



# Unique EPR Approach and its Accomplishments

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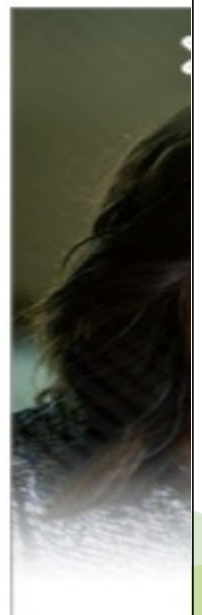


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## Taiwan: The World's Geniuses of Garbage Disposal

How the island, with landfills not far from capacity, became one of the world-wide leaders in recycling



# 2021 Recycling Statistics

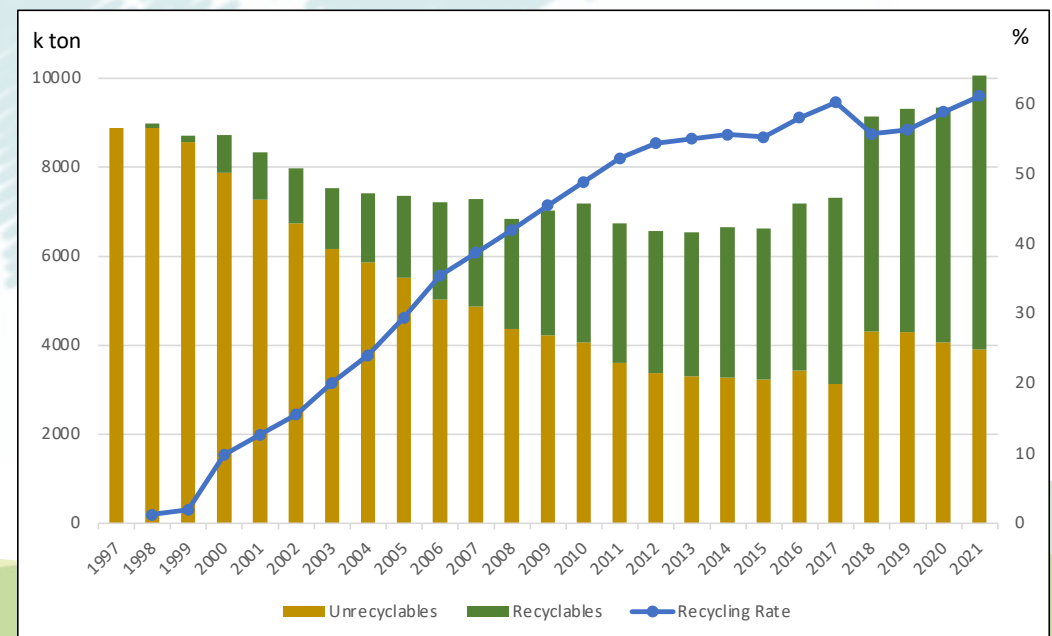
Waste Generation: 10 M ton

Collection Rate: 93.6%

Waste generated: 1.175 kg/capita/day

Amount Recycled: 6.1 M ton

Recycling Rate: **61.1%**



# In the early days...

- **Rapid** economic development in the 70's
- **Limited** waste treatment options
  - x Composting
  - x Landfill
  - x Open burning
- Recycling was mainly **market driven**





