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**Catalogue for Guiding Industry Restructuring (2011 Version) (2013 Amendment) [Expired]****產業結構調整指導目錄(2011年本)(2013修正) [失效]****【法寶引證碼】CLI.4.195401(EN)****Issuing authority:** [Instrumentalities of the State Council, All Commissions, State Development & Reform Commission](#)**Document Number:** Order No. 21 of the National Development and Reform Commission**Date issued:** 02-16-2013**Effective date:** 05-01-2013**Level of Authority:** [Departmental Rules](#)**Area of Law:** [Reform and Opening-up](#)**Invalidated by:** [Catalogue for Guiding Industry Restructuring \(2019 Version\) \(Issued on 10-30-2019 Effective on 01-01-2020\)](#)**Partially Invalidated by:** [Order No. 36 of the National Development and Reform Commission — the Decision on Ceasing the Implementation of the Provision on the Deadline Elimination of Techniques of Cyanide Gold Plating \(Issued on 03-25-2016 Effective on 04-25-2016\)](#)

Catalogue for Guiding Industry Restructuring (2011 Version) (2013 Amendment)

(Issued by Order No. 9 of the National Development and Reform Commission on March 27, 2011, and amended in accordance with the Decision of the National Development and Reform Commission on Amending the Relevant Clauses of the Catalogue for Guiding Industry Restructuring (2011 Version) issued by Order No. 21 of the National Development and Reform Commission on February 16, 2013)

產業結構調整指導目錄（2011年本）（修正）

（2011年3月27日國家發展改革委第9號令公布，根據2013年2月16日國家發展改革委第 21 號令公布的《國家發展改革委關於修改〈產業結構調整指導目錄（2011年本）〉有關條款的決定》修正）

Category I Encouragement

第一類 鼓勵類

I. Agriculture and Forestry**一、農林業**

1. Comprehensive improvement of low- and medium-yield fields and construction of basic farmlands with stable and high yields

1、中低產田綜合治理與穩產高產基本農田建設

2. Construction of agricultural product bases

2、農產品基地建設

3. Development and application of advanced protected cultivation technologies for vegetables, melons, fruits, and flowers (including soilless cultivation)

3、蔬菜、瓜果、花卉設施栽培（含無土栽培）先進技術開發與應用

4. Development and application of high-quality, high-yield, efficient, and standardized cultivation technologies

4、優質、高產、高效標準化栽培技術開發與應用

5. Development and application of technologies for the standardized breeding of livestock and poultry on a certain scale

5、畜禽標準化規模養殖技術開發與應用

6. Prevention and control of serious plant diseases, insect pests, and animal diseases

6、重大病蟲害及動物疫病防治

7. Genetic engineering of crops, livestock, poultry, aquatic animals and plants, and wildlife, as well as construction of gene pools

7、農作物、家畜、家禽及水生動植物、野生動植物遺傳工程及基因庫建設

8. Selection, breeding, breed conservation, and development of the fine varieties of animals and plants (including wild animals and plants); biological breeding; and production, processing, storage, and appraisal of seeds

8、動植物（含野生）優良品種選育、繁育、保種和開發；生物育種；種子生產、加工、貯藏及鑒定

9. Development and application of seed (seedling) detoxification technologies

9、種（苗）脫毒技術開發與應用

10. Development and application of technologies for dry land water-saving agriculture, protective cultivation, ecological agricultural construction, arable land quality construction, and rapid fertilization of new arable land	10、旱作節水農業、保護性耕作、生態農業建設、耕地質量建設及新開耕地快速培肥技術開發與應用
11. Development and application of ecological planting (or breeding)	11、生態種（養）技術開發與應用
12. Development and application of pollution-free degradation technologies for agricultural membrane and heavy metal degradation technologies for farmland soil	12、農用薄膜無汙染降解技術及農田土壤重金屬降解技術開發與應用
13. Development of green and pollution-free feeds and feed additives	13、綠色無公害飼料及添加劑開發
14. Resource multiplication and protection projects of large inland lake basins	14、內陸流域性大湖資源增殖保護工程
15. Distant fishery and projects of fishery administration and fishing ports	15、遠洋漁業、漁政漁港工程
16. Industrialized production of embryo (in vivo) and semen of cattle and sheep	16、牛羊胚胎（體內）及精液工廠化生產
17. Development and application of agricultural biotechnology	17、農業生物技術開發與應用
18. Arable land maintenance management and development and application of fast testing technologies for soil, fertilizer and water	18、耕地保養管理與土、肥、水速測技術開發與應用
19. Construction of conservation lands and conservation zones of germ plasm resources of agricultural, forestry and fishery species; collection, conservation, appraisal, development, and application of germ plasm resources of animals and plants	19、農、林作物和漁業種質資源保護地、保護區建設；動植物種質資源收集、保存、鑒定、開發與應用
20. Crop straw manure and comprehensive utilization (including but not limited to the development and utilization of ensile, cattle raising with ammoniated straws to realize return of straws to land, straw methane and its pyrolyzation and gasification, cultivation of edible fungus, densified biomass briquette fuel, man-made straw boards, straw cellulose fuel ethanol, and non-cereal feed resources)	20、農作物秸稈還田與綜合利用（青貯飼料，秸稈氮化養牛、還田，秸稈沼氣及熱解、氣化，培育食用菌，固化成型燃料，秸稈人造板，秸稈纖維素燃料乙醇、非糧飼料資源開發利用等）
21. Projects of comprehensive utilization and development of rural renewable resources (including but not limited to biogas projects, comprehensive utilization of "biogas, biogas slurry, and biogas residue," and biogas filling and purification)	21、農村可再生資源綜合利用開發工程（沼氣工程、“三沼”綜合利用、沼氣灌裝提純等）
22. Recovery projects of leveling embankment for flood running and returning farmland to lake	22、平垸行洪退田還湖恢復工程
23. Cultivation of edible (medicinal) fungus	23、食（藥）用菌菌種培育
24. Comprehensive harnessing projects for grassland and forest disasters	24、草原、森林災害綜合治理工程
25. Projects of returning cultivated land (or grazed field) to forest (or grassland) and restoring vegetation of natural grassland, where non-arable land is utilized	25、利用非耕地的退耕（牧）還林（草）及天然草原植被恢復工程
26. Development and application of new techniques and technologies for new diagnosis reagents and vaccines for animal epidemics and veterinary drugs with low toxin and low residue (including biological products for animals)	26、動物疫病新型診斷試劑、疫苗及低毒低殘留獸藥（含獸用生物制品）新工藝、新技術開發與應用
27. Artificial cultivation and processing of high-quality and high-yield forage grass	27、優質高產牧草人工種植與加工
28. Planting and production of natural rubber and eucommia	28、天然橡膠及杜仲種植生產
29. Pollution-free agricultural products and development and application of technologies for monitoring harmful elements in the environment of producing areas	29、無公害農產品及其產地環境的有害元素監測技術開發與應用
30. Development and application of technologies for the innocuous disposal of organic waste and the industrialization of organic fertilizer	30、有機廢棄物無害化處理及有機肥料產業化技術開發與應用
31. Development and application of production technologies for pollution-free and green agricultural, husbandry, and fishery products	31、農牧漁產品無公害、綠色生產技術開發與應用
32. Storage, transportation, freshness maintenance, processing, and comprehensive utilization of agricultural, forestry, husbandry, and fishery products	32、農林牧漁產品儲運、保鮮、加工與綜合利用
33. Protection projects of natural forest and other natural resources	33、天然林等自然資源保護工程

34. Planting of carbon sequestration forest, tree planting and grass growing projects, and tree seedling projects	34、碳彙林建設、植樹種草工程及林木種苗工程
35. Development and application of technologies for the comprehensive harnessing of water loss and soil erosion	35、水土流失綜合治理技術開發與應用
36. Ecosystem restoration and reconstruction projects	36、生態系統恢復與重建工程
37. Construction of natural reserves including but not limited to ocean, forest, wildlife, wetland, desert and grassland and eco-demonstration projects	37、海洋、森林、野生動植物、濕地、荒漠、草原等自然保護區建設及生態示範工程
38. Shelter forest projects	38、防護林工程
39. Desertification prevention and control and sand prevention and control projects	39、石漠化防治及防沙治沙工程
40. Production of new materials for sand stabilization, water conservation, and soil improvement	40、固沙、保水、改土新材料生產
41. Cultivation of salt-tolerance and drought-enduring plants	41、抗鹽與耐旱植物培植
42. Fast-growing and high-yield plantation projects, industrial raw material forest projects, cultivation of rare trees, and planting of famous, featured, high-quality, and novel economic forests	42、速生豐產林工程、工業原料林工程、珍貴樹種培育及名特優新經濟林建設
43. Construction of bamboo and rattan bases and development of bamboo and rattan products undergoing fine or deep processing and bamboo by-products	43、竹藤基地建設、竹藤精深加工產品及竹副產品開發
44. Projects of forest tending and improvement of low-yield forests	44、森林撫育、低產林改造工程
45. Protection, improvement, development, and utilization of wild economic forest species	45、野生經濟林樹種保護、改良及開發利用
46. Conservation projects of rare and endangered species of wild animals and plants	46、珍稀瀕危野生動植物保護工程
47. Conservation projects of forest genetic resources	47、林業基因資源保護工程
48. Deep processing and product development of inferior and small firewoods, shrubs grown in sand, and "three residues" (felling residue, forest planting residue, and processing residue)	48、次小薪材、沙生灌木及三剩物深加工與產品開發
49. Construction of cultivation, taming and breeding bases of wild animals and plants and development of a monitoring and early warning system of epidemic sources and diseases	49、野生動植物培植、馴養繁育基地及疫源疫病監測預警體系建設
50. Planting (breeding) of fine traditional Chinese medicine and high-quality, high-yield, endangered, or rare animal and plant medicinal materials	50、道地中藥材及優質、豐產、瀕危或緊缺動植物藥材的種植（養殖）
51. Artificial cultivation and development of underwood species including but not limited to spices and wild flowers	51、香料、野生花卉等林下資源人工培育與開發
52. Development of technologies for wood-based composite materials and structural artificial boards	52、木基複合材料及結構用人造板技術開發
53. Production and comprehensive utilization of wood-based composite materials and bamboo construction materials	53、木質複合材料、竹質工程材料生產及綜合利用
54. Constructon of turpentine orchards and deep processing of forest chemicals	54、松脂林建設、林產化學品深加工
55. Development and application of artificial rainfall and hail suppression and other weather modification technologies	55、人工增雨防雹等人工影響天氣技術開發與應用
56. Development and application of digital (information-based) agricultural technologies	56、數字（信息）農業技術開發與應用
57. Development and application of agricultural environment and improvement and protection technologies	57、農業環境與治理保護技術開發與應用
58. Mariculture and deep processing of marine products and multiplication and protection of marine fishery resources	58、海水養殖及產品深加工，海洋漁業資源增殖與保護
59. Construction of ecologically-clean small watersheds and prevention and control of non-	59、生態清潔型小流域建設及面源污染防治

point source pollution

60. Construction of major farm tracks (bridges) in farmlands

61. Construction of oil tea, oil palm, and other woody foodstuff and oil bases

62. Dedicated cultivation and industrialization of bio-energy forests

63. Popularization and application of energy-saving grain and oil drying equipment, green grain storage technologies for farmers, deratization technologies, new barns for farmers (including but not limited to color plate mixing barns, rectangle barns with a steel skeleton, steel mesh drying barns, and hot-dip zinc-coated steel barns)

64. Development and application of automatic pest density monitoring technologies for crops and forests

65. Development and application of automatic fire monitoring and alarming technologies for forests and grasslands

66. Meteorological satellite projects (including but not limited to satellite research, development and manufacturing, supporting software systems, and ground receiving and processing equipment) and meteorological information services

II. Water Conservancy

1. River dyke construction projects and river course and reservoir harnessing projects

2. Cross-basin water diversion projects

3. Water supply source projects for urban and rural areas

4. Rural drinking water safety projects

5. Construction of flood storage and retention areas

6. Construction of sea walls

7. Projects of silt clean-up in rivers, lakes, and reservoirs

8. Risk elimination and reinforcement projects for defective and dangerous reservoirs and water gates

9. Development and application of technologies for the monitoring and elimination of hidden risks in dykes and dams

10. Urban water logging early warning and flood prevention projects

11. Improvement projects of outlets to sea

12. Key water harnessing projects for comprehensive utilization

13. Water conservancy projects in pastureland

14. Warp land dam projects

15. Development and manufacturing of geosynthetic materials and new materials for water conservancy projects

16. Improvement of irrigation areas and construction of supporting facilities

17. Construction of emergency reponse facilities for preventing and controlling flood and drought

18. Popularization and application of efficient water delivery and distribution and water-saving irrigation technologies

19. Development of automatic water condition and water quality monitoring and automatic flood control and dispatching systems

