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## The six departments jointly issued guidance on promoting the high-quality development of the petrochemical and chemical industry in the 14th Five-Year Plan

Ministry of Industry and Information Technology National Development and Reform Commission Ministry of Science and Technology Ministry of Ecology and Environment Ministry of Emergency Management National Energy Administration

Guiding opinions on promoting the high-quality development of the petrochemical and chemical industry in the 14th Five-Year Plan

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All provinces, autonomous regions, municipalities directly under the Central Government and the Xinjiang Production and Construction Corps industry and information technology, development and reform, science and technology, ecological environment, emergency response, and energy (management) departments, relevant central enterprises, and relevant associations:

The petrochemical and chemical industry is a pillar industry of the national economy, with a large economic aggregate, a long industrial chain, a wide range of products, and a wide range of related coverage, which is related to the safety and stability of the industrial chain and supply chain, green and low-carbon development, and the improvement of people's livelihood and well-being. In order to implement 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", implement the "14th Five-Year Plan" for the development of raw material industry, and promote the high-quality development of the petrochemical industry, this opinion is formulated.

## 1. General requirements

### (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 19th Plenary Session of the Communist Party of China, based on the new development stage, completely, accurately and comprehensively implement the new development concept, build a new development pattern, promote high-quality development as the theme, deepen supply-side structural reform as the main line, meet the needs of the people for a better life as the fundamental purpose, take reform and innovation as the fundamental driving force, coordinate development and security, accelerate the transformation and upgrading of traditional industries, and vigorously develop new chemical materials and fine chemicals. Accelerate the digital transformation of industries, improve the level of intrinsic safety and clean production, accelerate the quality, efficiency and power changes of the petrochemical and chemical industry, and promote our country from a petrochemical and chemical country to a strong country.

### (2) Basic principles

Adhere to market leadership. Give full play to the decisive role of the market in resource allocation, give better play to the role of the government, strengthen the guidance and standardization of planning policy standards, and maintain the order of fair competition.

Adhere to innovation-driven. Focus on scientific and technological self-reliance and self-improvement, promote key core technology research, promote the security and stability of the industrial chain and supply chain, improve total factor productivity, and improve the quality and efficiency of development.

Adhere to green safety. Establish a solid bottom line thinking, strengthen social responsibility care, improve the level of intrinsic safety, promote green, circular and low-carbon development, and strengthen the industry governance system and governance capacity building.

Adhere to open cooperation. Create a market-oriented, law-based, and international business environment, adhere to high-quality introduction and high-level going out, promote the efficient global allocation of factor resources, and strengthen the coordination between upstream and downstream of the industrial chain and the coupling development of related industries.

### (3) Main objectives

By 2025, the petrochemical and chemical industry will basically form a high-quality development pattern with strong independent innovation ability, reasonable structural layout, green, safe and low-carbon, high-end product guarantee capabilities will be greatly improved, core competitiveness will be significantly enhanced, and high-level self-reliance and self-improvement will take solid steps.

——Innovative development. By 2025, the R&D investment of enterprises above designated size will account for more than 1.5% of the main business income; breakthrough more than 20 key common technologies and more than 40 key new products.

-- Industrial structure. the production concentration of bulk chemical products has been further improved, and the capacity utilization rate has reached more than 80%; The level of ethylene equivalent guarantee has been greatly improved, and the guarantee level of n

ew chemical materials has reached more than 75%.

-- Industrial layout. The relocation and transformation of hazardous chemical production enterprises in densely populated urban areas has been fully completed, forming about 70 chemical parks with competitive advantages. By 2025, the output value of chemical parks will account for more than 70% of the total output value of the industry.

- Digital transformation. The automatic control rate of the main production equipment of enterprises in key areas such as petrochemical and coal chemical industry has reached more than 95%, and about 30 intelligent manufacturing demonstration factories and about 50 smart chemical demonstration parks have been built.

-- Green and safe. The energy consumption and carbon emissions per unit product of bulk products have decreased significantly, the total volatile organic compound emissions have been reduced by more than 10% compared with the "13th Five-Year Plan", and the intrinsic safety level has been significantly improved, effectively curbing major production safety accidents.