# Addressing Waste Issue

1987 EPA established

1998 Recycling Fund Management Board (RFMB) founded

- 4-in-1 recycling program
- Unique EPR



# Keys to Success

## 4-in-1 Recycling Program

**Community**  
(sorting)

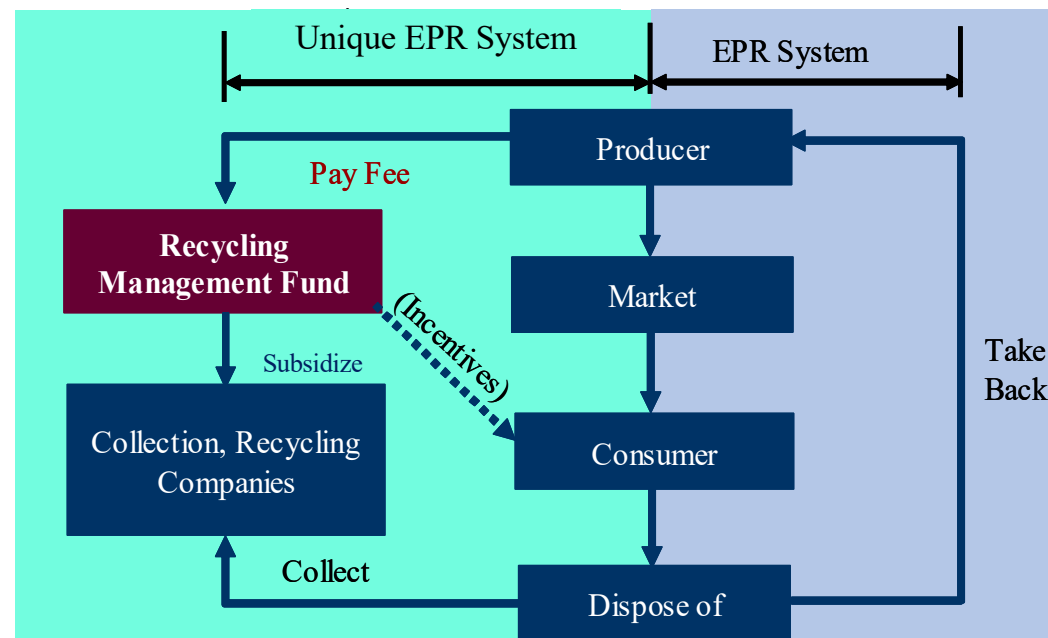
**Municipality**  
(collection)



**Recyclers**  
(processing)

**RFMB**  
(management)

## Unique EPR System



# Types of Waste Collected

## 1. General waste (non-recyclables)



Waste to energy

## 2. Recyclables



## 3. Food scrap/kitchen waste



# Waste Collection Process



General waste / Food scrap / Kitchen waste



Recyclables

- Collection provided 5 days/week, 2-3 times/day
- Trucks run on set routes to collect waste from residents
- Operate to the music of “fur elise”
- World Bank “What a Waste 2.0” case study: Musical garbage truck in Taiwan
- Youtube “Taiwan garbage truck”



# Pay Per Bag System

- In early 2000's, pay per bag system was introduced to encourage more recycling
- Residents in Metro Taipei area are required to purchase designated garbage bag in order to dispose general waste
- Less trash, less money spend for bags