60、農田主要機耕道（橋）建設

61、油茶、油棕等木本糧油基地建設

62、生物質能源林定向培育與產業化

63、糧油乾燥節能設備、農戶綠色儲糧生物技術、驅鼠技術、農戶新型儲糧倉（彩鋼板組合倉、鋼骨架矩形倉、鋼網式乾燥倉、熱浸鍍鋅鋼板倉等）推廣應用

64、農作物、林木害蟲密度自動監測技術開發與應用

65、森林、草原火災自動監測報警技術開發與應用

66、氣象衛星工程（衛星研制、生產及配套軟件系統、地面接收處理設備等）和氣象信息服務

二、水利

1、江河堤防建設及河道、水庫治理工程

2、跨流域調水工程

3、城鄉供水水源工程

4、農村飲水安全工程

5、蓄滯洪區建設

6、海堤建設

7、江河湖庫清淤疏浚工程

8、病險水庫、水閘除險加固工程

9、堤壩隱患監測與修復技術開發與應用

10、城市積澇預警和防洪工程

11、出海口門整治工程

12、綜合利用水利樞紐工程

13、牧區水利工程

14、淤地壩工程

15、水利工程用土工合成材料及新型材料開發製造

16、灌區改造及配套設施建設

17、防洪抗旱應急設施建設

18、高效輪配水、節水灌溉技術推廣應用

19、水情水質自動監測及防洪調度自動化系統開發

20. Infrastructure construction for hydrology emergency forecasting and drought monitoring	20、水文應急測報、旱情監測基礎設施建設
21. Projects of renovation and improvment of irrigation and drainage pump stations	21、灌溉排水泵站更新改造工程
22. Water conservancy projects for bilharziasis prevention and control (by taking engineering measures to prevent and extinguish snails, such as slope protection, hydraulic reclamation, isolation ditch, water gate improvement, establishment of snail retention tanks, and lifting islets and dropping mud flats, and measures for epidemic surveillance and publicity of prevention and control)	22、水利血吸蟲病防治工程（采用護坡、吹填、隔離溝、涵閘改造、設置沉螺池、抬洲降灘等防螺滅螺工程措施和疫情監測、防治宣教等措施）
23. Farmland water conservancy construction projects (construction of irrigation and drainage channels, water gates, and pump stations)	23、農田水利設施建設工程（灌排渠道、涵閘、泵站建設等）
24. Development and application of new technologies and new products for flood control and drought relief	24、防汛抗旱新技術新產品開發與應用
25. Projects of prevention and control of geological disasters from mountain torrents (construction of the monitoring, forecasting, and early warning system for mountain torrent geological disaster prevention and control areas and control of mountain torrent ditches, debris flow gullies, and landslide)	25、山洪地質災害防治工程（山洪地質災害防治區監測預報預警體系建設及山洪溝、泥石流溝和滑坡治理等）
26. Protection and restoration projects of the aquatic ecosystem and underground water	26、水生生態系統及地下水保護與修復工程
27. Water source conservation projects (zoning of water source conservation areas, isolated protection, conservation of water and soil, protection of water resources, water ecological restoration, and development and popularization of relevant technologies)	27、水源地保護工程（水源地保護區劃分、隔離防護、水土保持、水資源保護、水生環境修復及有關技術開發推廣）
28. Development and application of the automatic water loss and soil erosion monitoring and forecasting system (an integration of collection and storage of water loss and soil erosion data, intelligent transmission, data analysis and processing, scientific estimation and forecasting, and database management)	28、水土流失監測預報自動化系統（水土流失數據采集存儲、智能傳輸、數據分析處理、科學預測預報、數據庫管理一體化）開發與應用
29. Flood risk mapping technologies and their application (thematic maps of flood information in specific areas such as middle and lower reaches of great rivers, major flood control areas, and protected areas of flood control)	29、洪水風險圖編制技術及應用（大江大河中下游及重點防洪區、防洪保護區等特定地區洪澇災害信息專題地圖）
30. Development of the water resources management information system (which is a comprehensive management information system based on the monitoring of key links of water resources development and utilization, including but not limited to water sources, water intake, water transmission, water supply, water use, water consumption, and water drainage, and the monitoring of administrative border control sections of great rivers and groundwater overdraft areas, depending on the national e-government network and the backbone network of the state flood control and command system and centering on the water resources business application system)	30、水資源管理信息系統建設（以水源、取水、輸水、供水、用水、耗水和排水等水資源開發利用主要環節的監測及大江大河行政邊界控制斷面、地下水超采區監測為基礎，以國家電子政務外網和國家防汛指揮系統骨幹網為依托，以水資源業務應用系統為核心的綜合管理信息系統）
31. Construction of infrastructure for hydrologic stations and networks and development and application of instruments and equipment for them	31、水文站網基礎設施建設及其儀器設備開發與應用

III. Coal

三、煤炭

1. Coalfield geological and geophysical exploration	1、煤田地質及地球物理勘探
2. Construction of high-yield and efficient mines (including mine shafts and open-pit mines) with an annual yield of not less than 1.2 million ton and efficient coal preparation plants	2、120 萬噸/年及以上高產高效煤礦（含礦井、露天）、高效選煤廠建設
3. Prevention and control of mine disasters (including but not limited to gas, coal dust, mine water, fire, wall rock, earth temperature, and rock burst)	3、礦井災害（瓦斯、煤塵、礦井水、火、圍岩、地溫、沖擊地壓等）防治
4. Development and application of briquette coal and coal water slurry technologies	4、型煤及水煤漿技術開發與應用
5. Processing and comprehensive utilization of resources co-existing and associated with coal	5、煤炭共生資源加工與綜合利用
6. Exploration, development and utilization of coal-bed methane and extraction and utilization of coal mine gas	6、煤層氣勘探、開發、利用和煤礦瓦斯抽采、利用

7. Comprehensive utilization of fuels with low heat value, such as coal gangue, coal slurry, and middling
8. Coal conveyance through pipelines
9. Development and application of efficient coal washing, dressing and desulphurization technologies
10. Development and application of coal dressing engineering technologies
11. Control of land subsidence areas and protection and utilization of water resources in mine
12. Coal and electricity integration construction
13. Development and application of coal mining methods and techniques for improving resources recovery rate
14. Development and application of coal gangue backfilling technologies for coal mine gob areas
15. Development and application of underground rescue technologies and special equipment
16. Development and application of comprehensive monitoring technologies and equipment for the process of coal mine production
17. Construction of large-scale coal storage and transportation centers and coal trading markets
18. Development and application of the automatic monitoring and recording system for persons entering or exiting mines
19. Development and application of new equipment for risk avoidance and self-rescue of miners
20. Development and application of coal mining technologies using materials such as coal gangue as fillings under buildings, railways and other infrastructure and under water

IV. Electric Power

1. Water power
2. Construction of a supercritical or ultra-supercritical power plant with a unit generating capacity of not less than 600,000 kW
3. A backpressure (extraction back-pressure) heat and electricity cogeneration unit, a heat, electricity and cooling multi-generation unit, and a heat and electricity cogeneration unit with a generating capacity of not less than 300,000 kW
4. Construction of a large-scale air-cool power plant with a unit capacity of not less than 600,000 kW in a water-shortage area
5. Natural gas peak-shaving power generation projects in key power load centers in areas with sufficient natural gas
6. Clean coal power generation, such as power generation by circulating fluidized bed, pressurized fluidized bed, or integrated gasification combined cycle, with a generating capacity of not less than 300,000 kW
7. Power generation with a unit generating capacity of not less than 300,000 kW by using fluidized bed boilers and utilizing gangue, middling and coal slurry, among others.
8. Direct or alternate current transmission and transformation with a capacity of not less than 500 kV
9. Desulphurization and denitration improvement of in-service generating sets
10. Improvement and construction of grids

- 7、煤矸石、煤泥、洗中煤等低熱值燃料綜合利用
- 8、管道輸煤
- 9、煤炭高效洗選脫硫技術開發與應用
- 10、選煤工程技術開發與應用
- 11、地面沉陷區治理、礦井水資源保護與利用
- 12、煤電一體化建設
- 13、提高資源回收率的采煤方法、工藝開發與應用
- 14、礦井采空區矸石回填技術開發與應用
- 15、井下救援技術及特種裝備開發與應用
- 16、煤礦生產過程綜合監控技術、裝備開發與應用
- 17、大型煤炭儲運中心、煤炭交易市場建設
- 18、礦井進出人員自動監控記錄系統開發與應用
- 19、新型礦工避險自救器材開發與應用
- 20、建築物下、鐵路等基礎設施下、水體下采用煤矸石等物質充填采煤技術開發與應用

四、電力

- 1、水力發電
- 2、單機60萬千瓦及以上超臨界、超超臨界機組電站建設
- 3、采用背壓（抽背）型熱電聯產、熱電冷多聯產、30萬千瓦及以上熱電聯產機組
- 4、缺水地區單機60萬千瓦及以上大型空冷機組電站建設
- 5、重要用電負荷中心且天然氣充足地區天然氣調峰發電項目
- 6、30萬千瓦及以上循環流化床、增壓流化床、整體煤氣化聯合循環發電等潔淨煤發電
- 7、單機 30 萬千瓦及以上采用流化床鍋爐並利用煤矸石、中煤、煤泥等發電
- 8、500千伏及以上交、直流輸變電
- 9、在役發電機組脫硫、脫硝改造
- 10、電網改造與建設

11. Development and application of relay protection technologies and grid operation safety monitoring information technologies	11、繼電保護技術、電網運行安全監控信息技術開發與應用
12. Intensive design of large-scale power plants and large grid transformers and development and application of automation technologies	12、大型電站及大電網變電站集約化設計和自動化技術開發與應用
13. Development and application of inter-regional grid interconnection engineering technologies	13、跨區電網互聯工程技術開發與應用
14. Popularization and application of energy-saving and environmental protection technologies for power transmission and transformation	14、輸變電節能、環保技術推廣應用
15. Development and application of technologies for the reduction of electric loss in the process of power transmission, transformation and distribution	15、降低輸、變、配電損耗技術開發與應用
16. Popularization and application of distributed power supply and grid connection technologies	16、分布式供電及並網技術推廣應用
17. Desulfuration and denitration of coal-fired power generation units and control of combined pollutants	17、燃煤發電機組脫硫、脫硝及複合汙染物治理
18. Development and production of denitration catalysts for thermal power generation	18、火力發電脫硝催化劑開發生產
19. Development and application of engineering technologies for low and medium temperature water recovery measures and fish passage measures in hydropower generation	19、水力發電中低溫水恢復措施工程、過魚措施工程技術開發與應用
20. Development and application of large-capacity electricity storage technologies	20、大容量電能儲存技術開發與應用
21. Charging facilities for electric automobiles	21、電動汽車充電設施
22. Power generation technologies utilizing ventilation air methane (VAM) and development and utilization	22、乏風瓦斯發電技術及開發利用
23. Complete equipment for power generation through waste incineration	23、垃圾焚燒發電成套設備
24. Distributed power supply	24、分布式電源
V. New Energy	五、新能源
1. Development and application of integrated technologies for solar thermal heating power generation systems and solar photovoltaic power generation systems and development and manufacturing of inverting control systems	1、太陽能熱發電集熱系統、太陽能光伏發電系統集成技術開發應用、逆變控制系統開發製造
2. Development and application of technologies for complementary wind and photovoltaic power generation systems	2、風電與光伏發電互補系統技術開發與應用
3. Design and manufacturing of components for integration of solar energy and buildings	3、太陽能建築一體化組件設計與製造
4. Efficient solar water heaters and solar hot water projects, development of medium and high temperature utilization technologies for solar energy, and equipment manufacturing	4、高效太陽能熱水器及熱水工程，太陽能中高溫利用技術開發與設備製造
5. Development and application of production technologies of non-cereal biomass fuels, such as biomass cellulose ethanol and biodiesel	5、生物質纖維素乙醇、生物柴油等非糧生物質燃料生產技術開發與應用
6. Development of power generation technologies by direct combustion or gasification of biomass and equipment manufacturing	6、生物質直燃、氣化發電技術開發與設備製造
7. Development of collection, transportation and storage technologies for agricultural and forestry biomass resources and equipment manufacturing; and manufacturing of processing equipment of agricultural and forestry biomass briquette fuels, boilers, and furnaces	7、農林生物質資源收集、運輸、儲存技術開發與設備製造；農林生物質成型燃料加工設備、鍋爐和爐具製造
8. Complete equipment for large-scale biogas production with raw materials such as waste of livestock and poultry farms, urban landfills, and industrial organic waste water	8、以畜禽養殖場廢棄物、城市填埋垃圾、工業有機廢水等為原料的大型沼氣生產成套設備
9. Manufacturing of biogas power generating sets, biogas purification equipment, and complete equipment for biogas supply in pipelines and biogas filling in cylinders	9、沼氣發電機組、沼氣淨化設備、沼氣管道供氣、裝罐成套設備製造

10. Development of marine energy and geothermal energy utilization technologies and equipment manufacturing

10、海洋能、地熱能利用技術開發與設備制造

11. Development of offshore wind turbine technologies and equipment manufacturing

11、海上風電機組技術開發與設備制造

12. Construction of offshore wind plants and equipment manufacturing

12、海上風電場建設與設備制造

VI. Nuclear Energy

六、核能

1. Geological exploration of uranium mine, uranium mining and metallurgy, uranium purification, and uranium conversion

1、鈾礦地質勘查和鈾礦采冶、鈾精制、鈾轉化

2. Construction of advanced nuclear reactors and technology development

2、先進核反應堆建造與技術開發

3. Construction of nuclear power plants

3、核電站建設

4. Manufacturing of high-performance nuclear fuel elements

4、高性能核燃料元件制造

5. Post-processing of spent fuels

5、乏燃料後處理

6. Development of applied technologies of isotope, accelerator and irradiation

6、同位素、加速器及輻照應用技術開發

7. Development of advanced uranium isotope separation technologies and equipment manufacturing

7、先進的鈾同位素分離技術開發與設備制造

8. Development of radiation protection technologies and manufacturing of monitoring equipment

8、輻射防護技術開發與監測設備制造

9. Development of instruments and meters for the physical protection of nuclear facilities

9、核設施實體保護儀器儀表開發

10. Decommissioning of nuclear facilities and control of radioactive waste

10、核設施退役及放射性廢物治理

11. Technologies and equipment for life extension and decommissioning of nuclear power plants

11、核電站延壽及退役技術和設備

12. Technologies and equipment for emergency response and rescue of nuclear power plants

12、核電站應急搶險技術和設備

VII. Oil and Natural Gas

七、石油、天然氣

1. Exploration and exploitation of conventional oil and natural gas

1、常規石油、天然氣勘探與開采

2. Exploration and development of unconventional resources, such as shale gas, oil shale, oil sand, and natural gas hydrate

2、頁岩氣、油頁岩、油砂、天然氣水合物等非常規資源勘探開發

3. Storage and transportation of crude oil, natural gas, liquefied natural gas, and product oil and construction of pipeline transportation facilities and networks

3、原油、天然氣、液化天然氣、成品油的儲運和管道輸送設施及網絡建設

4. Comprehensive utilization of resources associated with oil and gas

4、油氣伴生資源綜合利用

5. Development and application of technologies for improving the recovery ratio of oil-gas fields, technologies for guaranteeing work safety, and technologies for restoring ecological environment and preventing and controlling pollution

5、油氣田提高采收率技術、安全生產保障技術、生態環境恢復與污染防治工程技術開發利用

6. Recycling of dumped natural gas and device manufacturing

6、放空天然氣回收利用與裝置制造

7. Development and application of natural gas distributed energy technologies

7、天然氣分布式能源技術開發與應用

8. Development and application of volatile oil and gas recovery technologies for oil storage and transportation facilities

8、石油儲運設施揮發油氣回收技術開發與應用

9. Development and application of liquefied natural gas technologies

9、液化天然氣技術開發與應用

VIII. Iron and Steel

八、鋼鐵

1. Exploration of substitute resources for ferrous metal mines and development of key exploration technologies

1、黑色金屬礦山接替資源勘探及關鍵勘探技術開發

2. Research, development and application of advanced technologies such as coal moisture

2、煤調濕、風選調濕、搗固煉焦、配型煉焦、幹法煅

control, winnowing and moisture control, rammed-coal coking, formed-coal coking, dry coke quenching, thermal oil heat-exchange, advanced treatment and recycling of coking waste water, fine and deep processing of coal tar, purification of benzene hydrogenation, production of needle coke from coal tar pitch, tar hydrogenation processing, and high value-added utilization of coke oven gas

3. Non-blast furnace ironmaking technologies

4. Production of nuclear power pipes for advanced pressurized water reactors, pipes for million-kilowatts thermal power boilers, corrosion-, pressure-, and temperature-resistance oil well pipes, corrosion-resistance aviation pipes, and high corrosion-resistance chemical pipes

5. Development and application of technologies for higher-performance, high-quality, and upgrading steel products, including but not limited to high-strength automobile sheets of not less than 600 MPa, high-performance pipeline steel for oil and gas transmission, high-strength wide and thick plates for vessels, marine engineering steel, moderate thickness plates of not less than 420 MPa for buildings, bridges and other structures, steel for high-speed and heavy-haul railways, low-iron loss and high-magnetic induction silicon steel, corrosion- and wear-resistance steel, alloy resource-saving stainless steel (modern ferritic stainless steel, duplex stainless steel, and nitrogen stainless steel), special steel bars and wire rods for high-performance basic parts (high-performance gears, bolts at or above Grade 12.9, high-strength spring, and long service life bearings), and high-quality special steel forged materials (tool and mould steel, stainless steel, and steel for machinery, among others)

