The General Office of the People's Government of Henan Province issued a notice on printing and distributing the action plan for Henan Province to accelerate the reconstruction of the advantages of the material industry and change lanes (2022-2025).

Source: Henan Provincial People's Government Time: 2022-07-29

General Office of the People's Government of Henan Province

Regarding the printing and distribution of Henan Province to accelerate the reconstruction of the advantages of the material industry

Notice of lane change leading action plan (2022-2025).

Yu Zhengban [2022] No. 65

People's governments of all provinces and municipalities, Jiyuan Demonstration Zone and Airport Area Management Committee, and departments of the Provincial People's Government:

The "Henan Province Accelerating the Reconstruction of Material Industry Advantages and Lane Change Leading Action Plan (2022-2025)" has been approved by the provincial government and is now issued to you, please implement it seriously.

General Office of the People's Government of Henan Province

July 19, 2022

Henan Province accelerates the reconstruction of the advantages of the material industry and leads the action plan

(2022-2025)

The materials industry is a strategic and basic industry, the pioneer and cornerstone of the high-quality development of the manufacturing industry, and a key area of high-tech competition. To build a strong province in advanced manufacturing, we must take the material industry as an important pillar and accelerate the transformation from a large raw material province to a strong new material province driven by innovation. In order to implement the deployment of the provincial party committee and the provincial government, and promote the reconstruction of the advantages of the material industry and the leadership of lane change, this action plan is formulated.

1. General requirements

(1) Development ideas. Adhere to the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, firmly implement General Secretary Xi Jinping's major requirements on taking the high-quality development of the manufacturing industry as the main direction, fully implement the deployment of the 11th Provincial Party Congress, take deepening supply-side structural reform as the main line, take reform and innovation as the driving force, improve the quality and development of advanced basic materials, cultivate and expand key strategic materials, and forward-looking layout of cutting-edge new materials as the key focus, strengthen key core processes, technologies and equipment, and accelerate the replenishment and strengthening of the chain and extension of the chain. Expand the comparative advantages of basic materials and characteristic materials, shape new competitive advantages of strategic materials and cutting-edge materials, build a modern

material industry system, and promote the high-end supply of the province's material industry, rationalization of structure, green development and system security.

(2) Development goals. Adhere to the principle of "innovation-led, demand-driven, chain coordination, integrated development, diversified layout, and key breakthroughs", organize and implement 8 key actions, and by 2025, basically realize the reengineering of the province's material industry advantages, lane change and green and low-carbon transformation, and become an important material innovation highland and advanced materials base in the country.

1. Build a high-quality development system for the "454" material industry. Focus on transforming and upgrading four advanced basic material industries, including advanced steel materials, advanced non-ferrous metal materials, advanced chemical materials, and advanced inorganic non-metallic materials, and focus on cultivating and expanding five key strategic material industries such as electronic functional materials, high-performance fiber materials, new power and energy storage battery materials, biomedical materials, and energy-saving, carbon reduction, and environmental protection materials.

2. Build a 2 trillion level material industry supported by new materials. Accelerate the transformation and quality improvement of the material industry, and the added value of the new material industry will increase by about 18% per year. By 2025, the output value of the new materials industry will exceed 1 trillion yuan, accounting for more than 50% of the materials industry, the total output value of the materials industry will reach 2 trillion yuan, the number of material enterprises above designated size will reach 10,000, the number of "specialized, special and new" enterprises will exceed 1,000, and the number of 10 billion-level leading enterprises will exceed 50.

3. Cultivate 40 key industrial chains of advanced materials. By 2025, 6 100-billion-level pillar industrial chains will be formed, including advanced steel materials, aluminum-based new materials, nylon new materials, new high-temperature materials, superhard materials, and new building materials, 30 10-billion-level characteristic industrial chains such as degradable materials, semiconductor materials, and metal-ion battery materials, and 4 cutting-edge industrial chains such as nanomaterials, graphene materials, additive manufacturing materials, and advanced composite materials.

4. Build an important national material innovation highland. Deploy the innovation chain around the industrial chain and lay out the industrial chain around the innovation chain. By 2025, more than 10 new national key innovation platforms will be added, 40 key industrial chains of advanced materials will achieve full coverage of provincial key innovation platforms, and material enterprises above designated size will achieve full coverage of R&D activities, breaking through about 30 key core technologies and advanced processes every year, and achieving more than 100 key core innovation achievements in four years.

2. Improve the quality and development of advanced basic materials industry

(1) Advanced steel materials.

1. High quality special steel. Vigorously develop EP explosion-proof steel, ultra-high strength steel, wear-resistant steel, rare earth weathering steel, cold-rolled high-end special steel, develop casting molds, hot and cold work molds, plastic molds and other mold steels, high-performance high-speed steel, cemented carbide and other cutting tool steels, high-grade CNC machine tool materials, Soxtenic, high-strength stainless steel steel, 300/400 series food-grade and medical grade stainless steel, duplex stainless steel, etc.

2. Steel for high-end equipment. Vigorously develop high-end equipment steel in the fields of intelligent manufacturing, rail transit, general aviation, new energy, automobile manufacturing, etc., focusing on the development of cutting-edge products such as special rods, wires, plates, and pipes for marine engineering equipment and high-tech ships, high-strength automotive steel, steel for high-speed rail and urban light rail, and superalloys for engines and gas turbines.

