

Financing E-Waste Management Programs in Taiwan

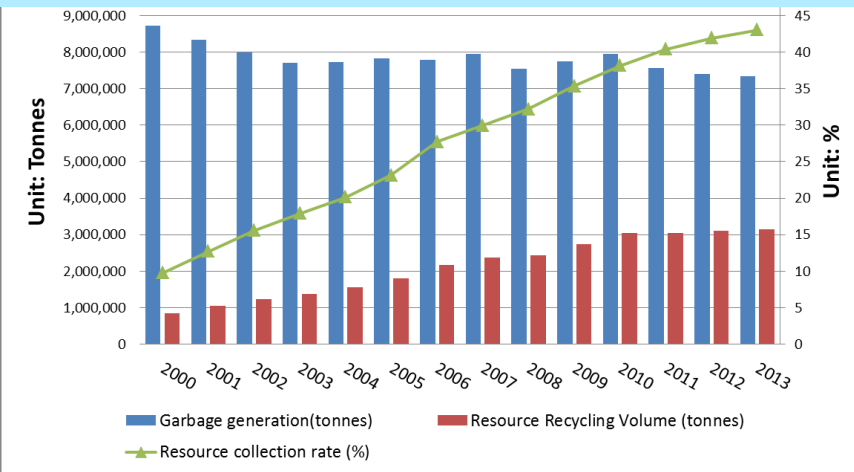
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Outlines

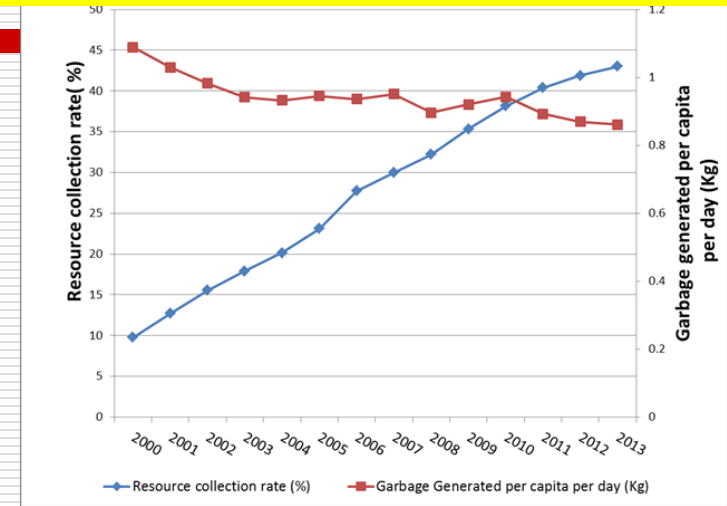
- Introduction
- Recycling System for Waste Electrical and Electronic Equipment
 - Required Recyclable Objects for WEEE in Taiwan
 - The Design of the Recycling Fee Scheme of WEEE
 - Formula of Recycling Fee of WEEE
- Overall Performance
- Conclusion Remarks

Introduction

The volume of garbage generation, resource recycling and resource collection rate, 2000-2013