6. Application of new-generation thermal machinery control processing (TMCP) technologies with online heat treatment, online performance control, and online forced cooling

7. Development and production of ultra-high power electrode with a diameter of not less than 600 mm, micropore and ultra-micropore carbon bricks for blast furnaces, special graphite (with high strength, high density, high purity, and high modulus), graphitized (graphitiferous) cathode, and lengthwise graphitization furnaces

8. Production techniques of long-life, energy-saving, environment-friendly, and fireproof materials for coke furnaces, blast furnaces, and hot blast furnaces; and production techniques of low-carbon or carbon-free fireproof materials for refined steel and functional, environment-friendly, and fireproof materials for efficient continuous casting

9. Application of online quality inspection technologies in the process of production

10. Disposal of waste discharged to the public by utilizing iron and steel production facilities

11. Technologies for multi-functional dry removal, including but not limited to sintering flue gas desulfurization, denitration and de-dioxin, and reutilization and recycling of by-products

12. Advanced techniques and technologies for the comprehensive utilization of refractory lean ores and (co-existing or) associated ores

13. Advanced techniques and technologies for the comprehensive utilization of metallurgical solid waste (including but not limited to waste rocks and tailings in metallurgical mining and various dust, mud, residues, and iron sheets generated by steelworks)

14. New techniques and technologies for smelting of iron alloy by utilizing low-grade manganese ores and RKEF (rotary klin 每 electric furnace) techniques and technologies for smelting of refined ferronickel by efficiently utilizing nickel laterite ores

15. Techniques and technologies and equipment for the cyclic utilization of metallurgical liquid waste (including waste water, waste acid, and waste oil)

16. Development and application of new-generation steel recycled process techniques and technologies (on the basis of satisfactory internal recycling of the steel industry, development of horizontal and longitudinal logistics and energy flow recycling processes between the iron

焦、導熱油換熱、焦化廢水深度處理回用、煤焦油精深加工、苯加氫精制、煤瀝青制針狀焦、焦油加氫處理、焦爐煤氣高附加值利用等先進技術的研發與應用

3、非高爐煉鐵技術

4、先進壓水堆核電管、百萬千瓦火電鍋爐管、耐蝕耐壓耐溫油井管、耐腐蝕航空管、高耐腐蝕化工管生產

5、高性能、高質量及升級換代鋼材產品技術開發與應用。包括 600 兆帕級及以上高強度汽車板、油氣輸送高性能管線鋼、高強度船舶用寬厚板、海洋工程用鋼、420兆帕級及以上建築和橋梁等結構用中厚板、高速重載鐵路用鋼、低鐵損高磁感矽鋼、耐腐蝕耐磨損鋼材、節約合金資源不鏽鋼（現代鐵素體不鏽鋼、雙相不鏽鋼、含氮不鏽鋼）、高性能基礎件（高性能齒輪、12.9級及以上螺栓、高強度彈簧、長壽命軸承等）用特殊鋼棒線材、高品質特鋼鍛軋材（工模具鋼、不鏽鋼、機械用鋼等）等

6、在線熱處理、在線性能控制、在線強制冷卻的新一代熱機械控制加工（TMCP）工藝技術應用

7、直徑600毫米及以上超高功率電極、高爐用微孔和超微孔碳磚、特種石墨（高強、高密、高純、高模量）、石墨（質）化陰極、內串石墨化爐開發與生產

8、焦爐、高爐、熱風爐用長壽節能環保耐火材料生產工藝；精煉鋼用低碳、無碳耐火材料和高效連鑄用功能環保性耐火材料生產工藝

9、生產過程在線質量檢測技術應用

10、利用鋼鐵生產設備處理社會廢棄物

11、燒結煙氣脫硫、脫硝、脫二惡英等多功能幹法脫除，以及副產物資源化、再利用化技術

12、難選貧礦、（共）伴生礦綜合利用先進工藝技術

13、冶金固體廢棄物（含冶金礦山廢石、尾礦，鋼鐵廠產生的各類塵、泥、渣、鐵皮等）綜合利用先進工藝技術

14、利用低品位錳礦冶煉鐵合金的新工藝技術，以及高效利用紅土鎳礦精煉鐵的回饋窯 - 礦熱爐（RKEF）工藝技術

15、冶金廢液（含廢水、廢酸、廢油等）循環利用工藝技術與設備

16、新一代鋼鐵可循環流程（在做好鋼鐵產業內部循環的基礎上，發展鋼鐵與電力、化工、裝備製造等相關產業間的橫向、縱向物流和能流的循環流程）工藝技術開發與應用

and steel industry and other industries, such as electricity industry, chemical industry, and equipment manufacturing industry)

17. Dry dedusting of blast furnace and converter gas

IX. Nonferrous Metals

- 1. Exploration and development of substitute resources for existing nonferrous mines and exploitation of deep and difficult-to-mine deposits of scarce resources
- 2. Development of efficient, low-consumption, low-pollution, and new smelting technologies
- 3. Recovery and comprehensive utilization on a certain scale of efficient, energy-saving, and low-pollution renewable resources. (1) Recovery of waste nonferrous metals. (2) Comprehensive utilization of valuable elements. (3) Comprehensive utilization of red mud and other smelting waste residues. (4) Extraction of alumina from high-alumina fly ash
- 4. Production of new nonferrous materials for information and new energy. (1) Information: silicon single crystal and polished section with a diameter of 200 mm or more, compound semiconductor with a diameter of 125 mm or more in LEC method or a diameter of 50 mm or more than in horizontal growth method, large-sized and high-purity targets of aluminum, copper, silicon, tungsten, and molybdenum, Cu-Ni-Si and Cu-Cr-Zr lead frame materials and electronic solders, among others, for ultra-large-scale integrated circuits. (2) New energy: nuclear-grade sponge zirconium and zirconium materials and high-capacity, long-life, and secondary cell electrode materials

5. Production of new nonferrous materials for transportation, high-end manufacturing, and other fields. (1) Transportation: high-strength and high-conductivity copper alloys, such as copper alloy precision strip and ultra-long wire products with compressive strength not less than 500 MPa and electric conductivity not less than 80% IACS, and new high-strength, high-tenacity, corrosion-resistance alloy materials and large-sized products for key bearing structures of means of transportation (the compressive strength of aluminum alloy is not less than 650 MPa for aviation and not less than 500 MPa for high-speed trains). (2) High-end manufacturing and other fields: biomedical materials, such as high-performance nano hard alloy cutters, large-particle hard alloy shield cutters and deep-processed products, rare earth and noble metal catalyst materials, low-module titanium alloys, and memory alloys; copper alloy and titanium alloy materials for corrosion-resistance heat exchangers; high-performance rare earth magnetic materials; hydrogen storage materials; and high-end applications

X. Gold

- 1. In-depth prospecting and exploitation of gold (1,000 m underground)
- 2. Recovery of gold from tailings and waste rocks

XI. Petrochemistry

- 1. Development and application of refining technologies for heavy and inferior sulfur- and acid-bearing crude oil and production technologies for high-standard oil products
- 2. Exploration, development, and comprehensive utilization of scarce chemical mineral resources such as sulfur, potassium, boron, and lithium; selection and utilization of low- and medium-grade phosphorite; and comprehensive utilization of resources associated with phosphorite.
- 3. Energy-saving technologies for zero-electrode-distance, oxygen-cathode and other ionic membrane caustic soda electrolytic cells; comprehensive utilization technologies such as production of chlorine by utilizing waste hydrochloric acid; development and application of new techniques for clean production of chromium salt; production of potassium permanganate by utilizing pneumatic fluidization tower; production of phosphoric acid in total heat recovery method; and large-scale production device of defluorinated calcium phosphate
- 4. Production devices for ethylene glycol of not less than 200,000 ton per year by utilizing synthesis gas, bisphenol A of not less than 100,000 ton per year in ion exchange method,

17、高爐、轉爐煤氣幹法除塵

九、有色金屬

- 1、有色金屬現有礦山接替資源勘探開發，緊缺資源的深部及難採礦床開采
- 2、高效、低耗、低汙染、新型冶煉技術開發
- 3、高效、節能、低汙染、規模化再生資源回收與綜合利用。（1）廢雜有色金屬回收（2）有價元素的綜合利用（3）赤泥及其它冶煉廢渣綜合利用（4）高鋁粉煤灰提取氧化鋁
- 4、信息、新能源有色金屬新材料生產。（1）信息：直徑200mm以上的矽單晶及拋光片、直徑125mm以上直拉或直徑50mm以上水平生長化合物半導體材料、鋁銅矽鎢鉬等大規格高純靶材、超大規模集成電路銅鐳砂和銅鎢鉬引線框架材料、電子焊料等。（2）新能源：核級海綿鎢及鎢材、大容量長壽命二次電池電極材料

5、交通運輸、高端製造及其他領域有色金屬新材料生產。（1）交通運輸：抗壓強度不低於500MPa、導電率不低於80%IACS的銅合金精密帶材和超長線材制品等高強高導銅合金、交通運輸工具主承力結構用的新型高強、高韌、耐蝕鋁合金材料及大尺寸制品（航空用鋁合金抗壓強度不低於650MPa，高速列車用鋁合金抗壓強度不低於500MPa）。（2）高端製造及其他領域：高性能納米硬質合金刀具和大晶粒硬質合金盾構刀具及深加工產品、稀土及貴金屬催化劑材料、低模量鈦合金材及記憶合金等生物醫用材料、耐熱熱交換器用銅合金及鈦合金材料、高性能稀土磁性材料和儲氫材料及高端應用

十、黃金

- 1、黃金深部（1000米以下）探礦與開采
- 2、從尾礦及廢石中回收黃金

十一、石化化工

- 1、含硫含酸重質、劣質原油煉制技術，高標準油品生產技術開發與應用
- 2、硫、鉀、硼、鋰等短缺化工礦產資源勘探開發及綜合利用，中低品位磷礦採選與利用，磷礦伴生資源綜合利用
- 3、零極距、氧陰極等離子膜燒城電解槽節能技術、廢鹽酸制氯氣等綜合利用技術、鉻鹽清潔生產新工藝的開發和應用，氣動流化塔生產高錳酸鉀，全熱能回收熱法磷酸生產，大型脫磷磷酸鈣生產裝置
- 4、20 萬噸/年及以上合成氣制乙二醇、10 萬噸/年及以上離子交換法雙酚A、15萬噸/年及以上直接氧化法環氧丙

propylene oxide of not less than 150,000 ton per year in direct oxidation method, propylene oxide of not less than 200,000 ton per year in common oxidation method, and adiponitrile of not less than 50,000 ton per year in butadiene method; and development and application of production technologies for ten-thousand-ton aliphatic isocyanate

5. Production of high-quality potassium fertilizer and various specialized fertilizers and slow control release fertilizers; energy conservation, emission reduction, and raw material restructuring of nitrogenous fertilizer enterprises; development and application of comprehensive utilization technologies for ardealite; and purification and production devices of phosphoric acid with an annual capacity of not less than 100,000 ton in wet process

6. Development and production of efficient, safe, and environment-friendly new type pesticides, new formulations of pesticides (such as water-based formulation), special midbody, and assistants (such as water-based assistants); development and application of clean production techniques such as production technique of acetochlor in methylene method, production technique of chorpyriphos by the aqueous phase process, recovery technique of chloromethane by utilizing glyphosate, production of chirality and three-dimensional-structure pesticides in directional synthesis method, and synthesis technologies of ethyl chloride; development and production of new biological pesticide products and development of new technologies for biological pesticides

7. Production of environment-friendly and energy-saving paints such as paints for water-based wood, industrial and marine paints, and exterior wall and external thermal insulation paints with high solid, solvent free, radiation curing, and functionality; and production of titanium white chloridization with a single capacity of not less than 30,000 ton per year and with rich titanium materials containing titanium dioxide of not less than 90% (artificial rutile, natural rutile, and high titanium slag)

8. Development and production of reactive dyes with high fixation rate, high color fastness, high upgrading, high dyeing levelness, high reproducibility, low pollution, low salt, low temperature, dyeing with small bath ratio and dyeing with a wet short steaming pad; disperse dyes with high and superfine denier polyester fiber, high fastness to chemical washing, high dyeing, high fastness and low staining (nylon and spandex), and dyeing with small bath ratio; weak acid dyes without metal for dyeing of polyamide fiber, wool, and leather; and organic pigments with good fastness and high weathering

9. Development and application of new technologies for clean production of dyes and dye intermediates and essential safety (including technologies such as catalysis, trioxide sulfonation, continuous nitrification, adiabatic nitration, directional chloride, synergistic combination, solvent reaction, and cyclic utilization; appropriate technologies in which such highly-toxic raw materials as phosgene are replaced; and technologies of membrane filtration and primary pulp drying)

10. Development and production of high-performance barrier resins such as EVOH and PVDC and special polyolefins such as PI and POE

11. Development and application of production devices of non-phosgene polycarbonate with an annual capacity of not less than 600,000 ton, production technologies of engineering plastics such as LCP and technologies of blending modification and alloying, development and production of water-absorbent resin, conductive epoxy, and degradable polymer, and development and production of new polyamides such as nylon 11, nylon 1414, nylon 46, long carbon chain nylon, and high temperature resistance nylon

12. Development and application of production devices with an annual capacity of not less than 30,000 ton of butyl rubber, ethylene propylene rubber (EPR), isoprene rubber, solution polymerized styrene-butadiene rubber (SSBR), rare earth butadiene rubber, and polyacrylate rubber, as well as filling oil styrene butadiene rubber with low aromatic content, and chemical modification technologies of synthetic rubber

13. Development and production of thermal-plastic elastic materials such as PTPE, TPEE, SIS and TPU

烷、20萬噸/年及以上共氧化法環氧丙烷、5萬噸/年及以上丁二烯法己二?生產裝置，萬噸級脂肪族異氰酸酯生產技術開發與應用

5、優質鉀肥及各種專用肥、緩控釋肥的生產，氮肥企業節能減排和原料結構調整，磷石膏綜合利用技術開發與應用，10萬噸/年及以上濕法磷酸淨化生產裝置

6、高效、安全、環境友好的農業新品種、新劑型（水基化劑型等）、專用中間體、助劑（水基化助劑等）的開發與生產，甲叉法乙草胺、水相法毒死蜱工藝、草甘膦回收氯甲烷工藝、定向合成法手性和立體結構農藥生產、乙基氯化物合成技術等清潔生產工藝的開發和應用，生物農藥新產品、新技術的開發與生產

7、水性木器、工業、船舶塗料，高固體分、無溶劑、輻射固化、功能性外牆外保溫塗料等環境友好、資源節約型塗料生產；單線產能3萬噸/年及以上、並以二氧化鈦含量不小於90%的富鈦料（人造金紅石、天然金紅石、高鈦渣）為原料的氯化法鈦白粉生產