3. Steel for core basic components. Vigorously develop high-end bearing steel, gear steel, spring steel, fasteners, and develop high-performance rod and wire rods such as easy-to-cut non-quenched steel, bridge cable steel, special wire rope, and special prestressed steel strand.

(2) Advanced non-ferrous metal materials.

1. Aluminum-based new materials. Vigorously develop lightweight high-end aluminum in the fields of new energy, packaging, aerospace, rail transit, electronic information, can materials, building decoration, etc., break through key technologies such as aluminum matrix composite

materials and high-end industrial profiles, promote the extension of aluminum alloys to high-end high-quality aluminum processing, and rely on Zhengzhou, Luoyang, Kaifeng, Shangqiu and other places to build important national aluminum materials and products production bases.

2. Copper-based new materials. Vigorously develop high-precision copper strips, high-end copper foils, precision copper pipes, precision copper conductors, and high-quality copper rod wires, accelerate the application of high-end copper-based materials in electronic information, aerospace, high-end equipment, new energy vehicles, military industry and other fields, promote the recycling of copper resources, expand and strengthen the recycled copper industry, and accelerate the development of copper and deep processing industries in Luoyang, Sanmenxia, Jiyuan, Xinxiang and other places.

3. Magnesium-based new materials. Vigorously develop lightweight and high-strength magnesium alloys such as automobile seats, steering wheel cores, and wheels, expand their applications in military industry, electronic information and other fields, and develop low-cost and high-purity magnesium purification and refining, high-performance casting magnesium alloys and magnesium-aluminum composite materials and other preparation and precision forming technologies, so as to expand and strengthen Hebi's "China Magnesium Valley".

4. New materials for tungsten and molybdenum. Vigorously develop ultra-wide, high-purity and high-density tungsten-molybdenum sputtering targets, new electronic functional tungsten-molybdenum materials and deep processing products, adjust the tungsten-molybdenum industry structure around the needs of energy, infrastructure, transportation, aerospace and other fields, integrate production and R&D resources, and promote Luoyang to build an international high-end tungsten-molybdenum new material industrial base.

5. Titanium-based new materials. Vigorously develop high-grade titanium sponge, titanium alloys for aerospace and ships, and 3D (three-dimensional) printed titanium alloy parts, accelerate the localization of high-quality titanium chloride dioxide raw materials and the research and development of high-performance green new titanium dioxide, establish a new system for the green comprehensive extraction of titanium, zirconium, vanadium, scandium resources, and promote the development of titanium industry clusters in Jiaozuo, Luoyang and other places.

6. New materials for lead and zinc. Vigorously develop zinc-based and lead-based new high-performance alloys, strengthen the research and development and application of technologies such as extraction and purification of valuable metals associated with lead-zinc smelting, accelerate the development of recycled lead, and focus on Jiyuan, Luoyang, Sanmenxia and other places to build an industrial chain of "lead concentrate-lead smelting-lead-acid battery-recycled lead" to improve the comprehensive utilization rate of resources.

(3) Advanced chemical materials.

1. New nylon material. Vigorously develop special nylon fibers, nylon slices, nylon engineering plastics, aramid skeleton materials, and dope coloring fibers, expand and strengthen nylon industrial yarn, civil silk, and composite nylon fabrics, promote nylon injection molding, nylon film, and polyurethane deep processing, and take Pingdingshan City's "China Nylon City" as the leader, cooperate with the special nylon industry in Hebi and other places to build a leading nylon new material production and research and development base in China.

2. Degradable materials. Vigorously develop degradable materials such as thermoplastic biodegradable plastics, polybutylene succinate, polyhydroxyacetic acid, polypropylene carbonate, biodegradable polyester, polylactic acid and starch-based, strengthen the research of core key technologies for industrialization, and build the largest biodegradable material industry base in the country.

3. Bio-based materials. Vigorously develop bio-based polymers, plastics, chemical fibers, rubber, coatings, material additives, and composite materials, focusing on breakthroughs in biomass grading and conversion and low-cost large-scale preparation technology of basic materials such as bio-based diacids and diols, as well as key polymerization technologies and processes such as lignin-based functional materials, bio-based polyester materials, and bio-based polytetrahydrofuran.

4. Advanced membrane materials. Expand the market share of polyester heat shrink films, functional polyester slices and films, accelerate the development of super memory alloy films, recycled polyester films, energy storage film materials, environmentally friendly film materials, polyester raw materials CHDM (cyclohexane dimethanol), high-end polyester materials PETG (polyethylene terephthalate) and localized high-end film making equipment, and build advanced film material R&D and production bases.

5. Fluorine-based new materials. Vigorously develop electronic-grade hydrofluoric acid (low-grade fluorosilicon resource preparation), silicon tetrafluoride, high-performance anhydrous aluminum fluoride and other high value-added inorganic fluoride and fluorine-containing pharmaceutical intermediates and other fluorine-containing fine chemicals, focus on the development of fluorine-containing materials and

products such as fluorine resin and fluoroelastomers, and support Luoyang, Jiaozuo and other places to strengthen the fluorine chemical industry.