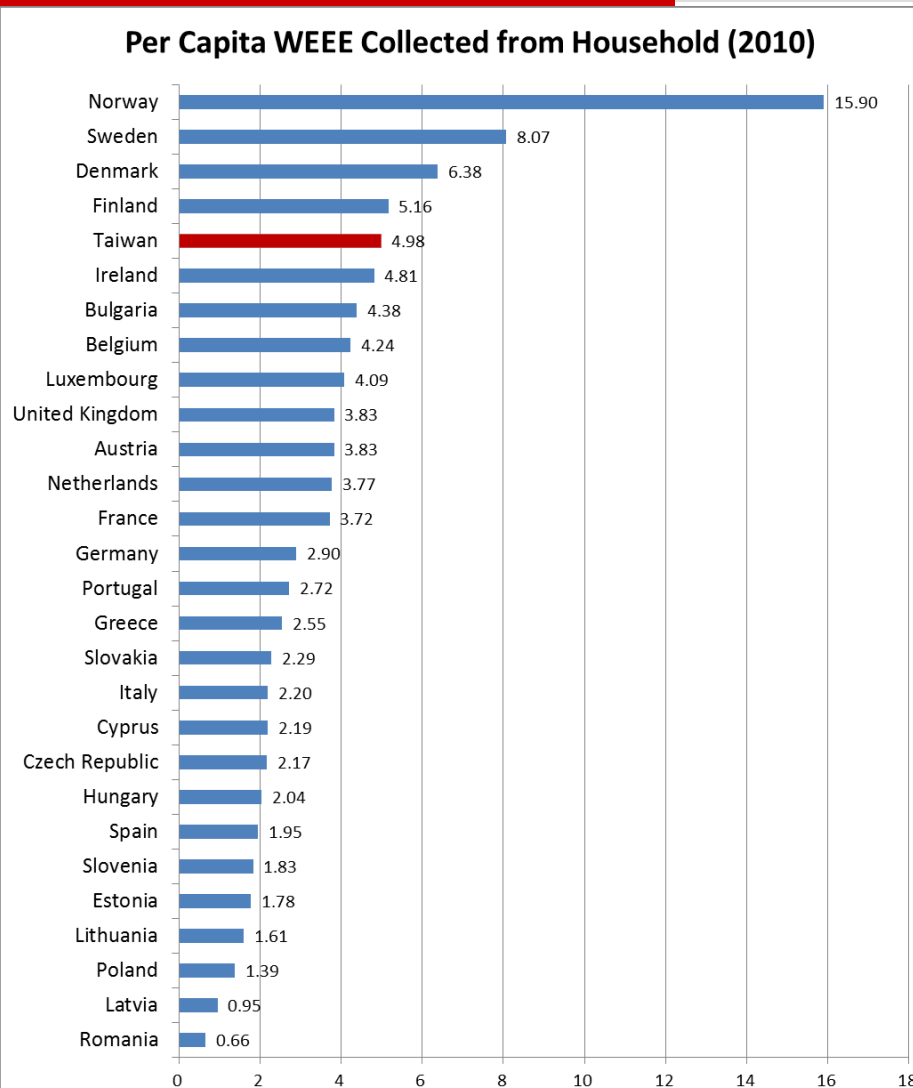
Resource collection rate and Garbage Generated per capita per day



- ❑ Taiwan faced a waste crisis in the 1980s because of lack of space to expand its landfill capacity and society's NIMBY activity for large-scale incineration.
- ❑ The high pressure of waste generations from industry and household drove the government to adopt goals and programs for waste prevention and recycling.
- ❑ These programs and policies were so effective that the volume of waste decreased significantly even while both population and gross domestic product increased.

