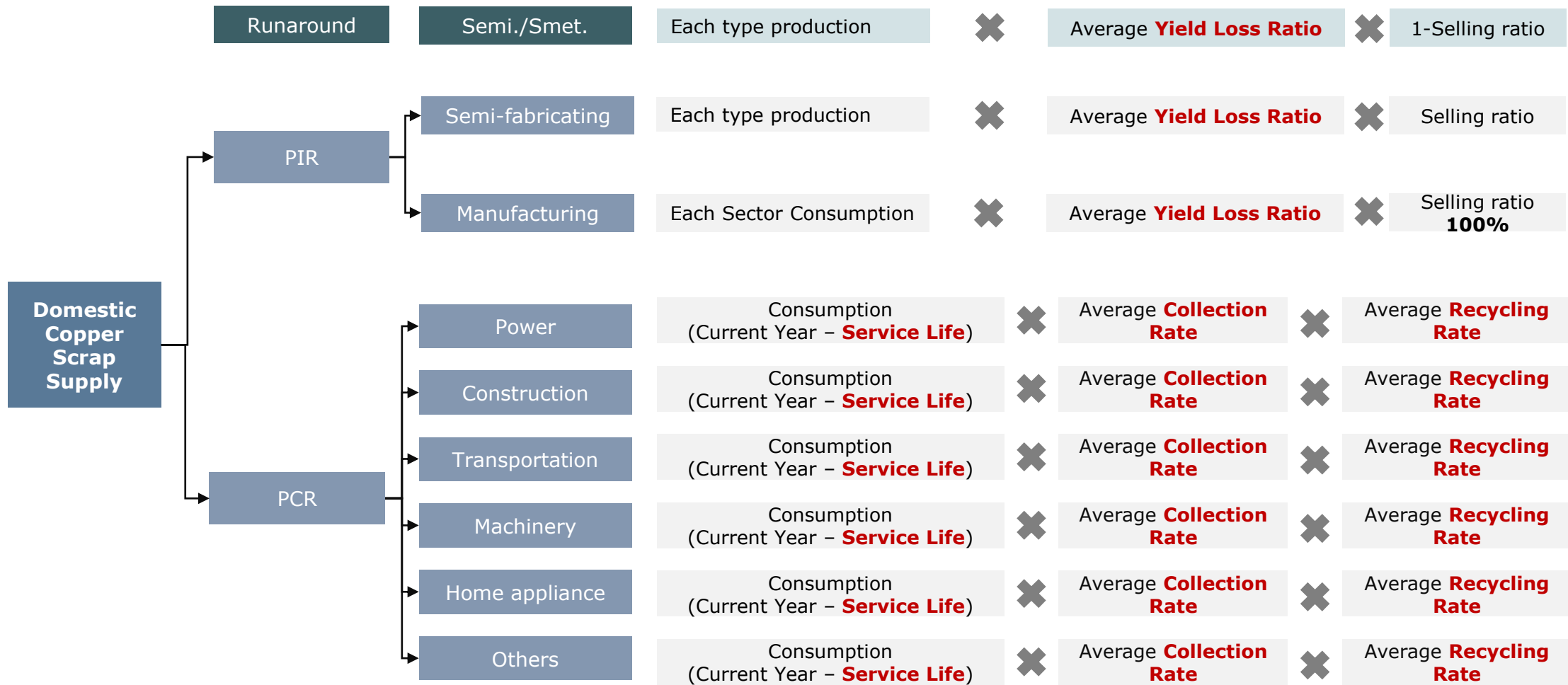


Methodology

SMM

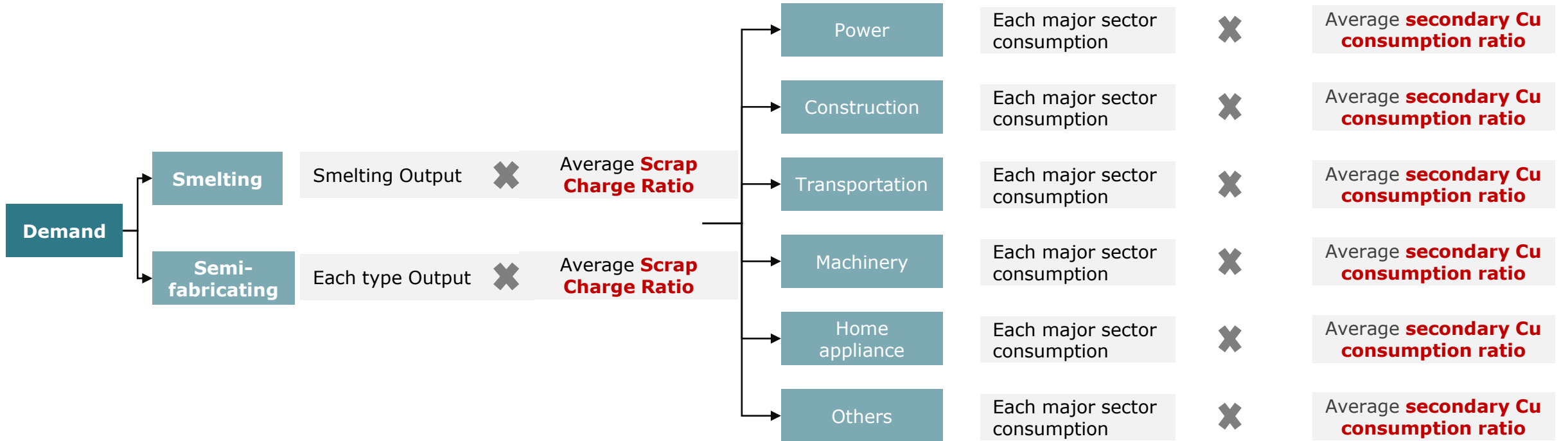
Copper Scrap Supply Methodology



Note:

1. Figures in red are key parameters and coming from SMM interviews with industry participants and industry experts.
2. Each type production of semi-fabricating includes wire, rod, plate, tube, foil, others.
