



# THE SUPPLY-SIDE STRUCTURAL REFORM OF CHINA IN STEEL INDUSTRY AND OUTLOOKS

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## **Abstract**

The objective of this thesis is to provide an overview of the supply-side structural reform (SSSR) of China's steel industry, which was first proposed in 2015 and has been undertaken since. After providing the political and economic arguments used by China's government in promoting the reform, the paper focuses specifically on the major concerns regarding the sector, current restructuring policies, remaining problems, and corresponding policy countermeasures. After scrutinizing the impacts of SSSR, and the pace of policy implementation, the paper addresses which outcomes are most likely in the foreseeable future.

**Keywords:** Supply-Side Structural Reform; Steel Industry; Overcapacity

## **1. Introduction**

Steel industry is considered as the backbone of China's secondary sector. After years of rapid development, it entered a period of stagnation. As a result of the low growth of demand and extensive development in past years, the overcapacity of China's steel industry has been a threat to the health of the industry, affecting the steel price and profitability of steel enterprises. In addition, the structural problem and high leverage also put pressure on the sustainable development. The supply-side structural reform (SSSR) was then proposed to solve the issues affecting the industry and this paper will analyze the countermeasures of SSSR and impacts on steel industry, and provide forecasts for further development in the coming years.

## **2. Methodology**

A qualitative methodology is in place for the study of the supply-side economy, the background of the SSSR, and the existing problems of the steelmaking industry of China. The research on the topics above is also supported by documentary analysis on theories and relevant policies, together with current data collected and analyzed about the steel industry of China. In addition, quantitative analysis is also applied to analyze the impacts of the measures taken and monitor the process of the reform. Moreover, a comparison is made between China and European countries regarding the measures to cut overcapacity and revive the steel industry.

## **3. Literature review**

Faced with financial crisis, China adopted the demand-side approach to drive economic development. However, continuous demand-side management policies might lead to reduced investment and solidification of the industrial structure, which constrain the sustainable development of the economy in the long term (Feng Z.F, 2016). The excess demand from government interventions would result in overcapacity in the industries, and long-term supply-demand imbalance (Alan H.P, Christopher B, Laura El-Sa, 2013). In China, the traditional industries are facing the great pressure of overcapacity, and the steel industry is the one suffers most (Ren Z.P, Zhang Q.C, 2016) The overcapacity is also affecting the high leverage and continuous loss the industry (Chen Y, Li Y.Q, 2016), so cutting overcapacity is of great urgency for steel industry. Moreover, increasing

resource utilization efficiency and optimizing the structure have become the way out for the global steel industry (Mandal GK. et. al,2014). Thus, China's steel industry has to focus on the supply side to speed up the structural upgrade and technological innovation, so as to get sustainable development.

#### **4. Theoretical support**

##### **1) Supply-side economics**

Regarding the economics studies on supply and demand, there are several stages. Keynes advocated that the country should take control to stimulate consumption and national investment to drive economic growth. However, he overemphasizes the importance of national management and investment, ignoring that it would result in overcapacity and some dying industries could survive with the help of the government, ending up with irrational industrial structure.

Facing this problem, the supply side approach proposed to balance the supply and demand through market mechanisms, with reducing regulation and taxes. B. Laffer (reference needed) believed that higher taxation leads to lower levels of specialization, economic efficiency and employment. The supply-siders propose to drive economic growth through reducing government spending, reducing taxation, strengthening market competition, releasing constraints over production factors and promote entrepreneurship.

##### **2) Characteristics of supply-side reform**

Compared with the demand-side management, the supply-side reform has four main characteristics:

- Supply-side reform focuses on long-term growth while Keynesians usually deals with short-term issues, especially when faced with financial crisis.
- Supply-side structural reform emphasizes the economic restructure, aiming to drive growth through optimizing allocation of the production factors and upgrading the quality and quantity of economy. Thus, supply-side management usually takes more time, resulting in time lag of policies.
- Supply-side reform is considered to be a more active response to economic

changes as the supply side is the one providing products.

- Some policies may face great difficulties as the structural reform could affect the benefits of interest groups. For China, the reform involving state-owned companies from various industries has a long way to go.

### **3) Past practices**

The “Reagan Economics” is a good example of supply school in which the government focused on tax cuts and relief of government control over enterprises to combat stagflation in the late 1970s and early 1980s in the United States. Moreover, it increased support for small and medium enterprises, and promoted the industrial restructuring. The measures were well paid off and the supply-side reform solved the stagflation problem and gave birth to the rise of “new economy” in the 1990s. The Thatcherism is another practice of supply-side management, with focus on the reform of state-owned enterprises and tightening monetary policy.

The practices provide reference for China’s SSSR. However, given that China is confronted with structural problems, but not the stagflation the U.S. and the UK faced in the late seventies and early eighties, the main purpose of China’s SSSR is to optimize the structure and stimulate economic vitality. Considering the characteristics of China’s economic and political systems, the relief of government control is not expected to be main instrument for China.

## **5. Introduction of China’s SSSR**

### **1) Background**

As a result of the financial crisis in 2008, the world economic situation deteriorated and China’s economy slowed down rapidly with negative growth in exports. And the growth rate dropping from 14.2% in 2007 to 9.7%. Faced with these problems, the Chinese government decided to follow a Keynesian approach to stimulate demand so as to drive economic growth, and introduced ten measures to further expand domestic demand in November 2008. To carry out these measure, the "Four Trillion Investment Plan" was proposed, meaning that by 2010, the estimated investment in various industries would be about 4 trillion yuan (US\$586 billion).

The plan did support the rapid recovery of GDP growth in 2009, reaching an annual rate of nearly 10%. However, it can't be ignored that this result is due to government intervention, instead of market mechanism. The overdraft of future demand misled some market participants to blindly expanded their production and some outdated production capacity was not weeded out. Moreover, the contribution of consumption was not as expected to drive economic growth.

The government intervention policy above was mainly used to deal with the short-term economic recession. Nowadays, the global economy has entered a new normal, and China is facing a phase of transition from a short-term plan to a long-term sustainable development mode. SSSR is a positive response of China to the issues such as a slowdown in GDP growth, overcapacity, structural transformation, environmental protection and so on.

## 2) Content and main goals

The SSSR was first proposed in November 2015 at the Central Financial Leading Group Meeting, which is a high-level conference of decision-making department of China's economy. In this meeting, Xi Jinping pointed out that "The structural problems are the most prominent, and the main contradictions lie in the supply side."

