificial intelligence, 5G, advanced sensing, cloud computing and other technologies, and cultivate new intelligent equipment and products such as industrial-grade intelligent hardware, intelligent robots, smart ships, drones, smart wearable devices, and smart homes. Support the development of scenario-based applications based on intelligent equipment and products, accelerate the application and promotion in key industries such as industry, energy, transportation, medical care, and education, and serve to support the digital transformation of industries.

The second is to vigorously promote the new model of integrated development. Deepen the application of the industrial Internet industry, guide enterprises to open up the data flow between design and manufacturing, consumption and production, management and service based on the platform, and cultivate new models such as digital management, network collaboration, service-oriented extension, personalized customization (C2M), and intelligent manufacturing for specific industries. In petrochemical, metallurgical and steel, building materials, energy and other industries, promote digital, networked and intelligent production control of the whole

production process; In industries such as electronic information, consumer goods, and equipment manufacturing, we will promote the integrated and innovative application of "ultra-high-definition video + 5G + AI+VR", and promote the innovative application of new technologies and products in typical scenarios such as industrial visualization, defect detection, product assembly and positioning guidance, and robot inspection. Support service innovation such as user demand mining, product research and development, intelligent production, and data value-added based on consumer data, and vigorously promote new formats such as gig economy, shared manufacturing, modern supply chain, industrial e-commerce, and industrial chain finance in typical scenarios such as open source platforms, capability sharing, supply chain collaboration, and finance, so as to meet the needs of diversified and personalized consumption upgrades, and promote changes in enterprise production methods, enterprise forms, and business models.

Column 4 New models and new formats of integrated development of major manufacturing industries
Digital management: By opening up the core data chain, enterprises optimize, innovate and even reshape business activities such as strategic decision-making, product research and development, manufacturing,

operation management, and market services based on extensive data aggregation, integration and optimization, and value mining, and build a new data-driven and efficient operation and management model.

Platform-based design: Relying on digital platforms to achieve high-level and efficient lightweight design, parallel design, agile design, interaction design and model-based design, changing traditional design methods and improving R&D quality and efficiency.

Networked collaboration: Through cross-departmental, cross-level, and cross-enterprise data interoperability and business interconnection, enterprises and partners in the supply chain are promoted to share various information resources such as customers, orders, design, production, and operation, and realize networked collaborative design, collaborative production, and collaborative services.

Service-oriented extension: a new industrial form of integrated development of manufacturing and service, enterprises have transformed from processing and assembly to "manufacturing + service", from simply selling products to selling "products + services", including equipment health management, product remote operation and maintenance, equipment financial leasing, sharing manufacturing, Internet finance, etc.

Personalized customization: Manufacturing enterprises carry out automatic configuration and flexible scheduling of manufacturing resources around user needs, which is a user-centered and data-driven manufacturing model.

Intelligent manufacturing: Based on the intelligent operation of production equipment, production lines, workshops and factories, it realizes comprehensive self-perception, self-optimization, self-decision-making and

self-execution of production management and manufacturing.

The third is to vigorously promote green manufacturing and safety applications. Accelerate the digitalization of the green manufacturing system, guide enterprises to apply a new generation of information technology to carry out dynamic monitoring, precise control and optimal management of the whole process of resources, energy and pollutants, promote the use of clean energy, energy-saving transformation of high-energy-consuming equipment, etc., to help achieve carbon peak and carbon neutrality. Promote the "industrial Internet + safety production" management and control model in key industries, accelerate the networked connection, platform aggregation and intelligent analysis of safety production factors, encourage the development of safety production model libraries and tool sets by industry, promote the software precipitation of safety production management knowledge and experience, and guide industrial enterprises to accelerate the construction of a new capability system of rapid perception, comprehensive monitoring, advanced early warning, linkage disposal and system evaluation of safety production.

(5) Accelerate the digital transformation of enterprises

The first is to improve the management ability of the integrated development of industrialization and industrialization

of enterprises. Build a monitoring mechanism for enterprise information technology application, encourage enterprises to carry out self-assessment and self-diagnosis of the integration of industrialization and industrialization, strengthen hierarchical and classified guidance based on industry characteristics and development stages, and comprehensively promote enterprises to improve the digital integration and application capabilities of supply chain management, customer relationship management, quality management and other production and operation. Accelerate the full coverage of the standards of the integration of industrialization and industrialization management system in key areas and advantageous industries, guide enterprises to promote the innovation of production methods, management model reform and business model transformation through the implementation of standards, and promote the pilot demonstration and graded implementation evaluation of the upgraded version of the enterprise integration management system.

Column 5 The management system and implementation of the integration of industrialization and industrialization
The integration management system of industrialization and industrialization is a general method for enterprises to systematically establish, implement, maintain and improve the management mechanism of the integration of industrialization and industrialization, covering the overall

situation of the enterprise, which can help enterprises to stipulate the relevant processes of integration of industrialization and industrialization according to the needs put forward to achieve their own strategic goals, and make them continuously controlled, so as to form a new capability in the information environment required to obtain sustainable competitive advantages.

Implementation of the integration management system of industrialization and industrialization: Through the series of standards of the integration management system of industrialization and industrialization, lead enterprises to be value-oriented, capability-oriented, and data-driven, build and continuously improve the integration management mechanism of industrialization and industrialization in line with the development laws and trends of the digital age, promote the interactive innovation and continuous optimization of all elements such as data, technology, process, and organization, continuously create new capabilities, and promote the new capabilities of enterprises to leap step by step along the unit level, process level, network level, and ecological level. Thus, it empowers business transformation and upgrading, and ultimately obtains the expected value benefits of digital transformation.

The second is to improve the ability of enterprise data management. Improve the governance capacity of data resources, improve the sharing mechanism of industrial big data, carry out research on mechanisms such as industrial big data ownership determination, value assessment, resource exchange, benefit sharing,

and dispute negotiation, improve the multi-level linkage of industrial big data service support system, and promote the free flow, efficient aggregation and integrated application of industrial data. Improve the development and utilization capabilities of data resources, guide enterprises to improve the level of standardized management and development and utilization of data, strengthen the classification and hierarchical management of industrial data, carry out enterprise data management capability maturity assessment (DCMM), improve the quality of data resources, and enhance the data-driven collaborative research and development, flexible production and lean management capabilities of enterprises. Encourage enterprises to carry out training on data application and related tool use for employees, and improve the overall efficiency and level of data analysis and use within the enterprise.

Column 6 Industrial data classification and grading, enterprise data management capability maturity assessment
Industrial data classification and grading: Promote industrial data classification and grading in accordance with the "Guidelines for Industrial Data Classification and Grading" (Ministry of Industry and Information Technology Xinfa [2020] No. 6). Industrial enterprises combine production and manufacturing mode, platform enterprises combined with service operation mode, analyze and sort out business processes and system

equipment, consider industry requirements, business scale, data complexity and other actual conditions, classify and identify industrial data, and form a classification list of enterprise industrial data. At the same time, according to the potential impact that different types of industrial data may have on industrial production and economic benefits after being tampered with, destroyed, leaked or illegally used, industrial data is divided into three levels: first, second, and third.

Enterprise Data Management Capability Maturity Assessment: According to the Data Management Capability Maturity Assessment Model (DCMM), the enterprise industrial data management capability assessment is carried out, and the data management capability maturity is divided into five levels: initial, managed, robber, quantitative, and optimized.

The third is to improve the ability to build a digital industrial chain. Promote the digital upgrading of the industrial chain and supply chain, use a new generation of information technology to accelerate the collaborative transformation of the entire industrial chain, promote the transformation of the industrial chain from "chain" to "network", enhance adaptive and self-repair capabilities, and improve the flexibility and resilience of the industrial chain. Promote the implementation of digital delivery by key industrial chain backbone enterprises, promote digital delivery collaboration of upstream and downstream enterprises, and omni-channel and full-link

supply and demand allocation and precise docking. Give full play to the enabling role of the provincial industrial Internet platform in the element guarantee, R&D and design, capacity sharing, brand marketing, market expansion, financial services, collaborative cooperation, etc. of the industrial chain, comprehensively enhance the competitiveness of key links in the industrial chain, and cultivate a digital industrial ecology. Strengthen supply chain collaboration capabilities, support the construction of super virtual factories, lead the logistics chain and capital chain with data supply chains, promote efficient collaboration of industrial chains, and help promote the upgrading of industrial foundations and modernization of industrial chains.

Fourth, improve the digital transformation capabilities of enterprises. Rely on the industrial Internet platform to promote the breadth and depth of the application of cutting-edge new technologies such as 5G, artificial intelligence, and blockchain in the industrial field, and deepen the integrated application of emerging technologies and platforms. Continue to accelerate the migration of industrial equipment and business systems to the cloud platform, promote the cloud transformation of core business systems such as "procurement", "production" and "sales" of leading enterprises in the industry, build

industrial Internet benchmark factories and C2M digital factories, and drive the cloud migration of business systems of upstream and downstream enterprises in the industrial chain. Support key industrial Internet platform cloud service providers to develop digital solutions with low cost, fast deployment, and easy to use for the needs of small and medium-sized enterprises in different industries, improve digital transformation service capabilities, and promote small and medium-sized enterprises to go to the cloud platform. Comprehensively promote the penetration rate of digital tools, operation and management, industrial Internet platforms, and CNC of key processes.

Column 7 Star Cloud Enterprises
Based on the Internet, enterprises that carry out the construction and application of information infrastructure, management, business and other aspects around the three directions of core business to the cloud, data and equipment to the cloud, and innovative application based on "data + model", and connect social resources, shared services and capabilities through the Internet and cloud computing means. 1. Three-star cloud enterprises: enterprises that realize computing, storage, design, production, security and other services to the cloud by applying basic cloud services, industrial APPs, and carrying out data migration to the cloud.

