



行政院環境保護署

Environmental Protection Administration  
Executive Yuan, R.O.C. (Taiwan)

# 台灣電子廢棄物回收處理管理制度

## Update on E-Waste Management in Taiwan

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資源回收管理基金管理委員會

Resource Recycling Fund Management Board

# Outline 簡報大綱

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1. **Waste clean system and performance 廢棄物清理制度及現況**
  - Evolution of the Municipal Solid Waste system 制度沿革
  - Performance 清理成果
2. **WEEE collection system and performance 電子廢棄物回收處理制度及現況**
  - WEEE collection system 電子廢棄物回收處理制度概要
  - Recycling fee rate 回收清除處理費率
  - Performance 回收處理成果
  - System of Auditing and Certification 稽核認證系統介紹
3. **Future vision 未來展望**



# 1. Waste clean system and performance

## 廢棄物清理制度及現況



# Introduction 背景說明

## Taiwan Demographic 臺灣人口數量及地理特性

■Population: 23.2 million  
總人口數：2,320萬人

■Area: 36,000 square kilometers  
總面積：36,000 km<sup>2</sup>

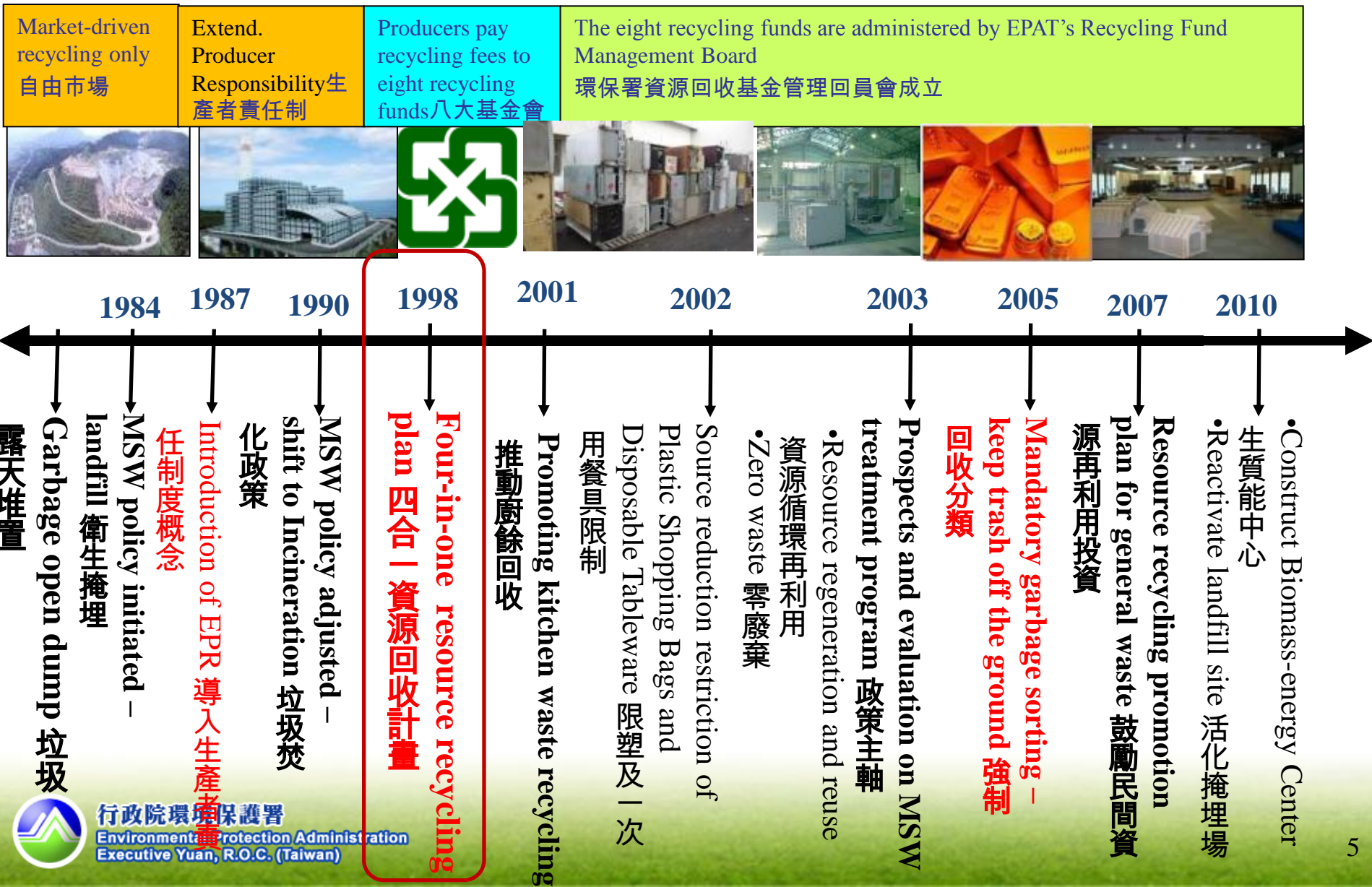
■Population Density: 641 persons/ km<sup>2</sup>  
人口密度：641人/km<sup>2</sup>





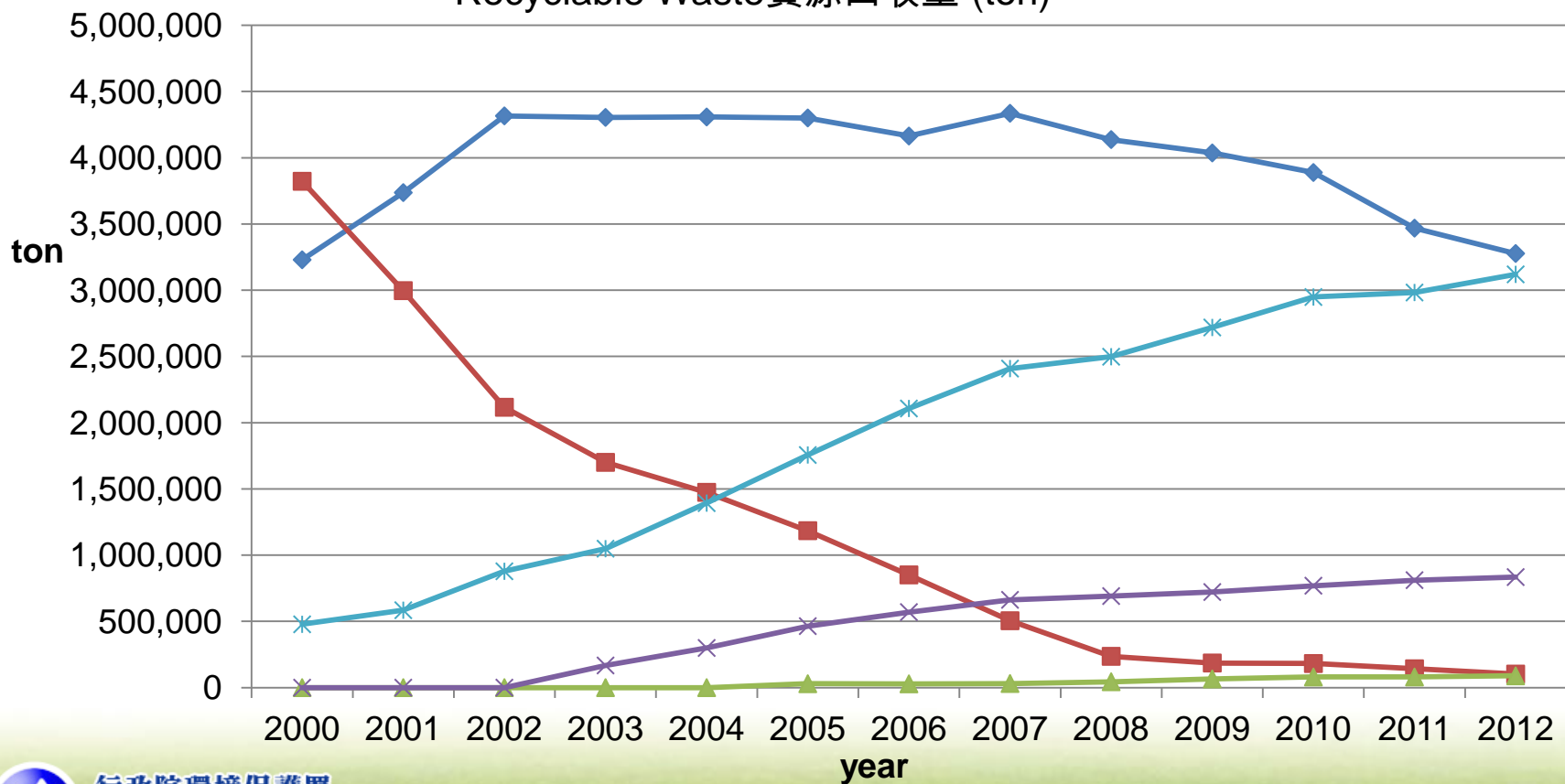
# Evolution of Municipal Solid Waste Policy

