Programme on Establishing Public-Private Partnership for Metal Recycling in Asia and the Pacific Region

REN Junshu

BCRC China / SCRCAP

2015.05.07

Basel Convention Regional Centre for Asia and the Pacific / Stockholm Convention Regional Centre for Capacity-Building and the Transfer of Technology in Asia and the Pacific

Outline

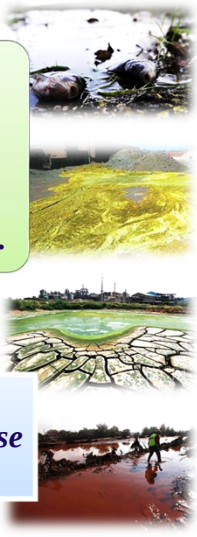
1. *Background on Metal Recycling*
2. *Benefits of Metal Recycling*
3. *Problems and objective in Asia and the Pacific*
4. *Programme—Establishing Public and Private Partnership for Metal Recycling in Asia and the Pacific Region*

Background on Metal Recycling

1. • *Informal sector of recycling causes environmental pollution.*
2. • *Metal resources reserves insufficient for consumption.*
3. • *Recovery ratio of metals is far lower than their potential*

1. Informal sector of recycling causes environmental pollution.

rapid economic development → *mining and smelting is influenced by the swelling consumption* → *global demand for metal resources sharp increase* → *serious problems to resources, energy and the environment.*



◆*Huge number of exhaust gas, waste water, residue and tailings are discharged in the process of non-ferrous metal production, which could cause environment damage.*

2. Metal resources reserves insufficient for consumption

Table 1 Worldwide reserves and service lives of non-ferrous metals

Metals	Metallic reserves / million tons	Service life / year
Cu	4900	55.1
Al	5000	334.2
Pb	120	21.4
Zn	150	23
Sn	10	41.7
Ni	540	79.6
Co	1.48	67.3
W	1.91	42.4
Mo	7.85	89.2
Ti	260	76.5

severe crisis of energy

◆*Minerals Management Services published 10 of the main non-ferrous metal reserves in the world, and then calculated their service lives according to the current level of consumption, which are shown in Table 1.*

❖ Statistics show that non-ferrous metals in the worldwide commonly have service lives ranging from 20 to 100 years.

2. Metal resources reserves insufficient for consumption

Take e-wastes for example

◆*In general，Iron and its alloys in e-waste account for 50%, followed by plastics is 21%, then non-ferrous metals is 13%.*

◆*Non-ferrous metals in e-wastes commonly posses high values for recycling, such as copper, aluminum, and precious metals.*

Table 2 Metal contents in mine and CPUs

	Grade of mine	Content in CPUs	Ratio
Au	3-6 g/t	250 g/t	40-80 times
Cu	8.7 kg/t	2000 kg/t	20-30 times
Pt	0.4 g/t	110 g/t	20-30 times

◆*Metal contents in CPUs were much higher than that in mine.*

2. Metal resources reserves insufficient for consumption

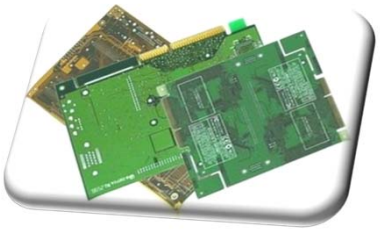
Table 3 Metal content in printed circuit boards

Metal	Content
Cu	20%
Fe	8%
Ni	2%
Sn	4%
Pb	2%
Al	2%
Zn	1%
Sd	0.40%
Au	500 g/t
Ag	1000 g/t
Pd	50 g/t

1 ton

waste print circuit boards

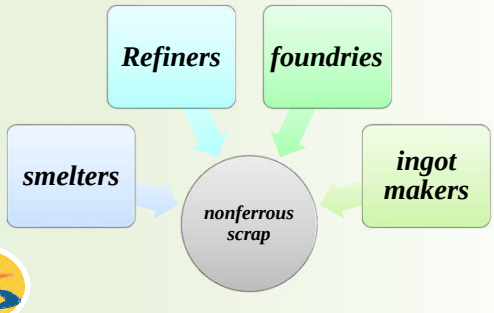
Cu	129.73 kg
Au	453.6 kg
Pb	20 kg
Sn	19.96 kg