2. Four-star cloud enterprises: cloud enterprises that realize cloud applications and services such as device management, data monitoring, and decision optimization through device migration.

3. Five-star cloud enterprises: cloud enterprises that realize new formats and new models such as market transaction analysis and forecasting, industrial chain collaboration, and enterprise operation analysis and forecasting through business cloud and device cloud migration, as well as innovative applications based on data + models.

(6) Strengthen the integration of industry and talent and innovation in industry and finance

The first is to promote the integration of industry and talent. Focus on strengthening the construction of industrial Internet talent training, encourage relevant colleges and universities in the province to carry out the construction of "new engineering" majors in the field of information and communication technology and the integration of industrialization and industrialization, strengthen the construction of the curriculum system, improve the talent evaluation mechanism, and promote the construction of characteristic and professional public service platforms, training bases and other carriers。 Focusing on the shortage of talents in advanced manufacturing clusters, support multi-level industrial Internet training, increase the training of integrated talents, improve digital thinking, strengthen the belief in digital

transformation, be familiar with digital business models, and continue to lead the promotion of digital transformation. Encourage school-enterprise cooperation to carry out joint education based on industrial needs, sink typical industry application scenarios, cultivate talents urgently needed for integrated development, and focus on cultivating leading talents in basic theoretical research, core technology development, and major project management in the manufacturing field.

The second is to deepen the innovation of industry and finance. Innovate financial service models, encourage manufacturing enterprises, platform enterprises and financial institutions to strengthen data sharing and business collaboration, innovate enterprise credit reporting mechanisms and movable property financing models based on real-time data on production and operation, and guide the capital market to increase investment in digital transformation, industrial Internet and other fields. Encourage the cooperation between the industrial Internet, big data, blockchain technology and the financial industry, build an industry-leading market-oriented industry-finance docking service platform, and alleviate enterprise financing problems by carrying out services such as intelligent matching, intelligent credit investigation, intelligent risk

assessment, and fund tracking.

The third is to improve the level of "entrepreneurship and entrepreneurship" in the manufacturing industry. Rely on the industrial Internet platform to build a multi-level service platform to serve the "double innovation" of the manufacturing industry, accelerate the digital transformation, online aggregation and platform sharing of innovation and entrepreneurship resources such as R&D, manufacturing, management, commerce, logistics, and incubation, and guide manufacturing enterprises to carry out innovation activities based on the platform using the resource elements of the whole society. Support the construction of a public service platform for "entrepreneurship and entrepreneurship" in the manufacturing industry, cultivate technology transfer centers and talent training centers for manufacturing "entrepreneurship and entrepreneurship", provide comprehensive services such as basic technology, project incubation, credit financing, and talent training for entrepreneurship and innovation teams, and cultivate a low-threshold, wide-coverage, and dynamic "entrepreneurship and entrepreneurship" service ecosystem.

4. Major projects

(1) Implementation project of the integration of industrialization

and industrialization management system

Carry out the evaluation, diagnosis and benchmarking guidance of the integration of industrialization and industrialization of enterprises. Focusing on 50 key industrial chains and 30 advantageous industrial chains, organize enterprises to carry out self-assessment, self-diagnosis and self-benchmarking of the integration of industrialization and industrialization, build a portrait of the integration and development of enterprises covering basic attributes, integration status, advantageous capabilities, and transformation needs, compile data maps of regional and industry integration of industrialization and industrialization, and form an integrated development monitoring system for 13 districted cities, provincial advanced manufacturing clusters, key industrial parks, and key enterprises. **Promote the pilot demonstration work of the upgraded version of the integrated management system of industrialization and industrialization.** Organize cities to carry out standard publicity and implementation exchanges, guide enterprises to carry out the implementation and evaluation of the integration of industrialization and industrialization management system in accordance with the requirements of new capacity grading construction and value and efficiency in stages, and focus on

metallurgy, machinery, textile and clothing, electric power, petrochemical, building materials, shipbuilding, equipment manufacturing, information technology, industrial automation and other industries to promote the pilot demonstration of the upgraded version of the standard implementation. **Improve the market-oriented service ecology of consulting for the integration of industrialization and industrialization.** In view of the new theory, new system, new standards, new methods and new services for the implementation of the standard, combined with the practice of model enterprises, regularly organize business training for the implementation of standard implementation service institutions, strengthen knowledge empowerment, provide more accurate and effective service content for the hierarchical classification of local enterprises, and self-develop and form hierarchical and classified standard implementation tools, methods, solutions, service models and service mechanisms, etc., and continuously improve the service ability and level of the upgraded version of the service team in our province.

(2) Upgrading the infrastructure of the integration of industrialization and industrialization

Accelerate the construction of new information and

communication infrastructure. Organize and implement the 5G and high-quality broadband "enterprise-enterprise communication" project, encourage and support enterprises to carry out internal and external network transformation, lay a solid foundation for "connecting parks, enterprises, workshops, and connecting equipment", and promote the improvement of 5G network coverage in the province. Promote the combination of 5G network construction and industry applications to ensure that 5G networks meet industry transformation and upgrading and high-quality economic development. **Improve the industrial Internet identification analysis system.** Support the construction of disaster recovery and custody service centers and industrial Internet recursive nodes for industrial Internet identification analysis national top nodes (Nanjing), promote node docking and operation services, encourage and support leading enterprises in the pharmaceutical, food, automobile and other parts industries to carry out the construction of secondary nodes for identification analysis, and accelerate the expansion of the province's logo registration scale, identification resolution volume and innovative application depth. **Carry out the assessment of the maturity of enterprise data management capabilities.** Strengthen the publicity and implementation of the

"Data Management Capability Maturity Assessment Model" (DCMM), carry out enterprise data management capability maturity assessment, guide enterprises to accelerate the digitalization of the whole business process with standards, realize the data penetration of the whole product life cycle, and form data-driven collaborative design, flexible production, lean management, and intelligent operation and maintenance capabilities. **Carry out the construction of industrial characteristic bases. Do a good job in the cultivation of** national new industrialization demonstration bases (industrial Internet) and provincial "Internet + advanced manufacturing" characteristic bases, support Nanjing, Suzhou, Wuxi, Changzhou, etc. to cultivate industrial ecology with integrated development of industrial Internet technology, industry, application and service around their own resource endowments and industrial characteristics, and accelerate the formation of a leading industrial Internet industry agglomeration area in China. **Promote the construction of digital smart parks.** Facing the new needs of park construction with comprehensive perception, ubiquitous connectivity, active service and intelligent evolution, guide and support all localities to incorporate new generation information technologies such as 5G, cloud computing, big data, and artificial intelligence into

the construction and transformation of industrial parks, and build a number of digital, networked and intelligent future smart parks.

(3) Integrated development of core technology breakthrough projects

Carry out common key core technology research. Establish a roadmap for the research and development of key technologies for digital transformation of enterprises such as 5G and industrial Internet, strengthen the cultivation of leading enterprises in key technology industries and related industries in vertical fields and the classification and guidance of related enterprises, regularly collect and analyze key technologies of the industrial Internet, sort out key research projects, organize key enterprises and scientific research institutes to jointly tackle key problems, and promote artificial intelligence, blockchain, digital twins, electronic components, Basic software and other key technology industries are integrated to make up for shortcomings and forge long boards. **Build a carrier for innovation and development of core technology industries.** Support key enterprises, universities, and scientific research institutes to carry out collaborative innovation, and build an integrated platform for industry, university, research and application and a public service platform for common technologies. Cultivate domestic industrial

software innovation centers, industrial Internet innovation centers (platforms), and digital transformation innovation and entrepreneurship platforms, continue to build Jiangsu industrial APP aggregation platforms, and cultivate third-party industrial APP application store brands. **Promote the transformation and commercial application of technological achievements.** Optimize the transformation mechanism of technological achievements, establish a technological innovation and application system that deeply integrates industry, academia, research and application, increase the autonomy of technology research and development personnel, expand the application scenarios of key technologies for integrated development, and promote the transfer and industrial application of technological achievements.

(4) Industrial Internet carrier upgrading project

Accelerate the construction of national platforms and centers. Further promote the construction and promotion of national application innovation experience centers, promotion centers and regional integrated public service platforms in Nanjing, Suzhou, Changzhou and other places, build a combination of online and offline technological innovation and verification, application promotion and service environment, and promote the precise docking and

collaborative innovation of platform supply and demand. Promote the construction of the Jiangsu Branch of the National Industrial Internet Research Institute and the Jiangsu Branch of the Industrial Internet Big Data Center, and promote the research and development of industrial big data collection, sorting, analysis, application and other links. **Promote the cultivation and upgrading of provincial key platforms.** Focus on key regions and industries with a good foundation for digital transformation of enterprises and strong driving effects of backbone enterprises, continue to deepen the construction of dual-cross-level, regional, industry-level, enterprise-level and supply chain industrial Internet platform systems, accelerate the coverage of platform services, improve the level of platform application services, and accelerate the innovation and transformation of production methods and industrial forms. **Promote the construction of industrial Internet benchmark factories.** Cooperate with professional institutions such as the China Academy of Information and Communications Technology and the National Industrial Information Security Development Research Center to carry out consultation and diagnosis of industrial Internet benchmark factories, project inspections, etc., focus on the optimization and control of the whole industrial chain of production and

manufacturing, the whole production process, the whole life cycle of products, and all elements of assets, continue to improve the construction guidelines of industrial Internet benchmark factories, cultivate a number of industry-level industrial Internet benchmark factories, C2M digital factories, and accelerate the formation of One industry, one benchmark factory". **Accelerate the migration of small and medium-sized enterprises to the cloud platform.** Continue to optimize the construction guidelines for provincial star-rated cloud enterprises, and create a number of star-rated cloud enterprises around three key directions: core business cloud, data and equipment cloud, and innovative applications based on "data + model"; Encourage cities to reduce the threshold and cost of enterprises to go to the cloud through "targeted cloud vouchers" and other methods, vigorously promote small and medium-sized enterprises to go to the cloud platform, and promote small and medium-sized enterprises to accelerate digital transformation. **Promote the construction of the Yangtze River Delta Industrial Internet Integrated Development Demonstration Zone.** Every year, the key points of industrial Internet integration in the Yangtze River Delta are formulated, and exchanges and cooperation between regional authorities and enterprises are strengthened to promote the high-quality integrated

development of the industrial Internet in the Yangtze River Delta by jointly carrying out special actions (activities) such as industrial Internet technology research, platform docking, enterprise cooperation, standard sharing, landing co-construction, and conference competitions.

