

Ministry of Industry and Information Technology Notice on Issuing the Steel Industry Adjustment and Upgrading Plan (2016–2020)

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To the competent departments of industry and information technology in all provinces, autonomous regions, municipalities directly under the Central Government, cities with independent planning status, and the Xinjiang Production and Construction Corps; relevant industry associations; and relevant central enterprises:

To implement the Thirteenth Five-Year Plan for National Economic and Social Development of the People's Republic of China, Made in China 2025, and the State Council's Opinions on Resolving Excess Capacity and Achieving Sustainable Development in the Steel Industry, and to promote structural adjustment and transformation in the steel sector, our Ministry has formulated the Steel Industry Adjustment and Upgrading Plan (2016–2020). This document is hereby issued to you. Please implement it conscientiously in accordance with local circumstances.

Ministry of Industry and Information Technology

28 October 2016

Steel Industry Adjustment and Upgrading Plan (2016–2020)

The steel industry constitutes a vital foundational sector of the national economy and serves as a cornerstone of the nation. For an extended period, it has provided essential raw material support for national construction, robustly underpinned the development of related industries, propelled China's industrialisation and modernisation, and contributed to improved livelihoods and social progress. The 13th Five-Year Plan period marks the decisive stage for China to build a moderately prosperous society in all respects, the opening phase of the three-step strategy to build a manufacturing powerhouse, and a critical juncture for structural reform in the steel industry. Formulating and implementing the Steel Industry Adjustment and Upgrading Plan (2016-2020) holds significant importance for achieving the transformation and upgrading of the steel industry, establishing China as a global steel powerhouse, and building a manufacturing powerhouse.

The Steel Industry Adjustment and Upgrading Plan (2016-2020) was formulated in accordance with the Outline of the 13th Five-Year Plan for National Economic and Social Development of the People's Republic of China, Made in China 2025, and the State Council's Opinions on Resolving Excess Capacity and Achieving Sustainable Development in the Steel Industry. It serves as the guiding document for China's steel industry development over the next five years.

I. Current Industry Status

During the Twelfth Five-Year Plan period, China established the world's most comprehensive steel industrial system along the entire value chain, supplying the vast majority of steel materials required for national economic development. Product quality has steadily improved, effectively supporting the stable and relatively rapid growth of downstream steel-consuming industries and the national economy. Concurrently, China's steel industry faces increasingly acute challenges including overcapacity, insufficient innovation capabilities, intensifying environmental and energy constraints, and persistent operational difficulties for enterprises.

(1) Development Achievements During the Twelfth Five-Year Plan Period

1. Supporting Rapid Economic Growth. During the Twelfth Five-Year Plan period, driven by demand, China's crude steel output increased from 630 million tonnes in 2010 to 800 million tonnes in 2015, achieving an average annual growth rate of 5%. It reached a historical peak of 820 million tonnes in 2014. Steel products held over 99% of the domestic market share, largely meeting the nation's economic and social development demands. In 2015, the steel industry generated RMB 7.3 trillion in main business revenue and RMB 241.6 billion in profits and taxes, providing crucial support for the nation's rapid and stable economic growth.

2. Diversified Product Range and Enhanced Quality. During the Twelfth Five-Year Plan period, breakthroughs were achieved in the production of critical steel grades. High-end equipment steels, including those for million-kilowatt nuclear power plants, ultra-supercritical thermal power units, high-permeability oriented silicon steel, third-generation high-strength automotive steel, and high-performance offshore platform steel, were successfully industrialised. Building steel, which accounts for a large volume and wide application, underwent an upgrade. The production proportion of high-strength reinforcing bars of 400 MPa (Grade III) and above in key large and medium-sized steel enterprises reached 99.6%, exceeding the '12th Five-Year Plan' target of 'over 80%'. Steel quality significantly improved, with 497 steel products achieving the advanced physical quality standards of foreign countries, accounting for 40% of the total production volume.

3. Technological and equipment standards have substantially advanced. The core equipment of China's steel enterprises has generally reached internationally advanced levels, possessing a range of the world's most modern metallurgical facilities including blast furnaces exceeding 3,000 cubic metres, 5-metre-class wide plate rolling mills, and 2-metre-class hot and cold continuous rolling mills. In key large and medium-sized steel enterprises, blast furnaces of 1,000 cubic metres or larger account for 72% of total ironmaking capacity, while converters (or electric furnaces) of 100 tonnes or larger constitute 65% of total steelmaking capacity. A range of key common technologies—

including high-efficiency, low-cost smelting techniques, new-generation controlled rolling and controlled cooling technologies, and integrated production management systems—are now widely applied. New-generation circular steelmaking processes have been implemented in newly constructed facilities.

4. Significant achievements in energy conservation and emission reduction. During the 12th Five-Year Plan period, 90.89 million tonnes of ironmaking capacity and 94.86 million tonnes of steelmaking capacity were phased out. Energy-saving and emission-reduction technologies, exemplified by dry quenching, dry dust removal, sinter desulphurisation, and energy management centres, are extensively deployed across the industry. Comprehensive energy consumption per tonne of steel (converted to standard coal) at key large and medium-sized enterprises decreased from 605 kilograms to 572 kilograms. Sulphur dioxide emissions per tonne of steel fell from 1.63 kilograms to 0.85 kilograms. emissions of soot and dust per tonne of steel decreased from 1.19 kilograms to 0.81 kilograms, and fresh water consumption per tonne of steel fell from 4.10 tonnes to 3.25 tonnes, achieving the targets set in the 12th Five-Year Plan. Overall energy consumption in the steel sector is showing a downward trend.

5. Industrial layout increasingly optimised. Guided by the Belt and Road Initiative, coordinated development of the Beijing-Tianjin-Hebei region, the Yangtze River Economic Belt strategy, and the national main functional zone planning, China's steel industry layout has progressively improved. The completion and commissioning of major coastal base projects such as Baosteel Zhanjiang Phase I and Wuhan Iron and Steel Fangchenggang have fundamentally altered the industry's historical north-heavy, south-light distribution. Qingdao Iron and Steel, Wuhu Xinxing Cast Iron Pipe, and Guangzhou Iron and Steel have completed relocation and production conversion, while urban steel mills including Shijiazhuang Iron and Steel, Guiyang Iron and Steel, and Hangzhou Iron and Steel are undergoing relocation, transformation, or transition.