8、高固著率、高色牢度、高提升性、高勻染性、高重現性、低沾汙性以及低鹽、低溫、小浴比染色用和濕短蒸軋染用的活性染料，高超細旦聚酯纖維染色性、高洗滌牢度、高染著率、高光牢度和低沾汙性（尼龍、氨綸）、小浴比染色用的分散染料，用於聚?胺纖維、羊毛和皮革染色的不含金屬的弱酸性染料，高耐曬牢度、高耐氣候牢度有機顏料的開發與生產

9、染料及染料中間體清潔生產、本質安全的新技術（包括催化、三氧化硫磺化、連續硝化、絕熱硝化、定向氯化、組合增效、溶劑反應、循環利用等技術，以及取代光氣等劇毒原料的適用技術，膜過濾和原漿乾燥技術）的開發與應用

10、乙烯-乙烯醇樹脂（EVOH）、聚偏氯乙烯等高性能阻隔樹脂，聚異丁烯（PI）、聚乙烯辛烯（POE）等特種聚烯烴開發與生產

11、6萬噸/年及以上非光氣法聚碳酸酯生產裝置，液晶聚合物（LCP）等工程塑料生產以及共混改性、合金化技術開發和應用，吸水性樹脂、導電性樹脂和可降解聚合物的開發與生產，尼龍11、尼龍1414、尼龍46、長碳鏈尼龍、耐高溫尼龍等新型聚?胺開發與生產

12、3萬噸/年及以上丁基橡膠、乙丙橡膠、異戊橡膠，溶聚丁苯橡膠、稀土系順丁橡膠、丙烯酸酯橡膠及低多芳含量填充油丁苯橡膠等生產裝置，合成橡膠化學改性技術開發與應用

13、聚丙烯熱塑性彈性體（PTPE）、熱塑性聚酯彈性體（TPEE）、苯乙烯-異戊二烯-苯乙烯熱塑性嵌段共聚物

14. Development and production of modified or water-based adhesives and new hot melt glue, environment-friendly water absorbents and water treatment chemicals, efficient and environment-friendly new catalysts and assistants such as molecular sieve solid mercury and mercury-free catalysts and assistants, safe food additives and feed additives, nanometer materials, functional membrane materials, and new and fine chemicals such as ultra-clean and high-purity reagents, photoresist, electron gas, and high-performance liquid crystal materials

15. New organosilicone monomers such as phenyl chlorosilane and vinyl chlorosilane; phenyl silicone oil, amino silicon oil, polyether modified silicone oil, and others; high-performance rubbers and hybrid materials such as phenyl siloxane rubber and phenylene silicone rubber; high-performance resins such as methylphenyl silicone resin; and serial efficient coupling reagents such as triethoxysilane

16. Development and application of special fluoride monomers such as perfluorinated ene ether; high-quality fluororesins such as FEP, PVDF, PTFCE, and ETFE; high-performance fluorine rubbers such as fluoroether rubber, fluorinated silicone rubber, AFLAS FEPM, and 246 high fluoride fluorine rubber; fluoride lubricating grease; substitutes of Ozone Depleting Substances (ODS) with zero Ozone-depleting Potentials (ODP) and low Global Warming Potentials (GWP); PFOS and PFOA and their salt substitutes and substitution technologies; fine chemicals containing fluorine and high-quality inorganic salt containing fluorine

17. Production of high-performance radial tyres (including tubeless tyres, low-section tyres and flattened tyres (with flatness ratio lower than 55%), high-performance radial tyres for passenger cars with a large rim (with a diameter of 15 inch or more), aviation tyres, and agricultural radial tyres) and ancillary special materials and equipment; and development and application of new natural rubber

18. Development and production of biopolymer material, padding, reagent, chip, interferon, sensor, cellulase, alkaline protease, diagnosis enzyme, and other enzymic preparation and cellulose biochemical products

19. Comprehensive utilization of by-products such as carbon tetrachloride, silicon tetrachloride, methyl trichloro silane, and chlorotrimethylsilane; and capture and application of carbon dioxide

XII. Building Materials

1. Disposal of industrial waste, urban sludge, and domestic garbage by utilizing the existing new dry-process cement furnaces with a daily disposal capacity of 2,000 ton or more, and power generation by purely utilizing low temperature exhaust heat; and energy-saving transformation of grinding systems

2. Development and application of ultra-thin (less than 1.3 mm in depth) electronic industry glass, ultra-white (converted to 5 mm in thickness and transmission ratio of visible light > 90%) solar energy industry glass, on-line coated glass, low-radiation glass, and other special float glass production lines; combustion technology in pure oxygen and technology of power generation with low temperature exhaust heat adopted by the existing float glass production lines; high-grade refractory materials for glass furnaces; and process equipment and technologies for deep processing of glass

3. Development and production of materials such as new walling and roofing materials, insulation and deadening materials, and waterproof and airproof materials

4. Development and application of production lines of ceramic plate which is less than 6 mm in depth with an annual capacity of not less than 1.5 million m2 and process equipment and technologies

5. Development and production of sitting and squatting toilet pans, water-saving urinals and

(SIS)、熱塑性聚氨酯彈性體等熱塑性彈性體材料開發與生產

14、改性型、水基型膠粘劑和新型熱熔膠，環保型吸水劑、水處理劑，分子篩固汞、無汞等新型高效、環保催化劑和助劑，安全型食品添加劑、飼料添加劑，納米材料，功能性膜材料，超淨高純試劑、光刻膠、電子氣、高性能液晶材料等新型精細化學品的開發與生產

15、苯基氯矽烷、乙烯基氯矽烷等新型有機矽單體，苯基矽油、氨基矽油、聚醚改性型矽油等，苯基矽橡膠、苯撐矽橡膠等高性能橡膠及雜化材料，甲基苯基矽樹脂等高性能樹脂，三乙氧基矽烷等系列高效偶聯劑

16、全氟烯醚等特種含氟單體，聚全氟乙丙烯、聚偏氟乙烯、聚三氟氯乙烯、乙烯-四氟乙烯共聚物等高品質質氟樹脂，氟醚橡膠、氟矽橡膠、四丙氟橡膠、高含氟量 246 氟橡膠等高性能氟橡膠，含氟潤滑油脂，消耗臭氧潛能值（ODP）為零、全球變暖潛能值（GWP）低的消耗臭氧層物質（ODS）替代品，全氟辛基磺化化合物（PFOS）和全氟辛酸（PFOA）及其鹽類替代品種和替代技術的開發和應用，含氟精細化學品和高品質含氟無機鹽

17、高性能子午線輪胎（包括無內胎載重子午胎，低斷面和扁平化（低於55系列）、大輪輞高性能轎車子午胎（15吋以上），航空輪胎及農用子午胎）及配套專用材料、設備生產，新型天然橡膠開發與應用

18、生物高分子材料、填料、試劑、芯片、幹擾素、傳感器、纖維素?、碱性蛋白?、診斷用?等?制劑、纖維素生化產品開發與生產

19、四氯化碳、四氯化矽、一甲基氯矽烷、三甲級氯矽烷等 副產物綜合利用，二氧化碳的捕獲與應用

十二、建材

1、利用現有2000噸/日及以上新型幹法水泥窯爐處置工業廢棄物、城市汙泥和生活垃圾，純低溫余熱發電；粉磨系統等節能改造

2、電子工業用超薄（1.3mm以下）、太陽能產業用超白（折合5mm厚度可見光透射率>90%）、在線鍍膜玻璃和低輻射等特殊浮法玻璃生產線；現有浮法生產線採用純氧燃燒技術、低溫余熱發電技術；玻璃熔窯用高檔耐火材料；玻璃深加工工藝裝備技術開發與應用

3、新型牆體和屋面材料、絕熱隔音材料、建築防水和密封等材料的開發與生產

4、150萬平方米/年及以上、厚度小於6毫米的陶瓷板生產線和工藝裝備技術開發與應用

5、一次沖洗用水量6升及以下的坐便器、蹲便器、節水型

water control equipment with the amount of each flush not more than 6 liter

6. Technology development and production of alkali free glass fiber tank klin wire drawing and high-performance glass fiber and products with an annual yield of 50,000 ton

7. Development and production of new technologies and new products of asbestos-free friction and sealing materials using synthetic mineral fiber or aramid fiber as reinforcing material

8. Production equipment technology development of high-quality artificial crystalline materials, products, and parts for fields such as information, new energy, national defense, and aerospace aviation; manufacturing technology development and production of high-purity quartz raw materials, quartz glass materials and their products; and technology development and production of special glass demanded in the field of aerospace aviation

9. Production of nonferrous deep processing materials such as kaolin, graphite and diatomite for high-purity, superfine, modified, and other refined processing as demanded in the high-tech fields and development and manufacturing of their technical equipment

10. Production of ultra-thin composite stones with an annual yield of not less than 300,000 m²; mechanized quarrying; and production for the comprehensive utilization of ore and sheet scraps and development of technical equipment

11. Comprehensive utilization of waste rock, tailings, and construction waste

12. Technology development and production of farm construction materials for agriculture

13. Development and manufacturing of new walling materials by utilizing industrial by-product gypsum and technical equipment

14. Development and production of emergency settlement dwellings

XIII Medicine

1. Development and production of new medicine with independent intellectual property right, development and production of natural medicine, development and production of new birth-control medicine (including the third-generation progestogen contraceptive), initial development and production of generic medicine that meets China's demand for prevention and control of grave and frequent diseases, development and production of new formulations and new supplementary materials, development and application of technologies in the process of medicine production such as membrane separation, supercritical extraction, new crystallization, chiral synthesis, enzymatic synthesis, biotransformation, and self-control, and development and application of energy-saving and consumption-reduction technologies in the production of Active Pharmaceutical Ingredients (APIs) and new pharmaceutical preparation technologies

2. Development and production of modern biotech medicine, vaccine and medicine for prevention and control of grave epidemic diseases, and new diagnosis reagents, development and application of large-scale cell culture and purification technologies and synthesis, fermentation, and purification technologies of large-scale therapeutic peptide and nucleic acid, and transformation of traditional production technologies by utilizing modern biotechnology

3. Development and production of new packing materials for medicine and technologies (first-class waterproof pharmaceutical glass, degradable materials, functional materials with lucifuge, high barrier and high permeability, packing of novel drug delivery systems; and printing technique with non-benzene ink for medicine packing materials, among others)

4. Development of artificial propagation technologies for endangered and rare medicinal plants and animals and development and production of their substitutes, application of advanced agricultural technologies in the standardized planting and breeding of traditional Chinese medicinal materials, development and application of new technologies of extraction, purification and quality control of active ingredients of traditional Chinese medicine,

小便器及節水控制設備開發與生產

6、5萬噸/年及以上無城玻璃纖維池窯拉絲技術和高性能玻璃纖維及制品技術開發與生產

7、使用合成礦物纖維、芳綸纖維等作為增強材料的無石棉摩擦、密封材料新工藝、新產品開發與生產

8、信息、新能源、國防、航天航空等領域用高品質人工晶體材料、制品和器件生產裝備技術開發；高純石英原料、石英玻璃材料及其制品製造技術開發與生產；航天航空等領域所需的特種玻璃製造技術開發與生產

9、高新技術領域需求的高純、超細、改性等精細加工的高嶺土、石墨、矽藻土等非金屬礦深加工材料生產及其技術裝備開發與製造

10、30萬平方米/年以上超薄複合石材生產；機械化石材礦山開采；礦石碎料和板材邊角料綜合利用生產及工藝裝備開發

11、廢礦石、尾礦和建築廢棄物的綜合利用

12、農用田間建設材料技術開發與生產

13、利用工業副產石膏生產新型牆體材料及技術裝備開發與製造

14、應急安置房屋開發與生產

十三、醫藥

1、擁有自主知識產權的新藥開發和生產，天然藥物開發和生產，新型計劃生育藥物（包括第三代孕激素的避孕藥）開發和生產，滿足我國重大、多發性疾病防治需求的通用名藥物首次開發和生產，藥物新劑型、新輔料的開發和生產，藥物生產過程中的膜分離、超臨界萃取、新型結晶、手性合成、²促合成、生物轉化、自控等技術開發與應用，原料藥生產節能降耗減排技術、新型藥物制劑技術開發與應用

2、現代生物技術藥物、重大傳染病防治疫苗和藥物、新型診斷試劑的開發和生產，大規模細胞培養和純化技術、大規模藥用多²和核酸合成、發酵、純化技術開發和應用，採用現代生物技術改造傳統生產工藝

3、新型藥用包裝材料及其技術開發和生產（一級耐水藥用玻璃，可降解材料，具有避光、高阻隔性、高透透性的功能性材料，新型給藥方式的包裝；藥包材無苯油墨印刷工藝等）

4、瀕危稀缺藥用動植物人工繁育技術及代用品開發和生產，先進農業技術在中藥材規範化種植、養殖中的應用，中藥有效成份的提取、純化、質量控制新技術開發和應用，中藥現代劑型的工藝技術、生產過程控制技術和裝備

development and application of modern formulation techniques and technologies of traditional Chinese medicine, production process control technologies and equipment, development and application of innovative technologies of traditional Chinese medicine prepared in ready-to-sue forms, and secondary development and production of traditional Chinese patent medicine

5. Development and production of ethnic medicine

6. Development and production of new medical instruments and equipment for medical diagnosis, minimal invasive surgery and interventional therapy equipment, medical first-aid and mobile medical equipment, rehabilitation engineering technology devices, domestic medical instruments, new birth-control instruments (third-generation intra-uterine device), new medical materials, artificial organs, and key components; and development and application of digital medical imaging products and medical information technologies

7. Standardized breeding of laboratory animals and animal experiment services

8. Improvement of the quality and production technology level of essential medicines and reduction of costs

XIV. Machinery

1. High-speed and precision numerically-controlled machine tools with the joint action of three or more axes and supporting numerically-controlled systems, servo motors and drive devices, functional parts, tools, measuring tools, measuring instruments, and high-grade abrasive tools and abrasives

2. Distributed control systems (DCS), fieldbus control systems (FCS), and new energy power generation control systems used for major technical equipment, such as large generating sets, large petrochemical installations, and large complete metallurgical equipment

3. Programmable logic controllers (PLC) with 512 or more input and output points

4. Digital, intelligent, and networked industrial automated detection meters and sensors, in-situ online component analysis instruments, low-power intelligent sensors with wireless communication function, electromagnetic compatibility testing devices, intelligent ammeters used for intelligent grids (with functions of sending and receiving signals, self-diagnosis, and data processing), and fiber optic sensors

5. Instruments and meters used for the detection and analysis of radiation, toxicity, flammables, explosives, heavy metals, and dioxins, among others, testing instruments for water quality, flue gas and air, mass spectrometers used for drug testing with the mass number of more than 1,000 atomic mass units (amu), color-mass spectrometers, and relevant automated sampling systems and sample handling systems

6. Multi-dimensional geometric parameter measuring instruments used for scientific research with a measurement precision of micron or a more precise measurement, automated, intelligent and multi-functional material mechanics performance testing equipment, non-destructive testing equipment such as industrial CT and three-dimensional ultrasonic flaw detector, and electron microscopes used for nanometer observation and measurement with a resolution higher than 3.0 nm