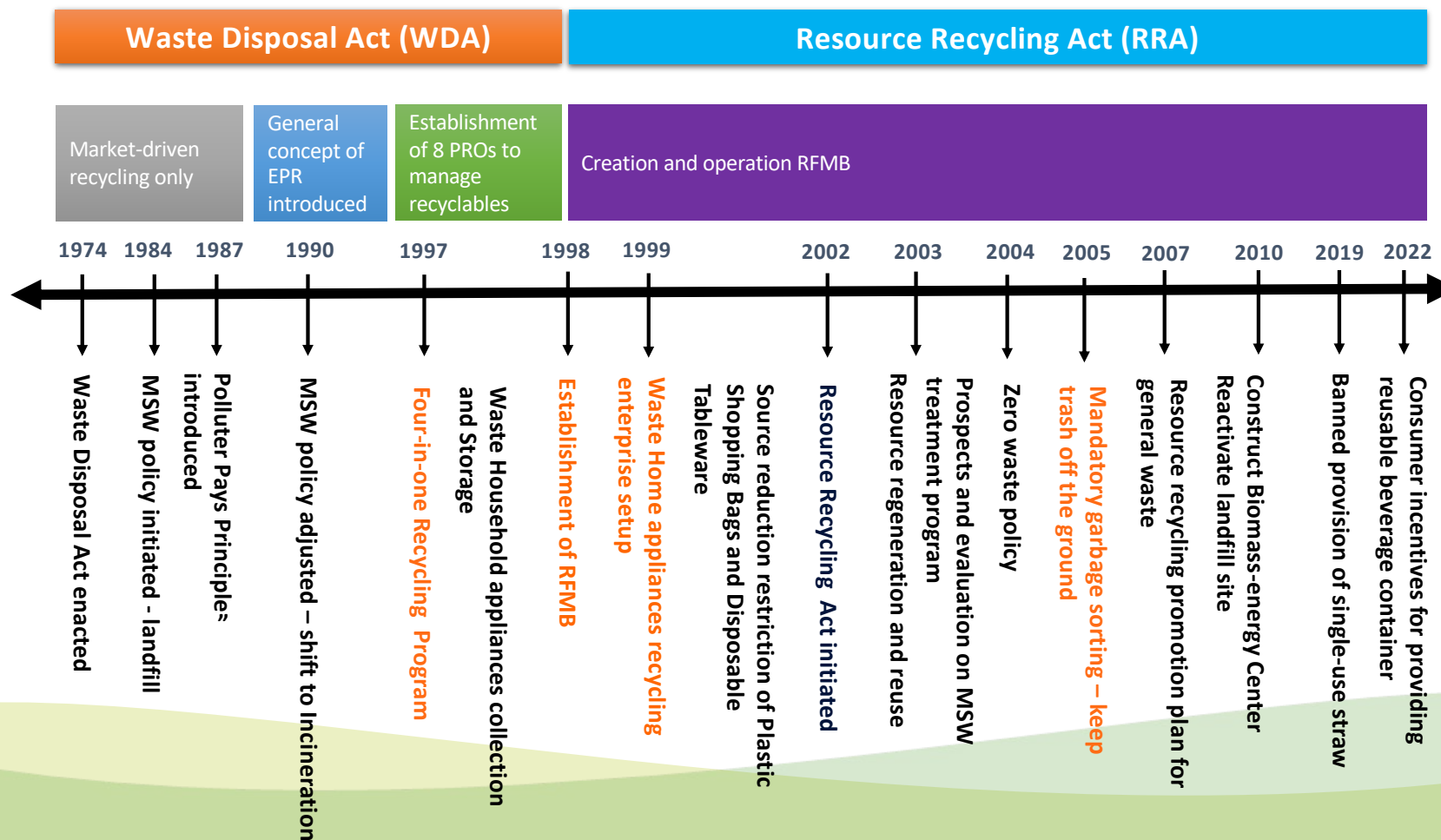


Source: Environmental Protection Department Taipei City Government

Small/Medium/Large

NTD 1-5/bag, USD≈0.03-0.17/bag

# Waste Management Policy



# Waste Disposal Act

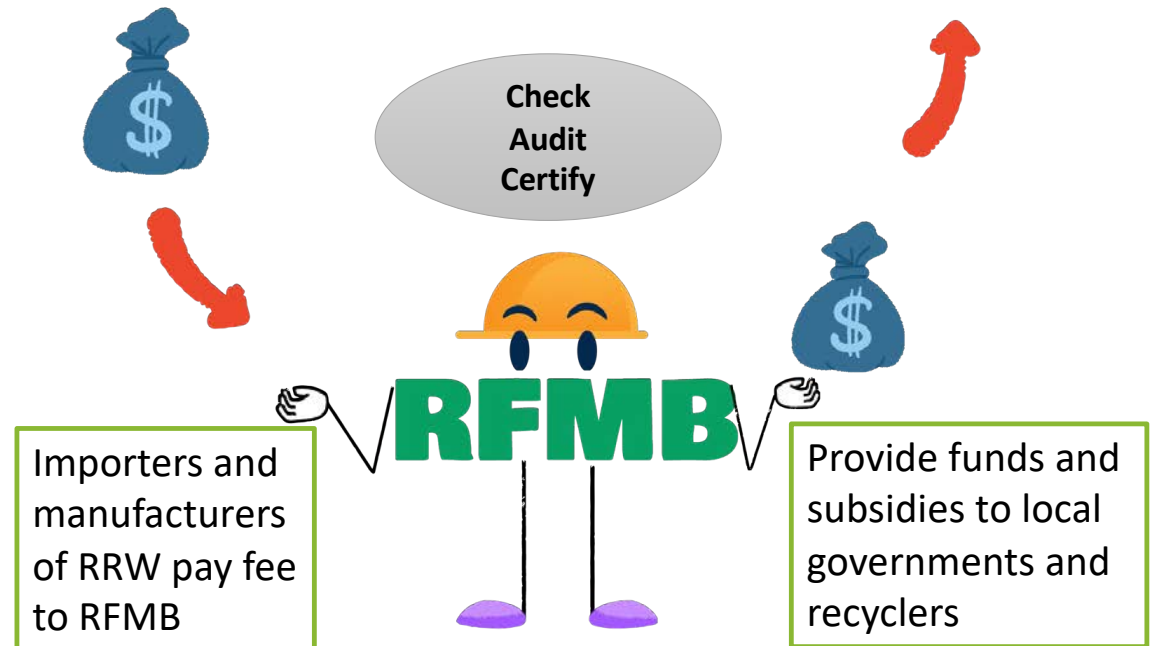


# Role of RFMB

- Established in 1998, coordinate and manages national recycling
- Collects fees from regulated producers
- Provides funding to implement recycling
- Implementor of the EPR
- Operational fund >\$300 million in 2021