6. Integration of industrialisation and informatisation has markedly advanced. During the Twelfth Five-Year Plan period, the application of information technologies deepened across production, enterprise management, logistics distribution, and product sales. The numerical control rate for key production processes exceeded 65%, while enterprise resource planning (ERP) equipment adoption rate surpassed 70%. Pilot smart manufacturing plants emerged, exemplified by Baosteel's intelligent hot continuous rolling workshop and Ansteel's digital metallurgical mine. New models of personalised, flexible product customisation emerged, represented by Nangang's just-in-time (JIT) delivery of customised ship plate sections. Innovative steel trading formats proliferated, giving rise to a cohort of steel e-commerce trading platforms.

7. Resource security has achieved new progress. The interplay between the domestic iron ore price index, spot trading platforms, and futures markets has strengthened, enhancing their international influence and making iron ore transaction pricing more

transparent. Capacity to utilise overseas iron ore resources has grown, with cumulative production capacity from equity mines reaching 120 million tonnes – a 114% increase since the end of the 11th Five-Year Plan period. Domestic iron ore exploration efforts have intensified, with newly identified reserves reaching 13.3 billion tonnes. Utilisation of scrap steel resources has advanced, with cumulative scrap steel consumption during the Twelfth Five-Year Plan period reaching 440 million tonnes – a 14% increase over the Eleventh Five-Year Plan period.

(2) Principal Challenges

1. Intensifying overcapacity issues. During the Twelfth Five-Year Plan period, China's steel production capacity reached approximately 1.13 billion tonnes. Key large and medium-sized enterprises saw debt ratios exceed 70%, while crude steel capacity utilisation rates declined from 79% in 2010 to around 70% in 2015. Steel production capacity has evolved from regional and structural overcapacity to absolute overcapacity. Industry concentration declined rather than increased, with the top ten steel enterprises' market share falling from 49% in 2010 to 34% in 2015, failing to meet the Twelfth Five-Year Plan target of 60%. The entire sector operated under prolonged low profitability, suffering severe losses in 2015.

2. Low level of independent innovation. The steel sector has long underinvested in independent innovation, with enterprise R&D expenditure accounting for merely 1% of main business revenue. This falls short of the Twelfth Five-Year Plan target of 'over 1.5%' and remains significantly below the 2.5%+ level seen in developed nations. Consequently, innovation-led development capacity remains weak, with the industry yet to transcend the traditional model of digesting, absorbing, and imitative innovation. Innovation platforms remain fragmented, with redundant allocation of resources such as funding, equipment, and talent. Collaboration between industry, academia, research institutes, and end-users is inadequate, necessitating continued reliance on imports for certain critical high-end steel products.

3. Intensifying resource and environmental constraints. Equipment standards within China's steel sector vary considerably, with historical underinvestment in energy conservation and environmental protection. Many enterprises have yet to achieve comprehensive and stable compliance with pollutant discharge standards, requiring further upgrades to energy-saving and environmental protection facilities. Although energy consumption and pollutant emissions per tonne of steel have declined annually, this has not offset the overall increase in energy consumption and pollutants resulting from rising steel output. Particularly in steel-producing clusters such as the Beijing-Tianjin-Hebei region and the Yangtze River Delta, environmental carrying capacity has reached its limits, making green and sustainable development imperative.

4. Corporate operations urgently require standardisation. China's steel enterprises vary greatly in quality, with illegal production capacities violating environmental, quality, safety, and land regulations still existing, severely disrupting market order. Inadequate regulatory penalties and mechanisms for phasing out backward capacities make it difficult for inefficient production and zombie enterprises to exit through market mechanisms. Poor industry self-discipline and disorderly market competition exacerbate vicious market competition.

II. Current Landscape

During the 13th Five-Year Plan period, China's economic development entered a new normal characterised by shifting growth rates, structural optimisation, and transitioning drivers, marking a critical phase in advancing supply-side structural reforms. The steel industry faces both significant opportunities—including deepening reforms, expanding openness, structural adjustments, and upgrading demand—and severe challenges such as declining demand, overcapacity, and insufficient effective supply.

(1) Overall Situation

A new wave of technological revolution and industrial transformation is gathering momentum. Developing nations are accelerating their planning and strategic positioning, actively embracing industrial and capital transfers. The implementation of the Belt and Road Initiative presents market opportunities for China's steel sector to engage extensively in international cooperation. China possesses robust material foundations, abundant human capital, vast market potential, and substantial development prospects. The transformation of its economic development model is accelerating, with new growth drivers emerging. The fundamental characteristics of sustained long-term economic growth remain unchanged: strong resilience, ample potential, and considerable room for manoeuvre. The solid foundations and conditions supporting sustained economic growth persist. Consumption upgrades, the synchronous advancement of industrialisation, informatisation, urbanisation, and agricultural modernisation, alongside infrastructure expansion, continue to broaden the demand space for steel products. The nation's drive to become a manufacturing powerhouse and an innovation-driven country is at a critical juncture, driving continuous upgrades in demand for steel product variety, quality, and service. The transformation of government functions, gradually reducing state intervention in microeconomic affairs, will fully leverage the decisive role of the market in resource allocation, stimulate market vitality, and open new development prospects for China's steel industry.

Concurrently, the global economy is experiencing a tortuous recovery amid profound adjustments. The deep-seated impacts of the international financial crisis will persist for an extended period. Sluggish growth in global crude steel demand, coupled with

intensifying overcapacity, has fuelled the resurgence of various forms of trade protectionism, rendering international competition more intense and complex. Significant fluctuations in the supply and pricing of global raw materials, such as iron ore, have heightened uncertainties in the steel industry's operations. China's economy is transitioning from an investment-driven, scale-expansion model towards one focused on enhancing quality and efficiency, optimising structure, and upgrading industries. In the coming years, the coexistence of sluggish aggregate demand and overcapacity is unlikely to undergo fundamental change. Economic growth will not follow the previous pattern of sustained upward momentum and consecutive years of high growth upon recovery. Overcapacity can no longer be absorbed through the sustained, high-speed economic growth seen historically. The prominent contradictions and challenges confronting economic development are structural, not cyclical. They represent deep-seated, long-term contradictions shaped by shifts in development conditions such as environmental and resource constraints. These cannot be resolved through short-term stimulus measures yielding V-shaped or U-shaped rebounds; instead, the economy will undergo an L-shaped development phase. The industry's advancement towards mid-to-high-end levels will create urgent demands for enhancing the effective supply capacity of the steel sector. Social development and ecological civilisation construction will impose new requirements on the steel industry regarding energy conservation, emission reduction, and quality improvement. Enterprises will place greater expectations on improving fair competition, and the survival-of-the-fittest market environment and mechanisms. It is now imperative to advance supply-side structural reform in the steel industry, focusing on resolving excess capacity and enabling the sector to overcome difficulties and achieve sustainable development.