The SSSR consists of five key measures: ("三去一降一补" in Chinese)

- Lowering the corporate costs,
- Destocking social inventories,
- Cutting overcapacity in relevant industries,
- Lowering the production costs,
- Making up for shortcomings.

In January 2016, Xi said that the fundamental purpose of the SSSR is to raise the level of "social productivity". In October 2016, the Ministry of Industry and Information Technology (MIIT) published the Steel Industry Adjustment and Upgrading Plan (2016-2020), setting goals for steel industry during the 13<sup>th</sup> Five-Year Plan (Table 1). In October 2017, Xi emphasized in the 19<sup>th</sup> CPC National Congress Report that "We must insist on quality first, efficiency first, and take SSSR as the main line to promote

economic development”<sup>1</sup>, setting the reform as the guideline for China’s further development.

Table 1: Key figures for China’s steel sector during the 13<sup>th</sup> Five-Year

	2015	2020	
<b>Industrial value added growth (%)</b>	5.4	6.0	Increase by 0.6%
<b>Crude steel production capacity (m tons)</b>	1,130	1,000-	Slim down by 130 to 150
<b>Crude steel capacity utilization rate (%)</b>	70	80	Increase by 10%
<b>Concentration ratio of top 10 (%)</b>	34.2	60+	Rise by more than 25%

Source: MIIT, Steel Industry Adjustment and Upgrading Plan (2016-2020)

## 6. Introduction of China’s steel industry

In the past decades, China has put emphasis on the development of the secondary sector. According to the data of the National Bureau of Statistics of China (NBSC), the secondary sector contributes around 40% to the GDP of China. Among the six sections of secondary sector<sup>2</sup>, the steel industry is considered to the backbone as it provides raw materials and finished products for its upstream and downstream industries. It has played indispensable and important role and seen rapid development in an extensive way. According to the MIIT, the market share of domestic steel products is over 99%, meeting the demand of steel products in our national economy and social development.<sup>3</sup>

According to *World Steel in Figures 2017*<sup>4</sup> by the World Steel Association, China ranks 1<sup>st</sup> worldwide in crude steel production with tonnage of 808.4 million in 2016, marking a new high in recent years. And the production takes a proportion of 49.6% of the world. Regarding the apparent steel use of finished steel products, China accounts for 45% of global market. Nowadays, China is the biggest producer and consumer of steel worldwide, and plays an important role in international business.

<sup>1</sup> Secure a Decisive Victory in Building a Moderately Prosperous Society in All Respects and Strive for the Great Success of Socialism with Chinese Characteristics for a New Era, Xi Jinping, October 18, 2017. P 26. Available at [http://www.xinhuanet.com/english/download/Xi\\_Jinping's\\_report\\_at\\_19th\\_CPC\\_National\\_Congress.pdf](http://www.xinhuanet.com/english/download/Xi_Jinping's_report_at_19th_CPC_National_Congress.pdf)

<sup>2</sup> Secondary industry includes 6 sectors in China, mining, manufacturing, electricity, construction, gas and water.

<sup>3</sup> Steel Industry Adjustment and Upgrading Plan (2016-2020), the Ministry of Industry and information Technology of China, October 2016, P2. Available at <http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757016/c5353943/content.html>

<sup>4</sup> World Steel in Figures 2017, World Steel Association, May 2017, P9 to P15. Available at <https://www.worldsteel.org/en/dam/jcr:0474d208-9108-4927-ace8-4ac5445c5df8/World+Steel+in+Figures+2017.pdf>

## **7. Existing problems in China's steel industry**

### **1) Overcapacity and low capacity utilization rate**

According to the implementation plan of “4 Trillion Investment Plan”, the projects included covered a wide range of infrastructure constructions. It was roughly calculated that 81.75% was related to investment in infrastructure, stimulating the general demand for steel products. However, the actual driving force was not as expected. According to Wiley Rein LLP (2013), the Chinese government's significant involvement in its steel industry has both contributed to the enormous increases in new capacity and prevented the closure of inefficient capacity.<sup>5</sup>

“Zombie enterprises” are example of the capacity that should have been closed. They refer to companies with negative non-recurring gains per share for 3 years, so mainly are maintained by government subsidies and bank loans. They usually have low resource allocation efficiency and expose risks on the stability of industry funding chain. Xi Jinping pointed out that combating zombie enterprises is the top task in cutting overcapacity, and according to “The Zombie Enterprise in China – Status, Causes and Countermeasures” (Nie H.H, Jiang T., 2016), the proportion of zombie enterprises of steel industry was 51.45% in 2013, ranking 1<sup>st</sup> among the industries in China.<sup>6</sup>

This situation, together with continuously expanding capacity, results in the low capacity utilization rate in China's steel industry. Capacity utilization is the result of dividing the actual production by the capacity and multiplying by 100%. Based on the calculation, the capacity utilization peaked in Q4 of 2014 with 76.1% and dropped to 72.9%, a historical new low in Q1 of 2016.

### **2) The lack of demand.**

As mentioned, China is confronted with problem of the slowdown of GDP and fixed asset investment growth. The direct impact on the steel industry is that the contribution of crude steel per unit GDP and fixed asset investment is declining. The inevitable result

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<sup>5</sup> Government Intervention and Overcapacity: Causes and Consequences for the Global Steel Industry, Alan H.P., Christopher B.W., Laura El-Sa, July 2013. Available at <https://www.wileyrein.com/assets/htmldocuments/Government%20Intervention%20and%20Overcapacity%20Causes%20and%20Consequences%20for%20the%20Global%20Steel%20Industry.pdf>