7. Technical equipment for urban intelligent visual surveillance, video analysis, and video-assisted criminal investigation

8. Monitoring instruments and meters and systems for mine disasters (gas, coal dust, mine water, fire, and wall rock, among others)

9. Comprehensive meteorological observation instruments and equipment (ground, high altitude, and marine meteorological observation instruments, equipment and consumables, professional meteorological observation and atmospheric composition observation instruments, equipment and consumables, and weather radars, among others), mobile emergency meteorological observation systems, mobile emergency meteorological command systems, meteorological measurement checking equipment, meteorological repair and

的開發與應用，中藥飲片創新技術開發和應用，中成藥二次開發和生產

5、民族藥物開發和生產

6、新型醫用診斷醫療儀器設備、微創外科和介入治療裝備及器械、醫療急救及移動式醫療裝備、康復工程技術裝置、家用醫療器械、新型計劃生育器具（第三代宮內節育器）、新型醫用材料、人工器官及關鍵元器件的開發和生產，數字化醫學影像產品及醫療信息技術的開發與應用

7、實驗動物標準化養殖及動物實驗服務

8、基本藥物質量和生產技術水平提升及降低成本

十四、機械

1、三軸以上聯動的高速、精密數控機床及配套數控系統、伺服電機及驅動裝置、功能部件、刀具、量具、量儀及高檔磨具磨料

2、大型發電機組、大型石油化工裝置、大型冶金成套設備等重大技術裝備用分散型控制系統（DCS），現場總線控制系統（FCS），新能源發電控制系統

3、輸入輸出點數512個以上的可編程控制系統（PLC）

4、數字化、智能化、網絡化工業自動檢測儀表與傳感器，原位在線成份分析儀器，具有無線通信功能的低功耗智能傳感器，電磁兼容檢測設備，智能電網用智能電表（具有發送和接收信號、自診斷、數據處理功能），光纖傳感器

5、用于輻射、有毒、可燃、易爆、重金屬、二惡英等檢測分析的儀器儀表，水質、煙氣、空氣檢測儀器，藥品檢驗用質量數大于 1000 原子質量單位（amu）的質譜儀，色質聯用儀以及相關的自動取樣系統和樣品處理系統

6、科學研究用測量精度達到微米以上的多維幾何尺寸測量儀器，自動化、智能化、多功能材料力學性能測試儀器，工業 CT、三維超聲波探傷儀等無損檢測設備，用于納米觀察測量的分辨率高于3.0納米的電子顯微鏡

7、城市智能視覺監控、視頻分析、視頻輔助刑事偵察技術設備

8、礦井災害（瓦斯、煤塵、礦井水、火、圍岩等）監測儀器儀表和系統

9、綜合氣象觀測儀器裝備（地面、高空、海洋氣象觀測儀器裝備及耗材，專業氣象觀測、大氣成分觀測儀器裝備及耗材，氣象雷達等）、移動應急氣象觀測系統、移動應急氣象指揮系統、氣象計量檢定設備、氣象維修維護設備、氣象觀測儀器裝備運行監控系統

maintenance equipment, and operation monitoring systems of meteorological observation instruments and equipment

10. Hydrological data collection instruments and equipment and hydrological instrument measurement checking equipment

11. Instruments and meters for the observation of earthquakes and geological disasters

12. Ocean observation, detection, and monitoring technical systems, instruments, and equipment

13. Digital multifunctional integrated office equipment (copying, printing, fax, and scanning), digital cameras, digital cinema projectors, and other modern cultural and office equipment

14. Bearings of China Railway High-Speed (CRH) trains with a speed of 200 kilometers per hour or higher, bearings of heavy haul railway wagons with an axle load greater than 30 tons, bearings of new urban rail transit with a service life of two million kilometers or more, hub bearing units of automobiles with a service life of 250,000 kilometers or more, high temperature-resistant (400°C or above) automobile turbines, supercharger bearings, numerically-controlled machine tool bearings of Classes P4 and P2, all kinds of precision bearings used for wind turbines of two megawatts (MW) or higher, bearings of large construction machinery such as shield machines with a service life of more than 5,000 hours, high-speed and precision metallurgical rolling mill bearings of Classes P5 and P4, aircraft and engine bearings, medical CT machine bearings, and parts of the above bearings

15. Francis hydroelectric equipment with a unit capacity of 800,000 kilowatts or above (water turbines, generators, governors, excitation, and other ancillary equipment), pumped-storage hydroelectric equipment with a unit capacity of 350,000 kilowatts or above, tubular hydroelectric equipment with a unit capacity of 50,000 kilowatts or above, pelton hydroelectric equipment with a unit capacity of 100,000 kilowatts or above, and their key supporting auxiliary engines

16. Generator circuit breakers, pumps, valves, and other key ancillary engines and parts used for supercritical and ultra-supercritical thermal power units of 600,000 kilowatts or above

17. Supercritical parameters circulating fluidized bed boilers of 600,000 kilowatts or above

18. Gas turbine high temperature components and control systems

19. Rotors (forging or welding), runners, blades, pumps, valves, spindle sheaths, and other key castings and forgings used for power generation equipment of 600,000 kilowatts or above

20. High and low temperature-resistant, corrosion-resistant, and abrasion-resistant precision castings and forgings

21. Extra-high-voltage and ultra-high-voltage alternating current and direct current power transmission equipment of 500 kilovolt (kV) and above and key parts: transformer (outlet devices, casing, and pressure switches), switching devices (arc-control devices, hydraulic operating mechanism, and large basin insulators), high-intensity post insulators and hollow insulators, suspension composite insulators, molded insulation, ultra high voltage arresters, direct current arresters, electric control and light control thyristors, converter valves (flat wave reactors and cooling equipment), control and protection equipment, and direct current field outfits, among others

22. High-voltage vacuum components and switchgears, intelligent medium-voltage switch components and outfits, insulated switch cabinets using environment-friendly medium-voltage gas, intelligent (communicable) low-voltage electrical appliances, and amorphous alloy, roll-core, and other energy-saving distribution transformers

23. The second-generation improved and third-generation nuclear power equipment and key parts; complete wind power machines of 2.5 megawatts or above, and control systems, converters and other key components and parts of wind power equipment of 2.0 megawatts

10、水文數據采集儀器及設備、水文儀器計量檢定設備

11、地震、地質災害觀測儀器儀表

12、海洋觀測、探測、監測技術系統及儀器設備

13、數字多功能一體化辦公設備（複印、打印、傳真、掃描）、數字照相機、數字電影放映機等現代文化辦公設備

14、時速200公裏以上動車組軸承，軸重大于30噸重載鐵路貨車軸承，使用壽命 200 萬公裏以上的新型城市軌道交通軸承，使用壽命25萬公裏以上汽車輪轂軸承單元，耐高溫（400°C以上）汽車渦輪、機械增壓器軸承，P4、P2級數控機床軸承，2兆瓦（MW）及以上風電機組用各類精密軸承，使用壽命大于5000小時盾構機等大型施工機械軸承，P5級、P4級高速精密冶金軋機軸承，飛機及發動機軸承，醫療CT機軸承，以及上述軸承零件

15、單機容量80萬千瓦及以上混流式水力發電設備（水輪機、發電機及調速器、勵磁等附屬設備），單機容量 35 萬千瓦及以上抽水蓄能、5萬千瓦及以上貫流式和10萬千瓦及以上沖擊式水力發電設備及其關鍵配套輔機

16、60 萬千瓦及以上超臨界、超超臨界火電機組用發電機保護斷路器、泵、閥等關鍵配套輔機、部件

17、60萬千瓦及以上超臨界參數循環流化床鍋爐

18、燃氣輪機高溫部件及控制系統

19、60萬千瓦及以上發電設備用轉子（鍛造、焊接）、轉輪、葉片、泵、閥、主軸護套等關鍵鑄鍛件

20、耐高低溫、耐腐蝕、耐磨損精密鑄鍛件

21、500千伏（kV）及以上超高壓、特高壓交流輸電設備及關鍵部件：變壓器（出線裝置、套管、調壓開關），開關設備（滅弧裝置、液壓操作機構、大型盆式絕緣子），高強度支柱絕緣子和空心絕緣子，懸式複合絕緣子，絕緣成型件，特高壓避雷器、直流避雷器，電控、光控晶閘管，換流閘（平波電抗器、水冷設備），控制和保護設備，直流場成套設備等

22、高壓真空元件及開關設備，智能化中壓開關元件及成套設備，使用環保型中壓氣體的絕緣開關櫃，智能型（可通信）低壓電器，非晶合金、卷鐵芯等節能配電變壓器

23、二代改進型、三代核電設備及關鍵部件；2.5兆瓦以上風電設備整機及 2.0 兆瓦以上風電設備控制系統、變流

or above; production equipment of various types of crystalline silicon and thin film solar photovoltaic cells; power generation equipment using ocean energy (tide, wave, and ocean current)

24. Short-process molten techniques and equipment directly using blast furnace melted iron to manufacture iron castings; static pressure clay sand molding main engines; external heat blast water-cooled cupolas with a long service life and large tonnage (15 tons or more per hour); large die-casting machines (with clamping force of 3,500 tons or above); counter-pressure casting machines; automatic casting machines; and manufacture and application of special robots used for casting

25. Application of technologies of reclamation and reuse of resin sand and casting clay sand, among others, by dry (heat) process

26. High-speed precision presses (180 to 2,500 kN, and 2,000 to 750 beats/min), ferrous metal hydraulic extruders (150 mm/sec or more), light alloy hydraulic extruders (10 mm/sec or less), high-speed precision shearing machines (2,000 kN or more, 70 to 80 beats/min, and with cross slope of less than 1.50), internal high-pressure molding machines (10,000 kN or more), large bending machines (60,000 kN or more), digital sheet metal processing centers (flexible manufacturing centers/flexible manufacturing systems), high-speed power spinning machines (radial rotation pressure per round: 1,000 kN, axial rotation pressure per round: 800 kN, spindle torque: 240 kN/m, maximum spindle speed: 95 rev/min), numerically-controlled multi-station punching machines, large nominal pressure cold/warm forging presses (with effective nominal pressure stroke of 25 mm or more and nominal pressure of 10,000 kN or more), and automatically warm/hot forging presses with four or more stations (with nominal pressure of 16,000 kN or more)

27. Cracked gas compressors, propylene compressors, and ethylene compressors, 400,000-ton (polypropylene, among others) extrusion granulation units, 500,000-ton synthesis gas, ammonia, and oxygen compressors, and other key equipment

28. Large wind power generation seals (with a service life of seven years or more and a working temperature from -45°C to 100°C); nuclear main pump mechanical seals (applicable pressure ? 17 MPa and working temperature from 26.7°C to 73.9°C); shield machine main bearing seals (with a service life of 5,000 hours); rotating seals for automobile power train systems and transmission systems; oil well drilling and logging equipment seals (applicable pressure ? 105 MPa); hydraulic support seals; high PV value rotary dynamic seals; mechanical seals with oversized diameter (? 2 m); seals for aerospace use (working temperature from -54°C to 275°C and line speed ? 150 m/s); high-pressure seals for hydraulic components (applicable pressure ? 31.5 MPa); high-precision hydraulic castings (runner size precision ? 0.25 mm and fatigue performance test ? 2 million times)

29. High-performance non-asbestos sealing materials (with a heat-resistant temperature of 500°C and a tensile strength ? 20 MPa); high-performance carbon graphite sealing materials (with a heat-resistant temperature of 350°C and a compressive strength ? 270 MPa); high-performance pressureless sintered silicon carbide materials (with a flexural strength ? 200 MPa and a thermal conductivity ? 130 W/m·K)

30. Intelligent welding equipment; laser welding and cutting, electron beam welding, and other high-energy beam welding and cutting equipment; friction stir, composite heat sources, and other welding equipment; and digital and large capacity inverter welding power sources

31. Large (lower plate half cycle length of the stamping die > 2,500 mm, and lower plate half cycle length of the cavity die > 1,400 mm) and precision molds (precision of stamping dies ? 0.02 mm and precision of cavity dies ? 0.05 mm)

32. Large (with a furnace capacity of one ton or more) multifunctional controlled atmosphere heat treatment equipment, program-controlled chemical heat treatment equipment, program-controlled multifunctional vacuum heat treatment equipment and vacuum heat treatment equipment with a furnace capacity of 500 kg or more, and heat treatment heating furnaces with full fiber lining

器等關鍵零部件；各類晶體矽和薄膜太陽能光伏電池生產設備；海洋能（潮汐、海浪、洋流）發電設備

24、直接利用高爐鐵液生產鑄鐵件的短流程熔化工藝與裝備；粘土砂靜壓造型主機；外熱送風水冷長爐齡大噸位（15噸/小時以上）沖天爐；大型壓鑄機（合模力 3500 噸以上）；差壓鑄造機；自動澆注機；鑄造專用機器人的製造與應用

25、樹脂砂、鑄造粘土砂等幹（熱）法再生回用技術應用

26、高速精密壓力機（180~2500千牛，2000~750次/分鐘）、黑色金屬液壓擠壓機（150毫米/秒以上）、輕合金液壓擠壓機（10毫米/秒以下）、高速精密剪切機（2000千牛以上，70~80次/分，斷面斜度1.50以下）、內高壓成形機（10000千牛以上）、大型折彎機（60000千牛以上）、數字化鈹金加工中心（柔性制造中心/柔性制造系統）、高速強力旋壓機（徑向旋壓力/每輪：1000 千牛，軸向旋壓力/每輪：800 千牛，主軸轉矩：240 千牛·米，主軸最高轉速：95轉/分鐘）、數控多工位沖壓機、大公稱壓力冷/溫鍛壓力機（有效公稱力行程 25 毫米以上，公稱力 10000 千牛以上）、4工位以上自動溫/熱鍛造壓力機（公稱力16000千牛以上）

27、乙烯裂解三機，40 萬噸級（聚丙烯等）擠壓造粒機組，50萬噸級合成氣、氨、氧壓縮機等關鍵設備

28、大型風力發電密封件（使用壽命7年以上，工作溫度-45°C~100°C）；核電站主泵機械密封（適用壓力?17兆帕，工作溫度26.7°C~73.9°C）；盾構機主軸承密封（使用壽命5000小時）；轎車動力總成系統以及傳動系統旋轉密封；石油鑽井、測井設備密封（適用壓力?105兆帕）；液壓支架密封件；高PV值旋轉動密封件；超大直徑（?2米）機械密封；航天用密封件（工作溫度-54°C~275°C，線速度?150 米/秒）；高壓液壓元件密封件（適用壓力?31.5 兆帕）；高精密液壓鑄件（流道尺寸精度?0.25 毫米，疲勞性能測試?200萬次）

29、高性能無石棉密封材料（耐熱溫度500°C，抗拉強度?20兆帕）；高性能碳石墨密封材料（耐熱溫度350°C，抗壓強度?270兆帕）；高性能無壓燒結碳化矽材料（彎曲強度?200 兆帕，熱導率?130瓦/米·開爾文（w/m·K））