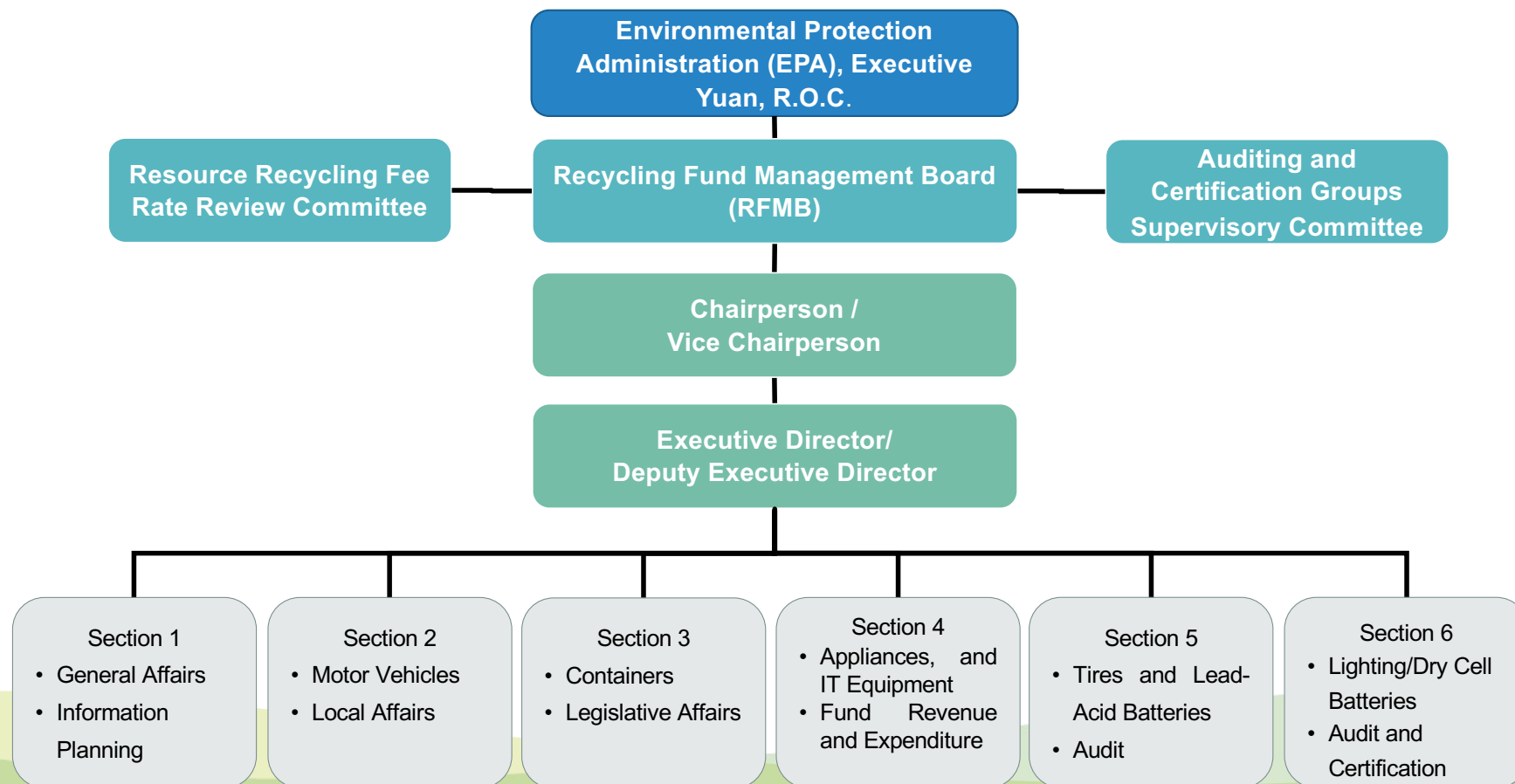
## PRODUCER

## RECYCLER


















# RFMB Structure



# EPR System

## Packing/Containers

## Articles

1 	<b>Metal</b> Canned goods, pesticide canister	6 	<b>Agrichemical</b> Herbicide, pesticide container	11 	<b>IT Equipment</b> Notebook PC Hard drive Casing Motherboard Display Printer Power source Keyboard
2 	<b>Aluminum</b> Soda and beverage cans, etc...	7 	<b>Dry cell batteries</b>	12 	<b>Appliance</b> TV Washer A/C Refrigerator Electric fan
3 	<b>Glass</b> Beer bottles, containers etc...	8 	<b>Automobiles</b> Cars, scooters and motocycles	13 	<b>Lighting</b>
4 	<b>Paper</b> Milk carton, foil lined package	9 	<b>Tires</b>		
5 	<b>Plastic</b> PET, PVC, PV, PE, PS, etc...	10 	<b>Lead batteries</b>		