3. Recovery ratio of metals is far lower than their potential.

Table 4 Ratios of recycling of main non-ferrous metals in the worldwide

Metal	Cu	Al	Pb	Zn
Ratio of recycling	>40%	>33%	>35%	>30%



- *As for a study from UNEP, end-of-life recycling rate of most metals is below 1% , many of which are crucial to clean technologies.*
- *40% of the world's demand for copper is using recycled material.*
- *30% of global zinc production comes from secondary zinc.*

❖ *Recycling and reuse industries of resources in Asia and the Pacific region are still in its initial stage.*

Benefits of Metal Recycling

1. • *Recycling of metal scraps **reduces energy consumption** .*
2. • *Recycling of metal scraps brings **handsome economic and social interests**.*
3. • *Recycling of metal scraps **reduces environmental pollution**.*

1. Recycling of metal scraps reduces energy consumption.

Recycling one ton of aluminium can save up

- *8 tons of bauxite*
- *14,000 kWh of energy*
- *40 barrels (6300 liters) of oil*
- *238 million Btu's of energy*
- *7.6 cubic meters of landfill*

In China, during year 2012 to 2013, 710 million tons of mine can be saved up of primary metal production.

- Recycling aluminium uses 95% less energy than producing aluminium using raw materials, which can saves enough energy to power a 100-watt bulb for four hours.
- For every single can manufactured using virgin ore, the same amount of energy used will produce 20 recycled cans.
- A used aluminium can is recycled and back on the grocery shelf in as little as 60 days.

2. Recycling of metal scraps brings handsome economic and social interests.

- ***create considerable economic benefits.***
- ***increase local employment, and mobilize development of related industrial chains.***

In the United States, non-ferrous metal scrap recycling reached 10.5 million tons in 2007, with a value of 38 billion dollars.
in North America, aluminium recycling is 5 million tons each year, almost equal with primary aluminum production, during 2006 to 2010.

Metal recycling in EU countries stands leading, with average recovery rate of non-ferrous metal has surpassed 34.7% since 2001.
Germany as the earliest one, earns 41 billion euros each year.

A report published in 2012 estimated that the proportion of materials generated from recycling industries would increase from 30% to 80% over the next 30 years, making a contribution of $3 trillion.

http://www.unep.org/resourcepanel/Publications/Recyclingratesofmetals/tabid/56073/Default.aspx

3. Recycling of metal scraps reduces environmental pollution.

Generation of secondary metal → Shorter processes → Lower energy consumption → Lower environmental pollution risk

Formal methods could reduce or even eliminate all these kinds of damage

Existing crude operations in metal scrap treatment , mining, smelting with little safeguards, result in serious injuries to human health and the environment.

Pollution causes fugitive emissions and slag containing heavy metals, also working in poorly ventilated enclosed areas without masks or technical.

Table 5 Resource saving and pollution reducing in secondary metal production

Secondary metal	Standard coal saved	Water saved	Solid waste reduced	SO_2 reduced
Cu	1054 kg	395 m^3	380 t	0.137 t
Al	3443 kg	22 m^3	20 t	
Pb	659 kg	235 m^3	128 t	0.03 t