6. New salt materials. Vigorously develop polycarbonate, polyvinyl chloride, polyurethane materials, toluene diisocyanate, pharmaceutical intermediates and other products, further consolidate the advantages of chlor-alkali, soda ash, rock salt and other industries, broaden the downstream application of chlorine and hydrogen, promote the expansion of salt chemical industry to light industry and daily chemical products, promote the coordinated development of salt chemical industry and modern coal chemical industry, and build characteristic salt chemical material bases with Pingdingshan, Kaifeng, Luohe and Nanyang as the focus.

(4) Advanced inorganic non-metallic materials.

1. Superhard material. Focus on the development of composite superhard materials and products and key equipment in the fields of 5G (fifth-generation mobile communication technology), chip manufacturing, oil and gas drilling, accelerate the research of nano polycrystalline diamond, functional diamond and other preparation technologies, expand applications in jewelry, electronic information, sewage treatment, biomedicine and equipment, and build the world's largest superhard material R&D and production base with Zhengzhou, Xuchang, Shangqiu, Luohe, Nanyang and Xinyang as fulcrums.

2. New high-temperature materials. Focus on the development of functional refractories, high-efficiency thermal insulation materials, key refractories for hydrogen metallurgy, and key materials for high-temperature thermal protection in military industry and strategic emerging fields, promote the service, integration and composite development of new refractories, and build an important national new refractory industry base.

3. Special glass materials. Focus on the development of high-quality float glass, ultra-thin glass, vacuum glass, ultra-white glass, liquid crystal display substrate glass and other new types of glass, accelerate the development of high-generation ultra-thin screen display substrate glass, solar photovoltaic glass, low-emissivity coated glass, aircraft and high-speed train windshields and other high-performance functional glass, and promote the upgrading of the glass industry in Luoyang, Anyang, Shangqiu and other places from original film production to deep processing.

4. New building materials. Focus on the development of special cement, special cement, lightweight thermal insulation materials, etc., and build a comprehensive production base for green building materials integrating cement clinker, sand and gravel aggregate, commercial concrete, high-quality stone, prefabricated building parts and components. Vigorously develop lightweight thermal insulation materials such as aerogel composites, hollow glass beads, vitrified microbeads, and inorganic light aggregate products.

5. New ceramic materials. Focus on the development of functional ceramics such as insulation and dielectric ceramics, ferroelectric ceramics, piezoelectric ceramics, semiconductor ceramics, ceramics for key components of semiconductor equipment, and structural ceramics with high strength, high hardness, high temperature resistance, corrosion resistance, and oxidation resistance, and develop porous ceramics, ceramic sheets, decorative ceramics, water-saving sanitary ceramics, etc.

3. Cultivate and expand key strategic material industries

(1) Electronic functional materials.

1. Semiconductor materials. Focus on the development of silicon carbide, gallium nitride, indium phosphide, etc., improve the R&D and industrialization capabilities of large-size monocrystalline silicon polishing wafers, electronic-grade high-purity silicon materials, and zone fused silicon single crystals, develop special equipment such as semiconductor material slicing, grinding wafers, and polishing, support forward-looking research on electronic-grade diamonds, lay out the R&D and production of diamond, gallium ammide, and gallium arsenide, and improve the production capacity of silicon single crystal polishing wafers.

2. Optoelectronic functional materials. Focus on the development of high-performance optical fiber materials, long-life organic light-emitting materials, electronic pastes, optoelectronic displays and functional crystal materials, develop new light-emitting materials for Micro-LED (micro-light-emitting diode), mini-LED (sub-millimeter light-emitting diode), OLED (organic light-emitting diode), increase the research and development of semiconductor lighting materials such as LED (light-emitting diode) high-end epitaxial wafers, chips and other semiconductor lighting materials, improve the performance of optoelectronic display materials, and promote the transformation of scientific research achievements in optoelectronic functional crystal materials. Improve the optoelectronic functional materials industry chain.

3. New electronic component materials. Focus on the development of resistors, capacitors, inductors and other electronic components, research and development of thin film capacitors, polymer aluminum electrolytic capacitors, chip multilayer ceramic capacitors, silicon capacitors, ceramic substrates and other high-end electronic components such as foam core materials, electrolytes, electrolytes, electronic-grade ceramic powders, electrode materials, packaging materials and preparation technologies, and promote the upstream expansion of the new electronic component industry in Zhengzhou, Hebi and other places.

4. Process assistance and packaging materials. Focus on the development of electronic-grade high-purity reagents and targets, substrate materials, bonding wires for packaging, high-purity single crystal copper wires, electronic-grade glass fiber yarns, epoxy resin molding compounds, electronic-grade protection and structural glues, special inks, etc., accelerate the research and development and large-scale production of wet electronic chemicals, high-purity special gases, and high-purity metal materials, and promote the strengthening and refining of electronic chemical industries in Luoyang, Jiaozuo, Puyang and other places.

(2) High-performance fiber materials.

1. Carbon fiber. Focus on the development of T300 and T700 grade carbon fiber, polyacrylonitrile-based carbon fiber, asphalt-based carbon fiber, layout of large tow above 48K, high strength and high mode and high extension, T1100 grade and M65J grade carbon fiber preparation technology research and development, research and development of carbon fiber composite repair and reuse technology, expand the application of carbon fiber in new energy, automobile manufacturing, aerospace and other fields, and rely on Shangqiu and other places to build the largest carbon fiber production base in China.