(5) Integration solution application docking project

Build a resource pool for integrated development solutions. Collaborate with professional institutions such as the National Industrial Information Security Development Research Center and the China Institute of Electronic Technology Standardization to cultivate and develop a number of industry-level integrated development solutions by industry and link around collaborative research and development, lean production, intelligent operation and maintenance, industrial chain collaboration, digital supply chain management and other fields, form an industry solution resource pool, and improve the flexible deployment and comprehensive integration capabilities of solutions in different scenarios. **Organize and carry out the application and promotion of new models and new formats of integrated development.** Focusing on the needs of deep integration such as "industrial Internet + 5G, artificial intelligence, digital twin, blockchain, extended reality (XR) and data center", excellent

solutions and system service providers will be selected by industry, mode and field, and the integration of industrialization and industrialization into counties (districts) and parks will be carried out to accelerate the implementation and promotion of new models and new formats. Organize the "Industrial Internet + Safety Production" platform and enterprises to enter parks and enterprises, and improve the safety production perception, monitoring, early warning and disposal capabilities of key parks and enterprises. **Continue to promote the action of strengthening the chain and expanding the city.** Support in-depth cooperation between key industrial e-commerce platforms and industrial Internet platforms with brands and leading enterprises in the province, drive upstream and downstream supporting enterprises to improve the supply chain, improve the level of comprehensive development and utilization of supply chain data, promote innovative applications such as supply chain finance, industrial supermarkets, industrial credit, and blockchain, and promote the restructuring and upgrading of the supply chain. Relying on the shared manufacturing platform, we will promote the integration of service resources and solution application and promotion of common links of enterprises such as design and development, logistics and warehousing, data analysis, and

equipment maintenance, and realize networked collaborative design, collaborative production, and collaborative services. **Organize consultation and diagnosis of key enterprises.** Facing the needs of digital, networked and intelligent transformation of the manufacturing industry, evaluate the development status of the deep integration of industrialization and industrialization of enterprises, help enterprises clarify their development goals and main tasks, study and formulate strategic plans and action plans, and support enterprises to improve quality and efficiency, transformation and upgrading, and build new capabilities.

(6) Industrial Internet leading enterprise cultivation project

Promote the development and growth of leading backbone enterprises of the industrial Internet. Focus on industrial Internet networks, platforms, security and other industrial fields, and implement the industrial Internet leading enterprise cultivation plan. Support key industrial Internet platforms in our province to upgrade technical products and improve service capabilities, encourage the exploration of mature business models, and accelerate the promotion and application of platforms in manufacturing enterprises; Promote the innovation of key enterprise formats and models of the industrial Internet, deepen market and business cooperation, promote the

implementation of enterprise mergers and acquisitions and development and growth, promote the high-quality development of the digital economy with the industrial Internet, and actively lead the development of the industrial Internet industry; Deeply organize and carry out the cultivation of industrial Internet unicorns, quasi-unicorns, and gazelle enterprises, support the development of industrial Internet enterprises with good quality and strong driving effect, and actively cultivate "chain master" enterprises in the industrial Internet industry chain. **Cultivate a group of leading talents in the industrial Internet.** Promote the establishment of industrial Internet professional disciplines in colleges and universities in the province, pilot the construction of industrial Internet colleges (research institutes and training bases), establish a joint training mechanism for interdisciplinary talents, and increase efforts to cultivate multidisciplinary and multidisciplinary compound industrial Internet professionals; Through the provincial "entrepreneurship and entrepreneurship plan" and "333" talent projects, vigorously introduce leading talents and talent teams in the field of industrial Internet "stuck neck" and "high-precision and cutting-edge"; Continue to organize provincial science and technology entrepreneurs and heads of key enterprises to carry out multi-level industrial Internet training.

Deepen the industrial Internet industry and integration cooperation. Improve industrial and financial cooperation mechanisms, promote innovation in financial products and services based on industrial Internet platforms, and guide financial institutions to strengthen precise docking with key cities (counties, districts), key clusters, key platforms, and key enterprises in the fields of digital transformation and industrial Internet. Encourage industrial capital and financial capital to set up industrial Internet industry funds, investment trust plans or investment funds to help accelerate the development of key industrial Internet enterprises. Strengthen communication and cooperation with relevant departments, actively do a good job in the listing cultivation and guidance and recommendation of key industrial Internet enterprises in the province, and continuously expand the scale of investment and financing that respects the laws of market and industrial development.

(7) Industrial information security assurance strengthening project

Build an integrated network security guarantee system. With the goal of "strengthening top-level design and doing a good job in regulatory support", we will continue to strengthen the construction of security technical means, upgrade and improve the functions of

platform systems, and build a three-level network and data security supervision technical support platform covering network infrastructure such as telecommunications networks, the Internet, and the industrial Internet. **Improve the industrial information security policy system.** Establish and improve laws and regulations, systems and working mechanisms such as industrial Internet security supervision and inspection, risk assessment, information sharing and notification, emergency response, and data protection, consolidate the main responsibility of enterprises, guide enterprises to establish security management systems and internal control systems, and explore the implementation of classified and hierarchical management of industrial Internet security enterprises. **Strengthen the security protection of industrial Internet platforms**. Promote the construction of provincial industrial Internet security situational awareness platforms, information sharing and emergency service platforms, and industrial information security monitoring platforms in key areas, promote the localization and replacement of core software such as industrial control systems and real-time databases, and cultivate industrial information security protection star enterprises. **Vigorously develop the industrial information security industry.** Create a "double creation" environment and incubation base for the

industrial information security industry where resources gather and share elements, cultivate a number of leading industrial information security enterprises, accelerate breakthroughs in "external security" protection technologies such as host protection, network protection, and threat detection, and drive the overall improvement of the information security industry chain and supply chain.

5. Safeguard measures

(1) Strengthen organizational leadership

Strengthen the leading and coordinating role of the provincial industrial Internet promotion work class under the office of the provincial leading group for the construction of a strong manufacturing province, increase work cooperation with the provincial development and Reform Commission, the Department of Science and Technology, the General Communications Administration and other departments, and coordinate the promotion of important policies, major projects, key projects and action plans. Strengthen the linkage between provinces, cities, counties and counties (districts) and industry-university-research-application cooperation, and jointly implement action plans such as the integration of industrialization and industrialization into the standard, benchmark factories, platform cultivation, enterprise cloud migration,

industrial APP promotion, and industrial control security. Strengthen the follow-up and evaluation of the publicity and implementation of the plan, and encourage all districted cities to scientifically formulate special plans and action plans based on actual conditions to ensure the implementation of the main objectives, tasks and projects of the plan.

(2) Strengthen policy support

Give full play to the guiding role of special funds for the transformation and upgrading of the provincial industrial and information industry, study and formulate several policy opinions to accelerate the digital transformation of the province's manufacturing industry, and increase policy and financial support for network infrastructure, industrial Internet benchmark factories and platform systems, solution service providers, information security and core technology research. Encourage local government investment funds to cooperate with social capital, increase investment in outstanding enterprises and service providers integrating industrialization and industrialization, and promote qualified enterprises to enter the multi-level capital market for direct financing. Encourage banks, insurance, guarantees and other financial institutions to cooperate with industrial Internet enterprises to launch innovative financial services and financing products. Promote the integrated development of the

national new generation of information technology and manufacturing, various pilot demonstrations such as the industrial Internet, industrial Internet innovation experience and service centers and public service platforms in our province, and cultivate a number of Jiangsu models of national manufacturing digital transformation demonstrations.

(3) Strengthen talent gathering

For key areas such as industrial Internet, big data, industrial software, and industrial information security, rely on and support key enterprises in the province's universities and research institutes, manufacturing and information service industries, increase the introduction of world-class talents and teams, and widely attract "top" talents and teams. Implement the construction and deployment of "new engineering", study and compile a work plan to promote the integration and development of industrial Internet industry and talent, build and upgrade a number of industry-talent integration innovation platforms and professional talent training bases, accelerate the promotion of professional (academic) education and vocational education in the field of industrial Internet, and expand the compound "craftsman" team. Cooperate with the China Academy of Information and Communications Technology, Nanjing Institute of Information

Management, Provincial Enterprise Information Association, etc., to continue to carry out training such as provincial science and technology entrepreneurs and provincial industrial Internet innovation and application cultivation, and cultivate "leading" figures of Suzhou businessmen.

