

# Industry and Information Technology issued the "iron industry" second five "development plan"

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## On the issuance of "iron and steel industry" second five "development planning" MIIT Regulation No. 480 [2011]

provinces, autonomous regions and municipalities of industry and information technology departments, relevant trade associations, relevant central enterprises: iron and steel industry is important to the national economy basic industries in the industrialization and urbanization process in China play an important role. To promote the steel industry restructuring and upgrading, take the new path of industrialization with Chinese characteristics, based on "economic and social development Twelfth Five-Year Plan" and "industrial transformation and upgrading plan (2011 to 2015)", our department developed a "iron and steel industry, "second five" development plan. " Is issued to you, please actual, conscientiously implement.

October 24,

2011 **Attachments:**

### Iron and steel industry, "second Five Year Plan"

### the steel industry "second Five Year Plan"

#### Preface

steel industry is an important basic industry of the national economy, including mining, beneficiation, sintering (pellets), coking, iron making, steel making, rolling, metal products and materials and other production processes. Since the reform and opening up, especially after nearly a decade of development, the market allocation of resources continue to strengthen all forms of ownership develop iron and steel enterprise collaboration, product structure, organizational structure, technical equipment and constantly optimized to efficiently support the steady and rapid economic development .

"1025" period is to further promote scientific development, accelerate the transformation of development mode of the hard stage. Iron and steel industry, "second Five Year Plan", according to "Economic and Social Development Twelfth Five-Year Plan" and "industrial transformation and upgrading plan (2011 to 2015)" establishment, to clarify that the steel industry development strategy and objectives, clear development priorities and guide the market to optimize the allocation of resources, iron and steel industry restructuring and upgrading to deploy, as the "second five" China's steel industry guidance documents. **First, the status of development** "Eleventh Five-Year" period of China's steel industry is the

fastest growing energy saving achieved remarkable results in five years, the steel industry to effectively meet the needs of economic and social development. At the same time, the development of industry resources and environmental constraints gradually increased, the structural contradictions are still outstanding. (A) "five" major achievements 1.

Supporting the steady and rapid development of the national economy. "Eleventh Five-Year" period, China's crude steel production from 350 million tons to 630 million tons, an average annual growth of 12.2%. Steel domestic market share from 92% to 97%. In 2010, the iron and steel industry realized an industrial output value of 7 trillion yuan, accounting for 10% of the national industrial output value; assets totaled 6.2 trillion yuan, accounting for 10.4% of industrial enterprises above designated size total assets for the construction, machinery, automobiles, appliances, shipbuilding and other industries and the rapid development of the national economy provides an important raw material security. 2. Variety, quality improved significantly. "Eleventh Five-Year" period, China's steel product structure was further optimized, the full range of steel, continuously improve product quality, most varieties of self-sufficiency rate of 100%. The key development has made great progress steel products, high-strength steel used in construction, earthquake-resistant building with high-strength rebar, aerospace Used alloy materials, high-performance steel, large hydropower steel, high magnetic induction oriented silicon steel, high-speed railway with rails and other high-performance steel materials strong support for the development of related fields, to protect the Beijing Olympic venues, Shanghai World Expo venues, reconstruction, manned spaceflight, lunar exploration and other major national construction projects and natural gas and the Three Gorges Project, the Beijing-Shanghai high-speed rail and other national key projects successfully implemented. 3. Greatly improve the level of technical equipment. "Eleventh Five-Year" period, focusing on statistics and steel enterprises over 1000 cubic meters of blast furnace production capacity by a 48.3% increase the proportion to 60.9 percent, and more than 100 tons of converter steel production capacity by a 44.9% increase the proportion to 56.7% Most companies have been equipped with hot metal pretreatment, steel secondary refining facilities, refining ratio of 70%. Rolling system basically achieve full rolling, long-term shortage of hot rolling and cold rolling wide strip mill respectively, by 26 sets and 16 sets to 72 sets and 50 sets. Baoshan Iron and Steel, Anshan Iron and Steel, Wuhan Iron and Steel, Shougang Jingtang, Maanshan Iron and Steel, TISCO, Sha Steel, Xingcheng Special Steel, Dongbei Special Steel and other large enterprises in Dalian base technology and equipment to reach the international advanced level. 4. Energy saving achieved remarkable results. "Eleventh Five-Year" period, a total elimination of outdated iron production capacity of 122.72 million tons, 72.24 million tons of steel production capacity, blast furnace top pressure power generation, gas recycling and energy saving regenerative combustion technology is widely used, some large energy management companies to establish a center to promote the steel industry energy conservation. In 2010, the focus of statistics iron and steel enterprises overall improvement in the emission reduction targets, energy consumption per ton dropped to 605 kilograms of standard coal, the consumption of the new 4.1 cubic meters of water, 1.63 kilograms of sulfur dioxide emissions, compared with 2005, down 12.8%, respectively, 52.3% and 42.4%. Solid waste utilization from 90% to 94%. 5. Accelerate the pace of consolidation and reorganization. Continue to promote cross-regional restructuring, restructuring of Baosteel Xinjiang Bayi Iron and Steel, Shaoguan Steel and Ningbo Steel, Wuhan Iron and Steel restructuring Hubei, Liu Gang and Kunming Iron and Steel shares, Angang joint restructuring Panzhihua, Shougang steel restructuring water, Changzhi Iron and Steel, Guiyang Steel and Tonghua Steel Shagang restructuring Henan Wing Steel, Valin Iron & Steel and other restructuring Wuxi completed. Joint restructuring made new progress in the region, have established the Hebei Iron and Steel Group, Shandong Iron and Steel Group, the Bohai Steel Group, the new Wuan Iron and Steel Group, Hebei Iron and Steel Group also explore the gradual integration of the equity restructuring in the iron and steel enterprises in the region 12. 6. Layout optimization progress. Built Caofeidian, Bayuquan, Ningbo and other modern coastal steel base, Baosteel, Wuhan Iron and Steel, Sha Steel, Maanshan Steel and other steel mills along the river's influence further enhanced. Wuhan Iron and Steel Baosteel Zhanjiang and Fangchenggang steel bases along the coast has completed preliminary preparations, Shougang, heavy steel, steel mills and other cities Dalian steel relocation project completed. Domestic resources as the leading iron and steel industry layout gradually change both the strategic layout of the market and close to the international and domestic resources. 7. Integration of the two rising standards. Iron and steel industry industrialization and