## 2. Improve the level of innovation and development

(1) Improve the innovation mechanism and form a "trinity" collaborative innovation system. Strengthen the main position of enterprise innovation, accelerate the construction of a "trinity" innovation system of key laboratories, innovation centers in key areas, and common technology research and development institutions, and promote the deep integration of industry, academia, research and application. Optimize and integrate industry-related R&D platforms, create innovation centers in the fields of high-end polyolefins, high-performance engineering plastics, high-performance membrane materials, biomedical materials, carbon dioxide capture and utilization, strengthen the role of national new material production and application demonstration, testing and evaluation, test and testing, and promote common technological innovation such as catalytic materials, process strengthening, polymer material structure characterization, processing and application technology and equipment. Support enterprises to take the lead in forming collaborative innovation organizations such as industrial technology innovation alliances and upstream and downstream cooperation mechanisms, and support local rational layout and construction of regional innovation centers and pilot bases.

(2) Overcome core technologies and enhance the momentum of innovation and development. Accelerate breakthroughs in key technologies such as new catalysis, green synthesis, function-structure integrated polymer material manufacturing, and large-scale application of "green hydrogen", lay out cutting-edge technologies such as short-process preparation of basic chemicals, intelligent biomimetic materials, and new energy storage materials, and consolidate and improve process enhancement technologies such as micro-reaction continuous flow, reaction-separation coupling, efficient purification and concentration, plasma, and supergravity field. Focus on the needs of major projects, break through the manufacturing technology of important equipment and parts such as special structure reactors, high-power electric heating furnaces, large special pumps, valves, control systems, etc., and strive to develop and promote perception technologies such as online detection of process parameters and online rapid identification and judgment of physical properties, as well as control technologies such as process control software, full-process intelligent control systems, fault diagnosis and predictive maintenance.

(3) Implement the "three products" action to improve the quality of chemical product supply. Focusing on strategic emerging industries such as new generation information technology, biotechnology, new energy, and high-end equipment, we will increase the variety and specifications of materials such as fluorosilicone, polyurethane, and polyamide, and accelerate the development of high-end polyolefins, electronic chemicals, industrial special gases, high-performance rubber and plastic materials, high-performance fibers, bio-based materials, and special lubricating greases. Actively deploy new product development such as shape memory polymer materials, metal-organic framework materials, efficient separation media for metal elements, and integrated reaction-separation membrane devices. Increase the p

roportion of green products in fertilizers, tires, coatings, dyes, adhesives and other industries. Encourage enterprises to improve quality and cultivate and create brands.

### 3. Promote industrial restructuring

(4) Strengthen classified policies and scientifically regulate the scale of the industry. Promote refining and chemical projects in an orderly manner to reduce oil and increase chemical production, and extend the petrochemical industry chain. Enhance the supply capacity of high-end polymers, special chemicals and other products. Strictly control the new production capacity of oil refining, ammonium phosphate, calcium carbide, yellow phosphorus and other industries, prohibit the construction of new mercury (poly)vinyl chloride production capacity, and accelerate the withdrawal of inefficient and backward production capacity. Promote the high-end, diversified and low-carbon development of the coal chemical industry, and develop modern coal chemical industry in a steady and orderly manner in accordance with the requirements of ecological priority, water-based production, total control, and agglomeration development.

(5) Accelerate the transformation and upgrading to improve the competitiveness of the industry. Dynamically update the technology and product catalogue of the petrochemical industry to encourage the promotion and application, encourage the use of advanced and applicable technologies to implement safety, energy saving, emission reduction, low-carbon and other transformations, and promote intelligent manufacturing. Guide the lightening of olefin raw materials, optimize the structure of aromatic raw materials, and improve the utilization level of by-product resources such as carbon 5 and carbon 9. Accelerate the extension of coal-to-chemical to new chemical materials, coal-to-oil and gas to special fuels, high-end chemicals and other high value-added products, and focus on improving the quality control level of coal-to-ethylene glycol.

### Fourth, optimize and adjust the industrial layout

(6) Coordinate the project layout and promote coordinated regional development. According to territorial spatial planning, ecological environment zoning control and major national strategic arrangements, coordinate the layout of major projects, and promote the concentration of new petrochemical and chemical projects in chemical parks with good matching of raw materials and clean energy, rich environmental capacity, energy conservation, environmental protection and low carbon. Promote the transformation and upgrading of modern coal chemical industry demonstration zones, steadily promote the construction of coal-to-oil and gas strategic bases, and build industrial demonstration bases with efficient utilization of raw materials, integration of resource elements, coordination of pollution reduction and carbon reduction, advanced and mature technology, and high-end product series. Continue to promote the relocation and transformation of hazardous chemical production enterprises in densely populated urban areas. Implement the requirements for promoting the development of the Yangtze River Economic Belt, ecological protection and high-quality development of the Yellow River Basin, and promote the scientific layout and orderly transfer of petrochemical and chemical projects in the Yangtze River and Yellow River Basin.