(II) Demand Forecast

Based on the target of an average annual GDP growth rate exceeding 6.5% as outlined in the Outline of the 13th Five-Year Plan for National Economic and Social Development of the People's Republic of China, and considering factors such as the range of economic growth rates, changes in downstream industrial demand, regional development balance, and steel imports and exports, combined with the overall situation facing the steel industry, this plan employs a comprehensive approach. Methods including the steel consumption coefficient method, regional consumption balance method, and industry consumption survey method are used to forecast crude steel demand and production.

Internationally, crude steel consumption and production are projected to remain largely stable at approximately 1.6 billion tonnes by 2020. In the medium to long term, as the global economy gradually recovers from the crisis, developing nations will experience steady and modest growth in crude steel consumption driven by industrialisation and urbanisation.

Domestically, during the 13th Five-Year Plan period, both the intensity and total volume of China's steel consumption will follow a dual-decline trajectory. Production and consumption will enter a phase of peak-arc descent, exhibiting a trend of fluctuating yet gradual decline. Following the peak of 760 million tonnes reached in 2013, domestic crude steel consumption is projected to decrease to 650-700 million tonnes by 2020, with production expected to range between 750-800 million tonnes.

III. Guiding Principles, Fundamental Principles and Objectives

(I) Guiding Principles

Fully implement the guiding principles of the 18th CPC National Congress and the Third, Fourth and Fifth Plenary Sessions of the 18th CPC Central Committee. Uphold the development concepts of innovation, coordination, green development, openness and sharing. Actively adapt to, grasp and lead the new normal of economic development. Give full play to the decisive role of the market in resource allocation and better leverage the role of government. Focus on advancing supply-side structural reform in the steel industry. With the goal of comprehensively enhancing the integrated competitiveness of the steel industry, the primary focus shall be on resolving excess capacity. This will promote innovative development, uphold green development, advance intelligent manufacturing, and improve the quality and efficiency of China's steel industry.

(2) Fundamental Principles

1. Adhere to structural adjustment. With resolving excess capacity as the core, actively and prudently implement capacity reduction. Focus on intelligent manufacturing to advance industrial transformation and upgrading. Utilise mergers and reorganisations as a means to deepen coordinated regional development.
2. Adhere to innovation-driven development. Strengthen the role of enterprises as the main drivers of innovation, improve the collaborative innovation system involving industry, academia, research institutes and end-users, stimulate innovation vitality and creativity, and comprehensively lead the industry's transformation and upgrading by tackling the challenges in steel material R&D.
3. Adhere to green development. With the objectives of reducing energy consumption and pollutant emissions, comprehensively implement energy-saving and emission-reduction upgrades and transformations, continuously optimise the structure of raw materials and fuels, vigorously develop a circular economy, actively research, develop and promote green steel products throughout their entire life cycle, and establish a new pattern of harmonious development between steel manufacturing and society.
4. Prioritise quality. Strengthen enterprises' primary responsibility for quality, focusing on enhancing the stability, reliability, and durability of physical product quality. Intensify

the application of quality improvement management techniques, increase efforts in brand cultivation, and achieve a shift towards quality-driven efficiency.

5. Pursue open development. Use openness to drive reform, development, and innovation. Fully leverage both domestic and international markets and resources, adhere to the principle of 'importing and exporting the best', actively attract foreign investment and advanced technologies, and comprehensively advance international steel capacity cooperation.

(III) Objectives

By 2020, the supply-side structural reform of the steel industry shall achieve significant progress, fundamentally resolving the industry's difficulties. The contradiction of overcapacity shall be effectively alleviated, with a net reduction of 100–150 million tonnes in crude steel capacity. Innovation-driven capabilities shall be markedly enhanced, establishing national-level industry innovation platforms and a cohort of internationally leading innovative enterprises. Energy consumption and pollutant emissions shall comprehensively and stably meet standards, with both totals decreasing. A group of intelligent steel manufacturing plants and smart mines shall be cultivated and formed. Product quality stability and reliability will be substantially improved, ensuring effective supply of key steel grades. By 2025, the steel industry's supply-side structural reform will achieve remarkable results, with markedly enhanced independent innovation capabilities and significantly improved effective supply levels. This will foster an optimised organisational structure, rational regional distribution, advanced technology, outstanding quality and branding, strong economic performance, and robust competitiveness, enabling China's steel industry to make a historic leap from size to strength.

Box 1 Key Indicators for Adjustment and Upgrading of the Steel Industry during the 13th Five-Year Plan Period

No.

Indicator

2015

2020

Cumulative Increase during 13th Five-Year Plan

1

Industrial value-added growth rate (%)

5.4

Around 6.0 (annual average growth rate)

/

2

Crude steel production capacity (billion tonnes)

11.3

Below 10

Reduction of 1-1.5

3

Capacity Utilisation Rate (%)

70

80

10

percentage points

4

Industry Concentration (Top 10 Enterprises) (%)

34.2

60

Over 25 percentage points

5

Smart Manufacturing Demonstration Sites (Number)

2

10

8

6

Labour productivity in core operations (tonnes of steel/employee·year)

514

1000

or above

486 or above

7

Total energy consumption

/

/

Decrease by 10% or more

8

Comprehensive energy consumption per tonne of steel (kg standard coal equivalent)

572

≤ 560

Reduction of 12% or more

9

Fresh water consumption per tonne of steel (m³)

3.25

≤ 3.2

Reduced by 0.05 or more

10

Total pollutant emissions

/

/

Reduced by 15% or more

11

Sulphur dioxide emissions per tonne of steel (kg)

0.85

≤ 0.68

Reduced by 0.17 or more

12

Comprehensive utilisation rate of steel smelting slag (%)

79

90 or above

11 percentage points or more

13

R&D expenditure as a proportion of main business revenue (%)