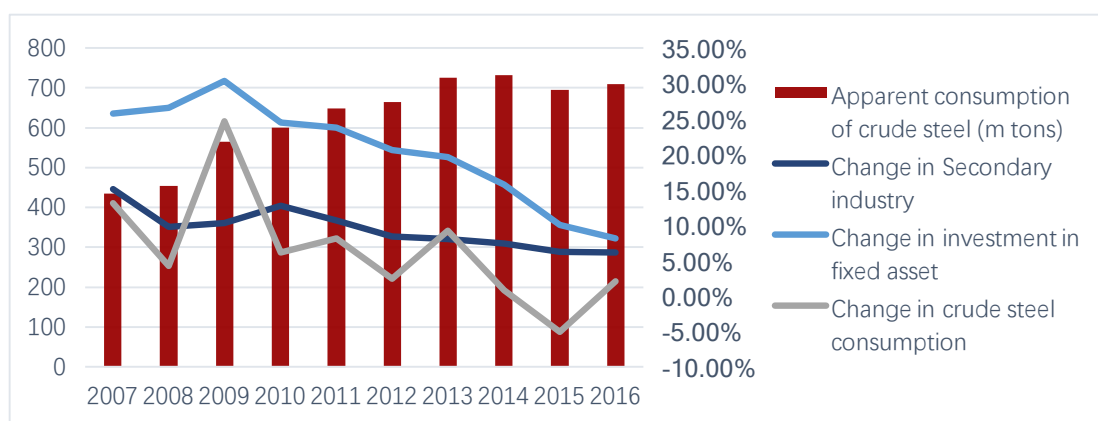
<sup>6</sup> The Zombie Enterprise in China-Status, Causes and Countermeasures. Nie H.H, Jiang T., July 2016, P2.



is the drop in consumption of steel. On the other hand, international demand is not growing at a pace that could absorb the production of the aforementioned excess capacity prevailing today in China.

According to the study of the domestic apparent demand of crude steel in past 20 years, it has already peaked in 2013 (765.75 million tons) and saw a decline at an average rate of 4% in the following years. Considering the relevant real estate sales and investment, the domestic demand for crude steel is considered to remain around 700 million tons on average according to China’s Steel Association. (Graph 1)

Graph 1: Apparent Consumption of Crude Steel and Development of Secondary Sector



Source: WIND Database, the changes are year-on year

### 3) Continuous loss in whole industry

According to China Iron and Steel Association, the profits of industry maintained decreasing after 2007 and were reported to be nearly 0 in 2012. In 2015, the China’s major steel enterprises got sales revenue of 2.89 trillion yuan while recorded a loss of 64.534 billion yuan. The whole-industry loss was 77.9 billion yuan.

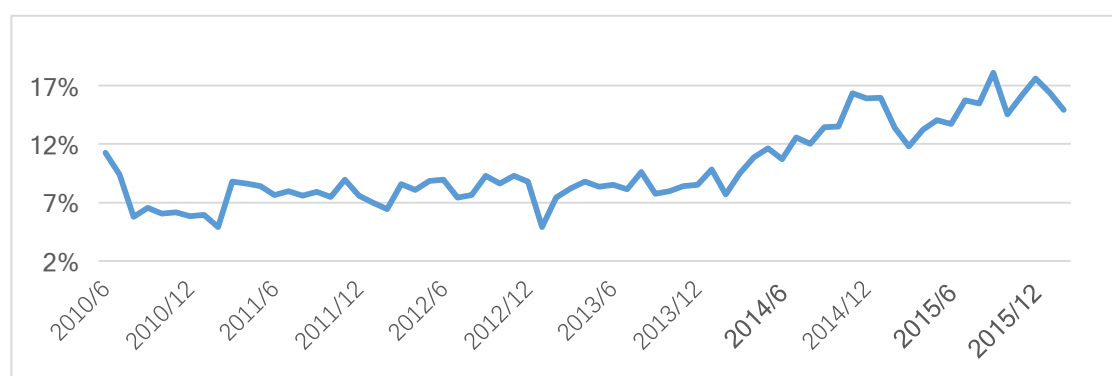
One of main reasons is the production of intermediate frequency furnace (IFF) steel (“Ditiaoogang” in Chinese). It is made by melting scrap in intermediate frequency furnace and there is no effective control over the quality of the products and lacks environmental protection facilities. To reduce production costs, the operators usually tend not to issue invoice so as to avoid taxes, or don’t meet requirements for safe production or environmental admission. Sometimes they even counterfeit other regular mills’ products. The low marginal cost of production facilitates their competing with standard enterprises at low price. As a result, this unfair and illegal competition does

enormous harm to the health of steel industry, affecting the space of interest.

#### 4) International pressure regarding exports and overcapacity

The volume of steel exports is negatively correlated with the domestic price of steel according to past data. As is shown in the Graph 2, the export-to-production ratio has climbed from 7% to around 16% in the past years. In 2015, the steel exports reached 112 million tons, marking a new high when the domestic steel price remained at a historic low level. However, China is facing increasing pressure from trade frictions and 43 cases of anti-subsidy and anti-dumping were registered in 2016.

Graph 2: Export-Production Ratio of China's Crude Steel



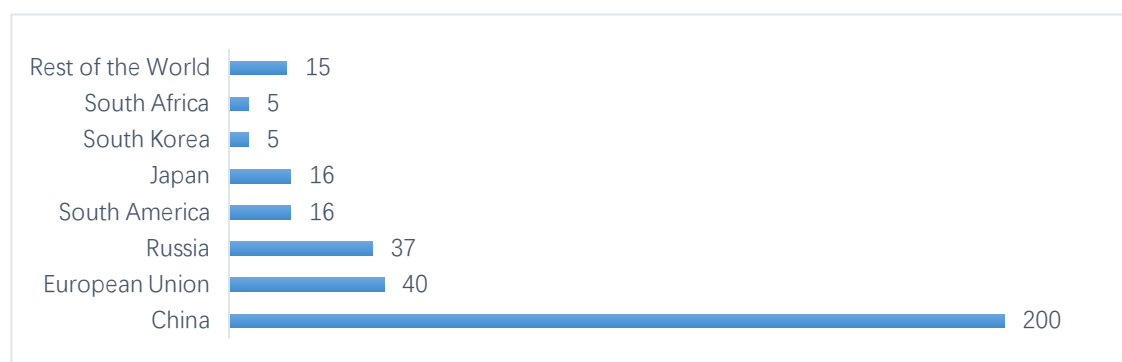
Source: Wind Database, the blue line represents the trend regarding the proportion of the exports of China's crude steel production

The overcapacity has also been a key issue for global steel participants. According to estimations of Morgan Stanley, the world is faced with overcapacity of 334 million tons, among which, China has to be responsible for 200 million tons, a percentage of 59.8%. (Graph 3) "Excess capacity has a distorting and damaging effect on global markets", said Jack Lew, the U.S. Treasury Secretary in 2016 Strategic and Economic Dialogue. Some countries have complaints that overflow of cheap steel exports from China has been dampening steel prices and profitability in some regions. In 2016, the European Parliament refused to ease its anti-dumping ban on China, it stated that China is against 56 out of 76 measures of European Union regarding anti-dumping. Moreover, the main concern is in the China's steel industry.<sup>7</sup> There is increasing pressure on China to cut

<sup>7</sup> Europe and the U.S. Take Anti-Dumping Measures against China, Jiang Jianze, Wallstreet.cn, May 13, 2016. Available at <https://wallstreetcn.com/articles/236492>

overcapacity and stabilize the global markets.

