



Taiwan's PET Bottle Recycling System and Application



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What we'll look at today

- A Review of Taiwan's Recycling History
- The Four-in-One Recycling Program
- The Collecting Channels of Recyclables in Taiwan
- How does Taiwan give new lives to PET bottles?
- Conclusion

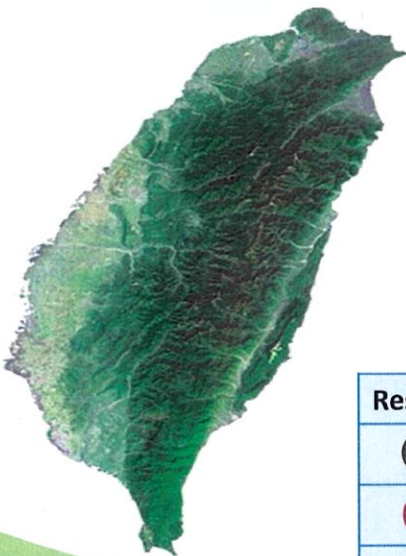


From Past to Present

A REVIEW OF TAIWAN'S RECYCLING HISTORY






Taiwan: High population density with limited resources



- ◆ Population: 23 million
Area: 36,000 square kilometers
Population Density: **624** persons/km²
(Urbanization : 78%)
(Taipei City : 9,956 person/km²)
- ◆ Resource conservation and recycling are important for Taiwan's sustainable development.



Resource Import :

 Energy	>98%
 Mineral	>80%
 Food	>70%



Taiwan's Recycling: From past to present

Waste was landfilled or Buried Near Riverside



1. Past
(Before 1980s)

2. Introduced the Concept of EPR (1988)



Garbage Sorting

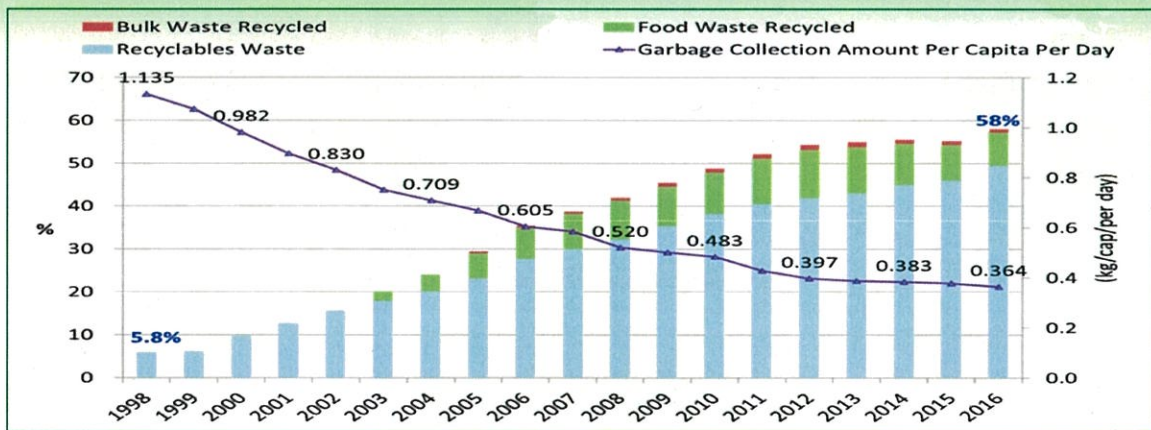
Recycling Truck



3. Launched the Four-in-one Recycling Program(1997)



Analysis of Taiwan's MSW Trend





Extended Producer Responsibility (EPR)

THE FOUR-IN-ONE RECYCLING PROGRAM

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The Evolution of the Recycling System in Taiwan

The Vendor Independent Period (Nov. 1988 to Jul. 1997)

- ◆ Manufacturers and importers established or co-established recycling organizations and proposed recycling, clearance, and disposal projects to implement the recycling work.

Launched the "Four-in-one Recycling Program" (1997)

The Public-Owned and Private-Run Period (Jul. 1997 to Jun. 1998)

- ◆ TEPA established 8 recycling fund management committees formed by private enterprises.

The Public-Owned and Public-Run Period (Jul. 1998 to present)

- ◆ TEPA established the official Recycling Fund Management Board.

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The Four-in-One Recycling Program



Waste Generators

- ◆ To form community-based recycling organizations & promote the separation of wastes and recyclables.