These products are also known as Regulated Recyclable Waste (RRW) and it is the basis of Taiwan EPR

# RFMB and EPR Regulations

Framework	Regulations
RFMB Structure	Regulations for the Collection, Safekeeping, and Utilization of the Trust Fund of the Resource Recycling Management Fund
	Regulations for Establishment of the Resource Recycling Fee Rate Review Committee of the Environmental Protection Administration, Executive Yuan
Recycling Fee	Article Recycling, Clearance and Disposal Fee Rate
	Container Recycling, Cleaning and Disposal Fee Rates
	Lighting Source Recycling, Clearance and Disposal Fee Rate
	Dry Cell Battery Recycling, Clearance and Disposal Fee Rate
Recycling Subsidy	Subsidy Rates for the Recycling, Clearance, and Disposal of Recyclable Waste (excluding waste motor vehicles and waste lighting sources)
	Subsidy Rates for and Subjects of Waste Lighting Source Processing Efficiency, Recycling and Disposal
	Subsidy Rates for Waste Battery Recycling and Disposal

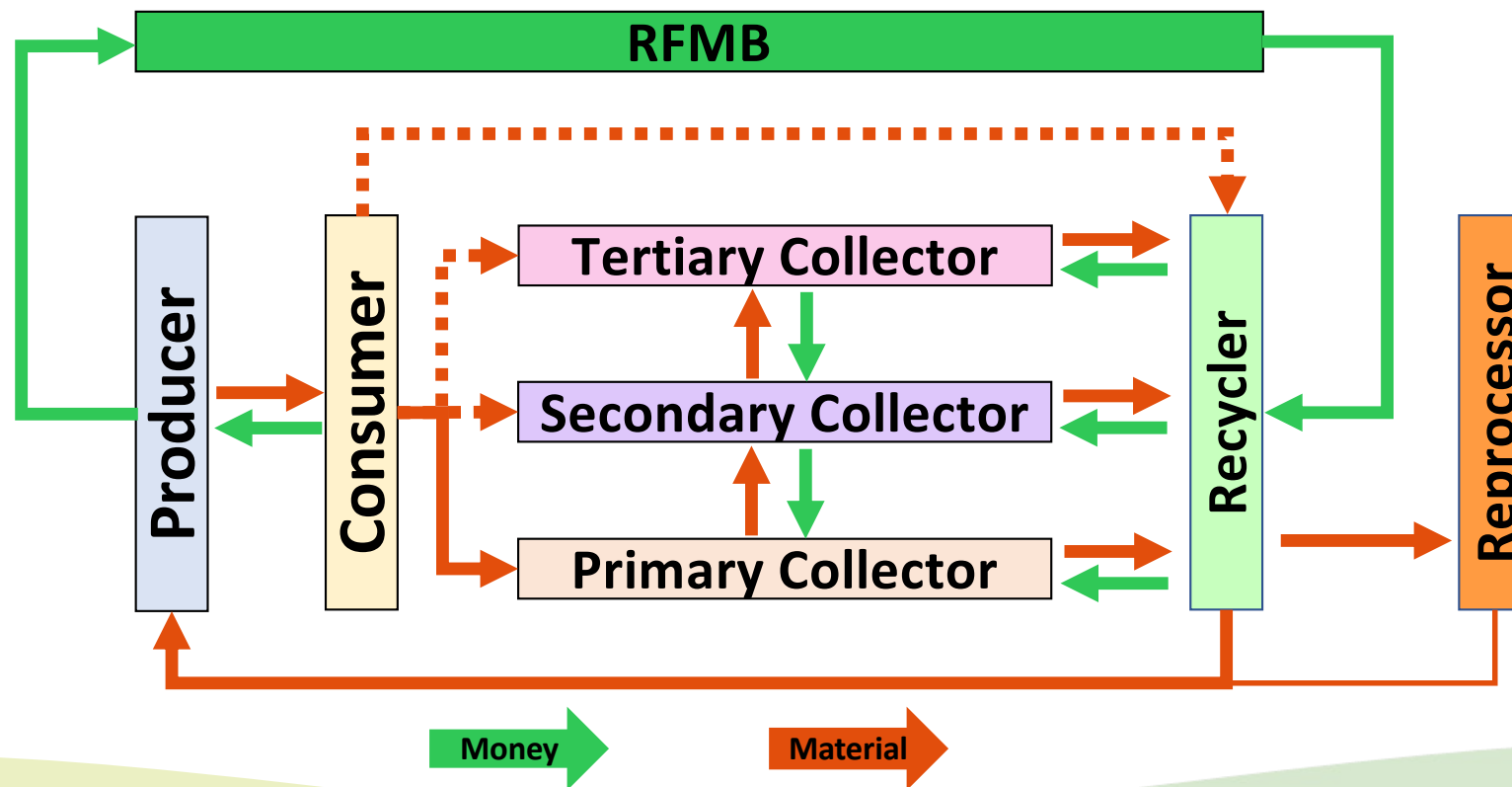
# Recycling Fee and Subsidy

Product	Fee		Subsidy
	Regular Rate	Green Rate (Eco-modulated)	
TV	Non-LCD >27" \$12.8/unit ≤27" \$8.9/unit LCD >27" \$12/unit ≤27" \$4.1/unit	Non-LCD >27" \$12.2/unit ≤27" \$8.5/unit LCD >27" \$11.5/unit ≤27" \$3.9/unit	Non-LCD \$9.8/unit LCD >27" \$8.9/unit ≤27" \$6.8/unit
Refrigerator	>250L \$22.9/unit ≤250L \$15.3/unit	>250L \$19.5/unit ≤250L \$13.0/unit	\$21.9/unit
Washer	\$12.3/unit	\$10.5/unit	\$11.9/unit
Portable PC	\$1.4/unit	\$1.1/unit	\$8.1/unit (laptop) \$4.7/unit (tablet)
Desktop	Motherboard \$1.6/unit HDD \$1.6/unit Power supply \$0.3/unit Case \$0.3 unit	Motherboard \$1.4/unit HDD \$1.4/unit Power supply \$0.2/unit Case \$0.2/unit	All \$5.4/unit Case + MB + HDD \$4.2/unit Case + MB + power \$3.9/unit Case + MB \$3.0/unit
Printer	Laser \$6.7/unit Inkjet \$6.0/unit Dot-matrix \$6.5/unit	Laser \$6.4/unit Inkjet \$5.7/unit Dot-matrix \$6.2/unit	\$4.0/unit