(4) Optimize the development environment

Support Nanjing, Changzhou and Suzhou to hold the World Industrial and Energy Internet and Industrial Equipment Expo, the National Industrial Internet Platform Conference, the National Industrial Internet Skills Competition, and the Yangtze River Delta Industrial Internet Development Conference, and hold industrial Internet theme forums, exhibitions and intelligent manufacturing competitions during the World Intelligent Manufacturing Conference, the World Internet of Things Expo, and the International Software Products and Information Services Trade Expo, so as to create a Jiangsu brand with deep integration of industrialization and industrialization. Organize and promote the in-depth activities of industrial Internet travel around provinces and districts and counties, continue to interpret relevant policies for the integration of industrialization and industrialization, widely publicize and promote new concepts, new technologies, new models, new experiences and

new achievements of the integration of industrialization and industrialization, and create a good development environment for enterprises.

Jiangsu Province's "14th Five-Year Plan" radio management development plan

The "14th Five-Year Plan" is the first five years to start a new journey of building a modern socialist country in an all-round way, and the strategic position of radio spectrum resources as a basic and scarce core strategic resource will be further highlighted. In order to further implement the strategy of manufacturing power and network power, and deeply implement the three national strategies of the "Belt and Road" construction, the development of the Yangtze River Economic Belt and the integrated development of the Yangtze River Delta region, this plan is formulated in accordance with the "14th Five-Year Plan for National Radio Management and Development", the "14th Five-Year Plan for National Economic and Social Development of Jiangsu Province and the Outline of Long-term Goals for 2035", combined with the actual radio management work in our province.

1. Review of the main work of the "13th Five-Year Plan"

During the "13th Five-Year Plan" period, the province's radio management agencies firmly established the development concept of innovation, coordination, green, openness and sharing, according to

the "three management, three services, and one prominence"The overall requirements are to closely follow the key points of work, actively explore and innovate, strengthen service management, continuously improve the efficiency of radio management, continuously optimize the management of frequency stations, steadily advance the construction of technical facilities, maintain the radio wave order solidly and effectively, carry out administrative norms in accordance with the law, and deepen the service of national defense, achieve the "double improvement" of radio management capabilities and security levels, and better complete the overall goal of the "13th Five-Year Plan", and make important contributions to promoting the economic construction, national defense construction and social undertakings of our province.

(1) Continuous optimization of systems and mechanisms

During the 13th Five-Year **Plan** period, the radio management agency of Jiangsu Province has undergone two institutional adjustments, further straightening out the system and mechanism. After the reform, the administrative functions of radio management were merged into the Department of Industry and Information Technology of Jiangsu Province, and the radio management office (listed as the "Provincial Radio Management Office") and the radio

supervision and inspection office were set up, and the radio administrative licensing function was adjusted to the newly established "Administrative Examination and Approval Office" ”。The municipal radio management agency is unified into a districted city bureau of industry and information technology, and the sign of "XX City Radio Management Office of Jiangsu Provincial Department of Industry and Information Technology" is added, and the work responsibilities are clarified. The provincial and municipal radio monitoring stations are unified as public institutions directly under the Jiangsu Provincial Department of Industry and Information Technology and the Industry and Information Technology Bureaus of each districted city. Provincial and municipal radio management functional offices and provincial and municipal radio monitoring stations jointly perform the radio management and technical functions of the province.

(2) Efficient use of frequency stations

Scientifically plan and allocate spectrum resources. Formulate and issue provincial frequency allocation and use plans such as remote control telemetry and broadband wireless access, coordinate the use needs of the province's government affairs, civil aviation, railways, rail transit, electric power, meteorology, ports and other

units, strengthen frequency reuse and coordination, promote network co-construction and base station sharing, improve frequency use efficiency, and promote the development of broadband wireless private networks in the province's government affairs and industries. Carry out frequency performance evaluation by category, reasonably recover idle and low utilization frequencies, and alleviate structural tensions and contradictions in frequency resources.

Give full play to the efficiency of spectrum resources to serve the development of key industries. Focusing on the strategy of serving the "strong network province" and "strong manufacturing province", we will take the initiative to carry out frequency demand research for key projects and major projects, implement precise services, and ensure the rapid development of key industries. Support operators to carry out outfield testing of 5G test networks, solidly promote the coordination of interference between 5G base stations and satellite earth stations, clarify coordination procedures and establish a coordination mechanism, complete the coordination work of hardware transformation to improve the anti-interference capability of 566 satellite earth stations, respond to and deal with 55 related interferences in a timely manner, effectively ensure the construction progress of 5G base stations, and help the development of the 5G

industry. Ensure the use of Internet of Vehicles frequency in Jiangsu (Wuxi) National Pilot Zone, and promote the rapid and healthy development of the province's Internet of Vehicles industry; Explore the establishment of a coordination and co-management mechanism to promote the frequency reuse and base station sharing of private networks in electric power, subways, ports and other industries.

Rational layout and approval of stations. During the 13th Five-Year Plan period, 68,818 new radio station licenses were issued and renewed, and 717 license reviews were completed. Strengthen the coordination of the establishment of large stations, optimize the approval procedures, organize and carry out electromagnetic compatibility analysis, testing and verification, strengthen the coordination between the military and the local government and departments, and complete the establishment of large stations such as radar, broadcast transmitters, and satellite earth stations. Strengthen the construction of frequency station management information system and do a good job in frequency station database maintenance. Timely do a good job in adjusting the management model of national amateur radio, organize 69 amateur radio station operation examinations, and issue 3,944 amateur radio station licenses.

(3) Facility construction is steadily advancing

Promote the construction of key projects in an orderly manner. During the 13th Five-Year Plan period, the province built 12 new first-class fixed stations, 50 third-class fixed stations, and 21 fourth-class fixed stations, and the monitoring coverage rate increased by 21.9%. The upgrading and transformation of existing monitoring facilities has been promoted in an orderly manner, and the monitoring capacity has been significantly improved. Innovatively carry out the test and construction of airborne radio monitoring systems to effectively improve signal capture and discovery capabilities in complex environments. Coordinate and promote the construction of border and sea projects. Compile the "Special Plan for the Construction of Border and Sea Radio Management Technical Facilities in Jiangsu Province" to guide the construction of technical facilities in coastal areas. A border and sea engineering radio monitoring network covering land, ports, fishing grounds and islands in the three coastal cities of Jiangsu has been initially built.

(4) Carry out administrative norms in accordance with the law

Actively promote the revision of the "Regulations on Radio Management in Jiangsu Province", formulate the "Interim Measures for Complaints and Investigations of Radio Interference", the "Discretionary Benchmark for Administrative Penalties in Radio

Management in Jiangsu Province", and revise the "List of Administrative Powers of Radio Management System in Jiangsu Province". Innovate and carry out administrative law enforcement in radio management, and sign administrative law enforcement power of attorney with the industry and information technology bureaus of districted cities. Further standardize the work process and complete all kinds of radio administrative approvals on time. Formulate the "Implementation Plan for the Supervision of Radio Management in Jiangsu Province" to strengthen supervision during and after the event. Strengthen the management of radio transmission equipment, solidly carry out random spot checks of radio transmission equipment production and sales enterprises, and organize rectification and implementation to look back.

(5) Solid and strong security guarantees

Establish and improve the radio safety guarantee mechanism for major events, simplify the work process, and improve the guarantee plan. During the 13th Five-Year Plan period, the G20 Hangzhou Summit, the 19th National Congress of the Communist Party of China, and the Belt and Road Initiative were successfully completed Radio safety assurance work for major events such as the International Cooperation Summit Forum, National Memorial Day,

and new crown epidemic prevention and control, and more than 650 cases of radio interference were investigated and dealt with. A total of 600,000 hours of protective monitoring of important services and key frequency bands have been carried out. Carry out in-depth radio "anti-cheating" work, and ensure 45 batches of national examinations and hundreds of batches of provincial and municipal examinations. Continue to carry out special actions to crack down on "black broadcasting" and "pseudo-base stations", and investigate and deal with "black broadcasting" and "pseudo-base stations"545 cases.

(6) Serving national defense continues to deepen

Thoroughly implement the national security strategy and strive to improve the ability of radio management services to build national defense. organize and carry out radio potential verification data statistics, and conscientiously do a good job in national defense information mobilization; Continuously improve the working mechanism for military-civilian coordination, organize and carry out the use of frequencies, station settings, and major activities to ensure military-civilian coordination, and effectively solve matters such as the use of shared frequencies between the military and the civilian, the location of key stations, and the joint investigation and handling of harmful interference with the military and the civilian.

During the "13th Five-Year Plan" period, remarkable achievements have been made in radio management in our province, but there are also some problems and deficiencies. For example, the radio management system and mechanism need to be further improved, and the structural shortage of radio spectrum is difficult to meet the development needs of new technologies, new applications and new formats. It is difficult to select the location of large stations, and it is difficult to coordinate interference and coordination, forming new challenges. the construction of technical facilities needs to be further coordinated; the construction of the talent team needs to be further strengthened, etc.

2. The development situation faced by the "14th Five-Year Plan"

(1) Spectrum resources support high-quality economic and social development facing new problems

Radio spectrum resources have become an important production factor to promote industrial transformation and upgrading, build a new generation of information infrastructure, and develop the digital economy, and are a scarce and important strategic resource for the country. During the "14th Five-Year Plan" period, the development of our province is still in a period of important strategic opportunities, and promoting innovation and breakthroughs, accelerating industrial

upgrading, building a new development pattern, and building a new driving force for high-quality development are still the main tasks of our province. With rapid economic and social development, the contradiction between supply and demand of frequency resources has become increasingly prominent. Overall coordination and rational allocation of spectrum resources to effectively meet the frequency needs of all walks of life have become very important and urgent issues faced by radio management agencies.