I. Introduction

--A Comparison of Per capita WEEE Collected between EU and Taiwan



Unit: Kg/person/yr

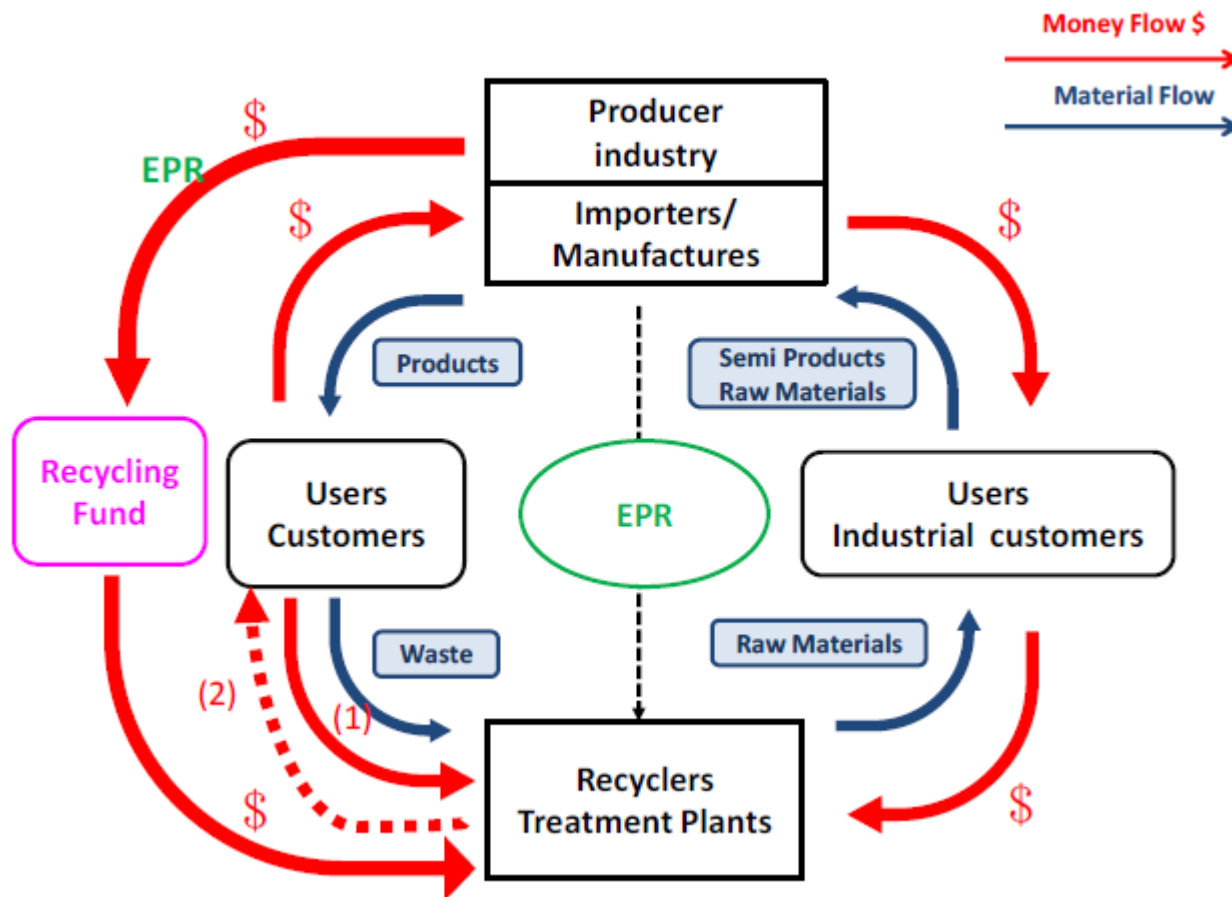
II. Recycling System for Waste Electrical and Electronic Equipment

--Required Recyclable Objects for WEEE in Taiwan

The year each item was listed as RRW	電子電機項目EEE
March, 1998	
June, 1998	
January, 2001	
July, 2002	
July, 2007	
October, 2007	
July, 2008	

II. Recycling System for Waste Electrical and Electronic Equipment

--Material and money flows in the Taiwan Model



III. Recycling System for WEEE

--The Design of the Recycling Fee Scheme of WEEE

- To sustain a cost-effective recycling system, recycling fee schemes are critical for both upstream rate payers and downstream subsidized recyclers.
- Principle: to assure financial sustainability, total revenue collected should be maintained break-even with the total expenditure required.
- Total expenditure includes: cost of collection, transportation, recycling, auditing, certification, and RFMB administrative cost

III. Recycling System for WEEE

-- Formula of Recycling Fee of WEEE



$$\text{Recycling fee}_t = \frac{[H + L - V - F]_t}{\text{total sales of } EEE_t}$$

$H+L-V-F$
Total expenditure
required

H : total cost of collection, transportation, and recycling

L : cost of auditing and verification

V : total revenue generated by recyclers from processing RRW

F : prorated trust fund surplus

III. Recycling System for WEEE

--Detailed information of cost factors for Recycling Fee

Calculation of WEEE Recycling Fee Rate

H: Total Cost of collection, transportation, and recycling (NTD\$)=D+T+E

D: (Cost of collection, transportation, and recycling)(NTD\$)= (C₁+C₂) × g

T : (Municipal Collection Costs) (NTD\$)

E: (Environmental External Cost, including cost of environmental effects) (dollar)

C₁: Unit cost of collection (NTD\$/unit)