2. Aramid fiber. Focus on breakthroughs in key technologies such as efficient dissolution, spinning stability control, and high-temperature heat treatment of para-aramid raw materials, as well as preparation technologies such as large-capacity continuous polymerization, high-speed spinning, high-stability and high-speed traction, and drafting, lay out the research and development of key technologies and industrialization technologies of meta-aramid fibers, accelerate the construction of the para-aramid project in Pingdingshan, and promote the extension of the industrial chain to aerospace, national defense and military industry, marine aquatic products, sporting goods and other fields.

3. Ultra-high molecular weight polyethylene fiber. Focus on the development of ultra-high molecular weight polyethylene plates, pipes, rods, profiles, films, fibers and other products, accelerate the construction of ultra-high molecular weight polyethylene projects in Puyang and other places, improve production capacity and post-processing capacity, and expand applications in machinery manufacturing, aviation military, medical equipment, sporting goods, textile industry and other fields.

4. Textile fiber. Focus on the development of functionalized and differentiated regenerated cellulose fibers and differentiated spandex fibers such as photochromic fibers, temperature-sensitive color-changing fibers, intelligent temperature control fibers, and super high-efficiency antibacterial fibers, and promote the growth of the spandex industry in Xinxiang and other places.

(3) New power and energy storage battery materials.

1. Metal-ion battery material. Focus on the development of positive and negative electrodes, electrolytes, separators and other materials, expand the industrial scale of electrolytes and additives such as lithium hexafluorophosphate and fluoroethylene carbonate, lithium iron phosphate, high-nickel ternary materials and graphite anode materials and increase market share, accelerate the layout of new battery materials such as sodium difluorosulfonimide, sodium hexafluorophosphate, Prussian white, hard carbon anode materials, lithium-sulfur battery cathode and anode materials, and promote the layout and development of sodium-ion batteries and full (semi) solid-state battery industries in Jiaozuo, Xinxiang and other places.

2. Hydrogen fuel cell materials. Focus on the development of key materials for hydrogen fuel cells such as proton exchange membranes, membrane electrodes, catalysts and diffusion layers, accelerate the research and development of high-performance proton exchange membranes, high-performance long-life membrane electrodes, high-performance low-load platinum long-life catalysts and slurries and other batch preparation technologies, and build a national hydrogen fuel cell industry base.

3. Photovoltaic cell materials. Focus on the development of crystalline silicon photovoltaic cell materials and compound films, develop large-size monocrystalline silicon, polycrystalline silicon solar silicon materials, polysilicon purification technology, polysilicon films, amorphous silicon films, research and development of new high-efficiency perovskite cell materials and organic-inorganic composites, copper, indium,

gallium, selenium and other thin-film cell materials, and create an industrial chain of "silane-granular silicon-monocrystalline silicon-cells-modules-power stations".

(4) Biomedical materials.

1. Medical equipment materials. Focus on the research and development of hollow fiber membranes for extracorporeal membrane lung oxygenation machines, hemodialysis membranes, high surface quality alloy wires, rods, and tubes, diffusion reinforced metals and alloys for CT (electronic computed tomography), vacuum high-temperature bearings, and large-capacity rotating targets, PET (positron emission computed tomography) for high thermal conductivity circuit substrate materials, scintillators for CT/PET detectors, high-efficiency filter materials for protective equipment, etc., relying on Zhengzhou, Luoyang, Xinxiang and other places to build medical equipment material production bases.

2. Functional plant/intervention materials. Focus on the development of functional implant/interventional medical materials for clinical treatment such as cardiovascular, artificial joints, dental implants, and visual restoration, expand the application of polylactic acid degradable materials in the medical field, and carry out research and development of high-performance medical-grade polyimide materials and medical nickel-titanium memory alloy capillary tubing.

3. New materials for medical consumables. Focus on the development of polymer materials and biodegradable materials such as functional dressings, medical protection, medical packaging, medical pipes, etc., develop precision protection, high-comfort medical textile/non-textile materials and functional coating materials, research and development of advanced materials such as medical styrene thermoplastic elastomers, biocompatible materials, bioinks, etc., and promote the high-end development of the medical consumables industry in Xinxiang, Pingdingshan, Luohe, Xinyang and other places.

(5) Energy-saving, carbon-reducing and environmentally friendly materials.

1. Energy-saving and carbon-reducing materials. Focus on the development of carbon capture materials based on solvents, adsorbents, membrane materials, metal-organic frameworks, etc., develop carbon emission reduction technologies such as oxygen-rich combustion emission reduction, CO2-N2O (carbon dioxide-nitrous oxide) catalytic emission reduction, and study carbon utilization technologies such as CO2 synthesis of low-carbon olefins, aromatics, and alcohol esters. Accelerate the development of integrated insulation boards, composite insulation materials, energy-saving self-insulation walls and materials, and promote the research and development and application of perlite insulation materials, ultra-high insulation energy-saving glass, intelligent dimming glass, automotive energy-saving glass and other products.