Graph 3: Overcapacity in the World (m tons)



Source: Morgan Stanley. The total overcapacity of steel in the world amounts to 334 million tons, while China is responsible for 200 million tons.

##### **5) Problems in management and supervision.**

World Steel Association announced that during the past 20 years, over 160 policies and measures related to control over steel capacity were implemented, but the problem still remains a headache for China's economy.<sup>8</sup> One possible reason is that there exists "local protection" towards some steelmaking mills of poor quality but high profits, which brings taxation and employment to the local governments.

##### **6) High leverage of whole industry**

The steel industry has been facing the increasing leverage ratio in the past year. According to public information, the steel industry is bearing a total debt of 4 trillion yuan. In 2016, the average asset-liability ratio of steel industry was nearly 79% according to China's Steel Association, and 11 member enterprises are suffering from ratio over 90% and 14 has ratio between 80% to 90%. Domestically, the ratio of steel industry is the highest among domestic industrial sectors, while from perspective of international comparison, it also far exceeds ones of comparable worldwide, it was registered that ArcelorMittal's asset-liability ratio was about 57% and Pohang of South Korea only has 43%.

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<sup>8</sup> China's Steel Sector Supply Reform, DBS Asian Insights No. 41, DBS Group Research, April 2017, P 4. Available at <https://zh.scribd.com/document/331490854/Insights-Oversupply-in-the-Global-Steel-Sector>

## **7) Distribution of industry**

It is reported that in 2015, the total output of the top four crude steel producers accounted for only 18.5% of the total production nationwide and the industrial concentration of the top ten steel enterprises dropped from 49% in 2010 to 34% in 2015.<sup>9</sup>

Compared with more mature global markets, it could be find that the share of top 3 producers is about 90% in Korea and Brazil, and over 60% in Japan, America and other leading countries. That is, there is much space for China to promote industrial concentration.

## **8) Structural problems**

Short-flow steelmaking is a commonly used production process in the world. The average proportion of electric arc furnace (EAF) steel production is 44% worldwide, with 63% in the U.S., 40% in Europe, and 30% in South Korea.<sup>10</sup> China is the largest steel producer in the world, but the output of EAF accounts for only 7%. The main reason is the lack of scrap resources, which have been primarily used by IFF steel mills, resulting in ineffectiveness of resources and structural problems.

Compared with the converter steelmaking process, EAF steel has the advantages of short process, low investment, fast construction, energy saving and emission reduction. The increase in the EAF share will absolutely contribute to the upgrade of whole industry and relief of environmental pressure.

## **8. The Countermeasures in Steel Industry**

### **1) Cutting overcapacity**

#### **a) Policies of cutting overcapacity**

According to the Chinese authorities, cutting overcapacity consists of two parts, one is

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<sup>9</sup> Steel Industry Adjustment and Upgrading Plan (2016-2020), the Ministry of Industry and information Technology of China, October 2016, P4. Available at <http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757016/c5353943/content.html>

<sup>10</sup> Promote Green Development in Steel Industry with Supply-Side Structural Reform, Xu Xiangchun, China Securities Journal, December 21, 2017. Available at <http://news.cnstock.com/paper%EF%BC%8F2017-12-21%EF%BC%8F924643.htm>

to eliminate the inefficient production capacity such as IFF steel and “zombie enterprises”, the other part is to protect the advanced production capacity, in case of affecting the improvement of the industry and production. Thus, administrative policies, such as “one size fits all” will not be adapted.

Regarding the cutting overcapacity, China’s central government issued four main policies.

- In February 2016, the Opinions on Resolving the Excess Production Capacity in the Iron and Steel Industry to Achieve Sustainable Growth issued by China’s State Council first mapped out the strategy of cutting overcapacity, as an important part of the SSSR. In this document, it proposed to eliminate the crude steel capacity by 100 to 150 million tons in the following five years.
- On February 15<sup>th</sup>, the National Development and Reform Commission and the Ministry of Industry jointly issued a document, requiring to ban the illegal production and sales of IFF steel. It is determined that by June 2017, all production of IFF steel should be cleared up.
- In April, the Plan of Action was issued, proposing to exert more controls over the production permission licenses in high energy consumption and high pollution industries.
- In May 2016, the State Council published the reform plan for the central state-owned enterprises, deciding to reduce the production capacity by 10% in the following two years.

In response to the government policy, the provinces issued their own plan regarding cutting overcapacity. For example, Hebei Province, the major steel producer in China, set the goal of reducing production capacity by 100 million tons in five years. Other main producer provinces announce to cut overcapacity from 8 to 15 million tons. The total planned reduction nationwide amounts to exceed the 45 million tons required by the government.

#### **b) Strengthened supervision**

To monitor the execution of reducing overcapacity and combating IFF steel, it is mandatory for provincial government of involved steel producers to make monthly

report. Moreover, the State Council have organized several waves of inspections since the start of SSSR. About 18 groups of officials visited the mills involved and if any kind of illegal production of IFF steel is found, the facilities would be demolished on the spot so as to avoid resurgence.

The supervision mechanism also includes administrative sanctions for officials in charge, in case that there is any kind of inefficiency in actual execution. In November 2016, Ma Qiulin, Vice Governor of Jiangsu Province was given an administrative record, while Zhang Jiehui, Vice Governor of Hebei Province was given administrative warning. In August 2017, Deputy Governor of Beichen District of Tianjin, was blamed and the deputy major of a town in Beichen District was resigned. The economic inspections of reform are closely followed by administrative policies, setting alarms to local officers in order to diminish the effect of the possible inefficiency in executing policies.

## **2) Restrictions on new steel production capacity**

According to general plan, no new capacity building projects are permitted, and all local authorities and departments shall not approve or register new projects in any way in the industries with excess capacity.<sup>11</sup> For the steel industry, the MIIT announced to strictly prohibit building of new steel production capacity and constructions that expand the capacity by 2020. In this case, the enterprises could adjust their production structure through capacity transfer or capacity replacement, and improve utilization efficiency of steel plant by technology development. And for the steel mills with already completed construction that were closed due to funding problems, they can resume production while ensuring the environmental protection and compliance.