C₂: : Unit cost of recycling (NTD\$/unit)

g: Certified quantities from processing RRW (number of units)

L : Cost of auditing and certification (NTD\$)

V : Revenue generated by recyclers from processing RRW (NTD\$)= r × g :

r : Average unit profit for recycler (NTD\$/unit)

g : Certified quantities from processing RRW (unit)

F : Prorated trust fund surplus (NTD\$) = (f- q)/ y :

f : Accumulated trust fund surplus (NTD\$)

q : Amount set aside from surplus for future fund management (NTD\$)

y : RRW life span (years)

S : Quantities of new RRW products (total units)

III. Recycling System for WEEE

--Recycling Fee Rate and Subsidy Fee Rate of Home Appliances

Items (selected)			Recycling Fee NT\$/unit (US\$/unit)		Subsidy Fee NT\$/unit (US\$/unit)	
			Regular	Green products		
1	TV sets	Non-LCD	Over 27 inches	371 (12.37)	260 (8.67)	379.5 (12.65)
			Under 27 inches	247 (8.23)	173 (5.77)	
	LCD	Over 27 inches	233 (7.77)	163 (5.43)	303 (10.1)	
		Under 27 inches	127 (4.23)	89 (2.87)		
2	Refrigerator	Over 250 Liters	588 (19.6)	412 (13.73)	635.5 (21.18)	
		Under 250 Liters	392 (13.1)	274 (9.13)		
3	Washing machine		307 (10.2)	215 (7.17)	346.5 (11.55)	
4	Air conditioner (Heater and air conditioner)		241 (8.03)	169 (5.63)	500 (16.67)	
5	Electric fans	Over 12 inches	34 (1.13)	24 (0.8)	20 (0.67)	
		Under 12 inches	19 (0.63)	13 (0.43)		
6	IT products	Desk top computer	111 (3.7)	78 (2.6)	182 (6.07)	
		Notebook	39 (1.3)	27 (0.9)	303 (10.1)	
7		Monitor	127 (4.23)	89 (2.97)	215 (7.17)	
		Printer (Laser)	144 (4.8)	137 (4.57)	130 (4.33)	
8	Fluorescent Tubes	(straight)	41 (1.37)		40 (1.33)/Kg	

Green Differential Fee Rate

- The differential fee rate means to encourage the development of environmental friendly products. It either decreases the recycling fee rate for the green product producers, or increases the recycling fee rate to hinder less environmental friendly product production.

