



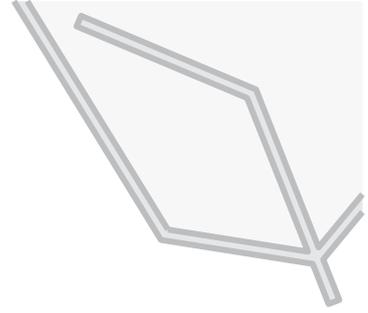
THEMATIC REPORT 12

China Scrap Metal Resource Recovery and Treatment Industry

Edited by China-Italy Chamber of Commerce



Camera di Commercio Italiana in Cina
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China-Italy Chamber of Commerce



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1. Definition and Policies of Scrap Metal Resource Recovery and Treatment Industry

1.1. Definition of Scrap Metal Resource Recovery and Treatment Industry

Scrap metals are metal fragments and scraps discarded by the metallurgical industry and metal processing industry. It also includes metal objects scrapped in equipment upgrades, as well as metal packaging containers, waste vehicles, and other metal objects recovered from municipal refuse.

All the countries around the world have set up specialized units responsible for the recovery and use of scrap metals. The recovered scrap metals are mainly smelt and transformed into secondary metals and part of it is used to produce machinery equipment or components, tools and civilian appliances.

Source	Brief Introduction
Internal scrap metals	Scrap metals that are generated by enterprises and then reused as raw materials for their production. In general, this part of scrap metals do not enter the market for circulation.
Scrap metals for processing use	Scrap metals produced in the domestic metal manufacturing industry and then returned to metal recycling plants for reuse as raw materials for production. In general, this kind of scrap metals could be returned to metal recycling plants within a few weeks after its production, which therefore is also referred to as "Short-Term Scrap Metals".
Depreciated scrap metals	Scrap metals formed when metal products are scrapped upon the end of its service life. As the formation of depreciated scrap metals needs to go through several life cycle stages, including metal production, metal products manufacturing, use, scrapping, and recycling, it usually takes several years or even a decade. It is therefore also referred to as "Long-Term Scrap Metals".
Imported scrap metals	Scrap metals imported from other countries.

Table 1: Classification of Scrap Metals (by Source).
Data source: GEP Research.

The scrap metal recovery commonly refers to the recovery of waste hardware and non-ferrous metals, such as phosphor copper, rose copper, copper bush, cupronickel, red copper, bronze (62#, 65#), brass, enamelled copper wire, copper scrap, aluminum, stainless steel (316.316L.304.301 .202), stainless iron, zinc alloy (slag), lead, industrial iron, gold-plated products, and silver-plated products.

1.2. Management System and Import Policies for the Scrap Metal Resource Recovery and Treatment Industry

1.2.1. Management System of the Waste Metal Resource Recovery and Treatment Industry

At present, the Ministry of Housing and Urban-Rural Development, the Ministry of Environmental Protection, the Ministry of Science and Technology, the Ministry of Finance, and other departments, mainly lead the management of livelihood garbage in China. They have divided functions and conduct supervision in coordination.

Management system of domestic waste industry	Competent department	Ministry of Housing and Urban-Rural Development
	Collaboration department	Ministry of Environmental Protection
		National Development and Reform Commission
		Ministry of Science and Technology
		Ministry of Industry and Information Technology
		Ministry of Finance
		Ministry of Land and Resources
		Ministry of Agriculture
		Ministry of Commerce

Table 2 Management system of domestic waste industry.

Data source: GEP Research.

The competent authority for the recycling industry is the Ministry of Commerce, which cooperates with the National Development and Reform Commission (Economic and Trade), the Ministry of Public Security, the State Administration for Industry and Commerce, the Ministry of Environmental Protection, the Ministry of Construction, the Urban and Rural Planning Departments, and other administrative departments.

Management system of renewable resources recycling and reclamation industry	Competent department	Ministry of Commerce
	Collaboration department	National Development and Reform Commission
		Ministry of Public Security
		Administration of Industry and Commerce
		Ministry of Environmental Protection
		Ministry of Construction
		Self-discipline organizations (Renewable Resources Recycling Industry Association)

Table 3 Management system of renewable resources recycling and reclamation industry.

Data source: GEP Research.

China National Resources Recycling Association is a state-level community organization voluntarily formed by recycling enterprises, social groups, and scientific research institutions across the country. Covering more than 10,000 enterprises in the renewable resources industry across the country, it works to serve member companies, the industry, and the government.