information technology and promote each other, the degree of integration continues to deepen. Iron and steel enterprises in the process equipment, process optimization, the level of corporate information management, marketing and other aspects of energy conservation significantly enhance and accelerate the transition to integrated applications. Basic automation universal application in the industry, focusing on statistics iron and steel enterprises has been fully implemented manufacturing execution systems, mainly iron and steel enterprises to achieve enterprise information management, and gradually formed a multi-level, multi-angle information of the overall solution.

8. Iron ore resource exploration and exploitation of new steps taken. During the "Eleventh Five-Year", China's new iron ore reserves of 15.1 billion tons to identify an average increase of 3.02 billion tons per year, the domestic iron ore output from 420 million tons to 1.07 billion tons, an average annual increase of 20.6% enhancing the resource base of China's steel industry.

(B) the main problem facing

1. Variety, quality needs to be upgraded. China's steel products quality overall level is still not high, only about 30% can reach the international advanced level. TV towers, and other varieties of hot rolled rebar upgrading slow, can not meet the norms and standards of steel reduction requirements. Product quality is unstable, the downstream industry is not yet efficient and scientific use steel. A few key species still dependent on imports of steel, high strength, corrosion resistance, long life, reduction of product development and production of high-performance technology needs to be further improved. Iron and steel industry has not yet formed to provide complete system solutions materials solutions and services for downstream industries.

2. Layout adjustment has been slow. Iron and steel industry, "North-South light" failed to improve the layout of the long-term, rapid economic development of the southeast coast of steel demand, lack of long-term supply. Bohai steel production capacity of nearly 400 million tons, more than 50 percent of products exported. The layout of the steel industry in parts of the country do not meet the main functional area planning and manufacturing transfer requirements. 16 municipalities and the capital city has a large iron and steel enterprises have become increasingly unsuited to the requirements of the overall development of the city.

3. Energy, environment, enhanced raw material constraints. Key statistics iron and steel enterprises sintering, iron making, steel-making and other processes energy consumption and the international advanced level still lags far behind the secondary energy recovery efficiency should be further improved, enterprise management needs to be improved energy conservation, energy saving technology mature for further system optimization. Blast furnace, converter gas dry dust penetration remains low.

Sintering desulfurization yet universal, green low-carbon technology development is still in its infancy, sulfur dioxide, carbon dioxide emission reduction task is arduous. Iron ore prices rose significantly squeezed profit margins in the steel industry, it has seriously hampered the healthy development of the steel industry.

4. Independent innovation capability is not strong. Key statistics iron and steel enterprise R & D investment accounted for only 1.1% of main business income, well below the 3% level of developed countries. Most of the iron and steel enterprise technology innovation system has not yet fully formed, independent innovation foundation is weak, the lack of high-level experts to take the lead talent, few independent innovation technology and equipment and key species. Rolling process control automation technology and some key equipment is still mainly rely on the introduction of non-blast furnace ironmaking, near net shape casting even less than other cutting-edge R & D investment.

**Second, the market consumption prediction** "Twelfth Five-Year" period, China's development is still in an important period of strategic opportunities can accomplish a great deal, the steel industry will enter a critical stage of changing patterns of development, we are facing restructuring, transformation and development opportunities for upgrading, but also face resource prices, demand growth slowed, increasing pressure on the environment challenges, product homogeneity competition, the overall industry will exhibit low growth, low profitability of running posture.

(A) development environment from the international environment, the world economic recovery and growth conducive to stimulating the development of the global steel industry, developing the national economy continued rapid growth in emerging economies in particular, provides a new market for the steel industry, but also will exacerbate Competition among countries to steel companies. Economic globalization will be conducive to China's steel enterprises are widely involved in international cooperation and competition. At the same time, far-reaching impact of the international financial crisis, the international steel market in various forms of trade protectionism, competition around the market, resources, standards and other aspects of more intense. Global iron ore and other raw fuel supply and price

volatility will continue our steel industry is running a significant impact. Climate change and environmental protection and other factors on the development of the iron and steel industry has put forward higher requirements. International environment for China's iron and steel industry become more complex. Domestic environment, China's "five-second" period will be based on domestic demand, the economy will maintain steady and rapid development momentum, but the GDP growth rate than during the "Eleventh Five-Year" will be lower, fixed assets investment growth will slow, the role of consumption and economic growth in the tertiary industry will gradually increase. China's economic development needs of steel consumption will continue to grow, but the growth rate slowed. Transformation of economic development to reduce steel consumption per unit of gross domestic product, the strength, the new material will replace part of the steel products, the quality of steel products will upgrade the downstream industry and strategic emerging industries, higher and updating requirements, the steel industry and other convergence between industries will be further strengthened. Tightening resource and environmental constraints, energy conservation will continue to curb steel production capacity release. By importing bulk raw material and fuel prices continue to increase and the rise of other factors affecting the cost, steel production cost pressures continue to increase, further increasing operational risks.