30、智能焊接設備，激光焊接和切割、電子束焊接等高能束流焊割設備，攪拌摩擦、複合熱源等焊接設備，數字化、大容量逆變焊接電源

31、大型（下底板半周長度沖壓模>2500毫米，下底板半周長度型腔模>1400 毫米）、精密（沖壓模精度?0.02 毫米，型腔模精度?0.05毫米）模具

32、大型（裝爐量 1 噸以上）多功能可控氣氛熱處理設備、程控化學熱處理設備、程控多功能真空熱處理設備及裝爐量 500公斤以上真空熱處理設備、全纖維爐襯熱處理加熱爐

33. High-strength (level 12.9 or above), special-shaped, and titanium alloy fasteners, springs used for aviation, aerospace, and engines, among others, miniature precision transmission junction pieces (clutches), and coupling shaft for heavy mills; new types of powder metallurgical parts: high-density (≥ 7.0 g/cc), high-precision, and complex-shaped structural parts; friction devices for high-speed trains and airplanes; oil bearings; speed-changing gearboxes for China Railway High-Speed(CRH) trains, gear transmission agents with adjustable blades used for vessels, gearboxes used for wind power of 2.0 megawatts and above, and gearboxes for metallurgical and mining machinery; automobile powertrain, engineering machinery, and chains used for large agricultural machinery

34. Sea water desalting equipment

35. Robot and industrial robot integrated systems

36. Integrated excavation equipment for a mine or a thin seam with an annual yield of five million tons or more and key equipment for a large-scale open-pit mine with an annual yield of 10 million tons or more

37. Supporting compressors, gas turbines, valves, and other key equipment for natural gas transmission lines with a diameter of 1,200 mm or above; supporting compressors, driven machinery, and cryogenic equipment, among others, for liquefaction of natural gas with an annual yield of 2.6 million tons or more per line; supporting oil pumps of 3,000 cubic meters or more per hour and other key equipment for large-scale oil pipelines

38. Sheet-fed and multi-color offset presses (width ≥ 750 mm; printing speed: single-sided and multicolor $\geq 16,000$ sheets/hour, and two-sided and multicolor $\geq 13,000$ sheets/hour); commercial web offset presses (width ≥ 787 mm, printing speed ≥ 7 m/s, and overprinter precision ≥ 0.1 mm); newspaper web offset presses (printing speed: single-paper path and single-width machine $\geq 75,000$ sheets/hour, double-paper path and double-width machine $\geq 150,000$ sheets/hour, and overprinter precision ≥ 0.1 mm); multicolor wide flexographic presses (printing width $\geq 1,300$ mm and printing speed ≥ 350 m/min); unit flexographic presses (printing speed ≥ 150 m/min); environment-friendly multicolor web photogravure presses (printing speed ≥ 300 m/min and overprinter precision ≥ 0.1 mm); inkjet digital presses (used for publication: printing speed ≥ 150 m/min and resolution ≥ 600 dpi; used for packaging: printing speed ≥ 30 m/min and resolution $\geq 1,000$ dpi; used for variable data: printing speed ≥ 100 m/min and resolution ≥ 300 dpi); computer-to-plate (CTP) (imaging speed ≥ 15 sheets/hour, plate width ≥ 750 mm, repeatability of 0.025 mm, and resolution of 3,000 dpi); and shaftless numerically-controlled platen hot stamping machines (stamping speed $\geq 10,000$ sheets/hour and machining precision of 0.05 mm)

39. Two- or four-wheel drive wheeled tractors and crawler tractors of 100 horsepower or above and equipped with a power shift transmission or fully-synchronized shift transmission, a bus control system, a safety cab, a power output shaft with two or more rotate speed, and hydraulic output points of not less than three groups

40. Supporting farm machinery of tractors of 100 horsepower or above: subsoilers, combined soil preparation machines, and combined machines for soil preparation and sowing, among others, required for conservation tillage and moldboard plows with a width of share ≥ 40 cm, round disc harrows, grain drills, precision planters for cultivated crops, cultivators, non-tillage planters, and large sprayers (dusters), among others, required for conventional agricultural operations

41. Key parts and components of tractors of 100 horsepower or above: power shift transmissions; front drive axles with a differential lock used for wheeled tractors; clutches, hydraulic pumps, hydraulic cylinders, various valves and hydraulic delivery valves, and other closed hydraulic systems; closed-core and load-sensing electronically-controlled hydraulic lifters, electric control systems, rims, spokes, and hydraulic steering mechanism, among others

42. Crop transplanting machines: ride-on plate-soil motor high-speed rice transplanters (350 times or more per minute, 3 to 5 plants per hole, applicable line spacing of 20 to 30 cm,

33、高強度（12.9級以上）、異形及鈦合金緊固件，航空、航天、發動機等用彈簧，微型精密傳動聯結件（離合器），大型軋機聯結軸；新型粉末冶金零件：高密度（ ≥ 7.0 克/立方厘米）、高精度、形狀複雜結構件；高速列車、飛機摩擦裝置；含油軸承；動車組用齒輪變速箱，船用可變齒輪傳動系統、2.0兆瓦以上風電用變速箱、冶金礦山機械用變速箱；汽車動力總成、工程機械、大型農機用鏈條

34、海水淡化設備

35、機器人及工業機器人成套系統

36、500萬噸/年及以上礦井、薄煤層綜合采掘設備，1000萬噸級/年及以上大型露天礦關鍵裝備

37、直徑1200毫米及以上的天然氣輸氣管線配套壓縮機、燃氣輪機、閥門等關鍵設備；單線260萬噸/年及以上天然氣液化配套的壓縮機及驅動機械、低溫設備等；大型輸油管線配套的3000立方米/小時及以上的輸油泵等關鍵設備

38、單張紙多色膠印機（幅寬 ≥ 750 毫米，印刷速度：單面多色 ≥ 16000 張/小時，雙面多色 ≥ 13000 張/小時）；商業卷筒紙膠印機（幅寬 ≥ 787 毫米，印刷速度 ≥ 7 米/秒，套印精度 ≥ 0.1 毫米）；報紙卷筒紙膠印機（印刷速度：單紙路單幅機 ≥ 75000 張/小時，雙紙路雙幅機 ≥ 150000 張/小時，套印精度 ≥ 0.1 毫米）；多色寬幅柔性版印刷機（印刷寬度 ≥ 1300 毫米，印刷速度 ≥ 350 米/分）；機組式柔性版印刷機（印刷速度 ≥ 150 米/分）；環保多色卷筒凹版印刷機（印刷速度 ≥ 300 米/分，套印精度 ≥ 0.1 毫米）；噴墨數字印刷機（出版用：印刷速度 ≥ 150 米/分，分辨率 ≥ 600 dpi；包裝用：印刷速度 ≥ 30 米/分，分辨率 ≥ 1000 dpi；可變數據用：印刷速度 ≥ 100 米/分，分辨率 ≥ 300 dpi）；CTP直接制版機（成像速度 ≥ 15 張/小時，版材幅寬 ≥ 750 毫米，重複精度 ≤ 0.025 毫米，分辨率3000 dpi）；無軸數控平壓平燙印機（燙印速度 ≥ 10000 張/小時，加工精度 ≤ 0.05 毫米）

39、100馬力以上、配備有動力換擋變速箱或全同步器換檔變速箱、總線控制系統、安全駕駛室、動力輸出軸有2個以上轉速、液壓輸出點不少於3組的兩輪或四輪驅動的輪式拖拉機、履帶式拖拉機

40、100馬力以上拖拉機配套農機具：保護性耕作所需要的深松機、聯合整地機和整地播種聯合作業機等，常規農業作業所需要的單體幅寬 ≥ 40 厘米的鐮式犁、圓盤耙、谷物條播機、中耕作物精密播種機、中耕機、免耕播種機、大型噴霧（噴粉）機等

41、100馬力以上拖拉機關鍵零部件：動力換擋變速箱，輪式拖拉機用帶差速鎖的前驅動橋，離合器，液壓泵、液壓油缸、各種閥及液壓輸出閥等封閉式液壓系統，閉心變量、負載傳感的電控液壓提升器，電控系統，輪軸及輻板，液壓轉向機構等

42、農作物移栽機械：乘坐式盤土機動高速水稻插秧機（每分鐘插次 ≥ 350 次以上，每穴3~5株，適應行距20

adjustable row spacing, and applicable row spacing of 12 to 22 cm); and plate-soil motor rice seedling transplanters (ride-on or walk-behind, applicable line spacing of 20 to 30 cm, adjustable row spacing, and applicable row spacing of 12 to 22 cm), among others

43. Cotton field intertillage tractors and high-clearance (minimum terrain clearance of 40 cm or more) tractors used for orchards, with matched power of 50 horsepower or above

44. Forage grass harvesting machinery: self-propelled forage grass harvesters, finger-wheel forage grass rakes, and forage grass pickup balers, among others

45. Agricultural harvesting machinery: self-propelled grain combine harvesters (feed rate of 6 kg/sec or more); self-propelled semi-feed rice combine harvesters (four lines or more and a supporting engine of 44 kilowatts or more); self-propelled corn combine harvesters (three to six lines, snapping type, and with a peeling device and a device of crushing stalks and returning them to field or a device of chopping and collecting stalks); self-propelled harvesters of silages such as barley, grass alfalfa, corn, and sorghum (with matched power of 147 kilowatts or more, a length of chopped stems of 10 to 60 mm, and a safety device to remove stone and iron); cotton picking machines (three lines or more, self-propelled or tractor backpack, cotton picking device of a mechanical or pneumatic style, an applicable height of cotton plant from 35 to 160 cm, with seed cotton containers and an automatic cotton unloading device); potato harvesters (self-propelled or tractor-drawn, two lines or more, adjustable line spacing, with a soil-removing device and a collection device, and a maximum digging depth of 35 cm); sugarcane harvesters (self-propelled or tractor knapsack, with matched power of 58 kilowatts or more, a perennial root broken rate $\geq 18\%$, and a loss rate $\geq 7\%$); and combined machines for plastic film residue recycling and stalk crushing

46. Water-saving irrigation equipment: all kinds of large and medium irrigation machines, and various types of micro-drip irrigation equipment, among others; flood control and drainage equipment (with displacement of 1,500 cubic meters/hour or more, lift of 5 to 20 meters, power of 1,500 kW or above, efficiency of 60% or above, and removable)

47. Biogas generation equipment: integration of biogas fermentation and storage (series of products with biogas storage capacity of 300 to 2,000 cubic meters) and equipment of pumping slag from biogas slurry (a pumping capacity of one cubic meter or more per minute), among others

48. Large construction machinery: hydraulic excavators of 30 tons or above, tunnel boring machines (TBM) of six meters or above, crawler dozers of 320 horsepower or above, loaders of six tons or above, bridging equipment of 600 tons or above (including bridge girder erection machines, girder transporting vehicles, and girder cranes), crawler cranes of 400 tons or above, all-terrain cranes of 100 tons or above, drill jumbos with a drill hole of 100 mm or above, concrete cold and hot recycling equipment of 400 kilowatts or above, and milling machines with a width of one meter or more; key components: power shift transmissions, wet drive axles, slewing bearings, torque converters, and supporting electric machines, electronic control, hydraulic motors with pressure of 25 MPa or more, pumps, and control valves for electric forklifts

49. Automated logistics systems and equipment; and information systems

50. Combustion engines with high reliability, low emissions and low power used for non-road mobile machinery: life indicators: 8,000 to 12,000 hours for heavy type, 5,000 to 7,000 hours for medium type, and 3,000 to 4,000 hours for light type, emission indicators: meeting the requirements of emission indicators in Europe III A and Europe III B; and the fuel system, pressurization system, and exhaust aftertreatment system (all including electronic control system) affecting the power, economic, and environmental protection performances of combustion engines used for non-road mobile machinery

51. Refrigeration and air-conditioning equipment and key components: heat pumps, composite heat source (air source and solar) heat pump water heaters, refrigeration and air-conditioning compressors with energy efficiency of level 2 or above, micro-channel and falling film heat transfer technologies and equipment, electronic expansion valves, and two-phase

~30 厘米, 株距可調, 適應株距 12~22 厘米); 盤土式機動水稻擺秧機(乘坐式或手扶式, 適應行距為20~30 厘米, 株距可調, 適應株距為12~22厘米)等

43、配套動力50馬力以上的棉田中耕型拖拉機、果園用高地隙拖拉機(最低離地高度40厘米以上)

44、牧草收穫機械: 自走式牧草收割機、指盤式牧草攔草機、牧草撿拾壓捆機等

45、農業收穫機械: 自走式谷物聯合收割機(喂入量 6 克/秒以上); 自走式半喂入水稻聯合收割機(4行以上, 配套發動機44千瓦以上); 自走式玉米聯合收割機(3~6 行, 摘穗型, 帶有剝皮裝置, 以及莖稈粉碎還田裝置或莖稈切碎收集裝置); 自走式大麥、草苜蓿、玉米、高粱等青貯飼料收穫機(配套動力 147千瓦以上, 莖幹切碎長度 10~60毫米, 帶有去石去鐵安全裝置); 棉花採摘機(3 行以上, 自走式或拖拉機背負式, 摘花裝置為機械式或氣力式, 適應棉株高度 35~160 厘米, 裝有籽棉集裝箱和自動卸棉裝置); 馬鈴薯收穫機(自走式或拖拉機牽引式, 2行以上, 行距可調, 帶有去土裝置和收集裝置, 最大挖掘深度 35 厘米); 甘蔗收穫機(自走式或拖拉機背負式, 配套功率58千瓦以上, 宿根破碎率 $\geq 18\%$, 損失率 $\geq 7\%$); 殘膜回收與莖杆粉碎聯合作業機

46、節水灌溉設備: 各種大中型噴灌機、各種類型微滴灌設備等; 抗洪排澇設備(排水量1500立方米/小時以上, 揚程5~20米, 功率1500千瓦以上, 效率60%以上, 可移動)

47、沼氣發生設備: 沼氣發酵及儲氣一體化(儲氣容積 300~2000立方米系列產品)、沼液抽渣設備(抽吸量1 立方米/分鐘以上)等

48、大型施工機械: 30 噸以上液壓挖掘機、6 米及以上全斷面掘進機、320 馬力及以上履帶推土機、6 噸及以上裝載機、600噸及以上架橋設備(含架橋機、運梁車、提梁機)、400 噸及以上履帶起重機、100噸及以上全地面起重機、鑽孔100毫米以上鑿岩台車、400千瓦及以上?冷熱再生設備、1米寬及以上銑刨機; 關鍵零部件: 動力換擋變速箱、濕式驅動橋、回轉支承、液力變矩器、為電動叉車配套的電機、電控、壓力25兆帕以上液壓馬達、泵、控制閥

49、自動化物流系統裝備、信息系統

50、非道路移動機械用高可靠性、低排放、低能耗的內燃機: 壽命指標(重型8000~12000小時, 中型5000~7000小時, 輕型3000~4000小時)、排放指標(符合歐 IIIA、歐IIIB排放指標要求); 影響非道路移動機械用內燃機動力性、經濟性、環保性的燃油系統、增壓系統、排氣後處理系統(均包括電子控制系統)