2. Environmentally friendly materials. Focus on the development of catalyst materials, hybrid matrix membranes, and high-performance hollow fiber membranes in the fields of water pollution control, industrial waste gas treatment, and automobile exhaust gas purification, and strengthen related technology research and development and product promotion. Research and promote materials with low (no) volatile organic compound content, such as coatings, inks, adhesives, cleaning agents, etc., with low (no) volatile organic compound content, and reduce the use of harmful substances at the source in the production and preparation of advanced materials.

Fourth, the forward-looking layout of cutting-edge new material industries

(1) Nanomaterials. Focus on the development of nanomaterials in the fields of metals, ceramics, composite materials, etc., develop electronic-grade spherical nanomaterials, rare earth nanomaterials, soil remediation agent nanomaterials, functional nanosilica and other products, and forward-look layout of advanced nanomaterials such as quantum dot luminescent materials, spherical alumina boron nitride thermal conductive materials, metal conductive antibacterial agents, accelerate the construction of Jiyuan Nanomaterials Industrial Park, and support Luoyang, Jiaozuo and other places to deepen the cultivation of carbon nanotubes, molecular sieves and other subdivisions.

(2) Graphene materials. Focus on the development of graphene energy storage devices, functional coatings, modified rubber and other special functional products, expand the application in anti-corrosion coatings, touch screens and other fields, develop graphene-based heat dissipation and sensor materials, research and development of large-scale preparation and micro-nano structure measurement and characterization and other key technologies, develop large-scale graphene film preparation equipment and measurement and testing instruments, and accelerate the construction of graphene industrial bases in Xinxiang, Kaifeng and Nanyang.

(3) Additive manufacturing materials. Focus on the development of metal powders such as titanium alloys, aluminum alloys, and superalloys for 3D printing, high-performance and stable photosensitive resins, binders, catalysts, engineering plastics and elastomers, and ceramic powders

and sheets such as silicon carbide and silicon nitride. Research the forming and preparation technology of metal spherical powder, nano-modified spherical powder and other materials, and accelerate the cultivation of additive manufacturing material industries in Zhengzhou, Luoyang, Jiyuan and other places.

(4) Advanced composite materials. Focus on the development of superconducting composites, carbon/carbon composites, functional composites, etc., develop high-performance carbon fiber, boron fiber, aramid fiber, silicon carbide fiber and other reinforcements, advanced resins, alloys, ceramics and other matrix materials, carry out research on advanced alloys such as high entropy alloys and liquid metals, and promote Zhengzhou, Luoyang and other places to build a "high-performance fiber-advanced composite materials-functional components" industrial chain.

5. Implement tough actions

(1) Implement material innovation ecological improvement. Adhere to innovation-driven, improve the innovation chain, connect industry, academia, research and application, realize the seamless connection of the whole process of "basic research, technical research, technology application, and industrialization of achievements", and create a first-class innovation ecology.

1. Improve the level of material innovation platform construction. Encourage advantageous enterprises to participate in the construction of state key laboratories, establish national manufacturing innovation centers, new material production and application demonstration bases, etc. Promote existing innovation platforms to accelerate key common technology research, and lay out a number of key laboratories, industrial research institutes, engineering technology research centers, etc. around key industrial chains to promote the incremental improvement of innovation platforms. Support large enterprises in the downstream of the industrial chain and small and medium-sized enterprises in the upstream of the industrial chain to form an innovation consortium for the integration of large and medium-sized enterprises and the collaboration of industry, university, research and application, undertake major scientific and technological projects, and promote the research and development of common technologies. (Responsible units: Provincial Department of Science and Technology, Department of Education, Department of Industry and Information Technology)

2. Enhance the independent innovation ability of material enterprises. Strengthen the main position of enterprise innovation and guide innovation elements to gather in enterprises. Support leading enterprises to take the lead in forming systematic, task-oriented, and open innovation consortiums to drive collaborative innovation among small and medium-sized enterprises. Accelerate the full coverage of R&D activities of material enterprises above designated size, and by 2025, R&D investment will account for more than 1.6% of the main business income of enterprises. (Responsible units: Provincial Department of Science and Technology, State-owned Assets Supervision and Administration Commission of the Provincial Government, Provincial Department of Industry and Information Technology)

3. Improve the efficiency of material innovation achievements. Deepen the reform of the ownership, use, disposal and income rights of scientific and technological achievements, innovate the transformation mechanism of scientific and technological achievements, and enhance the ability to diffuse common technologies. Accelerate the construction of the national technology transfer center in Zhengzhou, smooth the supply and demand docking channel, and strengthen the "matching" service of technology transactions. Improve the first batch of application demonstration guidance catalogues of key new materials, and increase financial support for the first batch of materials application. (Responsible units: Provincial Department of Science and Technology, Department of Industry and Information Technology, Department of Finance, Henan Banking and Insurance Regulatory Bureau)

(2) Implement core key technologies of materials. Adhere to the equal emphasis on material first and demand traction, focus on the development needs of advanced manufacturing, focus on breaking through the "bottleneck" technology and key common technologies of key material industries, and forward-looking layout of cutting-edge leading technologies.

