

# Management of PBDEs Flame Retarded Plastics from WEEE in China



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**China**

# Outline

- ❖ PBDEs and Stockholm Convention
- ❖ Status of Production and Consumption of PBDEs in China
- ❖ Status of Production of Electrical and Electronic Equipment in China
- ❖ Status of Waste Electrical and Electronic Equipment in China
- ❖ Management status of E-waste in China
- ❖ Status of recycling of plastic wastes



# What are PBDEs?

- ❖ Polybrominated diphenyl ethers are a group of industrial aromatic organobromine chemicals that have been used since the 1970s as additive flame retardants in a wide range of — mainly — consumer products. PBDEs were produced with three different degrees of bromination, and marketed as commercial PentaBDE, commercial OctaBDE and commercial DecaBDE.



# PBDEs and Stockholm Convention

- ❖ Four kinds of PBDEs, tetraBDE, PentaBDE, HexaBDE and HeptaBDE are listed in Annex A in stockholm convention on the fourth COP in May,2009. They must be phased out before 2030.
- ❖ The decision on the fifth COP (April, 2011), PBDEs-containing wastes should be separated from waste flow and soundly managed



# Three commercial PBDEs in China

## ➤ OctaBDE

China never produces OctaBDE.

## ➤ PentaBDE

PentaBDE production thoroughly stopped before year 2004 in China.

## ➤ DecaBDE

From 1990s, China is producing DecaBDE. The production capacity is 23 thousand tons, In which 99% is used in plastics. 70% of the flame retarded plastics are used in electrical and electronic equipment.

DecaBDE always used in plastics with  $\text{Sb}_2\text{O}_3$

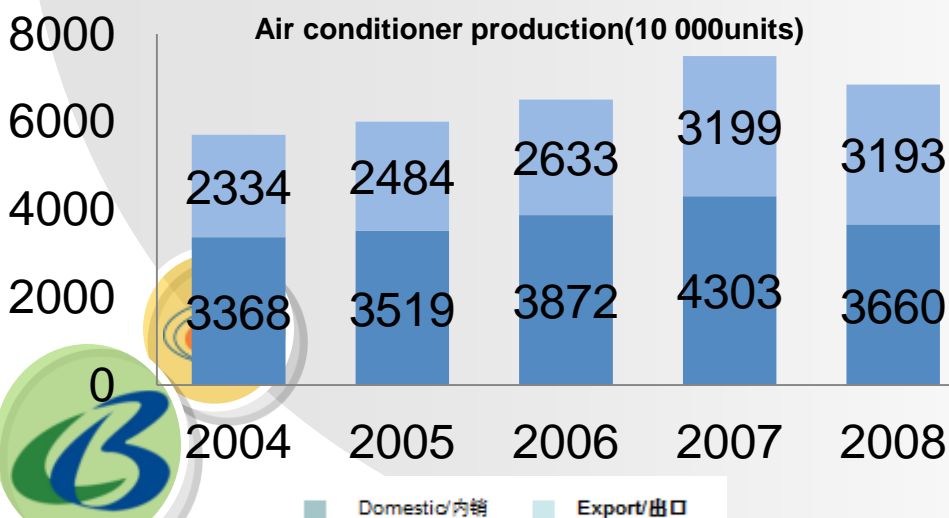
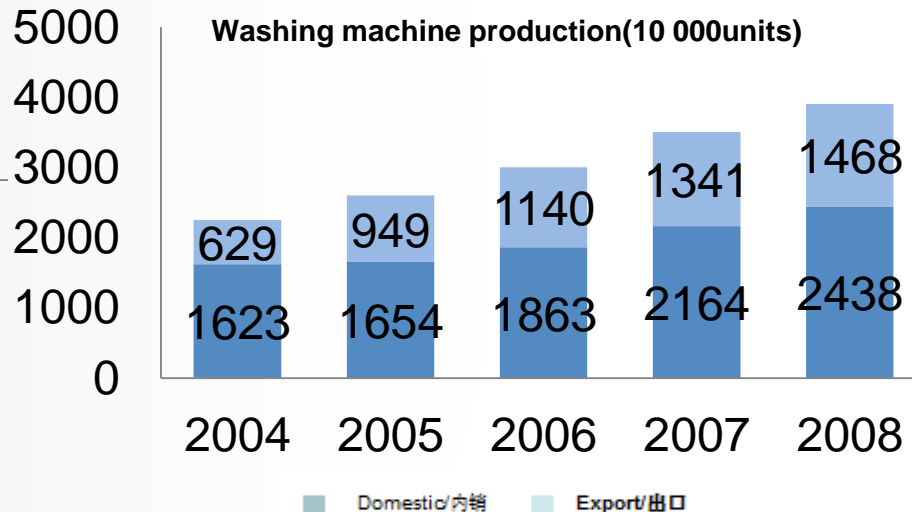
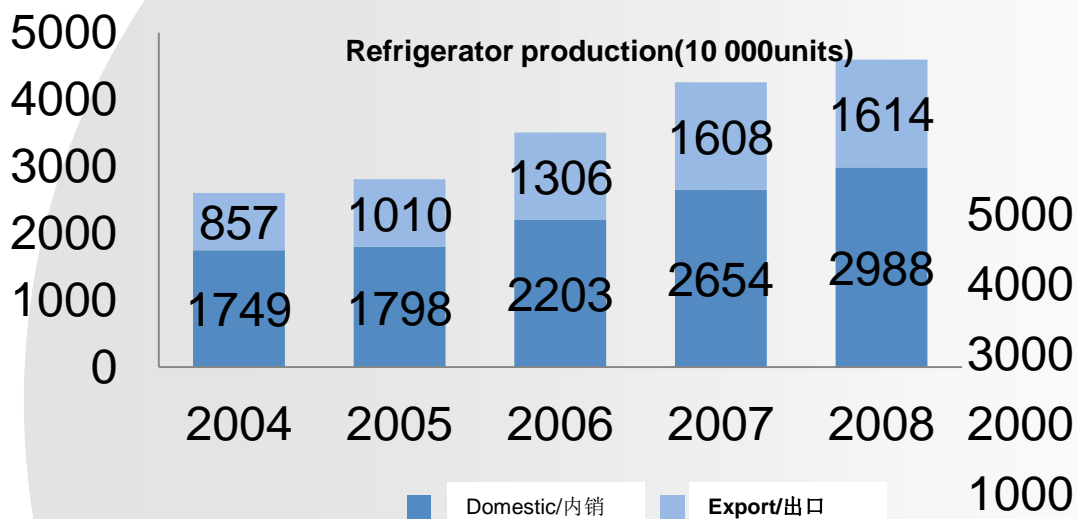