1.0

≥1.5

0.5 percentage points or more

14

Steel structure steel as a proportion of construction steel (%)

10

≥25

15 percentage points or more

15

Key Indicators for Industrial-IT Integration

Proportion of Large Enterprises Achieving Comprehensive Integration (%)

33

≥44

11 percentage points or more

Proportion of Large Enterprises Achieving Control Integration (%)

29

≥42

13 percentage points or more

Proportion of Large Enterprises Achieving Production-Supply-Sales Integration (%)

43

≥50

7 percentage points or more

IV. Key Tasks

(I) Proactively and Prudently Address Overcapacity and Deleveraging

Adhere to the principles of market-driven pressure, enterprise-led action, local organisation, and central government support. Focus on key areas, operate within legal and regulatory frameworks, and comprehensively employ market mechanisms, economic measures, and legal approaches to actively and prudently resolve excess capacity, dispose of zombie enterprises, and reduce corporate debt-to-asset ratios.

Strictly prohibit the addition of new steel production capacity. Halt all investment projects aimed at expanding steel production scale, redirecting investment priorities towards innovation capabilities, green development, intelligent manufacturing, quality and branding, product diversification, extended services, and capacity cooperation. All regions must refrain from any net increase in steel smelting capacity. Structural adjustment and transformation projects must strictly implement capacity reduction replacement. This requirement also applies to proposed and ongoing steel projects already approved nationally or filed locally. In environmentally sensitive regions such as the Beijing-Tianjin-Hebei area, the Yangtze River Delta, and the Pearl River Delta, capacity reduction replacement shall be implemented at a ratio of no less than 1:1.25. Capacity eliminated prior to 2015 (inclusive), backward capacity, capacity included in reduction targets, and capacity withdrawn with subsidy funds or policy support shall not be used for capacity replacement. Enterprises and equipment included in capacity replacement plans must be publicly disclosed on local government websites for social oversight.

Capacity reduction shall be carried out in strict compliance with laws and regulations. Environmental protection, energy consumption, quality, safety, and technical laws, regulations, and industrial policies must be rigorously enforced. Facilities failing to meet standards shall be shut down and withdrawn from operation in accordance with legal procedures. By 2016, all blast furnaces with a capacity of 400 cubic metres or less (excluding foundry blast furnaces meeting the 'Certification Standards for Foundry Pig Iron Enterprises') shall be fully shut down and dismantled. along with outdated production equipment such as steelmaking converters of 30 tonnes or less and electric furnaces of 30 tonnes or less (excluding those for high-alloy steel). Comprehensively eliminate the production capacity of medium-frequency and power-frequency furnaces used to produce substandard steel. Fully leverage the role of public oversight and reporting, actively utilise technical means such as satellite monitoring, and comprehensively carry out special operations including joint law enforcement inspections and the clearance of illegal construction projects. Focus on investigating

steel production enterprises and projects not included in the standardised management of the steel industry.

Accelerate the exit of zombie enterprises. Prioritise the complete withdrawal of enterprises that have sustained consecutive annual losses, are insolvent, have no prospect of recovery, and survive solely through bank loan renewals as the key to resolving excess capacity. Localities shall identify zombie enterprises and inefficient capacity based on their specific circumstances, cease fiscal subsidies and bank loans, properly resettle employees, and facilitate their exit from the market. Support local authorities and enterprises in exiting inefficient capacity through voluntary reductions, mergers and acquisitions, restructuring, and transformation. Leverage incentive policies such as special subsidy funds to encourage regions with substantial capacity to proactively reduce steel production.

Reduce corporate debt-to-asset ratios. Industries and enterprises must prioritise quality and efficiency, employing various means to substantially reduce debt-to-asset ratios. Enterprises with high debt ratios should make debt reduction a key task. For approved or filed projects involving structural adjustments or urban steel mill relocations—whether planned or under construction—feasibility must be reassessed against current conditions, with a focus on reduced-scale development. Projects with poor economic returns or capital ratios below 40% must be resolutely halted to prevent the emergence of new highly indebted enterprises. Enterprises facing insolvency or debt defaults must expedite resolution through bankruptcy reorganisations, debt restructurings, or liquidations. Strict measures shall be taken against enterprises evading or defaulting on bank debts, with creditors' lawful rights and interests protected in accordance with the law. Debt-to-equity swaps must adhere to market-oriented and rule-of-law principles, with market entities exercising autonomous choice. Zombie enterprises are strictly prohibited from being designated as targets for debt-to-equity swaps.

Box 2 Special Campaign to Resolve Excess Capacity

1 Joint Law Enforcement Inspection Campaign

(1) Environmental Protection Enforcement Campaign

Organise comprehensive environmental inspections of the steel industry, conduct specialised environmental law enforcement checks, systematically screen and investigate each case, and legally investigate and punish environmental violations. Steel enterprises exceeding emission standards or total quotas shall be penalised in accordance with the law, subject to daily consecutive fines, and ordered to implement measures such as production restrictions or suspension for rectification. Where

enterprises refuse to cease production after being ordered to suspend operations for rectification, resume production without authorisation, or repeat the same violations after the suspension order is lifted, they shall be reported to the competent people's government with approval authority for closure or cessation of business in accordance with the law.

(2) Quality Enforcement Special Action

Strictly enforce the Product Quality Law. For manufacturers whose products are legally deemed substandard in supervisory sampling or inspections organised by quality and technical supervision departments, the local quality and technical supervision department shall order rectification within a specified timeframe. Should rectification fail to occur within six months or the re-inspection remain non-compliant, the production licence shall be revoked or cancelled according to prescribed procedures. Strictly investigate and penalise producers of substandard steel, including those using medium-frequency furnaces or power-frequency furnaces for steelmaking. Such cases shall be promptly reported to local governments and relevant departments, with measures including power disconnection, water supply cessation, and loan suspension to be implemented in accordance with the law for resolute elimination.

(3) Special Energy Consumption Enforcement Campaign

A special energy consumption enforcement campaign shall be conducted, strictly implementing the Energy Conservation Law. Production capacities failing to meet mandatory standards such as the 'Energy Consumption Limits per Unit Product for Key Processes in Crude Steel Production' shall be required to rectify within a specified timeframe. Those failing to rectify by the deadline or failing to meet standards after rectification shall be shut down and withdrawn from the market in accordance with the law.