3. Manufacturing sector includes power, automobile, home appliance, construction, machinery, where related metal parts are produced.
4. SMM apply a 5 year average to smooth the historical copper consumption pool for PCR collection

Copper Scrap Demand Methodology

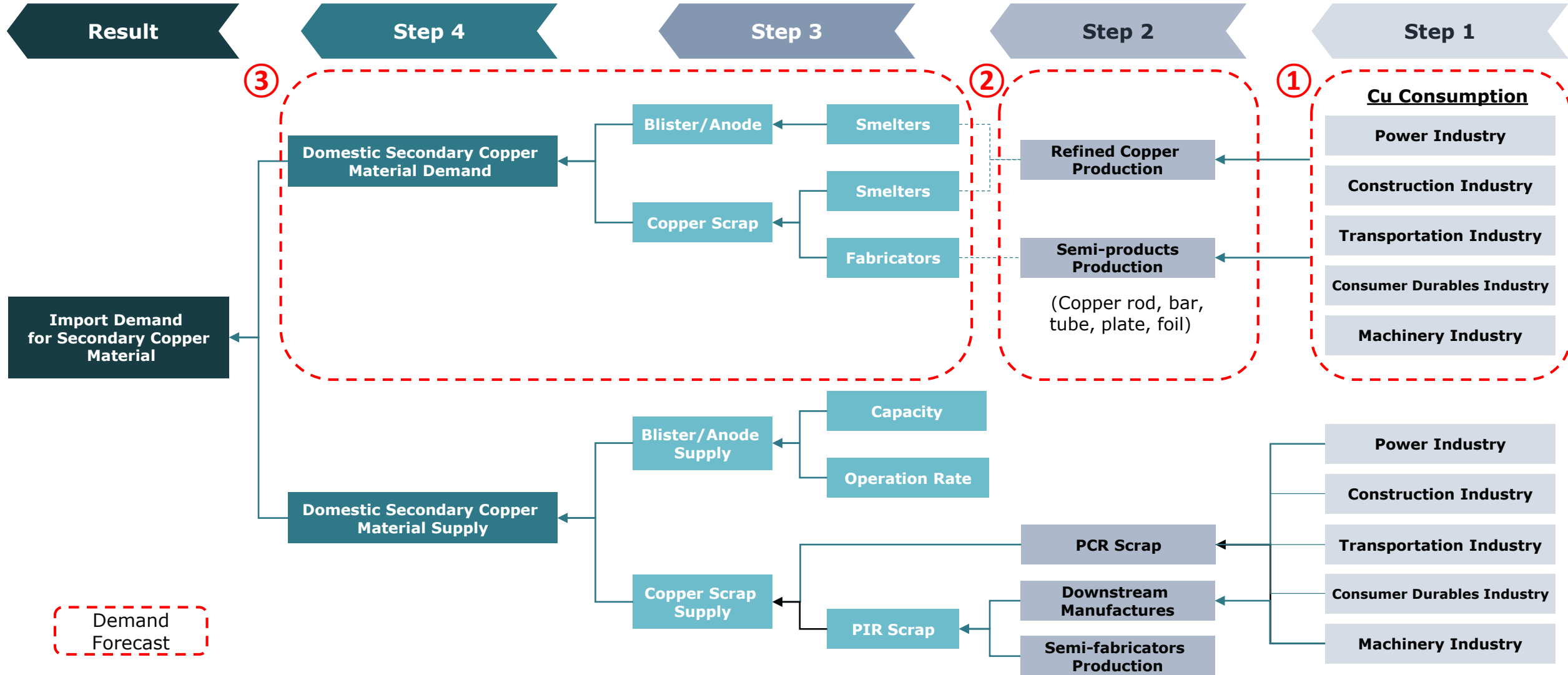


$$\text{Cu scrap import} = \text{Domestic scrap demand} - \text{Domestic scrap supply}$$