1.2.2. Scrap Metal Import Policies

From December 31, 2018, three kinds of metal-containing wastes were transferred from the restricted catalogue to the prohibited catalogue. The Ministry of Ecology and Environment, the Ministry of Commerce, the Development and Reform Commission, and the General Administration of Customs have issued the announcement to adjust the catalogue of imported waste management. Eight types of solid waste, such as iron, steel, copper waste and scrap, and aluminum waste and scrap, have been transferred from *the Catalogue of Solid Wastes Used as Raw Materials for Non-Restricted Imports* to *the Catalogue of Solid Waste Used as Raw Materials for Restricted Imports*, which was effective starting from July 1, 2019. Since its implementation, only qualified enterprises have been allowed to continue to import high-grade scrap steel, copper waste and scrap, and aluminum waste and scrap.

China has encouraged domestic scrap metal recycling and has tightened its scrap metal import policy. In order to achieve “zero imports” of solid waste by 2020, it is expected that scrap metal imports will decline year after year.

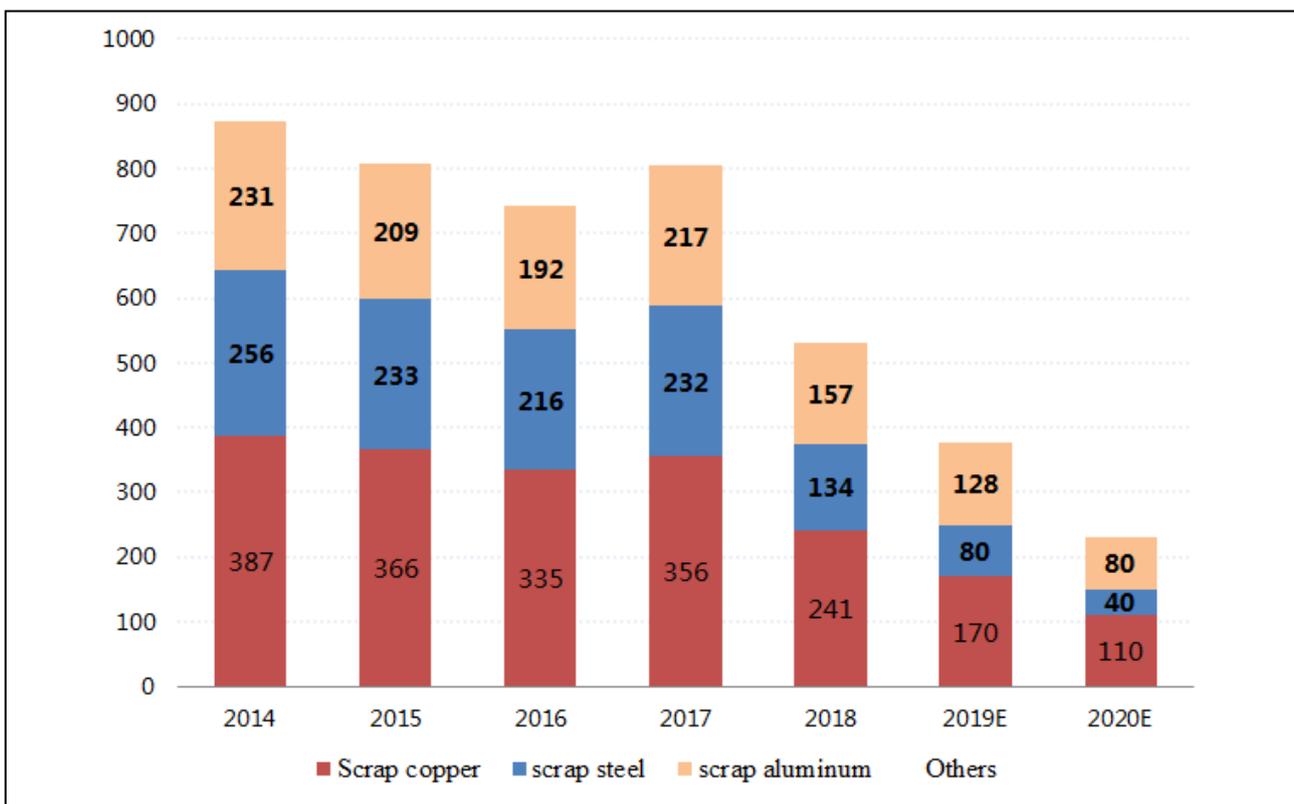


Figure 1 China's scrap metal imports. (10000 ton/Year).