As of November 2022

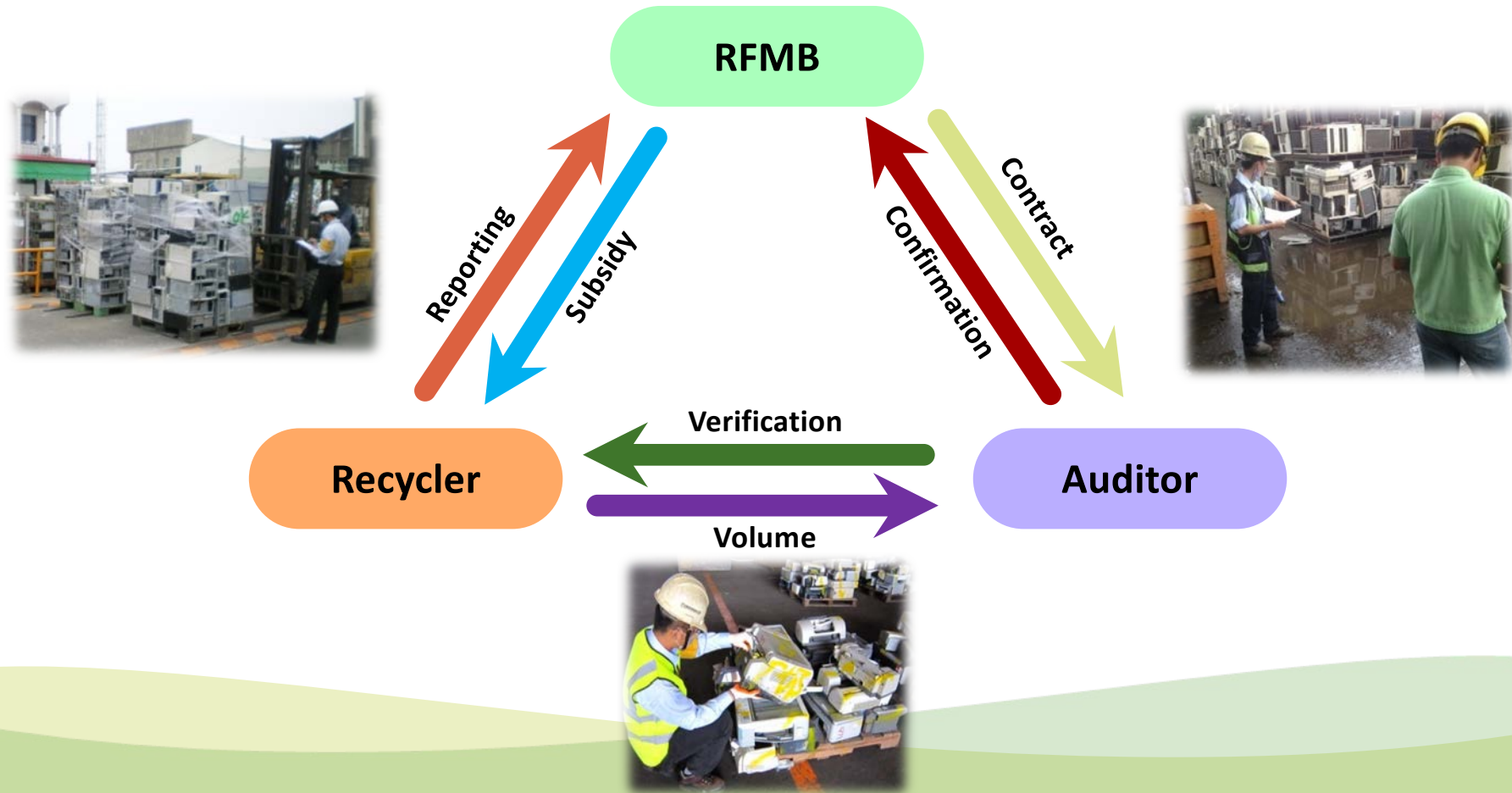


# Monetary and Material Flow



Primary collector: local government, self-employed collector, NGOs, community recycling centers  
Secondary and Tertiary collector: larger operating collectors

# Inspection and Auditing



# Environmental Education

- Enacted in 2000
- One of few countries in the world with EE Act
- Part of basic education curriculum (Pre-K and Elementary)
- Public servants: 4 hours of EE class per year; even president



# Vast Recycling Network

- Recycling points at many stores, vendors, supermarkets, and transportation stations across Taiwan
- Community recycling centers across the country
- Recycling kiosks
  - iTrash
  - Ecoco
  - Automated Recycling Machine (ARM)





# Circular Economy in Action

## Plastic



Sports uniform  
produce with fabric  
made from recycled  
PET bottle

## Electronics



Precious metals can  
be recovered from  
printed circuit board  
with environment-  
friendly chemicals



Heat resistant  
building material  
made from LCD glass

## Glass



Carbon powder  
from recycled tire  
is used to make  
diving suits

## Tire

# Innovated R&D

RFMB supports recycling industry and academia with grants to develop latest recycling technology



LCD glass reprocessed to treat waste water



Automobile  
PVB used as  
material for  
handbags



Refrigerator  
styrofoam  
converted into  
insulation  
material

# CIER Celebrating 40 Years!!!



## Chung-Hua Institution for Economic Research

- Established in 1981
- Research and policy think-tank
- Policy guidance and support
- Platform for local and international exchange
- Intermediary for government, academic and industry
- Over 400+ staff



# Center for Green Economy

- 20+ years of waste management and recycling policy
- Green economy, trade and finance
- Circular economy
- Environmental and energy policy
- Climate mitigation and adaptation
- GHG , carbon pricing and trading, ETS schemes
- ESG, CSR and sustainable development