(B) 2015 crude steel consumption forecast

steel consumption is mainly affected by factors of economic output and economic structure, development stage, fixed assets investment scale. "1025" period, industrialization, urbanization deepening of affordable housing projects, water conservancy facilities, transportation facilities and other large-scale construction will boost steel consumption. Meanwhile, China will accelerate the transformation of development, promote industrial restructuring and upgrading, developing strategic emerging industries, the steel "reduction" and material substitution and other factors will have a significant impact on steel consumption and consumption structure. Considering the above factors, the planning for the following three methods of domestic crude steel consumption in 2015 was predicted:

industry consumer research method. Investigation of the "five" demand for construction steel, machinery, automotive, transportation, mining, petrochemical and other 13 major downstream industries, forecast consumption in 2015 was about 750 million tons.

Regional consumption balance method. According provinces announced the "five-second" GDP development goals, combined with the existing level of steel consumption and trends of each region, forecast consumption in 2015 was 820 million tons.

Consumption coefficient and regression analysis. According to the target, "National Economic and Social Development Twelfth Five-Year Plan" proposed setting "1025" during the rapid economic, fast and moderate three different development scenarios, using a combination of gross domestic product steel consumption coefficient, fixed asset investment in steel consumption coefficient and regression analysis, forecast consumption in 2015 was 810 million tons, 750 million tons and 710 million tons.

Integrated predicted that by 2015 the domestic consumption of crude steel guide about 750 million tons.

(C) the long-term consumption of crude steel forecast

reference United States, Germany, Japan and other countries the law iron and steel industry, given our vast imbalance of economic development in all regions of the total steel consumption and duration will have a greater impact. A combination of factors, the use of gross domestic product and per capita crude steel consumption coefficient method, forecast China's crude steel demand is likely in the "five-second" peak of the arc into the area, the peak may occur during 2015-2020 a peak of about 7.7 ~ 820 million tons, after the peak arc area will continue for a period. As industrialization and urbanization in-depth development, and economic development pattern and industrial upgrading, urban and rural infrastructure investment scale slowdown, China's steel demand growth will show a declining trend, entered a stable period of development.

(Iv) key varieties of steel demand forecast

based on various sectors of steel demand, predicted in 2015 the consumption of key steel varieties.

#### **Box 1 2015 key steel products consumption prediction**





<b>No.</b>	<b>Variety</b>	<b>2010 Year (tonnes)</b>	<b>2015 years (10,000 tons)</b>
1	Railway rail	400	380
2	Railway wheels, axles steel	54	60
3	High-strength steel	5650	11200
4	Bearing steel	370	500

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<b>No.</b>	<b>Variety</b>	<b>2010 Year (tonnes)</b>	<b>2015 years (10,000 tons)</b>
5	Gear Steel	207	250
6	Alloy spring steel	260	450
7	Alloy tool steel	30	5 0
8	Shipbuilding plate	1300	1600
9	Pressure vessel steel plate	100	160
10	Automotive cold-rolled and galvanized sheet	835	1400
11	OCTG	380	470
12	Power stations, high-pressure boiler tube	48	70
13	Silicon	572	650
14	Stainless steel	940	1 6 00

### **Third, the guiding ideology, basic principles and main objectives**

(a) guiding ideology of Deng Xiaoping Theory and the important thought of "Three Represents" as guidance, thoroughly implement the scientific concept of development, adhere to the new path of industrialization with Chinese characteristics, to meet the transformation and upgrading of downstream industries requires the development of strategic emerging industries, iron and steel industrial restructuring, transformation and upgrading of the main direction of

innovation and technological innovation as the support, improve quality and expand high performance steel products, to achieve reduction of steel, promote energy conservation, optimize regional distribution, guide mergers and acquisitions, strengthen resource protection, improve capital openness and international operations, accelerate the development and expansion of scale achieved by the focus on quality and efficiency to focus on species change. (B) Basic principles

adhere to structural adjustment. To expand the varieties, improve quality, improve services and promote the steel reduction and accelerate energy conservation, elimination of backward, optimize the layout as the focus of the restructuring, strictly control the production capacity expansion, accelerate the development of new materials and steel producer services, continue to promote mergers and acquisitions, to further enhance the industrial concentration. Adhere to green development. Actively develop, promote the use of high-performance steel, promote two of the depth of integration, speed up resource-saving and environment-friendly iron and steel enterprises, vigorously develop clean production and recycling economy, actively develop and promote the use of energy saving and low-carbon technologies, strengthening waste of resource utilization. Adhere to independent innovation. Independent innovation as an important support for the sustainable development of the iron and steel industry, iron and steel enterprises to strengthen the dominant position of technological innovation, accelerating original innovation, integrated innovation and the introduction of absorption and innovation, improve the technological innovation system, foster independent intellectual property core technology and brand products. Adhere to regional coordination. The overall implementation of the national regional development strategy and the main functional areas of strategy, according to resources and energy, market demand, environmental capacity, industrial base and logistics support capabilities, integrated coastal border and inland, upstream and downstream industries and regional economic development, optimize the industrial layout, to meet Each regional economic and social development needs. Strengthening resources and support. To improve resource security capabilities to secure strategic development of the industry. Make full use of both domestic and foreign markets and resources, and increase cooperation in the development of mineral resources overseas, integration of the domestic iron ore resources development, regulate the domestic iron ore market order to establish a sound security system of iron ore resources strategy. (C) The main objective of the "second five" at the end, the steel industry has made significant progress in restructuring, the basic form a more reasonable distribution of productive forces, resources significantly increased level of protection, the steel volume and the variety and quality to meet the basic needs of national economic development, focusing on iron and steel statistics Enterprise energy saving up to international advanced level, some companies with strong international competitiveness and influence, the initial realization of the steel industry from large to strong changes.