Thus, there is control over the total production capacity while the steelmaking participants are encouraged to improve product quality and optimize capacity structure spontaneously.

## **3) Promoting international cooperation for new growth points**

China proposes the Belt and Road Initiative, including two strategies: Silk Road

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<sup>11</sup> Opinions on Dealing with Contradictions of Serious Excess Production Capacity, State Council of China, [2013] No. 41, October 18, 2013. Available at [http://www.gov.cn/zhengce/content/2013-10/18/content\\_4854.htm](http://www.gov.cn/zhengce/content/2013-10/18/content_4854.htm)

Economic Belt Strategy and the 21<sup>st</sup> Century Maritime Silk Road Economic Belt Strategy. They aim to take advantage of China's resources and technology so as to promote regional and international synergy in various industries. For example, the "Belt and Road" has involved about 60 countries and it is estimated that the demand for infrastructure investment would reach 10.6 trillion U.S dollars.<sup>12</sup> Infrastructure projects such as the Lao railway, the Mombasa-Nairobi railway and Indonesia's high-speed projects will all provide new opportunities for China's steel capacity outputting.

#### **4) Subsidies for unemployment**

As mentioned in last part, steel mills in China are undertaking more social responsibilities of creating job opportunities. Because of the SSSR, it is forecasted that in the next two or three years, there will be a cut of 30% in production capacity of steel, coal, shipbuilding and other industries suffering from overcapacity according to the CICC research. As a consequence, about 3 million workers may face the problem of layoff, resulting in an increase of 0.3% of urban unemployment rate.

The government has decided to allocate 100 billion yuan (US\$ 155 million) for the training and placement of laid-off workers from cutting overcapacity in steel and coal industries.

#### **5) Financial measures**

##### **a) Establishment of fund**

In April 2007, China launched the Siyuanhe Steel Industry Restructure Fund. The main general partners of it are China Baowu Iron and Steel Group, WL Ross of United States, Sino-US Green Fund and China Merchants Financial Group.<sup>13</sup> It is the first steel restructuring fund and also an important attempt to involve global resources in China's SSSR.

According to the chairman of Warburg Investment, the fund will invest in the steel industry chain and achieve revenue through core value addition of steel business,

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<sup>12</sup> Great Results Achieved in the Construction of "Belt and Road", Beijing Morning Post, May 14, 2017. Available at [http://bjcb.morningpost.com.cn/html/2017-05/14/content\\_443188.htm](http://bjcb.morningpost.com.cn/html/2017-05/14/content_443188.htm)

<sup>13</sup> Siyuanhe's Ambition: "Transformation" of China's steel industry, Xinhua, April 10, 2017. Available at <http://finance.sina.com.cn/chanjing/gsnews/2017-04-10/doc-ifyecezv2936520.shtml>

promoting the industry consolidation at the same time.

## **b) Deleverage**

The China Steel Association announced to take measures for the industrial deleverage, and set a goal of bringing the asset-liability ratio down to below 60% in three to five years.

Main tool adapted to relieve the pressure is the debt-to-equity swap. The mechanism of it is to involve fund to make equity investment in the enterprises with high debt-to-equity ratio, in order to help them make profits to repay debts. According to China Securities Journal, steel enterprises including Sinosteel, Wugang Steel, Anyang Steel have signed framework agreements with financial institutions by the end of 2016. The contract amounts add up to 150 billion yuan.

## **6) “Internet + Steel” and technology innovation**

“Internet +” is the strategy proposed by China’s government in 2015. Usually it was applied in driving growth of traditional industries, such as steel. The main purpose is to take advantage of the internet platform and promote the integration with traditional industries, enhancing the innovation and bringing vitality to them. During the past years, over 300 B2B steel trading platforms spring up during the past years, with increasing orders made online. For example, the Steelcn.com has over 210,000 trading users and cooperation with more than 74 steel mills. It reports to make a daily average turnover of more than 44,000 tons in 2016.<sup>14</sup>

In addition, Internet + also brings steelmaking technology innovations and deep reform to whole production process. In September 2017, Baidu signed agreements with Baosteel and Shougang, two top producers in China, to jointly promote the application of artificial intelligence, big data and cloud services in key technologies, production models and quality inspections. Huawei also signed agreements with Yonggang, aiming to deepen the intelligent manufacturing reform.

## **7) Industrial concentration**

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<sup>14</sup> The Steelcn.com and New Transformation of Steel E-commerce, Wei Wei, Steelcn.com, November 1, 2016. Available at <http://news.steelcn.cn/a/102/20161101/882902AE9204D0.html>



Faced with industrial distribution and excess competition, China encourages the industrial concentration through mergers and acquisitions or synergies, aiming to increase the share of top 10 steel producers from 35% to 60% in the 13<sup>th</sup> Five-Year Plan. The supporting policies include subsidy support for M&A, credit support on the basis of controllable risks and commercial sustainability and so forth.<sup>15</sup> The actual execution plan has three steps:<sup>16</sup>

- 2016-2018, slim down the overcapacity and clear up outdated capacity, trial of large M&A;
- 2018-2020, improve the policies regarding M&A based on existing practice;
- 2020-2025, promote large-scale M&As of the steel industry.

Learned from the past failure in industrial concentration, it is encouraged to take full advantages of market mechanism and fully analyze the respective situations of the enterprises involved. The government would not drive integration but providing guiding policies, such as encouraging projects of cross-regional and mixed ownership acquisitions.

## **9. Impacts of supply-side reform in steel industry**

### **1) Cutting overcapacity**

#### **a) Structural optimization in capacity**

In 2016 and 2017, it is reported by MIIT that the production capacity reduced by more than 115 million tons. Among the cleared overcapacity, the OPSteel concludes that ineffective capacity accounts for 72.48% and only 27.52% is in production, meaning that achievements have been made to optimize the structure and combat the zombie companies.