## 廢棄物管理制度沿革

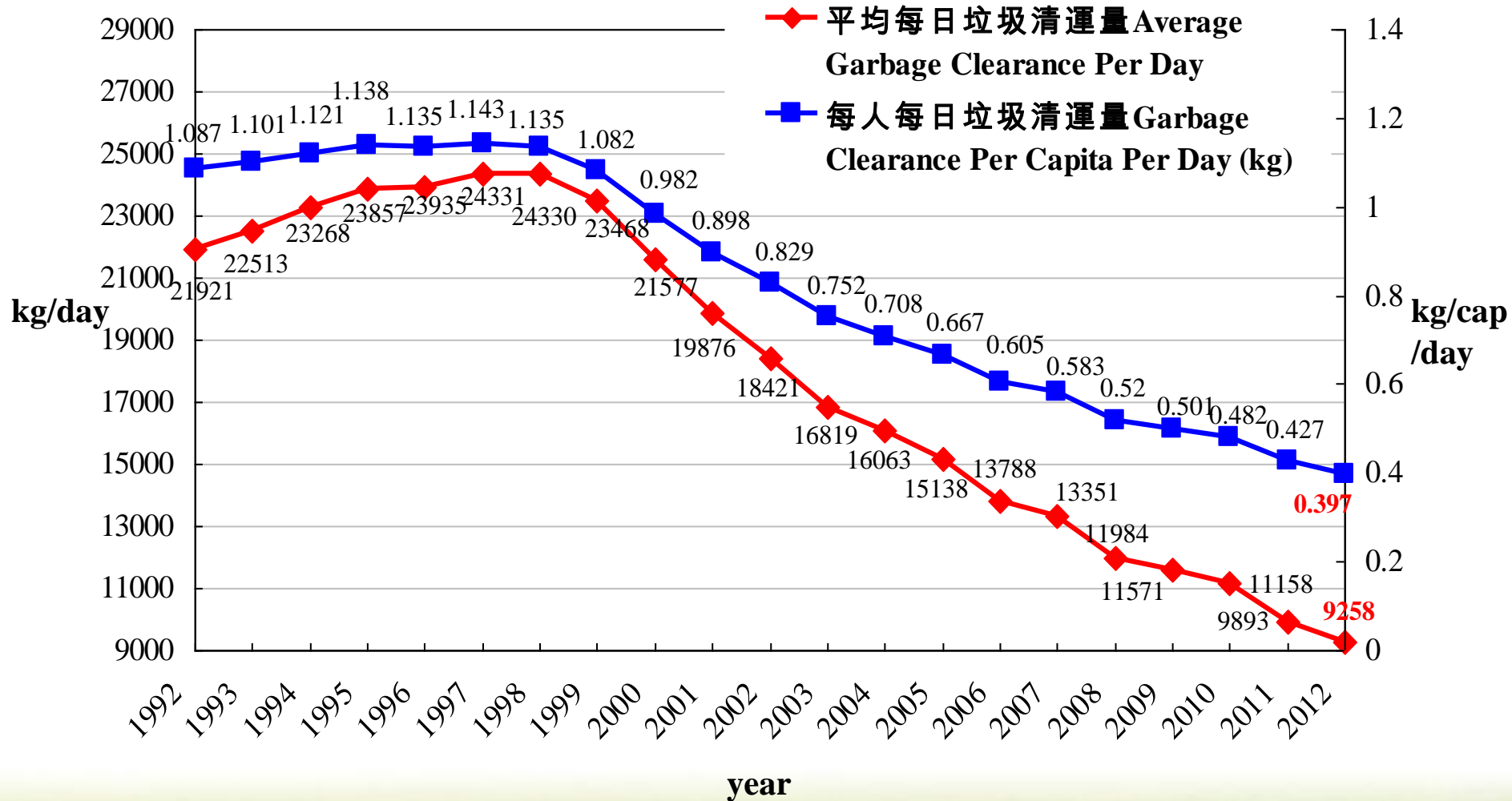


# MSW Clearance 一般廢棄物清理概況

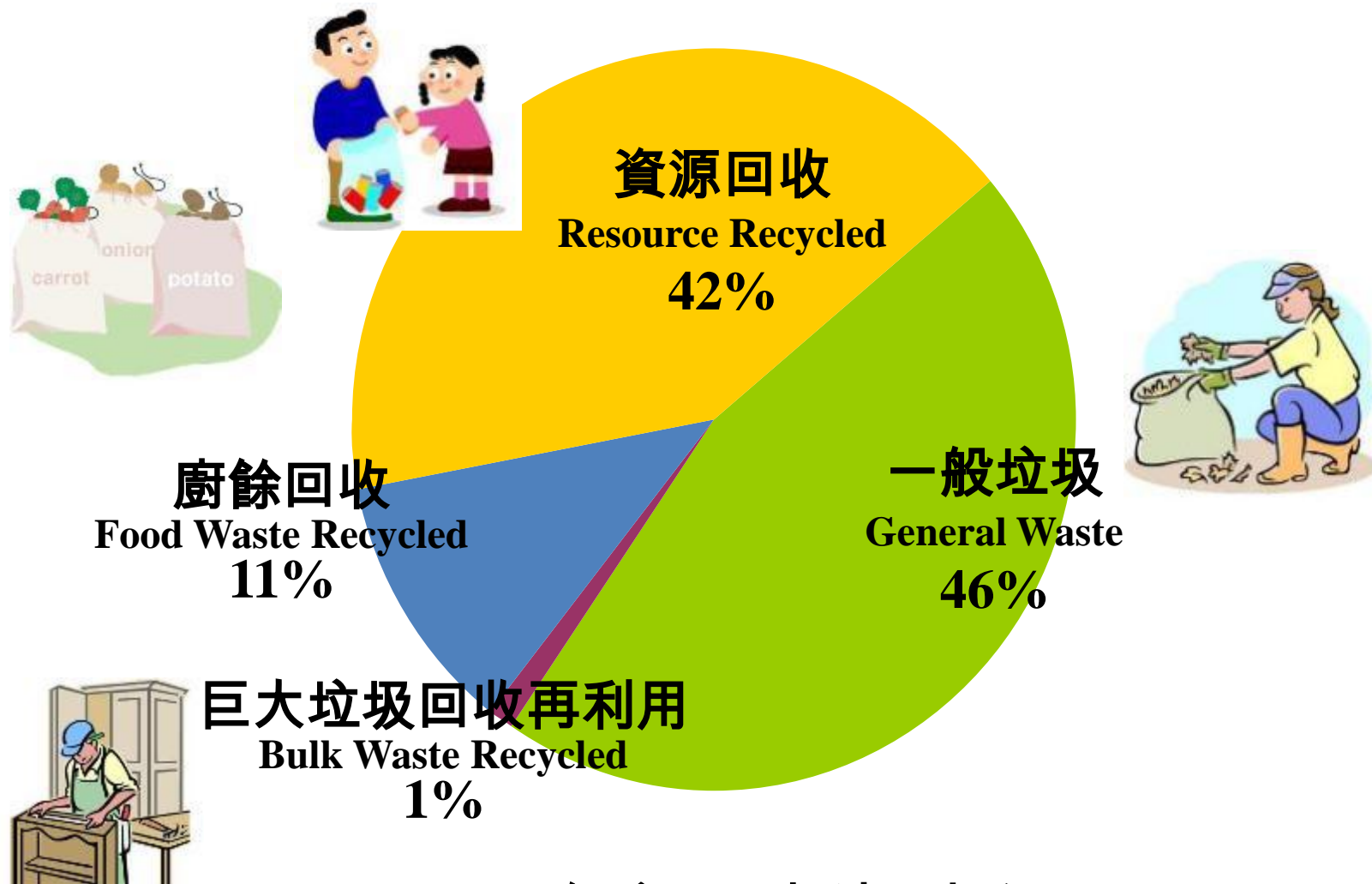
- ◆ Incineration(ton) 垃圾焚化量
- landfill(ton) 垃圾衛生掩埋量
- ▲ Bulk Waste Recycled (ton) 巨大垃圾再利用量
- × Food Waste recycled(ton) 廚餘回收量
- \* Recyclable Waste 資源回收量 (ton)