1. Variety and quality. Product quality has improved significantly, increased stability, to meet the needs of key areas and major projects, supporting downstream industries to upgrade and strategic development of new industries. Imports a large amount of high strength and high toughness automotive steel, silicon steel and other varieties to achieve large-scale production, the domestic market share of more than 90%; marine corrosion resistant steel, cryogenic pressure vessel plate, high-speed railway wheels and axles steel, high-pressure boiler tube and other high-end varieties of self-sufficiency rate of 80%. 400 MPa or more the proportion of high strength twisted steel and more than 80%. 2. Energy conservation. Elimination of 400 cubic meters and below blast furnace (not cast iron), 30 tons and below, converter and electric furnace. Key statistics iron and steel enterprises coke dry quenching rate of 95%. Per unit of industrial added value of energy consumption and CO<sub>2</sub> emissions decreased by 18%, focusing on statistical average energy consumption per ton of steel companies is less than 580 kg of standard coal, new water consumption per tonne of steel is less than 4.0 m<sup>3</sup> per tonne of sulfur dioxide emissions fell by 39%, per ton chemical oxygen demand fell 7% over solid waste comprehensive utilization rate of 97%. 3. Industrial layout. Overcapacity blind expansion area is suppressed, built in Zhanjiang, Fangchenggang steel base, solving the "North South transport of steel" problem fundamentally. 4. Resources and support. Basic set of shared interests iron ore, coal and other raw material and fuel security system iron and steel industry, the new foreign iron ore production capacity of 100 million tons. 5. Technological innovation. Key statistics iron and steel enterprises to establish a sound technical innovation system, R & D investment accounted for the main business income of more than 1.5%. Green low-carbon and resource comprehensive utilization of smelting technology innovation to make progress,

efficient production and energy conservation and other common key technologies are widely used. 6. Industrial concentration. Drastically reduce the number of steel companies, China's top 10 steel conglomerate proportion of the country's total steel output by 48.6 percent to around 60 percent. **Box 2 "1025" period development of steel industry the main indicators**

No.	Index	2005 Year	2010 Year	2015 Year	"1025" period the cumulative increase [%]
1	The top ten industries to improve industry concentration ( % )	34.7	48.6	60	11.4 *
2	To reduce energy consumption per unit of industrial added value ( % )				18

3	Reduce carbon dioxide emissions per unit of industrial added value ( % )				18
4	Corporate average energy consumption per ton decreased (kilograms of standard coal)	694	605	≤580	≥4
5	New water consumption per ton steel decreased (m)	8.6	4.1	≤4.0	≥2.4
6	Reduce sulfur dioxide emissions per ton (kg)	2.83	1.63	≤1	≥39
7	Per ton reduced COD (kg)	0.25	0.07	0.065	7
8	Solid waste comprehensive utilization rate ( % )	90	94	≥97	≥3 *
9	Research and experimental development expenses accounted for the main business income share ( % )	0.9	1.1	≥1.5	≥0.5 *

Note: \* for the 2015 year on year in 2010 to increase or decrease in percentage points.

#### Fourth, the key areas and tasks

(a) to accelerate product upgrading and comprehensively promote the steel variety, quality and standards promotion. In order to meet the state's industrial transformation and upgrading needs, iron and steel enterprises to give top priority to product upgrades will improve the enormous quantity of quality steel products, product quality and stability as the most important structural adjustment, improve performance and physical steel products quality, speed standard upgrade, effectively reduce production costs. Further increase hot metal pretreatment, refining ratio, ferroalloy and other materials focusing on the impact on product quality, to clean steel platform construction as the focus, streamline processes, promote the use of a new generation of controlled rolling and cooling and other technology. From the production and use of both work to strengthen the convergence criteria and downstream steel products construction, manufacturing standards, establish and improve product quality inspection system, to further enhance the construction, machinery, light industry, shipbuilding and other industries with the steel product quality, enhance the quality of stability. Increase the promotion and application of high strength steel. Support high-strength steel companies around twisted steel production and product development implementation of technological innovation, improve product quality, security of supply capacity, improve high strength twisted steel production and market distribution system. Amendment steel reinforced concrete standards, research and development of high strength twisted steel connection technology, to meet the high strength rebar production requirements. Combined with the national urban and rural infrastructure construction of major projects, affordable housing projects and key water conservancy projects, in the grasp of Jiangsu, Hebei, Yunnan, application of high strength rebar pilot basis, in the cities promote the use of 400 megabytes Pa, 500 MPa high-strength rebar, promote the upgrading and construction steel reduction applications. Development of key steel products. Encourage powerful enterprises to develop high-end steel varieties of steel, while preventing the development of products of high-grade homogeneity, avoid wasteful investment and disorderly competition in high-end products. **Box 3 downstream industries of steel products are mainly used to upgrade direction**

## **01 Construction**

To adapt to the trend of reduction of steel, hot-rolled steel standard upgrade, focusing on the development 400 MPa and the high strength twisted steel, seismic steel, high strength wire (hard line); in the field of steel construction focused on the promotion of high strength, shock, refractory weathering steel and H -beam applications.

## **02 Machinery Industry**

Focus on the development of high-strength, low-alloy plate and high-strength rods, improve steel product quality and stability.

## **03 Shipbuilding**

Focus on the development of high-quality corrosion aboard the tanker, a large liquefied natural gas ( LNG ) transport ship cryogenic pressure vessel plate and high-strength ship plate.