(2) The rapid development of radio services puts forward new requirements for radio supervision

With the rapid development of the global information and communication industry, radio technology is constantly evolving in the direction of higher frequency bands, larger bandwidth, and lower power. Radio transmission equipment is widely used, the number of radio stations of various types has shown explosive growth under the Internet of Everything, the electromagnetic environment is becoming more and more complex, and harmful interference is complex and changeable.

(3) The task of radio security in the new era is facing new challenges

The report of the 19th National Congress of the Communist

Party of China pointed out that "adhere to the overall national security concept and coordinate development and security". The National Defense Law of the People's Republic of China lists electromagnetic space as a major national security and defense field, and puts forward higher requirements for radio security. In recent years, the number of major activities and important examinations in our province has surged, and illegal acts such as illegal use of radio equipment have shown a high incidence. Ensuring radio safety is an important challenge facing radio management during the 14th Five-Year Plan period in our province.

(4) The development of emerging industries in radio management services urgently needs new ideas

With the in-depth implementation of the major strategy of manufacturing power and network power, and the continuous and in-depth promotion of the construction of a new Jiangsu of "strong, rich, beautiful and high", during the "14th Five-Year Plan" period, emerging industries such as 5G, industrial Internet, Internet of Vehicles, and the Internet of Things in our province will continue to develop rapidly, artificial intelligence, big data, The new generation of information technology such as blockchain will continue to innovate and accelerate the transformation of "Made in Jiangsu" to

"Made in Jiangsu"Promote the construction of an industrial science and technology innovation center with global influence. In this context, the radio management agencies of our province urgently need to think about how to combine radio management with the development of emerging industries from multiple angles and dimensions, how to innovate the radio spectrum resource management model, improve service efficiency and guarantee level, strengthen the integration and development of wireless technology applications, and serve the high-quality development of the economy and industry.

3. Guiding ideology, basic principles and development goals

(1) Guiding ideology

Adhere to the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, thoroughly implement the spirit of the 19th National Congress of the Communist Party of China and the 2nd, 3rd, 4th and 5th Plenary Sessions of the 19th Central Committee, and thoroughly study and implement the spirit of General Secretary Xi Jinping's important speech on Jiangsu's work. Closely following the overall goal of "strong, rich, beautiful and high", with the theme of promoting high-quality development, with reform and innovation as the driving force, and focusing on improving the

comprehensive supervision and service level of radio management, based on the new development stage, implementing the new development concept, and building a new development pattern. Implement the relevant requirements of the "14th Five-Year Plan" national radio management and development plan, better coordinate radio development and safety, continuously improve the utilization of radio spectrum and station management, strive to maintain safe and orderly radio wave order, make every effort to ensure the safety of electromagnetic space, efficiently help and support industrial development, and strive to promote radio regulatory capacity building to better serve Jiangsu's economic and social development.

(2) Basic principles

1. Scientific allocation to serve the overall situation

Under the overall leadership of the party, strengthen the overall planning of radio management, take radio management services for economic and social development and national defense construction as the overall situation, coordinate the frequency demand of various industries and departments, scientifically allocate spectrum resources, and rationally lay out the construction of technical facilities.

2. Govern according to law and strictly enforce the law

Strictly implement the "Regulations of the People's Republic of

China on Radio Administration" and relevant laws and regulations, improve the radio management law and regulation system in our province, strengthen law enforcement capacity, strictly enforce the law fairly, impartially, and openly, resolutely crack down on radio illegal and criminal activities, strengthen legal popularization and education, and improve the level of the rule of law in radio management.

3. Improve quality and efficiency, and pay attention to practicality

Focusing on the development trend of radio technology, focusing on solving problems and deficiencies, focusing on strengthening radio supervision, ensuring electromagnetic space safety and serving high-quality economic and social development, adapting measures to local conditions, moderately advanced, focusing on practicality and operability, and promoting the quality and efficiency of radio management.

4. Help the industry and deepen integration

Actively integrate into the overall development of Jiangsu Province to build an independent, controllable, safe and efficient modern industrial system, aim at the strategic direction of the development of a strong province in science and technology,

manufacturing and network, aggregate social resources, give full play to functional advantages and technical expertise, improve comprehensive management functions, improve professional service capabilities, promote the deep integration of radio management and related industry development, and create opportunities for coordinated development.

(3) Development goals

1. The main goals of the "14th Five-Year Plan"

By 2025, the radio management in our province will reach a new level in terms of "two systems", "two capabilities" and "one level", that is, the radio rule of law system will be more perfect, the radio management system will be continuously improved, the radio supervision capacity will be continuously strengthened, the radio service capacity will be significantly improved, and the comprehensive level of radio management will be at the forefront of the country, so as to better serve and support the construction of a "strong, rich, beautiful and high" new Jiangsu.

-- Improve the local rule of law system. The local legal system for radio management has been further improved, the joint law enforcement mechanism and comprehensive law enforcement methods have been further strengthened, and the intensity of

administrative law enforcement has been comprehensively improved, creating a clean and upright environment for the rule of law in radio management.

-- Improve the management system and mechanism. Form a radio management system with clear functions, sound institutions, perfect systems, and reasonable talent structure, improve and innovate various management and coordination mechanisms, and further improve the efficiency of radio management.

-- Improve the level of administrative management. Promote the reform of "one thing" in depth, and make government services more convenient and efficient. Scientifically plan spectrum resources, build a full life cycle management mechanism for spectrum resources, and efficiently utilize frequency resources. Standardize and refine the management of various radio stations, and establish a hierarchical and classified station management model.

-- Expand technical support capabilities. Expand the monitoring frequency bands and monitoring capabilities of radio management technology facilities, further improve the integrated platform, promote the application of new technologies such as big data, integrate various business systems, realize data resource sharing, comprehensively improve the intelligent level of technical facilities,

and build a scientific, reasonable, flexible and complementary radio management technology facility support system.

-- Improve safety and security capabilities. Further improve the radio safety guarantee mechanism for major activities, important business and emergency response, build a hierarchical and classified radio security system, and significantly enhance the radio security guarantee capability. Improve the level of military-civilian integration. Establish and improve the coordination mechanism for military and civilian radio management, and realize the exchange and sharing of military and civilian radio management resources.

-- Enhance service support capabilities. Strengthen service awareness, improve service efficiency, accurately supply spectrum resources, do a good job in service guarantee, and support the rapid development of new technologies, new applications, and emerging industries. Do a good job in overall coordination, create a good development environment, meet the needs of our province's economic, social and national defense construction, and help the coordinated development of various undertakings.

Table 1 The main objectives of the 14th Five-Year Plan work of radio management in Jiangsu Province

Seria	Indicator	Indicator name	Target	Properti

l number	category		value	es
1	Frequency station management	The administrative license of the frequency station is completed on time	100%	Binding
2		The rate of investigation and punishment of major violations	⩾95%	Anticipation
3	Technical capabilities	The monitoring coverage rate of the province has increased	⩾10%	Anticipation
4		The frequency band of fixed monitoring facilities has been expanded to 6GHz	⩾60%	Anticipation
5		The frequency band of mobile and removable monitoring stations has been expanded to 18GHz	⩾20%	Anticipation
6		Monitoring coverage of important coastal ports	100%	Anticipation
7		The access rate of the integrated platform of various fixed and mobile monitoring facilities	⩾90%	Anticipation

2. Long-term goals for 2035

The efficiency and benefits of radio spectrum resource

utilization have been greatly improved, and the service support capacity for industrial development and scientific and technological innovation has been significantly enhanced, which has become an important driving force for promoting industrial transformation and upgrading, achieving high-quality development, and building a modern socialist economic system in our province. The radio management laws and regulations system are sound and perfect, maintain the safety and order of electromagnetic space, and form a comprehensive radio management system that meets the needs of economic and social development and national defense construction in our province.

4. Main tasks

(1) Scientifically allocate spectrum to enhance the efficiency of use

1. Scientific planning

According to the frequency plan issued by the state and combined with the actual situation of our province, relevant frequency planning, frequency allocation and use opinions will be formulated in a timely manner. Strengthen regional coordination in the Yangtze River Delta and formulate 14GHz、1.8GHz boundary frequency coordination method. Support the application of new radio services

and technologies, do a good job in tracking frequencies such as 5G private network, Internet of Vehicles, Internet of Things and industrial Internet, and create a good application environment.

2. Efficient configuration

Strengthen the construction of spectrum engineering and improve the ability of electromagnetic compatibility analysis. Research and analyze the current situation of radio frequency use, study and judge the development trend, and scientifically allocate frequencies around key industry applications and new infrastructure, Yangtze River Economic Belt, and smart city construction. Promote the pilot application of 5G industry, and carry out feasibility studies on the integration of private and public networks in some industries.

3. Optimize management

Study the whole life cycle management mechanism of frequency resources, and improve the work specifications and management methods related to frequency application, use, adjustment, and recovery. Innovate frequency management methods and promote multi-departmental and multi-industry coordination and co-management models. Carry out feasibility studies on allocating frequency resources through market-oriented methods such as auctions and bidding, explore the establishment of competitive

frequency allocation models, solve the contradiction between supply and demand of frequency resources, improve the utilization rate of frequency resources, and give full play to their economic and social benefits.

(2) Innovate station management to achieve fine standardization

1. Deepen hierarchical and classified management

Strengthen the capacity building of dynamic supervision, complete the construction of data interaction systems for public mobile base stations and broadband wireless access private network base stations, obtain base station information in real time, and realize unified monitoring and management of base station radio frequency information. For public mobile communications, Internet of Vehicles, rail transit, civil aviation, and other relatively large and widely used stations, explore the use of batch licensing and light licensing management methods. Carry out the establishment of an integrity system for the legal use of stations, guide the establishment of radio stations in accordance with the law, and standardize the use of radio frequencies.