Data source: General Administration of Customs.

2. Analysis of the Development of the Scrap Metal Resources Recovery and Treatment Market

2.1. Demand Analysis of the Scrap Metal Resources Recovery and Treatment Market

In 2018, China's domestic scrap metal recycling volume was about 223 million tons, and its import volume was 0.05 million tons, totalling about 230 million tons. In terms of recovered materials, most scrap metal is scrap iron and steel, with an annual recovery of more than 210 million tons, accounting for more than 95%. In terms of recycling channels, industrial sources are the main source, which account for more than 90%. In 2018, the size of China's scrap metal recycling market was about RMB 600 billion.

The domestic recycling volume of waste non-ferrous metals is increasing year by year, while the import volume is decreasing. At the same time, due to the slowdown in downstream demand and the low profitability of the enterprises, the overall supply exceeds demand and the development of the industry is not expected.

Supplies	Supply and demand	2014	2015	2016	2017	2018	2019E	2020E
Scrap Copper	Recycled	135	190	179	200	210	220	230
	Imports	388	366	335	356	241	170	110
	Reproduction	295	305	300	320	325	330	335
Scrap Aluminum	Recycled	370	400	443	500	510	520	530
	Imports	230	209	192	217	157	128	80
	Reproduction	565	575	630	690	695	710	720
Scrap lead	Recycled	160	150	165	205	220	225	235
	Imports	-	-	-	-	-	-	-
	Reproduction	160	150	165	205	225	235	250
Waste zinc	Recycled	133	136	150	160	170	185	195
	Imports	3	2	-	-	-	-	-
	Reproduction	133	137	150	160	165	170	175
Scrap non-ferrous	Recycled	798	876	937	1065	1110	1150	1190
	Imports	618	577	528	575	400	300	192
	Reproduction	1153	1167	1245	1375	1410	1445	1480

Table 4 Recycling volume, import volume and reproduction output of waste nonferrous metals.
Data source: GEP Research, General Administration of Customs, Ministry Of Commerce.

2.2. Domestic Scrap Metal Recycling

2.2.1. Status Quo of Scrap Steel Recovery

Scrap metal come from three different channels, namely self-production, import, and social recycling. The waste iron and steel enterprises own production channels. Their output is directly related to the output of crude steel. At present, the rate of self-produced scrap from Chinese steel mills is stable at about 5%, corresponding to about 40 million tons per year. Recycling scrap in society includes two major sources, domestic sources (by waste treatment plants and by scavengers) and industrial sources (processing scrap, scrap scrap).

Overall, the scrap metal industry is oversupplied. The profit reduction stage of steel mills will reduce the demand for scrap. The decline in scrap prices will reduce the supply and there will be greater flexibility at both ends of the supply and demand.