Note:

1. Figures in red are key parameters and coming from SMM interviews with industry participants and industry experts.

Secondary Copper Materials Forecast Methodology



Key Parameters

Key Parameters		Main Impact on Scrap Steel Supply
PIR Scrap	Yield Loss Ratio	<ol style="list-style-type: none"> Economy - Increasing cost efficiency to ensure the minimum yield loss Technology Evolution - Plants with advanced technology began to use computers to automatically typeset and to cut for relatively higher accuracy and yield rate Characteristics of end-of-use products - In general, smaller size or simpler structure products have higher yield rate Customized copper products - Plants can achieve low yield loss rate by customizing raw material size with copper smelters
PCR Scrap	Service Life	<ol style="list-style-type: none"> Policy <ul style="list-style-type: none"> Mandatory service life of certain products More strict emission standards has shorten the service life of backward products City planning and renovation projects speed up the service life of construction Consumption Habits - Changing consumption habits may change the service life of certain products Technology Evolution - Improving quality has made service life longer, while frequently technique upgrading of products has shorten service life
	Collection Rate	<ol style="list-style-type: none"> Policy <ul style="list-style-type: none"> VAT and subsidy policy will push both dismantling and recycling enterprises to do the collection Circular economy will also promote the development of the recycling industry Recovery Benefits- If the scrap metal price is high enough, some hidden volumes (inventory and potential scrap capacity) will return to the market Maturity of Recycling System - If the recycling system is mature, people will get used to deliver end-of-use products to qualified recycling channels rather than idled or abandoned somewhere
	Recycling Rate	<ol style="list-style-type: none"> Policy - Production responsibility extension system improve the recycling efficiency Recovery Benefits - The increasing labor and waste disposal cost will decrease the recovery benefits and incentives for dismantling and recycling Technology Evolution - Mechanization of dismantling will increase the recycling rate Characteristics of end-of-use products - Complex products forms and structures add more difficulties to the dismantling process. Moreover, miniaturization of equipment and appliances might increase the difficulty for metal scrap recovery

Yield Loss Ratio Analysis

Semi-fabricators

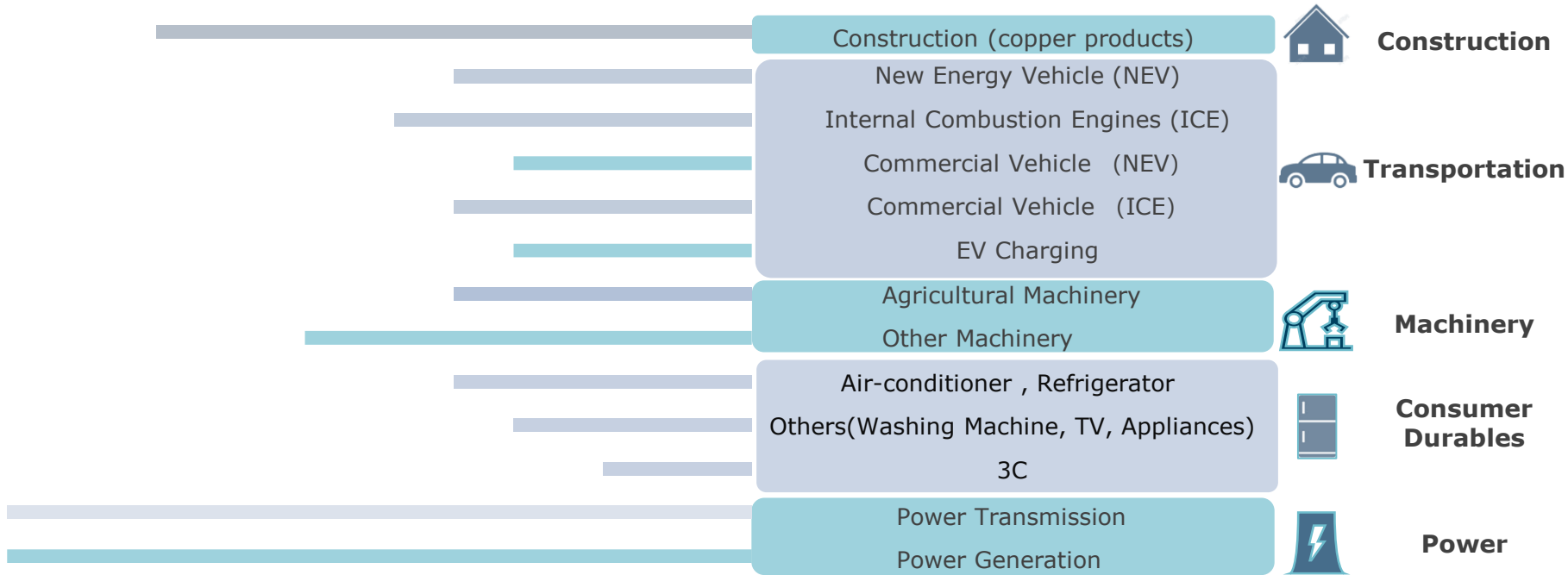
By Type	2010	2022	2035E	
Copper Rod	4%	xx	xx	↓
Copper Plate	30%	xx	xx	↓
Copper Tube	4.0%	xx	xx	↓
Copper Bar	14%	xx	xx	↓
Copper Foil	20%	xx	xx	↓