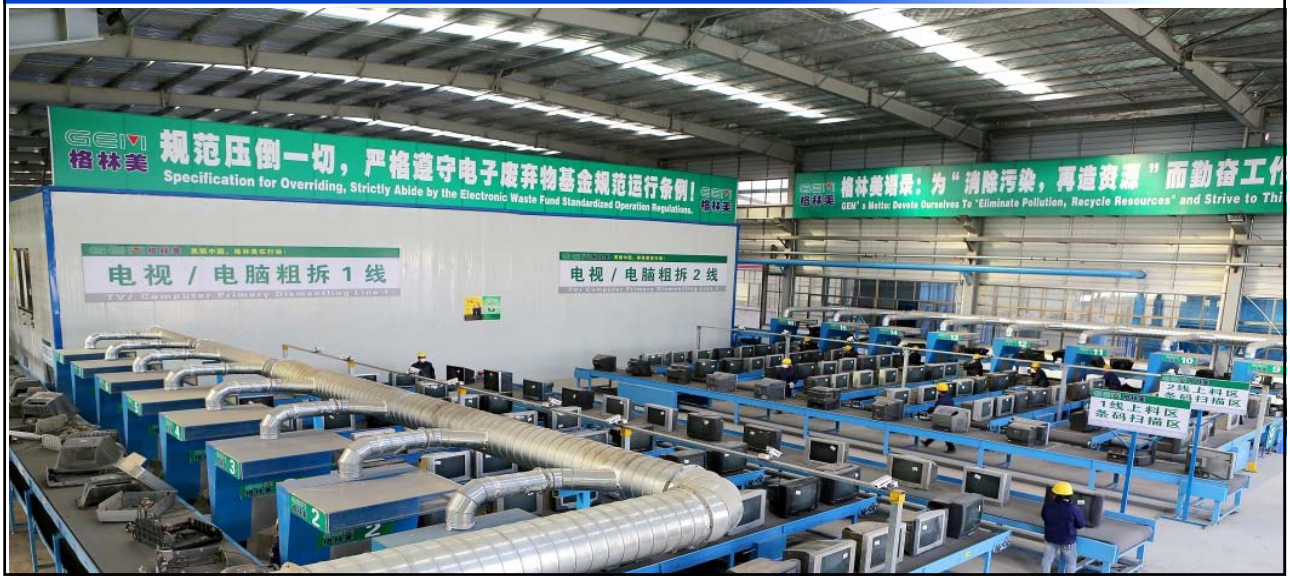
3. Recycling of metal scraps reduces environmental pollution.

Substandard informal sector before the year 2010;

Formal treatment of E-waste

3. Recycling of metal scraps reduces environmental pollution.

Formal treatment of E-waste



3. Recycling of metal scraps reduces environmental pollution.

Formal treatment of CRT

3. Recycling of metal scraps reduces environmental pollution.

Formal treatment of e-waste

3. Recycling of metal scraps reduces environmental pollution.

LCD three dimensional dismantling

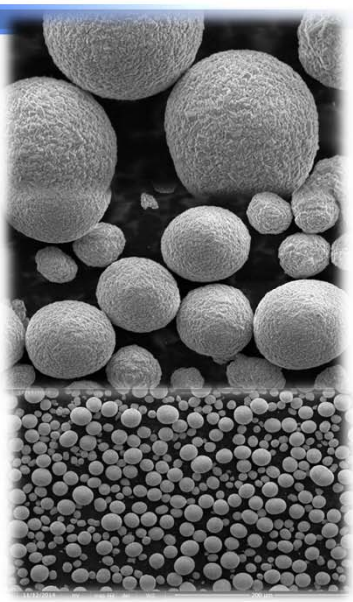
3. Recycling of metal scraps reduces environmental pollution.

NCM material Production line

18

3. Recycling of metal scraps reduces environmental pollution.

The Plant of NCA，300 tons/Mon



19

Problems and objective in Asia and the Pacific

1. • ***Problems of this sector in Asia and the Pacific.***
2. • ***Activities to guide and promote metal recycling in these areas.***

1. Problems of this sector in Asia and the Pacific.

Problems

- Environmental protection measures
- Unsound policy system
- Poorly motivated management
- Lack of awareness
- No training mechanism for workers
- Low degree of intensive industry
- Weak research and development strength

Activities to guide and promote metal recycling in these areas

Guide and promote the industry is crucial

◆*To re-design the decision making and strengthen the guidance for resources recycling;*

◆*To improve the management system and working mechanism of resources recycling;*

◆*To set up the special mechanism (Such as EPR, the extended producers' responsibility) and preferential policies, and to strengthen the supporting capacity;*

◆*To improve the research and development of new technology and thus improving the technological development level of the overall industry;*

◆*To promote the pilot construction, development of industry synergy and supply chain;*

◆*To attract and cultivate high-tech talents.*

Programme on Establishing Public and Private partnership for Metal Recycling in Asia and the Pacific Region

1. • ***Objectives.***
2. • ***Activities.***
3. • ***Implementation and management.***

1. Objectives

- The need of industry of Asia and the Pacific
- High risk of environment from informal treatment in this densely populated region.
- Existing a huge informal sector under the subsistence pressure in this region.