(4) Specialised Safety Enforcement Campaign

Organise comprehensive inspections of steel enterprises to ascertain their safety production status. Strictly enforce the Work Safety Law. Enterprises failing to achieve Level 3 or higher safety production standardisation, or whose safety conditions do not meet the requirements of the Ironmaking Safety Regulations, Steel Making Safety Regulations, or the Industrial Enterprise Gas Safety Regulations, shall be immediately ordered to cease production for rectification. Enterprises failing to rectify within six months or remaining non-compliant after rectification shall be shut down and withdrawn from the market by county-level or higher safety regulatory authorities, upon submission to the relevant people's government in accordance with legal procedures.

2 Special Campaign to Rectify Illegal Construction Projects

Through specialised concentrated inspections, targeted spot checks, and unannounced visits, verify whether smelting projects have completed approval and filing procedures, and whether capacity replacement and public notification requirements have been fulfilled. Prohibit the filing of new steel production capacity projects under any pretext or method. Based on inspection findings, illegally constructed projects shall cease production for rectification; ongoing projects shall be halted immediately and publicly notified nationwide. Depending on severity, relevant enterprises and personnel shall face accountability, with joint disciplinary measures applied in areas including financing credit, bond issuance, and railway transport capacity.

3 Special Campaign to Phase Out Obsolete Production Equipment

In accordance with the Industrial Structure Adjustment Guidance Catalogue (2011 Edition) (Revised) and relevant regulations, a series of key tasks—including baseline surveys, implementation, inspection and acceptance, and assessment—shall be undertaken to comprehensively shut down and dismantle obsolete production equipment. This includes blast furnaces of 400 cubic metres or less, steelmaking converters of 30 tonnes or less, and electric furnaces (excluding those for high-alloy steel).

(2) Refining the Steel Industry Layout Adjustment Framework

Taking into account market demand, transportation, environmental capacity, and resource/energy support conditions, deepen regional layout reduction and adjustment in conjunction with resolving excess capacity. Coastal regions must shift away from the practice of indiscriminately relocating steel plants to coastal areas. No new coastal bases shall be established; instead, existing coastal bases shall be developed in clusters to enhance quality and efficiency. Inland regions must adhere to dual constraints of regional market capacity and resource/energy support, resolutely phasing out uncompetitive enterprises while leveraging existing leading enterprises to implement consolidation and restructuring for sustainable development.

In the Beijing-Tianjin-Hebei region and its periphery, Yangtze River Delta: Building upon existing coastal and riverine layouts, focus on alleviating regional environmental pressures. Leveraging leading enterprises, significantly reduce excess steel capacity through reduction-based restructuring and optimisation of inland enterprises. Key steel-producing areas within the Beijing-Tianjin-Hebei economic zone should study the overall withdrawal and replacement of urban steel mills based on existing coastal steel bases, achieving reduced-scale development within the region. **Central and Western**

Regions, Northeast Old Industrial Bases: Implement regional consolidation by leveraging relatively strong enterprises within the area, reducing the number of enterprises and cutting excess steel capacity. **Southeast Coastal Regions:** Focusing on rectifying the national steel distribution imbalance ('heavy north, light south'), establish world-class coastal steel production bases of exceptional quality in locations such as Zhanjiang and Fangchenggang.

Urban Steelworks: Existing steelworks within central cities must serve and align with urban development needs. Options including closure and conversion, relocation, or coordinated urban development should be determined by comprehensively balancing factors such as the city's overall positioning, environmental capacity, land resource value, and tax contribution. Urban steelworks that fail to meet city development requirements, present significant conversion challenges, or lack competitiveness must undergo transformation and exit the steel industry. Urban steel plants aligned with their city's development plans shall implement a 'green development, industry-city integration' strategy. Ongoing urban steel plant relocation projects must adhere to capacity reduction principles, rigorously implement capacity reduction replacement, and publicly disclose details on government websites.

(3) Enhancing Independent Innovation Capabilities

Focusing on low-energy smelting technologies, energy-efficient rolling techniques, full-process quality inspection, forecasting and diagnostic technologies, intelligent steel process control systems, and high-end equipment steel. Support the full integration of existing scientific resources, leverage enterprises as the primary drivers of innovation, design units as bridges and promoters, and universities/research institutes as foundational pioneers. Implement an industry-academia-research-application innovation model. Through market-oriented mechanisms and diversified cooperation, establish national-level industry innovation platforms in steel to enhance original innovation and autonomous integrated innovation capabilities. Advance industrialisation of foundational and key common technologies, achieving landmark innovations annually. Promote the establishment of national technological innovation demonstration steel enterprises and support the development of national new industrialisation demonstration bases centred on steel as the leading industry. Encourage collaborative innovation between leading steel enterprises, research institutions, design units, and downstream users, increase innovation investment, and achieve a new phase of innovation-led development.

Column 3 Key Technology Development Priorities

1 Key Production Process Technologies

Comprehensive beneficiation techniques for complex, difficult-to-process ores; low-energy consumption blast furnace smelting technology; high-efficiency green electric

furnace smelting technology; high-efficiency, low-cost clean steel smelting technology; direct casting-to-rolling technology; ultra-rapid cooling technology; energy-saving, high-efficiency rolling and subsequent treatment technologies.

2 Key Product Quality Technologies

Fully continuous automatic tracking surface defect detection technology, large-section cleanliness inspection technology for continuous cast billets, online microstructure-property detection and precise prediction technology, integrated process quality data and comprehensive online quality evaluation technology, process quality parameter acquisition, storage, and traceability analysis technology, interactive product quality analysis and anomaly diagnosis technology.

3 Key Technologies for Intelligent Manufacturing

Expert systems for intelligent control of critical process equipment; intelligent robotics application technology; real-time multi-objective optimisation technology for manufacturing process operations; big data systems for intelligent fault diagnosis and maintenance of key process equipment; intelligent optimisation technology for steel industry supply chains; information integration technology for collaborative manufacturing enterprises.