1. Carry out research on key core technologies of 100 materials. Focus on the development needs of advanced basic materials, key strategic materials, and cutting-edge new materials, formulate and implement a list of core key technologies in the materials industry, and strive to break through more than 100 key core technologies and processes by 2025 through the support of various scientific and technological plans and projects. (Responsible units: Provincial Department of Science and Technology, Department of Education, Department of Industry and Information Technology)

2. Strengthen the supply of basic material research and original results. Adhere to the combination of basic research and applied research, support applied research with basic research, and drive basic research to achieve original results with applied research. Strengthen the

construction and basic research of advanced materials disciplines in "double first-class" universities. Give full play to the advantages of provincial laboratories such as Longmen Laboratory and Central Plains Critical Metals Laboratory in basic research and applied basic research. Promote "head goose" material enterprises to increase investment in basic research and applied basic research. (Responsible units: Provincial Department of Education, Department of Science and Technology, Department of Industry and Information Technology)

(3) Implement material supplementary chains, strengthen chains, and extend chains. Formulate a list of key industrial chains in the material subdivision industry to strengthen the chain and extend the chain, identify the faults and key shortcomings of the key industrial chain, accelerate the replenishment of the chain, and fill the core links; based on the comparative advantages of key industrial chains, accelerate the strengthening of the chain, and enhance the competitiveness of key technologies, processes and products; Aim at the downstream of key industrial chains and the high-end of the value chain to accelerate the extension of the chain and promote the reshaping of the value chain.

1. Accelerate the high-end extension of advanced basic materials. With the direction of "special, refined, high, cutting-edge and new", enhance the competitive advantage in the field of basic materials in our province. Promote advanced steel materials and advanced non-ferrous metal materials to extend the high-end product chain, and achieve a leap from materials to devices and equipment. Promote the development of advanced chemical materials to functional chemicals, special chemicals, and fine chemicals, extend the development of downstream high-end products, and realize the leap from key basic raw materials to high-end new chemical materials. Promote the promotion of advanced inorganic non-metallic materials to green, functional, and high-performance materials, enrich product functional categories, and expand from traditional fields such as refractory materials and building materials to emerging fields such as electronic information and aerospace. (Responsible units: Provincial Department of Industry and Information Technology, Development and Reform Commission)

2. Break through the core links of key strategic materials. Closely focusing on the development needs of strategic emerging industries such as new generation information technology, high-end equipment, biomedicine, new energy, energy conservation and environmental protection, aiming at the shortcomings and weaknesses of the core links of key strategic materials, accelerating the research and large-scale application of key raw materials, core component materials, and process materials, forming a virtuous circle of "materials-equipment-materials" promoting and improving each other, enhancing the comprehensive guarantee ability of materials for strategic emerging industries, and enhancing the division of labor in the value chain. (Responsible units: Provincial Development and Reform Commission, Department of Industry and Information Technology)

3. Build a first-mover advantage in cutting-edge new materials. Grasp the development trend of new materials, promote iterative, disruptive and original technological innovation, expand industrial applications, and lead cutting-edge new materials to "cultivate excellence in excellence, cultivate new in the middle, and create something out of nothing". Focus on breakthroughs in the batch preparation technology of nanomaterials, graphene materials, additive manufacturing materials, and advanced composite materials, and carry out forward-looking research on intelligent biomimetic materials, quantum information materials, high-entropy alloys, third-generation semiconductor materials, and liquid metals. Explore the establishment of a material "gene bank". (Responsible units: Provincial Development and Reform Commission, Department of Science and Technology, Department of Industry and Information Technology)

(4) Implement the construction of major material projects. Give full play to the traction role of key projects, adhere to external introduction and internal education, focus on key development areas of materials, plan, build and reserve a number of major projects, and roll out the implementation of "three batches" of material projects (one batch of signings, one batch of construction, and one batch of production).

1. In-depth implementation of technological transformation of material enterprises. Increase policy support and promotion, accelerate the high-end, intelligent, green and service-oriented transformation of material enterprises, improve the level of technology and equipment, and promote the traditional material industry to climb to the high end of the value chain and transform into strategic emerging industries. Strengthen project planning and generation, tap the potential of stock, and promote the growth rate of technological transformation investment in the materials industry to be higher than the average growth rate of technological transformation investment in the province. (Responsible units: Provincial Department of Industry and Information Technology, Development and Reform Commission, Department of Finance)

2. Vigorously carry out investment promotion in the industrial chain. Seize major policy opportunities such as building a new development pattern and promoting a new round of manufacturing transfer, deepen regional division of labor and cooperation, focus on supplementing and strengthening the chain and extending the chain, and strengthen the precise investment promotion of key material industry chains. Promote the coordination of industrial chain investment promotion and innovation chain investment promotion and supply chain investment promotion, attract investment and technology and wisdom at the same time, expand diversified supply chain channels, and effectively prevent the risk of

supply interruption in key links of the supply chain caused by emergencies. (Responsible units: Provincial Department of Commerce, Department of Industry and Information Technology)

(5) Implement the cultivation of material enterprises. Expand and strengthen the main body of the material industry market, improve the industry integration of leading enterprises, promote the development of small and medium-sized enterprises in the direction of "specialization, refinement and innovation", and form a pattern of collaborative innovation and integrated development of upstream and downstream industrial chains, large and small enterprises.