#### **b) Increase in capacity utilization rate**

Due to cutting the excess capacity, it could be observed that the ratio shifts up to 71.66% in 2016. According to the latest statistics released by the National Bureau of Statistics

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<sup>15</sup> Opinions on Cutting Overcapacity to Achieve Extricate Development in Steel Industry, State Council of China, [2016] No. 6, February 4, 2016. Available at [http://www.gov.cn/zhengce/content/2016-02/04/content\\_5039353.htm](http://www.gov.cn/zhengce/content/2016-02/04/content_5039353.htm)

<sup>16</sup> Steel Restructuring Road Map: More than 60% of the Future Steel Production Capacity Concentrated in the CR10, Zhao Jing, September 20, 2016. Available at <https://wallstreetcn.com/articles/263646>

of China, the steel industry has benefited from the SSSR and capacity utilization was 76.7% in Q3, 2017, seeing an increase of 5.04% compared with last year and marking a new high since 2013.

## **2) Resumption of steel mills**

Benefiting from the rising steel price and government policy, some steel mills which used to suffer from disruption of capital chain get the opportunity for reinjection of capital or industrial integration. According to OPSteel, about 120 furnaces were shut down in 2014 and 2015 because of the regression of whole industry and nowadays, 62 steel mills turn to reopen.<sup>17</sup> These capacities from resumption are all with already completed facilities and are confirmed in line with regulations. Thus, the resumption of steelmaking mills will just contribute to the rise in utilization rate without accounting for newly increased capacity.

An example is the Yunnan Yonggang Iron and Steel Group, which is one of five largest steel companies in Yunnan. In 2014 it went out of production as result of disruption of capital and in September 2017, it announced to prepare for resumption and recalled the workers for further preparation.

## **3) Destocking and increase of steel price**

The decline in steel capacity and production, together with the stabilization of market order, benefits the steel price a lot. Moreover, the restrictions on production to support environment protection also contributes to the destocking of steel social inventory. According to the research of Everbright, the steel social stock dropped by 5.78% to 8.36 million tons in November 2017, marking a seven-year low level. This pushes the supply-demand relationship back to a normal situation.

The steel price has rebounded from the low level of around 2000 yuan/ton and is considered to be a reasonable reflection of value and normal competition. From the trend of steel price, it could be concluded that despite of volatility, the price has shown a continuous increase in the past year. (Graph 4)

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<sup>17</sup> Total Output and Effective Capacity Increased in 2016, OPSteel, February 14, 2017. Available at <http://www.opsteel.cn/news/2017-02/4873DFB85DB78E9AE050080A7DC973E2.html>

It is worth mentioning that in the winter of 2017, China has exposed strict restraints on operating rate of furnaces in the area of “2+26”. It refers to comprehensive management of industrial air pollution in 2 municipalities (Beijing and Tianjin) and 26 main industrial cities in the northern China. So the increase in these months are considered to be a product of environment protection and short in supply. This impact is temporary. Considering the relevant cost and other factors, the price may remain high level but will not rise too much.

Graph 4: Price of Crude Steel (yuan/ton)



Source: WIND Database, the line presents the trend of selling price of crude steel

#### 4) Corporate profits of steel mills

As a consequence of the cutting capacity and rising steel price, the steel profitability starts to recover. According to Q3 reports of 2017, the profit of China’s steel industry had a substantial growth, the loss decreased by 4.8% compared with 2016. As reported by the China Steel Association, China’s steel industry realized a profit of 203.5 billion yuan in the first 3 quarters, an increase of 106.9% over the same period of 2016. For the large and medium-sized enterprises, the profit increased at an average rate of 374.4%.

For example, in the first 3 quarters of 2017, Baosteel Co., Ltd. reported to increase the net profit by 95.52%, amounting to 116.68 billion yuan, and the Shougang Steel achieved net profit attributable to parent company of 1.762 billion yuan, marking an increase of 1188% in the first 3 quarters of 2017.

The SSSR brings a turnover point for steel enterprises, it takes advantages of the

existing capacity and saves the enterprises from closing and resulting in unemployment. Moreover, increasing corporate profits will contribute to the deleverage of the whole industry, paying back the debts and eliminate the bankruptcy risk exposed to financial installations.

- **Profitability model of steel mills**

In order to simulate the changes in profitability of steel mills under the SSSR, a monitoring model is set for further analysis. This model is based on Everbright Securities' long-term research of Chinese steel mills, trend of industry, estimates of relevant costs and some ideal assumptions. By monitoring the estimates of corporate profits, it could be better observed the general steel industry benefits from supply-side reform.

The profits of the steel mill model are supposed to come from 3 main products, 20mm deformed steel bar, 3.0mm hot rolling steel and 1.0mm cold rolling steel. They account for 0.5, 0.25 and 0.25 respectively, which is also a common production structure in China's steel mills. And the production of each product per unit requires 1.6 units of iron ore and 0.5 units of coke. As the market transaction price of raw materials and steel products displayed in the database WIND contains a 17% VAT, it will be excluded from the profit estimates by dividing 1.17 when necessary. Other costs not specified are included in a rounded number respectively. So the calculation is as following:

A: Profit from deformed steel bar:  $\text{Price of product}/1.17 - \text{Price of iron ore} * 1.6/1.17 - \text{Price of coke} * 0.5/1.17 - 850$

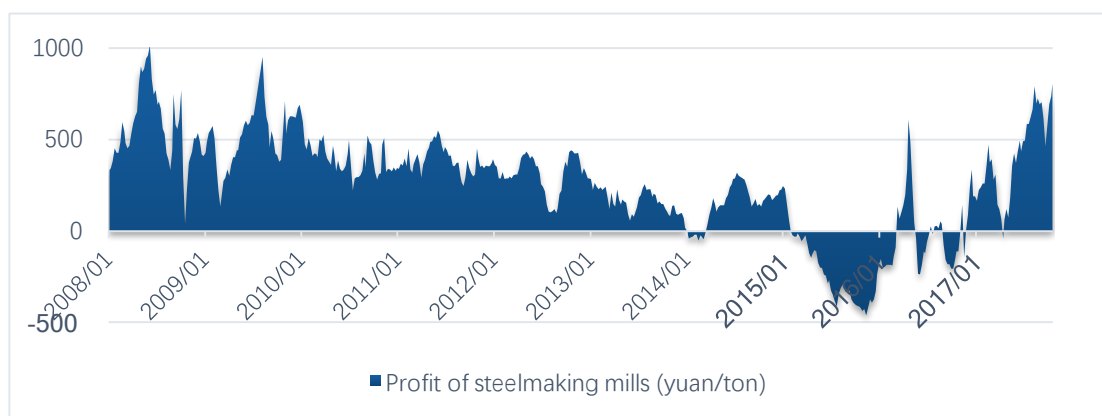
B: Profit from 3.0mm hot rolling steel:  $\text{Price of hot rolling}/1.17 - \text{Price of iron ore} * 1.6/1.17 - \text{Price of coke} * 0.5/1.17 - 1000$

C: Profit from 1.0mm cold rolling steel:  $\text{Price of cold rolling}/1.17 - \text{Price of iron ore} * 1.6/1.17 - \text{Price of coke} * 0.5/1.17 - 1500$

Profitability estimates =  $A * 0.5 + B * 0.25 + C * 0.25$

Based on the assumptions and calculations above, it could be concluded that the estimate of profits of general industry has helped the whole industry to make profits and the estimates reach new high in November 2017 under the SSSR. (Graph 5)

Graph 5: Estimates of Profits of Steelmaking Mills Based on Profitability Model



Source: WIND Database, the model is based on assumptions and past experience, just used to illustrate the trend of steel mills' profits.