(7) Guide chemical projects into the park and promote high-level agglomeration development. Promote the standardized development of chemical parks, use comprehensive standards in accordance with laws and regulations to force parks to prevent and resolve safety and environmental risks, accelerate the construction of infrastructure such as pollution prevention and control in parks, strengthen the investigation and rectification of sewage pipe networks in parks, and improve intrinsic safety and clean production levels. Guide the circular production and industrial coupling development of enterprises in the park, encourage the dislocation and differentiated development of chemical parks, and coordinate with metallurgy, building materials, textiles, electronics and other industries. Encourage chemical parks to build scientific and technological innovation and scientific research achievement incubation platforms and intelligent management systems. Strictly implement the "prohibition and control" catalogue of hazardous chemicals, and new hazardous chemical production projects must enter chemical parks with general or low safety risks (except for projects built in conjunction with production equipment in other industries), and guide the development of other petrochemical and chemical projects in chemical parks.

## 5. Promote industrial digital transformation

(8) Accelerate the collaborative innovation and application of new technologies and models, and create a characteristic platform. Accelerate the integration of new generation information technologies such as 5G, big data, and artificial intelligence with the petrochemical and chemical industries, continuously enhance the ability to obtain chemical process data, enrich the data of enterprise production management, process control, product flow, etc., smoothly connect the "islands" of production and operation information data, build analysis models such as production and operation, market and supply chain, strengthen the integrated control of the whole process, promote the innovative application of digital twins, and accelerate digital transformation. Build 3-5 industry-oriented professional industrial Internet platforms, and guide small and medium-sized chemical enterprises to accelerate the digital transformation of process equipment, safety and environmental protection with the help of platforms. Build an industrial chain monitoring and lean service system based on the industrial Internet around fertilizers, tires and other bulk products related to people's livelihood and safety.

(9) Promote demonstration and leadership, and strengthen the empowerment of the industrial Internet. Issued guidelines for the construction of intelligent manufacturing standard system in the petrochemical and chemical industry, and compiled standards for smart factories and smart parks. According to the characteristics of the industry, a number of digital workshops, smart factories, and smart park benchmarks will be built and selected. Establish an intelligent manufacturing industry alliance in the petrochemical and chemical industries, cultivate internationally competitive intelligent manufacturing system solution providers, and improve service capabilities such as digital simulation of chemical processes and remote diagnosis and operation and maintenance of large units. Based on intelligent manufacturing, promote the flexible production mode of multi-variety and small-batch chemical products to better meet the needs of customization and differentiation. Implement classified and hierarchical management of network security for industrial Internet enterprises in the petrochemical industry, promote the application of commercial cryptography, and improve the level of security protection.

## 6. Accelerate green and low-carbon development

(10) Give full play to the advantages of carbon fixation and carbon consumption, and jointly promote carbon emission reduction in the industrial chain. Promote energy conservation and carbon reduction in key areas of the petrochemical and chemical industry in an orderly manner, and improve the energy efficiency level of the industry. Formulate a high-carbon product catalog and prudently regulate the export of some high-carbon products. Improve the utilization level of low- and medium-grade thermal energy, promote the electrification of energy-using facilities, reasonably guide fuel "gas instead of coal", and moderately increase the proportion of hydrogen-rich raw materials. Encourage petrochemical and chemical enterprises to develop and utilize "green hydrogen" in a reasonable and orderly manner according to local conditions, promote the coupling demonstration of refining and coal chemical industry with "green electricity" and "green hydrogen", and take advantage of the characteristics of high purity and low capture cost of carbon dioxide emitted by refining and coal chemical plants to carry out large-scale carbon dioxide capture, storage, oil displacement and chemical production demonstrations. Accelerate the development and application of energy-saving and carbon-reducing technologies such as direct cracking of crude oil to ethylene, one-step syngas to produce olefins, and intelligent continuous micro-reaction to prepare chemical products.

(11) Focus on the development of clean production and green manufacturing, and cultivate and expand the biochemical industry. Carry out the identification of green processes, green products, green factories, green supply chains and green parks on a rolling basis, and build a green manufacturing system for the whole life cycle. Encourage enterprises to adopt cleaner production technology and equipment to transform and upgrade, and promote the "reduction" of industrial waste from the source. Promote the control of volatile organic compound pollution in the whole process, increase the treatment of wastewater containing salt and high ammonia nitrogen, promote the environmental protection and remediation of soda ash waste residue and waste liquid produced by ammonia-alkali method, improve the utilization and disposal capacity of hazardous wastes such as waste catalysts, waste acid, and waste salt, and promote the mercury-free production

n of (poly) vinyl chloride. Actively develop biochemical industry, encourage the development of enzyme species required for biomass utilization and biorefining based on biological resources, and promote new biological strains; Strengthen the connection between bio-based bulk chemicals and the existing chemical material industry chain, develop ecologically friendly bio-based materials, and realize the partial substitution of traditional petroleum-based products. Strengthen the research and development and application of green alternatives to toxic and harmful chemicals, and prevent and control the environmental risks of new pollutants.