# Status of Production of Electrical and Electronic Equipment in China



# Production

## Main White Goods Production in China

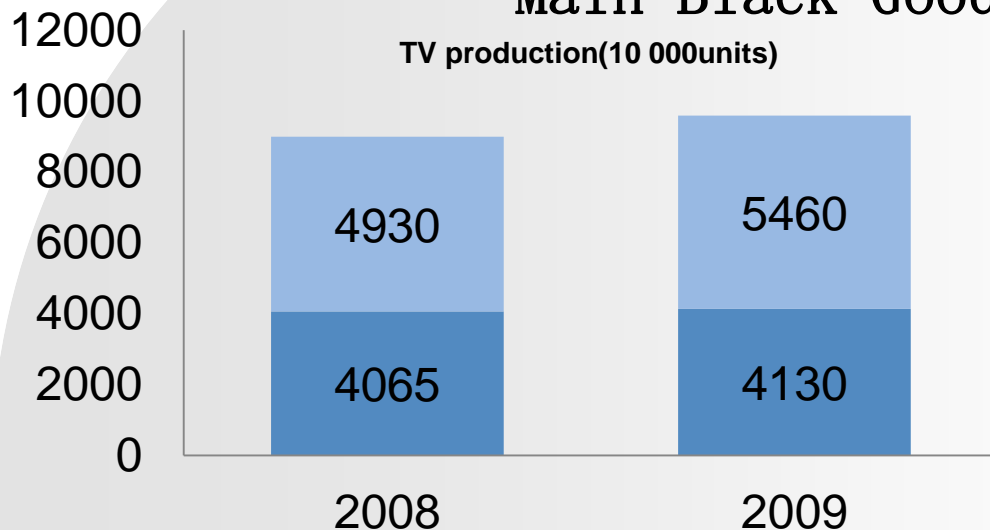


- First scale of main white goods production.
- The biggest consumption market in the world.