1. Accelerate the cultivation of leading material enterprises. Deeply implement the "head goose" enterprise cultivation action, focus on key areas such as advanced metal materials, advanced inorganic non-metallic materials, electronic functional materials, and bio-based new materials, and accelerate the cultivation of a number of leading enterprises with independent intellectual property rights and strong core competitiveness. Promote the merger, reorganization or alliance of key enterprises in the field of basic materials such as steel, nonferrous metals, and chemicals, and accelerate vertical extension, horizontal alliance, and leapfrog development. By 2025, there will be more than 50 leading enterprises in 10 billion materials in the province. (Responsible units: Provincial Department of Industry and Information Technology, Development and Reform Commission, State-owned Assets Supervision and Administration Commission of the Provincial Government)

2. Vigorously develop "specialized, special and new" material enterprises. In-depth implementation of the "specialized, special and new" enterprise cultivation action, and create a number of individual champions, hidden champions and "unicorn" enterprises around the material subdivision industry. By 2025, there will be more than 4,000 technology-based small and medium-sized enterprises in the field of materials, more than 3,000 national high-tech enterprises, more than 100 national-level specialized and new "little giant" enterprises, and more than 50 (products) individual champion enterprises (products). (Responsible units: Provincial Department of Industry and Information Technology, Development and Reform Commission, Department of Science and Technology)

3. Accelerate the promotion of "small upgrades" of material enterprises. Improve the incubation system for small, medium and micro enterprises, implement gradient cultivation plans, and increase the promotion of "small upgrading, regulation and stock reform, and stock listing" in key areas of materials. By 2025, there will be more than 10,000 material enterprises above designated size. (Responsible units: Provincial Department of Industry and Information Technology, Development and Reform Commission)

(6) Implement the green and low-carbon transformation of the materials industry. Deeply implement the green and low-carbon transformation strategy, resolutely curb the blind development of "two highs and one low" (high energy consumption, high pollution, and low level) projects, promote energy conservation and carbon reduction, ultra-low emissions and clean production, develop a circular economy, and accelerate the green development of the materials industry.

1. Strictly implement the industrial access and backward production capacity exit system. Strictly implement the capacity replacement policy of steel, cement, flat glass, and electrolytic aluminum industries, implement the joint review mechanism for "two high" projects, promote capacity integration and reduction and substitution, and increase the investigation and punishment of new production capacity in violation of laws and regulations. Establish and improve the "dual control" of carbon emissions, pollutant emissions, energy consumption and other means to force backward production capacity to withdraw. (Responsible units: Provincial Development and Reform Commission, Department of Industry and Information Technology, Department of Ecology and Environment, Department of Natural Resources, Market Supervision Bureau)

2. Further promote green manufacturing. Formulate and implement green manufacturing system management measures, and vigorously cultivate green factories, green design products, green supply chain management enterprises, and green industrial parks in the material industry. Implement energy-saving and carbon-reduction transformation actions in key areas, carry out energy-saving diagnosis services and energy efficiency and water efficiency benchmarking activities for key enterprises, support research on carbon capture, carbon sequestration, and carbon utilization, and accelerate research on new carbon collection and carbon negative technologies. (Responsible units: Provincial Development and Reform Commission, Department of Ecology and Environment, Department of Industry and Information Technology)

3. Promote the comprehensive utilization of resources. Improve the management level of key processes and processes, improve the efficiency of primary resource utilization, and reduce resource energy consumption from the source. Accelerate the development of recycled metal recycling industry and build "urban mines". Accelerate the control of plastic pollution and the recycling of plastics, and promote the industrialization and application of biodegradable plastics. Strengthen the standardized management of the comprehensive utilization industry of waste power batteries, waste paper, waste tires, etc. Build a resource recycling material industry system, build a material industry coupled development park,

and realize the cascade utilization of energy resources and the connection of industrial cycle. (Responsible units: Provincial Development and Reform Commission, Department of Commerce, Department of Ecology and Environment, Department of Industry and Information Technology)

(7) Implement material standards and quality brands. Adhere to quality first, efficiency first, innovate standardization systems and mechanisms, accelerate the establishment of new standard systems, improve material inspection and testing capabilities, and promote material quality technology innovation and brand building.

1. Carry out new material standard pilot actions. Deepen the construction of "standard Henan", strengthen the effective supply of standards in the field of new materials, promote enterprises, universities and scientific research institutions to lead and participate in the formulation (revision) of industry standards, national standards and international standards, support various innovation consortia to formulate and implement group standards with domestic (international) advanced level, and improve the level of "Henan standards" in the field of materials. Strengthen the connection between standards in the field of materials and design specifications in downstream industries such as equipment manufacturing and engineering construction, as well as related material application manuals. Relying on leading enterprises, key material industrial parks, universities, etc., we will build a technical standard innovation base in the field of new materials, and promote the development of science and technology, standards and industries in an integrated manner. (Responsible units: Provincial Market Supervision Bureau, Department of Industry and Information Technology, Department of Education)

2. Improve the inspection and testing capabilities of new materials. Increase the introduction of national new material inspection and testing institutions to improve the technical capabilities and level of inspection and testing in our province. Relying on key material research and development institutions, production enterprises and measurement and testing institutions, build a public technical service platform and service guarantee system for new material inspection and testing in our province, promote the sharing of new material testing instruments and equipment, testing needs and services, testing talents and qualifications, etc., meet the public needs of new material inspection and testing, and improve the overall level of the new material testing service industry. (Responsible units: Provincial Market Supervision Bureau, Department of Industry and Information Technology)