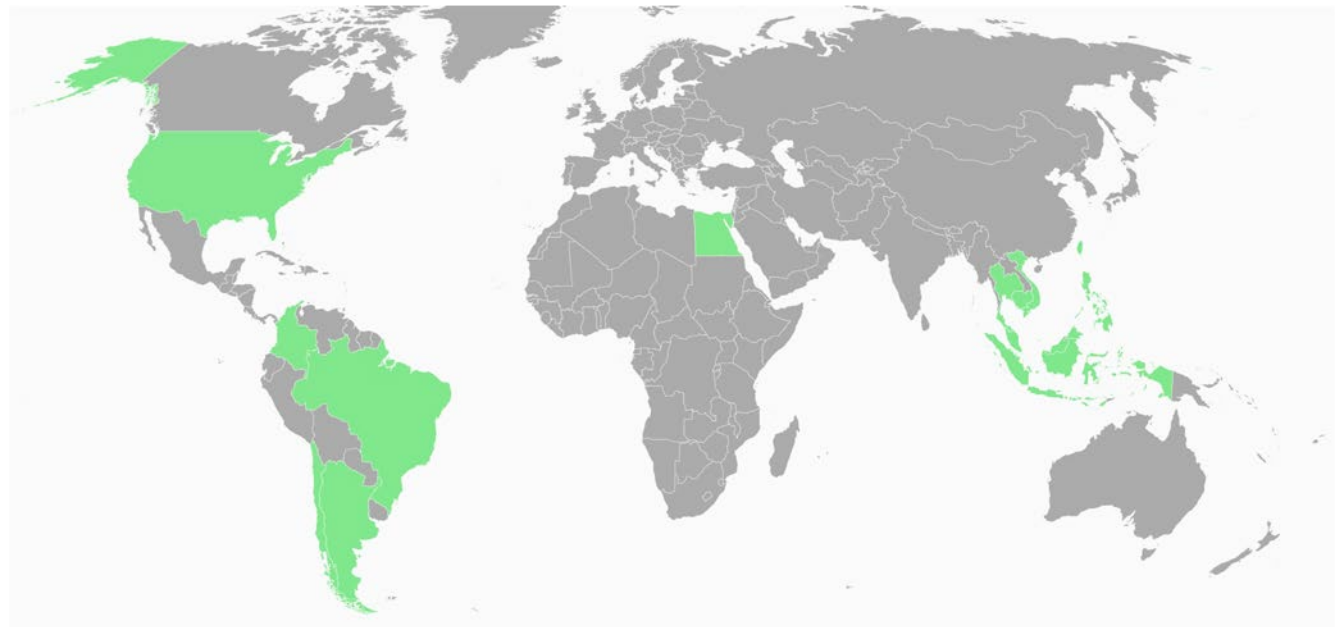
# International E-waste Management Network

**Bilateral Cooperation**

**International Network**

**SDGs**

- Collaborative platform established with the US EPA
- Co-implementor
- Initiated in 2011 and upgraded in 2014
- Promote environmentally sound management of e-waste
- 12 members countries (government/academia)



Argentina Brazil  
Chile Colombia

Egypt

Cambodia Indonesia Malaysia  
Philippine Thailand Tuvalu  
Vietnam

# Recent Activities

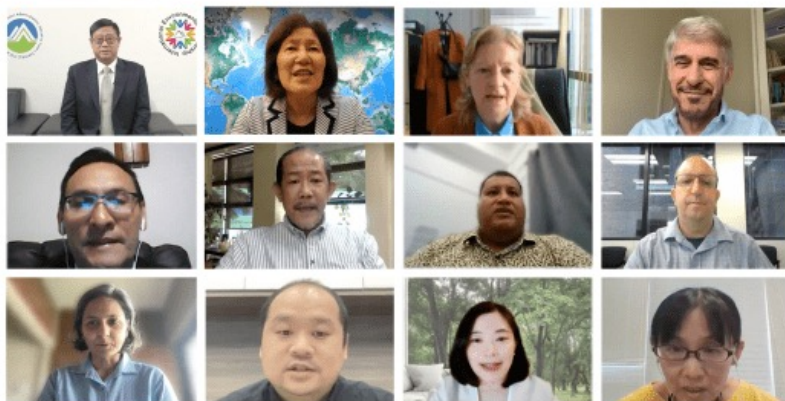
## IEMN Steering Committee

- Coordinate and guide IEMN activities
- Consist of 7 member countries passionate about e-waste management
- Meet online bimonthly

## IEMN Annual Meeting

1. June 8: Advancing E-waste Management
2. September 23: Accelerating Net-zero Emissions through E-waste Management

## 2022 International E-waste Management Network Virtual Meeting



## Accelerating Net-Zero Emission through E-waste Management

## IEMN Webinar

Share e-waste management policies and regulations from around the world

1. North America: US and Canada (completed)
2. Middle East: Jordan and Israel (completed)
3. Latin America: Argentina, Chile, Colombia, Costa Rica, UNIDO (completed)

# Thank you

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