(IV) Enhancing the Level of Effective Steel Supply

Promote service-oriented manufacturing. Fully establish a user-centric product philosophy and service awareness, driving the transformation of steel enterprises from manufacturers to service providers. Encourage steel enterprises to proactively engage with downstream steel-consuming enterprises, centring on user needs. Combining early-stage R&D involvement with late-stage continuous tracking and improvement (EVI) models, innovate technical support and after-sales services. Improve logistics distribution systems to provide a range of extended services, including material recommendations and subsequent processing and usage solutions, thereby creating and leading high-end demand. Support enterprises in prioritising R&D and industrialisation of high-end steel grades required for major technical equipment in sectors including high-tech vessels, offshore engineering equipment, advanced rail transit, power generation, aerospace, and machinery. Aim to achieve breakthroughs in 3-4 key grades annually, continuously increasing effective supply.

Column 4 Major Projects for Key Varieties

1 Marine Engineering Equipment and High-Tech Vessels

Steel for high-energy welding, thick plates with high crack-resistance properties, steel for vessels operating in extreme cold and cryogenic environments, high-manganese corrosion-resistant steel, Invar steel for LNG carriers, steel for offshore platform pile leg structures and 配套welding consumables.

2 Advanced Rail Transit Equipment Sector

Steel for high-speed rail wheelsets, high-strength rails for heavy-duty high-speed applications, weather-resistant and corrosion-resistant steel for vehicle bodies.

3 Energy-Efficient and New Energy Vehicles Sector

Next-generation ultra-high-strength automotive steel, coated sheet for hot stamping, ultra-high-strength cord steel, etc.

4 Power Generation Equipment Sector

Heat-resistant steels for ultra-supercritical thermal power units; steels for large forgings and blades in turbines and generators; steels for pressurised water reactor internal components in nuclear power plants; steels for large shaft forgings and spiral casings in hydroelectric units.

5 Critical Basic Components Sector

High-performance bearing steel, gear steel, and spring steel for advanced manufacturing; ultra-high-strength steel for drive shafts; high-strength, high-toughness non-tempered steel; steel for high-strength fasteners exceeding grade 12.9.

6 Other High-Quality Specialty Steels

High-quality cold heading steel, specialised steel for machine tool ball screws, free-cutting tool steel for complex cutting tools, ultra-high-strength stainless steel for specialised equipment, corrosion-resistant steel for energy-saving, environmental protection, and chemical processing equipment, high-efficiency, low-loss, and special-purpose silicon steel, large-section, high-uniformity, high-performance mould steel, high-performance cold-rolling mill roll steel, high-temperature alloys, and rolled composite plates.

Elevating Quality Standards. Foster a quality consciousness centred on stability.

Support enterprises in adopting quality enhancement technologies such as clean steel production, precision rolling, and integrated product quality management systems.

Utilise information technology, intelligent equipment, and methods to minimise human influence on quality control, thereby improving the stability, reliability, and durability of steel products.

Strengthen brand development. Establish a quality-centric brand system. Support steel enterprises in formulating brand management systems, enhancing intrinsic capabilities throughout R&D innovation, production manufacturing, quality management, and marketing services to solidify brand development foundations. Conduct quality benchmarking initiatives, utilising the metallurgical product physical quality certification programme as a platform to annually announce high-quality products and premium quality branded products meeting international standards, thereby intensifying brand cultivation efforts.

(V) Advancing Intelligent Manufacturing

Consolidate the foundations for intelligent manufacturing. Accelerate the integrated development of information technology, digitalisation, and manufacturing techniques in steel production, positioning intelligent manufacturing as the primary focus for deepening the integration of informatisation and industrialisation. Support steel enterprises in refining their four-tier information systems covering foundational automation, production process control, manufacturing execution, and enterprise management. Assist qualified steel enterprises in establishing big data platforms, promoting the digitalisation and networking of knowledge accumulation across all manufacturing processes. Support steel enterprises in implementing robotic replacement projects for positions involving harsh environments, high safety risks, and high operational consistency. Comprehensively advance the implementation and assessment of integrated IT-industrialisation management systems within steel enterprises, and promote standardisation efforts in intelligent steel manufacturing.

Comprehensively advance intelligent manufacturing. Promote new intelligent manufacturing models across the industry, summarising replicable and scalable best practices. Prioritise pilot demonstrations of four key intelligent manufacturing models: process-oriented intelligent manufacturing, networked collaborative manufacturing, mass customisation, and remote operation and maintenance. Enhance enterprises' capabilities in efficient product development, stable quality control, flexible production organisation, and comprehensive cost management. Fully leverage 'Internet Plus' initiatives, encouraging leading enterprises to explore establishing an industrial internet platform for the steel sector. This platform should aggregate resources from steel producers, downstream users, logistics providers, traders, research institutions, and financial organisations for collaborative operations and efficiency gains. Support qualified steel enterprises in meeting diverse, small-batch customisation demands across key industries such as automotive, shipbuilding, and home appliances, based on internet-based orders. Encourage leading steel enterprises to establish intelligent inspection systems for critical equipment, developing new remote operation and maintenance services such as fault prediction and automated diagnostic systems.

Summarise pilot demonstration experiences and models to formulate a roadmap for intelligent steel manufacturing.

(VI) Advancing Green Manufacturing

Implement green transformation and upgrading. Accelerate the promotion and comprehensive adoption of advanced, applicable, mature and reliable energy-saving and environmentally friendly process technologies and equipment. Fully complete upgrades such as sinter desulphurisation, dry quenching and blast furnace residual pressure recovery, while phasing out high-water-consumption processes and equipment including wet dust removal for blast furnace gas and traditional wet dust removal for converter primary flue gas. Establish comprehensive online environmental monitoring systems for key pollutant emissions across enterprise premises. Develop and promote advanced energy-saving and environmental technologies, launching specialised demonstration initiatives for challenging areas such as coke oven and sintering flue gas desulphurisation and denitrification, and advanced desalination for comprehensive wastewater reuse. In environmentally sensitive areas and steel production clusters with limited environmental carrying capacity, expedite clean production upgrades including enclosed raw material storage yards and advanced sintering flue gas purification. Within steel industry clusters, actively explore and implement centralised rail freight transport schemes, systematically optimise logistics systems, and reduce fugitive emissions during logistics operations.

Box 5 Key Focus Areas for Green Transformation and Upgrading

1 Energy-saving and emission-reduction technologies for comprehensive promotion

High-efficiency dust removal in sintering systems; comprehensive management of fugitive emissions from iron-making yards; dry (semi-dry) or novel wet dust removal for converter gas; secondary and tertiary dust removal for converters (electric furnaces); sinter waste heat recovery; energy management centres; efficient treatment and deep comprehensive utilisation of steel slag; integrated wastewater recycling and reuse.