# MSW Clearance 一般廢棄物清理概況



# MSW Sorting 廢棄物分類概況



2012年垃圾分類清理概況

Municipal Solid Waste Sorting in 2012



# Clearance Structure 分類回收與清理架構



## 分3類·好OK

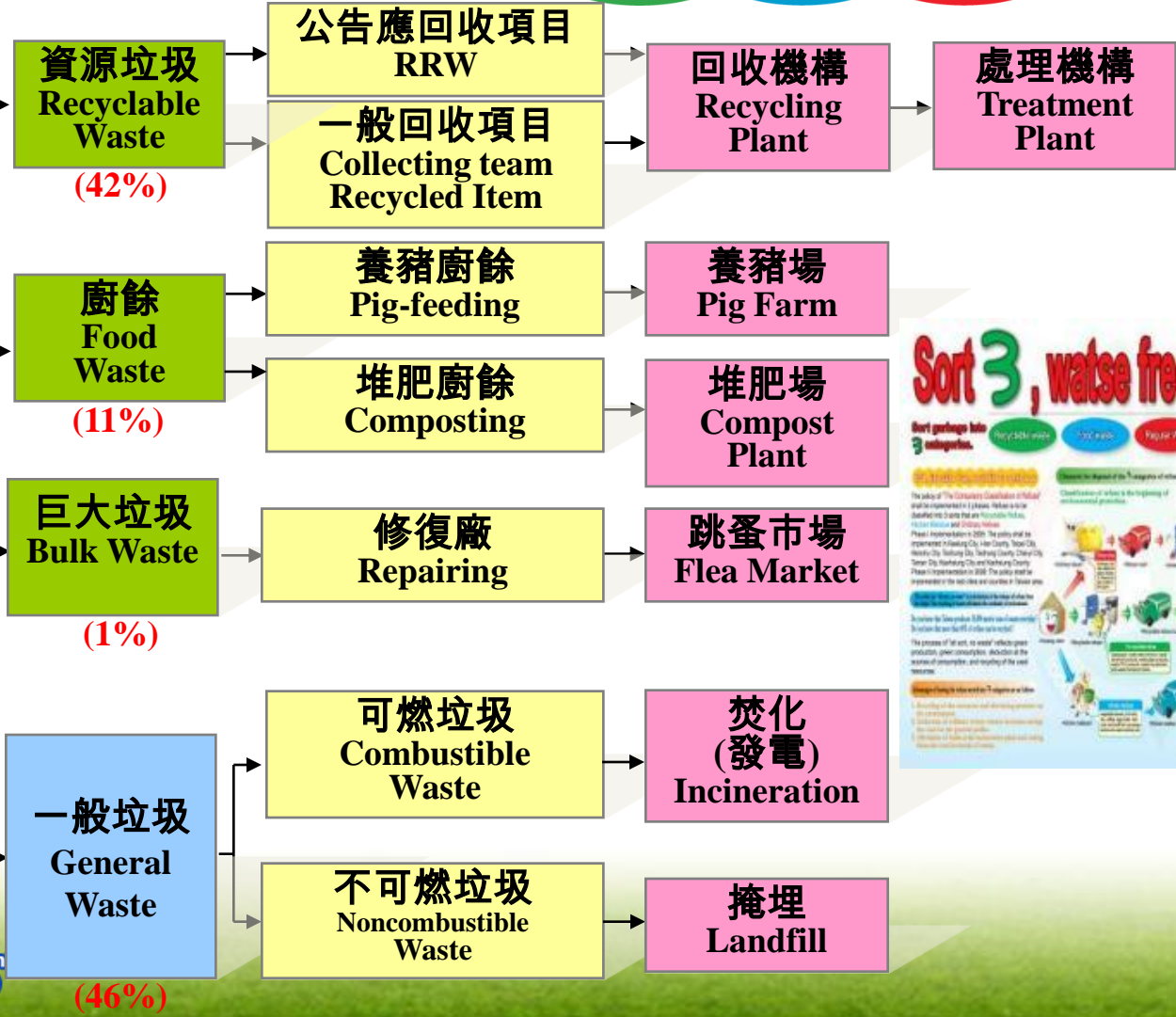


垃圾分3類 資源垃圾 廚餘 一般垃圾

**家戶垃圾**  
Municipal Solid Waste



垃圾車  
資源回收車  
廚餘回收車  
Garbage Truck  
Recycle Truck



# General Waste 一般垃圾



1. 一般垃圾  
General Waste



2. 垃圾費  
Garbage Fee



3. 清潔隊  
Municipal collection team



4. 焚化爐  
Incinerator



5. 熱能回收  
Energy Recycle



6. 底渣再利用  
Bottom Ash Recycling



# Bulk Waste 巨大垃圾



1. 廢家具 Bulk Waste



2. 廢自行車 Waste Bicycle



3. 修繕整理 Repairing



4. 再生家具 Reuse



5. 再生自行車 Bicycle



6. 跳蚤市場 Flea Market<sup>11</sup>



# Food Waste 廚餘垃圾



1. 家戶廚餘  
Food Waste



2. 清潔隊  
Municipal collection team



3. 廚餘處理  
Food Waste Treatment



4. 養豬場  
Pig Farm



5. 堆肥場  
Composting Treatment



6. 社區家庭液肥  
Composting Treatment



# Recyclable Waste 資源垃圾



1. 資源垃圾  
Recyclable Waste



2. 回收點  
Community Recycling Spot



3. 清潔隊  
Municipal collection team



4. 回收商  
Collector



5. 處理廠  
Recycler



6. 再生料  
Recovery Material

# Recyclable Waste 資源垃圾

- 執行機關一般廢棄物應回收項目

Recyclable Waste Recycled by Municipal Collection

Team

- 紙 Paper
  - 鐵 Iron
  - 鋁 Aluminum
  - 玻璃 Glass
  - 塑膠 Plastic
  - 光碟片 CDs
  - 行動電話及其充電器 Cell Phone & Charger
- 
- **責任業者無需繳費 No Recycling Fee**





# Regulated recyclable waste(RRW)

## 公告應回收廢棄物

### 容器 Containers

1.鐵容器  
Iron  
container



2.鋁容器  
Aluminum  
container



3.玻璃容器  
Glass  
container



4.紙容器  
Paper  
container



5.塑膠容器  
Plastic  
container



6.農藥廢容器  
Pesticide  
container



### 物品 Objects

7.乾電池  
General battery



8.機動車輛  
Automobile\Motorcycle



9.輪胎  
Tire



10.鉛蓄電池  
Lead-acid battery



11.資訊物品  
IT  
equipment



12.電子電器  
Home  
appliance



13.照明光源  
Light  
bulbs/tubes



## 2. WEEE collection system and performance

### 電子廢棄物回收處理制度 及現況





# Recycling Management Fund Function & Operation

## 四合一回收系統

### (1) Community residents 社區民眾

Form Community-based Recycling organization and promote separation of waste and recyclable.