2. Promote standardized management

Adhere to the principles of convenience and efficiency, further simplify the approval procedures for setting up stations, and improve

the efficiency of administrative services. Upgrade the comprehensive business system, add the function of entering the license information of the new version of the station, and realize the electronic license. Strengthen the collection, update, and integrity review of station data to ensure the completeness, accuracy, real-time, and standardization of data. Equipped with a portable station database query terminal, regular verification is carried out to realize remote and rapid search and comparison of station information, and promote the standardization of station management.

3. Implement the protection of key stations

For special stations such as civil aviation, water, railways, public security, and emergency response, establish a list of key station protection. Establish a coordination and contact mechanism and a regular visit system for key protection stations, implement special protection measures and responsible persons, strengthen special supervision of navigation, train adjustment, radar, emergency response and other stations, and ensure the standardized use and safe operation of the above-mentioned stations.

(3) Strengthen security and maintain radio wave order

1. Improve the radio security system

(1) Improve the radio safety guarantee mechanism. Formulate

the "Jiangsu Province Radio Security and Emergency Response Plan", combine the importance, urgency, and guarantee focus of major tasks such as emergency rescue and disaster relief, counter-terrorism and emergencies, and major activities, further improve the radio safety emergency management, guarantee process and interference emergency response mechanism, and formulate radio safety emergency response plans by level and classification.

(2) Improve the inter-departmental cooperation mechanism. In view of outstanding problems such as "black broadcasting", "pseudo-base stations" and satellite jammers, establish cooperation with public security, radio and television,Market supervision and other departments jointly investigate and deal with mechanisms, give full play to the functional advantages of competent departments and industry systems, jointly carry out special rectification, and jointly implement law enforcement investigations and punishments. In view of the characteristics of important businesses such as civil aviation, railways, and water, strengthen communication and coordination between departments, and build a joint prevention and control system along air routes, railways, and coastlines along rivers. For the supervision of UAV suppression equipment, strengthen communication and cooperation with relevant departments such as

civil aviation, military, public security, and national security, establish a long-term mechanism for the supervision of UAV suppression equipment, and form a closed-loop mechanism for monitoring, management and banning UAV equipment. Cooperate with examination departments at all levels in the province to establish a coordinated and long-term working mechanism, strictly investigate the use of radio equipment to engage in exam cheating, and maintain the fairness and impartiality of the examination. Further deepen ties with the competent departments of public security, radio and television, transportation, forestry, and communications, establish emergency support mechanisms for emergency rescue and disaster relief, and efficiently do a good job in emergency rescue and disaster relief support.

(3) Innovate radio security guarantee methods. Explore ways to effectively solve the problem of insufficient number of support personnel and technical equipment by purchasing third-party services, giving full play to the role of amateur radio enthusiasts, and encouraging key frequency users to monitor their own frequency bands, timely detect and investigate interference, eliminate hidden dangers of radio interference, and do a good job in the daily work of radio safety and security.

2. Strengthen border and sea security

Coordinate and promote the in-depth development of the electromagnetic spectrum, and strive to improve the ability to perceive the electromagnetic environment, detect and locate electromagnetic targets in coastal areas of our province. According to the relevant national and provincial border and sea construction plans, continue to promote the border and sea construction projects of Lianyungang, Nantong and Yancheng, and optimize and improve the monitoring network of important sea areas and coastal areas. Strengthen cooperation with relevant units, improve the linkage mechanism and coordination mechanism of maritime radio security, carry out joint law enforcement, and strengthen radio security in key sea areas and surrounding areas.

Column 1 Construction of Border and Sea Radio Management Technical Facilities
(1) Coastal monitoring belt phase II construction project Carry out the second phase of the construction of coastal monitoring belts to achieve 100% monitoring coverage of important coastal ports and more than 80% monitoring coverage of coastlines. Strengthen communication with relevant units, and the built facilities should reserve data or facility sharing interfaces according to the needs of relevant units. Strengthen communication and coordination with maritime law enforcement departments

and relevant units, make full use of existing facilities such as islands and reefs, relevant unit ships, fishing boats, and floating platforms to carry out construction, and promote the co-construction and sharing of infrastructure.

(2) Mobility construction project in the border and sea area

Carry out the construction of maritime mobility in three phases, grasp the electromagnetic spectrum situation of important fishing grounds and routes, and have the ability to locate and investigate maritime interference signals. The first phase of the project: the construction of three types of shipborne mobile stations; The second phase of the project: construction of shipboard sensor monitoring equipment; Phase III project: construction of a second-class lift-off monitoring platform and portable shortwave and microwave monitoring equipment.

(3) Important island coverage construction projects

Build new Class II fixed monitoring stations on four key islands in Lianyungang City, including Liandao, Qinshan Island, Cheniushan Island and Kaishan Island, to achieve 100% monitoring coverage of key islands with construction conditions.

(4) Border and sea command and decision-making system and data center construction projects

Build a command and decision-making system for border radio management and a special business system for border radio management, dig deep into monitoring data, and have the ability to dynamically display the radio spectrum in the sea area in real time to realize intelligent early warning of illegal signals. Build data centers in border and sea areas in accordance

with relevant national standards, improve border and sea monitoring databases, frequency and station coordination databases, and strengthen the collection, processing and utilization of border and sea data.

(4) Improve the rule of law system and strengthen administration according to law

1. Improve the legal system

Implement the "Regulations of the People's Republic of China on Radio Administration" and relevant national laws and regulations, complete the revision and promulgation of the "Regulations on Radio Management of Jiangsu Province", and provide a strong legal basis for the administration of radio management in accordance with the law in our province. Study the supply demand of radio management legal system under the new situation, improve the supporting system of radio management laws and regulations in our province, and study and formulate normative documents such as administrative punishment, administrative expropriation, and technical evidence collection; Closely follow up the national legislation on the "Radio Spectrum Resources Law" and the revision of the "Amateur Radio Management Measures", and implement the formulation and improvement of relevant local supporting regulations.

2. Strengthen administration according to law

(1) Strengthen the capacity building of radio management law enforcement. Strictly implement the territorial responsibility system for law enforcement, and further standardize the "administrative authorization" of radio administrative law enforcement personnel. Establish and improve the administrative assessment system in accordance with the law, and strengthen the supervision of law enforcement assessment. Carry out the construction of the "Jiangsu Province Radio Supervision and Law Enforcement Improvement Project", build an administrative law enforcement information system, standardize law enforcement documents and law enforcement processes, equip necessary administrative law enforcement information equipment, and improve the level of law enforcement information management. Strengthen the construction of law enforcement teams and the training of law enforcement personnel, conscientiously implement the system of holding certificates, study and analyze difficult problems in administrative law enforcement, standardize administrative law enforcement behavior, and improve the level of law enforcement capabilities.

(2) Increase the intensity of administrative law enforcement inspections. Strengthen the standardized management of the radio transmission equipment market, fully implement the supervision of

the sales filing market, strengthen the supervision of random inspections and supervision of production sources, and strictly investigate and deal with illegal production and sales of transmitting equipment. Strengthen cooperation with public security, market supervision, customs and other departments, establish and improve joint law enforcement mechanisms, and do a good job in information sharing and responsibility implementation. Carry out special actions for joint law enforcement to ensure the effectiveness of joint law enforcement. Establish and improve the post-event return visit system, conduct follow-up and investigation of law enforcement targets, and introduce a credit assessment system.

(3) Carry out special rectification of illegal acts. Severely crack down on illegal acts such as "black broadcasting" and "fake base stations", and regularly analyze the law enforcement situation. Strengthen research on new technologies such as drones and autonomous driving, make research and judgments on possible interference, and strengthen the reserve of technology and facilities accordingly. Increase comprehensive research and judgment on critical periods, important activities, and key businesses, revise and improve disposal plans, and organize and carry out special rectification in a timely manner. The investigation and punishment

rate for major violations endangering national security, public safety, and the safety of life and property shall not be less than 95%.

(5) Optimize the management system and improve management efficiency

1. Strengthen the construction of systems and mechanisms

(1) Continue to improve the radio management system in our province. Adapt to the needs of the new situation after institutional reform, do a good job in coordinating work, further clarify the functions of provincial and municipal radio monitoring stations, and give full play to the supporting role of provincial and municipal radio monitoring stations in radio management. Pay attention to and strengthen the institutional construction and talent team construction of radio management departments in districted cities, build a front-line radio management talent team system that is compatible with job needs, work reality and technological development, and create conditions for them to better perform radio management functions.

(2) Promote the improvement of internal system construction. Focus on the whole process management, establish and improve internal management systems such as radio management infrastructure and technical facility construction projects, operation and maintenance projects, and asset management. Further clarify the

responsibilities and tasks of project construction and management entities, and promote the refinement of project management. Improve the radio monitoring work system, formulate and issue a series of standards and specifications for monitoring facility construction, operation and maintenance, testing and verification, maintenance and scrapping, etc., to improve the efficiency of radio monitoring work. According to the characteristics of radio wave propagation, explore the establishment of management integration in the corresponding area.

(3) Explore the innovation of management service models. Continue to deepen the reform of "decentralization, management and service", further improve the ability of government services on the basis of achieving "non-face-to-face approval" and "one-stop service", optimize the administrative licensing links and simplify procedures related to the use of frequency stations, implement the notification and commitment system for certification matters, and promote the issuance and application of electronic licenses, so as to significantly improve public satisfaction. Make full use of social resources to make up for the shortcomings of radio management agencies in personnel and equipment, and improve service efficiency and work efficiency. Standardize the collection of radio frequency

occupancy fees in various industries, explore the pilot of tax collection and frequency occupancy, and further improve the efficiency of frequency occupancy fee collection. Strengthen the management of radio frequency occupancy fees, establish and improve workflows and norms such as the application, allocation, asset management, supervision and inspection of frequent occupancy funds, and improve the efficiency of fund use management.