## **04 Automotive Industry**

Focus on the development 700 MPa or more automobile frames and high-strength, 780 MPa - 1500 MPa high-strength automotive panels, high-strength, ultra high strength steel cord products. Improve product surface quality and quality stability.

## **05 appliance industry**

Focus on the development of high-strength, thin-gauge steel appliances, improve the surface quality plate, flatness, promote the use of passive or fingerprint-resistant galvanized steel membrane processing, chromium-free passivation galvanized plate, color-coated chromium-free electrical steel environmental protection coating panels and other green timber.

## **06 Power Industry**

Focus on the development of supercritical, ultra-supercritical thermal power units with a large-caliber heat, high pressure pipe, nuclear power units with high-performance ferritic and austenitic stainless steel, manganese, nickel, molybdenum alloy steel pipe, low iron loss and high magnetic induction silicon steel, amorphous material.

Promote comprehensive upgrade quality steel. Steel support corporate mergers and acquisitions, and enhance the leading role of TISCO, CITIC Pacific, Northeast Special Steel, Baosteel Special Steel and other steel enterprises, to encourage steel enterprises to take "specialized, sophisticated, special, new" road of development, and vigorously promote Steel technical progress and product upgrading, development of high-performance steel materials required for energy saving green low-carbon steel and equipment manufacturing, aerospace industry. Focus on improving the quality and performance of bearing steel, gear steel, tool steel, stainless steel, high alloy steel products, especially long life. Support to develop steel scrap recycling system and other steel supporting industries. **Box 4 special steel development priorities**

### **01 promote the use of special steel production technology**

High purity special steel smelting technology, electroslag casting, vacuum metallurgy and other special smelting technology, homogenization, fine crystallization solidification technology, precise composition control technology, control molding technology, special molding technology, precision thermal processing technology.

### **02 focus on the development of key steel varieties**

High-speed rail and other major equipment with a high-quality bearing steel, axle steel, wheels, spring steel, ultra-supercritical thermal power group with heat-resistant steel, high-grade stainless steel, automobile and other manufacturing industries with high-grade gear steel, high polished performance, high resistance to corrosion performance of work Die steel, special corrosion-resistant OCTG, aerospace components with special steel, high-end CNC machine tools with special steel, nuclear power units with special steel, construction machinery high strength and hardness alloy steel, high-temperature alloys and special alloys, special alloys steel, silver bright material, precision cold with other deep-processed products .

### **03 Steel Key Technology Development**

Large forging production lines, large size round billet casting, heat treatment of special steel, high-grade special steel profiles and stainless steel seamless pipe, alloy steel wire production line. .

(Ii) further promote energy conservation decomposition of tasks in accordance with the national energy saving indicators of overall requirements and areas, reduce iron and steel enterprises to increase the value of energy consumption, CO2 emissions and water consumption, reduce sulfur dioxide emissions. Full installation of sintering flue gas desulphurization and waste heat recovery unit, denitration encourage reform, basic iron and steel enterprises coke dry quenching of coke, blast all equipped with high efficiency pulverized coal injection and residual heat and pressure recovery, enhance the level converter negative energy steelmaking, further promote the popularization and application of dry dust, regenerative combustion energy-saving technologies. Strengthen metallurgical slag, dust and sludge and other solid waste comprehensive utilization of resources and energy to accelerate the steel industry recycling industry. Promote the integration of the steel and other industries, the development of recycling economy. Sound energy measurement management system, improve the energy management system and carry out energy audits in accordance with law, the implementation of cleaner production audits and cleaner production programs. **Box 5 energy saving technology promotion and application of focus**

### **01 Iron former energy saving technology**

Low-temperature sintering technology, sintering flue gas desulfurization, denitrification technology, pellet sintering technology, grate - rotary kiln pelletizing technology, pellet heat recycling technology, high temperature and high pressure CDQ technology, coal moisture control technology, pound solid coke technology, coke oven,

blast furnace waste plastics technology, efficient blast furnace coal injection technology, blast off the wet blast technology, BF dry dust removal technology, double preheating hot blast furnace technology, the rotary hearth furnace process iron-bearing dust technology.

## **02 steel making, rolling energy saving technology**

Converter gas dry dust technology, converter negative energy steelmaking technology, furnace flue gas heat recovery dust removal technology, regenerative combustion technology, low rolling technology, online heat treatment technology, rolling mill scale integrated use of technology.

## **03 Integrated energy saving technology**

Gas - steam combined cycle power generation technology, raw material yard dust suppression technology, dual-membrane wastewater treatment and reuse technology art, energy management center and Regulation Technique. Metallurgical slag comprehensive utilization of technology, integrated sewage treatment technology, waste heat and pressure utilization technology.

(Iii) strengthening technological innovation and transformation promote technological innovation and improve the steel industry's independent innovation capability. Encourage the development and application of a new generation of recyclable steel process technology, low-grade, Refractory, were associated tailings and mineral resources development and utilization of technology, non-blast furnace ironmaking technology, cost-efficient production of clean steel technology, near-net-shape even casting complete sets of equipment and technology, high-strength, longevity, corrosion product manufacturing technology, and denitration sintering dioxin energy saving advanced technology. Support enterprises to develop strategic emerging industries of steel around the new material. Accelerate the establishment of enterprises as the mainstay, market-oriented research with technological innovation system and mechanism combination. Enhanced metallurgical research institutes, universities and engineering design innovative power units, to encourage large-scale iron and steel enterprises to increase R & D investment, promote the establishment of strategic alliances innovative enterprises, research institutes, universities, engineering unit and downstream users to participate. Improve the iron and steel industry National Engineering Laboratory, Key Laboratory of Engineering and Technology (research) centers, enterprise technology center, technology innovation demonstration enterprises, high-tech industrialization demonstration base and efficient steel technology innovation platform. **Box 6 Key Technology Innovation**

## **01 new technology, new equipment, new technology**

Non-blast furnace ironmaking technology, a new generation of process technology can be recycled steel, steel toughening technology, a new generation of controlled rolling and cooling technology, large-scale furnace equipment set of technologies, processes short strip casting technology industry, coal needle coke industrialization technical, industrial core process controller system ( CCTS ) research



and development .