社區回收點建立及民眾垃圾分類

### (4) Recycling Fund 回收基金

- Financed by producers
- RFMB plans and implements recycling programs.

建立回收處理系統，維持體系基金運作

Waste  
Generators

Private  
Recycling  
System



Funding  
Sources

Municipal  
Collection  
System

### (2) Recycling Industries 回收業者

Collect and recycle recyclable from households, communities, sellers and municipalities.

收集民眾社區清潔隊之資源物

### (3) Local Authority 地方政府

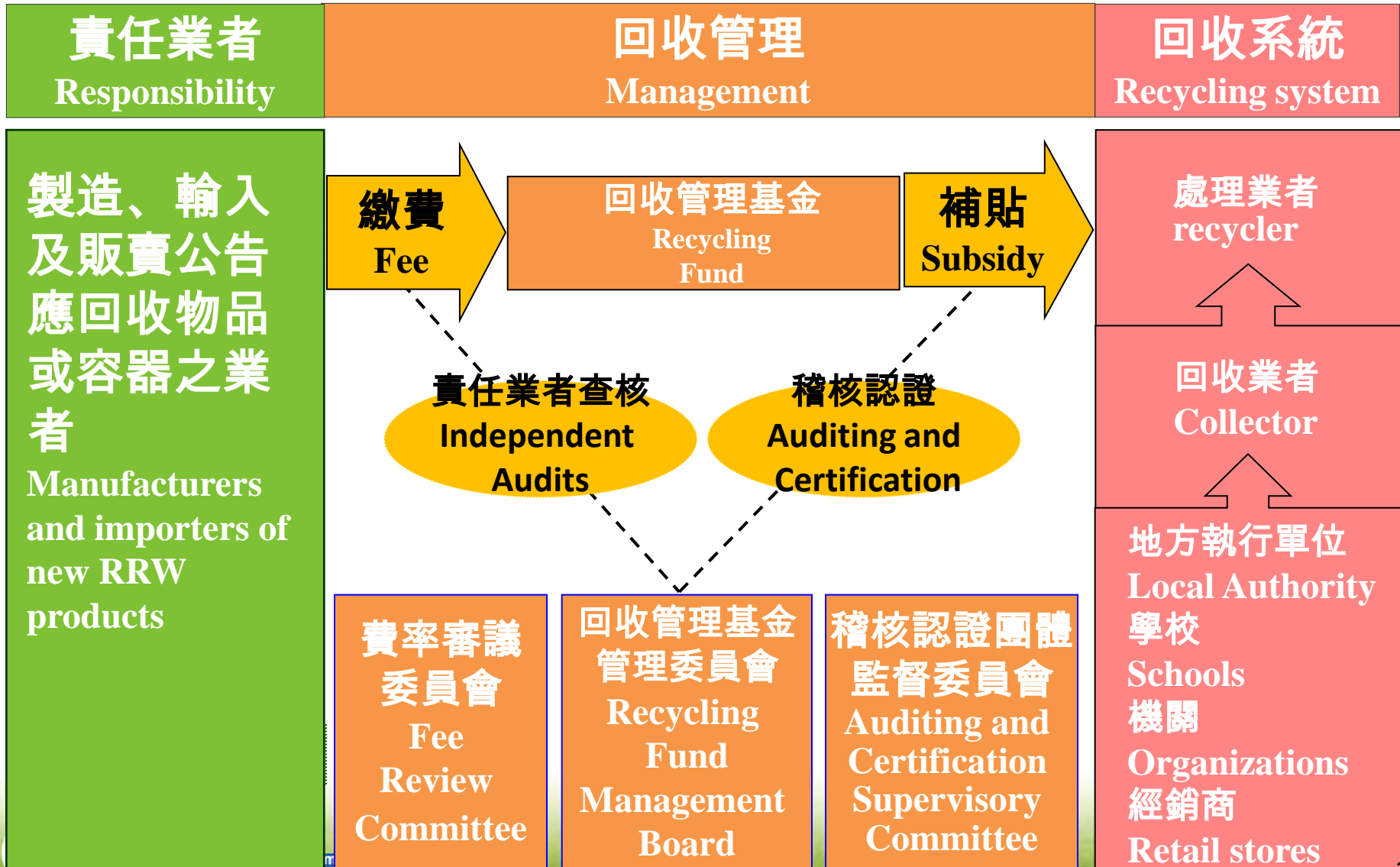
- Collect and sort recyclable
- Part of the revenues from selling recyclable must feed back to the general public.

垃圾收集及變賣所得回饋公共事務



# Recycling Management Fund Function & Operation

## 資源回收基金功能與運作



# Evolution of manufacturers and importers Responsibility in Taiwan

## 廢家電資訊物品業者責任制度發展

Year	Features	Mile stone
Prior to 1988	自由市場 Market-driven recycling only	<ul style="list-style-type: none"> <li>▶ 1987:“Polluter Pays Principle” introduced(汙染者付費)</li> </ul>
1988 - 1997	業者自行回收 Manufacturers and importers were responsible for recycling physically and financially	<ul style="list-style-type: none"> <li>▶ IT equipments is not widespread(資訊產品並不普及)</li> <li>▶ Computer recycling Alliance established in 1996/10(電腦回收聯盟成立)</li> </ul>
1997 - 1998	八大基金會管理(公辦民營) Manufacturers and importers pay recycling fees to eight recycling funds	<ul style="list-style-type: none"> <li>▶ 1997:“4-in-1” Recycling Program(四合一回收計畫)</li> <li>▶ Waste appliances recycling Fund management board established in 1997/12(廢電子電器回收基金會成立)</li> <li>▶ IT equipment recycling Fund management board established in 1998/03(廢資訊物品回收基金會成立)</li> </ul>

# Evolution of manufacturers and importers Responsibility in Taiwan

## 廢家電資訊物品業者責任制度發展


Year	Features	Milestone
1998 - now	<p>回收基管會成立(公辦公營)</p> <p>The eight recycling funds are administered by EPAT's Recycling Fund Management Board</p>	<ul style="list-style-type: none"> <li>▶ 1998/03: Home appliance was listed as Regulated Recyclable waste (RRW) by EPAT(公告家電回收物)</li> <li>▶ 1998/06: Subsidize the waste appliances storage site (44 company with 67 sites) 家電回收貯存場設立</li> <li>▶ 1998/06 : Waste IT equipment collection station(Subsidize the Public) 資訊處理廠設立</li> <li>▶ 2002: EPAT promulgated standards for the methods and facilities for the collection, storage, and recycling of waste appliances and waste IT equipment (回收清除處理方法以及設施標準公告)</li> <li>▶ 2007: Electrical fans and keyboards were listed as RRW by EPAT(公告電風扇以及鍵盤回收)</li> <li>▶ 2010: EPAT promulgated waste home appliance takeback system (推行廢四機回收政策)</li> </ul>