51、制冷空調設備及關鍵零部件: 熱泵、複合熱源(空氣源與太陽能)熱泵熱水機、二級能效及以上制冷空調壓縮機、微通道和降膜換熱技術與設備、電子膨脹閥和兩相流噴射器; 使用環保制冷劑(ODP為0、GWP值較低)的制冷空調壓縮機

flow ejectors; and refrigeration and air-conditioning compressors using environment-friendly refrigerants (ODP is 0 and GWP value is lower)

52. Complete drilling machines such as deep drilling rigs with a depth of 12,000 m or more, polar drilling rigs, high displacement deep-well and desert drilling rigs, drilling rigs used in swamp areas difficult to enter, offshore rigs, truck-mounted drilling rigs, and drilling rigs used for special drilling techniques

53. Centralized processing equipment for hazardous waste (including medical waste)

54. Large efficient two-plate injection molding machines (with a mold clamping force of 1,000 tons or more), all-electric plastic injection molding machines (with an injection volume of less than 1,000 g), energy-saving plastics and rubber injection molding machines (with energy consumption of less than 0.4 kwh/kg), high-speed energy-saving plastic extrusion units (production capacity: 30 to 3,000 kg/hour, and energy consumption: less than 0.35 kwh/kg), microcellular foam plastic injection molding machines (mold clamping force: 60 to 1,000 tons, injection volume: 30 to 5,000 g, and energy consumption of less than 0.4 kwh/kg), large twin-screw extrusion granulation units (production capacity: 300,000 to 600,000 tons/year), large para-aramid reactive extrusion units (production capacity of 14,000 tons/year or above), and carbon fiber pre-impregnated units (a production capacity of 600,000 m/year or above; and a width of 1.2 m or more)

55. Nano-filtration and reverse osmosis pure water equipment used for coating

56. Safe drinking water equipment: combined-type integrated water purifiers (with a processing capacity of 100 to 2,500 tons/hour)

57. Air pollution control equipment: selective catalytic reduction (SCR) technical equipment for denitration of fumes from coal-fired power plants of 300 megawatts or more (nitrogen removal efficiency of 90% or above and the catalyst with a service life of 16,000 hours or more); circulating fluidized bed dry desulphurization and dedusting outfits for steel sintering fumes (calcium sulfur ratio: 1.2 to 1.3); supporting electrostatic precipitation technical equipment for ultra-supercritical units of 1,000 megawatts; electric-bag composite dust removal technical equipment (dust emission concentration < 30 mg/cubic meter); ultra-supercritical oxidative desulfurization multistage centrifugal blower units of 1,000 megawatts or above (air volume ? 450 cubic meters/min and boost ? 14,000 millimeter of water); and plasma exhaust gas purifiers (exhaust removal rate > 95%)

58. Sewage prevention and control technical equipment: urban sewage treatment outfits of 200,000 tons/day (phosphorus and nitrogen removal); sludge drying and incineration technical equipment (slag removal quantity of 90% or above); immersed membrane bioreactors (COD removal efficiency of 90 % or more); ceramic vacuum filters (vacuum degree: 0.09 to 0.098 MPa, and porosity: 0.2 microns to 20 microns); integrated wastewater treatment technical outfits for small- and medium-sized towns; and technical equipment for the treatment of high concentration organic wastewater by ultrasonic coupling and biofilm processes

59. Solid waste prevention and control technical equipment: domestic garbage clean incineration technical equipment (with the amount of combustion-supporting coal of less than 20%); technical equipment for concentrated decontamination of kitchen waste (with a utilization rate of 95%); technical equipment for landfill leachate and odor treatment (with a handling capacity of 50 tons/day or above); technical equipment for domestic garbage automated sorting (with a sorting rate of 80% or more); construction waste treatment and recycling technical equipment (with a handling capacity of 100 tons/hour or more); technical equipment for industrial hazardous waste disposal and treatment (with a treatment rate of 90% or more); technologies and outfits for oilfield drilling waste disposal and treatment (with a volume reduction of 50% or more and a treatment rate of 70% or more); and technical equipment for medical waste clean incineration and thermophilic digestion decontamination (with a handling capacity of 150 kg/hour or more and combustion efficiency of 70% or more)

60. Soil remediation technical equipment

52、12000米及以上深井鑽機、極地鑽機、高位移性深井沙漠鑽機、沼澤難進入區域用鑽機、海洋鑽機、車裝鑽機、特種鑽井工藝用鑽機等鑽機成套設備

53、危險廢物（含醫療廢物）集中處理設備

54、大型高效二板注塑機（合模力 1000 噸以上）、全電動塑料注射成型機（注射量 1000 克以下）、節能型塑料橡膠注射成型機（能耗 0.4 千瓦時/千克以下）、高速節能塑料擠出機組（生產能力：30～3000公斤/小時，能耗 0.35千瓦時/千克以下）、微孔發泡塑料注射成型機（合模力：60～1000 噸，注射量：30～5000克，能耗 0.4 千瓦時/千克以下）、大型雙螺杆擠出造粒機組（生產能力：30～60 萬噸/年）、大型對位芳綸反應擠出機組（生產能力 1.4 萬噸/年以上）、碳纖維預浸膠機組（生產能力 60 萬米/年以上；幅寬1.2米以上）

55、塗裝用納米過濾和反向滲透純水裝備

56、安全飲水設備：組合式一體化淨水器（處理量100～2500噸/小時）

57、大氣汙染治理裝備：300兆瓦以上燃煤電站煙氣SCR脫硝技術裝備（脫氮效率90%以上，催化劑使用壽命16000小時以上）；鋼鐵燒結煙氣循環流化床幹法脫硫除塵成套裝備（鈣硫比：1.2～1.3）；1000 兆瓦超超臨界機組配套電除塵技術裝備；電袋複合除塵技術裝備（煙塵排放濃度<30 毫克/立方米）；1000 兆瓦超超臨界以上機組脫硫氧化多級離心鼓風機（風量?450 立方米/分鍾、升壓?14000毫米水柱）；等離子體廢氣淨化機（廢氣去除率>95%）

58、污水防治技術設備：20萬噸/日城市污水處理成套裝備（除磷脫氮）；汙泥幹燥焚燒技術裝備（減渣量90%以上）；浸沒式膜生物反應器（COD去除率90%以上）；陶瓷真空過濾機（真空度：0.09～0.098兆帕，孔隙：0.2微米～20微米）；中小城鎮一體化污水處理成套技術裝備；超生耦合法和生物膜法處理高濃度有機廢水技術裝備

59、固體廢物防治技術設備：生活垃圾清潔焚燒技術裝備（助燃煤量20%以下）；廚余垃圾集中無害化處理技術裝備（利用率95%以上）；垃圾填埋滲濾液和臭氣處理技術裝備（處理量50噸/天以上）；生活垃圾自動化分選技術裝備（分選率 80%以上）；建築垃圾處理和再利用工藝技術裝備（處理量 100 噸/小時以上）；工業危險廢棄物處置處理技術裝備（處理率 90%以上）；油田鑽井廢棄物處理處置技術與成套裝備（減容50%以上，處理率70%以上）；醫療廢物清潔焚燒、高溫蒸餾無害化處理技術裝備（處理量 150千克/小時以上，燃燒效率70%以上）

60、土壤修復技術裝備

XV. Urban Rail Transit Equipment

1. Application of urban rail transit damping and noise reduction technologies
2. Automatic fare collection systems (AFC) and systems of vehicle doors, platform screen doors, and vehicle couplers
3. Fire alarm and automatic fire extinguishing systems for urban rail transit
4. Digital track circuits and wireless communication-based signaling systems [including automatic train supervision system (ATS), automatic train protection (ATP) devices, and automatic train operation (ATO) devices]
5. Key components of outfits of power supply systems for direct current speed-sensitive switches and gas insulated switchgears (GIS)
6. Railway vehicle alternating current traction drive systems, brake systems, and core components (including IGCT and IGBT components)
7. Urban rail train network control systems and operation control systems
8. Lightweight application of vehicle body, bogie, gearbox, and interior decoration materials
9. Urban rail train regenerative braking absorption devices

XVI. Automobiles

1. Key components of automobiles: gasoline engine turbochargers, eddy current retarders, tire pressure monitoring systems (TPMS), servo headlamp systems, LED headlamps, digital instrumentation, solenoid valves used for electrical control system actuators, axles exclusively used for large low-floor buses, air suspension, energy-absorbing steering systems, inverter air conditioners for large and medium-sized passenger cars, high-strength steel wheels, and rear disc brakes for trucks
2. Dual-clutch transmissions (DCT) and automatic mechanical transmissions (AMT)
3. Application of lightweight materials: high-strength steels, aluminum-magnesium alloys, composite plastics, powder metallurgy, and high-strength composite fibers, among others; application of advanced forming technologies: expanded application of laser tailor-welded blanks, hydroforming, ultra high strength steel hot forming, and flexible roll forming, among others; and application of environment-friendly materials: water-based paints and lead-free solders, among others
4. Efficient diesel engines (the power per liter for those with displacement of less than 3L is ? 50 kW/L, and the power per liter for those with displacement of 3L or more is ? 40 kW/L); post-processing systems (including particulate traps, oxidized-form catalytic converters, and reduced-form catalytic converters); electrically-controlled in-line injection pumps, electronically-controlled high pressure common rail injection systems, electronically-controlled high pressure monoblock pumps, injectors, and fuel spray nozzles
5. Efficient gasoline engines (the power per liter of naturally-aspirated gasoline engines is ? 60kW/L, and the power per liter of turbocharged gasoline engines is ? 70kW/L)
6. Key parts and components of new energy vehicles: energy-type drive battery packs (energy density ? 110Wh/kg and cycle life ? 2,000 times), battery cathode materials (specific capacity ? 150mAh/g and a cycle life of 2,000 times without lowering than 80% of the initial discharge capacity), battery separators (thickness of 15 to 40 米m and porosity of 40% to 60%); battery management systems, motor management systems, and electronic control integration of electric vehicles; driving motors of electric vehicles (peak power density ? 2.5kW/kg, high-efficiency area: 65%, efficiency in working area ? 80%), vehicle DC/DC (input voltage of 100V to 400V), high-power electronic devices (IGBT, voltage class ? 600V, and current ? 300A); and plug-in hybrid electromechanical coupling drive systems

十五、城市轨道交通裝備

- 1、城市轨道交通減震、降噪技術應用
- 2、自動售檢票系統（AFC），車門、站台屏蔽門、車鉤系統
- 3、城市轨道交通火災報警和自動滅火系統
- 4、數字軌道電路及以無線通信為基礎的信號系統[含自動列車監控系統（ATS）、列車自動保護裝置（ATP）、自動列車運行裝置（ATO）]
- 5、直流高速開關、真空斷路器（GIS）供電系統成套設備關鍵部件
- 6、軌道車輛交流牽引傳動系統、制動系統及核心元器件（含IGCT、IGBT元器件）
- 7、城軌列車網絡控制系統及運行控制系統
- 8、車體、轉向架、齒輪箱及車內裝飾材料輕量化應用
- 9、城軌列車再生制動吸收裝置

十六、汽車

- 1、汽車關鍵零部件：汽油機增壓器、電渦流緩速器、輪胎氣壓監測系統（TPMS）、隨動前照燈系統、LED前照燈、數字化儀表、電控系統執行機構用電磁閥、低地板大型客車專用車橋、空氣懸架、吸能式轉向系統、大中型客車變頻空調、高強度鋼車輪、載重車後盤式制動器
- 2、雙離合器變速器（DCT）、電控機械變速器（AMT）
- 3、輕量化材料應用：高強度鋼、鋁鎂合金、複合塑料、粉末冶金、高強度複合纖維等；先進成形技術應用：激光拼焊板的擴大應用、內高壓成形、超高強度鋼板熱成形、柔性滾壓成形等；環保材料應用：水性塗料、無鉛焊料等
- 4、高效柴油發動機（3L以下升功率?50 kW/L，3L以上升功率?40 kW/L）；後處理系統（包括顆粒捕捉器、氧化型催化器、還原型催化器）；電控直列式噴油泵、電控高壓共軌噴射系統、電控高壓單體泵以及噴油器、噴油嘴
- 5、高效汽油發動機（自然吸氣汽油機升功率?60kW/L，渦輪增壓汽油機升功率?70kW/L）
- 6、新能源汽車關鍵零部件：能量型動力電池組（能量密度?110Wh/kg，循環壽命?2000次），電池正極材料（比容量?150mAh/g，循環壽命2000次不低於初始放電容量的80%），電池隔膜（厚度15~40米m，孔隙率40%~60%）；電池管理系統，電機管理系統，電動汽車電控集成；電動汽車驅動電機（峰值功率密度?2.5kW/kg，高效區：65%工作區效率?80%），車用DC/DC（輸入電壓100V~400V），大功率電子器件（IGBT，電壓等級?600V，電流?300A）；插電式混合動力機電耦合驅動系統

- 7. On-board chargers and off-board charging equipment
- 8. Electric air conditioners, electric brakes, and electric power steering; and idle start-stop systems
- 9. Automotive electronic control systems: the engine control unit (ECU), transmission control unit (TCU), anti-lock braking system (ABS), acceleration slip regulation (ASR), electronic stability program (ESP), network bus control, on-board diagnostics (OBD), electronically-controlled intelligent suspensions, electronic parking system, automatic collision avoidance system, and electronic throttle, among others
- 10. Automotive product development, experiment and testing equipment and facility construction

XVII. Vessels

- 1. Optimization and upgrading of bulk carriers, oil tankers, and container ships to meet the requirements of environmental protection and safety; and development and construction of ships of types meeting the new international shipbuilding specifications and standards
- 2. Liquefied natural gas carriers with a capacity of 100,000 cubic meters or more, liquefied petroleum gas vessels with a capacity of 15,000 cubic meters or more, container ships with 10,000 containers or more, car carriers with 5,000 parking spaces or more, luxury ro-ro passenger ships, chemical tankers of IMO Tier II or above, luxury cruise ships, and other high-tech and high value-added ships
- 3. Large distant fishing and processing vessels, trailing suction hopper dredgers with a capacity of 10,000 cubic meters or more, train ferries, scientific research ships, icebreakers, oceanographic research ships, marine supervision vessels, and other special ships as well as their dedicated equipment
- 4. Small waterplane area twin-hull ships, hydrofoils, ground effect ships, hovercrafts, wave-piercing ships, and other high-performance vessels
- 5. Self-elevating drilling platforms for a water depth of 120 meters or more, deep drilling ships for a water depth of 1,500 meters or more, semi-submersible drilling platforms for a water depth of 1,500 meters or more, and other mainstream mobile marine drilling platforms (vessels); floating production storage and offloading (FPSO) of 150,000 tons or above, 1,500-meter semi-submersible production platforms, spar platforms (SPAR), tension leg platforms (TLP), LNG-FPSO, marginal field floating production storage units, and other floating production systems; deep-water anchor handling towing supply vessels with horsepower of 10,000, 1,500-meter large lifting pipe-laying vessels, 1,500-meter surveying vessels, high-performance seismic vessels, semi-submersible transport ships of 50,000 tons or above, offshore wind turbine installation vessels, and other marine engineering workboats and auxiliary vessels
- 6. Dynamic positioning systems, FPSO single-point mooring systems, large-scale offshore platform power plants integrated systems, active power and transmission systems, drilling platform lifting systems, oil production systems, and other general and special marine engineering support equipment
- 7. Development and manufacturing of luxury yachts and supporting industries
- 8. Intelligent environment-friendly low- and medium-speed marine diesel engines and their key parts and components, large deck machinery, marine boilers, oil-water separators, desalination plants, ballast water treatment systems, shore power technologies and equipment used for vessels, liquefied natural gas marine dual fuel engines, pod propulsions, large efficient jet propulsion units, high-power medium- and high-voltage generators, marine communication, navigation and automation systems, and other key supporting marine equipment
- 9. Underwater vehicles, robots, and detection and observation equipment