# Production

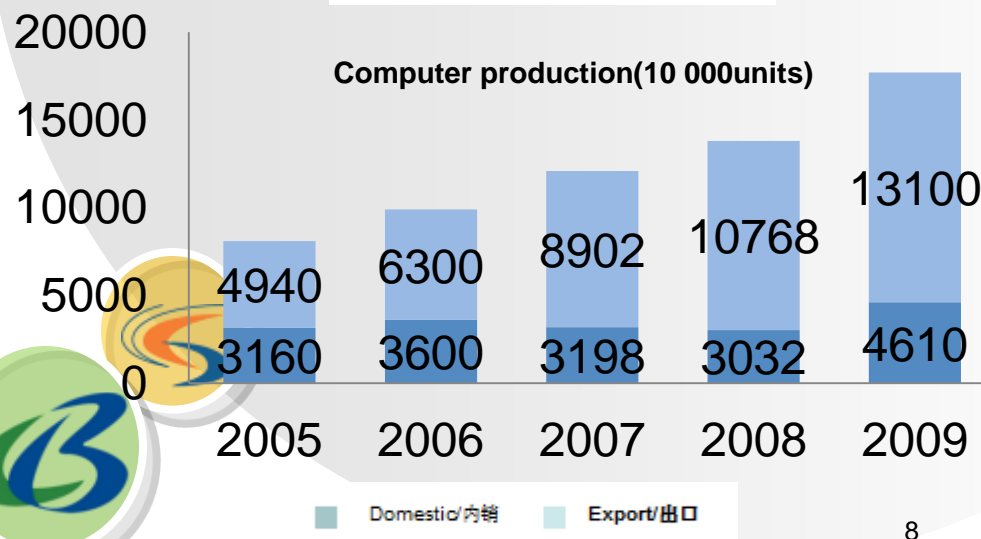
## Main Black Goods Production

TV production(10 000units)



- First scale of main black goods production.
- The biggest consumption market in the world.

Computer production(10 000units)





# Status of Waste Electrical and Electronic Equipment in China



# Consumption and discarded situation

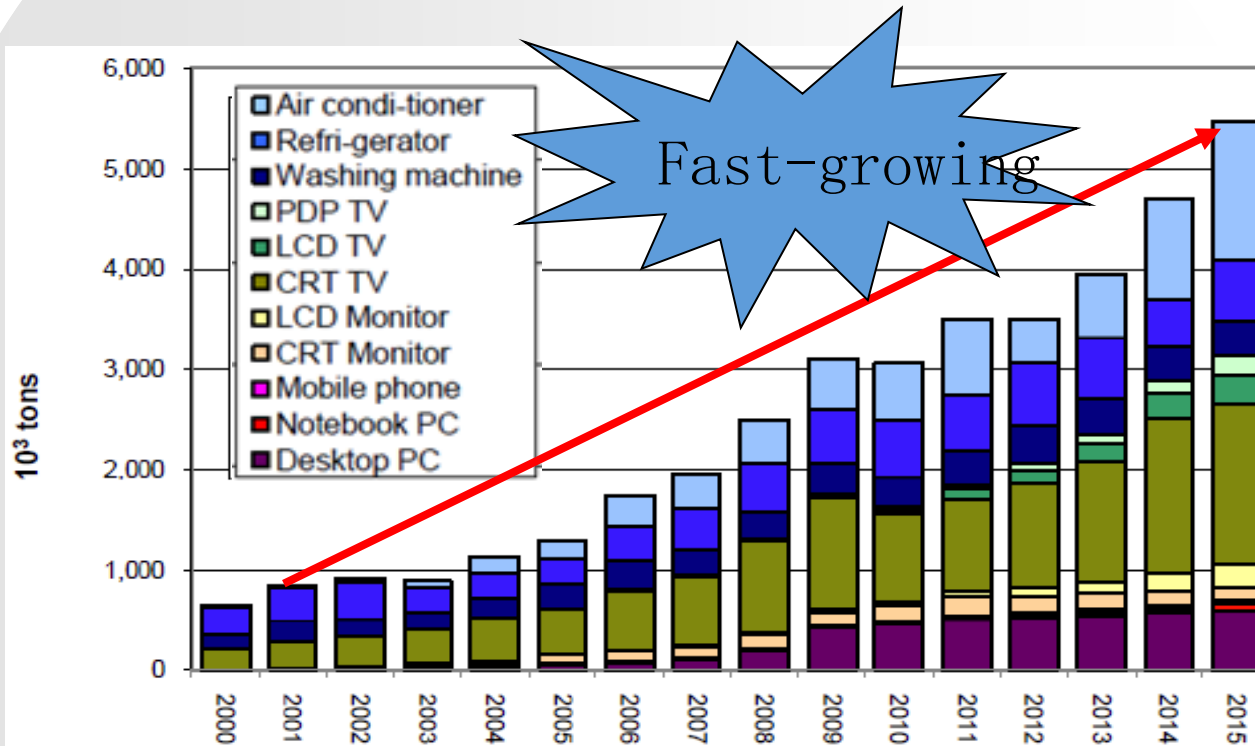
The lifecycle of main electrical and electronic products in China