3. Strengthen the brand building of material quality. Connect with the national material testing and evaluation platform, optimize material preparation technology and technology, and improve online quality monitoring, online control and product life cycle quality traceability capabilities. Support key material enterprises to benchmark against international benchmarks, set a number of quality benchmarks, and lead the high-end of enterprise brands. Encourage the establishment of a specification mechanism for key product instructions to improve the quality of product application. Promote quality management system certification, environmental management system certification, and green product certification. (Responsible units: Provincial Market Supervision Bureau, Department of Industry and Information Technology)

(8) Implement material integration and innovative application. Promote the deep integration of a new generation of information technology and the materials industry, strengthen digital empowerment and industrial Internet empowerment, develop service-oriented manufacturing, and give birth to new technologies, new formats and new models in the materials industry.

1. Accelerate digital transformation. Promote the intelligence of the material manufacturing process, improve the real-time perception and data collection, process control and other capabilities of the material production site, encourage the application of robots in positions with high labor intensity, high safety risks, and high precision requirements, and build a material intelligent production management and business decision-making system integrating production execution, process control, operation management and customer service. Carry out pilot demonstrations and graded evaluation of the "two modernizations" integrated management system, promote material enterprises to improve the level of information technology integration and application, and accelerate the reform of the management system of material enterprises. (Responsible unit: Provincial Department of Industry and Information Technology)

2. Promote the empowerment of the industrial Internet. Encourage material enterprises to build a networked collaboration platform between enterprises to realize resource sharing and collaborative manufacturing of multiple production bases. Support the "chain master" enterprises of the industrial chain to build professional and characteristic industrial Internet platforms for the industry, open up the data of the enterprise side and the user side, and reconstruct the product structure and manufacturing process. Accelerate the integrated development of the material industry and "5G + industrial Internet", create typical application scenarios, and promote material enterprises to improve quality, reduce costs and increase efficiency. (Responsible unit: Provincial Department of Industry and Information Technology)

3. Develop service-oriented manufacturing. Promote the deep integration of advanced material manufacturing and modern service industries, encourage material enterprises to develop industrial design, customized services, supply chain management, shared manufacturing, inspection, testing and certification services, general integrated general contracting, productive finance and other services, transform from single manufacturing to "manufacturing + service", and accelerate the innovation of business formats and models. (Responsible units: Provincial Department of Industry and Information Technology, Development and Reform Commission)

6. Safeguard measures

(1) Strengthen organizational leadership. The provincial leading group for the construction of a strong manufacturing province will coordinate and promote the implementation of this action plan. Deepen the linkage of departments, blocks, and government-enterprises, and focus on solving major problems in the high-quality development of the material industry in our province. improve the "double-length system" of key material industries and industrial chains, promote the leading role of "chain master" enterprises, and promote the integrated development of upstream and downstream, large and small enterprises; Promote the role of staff assistants and bridges to strengthen enterprise industrial services and government decision-making services.

(2) Strengthen policy coordination. Focusing on the development goals, main directions and key actions of the material industry, formulate support policies to accelerate the reconstruction of the advantages of the material industry. Promote the effective connection and synergy between fiscal and taxation, finance, energy, science and technology, investment, investment promotion, ecological environment, natural resources and industrial policies and industrial policies to form an aggregation effect. Relying on the activity mechanism of "10,000 people help 10,000 enterprises", strengthen policy supply and research reserves, increase policy publicity and implementation, and promote the implementation of policies to benefit enterprises.

(3) Strengthen factor guarantees. Deeply promote the "three batches" of project construction, and take multiple measures to ensure the production factors of key material enterprises such as energy, land, labor, and transportation. Promote the inclination of financial services to innovative applications and small and medium-sized enterprises in the fields of advanced basic materials, key strategic materials, and cutting-edge new materials, expand financing channels, reduce financing costs, and alleviate financing difficulties. Encourage resource-based material enterprises to "go global" and improve the level of mineral products and raw materials necessary for the development of the material industry and urban and rural construction.

(4) Strengthen talent introduction and training. Implement the talent introduction policy, and accelerate the introduction of top talents, leading talents, young talents and potential talents urgently needed by the material industry. Deepen the construction of new engineering disciplines in colleges and universities in the province, optimize the layout of related disciplines, and expand the scale of professional talent training. Promote school-enterprise cooperation in running schools, jointly build internship training bases, and strengthen the introduction and training of high-quality skilled talents. Support key material enterprises to set up postdoctoral workstations and innovative practice bases, establish flexible and diverse talent use models, and improve the development system of knowledge-based, skill-based, and managerial talents.

(5) Strengthen institutional innovation. Deepen the comprehensive supporting reform of innovation and development, innovate administrative examination and approval and government service models, and create a market-oriented, law-based, and international business environment. Strictly implement the "negative list" system for market access, resolutely abandon the thinking and practice of "one-size-fits-all" inclusion in the scope of restrictions or prohibitions in steel, non-ferrous metals, building materials and other industries, and implement industrial layout and projects that are not prohibited from entering. Encourage qualified localities to actively explore institutional innovation based on actual conditions, support advantageous new material products to be included in the procurement catalogue of government procurement and state-owned investment projects, accelerate the promotion and application, and create a favorable environment to support the development of the new material industry.

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