# EEE Subject to Taiwan's EPR Law

## 公告回收廢家電資訊物品項目

The year each item was listed as RRW	EEE item
March, 1998	
June, 1998	
January, 2001	
July, 2002	 Light tubes
July, 2007	 Light bulbs
October, 2007	
July, 2008	 High Intensity Discharge
<b>Jan, 2014(draft)</b>	 <b>Tablet</b> <b>CCFL</b>

# Recycling fee rate

## 回收清除處理費率

### Purpose of recycling fee 回收清除處理費用途

- For operating collection system, recycling fees charged to manufacturers and importers of new regulated recyclable waste (RRW) products feed into the Recycling Fund that subsidizes licensed collectors and recyclers.  
向責任業者收取回收清除處理費，並作為補貼回收處理業者之基金，維持回收處理系統運作。
- These are used to subsidize private collectors and recycling enterprises that meet EPAT standards. Special income funds are dedicated to education, research and development, auditing and certification, grants for municipalities and citizen groups, and administration of the 4-in-1 Recycling Program  
回收清除處理費將用於補貼回收處理作業、稽徵查核、教育宣導、研發、地方補助、組織行政。



# Recycling fee rate

## 回收清除處理費率

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### What is Green Differential Fee Rate 綠色差別費率

- To encourage the development of environmental friendly products. The Green Differential Fee Rate may decrease the recycling fee rate for the green product producers, or increase the recycling fee rate to hinder less environmental friendly product production.

鼓勵業者配合環境友善設計，發展有利於環境的產品，提供綠色差別費率，以經濟誘因促進業者朝向綠色生產，提高綠色消費比例。



# Recycling fee rate

## 回收清除處理費率

### Successful example 成功案例

- from June 2000, Zinc-carbon batteries and non-button type alkaline batteries (disposable) containing Cadmium more than 250ppm ( $Cd > 250ppm$ ) or lead more than 4,000ppm ( $Pb > 4,000ppm$ ) were charged four times higher than the general recycling fee rate for dry batteries. This policy was formulated to urge the battery producers moving towards the product green design and reducing environmental impacts.

乾電池類從2000年6月開始，在錳鋅電池及非鈕扣型鹼錳電池之一次性電池部份，重金屬鎘含量超過250ppm或鉛含量超過4,000ppm者之費率為原費率之4倍，以鼓勵業者朝綠色生產技術方面發展，減少環境負荷。

- In 2005, EPAT increased the recycling fee rate of PVC made container attachments upwards by 30%, then again upwards by 100% in 2008. This policy effectively reduced the use of PVC made container attachments.  
2005年起，針對容器瓶身以外之附件使用PVC材質者加重徵收費率30%，並於2008年調整加重100%，此措施也促使容器附件使用PVC情形逐年減少。





# Recycling fee rate

## 回收清除處理費率

### EEE's Green Differential Fee Rate 電子電器及資訊物品綠色費率

Home  
appliance  
(enforce  
2013 )  
家電類

- ✓ Green Mark by EPAT  
環保標章
- ✓ Energy Label  
節能標章
- ✓ Grade 1 or 2 of the Energy  
Efficiency Grade Standard  
節能分級:1,2級
- ✓ Water Conservation Mark  
only for Washing machine  
省水標章

30%  
discount  
7折優惠

IT equipment  
(draft)  
資訊類

- ✓ Green Mark by EPAT  
環保標章

30%  
discount  
7折優惠

To encourage  
the  
development  
of  
environmental  
friendly  
products  
促進商品環保  
化設計及鼓勵  
綠色消費



# Recycling fee rate

## 回收清除處理費率

Items			Regular (NT\$/unit)	Green products (NT\$/unit)	
1	TV sets	No-LCD	Over 27 inches	371	260
			Under 27 inches	247	173
		LCD	Over 27 inches	233	163
			Under 27 inches	127	89
2	Refrigerator	Over 250 Litres	588	412	
		Under 250 Litres	392	274	
3	Washing machine		307	215	
4	Air conditioner (Heater and air conditioner)		241	169	
5	Electric fans	Over 12 inches	34	24	
		Under 12 inches	19	13	



# Recycling fee rate

## 回收清除處理費率

Items		Regular (NT\$/unit)	Green products (NT\$/unit, draft)		
1	Monitors	No-LCD	127	89	
		LCD	Over 25 inches	233	163
			Under 25 inches	127	89
2	Printers	Ink-jet type	101	96	
		Laser type	144	137	
		Dot-matrix type	152	144	
3	PCs	114.8	78		
4	Notebooks	39	27		
5	Keyboards	14	10		
6	Tablet (draft)	39	27		



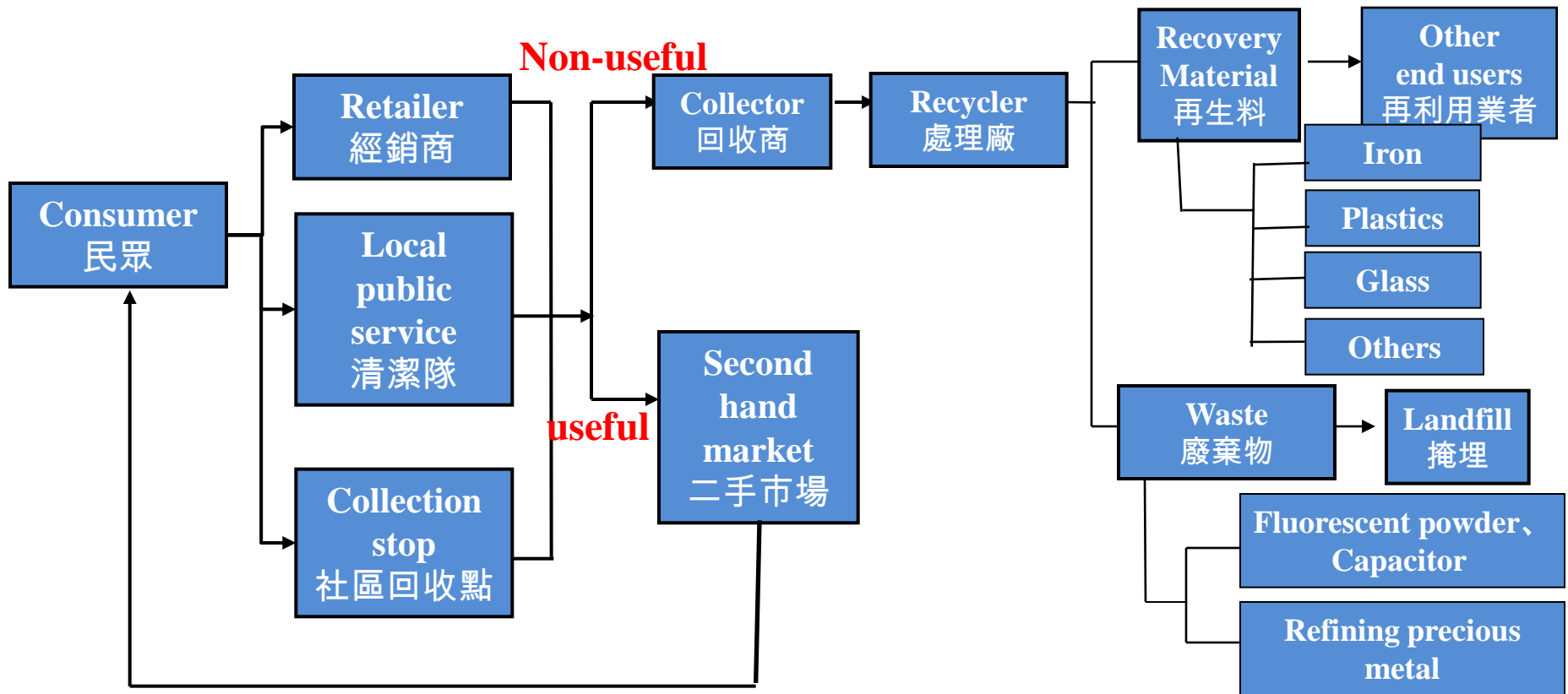
# WEEE Recycling Flow-chart

## 廢家電資訊物品回收處理流向

### Generation (Recycling) Source 來源端

### Collection Organization 收集端

### Recycling Enterprise (Facility) 處置端



# Distribution of WEEE recycler

## 廢電子電器、資訊及照明光源處理廠分布

佳龍科技 Super Dragon Tech      綠電再生 R&R Recycling

明鴻 ming-hong Co.