## **02 new products, new materials technology**

Stainless nuclear power, the nuclear island pressure vessel steel, nuclear power generator rotor forging steel, nuclear power evaporator heat transfer tubes steel production technology; ultra-supercritical thermal power steam pipes, superheater, reheater steel, high piezoelectric rotor steel production technology; super ferrite stainless steel, high nitrogen Nitrogen austenitic stainless steel, super austenitic grade corrosion resistant stainless steel production technologies; oil tanker with a high quality corrosion aboard, the special corrosion-resistant oil well pipe production technology; high-strength and high toughness automotive steel, high-quality bearing steel, gear steel and other production technology.

## **03 new energy saving technologies and resources, energy recycling technology**

Enriched blast furnace coke oven gas injection technology, blast furnace top gas recycling blast oxygen furnace technology, firing off dioxin denitrification technology, emission reduction technology in EAF dioxins, rotary hearth furnace direct reduction vanadium- titanium magnetite technology, comprehensive utilization of mineral resources, the new process technology, blast furnace slag, slag and other sensible heat recovery advantage with technology, associated minerals, Refractory ore application technology.

Accelerate technological innovation, promote the optimization and upgrading of the steel industry. Around the variety and quality, energy saving, clean production, "two of" integration and production safety focus on accelerating the application of new technologies, new processes, new equipment for the company's existing production facilities, equipment, production technology conditions to transform the continuous optimization production processes, upgrade enterprise technology and equipment, improve the comprehensive utilization of resources, enhance new product development capabilities, accelerate the upgrading of products, improve production safety protection. **Box 7 transformation focus**

## **01 varieties of quality**

It focuses on the development of downstream industries to meet key steel products and strategic development of new industries need to improve production quality products, quality and stability . Relying on the strength of business development speed rail steel , high magnetic induction oriented silicon steel , automotive steel high strength and high toughness, high mechanical strength steel , cryogenic pressure vessel plate, shipbuilding industries with corrosion resistant steel, high oil and gas transmission pipeline steel, high Mechanical strength steel, marine engineering steel, oil and gas storage tank steel, power industry and nuclear power with high-pressure boiler tube steel and other sophisticated products and key steel varieties. Construction steel manufacturers comprehensive upgrading, production 400 MPa and the high strength rebar.

## **02 Resource Development**

Low-grade ore mining associated smelting, tailings utilization, scrap processing and so on .

### **03 energy saving**

BOF, blast furnace flue gas purification and dry heat and pressure to optimize utilization of system integration, furnace flue gas waste heat recovery, energy conservation systems integration sintering process optimization, metallurgical slag and other solid waste treatment process I use and heat utilization system integration optimization.

### **04 Technology**

Clean steel production , a new generation of controlled rolling and cooling ( TMCP ) and other technology transformation and process optimization.

### **05 integration of the two**

Steel-line performance monitoring, forecasting, control technological innovation, information integration system transformation, building energy management center.

(Iv) the elimination of backward production capacity , "1025" period is a crucial period to eliminate backward, continue to strictly enforce energy conservation, land and environmental protection laws and regulations, the integrated use of differential pricing, financial incentives, and other legal means accountability assessment, economic instruments and necessary administrative means to increase the degree of elimination of backward production capacity, eliminate backward production company announcement list, the practical implementation of the annual plan to eliminate backward, backward production capacity transfer is prohibited. To the big and small pressure combined with new projects and eliminate backward combine, eliminate backward production capacity according to the regional situation, the priority task is completed approved the elimination of backward regions and better technical transformation projects of enterprises. **Box 8 backward production technology and equipment and products**

### **01 sintering, pellets and coking production technology and equipment**

90 square meters sintering machine, earth sinter, hot sinter process, 8 square meters pellet furnace, indigenous coking (including improved oven), a single furnace capacity of 7.5 ten thousand tons / year or less or no gas, tar recovery Lee used and wastewater treatment of semi-coke (blue charcoal) production plant is less than the required access conditions, carbonization chamber height of 4.3 meters (tamping coke oven 3.8 meters) or less conventional coke oven.

### **02 iron and steel production technology and equipment**

400 cubic meters and below blast furnaces of 200 cubic meters and below professional cast iron pipe factory blast furnace, the production to be steel, carbon steel the frequency and intermediate frequency induction furnace (with the exception of steel ingot casting machine), 30 tons and below refining steel converter, 15,000 KVA and below ( 30 tons and below) steelmaking furnace, 5000 KVA to under (nominal capacity

of 10 tons and below) EAF high alloy steel.

### **03 steel rolling production technology and equipment**

Complex double wire rod mill, Roll mill sheet, row-style bar and section mill, ordinary steel blooming mill and blooming medium mill, hot rolled narrow strip ( 600 mm and below) mill, three-roll mill plate Laut formula , a diameter of 76 mm hot-rolled seamless pipe unit, three-roller type row type wire rod mill (excluding special steel raw production).

### **04 behind the products**

Hot-rolled silicon steel sheet, I threaded bar products, II grade rebar product ( steel by construction industry standards and building code requirements eliminated ) , 25A fasting Gangchuang materials, general relaxation level of steel wire and strand.