- 7、車載充電機、非車載充電設備
- 8、電動空調、電制動、電動轉向；怠速起停系統
- 9、汽車電子控制系統：發動機控制系統（ECU）、變速箱控制系統（TCU）、制動防抱死系統（ABS）、牽引力控制（ASR）、電子穩定控制（ESP）、網絡總線控制、車載故障診斷儀（OBD）、電控智能懸架、電子駐車系統、自動避撞系統、電子油門等
- 10、汽車產品開發、試驗、檢測設備及設施建設

十七、船舶

- 1、散貨船、油船、集裝箱船適應綠色、環保、安全要求的優化升級，以及滿足國際造船新規範、新標準的船型開發建造
- 2、10萬立方米以上液化天然氣船、1.5萬立方米以上液化石油氣船、萬箱以上集裝箱船、5000 車位及以上汽車運輸船、豪華客滾船、IMO II型以上化學品船、豪華郵輪等高技術、高附加值船舶
- 3、大型遠洋捕撈加工漁船、1 萬立方米以上耙吸式挖泥船、火車渡輪、科學考察船、破冰船、海洋調查船、海洋監管船等特種船舶及其專用設備
- 4、小水線面雙體船、水翼船、地效應船、氣墊船、穿浪船等高性能船舶
- 5、120米及以上水深自升式鑽井平台、1500米及以上深鑽井船、1500 米及以上水深半潛式鑽井平台等主流海洋移動鑽井平台（船舶）；15萬噸及以上浮式生產儲卸裝置（FPSO）、1500米水深半潛式生產平台、立柱式生產平台（SPAR）、張力腿平台（TLP）、LNG-FPSO、邊際油田型浮式生產儲油裝置等浮式生產系統；萬馬力水級深水三用工作船、1500米水深大型起重鋪管船、1500米水深工程勘察船、高性能物探船、5萬噸及以上半潛運輸船、海上風車安裝船等海洋工程作業船和輔助船
- 6、動力定位系統、FPSO單點系泊系統、大型海洋平台電站集成系統、主動力及傳動系統、鑽井平台升降系統、采油系統等通用和專用海洋工程配套設備
- 7、豪華游艇開發製造及配套產業
- 8、智能環保型船用中低速柴油機及其關鍵零部件、大型甲板機械、船用鍋爐、油水分離機、海水淡化裝置、壓載水處理系統、船舶使用岸電技術及設備、液化天然氣船用雙燃料發動機、吊艙推進器、大型高效噴水推進裝置、大功率中高壓發電機、船舶通訊導航及自動化系統等關鍵船用配套設備
- 9、水下潛器、機器人及探測觀測設備

10. Application of precision management control, digital shipbuilding, unit assembly, advanced outfitting and modularization, advanced coating, and efficient welding technologies

10、精度管理控制、數字化造船、單元組裝、預裝和模塊化、先進塗裝、高效焊接技術應用
11. Repair and modification of high-tech and high value-added vessels and marine engineering equipment

11、高技術高附加值船舶、海洋工程裝備的修理與改裝

XVIII. Aviation and Aerospace

十八、航空航天

1. Development and manufacturing of aircrafts for trunk lines, regional aircrafts, and utility aircrafts and their parts and components

1、幹線、支線、通用飛機及零部件開發制造
2. Development and manufacturing of aircraft engines

2、航空發動機開發制造
3. Development and manufacturing of airborne equipment, mission equipment, air traffic control equipment, and ground support equipment systems

3、機載設備、任務設備、空管設備和地面保障設備系統開發制造
4. Development and manufacturing of helicopters, rotor systems, and drive systems

4、直升機總體、旋翼系統、傳動系統開發制造
5. Development and production of new materials for aviation and aerospace use

5、航空航天用新型材料開發生產
6. Manufacturing of gas turbines for aviation and aerospace use

6、航空航天用燃氣輪機制造
7. Manufacturing of satellites and launch vehicles and their parts and components

7、衛星、運載火箭及零部件制造
8. Application of aviation and aerospace technologies and development and production of system software and hardware products and terminal products

8、航空、航天技術應用及系統軟硬件產品、終端產品開發生產
9. Development and manufacturing of aircraft ground-based simulation training systems

9、航空器地面模擬訓練系統開發制造
10. Development and manufacturing of aircraft ground repair, maintenance, and testing equipment

10、航空器地面維修、維護、檢測設備開發制造
11. Satellite ground and application system construction and equipment manufacturing

11、衛星地面和應用系統建設及設備制造
12. Development and application of emergency rescue equipment exclusively used for aircrafts

12、航空器專用應急救援裝備開發與應用
13. Repair of aircrafts, equipment, and parts

13、航空器、設備及零件維修
14. Development and production of advanced satellite payloads

14、先進衛星載荷研制及生產

XIX. Light Industry

十九、輕工

1. Construction of forest-paper integration production lines each with an annual production capacity of 300,000 tons or more of chemical wood pulp, an annual production capacity of 100,000 tons or more of chemi-mechanical wood pulp, or an annual production capacity of 100,000 tons or more of chemical bamboo pulp, and corresponding paper and paperboard production lines (excluding newsprint and art paper); and construction of paper pulp production lines adopting cleaner production techniques and using non-wood fiber as raw materials each with an annual production capacity of 100,000 tons or more

1、單條化學木漿30萬噸/年及以上、化學機械木漿10萬噸/年及以上、化學竹漿 10 萬噸/年及以上的林紙一體化生產線及相應配套的紙及紙板生產線（新聞紙、銅版紙除外）建設；采用清潔生產工藝、以非木纖維為原料、單條10 萬噸/年及以上的紙漿生產線建設
2. Development and manufacturing of advanced pulping and papermaking equipment

2、先進制漿、造紙設備開發與制造
3. Development and application of techniques of elemental chlorine free (ECF) and totally chlorine free (TCF) bleaching of chemical pulp

3、無元素氯（ECF）和全無氯（TCF）化學紙漿漂白工藝開發及應用
4. Design and manufacturing of precision moulds for metalloid products

4、非金屬制品精密模具設計、制造
5. Development, production, and application of biodegradable plastics and their series products

5、生物可降解塑料及其系列產品開發、生產與應用
6. Development and production of agricultural plastic water-saving equipment and functional agricultural films with a long life (three years or more)

6、農用塑料節水器材和長壽命（三年及以上）功能性農用薄膜的開發、生產
7. Production of new plastic building materials (highly airtight and energy-saving plastic windows, large-diameter drainage and sewage pipes, impact-resistant modified PVC pipes, polyethylene pipes used for ground-source heat pump systems, trenchless plastic pipes,

7、新型塑料建材（高氣密性節能塑料窗、大口徑排水排污管道、抗沖改性聚氯乙稀管、地源熱泵系統用聚乙烯管、非開挖用塑料管材、複合塑料管材、塑料檢查井）；

composite plastic pipes, and plastic inspection wells); impermeable geomembrane; wood plastic composites and ultra-high molecular weight polyethylene pipes and sheets with molecular weight $\geq 2,000,000$	防滲土工膜; 塑木複合材料和分子量 ≥ 200 萬的超高分子量聚乙烯管材及板材生產
8. Dynamic plasticizing and plastic extensional rheology plasticizing technology application and equipment manufacturing; and plastics processing equipment adopting electromagnetic induction heating and servo drive systems	8、動態塑化和塑料拉伸流變塑化的技術應用及裝備製造; 應用電磁感應加熱和伺服驅動系統的塑料加工裝備
9. Production of special ceramics used in industry, medical science, electronics, aviation and aerospace and other fields and the development of relevant technologies and equipment; and development of ceramics cleaner production and comprehensive utilization technologies	9、應用于工業、醫學、電子、航空航天等領域的特種陶瓷生產及技術、裝備開發; 陶瓷清潔生產及綜合利用技術開發
10. Development and manufacturing of energy efficient sewing machinery (adopting embedded digital control, oil-free or micro-oil lubrication, and other advanced technologies) and their key parts and components	10、高效節能縫制機械(採用嵌入式數字控制、無油或微油潤滑等先進技術)及關鍵零部件開發製造
11. Research, development, and manufacturing of multiple station modular machine tools used in industries such as manufacturing of writing instruments and clocks and watches	11、用于制筆、鐘表等行業的多工位組合機床研發與製造
12. Development and application of high-tech digital printing technologies and high-definition platemaking systems	12、高新、數字印刷技術及高清晰度制版系統開發與應用
13. Manufacturing of supplies specially for ethnic minorities	13、少數民族特需用品製造
14. Vacuum aluminizing, spraying silicon oxide, and polyvinyl alcohol (PVA) coating-type films, functional polyester (PET) film, oriented polystyrene (OPS) film, paper-based multi-layer co-extruded or composite packaging materials, and other new packaging materials	14、真空鍍鋁、噴鍍氧化矽、聚乙烯醇(PVA)塗布型薄膜、功能性聚酯(PET)薄膜、定向聚苯乙烯(OPS)薄膜及紙塑基多層共擠或複合等新型包裝材料
15. Manufacturing of equipment of metal plate printing in two or more colors, matching UV curing equipment, laminating equipment, and high-speed food and beverage cans processing equipment, as well as their ancillary equipment	15、二色及二色以上金屬板印刷、配套光固化(UV)、薄膜覆膜和高速食品飲料罐加工及配套設備製造
16. Lithium iron disulfide, lithium thionyl chloride, and other new lithium primary batteries; lithium-ion batteries, nickel hydrogen batteries, new-structure (coiled and tubular, among others) sealed lead-acid batteries and other power batteries; lithium-ion batteries for energy storage, and new large-capacity sealed lead-acid batteries; and super batteries and super capacitors	16、鋰二硫化鐵、鋰亞硫?氯等新型鋰原電池; 鋰離子電池、鎳鎘電池、新型結構(卷繞式、管式等)密封鉛蓄電池等動力電池; 儲能用鋰離子電池和新型大容量密封鉛蓄電池; 超級電池和超級電容器
17. Lithium iron phosphate and other cathode materials used for lithium-ion batteries, mesocarbon microbeads (MCMC), lithium titanate and other anode materials, single-layer and three-layer composite lithium-ion battery separators, fluorinated ethylene carbonate (FEC), and other electrolytes and additives; harmless recycling of used lead-acid batteries, and manufacturing of secondary lead process equipment system with annual recycling capacity of 50,000 tons or more	17、鋰離子電池用磷酸鐵鋰等正極材料、中間相炭微球和鈦酸鋰等負極材料、單層與三層複合鋰離子電池隔膜、氟代碳酸乙烯酯(FEC)等電解質與添加劑; 廢舊鉛酸蓄電池資源化無害化回收, 年回收能力5萬噸以上再生鉛工藝裝備系統製造
18. Various types of advanced solar photovoltaic cell materials and high-purity crystalline silicon materials (conversion efficiency of monocrystalline silicon photovoltaic cells is greater than 17%, conversion efficiency of polycrystalline silicon cells is greater than 16%, conversion efficiency of silicon-based thin-film cells is greater than 7%, conversion efficiency of cadmium telluride cells is greater than 9%, and conversion efficiency of copper indium gallium selenide cells is greater than 12%)	18、先進的各類太陽能光伏電池及高純晶體矽材料(單晶矽光伏電池的轉化效率大於17%, 多晶矽電池的轉化效率大於16%, 矽基薄膜電池轉化效率大於7%, 碲化鎘電池的轉化效率大於9%, 銅鎢鎳碲電池轉化效率大於12%)
19. Manufacturing of automated production outfits of lithium-ion batteries; and manufacturing of automated production outfits of alkaline zinc-manganese batteries with a production capacity of 600 batteries/min or more	19、鋰離子電池自動化生產成套裝備製造; 碱性鋅鎂電池600只/分鐘以上自動化生產成套裝備製造
20. Tanning and fur processing cleaner production, development of new technologies of leather post-finishing, manufacturing of key equipment, and comprehensive utilization of leather waste; recycling of leather chrome tanning liquid waste and comprehensive utilization of trivalent chromium sludge; development, production, and application of functional chemical products such as ashless expansion (assistant) agents, ammonia-free deliming (assistant) agents, salt-free pickling (assistant) agents, high-exhaustion chrome tanning	20、制革及毛皮加工清潔生產、皮革後整飾新技術開發及關鍵設備製造、皮革廢棄物綜合利用; 皮革鉻鞣廢液的循環利用, 三價鉻污泥綜合利用; 無灰膨脹(助)劑、無氮脫灰(助)劑、無鹽浸酸(助)劑、高吸收鉻鞣(助)劑、天然植物鞣劑、水性塗飾(助)劑等高檔皮革用功能性化工產品開發、生產與應用

(assistant) agents, natural vegetable tanning agents, and water-based finishing (assistant) agents used for top grade leather

21. Development of technologies of energy-efficient electric light sources (high and low-pressure discharge lamps and solid state lighting products), production of relevant products, and application of solid mercury production techniques; and recycling and reusing of waste and used lamps

22. Development and production of energy-efficient household appliances

23. Development and production of multiple-effect, energy-saving, water-saving, and environment-friendly surfactants and concentrated synthetic detergents

24. Development and manufacturing of air conditioners using new refrigerants to replace hydrochlorofluorocarbon-22 (HCFC-22 or R22), production of household appliances using new blowing agents to replace hydrochlorofluorocarbon-141b (HCFC-141b), and production and application of rigid polyurethane foam using new blowing agents to replace hydrochlorofluorocarbon-141b (HCFC-141b)

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21、高效節能電光源（高、低氣壓放電燈和固態照明產品）技術開發、產品生產及固汞生產工藝應用；廢舊燈管回收再利用

22、高效節能家電開發與生產

23、多效、節能、節水、環保型表面活性劑和濃縮型合成洗滌劑的開發與生產

24、採用新型制冷劑替代氫氯氟烴-22（HCFC-22 或 R22）的空調器開發、製造，採用新型發泡劑替代氫氯氟烴-141b（HCFC-141b）的家用電器生產，採用新型發泡劑替代氫氯氟烴-141b（HCFC-141b）的硬質聚氨酯泡沫的生產與應用

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