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
- ✓ Energy Label
節能標章

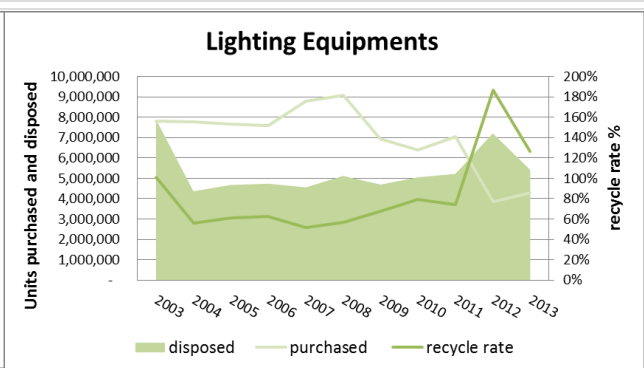
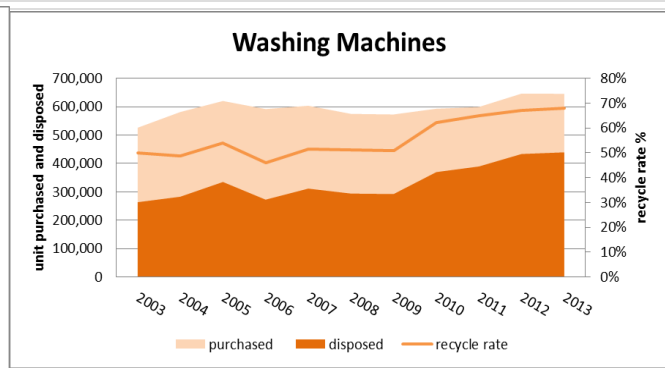
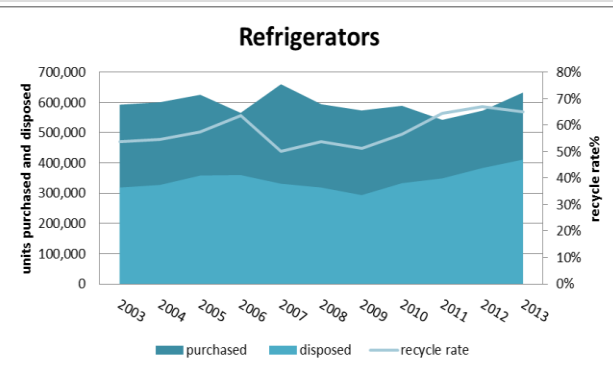
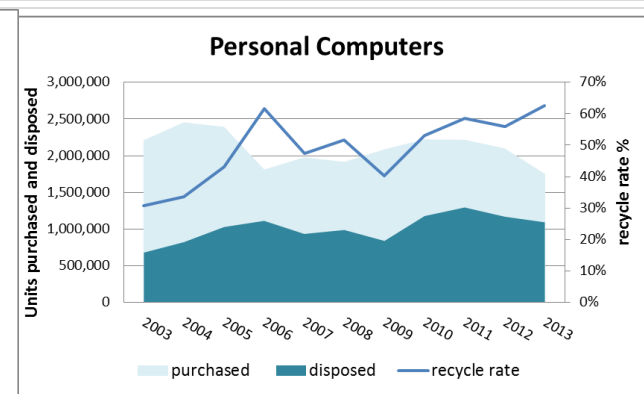
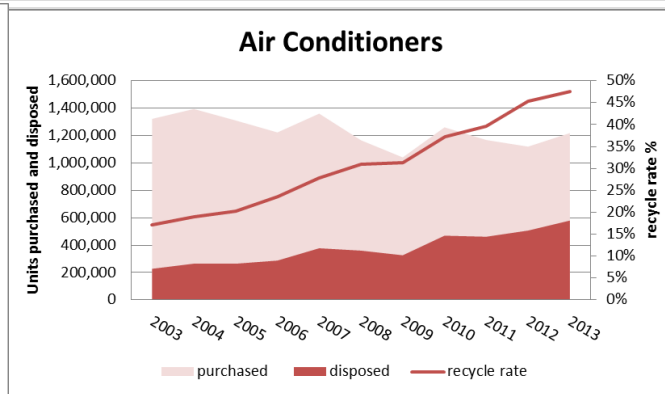
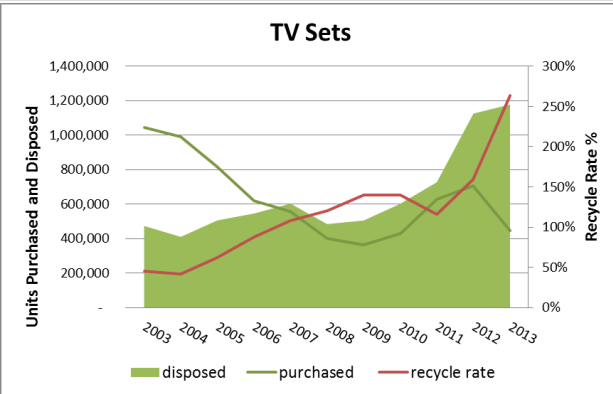
30% discount
7折優惠

To encourage the development of environmental friendly products

促進商品環保化設計及鼓勵綠色消費

Overall Performance

Purchased Units vs. Disposed Units



Define: $Recycle\ rate = \frac{Units\ disposed}{Units\ purchased}$

Conclusion Remarks

- A well-designed and executed fee rate policy will warrant a healthy financial conditions and provide adequate incentives to the policy stakeholders (include upstream manufacturers, downstream recyclers and consumers) to drive the recycling system sustainably.
- Taiwan's case certainly provide a good example to address this point.

The End