Products	Lifecycle
Television	10-16years
Refrigerator	10-16years
Washing-machine	10-16years
Air condition	10-16years
Computer	4-6years



# Consumption and discarded situation

## Tendency of WEEE generation in China



In China, the amount of E-waste generation increased fast, large base. The amount is expected to reach 4.0 million tons in 2013

Estimates for domestically-generated e-waste in China



# Management Status of Waste Electrical and Electronic Equipment in China



# Laws and regulation on e-waste treatment

- The Regulations for the Administration of Recycling and Treatment of Waste Electric and Electronic Equipment
- Pollution Control Technical Policy on Abandoned household appliances and electronic products
- Administrative Measures for the Prevention and Control of Environmental Pollution by Electronic Waste

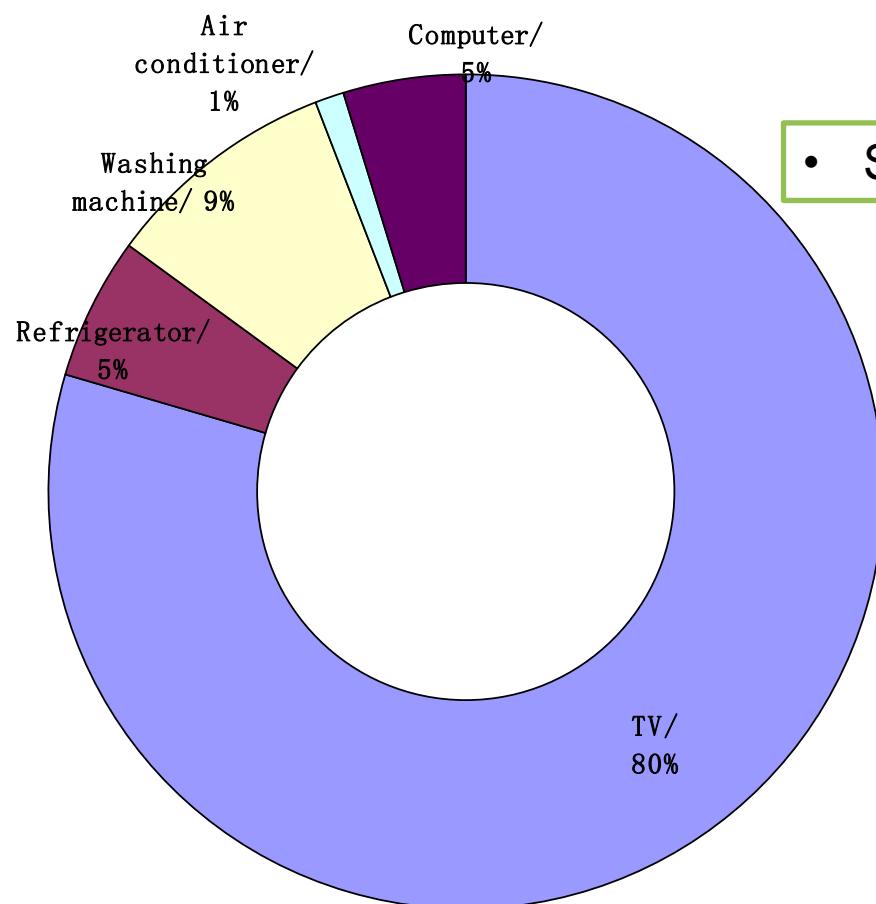
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# The Status of WEEE Collection in China

## Policy for “Old for New”

“Old for new” policy, June, 2009–December, 2011



- Subsidy for 5 types of WEEE

According to the MoC, until the end of **November 31, 2011**, **95.48 million** units of waste household appliances were collected.