2. Serve the development of national defense construction

Coordinate and plan the needs of the military and civilian electromagnetic spectrum, strengthen cooperation with the theater electromagnetic spectrum management departments, and establish and improve the coordination mechanism and various systems for the management of the military and civilian electromagnetic spectrum (radio). In response to the call for national defense mobilization, we should do a good job in the statistics of basic data on radio national defense mobilization, actively participate in military training for national defense mobilization and joint exercises on military-civilian radio spectrum management, and do a good job in radio management and national defense mobilization with high standards. Strengthen cooperation between the military and the local government in monitoring data sharing, joint construction and sharing of technical

facilities, and joint investigation and handling of interference, and effectively ensure the safety of military and civilian radio spectrum applications. Promote the construction of radio management technical facilities and standards and specifications, comprehensively improve the comprehensive management capacity of the electromagnetic spectrum, vigorously develop electromagnetic space supervision methods, strengthen cooperation between the military and the civilian monitoring work, enhance the technical ability to cope with the complex electromagnetic environment, better serve national defense construction, and form a good situation of coordinated development between the military and the civilian.

(6) Strengthen facility construction and improve support capacity

1. Optimize the radio monitoring network system

(1) Improve the province's monitoring network coverage to make up for the blind. Based on the layout principle of "solidifying and moving", relying on the integrated platform of radio management in Jiangsu Province, a variety of monitoring methods are flexibly combined and organically combined, and the construction idea of "multi-point guarantee, dedicated line support, and comprehensive linkage" is used to strengthen the monitoring of "point", "line" and

"surface" to make up for the blindness, and create a radio monitoring network in Jiangsu Province with complete facilities, comprehensive functions and interconnection. Comprehensively consider the position of our province in major strategies such as the "Belt and Road", the integration of the Yangtze River Delta, and the Huaihai Ecological Economic Belt, supplement the special monitoring systems of "point" and "line" areas such as civil aviation, railways, and water in stages and plans, and build two comprehensive three-dimensional transportation special radio monitoring networks in southern Jiangsu and northern Jiangsu to ensure the safety of electromagnetic space in special scenarios. Strengthen the monitoring coverage of "surface" urban areas to make up for the blind, optimize the layout of fixed monitoring stations in the province through relocation, upgrading, and new stations, and effectively improve the radio monitoring coverage rate in our province. Promote the co-construction and sharing of integrated radio management technical facilities in the Yangtze River Delta region, and improve the efficiency of technical facilities.

(2) Coordinate and promote the upgrading and transformation of monitoring facilities. According to the needs, the province's fixed, mobile and portable monitoring facilities will be expanded to meet the

monitoring coverage needs of 5G and other high-frequency bands, and keep up with the pace of 6G development. Optimize technical indicators, improve the signal analysis ability of the monitoring system, and provide technical support for refined spectrum resource management and precise interference investigation and handling.

(3) Strengthen the construction of mobile forces. Comprehensively considering factors such as efficient scheduling, cost saving, and rapid deployment, relying on the integrated radio management platform of our province, we will concentrate on strengthening the construction of mobile forces at the provincial and regional levels, and improve radio emergency response and rapid response capabilities.

Column 2 Optimization of radio monitoring facilities
(1) Fixed monitoring facility construction projects Combined with the current situation and needs, we will plan and build a number of fixed monitoring stations, optimize and adjust with new construction and upgrading, and reduce the blind spots of monitoring coverage in the province's "surface" areas. By the end of the 14th Five-Year Plan, the province's monitoring coverage rate will be increased by no less than 10% (relative value). By the end of the 14th Five-Year Plan, 95% of county-level administrative divisions have built ultra-short wave fixed monitoring stations.

(2) Comprehensive three-dimensional traffic special monitoring network construction project

Build two comprehensive three-dimensional transportation radio monitoring networks in southern Jiangsu and northern Jiangsu, and equip aviation monitoring equipment, railway monitoring equipment and water monitoring equipment on routes, along high-speed railways, and inland waterways, and deploy sensors in key areas that need to be intensively deployed in accordance with relevant national requirements.

(3) Special environmental monitoring facility construction projects

Refer to the national requirements for the configuration of monitoring systems such as airports, railway stations and ports to configure special monitoring facilities, expand monitoring functions and performance indicators in a targeted manner, integrate and share tower resources, and make full use of miniaturized and lightweight equipment such as sensors to carry out monitoring to ensure the safety of frequency use in special environments such as airports, railway stations, high-speed railways, and important ports.

(4) Mobility construction project

In accordance with the time limit requirements for mobile forces to arrive at the site within 3 hours to carry out work, strengthen the construction of mobile forces at the provincial and regional levels. The provincial mobile force ensures the emergency needs of radio safety in the province, and the mobile force in the area is divided into four major areas: southern Jiangsu, central Jiangsu, northern Jiangsu and the border sea, which are responsible for the radio safety emergency support of the corresponding area. According

to the current situation of mobile facilities and actual work, sensors, mobile monitoring stations, portable monitoring stations, portable monitoring equipment and other technical facilities are configured, all of which can be connected to the integrated platform and have networking linkage functions.

According to the location characteristics and management needs, new air radio monitoring facilities will be built, and all-round radio monitoring will be carried out with ground monitoring facilities.

Make full use of public transportation and other social resources to carry out the construction of a crowdsourcing monitoring system.

(5) Monitoring facility upgrading projects

Upgrade and transform existing fixed monitoring stations, expand monitoring frequency bands, improve the monitoring sensitivity of fixed monitoring stations, and enhance the ability of fixed stations to resist base station signal interference. By the end of the 14th Five-Year Plan, no less than 60% of the frequency bands of fixed monitoring facilities will be expanded to the 6GHz frequency band. According to actual needs, some monitoring frequency bands are expanded to more than 8GHz, and the positioning capacity is further expanded to more than 6GHz frequency bands. Upgrade the use of the fixed station support card slot function module to provide support for subsequent transformation and the implementation of custom functions. By the end of the 14th Five-Year Plan, no less than 20% of mobile and portable monitoring stations will be expanded to the 18GHz frequency band, and special needs can be expanded to the 30GHz frequency band.

2. Improve the intelligent level of radio management

(1) Improve the construction of radio management information network. Accelerate the upgrading and transformation of central computer rooms of provincial and municipal radio monitoring stations, complete the interconnection of provincial and municipal dedicated line networks, upgrade network bandwidth as required, and gradually complete the construction of radio management information network security level protection in Jiangsu Province.

(2) Complete the construction of radio management integration platform and application system in Jiangsu Province. In accordance with the idea of organic connection of "basic platform + business application", carry out the construction of integrated platforms, business application systems and auxiliary support systems. Accelerate the completion of the construction of the integrated basic platform and management and control system of radio management in Jiangsu Province, and lay the foundation for the comprehensive integration of system resources, automation, collaboration, standardization, and globalization of data resources.

(3) Strengthen the integration of data resources and value mining. Improve and integrate and network and share databases such as frequency, monitoring, detection, stations, geographic information,

and meteorology to achieve interconnection with the integrated platform. Build provincial data centers and district-level data centers to lay the foundation for data mining and analysis. Select rail, electric power and other industries to carry out pilot applications of data mining and analysis to promote intelligent comprehensive decision-making.

Column 3 Intelligent upgrade project of radio management
(1) Network infrastructure and information security construction projects Upgrade network infrastructure such as computer rooms, networks, computing, and storage to meet the needs of radio management informatization development. Improve the network connection rate, and the link route of provincial nodes to relevant nodes of the national backbone network is responsible for the National Radio Monitoring Center, with a link rate of ⩾ 100Mbps; The link rate of provincial nodes connected to municipal nodes is ⩾ 50Mbps; The link rate of the fixed monitoring facility ⩾ 30Mbps. Complete the upgrading and transformation of provincial information rooms to meet the requirements of "B-level electronic information system rooms". To enhance the basic protection capabilities of network security, provincial nodes should reach at least the third level of information system security level protection. (2) Integrated platform construction project Promote the construction, upgrading, transformation and expansion of

the integrated radio management platform in our province step by step, realize the interconnection with the national integrated platform, and all new fixed and mobile monitoring facilities are connected to the integrated platform. Carry out atomic service transformation of existing fixed and mobile monitoring facilities, and achieve an access rate of 90% of the integrated platform of various fixed and mobile monitoring facilities in ⩾the province. On the basis of completing the construction of the provincial integrated basic platform and management and control system, the distributed (sub-platform) deployment of the integrated basic platform and management and control system will be implemented in the four major areas of southern Jiangsu, central Jiangsu, northern Jiangsu and Bianhai to improve business stability and the efficiency of resource mobilization in districted cities.

(3) Application system construction project

Gradually build or upgrade public mobile base station data interaction systems, radio administrative law enforcement management systems, radio integrated service business systems, radio document management systems and other business application systems; new or upgraded auxiliary support systems such as auxiliary decision-making and visual display systems, fixed asset management systems, and radio management information release systems for the public.

(4) Data center construction projects

Build a provincial data center for radio management in Jiangsu Province and data centers in four major areas of southern Jiangsu, central Jiangsu, northern Jiangsu and Bianhai, and promote transformation and upgrading. In

accordance with the radio monitoring data collection specifications and radio monitoring database specifications, combined with the construction of data centers, strengthen the storage of radio monitoring historical data, and compress and clean the radio monitoring stock data to enhance the consistency and interoperability of radio monitoring data.