- ◆ To be paid by responsible enterprises.
- ◆ To subsidize the collecting and recycling system.

\$\$\$ Funding Sources



Private Recycling System

- ◆ To purchase wastes from the public, communities, and local governments.

- ◆ To transport wastes & recyclables separately.

- ◆ Part of the revenue is given to the general public.

Municipal Collection System



The Recycling Fund Management



Recycling Fee and Subsidy of PET Bottles

Use single material (higher fee is imposed on complex materials)

Design labels that can be easily removed (green incentive rate is imposed)



The Present Green Incentive Rate for PET Recycling Fee (NT/kg)			PET Subsidy (NT/kg)
The design of green incentive rate	Bottles with labels can be easily removed	Bottles with labels can't be easily removed	
Bottles with PVC accessory	17.00	18.70	For recyclers: 4.50
Bottles without PVC accessory	8.50	9.35	



How do the recyclables get into the recycling system?

THE COLLECTING CHANNELS OF RECYCLABLES IN TAIWAN

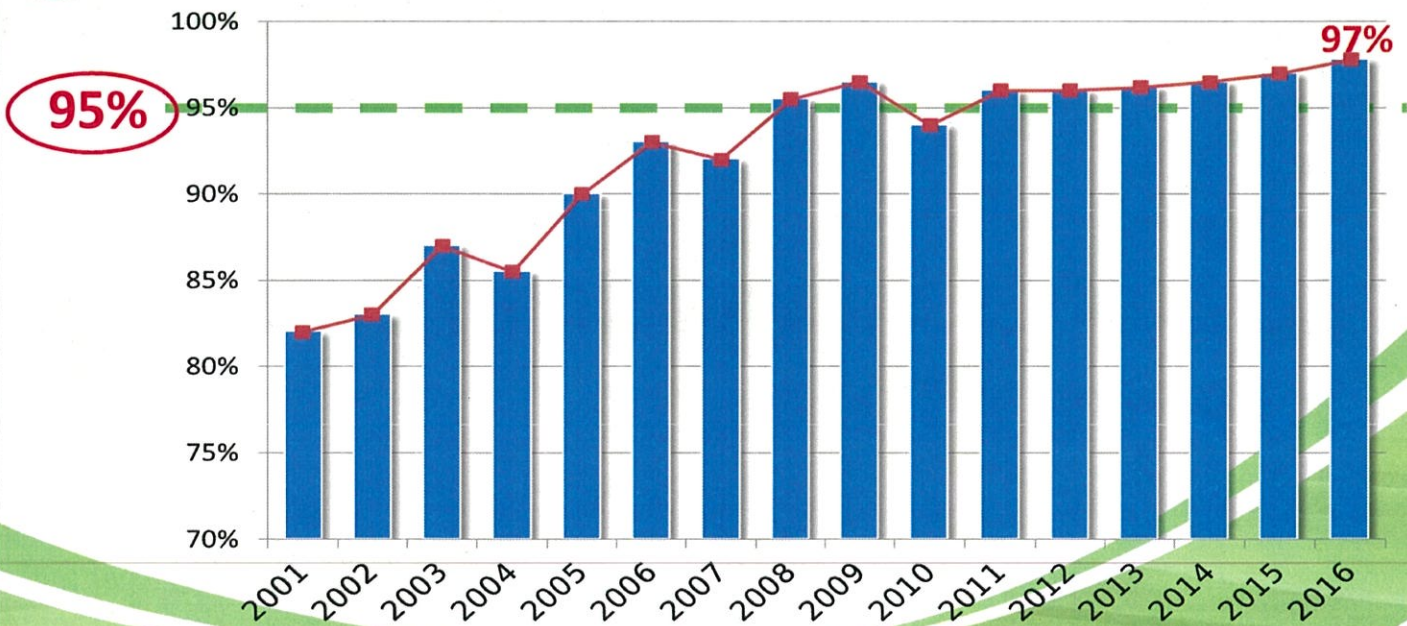


Collecting Channels of Recyclables

- ◆ Local Governments Use recycling truck collects on recycling day
- ◆ TEPA Subsidize the establishment of Collecting Stations in Local communities
- ◆ Designated Stores should provide recycling facilities.
- ◆ NGOs and Recycling Enterprises
- ◆ Scavengers