# Treatment Status of Plastic Waste from Waste Electrical and Electronic Equipment



# Plastics production from E-waste

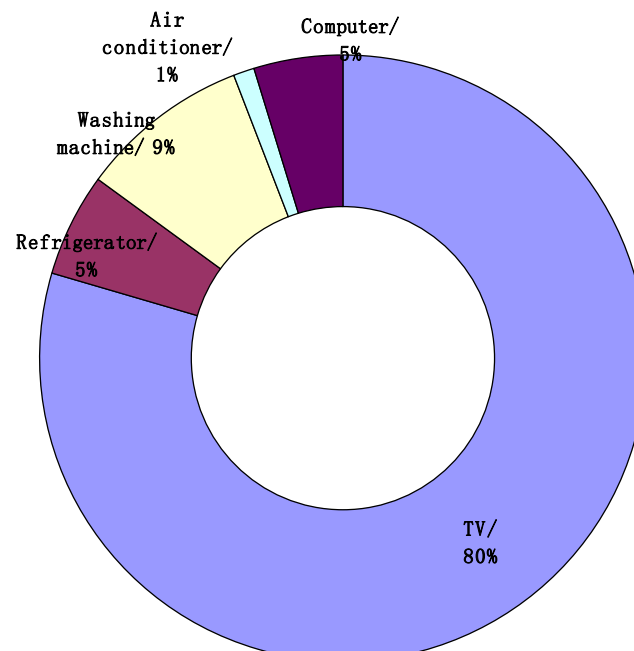
Average weight of E-products /kg

	tv	Air conditioner	Washing machine	refrigerator	computer
Average weight	38.5	63.5	35	50	5.1

Plastic containing in Five E -products

	tv	Air conditioner	Washing machine	refrigerator	computer
Average weight	25%	35%	50%	16%	25%

- ❖ Up to Dec.3, 2011, the overall recovery number of “old for new” household appliance is 954.8 thousand units. According to the weight of E products and its plastic percentage, the estimated **waste plastic from dismantling recovery household appliance is 97.1 thousand tones**. In which the **flame retarded plastics are 211 thousand tones** (about 21.7% of total). **147.7 thousand tones** of DecaBDE flame retarded plastics.