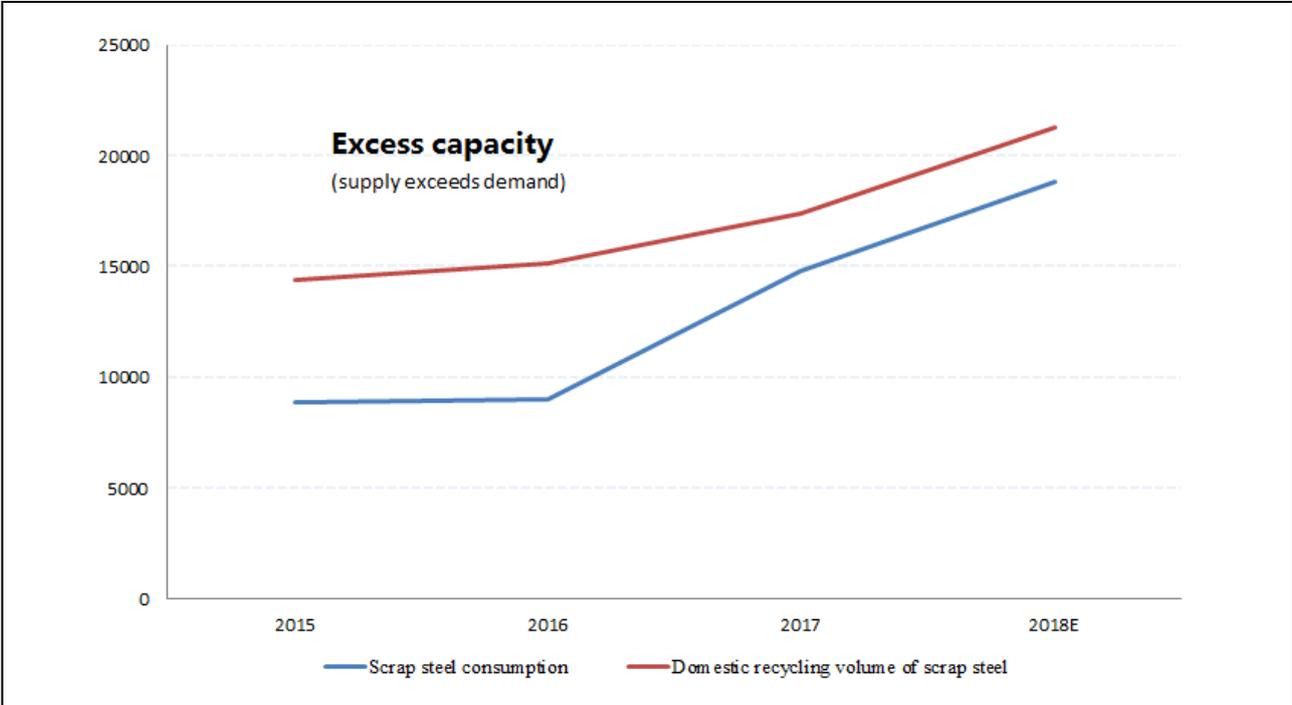


Figure 2 Overcapacity in China's scrap steel industry.
Data source: GEP Research, Ministry of Commerce.

The production areas of scrap iron are distributed unevenly in China. More than 80% of scrap iron is distributed in 12 provinces and cities, namely Liaoning, Heilongjiang (Northeast China), Beijing, Tianjin, Hebei, Shanxi (North China), Jiangsu, Shanghai, Shandong (East China), Hubei, Sichuan and Guangdong. They have relatively concentrated industrial and mining enterprises and dense population. Other regions only have less than 20% of the national scrap steel due to poor geographical conditions and relatively small population.

2.2.2. Status Quo of Cobalt Recovery

The world's cobalt reserves are about 7.1 million tons, concentrated in the DRC, Australia, Cuba, just to

name a few countries. China's cobalt reserves are about 80,000 tons, accounting for only 1% of global reserves. As it is very scarce in China, the import dependence account for 90% of the total. The secondary cobalt industry is essential to ensure domestic cobalt supply. In 2018, China's cobalt demand was about 54,000 tons, and the output of recycled cobalt was 7,800 tons.

There are many types of cobalt-containing waste materials in China, mainly including waste superalloys, waste hard alloys, and waste battery materials. Among them, waste high-temperature alloys account for 14%, waste cemented carbides account for 36%, and waste batteries account for 50%. Since 2011, due to the rapid increase in the production of lithium batteries, the proportion of domestic waste batteries in renewable cobalt sources has expanded, accounting for more than 50% in 2018.

Unit: Ton	2011	2012	2013	2014	2015	2016	2017	2018	2019E
Cobalt alloy recovery	1500	1800	2160	2592	3059	3303	3568	3853	4084
Battery cobalt recovery	1300	1586	1935	2361	2880	3312	3643	4007	4328
Total cobalt recovery	2800	3386	4095	4953	5938	6615	7211	7860	8412
Cobalt ratio in battery	46%	47%	47%	48%	48%	50%	51%	53%	56%

Table 5 Recovery of waste cobalt in China.

Data source: GEP Research, Ministry of Commerce.

3. Competition Analysis of the Scrap Metal Resources Recovery and Treatment Market in China

3.1. Supply Analysis of the Scrap Metal Resources Recovery and Treatment Market in China

In China, the recycling of scrap metals mainly includes the recycling of scrap steel and scrap non-ferrous metals (such as copper, aluminum, lead, and zinc). From the perspective of source channels, China has tightened its scrap metal import policies and has striven to achieve zero solid waste import by 2020, with a main focus on the domestic scrap metal recycling. From the perspective of supply-demand relations, the scrap steel industry in China remains in an oversupply state, with a relatively low gross profit margin for enterprises (not higher than 10%). At present, some companies in the scrap metal recycling industry are working in the end-of-life vehicles disassembling business field, among which the major companies and their development overview are as follows:

1. Ye Chiu. It is engaged in the domestic aluminum resources recycling, in overseas vehicle dismantling and then in the layout of the domestic vehicle dismantling field. In addition, the company acquired Metalico (a listed renewable resources recycling company in the United States that focuses on vehicle dismantling).
2. Chiho Environmental Group. It makes layout in the secondary metal and environmental protection industries. At the end of 2016, it acquired the German metal recycling company Scholz Group.
3. Gezhouba. It is a secondary metal company throughout the whole industry chain, which has integrated recycling, dismantling, pre-treatment, smelting, deep processing, and fine machining (research and development).
4. GEM. It mainly collects waste cobalt, nickel, tungsten, and electronic wastes. It also lays out the recycling industry chain with the strategy of "urban mines + new energy materials", and works in the end-of-life vehicles disassembling field.
5. Miracle Automation. It is a listed company with layouts in the whole industry chain of automobile dismantling.
6. Longyun Environmental Protection. The company focused on the recycling and dismantling of scrapped motor vehicles, sorting and scrapping metals.
7. China Recycling. It is currently under reorganization. It needs further observations.

3.2. Price Analysis of the Scrap Metal Resources Recovery and Industry in China

The recycling price of non-ferrous domestic metal scrap is less than RMB 200 million per ton. The prices of imported non-ferrous metal scrap have rebounded since 2016.

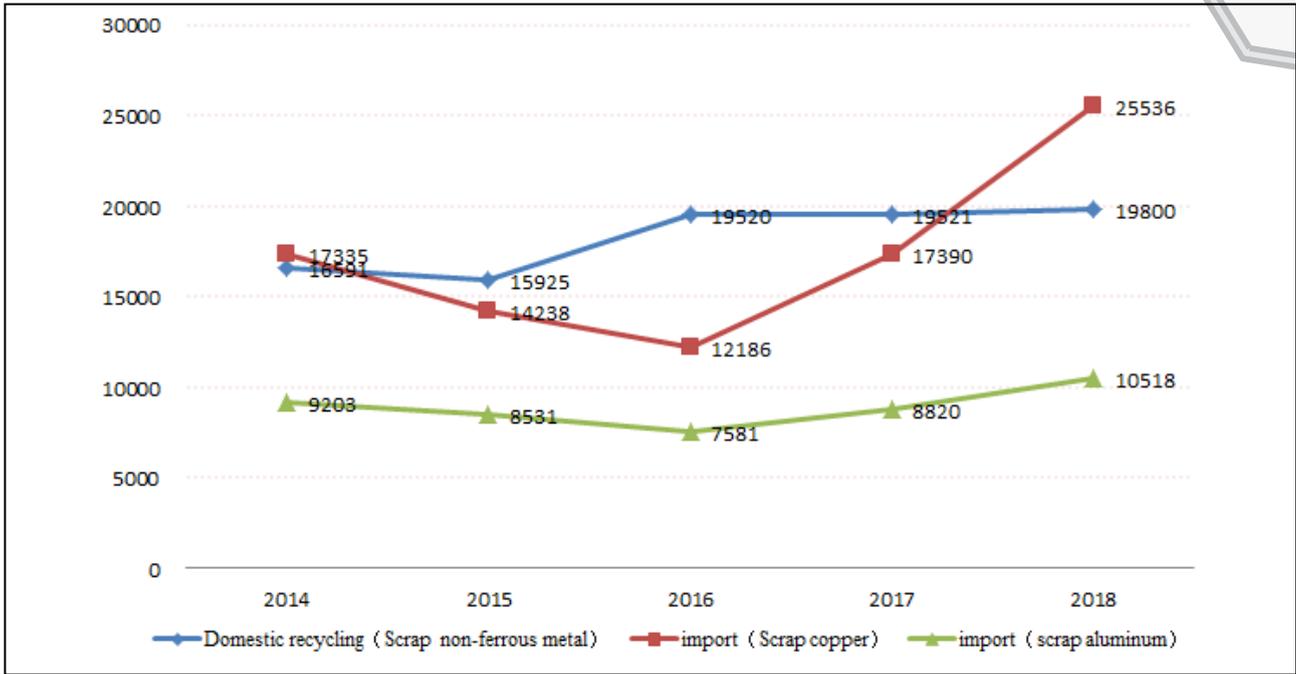


Figure 3 recycling and import prices for scrap non-ferrous metals.

Data source: GEP Research, Ministry of Commerce, General Administration of Customs.



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Sicab consortium includes five partners: Politecnico di Milano (Lead Partner), Euro-Mediterranean Center on Climate Change, Italy China Foundation, Fondazione Politecnico di Milano, Sapienza University of Rome.



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