2 Key Promoted Energy-Saving and Emission-Reduction Technologies

Sheltering and warehousing of raw material yards, sintering flue gas recirculation, integrated treatment of multiple pollutants in sintering flue gas, high-temperature high-pressure dry quenching, ultra-high-pressure gas boiler power generation, recovery and utilisation of medium-low temperature flue gas waste heat, energy optimisation control technologies, urban reclaimed water reuse, comprehensive utilisation of iron- and zinc-containing dust sludge, etc.

3 Demonstration and Promotion of Energy Conservation and Emission Reduction Technologies

Coke oven flue gas desulphurisation and denitrification; sintering and electric furnace dioxin prevention technologies; coking (cold rolling) wastewater treatment, reuse and 'zero discharge'; sensible heat recovery and utilisation in vertical shaft sintering furnaces; reduction and disposal of brine; efficient utilisation of waste heat from coke oven gas primary cooling systems; utilisation of renewable and clean energy sources.

4 Frontier Reserve Energy-Saving and Emission-Reduction Technologies

Slag waste heat recovery and resource utilisation, new composite iron-coke technologies, integrated optimisation of material flows, energy flows and information flows (big data) in steel plants, carbon dioxide capture, utilisation and storage technologies, etc.

Accelerate the development of a circular economy. Promote the standardised and scaled development of the comprehensive resource utilisation industry, vigorously advancing the circular economy. With the accumulation of scrap steel resources in China, prioritise development opportunities for short-process electric arc furnace steelmaking using scrap steel as raw material, guided by green and circular principles. Encourage industrial coupling, establish green industrial parks, and promote integrated development between steel and building materials, power, chemical industries, and urban areas, achieving the triple functions of steel manufacturing, energy conversion, and waste absorption. Accelerate the development of resource and energy recovery industries within the steel sector. Enhance the comprehensive utilisation of solid waste such as metallurgical slag and dust sludge. Expedite the construction of scrap steel processing and distribution systems. Promote integrated technologies for the combined regeneration and reuse of municipal reclaimed water and industrial wastewater from steel production.

Guide green consumption. Accelerate the promotion and application of steel structure buildings. Support steel enterprises in actively participating in the construction of steel structure demonstration industrial bases. develop customised and specialised steel products aligned with structural steel component requirements, promote 390 MPa and higher high-strength structural steels, research fire-resistant and corrosion-resistant high-performance structural steels, explore production of highly standardised structural steel components, and establish centralised distribution centres for structural steel components. Aim to increase structural steel consumption from the current 50 million tonnes to over 100 million tonnes. Continue to advance the application of high-strength reinforcing bars, comprehensively popularise the use of 400 MPa (Grade III) high-strength reinforcing bars, promote 500 MPa and above grades, and explore establishing processing and distribution centres for reinforcing bars. Align

with initiatives such as automotive lightweighting, high-tech shipbuilding, and ultra-efficient motor deployment to encourage steel enterprises to strengthen collaboration with downstream industries, developing high-quality steels featuring high strength, corrosion resistance, and extended service life.

Box 6 Major Projects for Green Transformation and Upgrading

1 Covering and Warehousing of Raw Material Yards

Implement covering and warehousing of raw material yards to address dust emissions, ensuring particulate matter concentrations in the ambient air of enterprises are below 1 mg/m³.

2 Flue Gas Desulphurisation and Denitrification Upgrades

Implement coke oven flue gas desulphurisation and denitrification upgrades, achieving emission concentrations of ≤ 30 mg/m³ for sulphur dioxide, ≤ 150 mg/m³ for nitrogen oxides, and ≤ 15 mg/m³ for particulate matter.

3 Integrated Multi-Pollutant Control of Flue Gases

Implemented integrated multi-pollutant control for sintering (pelletising) flue gas, achieving desulphurisation efficiency exceeding 98% and denitrification efficiency exceeding 60%. Emission concentrations of sulphur dioxide, nitrogen oxides, and dioxins were maintained at ≤ 180 mg/m³, ≤ 300 mg/m³, and ≤ 0.5 ng-TEQ/m³ respectively. Establish a comprehensive utilisation production line for desulphurisation by-products, achieving full utilisation of all by-products.

4 Efficient Steel Slag Treatment and Deep Comprehensive Utilisation

Establish a complete steel slag treatment line encompassing slag processing, magnetic separation screening, and tailings application. This effectively extracts iron-containing materials from steel slag, reduces metallic iron content in tailings, and achieves near-total utilisation.

5 Energy Management Centre (Upgraded Version)

Implement upgrades to the Energy Management Centre, equipping it with short-term forecasting, prediction, and early warning capabilities for energy media including electricity, gas, steam, and oxygen. Achieve intelligent regulation of energy media and comprehensive assessment of corporate energy efficiency.

(VII) Promoting Mergers and Restructuring

Guided by market-oriented principles, enterprise autonomy, and government guidance, we will deepen mixed-ownership reforms and intensify state-owned enterprise restructuring. This will facilitate cross-industry, cross-regional, and cross-ownership mergers and acquisitions among leading enterprises, fostering several world-class, ultra-large steel conglomerates. In sectors such as stainless steel, special steel, and seamless steel pipes, we will cultivate several world-class specialised backbone enterprises to prevent homogenisation and cut-throat competition in high-end products. Support leading enterprises in major steel-producing provinces to leverage assets as a catalyst for regional mergers and acquisitions among steel firms, forming several super-large steel conglomerates. This will transform the fragmented landscape of small, scattered, and disorganised operations, enhancing regional industrial concentration and market influence. Mergers and acquisitions must prioritise capacity reduction and avoid forced pairings.

(8) Deepening Opening-up

Advancing international capacity cooperation. Leveraging the comparative advantages of China's steel industry and aligning with global industrial restructuring trends, steel enterprises should deepen international capacity cooperation. Prioritising countries along the Belt and Road route with favourable resource conditions, strong supporting capabilities, and significant market potential, continuously refine investment cooperation mechanisms with relevant nations. Strengthen coordination, harness the initiative and creativity of enterprises, and promote the outward expansion of advantageous capacities in a robust and orderly manner, preventing indiscriminate rushes and disorderly competition. Using the export of large-scale integrated equipment such as high-speed rail and power generation as a driving force, encourage competitive steel enterprises to establish overseas steel production bases and processing and distribution centres, thereby facilitating the outward transfer of advanced equipment, technology, and management practices.