# Main processing way for plastic from WEEE



E-waste dismantling



Shells  
of  
monitors



sorting



crushing





feeding



Extruding  
and cooling



Automatic granulating

Process of regeneration of plastic waste







Products with recycled plastics





**GAR-011(WW)  
(ABS+Recycled ABS)**



# One Way of Disposal of Waste PCB



waste PCB

automatic  
dismantling



Bare  
board



components

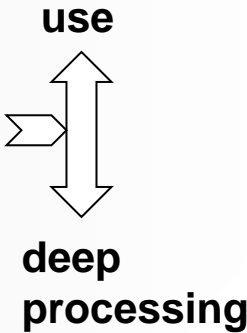
Smashed and  
Dry separation



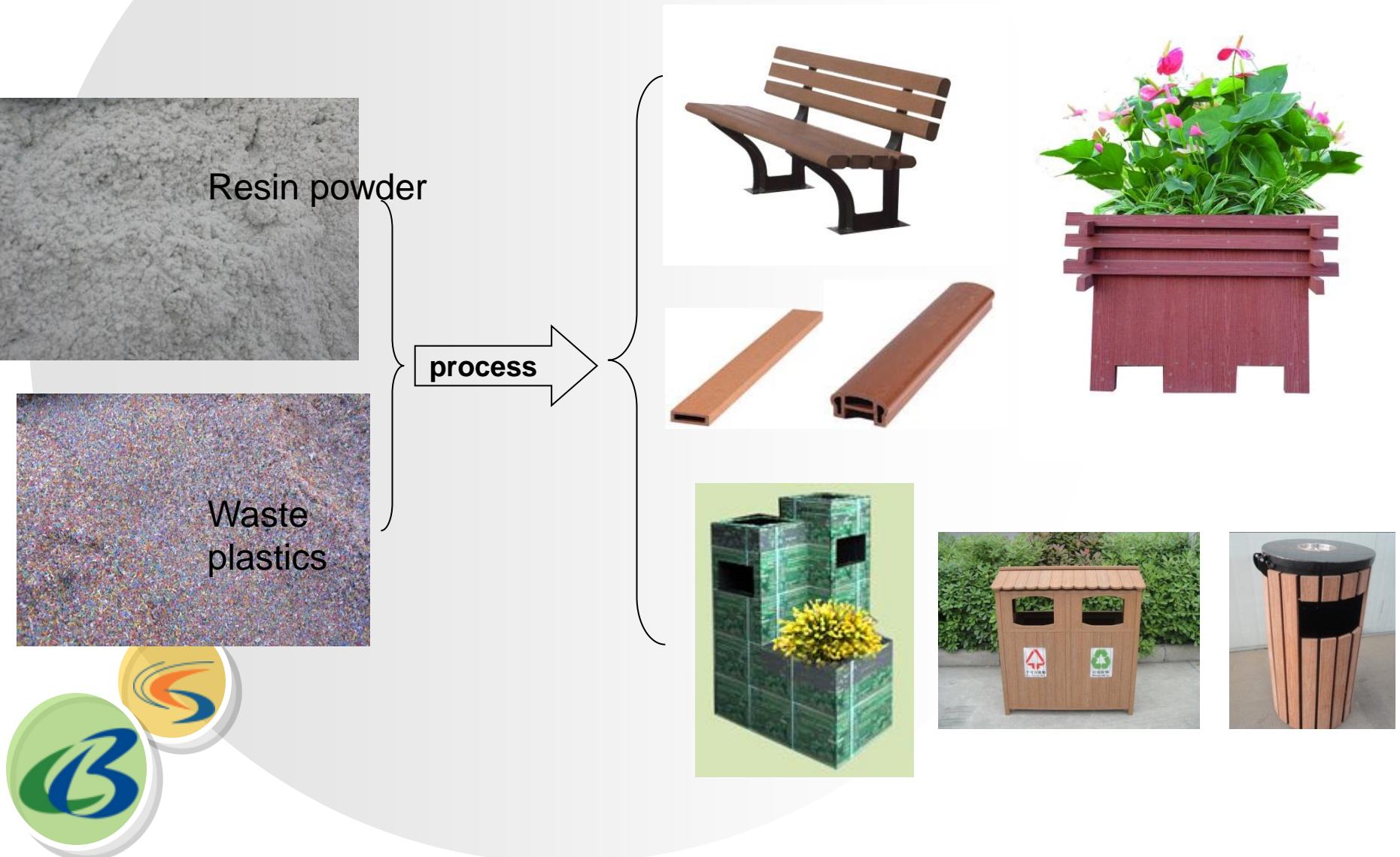
copper  
powder



resin



# Non-metal powder of printed circuit board resource utilization





# Laws and regulation e-products

- Technical Policies of Pollution Prevention and Control for Waste Household Appliances and Electronic Products

Lacking content standards of PBDEs in some other plastic products, but the standards will be developed by an e-waste project funded by GEF.



# Some projects on PBDE in BCRC/SCRC China

- Subregional Action Plan (Asia) for PBDEs Management and Reduction ,  
will funded by GEF
- Sound Management of POPs in articles and phasing out opportunities in emerging countries, Secretariat of the Basel, Rotterdam and Stockholm Conventions funded
- Study on debromination and regeneration of DecaBDE flame retarded plastics from e-waste, Key Laboratory for Solid Waste Management and Environment Safety, Ministry of Education of China funded
- Contamination characteristics of PBDE in the recycling and disposal of plastic waste from e-waste, State Key Joint Laboratory of Environment Simulation and Pollution Control funded
- Study on PBDE inventory in China, Ministry of Environment Protection funded





# Towards Ecological Civilization 迈向生态文明



## Welcome to

# The Eighth International Conference on Waste Management and Technology

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# Thanks for your attention!