## 5) Decline in steel exports

Due to the rebound of domestic steel prices, the steel enterprises start to give priority to meet domestic demand. 2016 is the first year to see a drop in volume in steel exports, and the downside trend continues over 2017. According to statistics from the General Administration of Customs of China, from January to November 2017, China's steel exports decreased by 30.7% versus 2016. The current low level of exports is primarily due to the tightening of domestic supply as a result of cutting overcapacity.

## 6) Industrial concentration

In December 2017, Baosteel, which is among top steel enterprise in China, announced to merge with Wuhan Iron and Steel Co., establishing a new giant steel producer named Baowu Steel. It is an important step in supply-side structure reform and as the result of the merger, it would have production capacity of 60 million tons and rank the 3<sup>rd</sup> place worldwide in terms of crude steel production. This inter-regional case is also the second largest M&A worldwide.

According to the conference call of Baowu, with the integration, the company would speed up the innovation and inter-regional synergies, and pushing up the industrial integration rate. It is the milestone of reform and new attempt in structural optimization of steel industry.

## 10. Comparison with cutting overcapacity in Europe

Europe had a rapid development period after war, with crude steel production expanding from 20 to 240 million tons in almost 20 years. In the 1970s, the overcapacity and oil crisis put the steel industry in trouble. The European governments decided to set guidelines for the prices of steel products and give subsidies to help steel mills survive. And the “Davignon Plan” was proposed in 1977, aiming to stipulate minimum selling price of steel products and encourage the displacement and replacement of production capacity. It helped to improve the interests of steel mills and set control over total capacity, but did not manage to fundamentally cut overcapacity.

By the late 1990s, the capacity issue of European steel industry was basically cleared and the capacity utilization rate rebounded to about 80%. It was the fruit of over 20 years of adjustment and upgrade. The main measures were as below:

- In 1991, the governments began to cut the subsidies to the steel industry. Moreover, more policies on environmental protection, such as carbon emissions trading policy, placed more pressure on the enterprises, increasing the production costs. Thus, some outdated production capacity had to exit, contributing to the upgrade of total industry.
- Since 1990, a series of large-scale industrial integration and reorganization took place in the European Union, with competitive and advanced enterprises emerging. The Alcoa in Luxembourg and ThyssenKrupp in Germany are good examples to illustrate the trend. In addition, some capacity was transferred to other developing areas, and it also relieves the pressure of overcapacity inside Europe. For example, ArcelorMittal has steel mills globally to take full advantage of localities worldwide.
- Development of technology is another contributing factor. As mentioned, the EAF steel outweighs other steelmaking technologies in many aspects. With the government’s encouragement, the EAF and converter in Germany had almost replaced all the outdated open hearth steelmaking in 1990.

Compared with the SSSR in China’s steel industry, we could conclude something in common that: 1) The overcapacity might be an inevitable issue for the steel-industrialized countries when they reached a certain stage; 2) Government’s interventions to give subsidies to all enterprises may result in overcapacity and delay

the process of upgrading the industry; 3) The industrial integration is a must way to go for sustainable development and international competition; 4) Cutting overcapacity requires long time of adjustment and involves the participant of both market mechanism and government's measures.

However, the China's SSSR has its own characteristics: 1) According to current plan and process, China is faced with tougher task and is expected to achieve the goal in shorter time, about 5 years; 2) More government's interventions are involved in integration and eliminating outdated capacity; 3) More administrative policies are published in addition to fiscal and monetary policies; 4) Industrial integration is expected to take place more inside Chinese enterprises, instead of globally mapping.

## **11. Predictions:**

### 1) Demand:

The demand for steel is closely related to the growth rate of the secondary industry, as the demand mainly comes from the downstream industries in this section. And the total investment in fixed asset is used to observe this trend. It could be included from the graphs that growth rate of the secondary industry has dropped and investment in fixed asset has cooled down, resulting in slightly lower growth rate of domestic demand.

The Metallurgical Industry Planning Research Institute of China (MIPRI) stated their prediction in December 2017, estimating that the actual consumption of steel in China in 2017 is 725 million tons with an increase of 2.2% compared with 2016. In the long term, MIIT predicts that the domestic crude steel consumption would drop to 650-700 million tons by 2020, showing a downward trend over the 13<sup>th</sup> Five-Year period.<sup>18</sup> Based on the past data and the plan, I forecast the apparent consumption for steel to rise at lower growth rate of around 0.28%, accounting for an estimated demand of 727 million tons in 2018.

### 2) Supply and capacity

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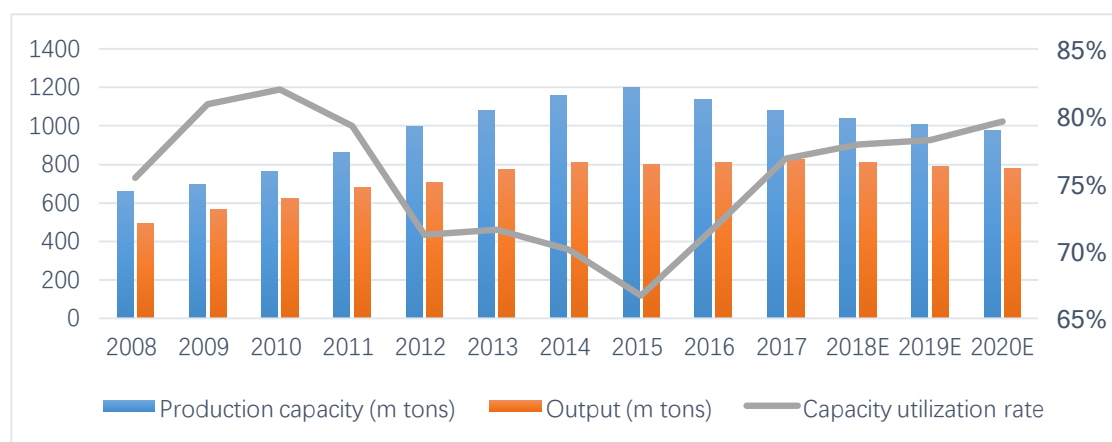
<sup>18</sup> Steel Industry Adjustment and Upgrading Plan (2016-2020), the Ministry of Industry and information Technology of China, October 2016, P7. Available at <http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757016/c5353943/content.html>