3. Strengthen comprehensive support capacity building

(1) Improve the province's command and monitoring system. Promote the construction and informatization of infrastructure such as provincial radio management command centers, area radio management and monitoring centers, and municipal video conferencing systems, realize the interconnection of command and dispatch systems at the provincial, district, and municipal levels, and improve the command and dispatch capabilities of radio supervision facilities such as fixed monitoring stations and mobile monitoring stations.

(2) Strengthen special supervision means. Continuously improve technical means such as cracking down on "black broadcasting" and "fake base stations", with active monitoring and voice recognition capabilities in broadcast frequency bands, and can automatically find direction and position, providing equipment support for the special work of improving radio administrative law enforcement capabilities

in Jiangsu Province. improve the ability to control unknown signals or interference sources such as drones and exam cheating; Strengthen the supervision of UAV suppression equipment and eliminate its interference with civil aviation.

(3) Improve the monitoring technical drill mechanism. Establish a long-term mechanism for radio monitoring technology drills in Jiangsu Province, reasonably formulate drill plans, standardize drill subject settings, scientifically configure drill facilities, effectively improve the professional quality of radio monitoring staff, and lay the foundation for participating in national radio monitoring technology drills.

(4) Coordinate the management of technical facilities. Build a ledger list of radio monitoring equipment, complete the statistics and asset inventory of various equipment, establish a "full life" cycle supervision mechanism for fixed assets from procurement to scrapping, and promote the standardization, digitization and informatization of equipment management. Implement the relevant national standards and regulations on the scrapping of radio management technical facilities, and optimize the structure of existing assets.

Column 4 Radio comprehensive support capacity improvement project

(1) Command center construction project

Strengthen the construction of infrastructure such as information computer rooms and business rooms of the second phase of the provincial radio management command center and the radio management and monitoring centers in the four major areas of southern Jiangsu, central Jiangsu, northern Jiangsu and the border sea, realize remote command and dispatch of fixed monitoring stations, mobile monitoring stations and other monitoring facilities in the province or area, and have the command ability to deal with emergencies. Improve the construction of municipal radio management video conference systems, and realize the command and dispatch of provincial radio management command centers and regional radio management and monitoring centers.

(2) Special supervision facility construction projects

Radio control equipment is arranged in blocks and zones, a radio control platform is built, and real-time linkage with the radio monitoring network is used to realize voice warnings or signal suppression of unknown signals and interference sources. Carry out the construction of a special detection system for "pseudo-base stations", and deploy and control "pseudo-base station" detection equipment at different points on main roads and key areas in urban areas. Equipped with UAV radio detection and countermeasure equipment on demand to improve the control ability of UAVs. Configure monitoring and countermeasure equipment for new exam cheating communication systems as needed to improve exam security capabilities. Build shortwave radio countermeasures facilities to improve radio security capabilities in key coastal

areas.

(3) Monitoring technical drill facility construction projects

Radio monitoring technology drill facilities are equipped as needed, mainly including simulation training systems, signal sources and their supporting equipment.

(4) Fixed asset management system construction project

Build a fixed asset management system, incorporate all aspects of the whole life cycle of radio management fixed assets into the scope of management, and realize the visualization, standardization, transparency and refinement of asset management.

(7) Serve the development of the industry and create local characteristics

1. Do a good job in supporting industrial development

Further improve the scientific level of frequency management to ensure the frequency demand for industrial development. Focus on supporting the construction of "two new and one heavy", and strive to ensure a "strong manufacturing province" and "a strong network province"and the frequency needs of advantageous industries such as new generation information technology, coordinate and solve the frequency problems of major projects and major projects such as new infrastructure construction, new urbanization construction, transportation, and water conservancy, assist enterprises, universities,

scientific research institutes, etc. to apply for frequency resources, and carry out research and application of new technologies such as 6G and satellite Internet. Do a good job in frequency planning and allocation of emerging industries such as the Internet of Things, industrial Internet, and Internet of Vehicles. Explore the use of low-power wide-area Internet of Things frequencies using a light licensing model, study the feasibility of dividing the dedicated frequencies of the industrial Internet, explore the spectrum resource sharing strategy of multiple candidate frequency band combinations, and continue to do a good job in the application support service for the Internet of Vehicles.

2. Help industrial transformation and upgrading

Innovate management models, promote joint management by government departments, industries and large enterprises, and establish and improve coordination mechanisms such as military and local, inter-provincial, multi-departmental, and multi-business. Continue to do a good job in the frequency coordination of the Yangtze River Delta integration, the interference coordination of 5G base stations and satellite earth stations, and the frequency coordination of broadband wireless private networks, help the coordinated development of economic, social and national defense

construction, promote the integration of the Yangtze River Delta, and ensure the operation of 5G networks and the safe broadcasting of radio and television. Explore new models of radio services under joint applications such as "5G + Internet of Vehicles" and "5G + Industrial Internet", encourage qualified industries and enterprises to carry out 5G industry application pilots, help the development of the province's 5G industry, and promote industrial upgrading and transformation.

3. Promote the healthy development of the industry

Cooperate with relevant departments to do a good job in the analysis of emerging industries and industrial chains such as the Internet of Vehicles, the Internet of Things and the Industrial Internet, strengthen and complement them, and promote the healthy development of the industrial ecology. Give full play to the advantages of Jiangsu Province's double first-class universities and national scientific research institutes, strengthen cooperation, build a public service platform for radio technology consulting for the development of emerging industries, provide frequency use and station management consulting, application planning and evaluation consulting, wireless network planning and design consulting and other services, promote the establishment of radio-related standards and the application of new technologies, and serve the development

of the industry. Create a model project. Closely track the national guidelines and specifications on the Internet of Things, Internet of Vehicles, industrial Internet, etc., provide policy support and service guarantee for key enterprises in our province to carry out application demonstrations, and provide classic cases and model projects for the application of emerging technologies. Cooperate with the construction of demonstration projects such as the Yangtze River Delta Industrial Internet Integration Development Demonstration Zone, Wuxi Internet of Vehicles Pilot Zone, and the Internet of Things, explore the extensive and in-depth application of new radio technologies and services in various economic and social fields, and drive the coordinated development of the upstream and downstream of the industrial chain.

5. Safeguard measures

(1) Strengthen overall leadership

Establish a leading group. Under the overall leadership of the party, a leading group has been set up with the leaders in charge of the provincial department of industry and information technology as the leader, the leaders in charge of the industry and information technology bureaus of each districted city, and the leaders of the provincial radio management and technical departments as members

to strengthen the overall leadership of the implementation of the plan. Formulate detailed plans. Closely follow the overall idea of planning, formulate annual implementation plans, decompose tasks, refine the division of labor, clarify responsibilities, and ensure that planning tasks are steadily implemented step by step, in stages and with quality. Carry out planning evaluation. Combined with the changes in work tasks, carry out mid-term evaluation of the plan, revise the content of the plan, adjust the goals and tasks, and ensure the implementation of the plan. Strengthen evaluation and supervision. Establish a planning implementation evaluation mechanism to ensure that the planning project is completed on time and with high quality.

(2) Do a good job in financial security

Actively strive for financial support. Actively coordinate with the national radio management departments and provincial and municipal financial departments to strive for financial support for radio management and provide financial guarantee for the implementation of the plan. Optimize the allocation of fund declaration. Combine the planning and construction tasks to sort out and establish a key project library, formulate an annual rolling plan for project construction, and carry out annual construction project budget preparation and fund allocation in strict accordance with the

plan to ensure the rigidity and binding force of the planning plan. Strict management of fund use. Strictly implement the national, provincial and municipal requirements for the management of the use of central transfer funds for radio frequency occupancy fees, strengthen the use evaluation and assessment supervision, and ensure that the management of the use of funds is standardized, orderly, safe and efficient.

(3) Strengthen capacity improvement

Improve policy support. Pay attention to and strengthen the construction of radio management professionals, actively tap resources in the training, retention and use of radio management talents, and strive to build a team of professionals with strong professional ability and relatively stability. Create a good atmosphere. Strengthen the reserve of professional talents, optimize the structure of the talent team, scientifically allocate posts, improve the assessment and evaluation mechanism, and stimulate the enthusiasm of the talent team to love their jobs and dedicate themselves to their work. Increase talent training. Formulate talent team training goals by category, increase investment in training, and support the improvement of professional talents' on-the-job ability. Carry out classified training. Organize post technical training, carry out

technical drills, and continuously improve the ability to carry out radio management and support. Establish a think tank platform. Establish and improve the radio management expert database, and give full play to the supporting role of the think tank platform.

(4) Create a good atmosphere

Improve the external publicity system. Establish a radio science popularization platform, mobilize the propaganda forces of television, newspapers, radio, new media, etc., carry out radio rule of law education, business publicity, and popularization of scientific and technological knowledge extensively, deeply, and persistently, improve the understanding of the whole society on the importance of radio spectrum resources and their important role in promoting national economic development and safeguarding national security, strengthen the public's awareness of using frequencies in accordance with the law, strengthen public awareness, understanding, and support for radio management, and create a good social environment for the development of radio industry. Increase internal publicity. Establish and improve the information reporting mechanism to the Ministry of Industry and Information Technology of the People's Republic of China, the provincial party committee and the provincial government, report the highlights and achievements of radio management work to

superiors in a timely manner, and show the good spirit of the radio management team in our province. Strengthen coordination and cooperation with the military, public security, market supervision, customs, civil aviation, railways and other departments, as well as coordination and cooperation with neighboring provinces, to jointly create a good industry development environment.

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