Downstream Manufacturers

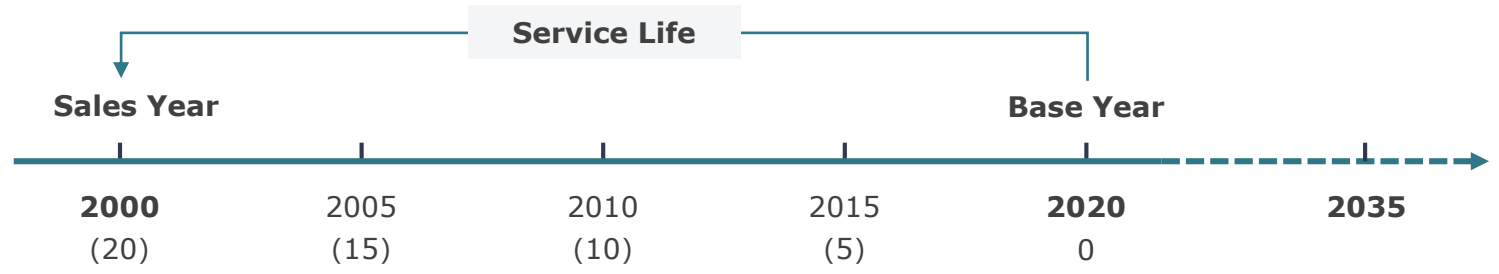
By Industry	2010	2022	2035E	
Power	5.0%	xx	xx	↓
Construction	5.5%	xx	xx	↓
Transportation	6.4%	xx	xx	↓
Consumer Durables	5.2%	xx	xx	↓
Machinery	4%	xx	xx	↓