During the 13<sup>th</sup> Five-Year Plan, the SSSR will be kept as guideline and no newly constructions projects to be approved. Moreover, according to MIIT, new policies to accelerate the pace of reducing production capacity and drive capacity transition would be detailed in 2018. In my point of view, the crude steel production is expected to show a downside trend in the future. With steps taken further, the total production capacity is predicted to be around 980 million tons, meeting the goal set for the industry by 2020.

As reported by the NBSC, the crude steel output from January to November 2017 was 768.8 million tons, up 5.7%. If factored in the effect of “2+26” environmental limited production policies, it is estimated that the total production in 2017 would reach around 830 million tons. And the number might be among 750 to 800 million tons by 2020.

With the improving efficiency of facilities and reducing capacity, the capacity utilization rate is expected to have a continuous increase, from 67% in 2015 to nearly 80% in 2020. (Graph 6)

Graph 6: Predictions on Production Capacity and Utilization Rate



Source: WIND Database, CISA. The predictions are based on the already revealed data and goals to be achieved by 2020, the capacity utilization rate is on secondary axis

### 3) Crude steel prices and corporate profitability

Due to the fact that the huge jump in steel price has exposed increasing pressure on downstream manufacturing industries, there is little possibility that the price gets overheated, or the government intervention may involve. Considering the estimated demand-supply and the possible uncertainty in the future, I forecast the steel prices to remain at current high level from 4400 to 4700 yuan/ton in 2018, but may fluctuate



with more deviations. In short term, because the weather affects the process of infrastructure construction, the monthly demand for steel may have seasonal changes and shrink from December to April. Coupled with the impact of limited production in “2+26”, the selling price of crude steel is expected to show seasonal changes and be pushed up to around 4600 yuan/ton over this horizon.

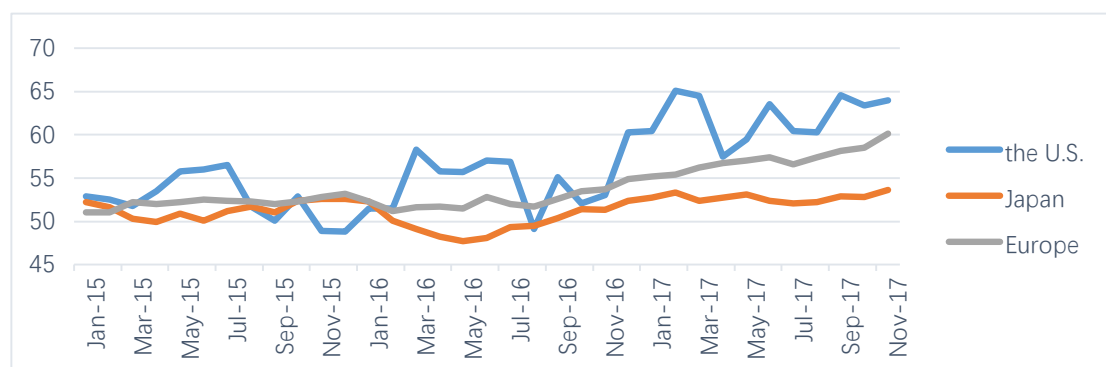
Regarding the corporate profitability of steel mills, the increasing raw materials costs and environmental costs are considered to compress the margins. In long term, it is believed that the measures of SSSR would help to upgrade the industry and protect the benefits of legal steelmaking participants. In my opinion, the profitability will remain strong, contributing to deleveraging and keeping a virtuous circle for sustainable growth.

#### 4) Exports of steel

As of January 2018, China will remove the export tariffs on steel products such as bar, rebar and wire, and appropriately reduce the export tariffs on stainless steel and billet. It aims to stimulate the export and optimize the structure of China’s exports.

Considering the upside trend of the purchasing managers’ index (PMI) of main business partners worldwide, it is expected to see an increase in China’s exports of steel. (Graph 7) However, there might be reinforces of anti-dumping policies against China, so the exact exports trend needs more monitoring.

Graph 7: PMI of Manufacturing Industry of the U.S., Japan and Europe



Source: WIND Database

#### 5) Structural adjustment with short-process steel

As China's growing attention to sustainable development of steel industry, the structural transition to developing short-process EAF steel is expected to be the highlight. It is reported that the MIIT is encouraging the steel mills among "2+26" transfer the production capacity to the southwestern, northwestern and southeastern areas in the form of electric short-process steel. However, it lacks detailed supporting plan regarding projects approval, subsidies and so forth.

China has made great achievements in clearing up IFF steel, involving a production capacity of 120 million tons. As a result, the scrap resources are available and abundant for development of EAF. According to Forward Looking Industrial Research Institute, the scrap resources reached 160 million tons. With the effect of electricity reform, the EAF would show continuous upside trend in terms of both production and proportion. In my opinion, it is expected to account for 12% to 15% of total output by 2020.

## **12. Conclusions**

The SSSR of China's steel industry is part of China's strategy to transform development for structural optimization and sustainable development. It has own characteristics as the government and administrative policies have played a very important role. By now, the implementation of policy goes smoothly and is quite powerful. For example, the goals of shutting down IFF steel has been achieved in advance and the profitability of steel mills has recovered to the best level since 2015. In my opinion, the SSSR is expected to provide meaningful results in the coming 3 years, contributing to the overall upgrade of China's economy. Furthermore, the best way to integrate the market mechanism with government intervention is to be explored by China in industrial integration and deleverage.

As the reform is still in process, the conclusions mainly focus on the outcomes and characteristics of current phase. And the predictions are made based on past experiences and the already-known new plan for the coming years. It will take more time to check the result of China's SSSR and, hence, we do not intend to provide final propositions at this stage.

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