Frequency and intermediate frequency induction furnace and other production to be steel, carbon steel and its raw materials for the production of steel production.

(V) optimize the industrial layout combination of mergers and acquisitions and eliminate backward, without increasing the production capacity of the premise, focusing on improving product quality and reduce logistics costs, and consider market demand, transportation, environmental capacity and iron ore, coal, water, electricity Energy security conditions and other resources, to maintain pressure, optimize the industrial layout. Major readjustment project to be energy and water consumption, overall balance environmental capacity, transportation, etc., to complete the binding energy and environmental indicators as a necessary condition for project approval. Bohai Rim, the Yangtze River Delta region in principle no longer layout new steel base. Steel larger area Hebei, Shandong, Jiangsu, Liaoning, Shanxi, through mergers and acquisitions, eliminate backward, reduction in the regional industrial layout adjustment. Hunan, Hubei, Henan, Anhui, Jiangxi and other provinces in the central region without increasing the total steel production capacity conditions, and actively promote structural adjustment and industrial upgrading. Part of the market is relatively independent of the west region, based on resources, undertake industrial transfer, combined with regional differentiation policy, appropriate development of the steel industry. Continue to promote the southeast coast of the steel base. "Twelve Five" period, accelerate the construction of Zhanjiang, Fangchenggang steel base along the coast, completely change the southeast coast of steel supply and demand contradiction, promote Ningde steel base construction, promote economic development in the West Coast. Through the construction of the above-mentioned major layout programs, inhibition of excess steel production capacity of blind expansion area. Iron and steel enterprises in western region has to accelerate industrial upgrading, combined with energy, iron ore, water resources, environment and market development capacity moderation. Xinjiang, Yunnan, Heilongjiang and other border areas, and actively explore the use of the surrounding offshore mineral, energy and markets, development of the steel industry. Full Panxi vanadium and titanium resources and Baotou Rare Earth resources, the development of the iron and steel industry has the characteristics of comprehensive utilization of resources. Uncoordinated and urban development in an orderly restructuring or relocation of steel. Supporting role for economic loss and environmental resources obvious contradiction between steel companies to implement restructuring or relocation and reconstruction. The overall strength of the weak, low technical level of the enterprise should implement restructuring, the development of steel service industry or other industries. Strength, technology, distinctive city mills, in conjunction with the regional iron and steel enterprise mergers and reorganizations, and industrial upgrading, considering the overall urban development plan, the capacity of enterprises, particularly in personnel placement and other factors, the orderly implementation of environmental relocation prohibited by the relocation of the name to expand steel production capacity. "Twelve Five" period according to the conditions are ripe, the support of Guangzhou, Qingdao, Kunming, Hefei, Tangshan (Fengnan), Hangzhou, Wuhu and other cities mills the relocation or restructuring and development, scientific proof

Xining, Fushun, Shijiazhuang, Guiyang and other cities Orientation mills. (F) to enhance resource security capacity strengthening iron ore resources security system. Actively optimize the global allocation of iron ore resources, encourage the development of iron and steel enterprises to establish a mechanism of external resources and benefit sharing of resources the country, the implementation of a diversified investment in the region, in countries and regions and neighboring countries with resources, ordered the establishment of a stable and reliable iron ore stone, chrome ore, manganese ore, coking coal and other raw fuel supply bases and transportation security system. Regulate the domestic iron ore market order, increase domestic exploration efforts iron ore resources, improve the level of comprehensive utilization of tailings recovery. Closure of mines for ecological restoration and rehabilitation to give the necessary support. Encourage the integration of existing domestic mining resources, improve industrial concentration, to ensure orderly development, non-small-large mines open, unauthorized mining. Accelerate the establishment of scrap recycling system to adapt to the requirements of China's steel industry. Relying meet the environmental requirements of domestic steel scrap processing and distribution business, focusing on building a number of scrap processing demonstration base, improve the recovery process and distribution chain, increase scrap processing technology and equipment and scrap product quality. Actively study and formulate preferential policies and measures scrap imports, encourage the establishment of scrap recycling processing and distribution bases overseas. (Vii) to speed up mergers and acquisitions in accordance with market-oriented operation, enterprises as the main guiding principle of the Government to comply with the national steel industry policy and the "steel industry production and management specification conditions" merger and reorganization of enterprises as the main body, combined with the elimination of backward, technological innovation and optimization layout, speed up the pace of merger and reorganization of steel enterprises. Encourage social capital to participate in state-owned steel company merger and restructuring. Focusing on the advantages of large-scale iron and steel enterprises to develop cross-regional, cross-ownership mergers and acquisitions. Give full play to the leading role of Baosteel, Anshan Iron and Steel, Wuhan Iron and Steel, Shougang and other large steel enterprise groups to form 3 to 5 furniture has a strong core competitiveness and international influence of enterprise groups. Anshan Iron and Steel and Panzhihua Iron and Steel focus on promoting sound, Benxi, the three steel companies, steel companies, Baosteel and Guangdong, Wuhan and Yunnan, Guangxi and steel companies, Shougang Jilin, Guizhou, Shanxi and other iron and steel enterprise mergers and reorganizations. Iron and steel enterprises to actively support the regional advantages of mergers and acquisitions, significantly reducing the number of iron and steel enterprises, promotion of regional steel enterprises to accelerate industrial upgrading and improve the level of development, the formation of 6-7 furniture with strong market competitiveness of enterprise groups. Consolidate Hebei Steel, Shandong Iron and Steel restructuring achievements, and actively promote the Tangshan Bohai Steel, Taiyuan Iron and Steel to carry out mergers and acquisitions, corporate mergers and acquisitions steel guide the province Hebei, Jiangsu, Shandong, Shanxi, Henan and Yunnan. Mergers and acquisitions to strengthen coordination and management, to maintain a harmonious and healthy development of the iron and steel enterprises, and avoid vicious competition. Restructuring enterprises should play a synergistic effect, focusing system and mechanism innovation, substantive consolidation in strategic management, planning and development, technological innovation, human, financial, production, supply, etc., reengineering business processes. Reorganization of enterprises to increase the elimination of backward and energy conservation efforts, and effectively protect the legitimate rights and interests of workers. (Viii) to strengthen the steel industry chain extension and collaboration change the service concept, enhance service awareness, the establishment of iron and steel enterprises and downstream users of strategic cooperation mechanisms, the development of steel processing, improve the distribution system, improve product value and corporate services, facilitated by steelmakers shift to service providers. Strengthen government guidance, combined with the promotion of industrial promotion steel new product applications. Encourage steel enterprises to establish a steel service center, the joint development of downstream industries of steel and new materials and downstream products, provide users with comprehensive solutions for steel materials, iron and steel industry and downstream industries to achieve mutual benefits. Positive development consulting services, technology intermediaries, industrial design, e-commerce and other steel services. Active in outsourcing maintenance, warehousing, logistics, and ancillary process