Unit: Year

Product Service Life Assumption by Industry



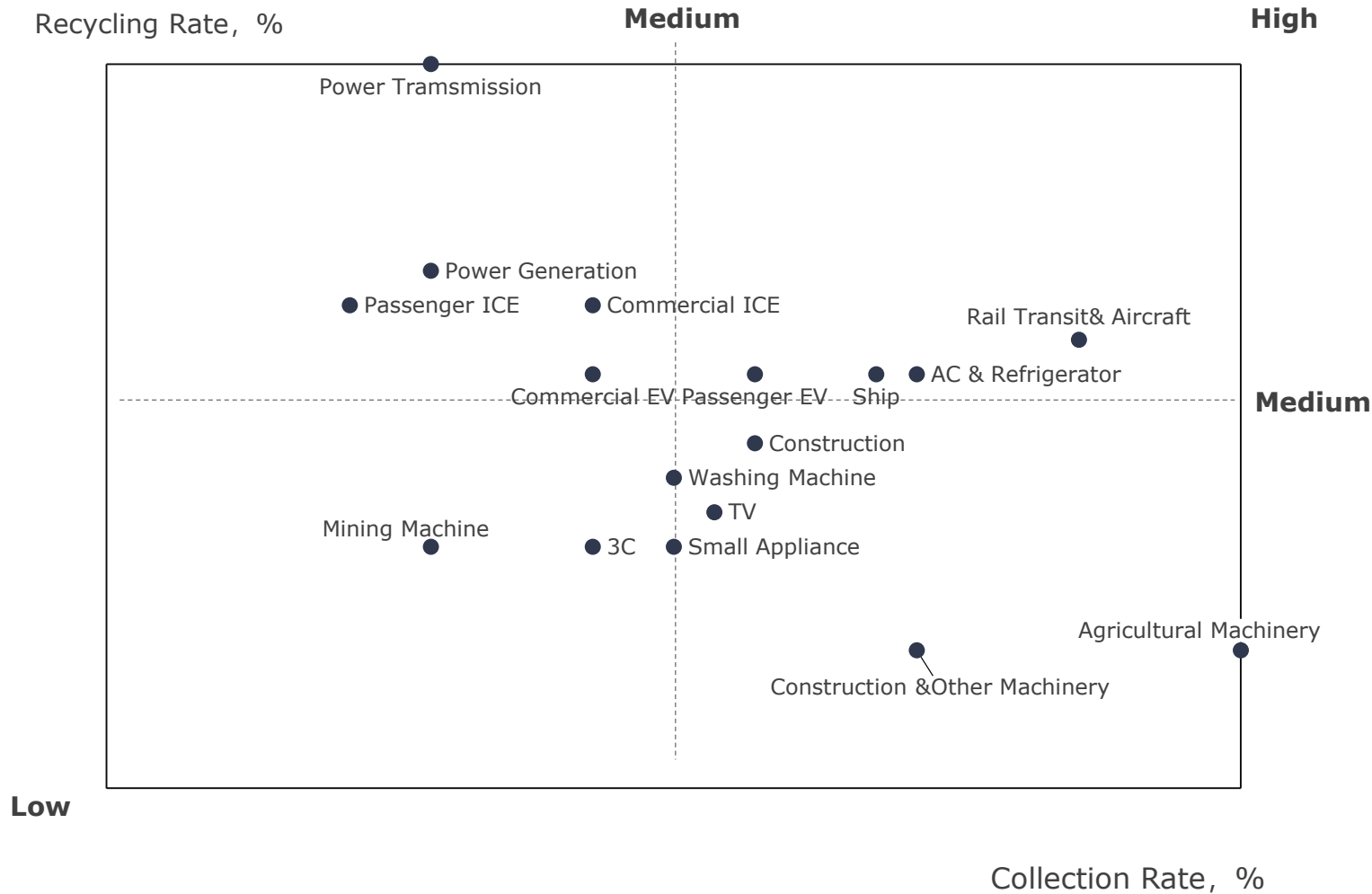
The Copper products transform into retired products and generate old scrap after serving for society for a while. Nevertheless, their lifetimes are diverse for end-use products of different categories, and SMM adopts the lifetime intervals on the basis of previous studies (Melo, 1999; Chen and Shi, 2012; Luca et al., 2013; Zhang et al., 2015a).



Taking 2020 as the base year for example, if we want to calculate the amount of PCR scrap produced in the construction industry in 2020, we need to use the newly added building area in 2000 as sales to calculate (assuming that the service life of the building is 20 years).

Source: SMM

Collection Rate and Recycling Rate



Transportation

A portion of cars that have reached their service life would enter the second-hand market after their parts are refurbished for reuse.

Construction

In China, the demolition of buildings often exceed their reasonable service life, and the recovery rate of copper products in construction is relatively low.

Power

The power industry has a long scrap cycle, and some scrap products are reused internally within the power system without flowing into the recycling system. Wires and cables are easy to disassemble with low loss rates.

Consumer Durables

The recovery rate in durable consumer goods industry is moderate, while the disassembly rate varies greatly depending on different products.

Sample Distribution

Investigate Sampling Distribution

of Investigate Samples

30



Copper Cathode Smelters

Zili (自立), Feinan (飞南), Yunnan Copper (云南铜业), East Copper (东部铜业), Jiangxi Copper (江西铜业), Shimao Copper (世茂铜业), etc.

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Copper Blister/Anode Producer

Huading Copper (华鼎), Kunpeng Copper (昆鹏), Yimen Copper (易门), Rijia Copper (日佳), Feishang Copper (飞尚), etc.

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Semi-fabricators

Jintian (金田), Walsin (华新), Zhongnan (中南), C-Kingdom (金龙), Huaze (华泽), Zhongyuan (众源), Changzhen Copper (长振), etc.

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Downstream Manufacturers

Leoni (莱尼尔), CATL (宁德时代), SVOLT (蜂巢), Haomai (豪迈电缆), Huapu (华普电缆), AUX (奥克斯), TCL, Panasonic (松下), etc.

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Dismantlers

Wanshun Cable Recycling (天津万顺), Shanghai Recycling (上海回收拆解), GEM (格林美), Chenlong Recycling (辰龙), TUS-EST (启迪), etc.