中台 Chung Tai Co.

全亞冠 Citiraya Tech

城礦 Cheng-Kuang Co.

惠嘉電 FDG Industrial

可百勝 Ke-Pai-Sheng Co.

瑞原 Re-Yuan Co.

大南方 Big South Co.

綠建 Luh-Jian Co.

久發環保 Chiu-Fa Co.

漢林 Han-Lin Co.

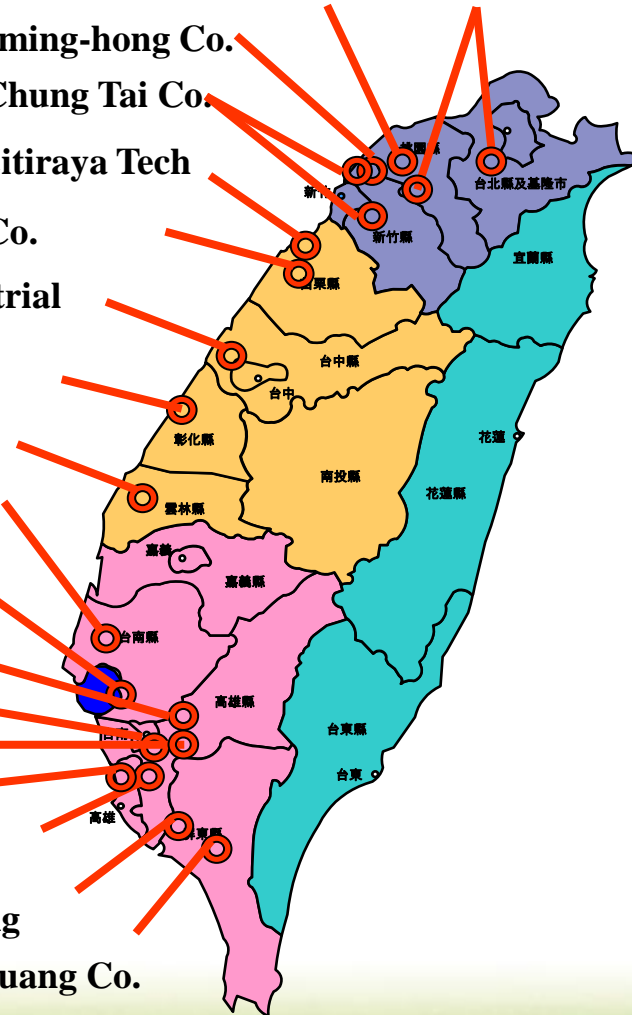
博威特 Perfect Co.

和緯 He-Wei Co.

大祈 Ta-Chi Environmental

宏青 Hong-Chin Recycling

弘光 Hong-Kuang Co.



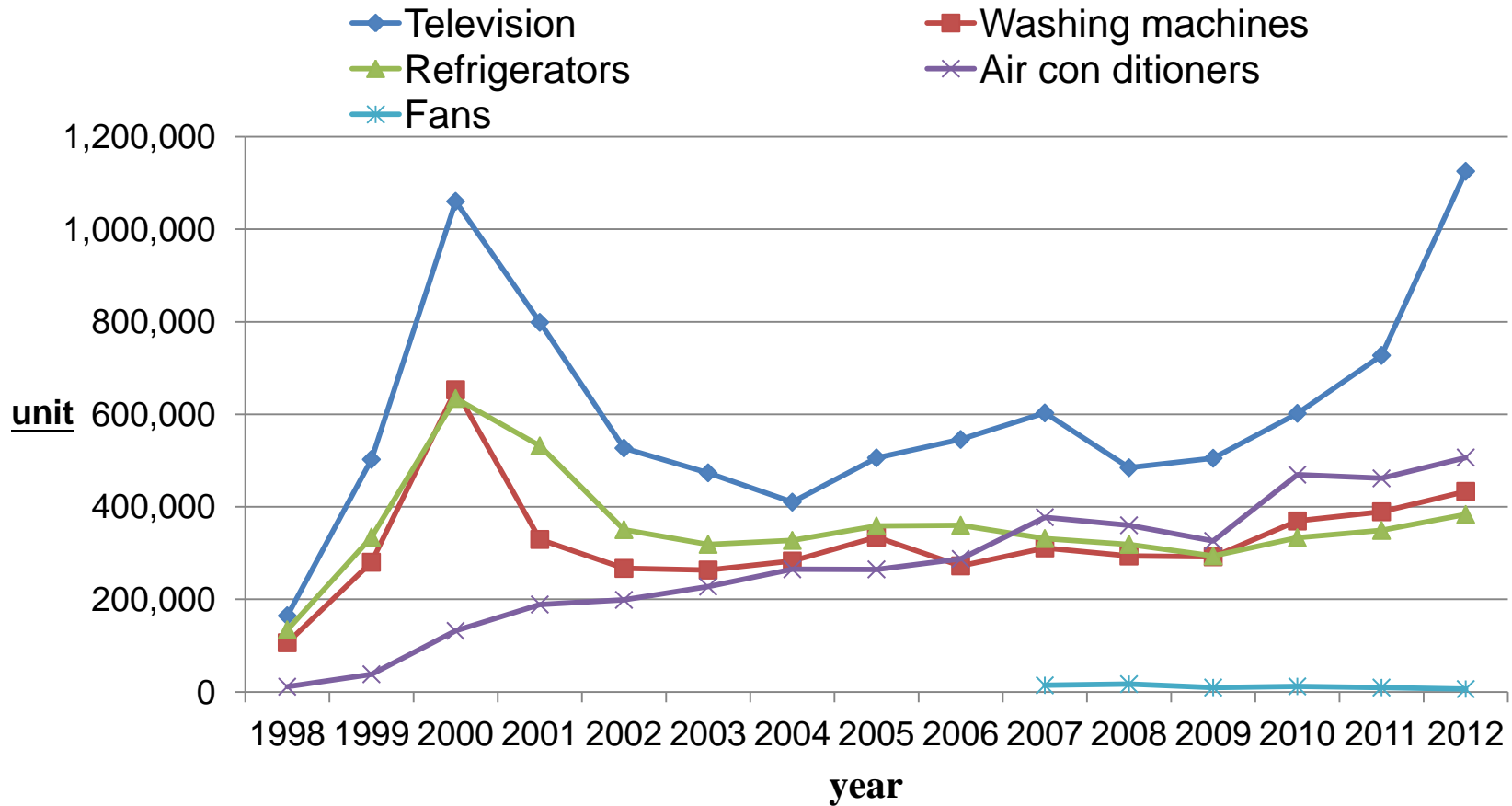
- There are 12 waste Appliances recycling enterprises (13 plants) and 241 collection enterprises  
家電類12家處理業者(13廠)241家回收業
- There are 16 waste IT equipment recycling enterprises (17 plants) and 236 collection enterprises  
資訊類16家處理業者(17廠)236家回收業
- There are 5 waste fluorescent lamp recycling enterprises (6 plants) and 182 collection enterprises  
照明類5家處理業者(6廠)182家回收業