1. Objectives

To improve resource utilization efficiency

To promote the development of formal metal recycling industry

To initiate and set up public propaganda and education demonstration

To cultivate high level talents of management and technique

Protect the ecological environment and human health

Metal recycling industry in countries in Asia and the Pacific region show up obvious gaps when compared to those in developed countries. For example, according to the current level of recycling, steel scrap smelting make up nearly 80% of steel products in both European and the United States, while this indicator in Asia and the Pacific Region reaches only 14% in 2010.

2. Activities

◆1 Establish regional metal recycling forum for information sharing;

◆2 Set up 3R information centre for typical metal;

◆3 Develop resource recycling demonstration projects for promoting technology progress;

◆4 Select enterprise as comprehensive propaganda and education demonstration base for forming a social environment to supporting advanced metal recycling;

◆5 Build resource recycling technology transfer platform;

◆6 Set up resource recycling awards;

◆7 Establish high-level talents network on metal recycling and resource management.

2. Activities

1. Establish regional metal resources recycling forum for information sharing

- ***To establish a regional platform***
  - ***To exchange of academic and technical information***
  - ***by organize regional and international conferences and seminars,***
  - ***for the implementation and information sharing of projects***
  - ***on metal recycling by a variety of means together with metal recycling industries, governments, research institutions and experts;***
- ***To promote the propaganda and education***
  - ***On resource recycling and environmental sustainable development in different forms***

2. Activities

2 Set up 3R information centre for typical metal

- ***To collect information related to***
  - ***resource recycling industry, such as technology, facilities, policy and programme/project,***
  - ***recycling product supply and demand, advanced professional technology and equipment, demands for personnel and technology;***
- ***To set up database and website***
  - ***in order to improve information exchange and resource sharing nationally and regionally.***

2. Activities

3 Develop resource recycling demonstration projects for promoting technology progress

- To promote and develop demonstration projects;
- To explore a series of innovative sustainable recovery technology;
- To promote enterprise technology development;
- To accelerate the transformation and improve the technological innovative capabilities of enterprises;
- To establish the communication and cooperation mechanism among stakeholders and technology assessment system, indicators for promoting technical assistance in Asia and the Pacific region.

2. Activities

4 Select enterprise as comprehensive propaganda and education demonstration base for forming a social environment to supporting advanced metal recycling

- To propose an indicator system and demonstration plan for recycling enterprises;
- To develop education training material, including on-line ;
- To develop policy and technical training programme for industry and government departments in Asia and the Pacific region with an aim to improve the management and technical level of resources recycling.

2. Activities

5 Build resource recycling technology transfer platform

- *To establish an indicator system;*
- *To collect information of best available*
- *To enhance the overall technical level*
- *to set up green corporation standards*

2. Activities

6 Set up resource recycling awards

- *By raising fund to set up Resource Recycling Awards for popularizing the formal recycling activities and encourage contribution from academy, government and industry cycle;*
- *To establish a mechanism to select the winners of the award aiming at improving the visibility of the award by nomination of domestic and international resources recycling industry*

2. Activities

7 Establish high-level talents network on metal recycling and resource management

- *To establish high-level talents*
- *Promote to establish long-term cooperation*
- *To develop long-term student cultivation mechanism to improve the international training of high-level talents*

3. Implementation and management

Performing Organization

Basel Convention Regional Centre for Training and Technology Transfer for Asia and the Pacific Region (BCRC China) with the support of United Nations Environment Programme

Performing Guarantee

A steering committee will be established for the technical guidance and objective direction control, which will be comprised of UNEP/IRP, UNEP/IETC, UNEP/BRS secretariat, UNEP/Beijing, UNEP/ROAP, representatives from industry, relevant Chinese and donor government departments, and Tsinghua University.

Performing Budget

The total programme budget is $17.27 million USD.

Welcome to join us!

Metal recycling companies are willing to provide a start-up capital of $1 million for starting this programme now.

3. Implementation and management

The 10th International Conference on Waste Management and Technology

October 28-30, 2015, Mianyang, China

http://2015.icwmt.org

Tel: 86-10-62794351
E-mail: icwmt@tsinghua.edu.cn
Website: http://2015.icwmt.org

Thank you !

Unit: BCRC China
Tel: 010-62794351
Email: bccc@tsinghua.edu.cn
Website: http://www.bcrc.cn