(12) Promote the coupling development between industries and improve the efficiency of resource recycling. Promote the coupling development of petrochemical and chemical industries with building materials, metallurgy, energy conservation and environmental protection, and improve the comprehensive utilization level of solid waste such as phosphogypsum, titanium gypsum, fluorine gypsum, and desulfurization gypsum, calcium carbide slag, alkali slag, fly ash, etc. Encourage enterprises to strengthen the utilization and harmless disposal of phosphorus and potassium associated resources, industrial waste salt, mine tailings, yellow phosphorus exhaust gas, calcium carbide furnace gas, and refinery balanced exhaust gas. Develop and scientifically promote biodegradable plastics in an orderly manner, and promote the recycling and recycling of waste chemical materials such as waste plastics and waste rubber.

#### 7. Consolidate the foundation for safe development

(13) Promote advanced technology management and improve the level of intrinsic safety. Consolidate the main responsibility for safe production, promote the implementation of responsible care, support enterprises and parks to improve the level of refined operation and management, establish and improve the health and safety environment (HSE) management system, safety risk hierarchical control and hidden danger investigation and management dual prevention mechanisms, establish and improve fire fighting and rescue forces, and improve emergency response capabilities. Continue to carry out the construction of "industrial Internet + safe production" in hazardous chemical enterprises, and promote the implementation of the "Global Unified Classification and Labeling System for Chemicals" (GHS). Encourage enterprises to adopt advanced and applicable technologies such as micro-reaction and online trace rapid detection of gas leakage to eliminate or reduce the level of hazard sources, and promote the safe transformation and replacement of high-risk processes.

(14) Strengthen the guarantee of raw material resources and maintain the security and stability of the industrial chain and supply chain. Expand the supply channels of petrochemical raw materials, build a solid domestic foundation and international diversified and stable supply system, and moderately increase the import of lightweight, low-carbon, and hydrogen-rich raw materials. In accordance with the principle of marketization, promote international cooperation in the development of potash and other resources. Strengthen the exploration of domestic potassium resources, and actively promote the development of efficient mining and processing technology for medium and low-grade phosphate ore and efficient utilization of non-water-soluble potassium resources. Take multiple measures to promote the reduction, recycling and harmlessness of phosphogypsum, and steadily promote the "slag production" of phosphorus chemical industry. Strengthen the guarantee of fertilizer production factors, improve production concentration and capacity utilization of backbone enterprises, and ensure the stable supply of fertilizers. Protect the exploitation of fluorite resources and encourage the development and utilization of associated fluorine resources.

#### 8. Strengthen organizational guarantees

(15) Strengthen organization and implementation. Relevant departments in all localities should combine local realities, integrate key tasks into the key work of departments, strengthen supervision during and after the event, and coordinate and promote the implementation of tasks. Relevant enterprises should combine their own realities, in accordance with their main goals and key tasks, pragmatically promote relevant work, and disclose environmental information in accordance with the law. Relevant industry organizations should play the role of bridges, actively serve and guide, and strengthen industry self-discipline. Strengthen policy publicity and interpretation,

actively respond to public opinion and the reasonable concerns of the public, and effectively enhance the public's scientific and rational understanding of petrochemical industry.

(16) Improve supporting policies. Strengthen the coordination of fiscal, financial, regional, investment, import and export, energy, ecological environment, price and other policies and industrial policies. Give full play to the role of the national industry and finance cooperation platform to promote bank-enterprise docking and industry-finance cooperation. Strengthen the protection of intellectual property rights. Strengthen the training of chemical professionals and employee training. Promote the demonstration application of the first (set) of equipment and the first batch of materials.

(17) Improve the standard system. Establish and improve the standard system for new chemical materials, especially modified special materials, fine chemicals, especially special chemicals, bio-based materials, biodegradable plastics, and recycled plastic materials evaluation and labeling management systems, and green energy monitoring and evaluation systems. Improve the energy consumption limit, toxic and harmful chemical content limit, and pollutant emission limit of key products. Explore the formulation and revision of carbon emission accounting standards for carbon-containing chemical products and low-carbon product evaluation based on carbon footprint. Participate in the formulation of global standards and rules, and strengthen the evaluation and transformation of international standards.

Ministry of Industry and Information Technology  
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