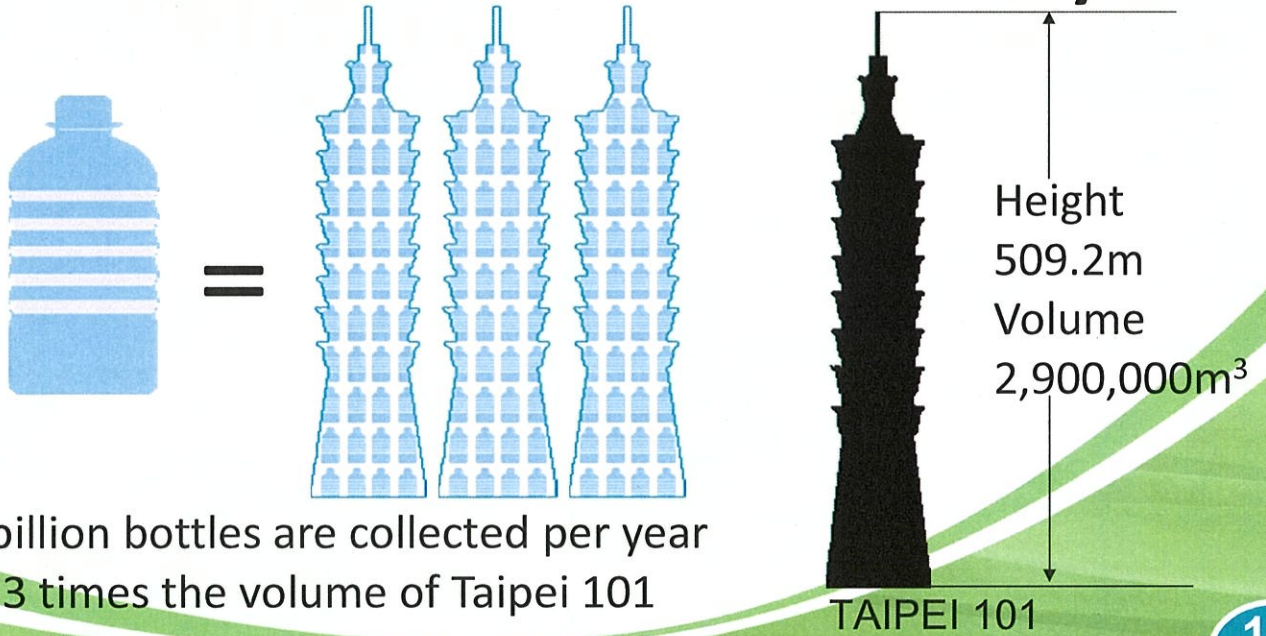


Taiwan's Recycling Rate of PET Containers





The Total Volume of PET Containers Collected in Taiwan Annually

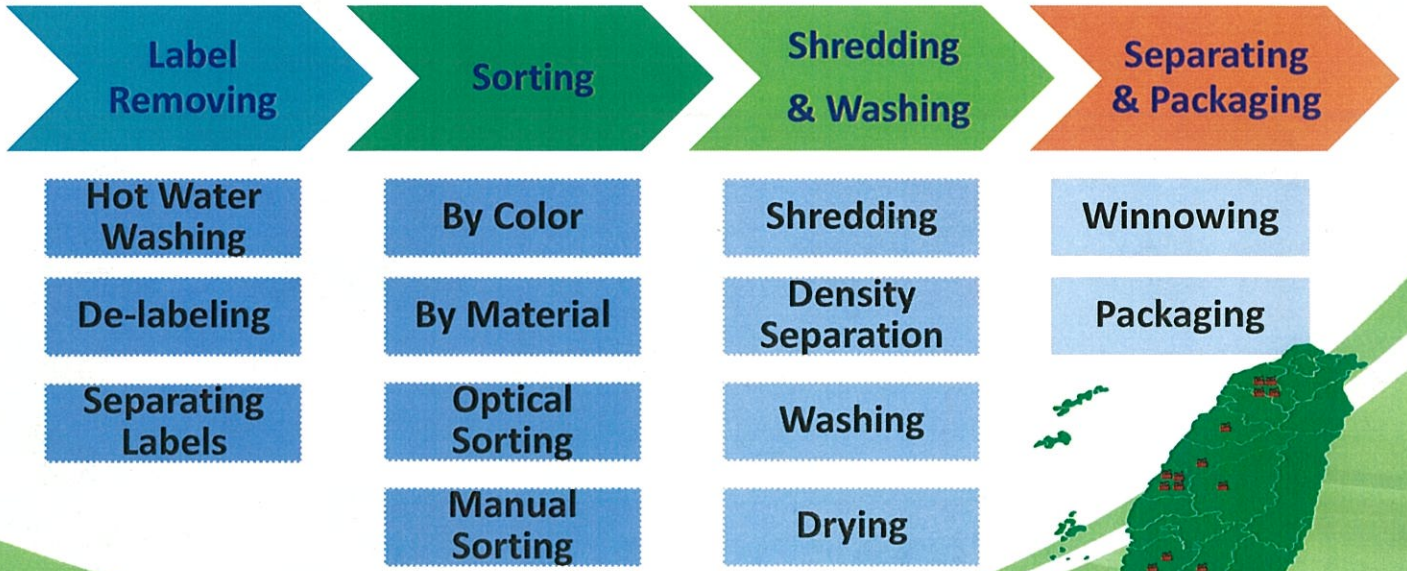


PET Recycling System in Taiwan

HOW DOES TAIWAN GIVE NEW LIVES TO PET BOTTLES?



The Recycling Process of PET Bottles



17 Registered PET Container Recyclers



LCA of Recycled PET Resins

- A Substantial Reduction in Carbon Emission



• Cited from the Far Eastern New Century Corporation
 • Life cycle assessment by DNV



Post-Consumer Recycled PET

NT\$1.23 billion worth of recycled plastics



Recycled 5.4 Billion Bottles



Packaging & Apparel

Bottle Bale



Packaging & Filament

Clean Flakes

Packaging usage

Solid State Process



Advanced Applications of rPET Fabric by Taiwan-based company- FENC

【 Innovative Top Quality PET-textile 】

•10 teams in FIFA 2014 wore jerseys made of recycled PET-textile made in Taiwan.

LE FIGARO - fr

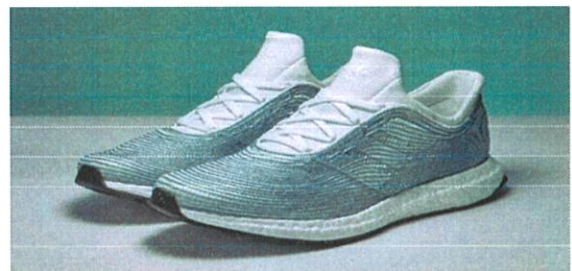
Quand Taïwan fait des maillots de foot avec des bouteilles en plastique

Par Anthony Bleux | Mis à jour le 25/06/2014 à 18:23 | Publié le 25/06/2014 à 15:48



LE FIGARO PUBLISHING 4 commentaires

VIDÉOS - En 20 ans, l'industrie taïwanaise du textile a placé le recyclage au cœur



【 A fashion miracle of ocean plastics 】

- As a part of its long-standing collaboration with environmental initiative Parley for the Oceans, Adidas has updated one of its classic shoes with yarns made from waste plastic.