outsourcing oxygen, lime, slag processing, scrap processing and classification. (Ix) to further improve the level of internationalization full use of two markets and two resources, co-ordination "bringing in" and "going out" to strengthen international operations, deepen economic and technological cooperation. To further expand the openness of the steel industry, encourage foreign advanced and well-known iron and steel enterprises equity investment in domestic iron and steel enterprises and projects, investment companies and research centers established in the field of deep processing of steel products, enhance innovation capability and management level of China's iron and steel enterprises. Will invest abroad as a steel plant in China's steel industry "going out" a major strategic study overseas regions and countries for the transfer of the steel industry, the development of incentives and measures to support domestic steel companies and other enterprises to invest in the construction and steel plants abroad economic and trade cooperation zone, foreign steel companies involved in mergers and acquisitions, market marketing network, improve the capacity and level of domestic steel enterprises to participate in international competition, to create a strong international competitive level of international enterprise groups. Development of the market support some border areas, raw materials and energy out of the iron and steel industry. **Fifth, policies and measures** (a) to improve industry management system to establish and improve the monitoring network run iron and steel industry and warning system, strengthening industry information statistics and information dissemination. Strengthen the industry, timely coordinate and solve major problems in the development of the industry appears to reduce the burden on enterprises, strict management of production safety, and promote the smooth operation of the industry development. An active role in strengthening the information exchange, industry self-regulation, corporate rights and other aspects of play associations and other intermediary organizations. (B) to create a fair competitive market environment full play to the market's basic role in allocating resources, strengthen and improve macroeconomic regulation. Specification steel industry production and operation, improve the iron and steel industry market entry and exit mechanisms, and create steel enterprises of various ownership legally equal use of production factors, fair market competition in the market environment, and resolutely put an end to tax evasion, production of fake and shoddy products, serious environmental pollution violations. (C) to strengthen industry standardization work to strengthen standardization in product quality, business management, production management, market development role. Pay close attention to revise and improve behind the development of de facto standards. Iron and steel enterprises to strengthen cooperation with the downstream steel enterprises to jointly promote the steel industry standardization system. Strengthen management and supervision of the standardization organization, to play the main role in the standardization. (D) strengthen macro guidance policy to strengthen the cohesion of taxation, finance, trade, land, energy conservation, environmental protection and production safety policies and steel policy. Timely release technology, advanced product catalog and equipment steel industry guidance, leading the development of advanced productive forces direction the steel industry. Strengthen existing iron and steel enterprise production and management and standardize management, enhanced product quality, energy conservation, environmental protection, equipment level, a reasonable size, production safety and social responsibility constraints and guide enterprises in line with production and management specification batches announcement conditions of enterprises list. Development of the steel industry mergers and acquisitions guidance, guide enterprises to develop local and mergers and acquisitions work. (V) to promote international exchange and cooperation mechanism to improve the exchange of Chinese and foreign steel, the parties to facilitate communication in information technology, management and other aspects. Timely adjustment of product import and export trade policy, actively respond to international trade friction. Establish efficient coordination mechanisms to support enterprises orderly development of offshore resources. Boot internationally competitive steel enterprise groups to participate in overseas domestic mergers and acquisitions and joint ventures. Support large enterprises around the advantages of low-carbon manufacturing technology to carry out international cooperation. (F) promote two of the depth of integration to promote the steel industry, "two of" integration level of development assessment, establish and improve the iron and steel industry and information technology standards work system. Promote enterprises to build production, supply and integration, management and control of convergence, third-synchronization (information flow, capital flow, material flow) of information integration system to support the establishment of trans-regional enterprise

group information geographically distributed sound system, improve the management and control efficiency. Strengthen information security and system security security system, improve the information system security and stability support capabilities. (Vii) improve the planning and implementation of mechanisms for the regional industry to promote mergers and acquisitions department in charge of the development of the steel industry and the region, eliminating the backward, great pressure on small, energy consumption and environmental capacity and other work together, to contact the actual development of the region implement the plan proposed tasks and policy measures. Related enterprises to formulate and present planning phase of convergence plan, co-ordinate the main objectives and priorities of this plan proposed. China Iron and Steel Industry Association and other industry organizations to play the role of bridge and link, reflect the steel industry to implement planned new situations and new problems, put forward policy recommendations.

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