# Household appliance collection amounts

## 廢家電物品回收成果



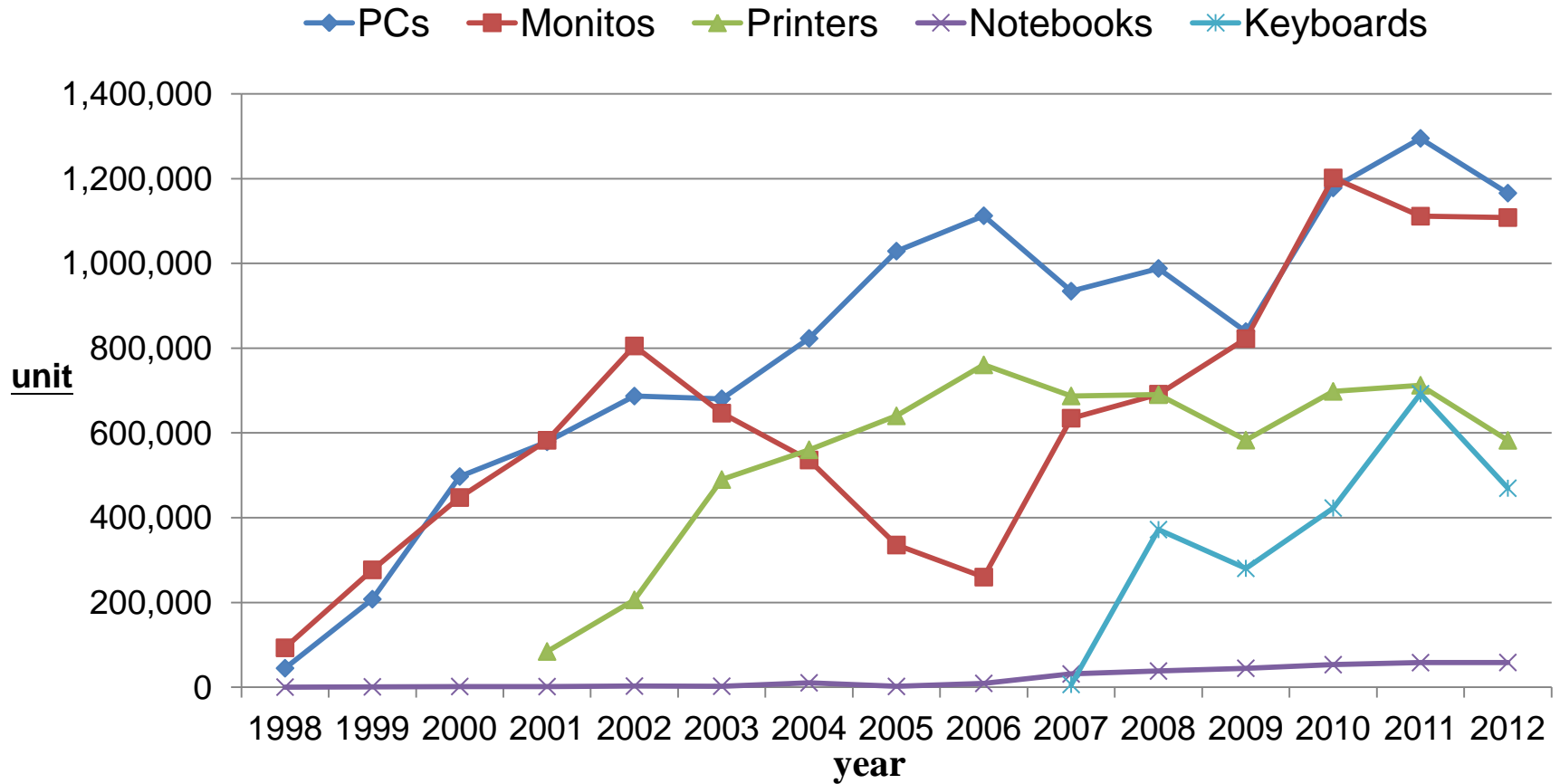
the Waste Appliance recycling volume increased 5.9 times in 2012 , as compared to 1998.

相較1998年廢電子電器物品收集量增加5.9倍。



# IT equipment collection amounts

## 廢資訊物品回收成果



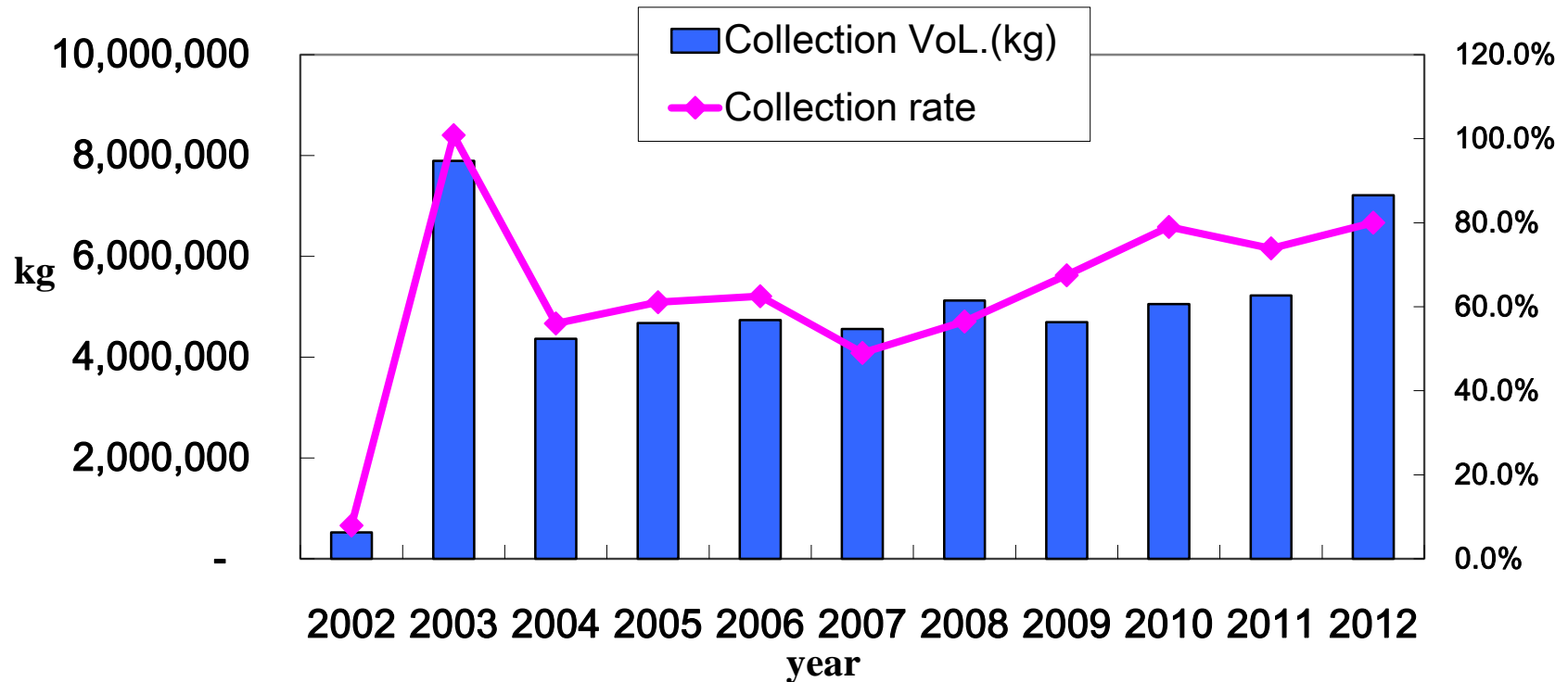
the Waste IT equipment recycling volume increased 24.4 times in 2012 , as compared to 1998.