Enhance international operational capabilities. Intensify efforts to open up to the outside world, elevate the level and calibre of foreign investment attraction, and advance trade optimisation and upgrading. Encourage leading overseas enterprises to participate in joint ventures and collaborations with domestic steel enterprises through equity participation or controlling stakes, facilitating mergers and acquisitions, restructuring, and layout adjustments. This will drive technological and management innovation while enhancing operational efficiency. Support domestic enterprises in establishing global marketing, R&D, and service systems through overseas mergers and acquisitions, equity investments, and similar means. Encourage domestic and foreign enterprises to collaborate, leveraging complementary strengths to jointly explore and develop third-party markets. Maintain a fair and orderly steel export environment,

adhering to the principle of prioritising domestic demand while actively engaging in international competition.

(IX) Enhancing Iron Ore Resource Security

Utilising both domestic and international resources, a new framework for iron ore supply security shall be established based on fair, open and mutually beneficial market principles. The role of China's iron ore price index, spot trading and iron ore futures shall be fully leveraged to advance a market pricing mechanism that objectively reflects supply-demand dynamics and aligns with all stakeholders' interests. Support qualified enterprise groups or consortia in steadily advancing the construction of overseas production bases for high-quality, low-cost mineral resources and equity investments in premium overseas mines through various means such as wholly-owned ventures or joint ventures. Continue to advance exploration in key domestic mineralisation zones to further clarify China's iron ore resource inventory. Support a group of competitive existing domestic iron ore enterprises to enhance mine management standards and ecological environments through scaled and intensive development, thereby strengthening the fundamental role of domestic mineral resources in supply security. Encourage uncompetitive domestic iron ore enterprises to cease production and exit the market.

(10) Fostering a Fair Competitive Environment

Strengthen ex-post supervision. Strictly enforce environmental regulations, unify enforcement standards, and focus on combating illegal activities such as falsifying data, clandestine discharges, and severe environmental pollution. Strictly enforce quality standards, persistently cracking down on illegal practices like passing off inferior products as genuine or counterfeiting. Implement rigorous energy efficiency management, enhance energy conservation inspections, and enforce mandatory energy consumption limits and product energy efficiency standards. Enforce safety regulations rigorously, mandating production halts and rectification for non-compliant practices such as cranes handling molten steel, iron, or slag failing to meet requirements; personnel gathering areas located within high-temperature molten metal handling zones; and gas holders lacking the required fire separation distance from surrounding structures. Severely penalise tax evasion practices such as selling goods without issuing VAT invoices. Integrate standardised management of the steel industry with environmental, quality, energy consumption, and safety enforcement. Revoke the standardised announcement status of enterprises with identified issues. Designate non-compliant steel enterprises as priorities for rectification and capacity reduction across regions, fostering a fair competitive environment based on integrity and law-abiding practices within the industry.

Promote effective industry self-regulation. Leverage the role of industry organisations to safeguard common interests and uphold fair competition. Encourage industry bodies and members to exercise oversight and reporting functions, urging steel enterprises to voluntarily comply with legal and regulatory requirements. Enhance early warning and forecasting services for key products such as electrical steel, tinplate, and automotive sheet through industry associations, guiding enterprises to rationally plan production and operations. Enterprises must strictly comply with the Anti-Unfair Competition Law, strengthen consultative self-regulation, and avoid disorderly, low-price cut-throat competition. Encourage steel enterprises to establish self-declaration and supervision systems for product and service standards, advance corporate integrity systems, and provide high-quality, standardised services.

V. Safeguard Measures

(1) Implementing Major Policies for Capacity Reduction

Fully implement the State Council's Opinions on Resolving Excess Capacity and Achieving Sustainable Development in the Steel Industry. Leverage the guiding role of special subsidies for industrial restructuring, providing tiered incentives to localities based on factors including capacity reduction progress, fiscal constraints, and employee resettlement numbers. Implement supporting policies for workforce resettlement, debt resolution, and non-performing asset disposal. Facilitate employee reintegration through internal redeployment, job transfers, entrepreneurship support, early retirement schemes, and public welfare positions. Employ market-based approaches to manage corporate debt and financial institutions' non-performing assets. For enterprises failing to meet industry standards or upgrade requirements, guide financial institutions to conduct rigorous credit reviews and strictly control new credit facilities. Strict accountability shall be enforced for illegal new capacity additions and failure to implement capacity replacement as stipulated.

(2) Refining Fiscal, Tax and Financial Policies

Fully leverage existing funding channels to encourage localities to explore diverse supporting measures, guiding financial institutions and social capital to support key planned tasks. Banks shall maintain reasonable credit provision for enterprises with market viability and profitability. Advance tax and fee reforms for iron ore mines by streamlining levies and establishing taxes, while researching measures to reduce the tax burden on mining operations. Implement equitable taxation policies and promote the abolition of bonded policies for imported steel under processing trade arrangements. Timely adjustments should be made to tax exemption policies for imported steel required by major technical equipment.

(3) Strengthening Industry Management

Implement dynamic management of standardised operations within the steel industry, continuously urging enterprises to standardise production and operations. Gradually explore tiered and categorised management of enterprises to better leverage the targeted effects of industrial policies. Leverage the guiding and standardising role of standards, ensuring alignment between steel industry standards and user application standards and specifications. Expedite the formulation and revision of urgently needed existing standards and new product standards, while advancing the internationalisation of leading standards. Strengthen intellectual property protection, fostering a fair, open, and transparent intellectual property environment to effectively promote IP utilisation.

(IV) Improving the Implementation Mechanism

The competent industrial authority shall conduct steel industry management in accordance with this plan, enhancing coordination with relevant departments and strengthening mid- and post-event supervision. Regional industry authorities shall integrate local steel industry adjustments and upgrades with this plan, implementing its tasks and policy measures in accordance with regional development realities and characteristics. Relevant enterprises shall formulate planning schemes aligned with this plan based on their specific circumstances, ensuring coherence with its primary objectives and key tasks. Industry organisations such as the China Iron and Steel Association shall serve as bridges and links, promptly reporting new developments and challenges in the steel industry's implementation of the plan and proposing policy recommendations.