- The global exclusive technology was developed by a Taiwanese company:

Far Eastern New Century Corporation®



DA.AI TECHNOLOGY CO., LTD. Makes PET Bottles Reborn as Grey Eco Blankets

慈濟賑災地圖 TZH CHI'S INTERNATIONAL RELIEF FOOTPRINT

慈濟全球環保毛毯賑災分布圖 · 2006-2016年 · 36個國家地區
Tzu Chi International relief eco-blanket footprint, record from 2006-2016, over 36 countries/regions



2006 – 2016
950,352 Eco Blankets
36 Countries/Regions



DA.AI TECHNOLOGY CO., LTD.

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CONCLUSION

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Conclusion

- ◆ The four-in-one recycling system not only created high recycling rate of PET bottles, but also enabled the recycling of 67 product items of 13 categories. **The recycling rate is 58% in 2016, 10 times that of 1998.**
- ◆ Taiwan strives to **turn wastes into resources and promote circular economy**, so as to achieve the goal of total resource recycling and sustainable materials. **We are now focusing on:**
 - Recycling organic wastes for renewable energy
 - Creating reuse value with recycling technology
 - Turning inorganic wastes into cement additives and construction materials
 - Recovering precious metals for reuse

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Thank you

In Taiwan, to recycle is a habit.

在台灣，資源回收是一種生活習慣

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email: hcsung@epa.gov.tw

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