相較1998年廢資訊品收集量增加24.4倍。



# Fluorescent lamp collection amounts

## 廢照明光源回收成果



the Waste fluorescent lamp recycling volume increased 13.7 times in 2012 , as compared to 1998.

相較1998年廢照明光源收集量增加13.7倍。

**Total WEEE collection in 2012 reach 5.45 Kg per Capita**

公告回收電子廢棄物人均回收量達5.45公斤/人。



# WEEE recycling process

## 廢家電資訊物品處理再利用流程



Disassembly  
拆解



Cutting the CRT tube  
映像管切割



Fluorescent powder Collect  
螢光粉吸取



Extracting the refrigerant  
冷媒抽取



Shredding  
破碎



Sorting  
分選





# WEEE recycling rate

## 廢廢電子電器、資訊及照明光源處理再利用比例

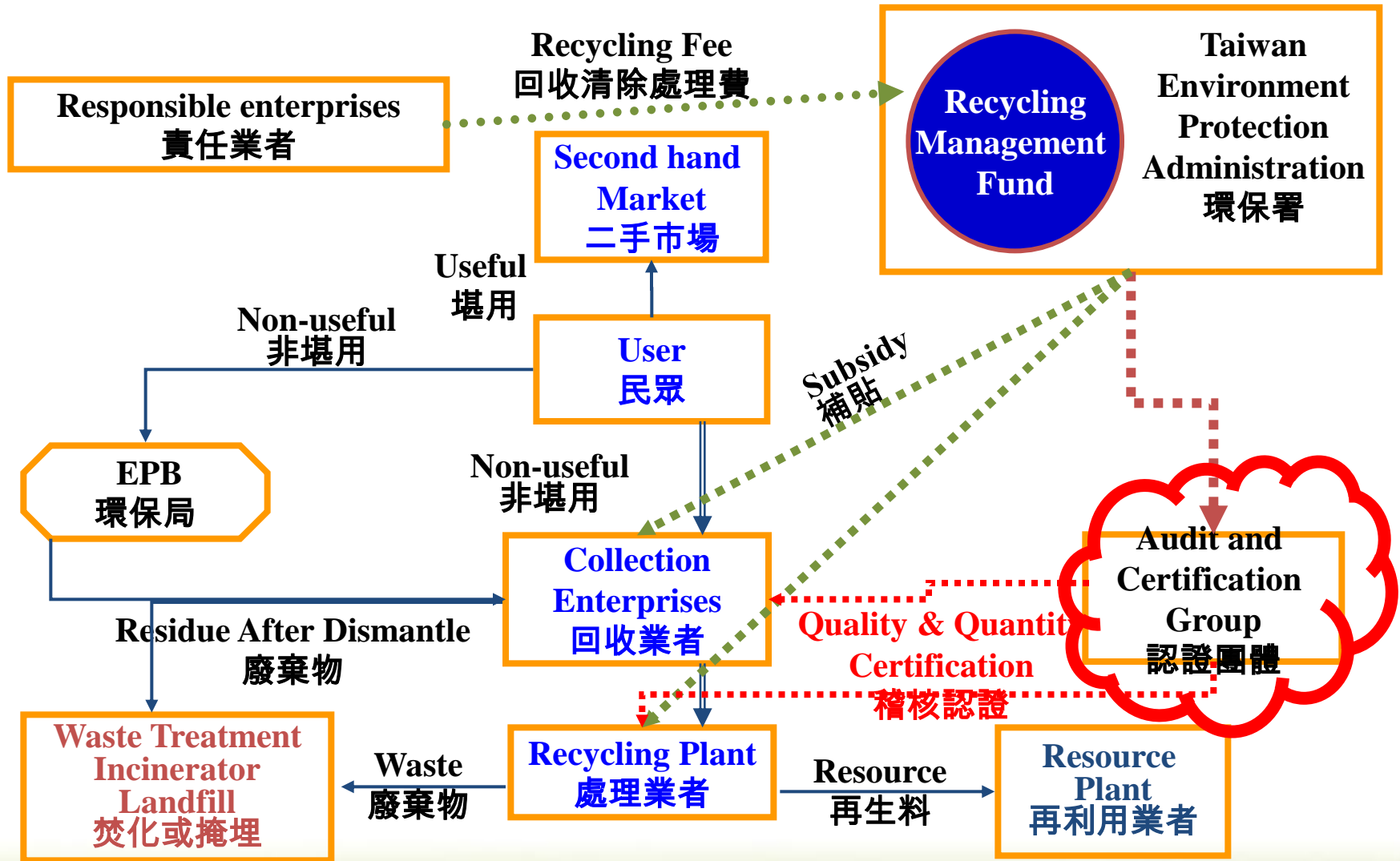


Recycling rate 資源化再利用率	Household appliance 廢家電物品	IT equipment 廢資訊物品	Fluorescent lamp 廢照明光源
regulation 法令規範	<b>70.0%</b>	<b>70.0%</b>	<b>90%</b>
operation 實際運作	<b>81.3%</b>	<b>82.3%</b>	<b>98%</b>



# System of Auditing and Certification

## 稽核認證系統介紹



# System of Auditing and Certification

## 稽核認證系統介紹

- Purpose 目的:
  - To confirm the quantity of regulated recyclable waste 確認回收量
  - To ensure the quality of regulated recyclable waste 確保回收處理品質
- Legal basis 法源依據
  - Article 18 of WDA 廢清法18條
    - To determine recycling, storage, clearance and disposal method and facility standards  
訂定回收貯存清除處理方法及設施標準
    - **To determine auditing and certification procedural regulations 訂定稽核認證作業辦法**
    - To determine management regulations for applications and reviews for the recycling, clearance and disposal subsidies





# System of Auditing and Certification

## 稽核認證系統介紹

1



Quality Checking  
進廠品質確認

2



Volume Checking  
進廠數量確認

3



Marking the  
checked waste  
認證註記

4



Storing Checking  
分類貯存

5



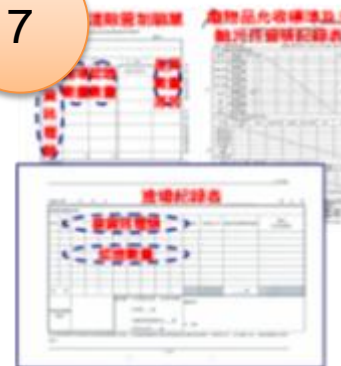
Loading Checking  
出廠確認

6



Shipping Checking  
出廠重量確認

7



Documentation for  
the certification lists  
業者報表審查

8



Operational reports  
Checking  
稽核認證報告



# 3. Future vision

## 未來展望



# 未來展望

- Raising collection performance. To Increase the number of listed recyclable wastes  
擴大回收成效，持續新增公告回收項目。
- To encourage the development of environmental friendly products. Implement Green Differential Fee Rate for IT equipments.  
鼓勵產品環境化設計，推動資訊物品綠色差別徵收費率。
- Promoting the quality of recycling process. Planning of Differential Subsidy Fee by incentive  
提升處理業者廢物品處理品質，以經濟誘因手段，研擬差別補貼方案。
- To prevent from ozone damaged and global warming. To Increase refrigerant recycling collection results.  
防止臭氧層破壞及減緩溫室效應，提升電冰箱及冷氣機冷媒回收收集成效。





*Thank You for Your Attention*

資源回收管理基金管理委員會  
Recycling Fund Management Board  
Environmental Protection Administration  
<http://recycle.epa.gov.tw>