

Zoom interview with Dr. Chun-hsu Lin (林俊旭)

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Questions

1. OVERVIEW of the SYSTEM

a. BACKGROUND:

- i. Why did the Taiwanese government decide to initiate the EPR system?

In 1970's, Taiwan experienced a rapid economic development and generated a lot of waste. At that time, very limited waste treatment options were available, landfill and opening burning.

- ii. How did you arrive at this particular system? Were there other plans? Did you hold public meetings to get input?

Prior to the introduction of EPR, waste management/recycling was purely driven by market needs, very inefficient. EPR before 1997 was carried out by PROs but government fully took it over after 1997 because of frauds in earlier operation.

- iii. Who did the government consult with for advice on designing this system?

Consulting firms, thinktanks and research academia. CIER played an important role in establishing the EPR system and advised Taiwan EPA especially in the aspect of economic incentives since the beginning.

- iv. When was the system first initiated and how long did it take to actually take for all to comply with new regulations?

The EPR in Taiwan was firstly introduced in 1988 and required manufacturers and importers to implement recycling (privately operated). In 1997, 8 EPR foundations were formed to implement recycling (government owned, privately operated). In 1998, these 8 foundations were merged into 1 organization called the Recycling Fund Management Board (RFMB, government own and operated), a unit under the Taiwan EPA. Since 1998, producers have been under strict auditing by the RFMB. In the case of under-reporting their sales, the producers will be fined or sued by Taiwan EPA. Even until now, there are still a few producers charged by Taiwan EPA for not submitting enough recycling fees. But I would say, without real investigation, the regulations were well followed after 5~10 years of the operation.

b. FEES:

- i. How does the fee system work?
Currently, there are 13 product categories regulated by Taiwan EPA that requires manufacturers and importer to pay recycling fees. These fees are used to fund collection and recycling of these waste products.
- ii. Are fees determined by the amount of production or sales? Who manages the collected fees? How are fees managed?
The fees for these 13 product categories are determined by a panel of experts within the RFMB. The fees are calculated based on numerous factors, cost of collection, recycling, and operation, raw material market price, PCR material price, etc. The RFMB collects the fee and allocates it to subsidize collection and recycling.

c. **COLLECTION:** Please describe the collection methods.

- i. Do municipalities determine collection methods independently or is there a universal system across the entire country?
Waste collection is universal throughout Taiwan. Garbage trucks of city government collect waste and recyclables 5 days a week on predetermined routes. In addition to the public services, some households especially those in a community may contract with private collectors to do the collection of trash and recyclables for them.
- ii. Are the operational costs of community collection sites subsidized by collected fees?
Yes, RFMB provides subsidies to these community collection sites by using the recycling fees collected from producers.
- iii. Are consumers paid to bring their containers/packages/hazardous waste?
For the products in the above mentioned 13 categories, a subsidy is paid to ensure recycling. So consumers might earn payments from those recyclables if they bring them to the recyclers or community collection centers. But consumers will not be paid additionally if handing the recyclables to daily public collection services by the city government.
- iv. What specific incentives (or regulations) are built into the system to encourage reduce, refill, etc?
The incentives are given to producers and importers who can pay lower recycling fee if their products meet certain criteria, i.e. energy efficiency, green design, easy to recycle, produced with recycled material etc.

d. **MATERIALS & ENVIRONMENTAL JUSTICE:**

- i. Are there minimum post-consumer recycled content standards and recyclability standards for packaging?
Currently, there is no regulations that requires minimum content of PCR material in the products. But manufacturers have been making products with PCR already.
- ii. Are there regulations that prohibit plastics that contain toxins that can impact human health? (such as PFAS, phthalates, etc?)
Yes.
- iii. Can companies pay a higher fee to make non-recyclable plastic?
The recycling fee in the EPR is set at a certain rate so companies do not pay higher for those difficult-to-recycle plastics. They can pay lower fee if their products meet green criteria, as mentioned above.

2. TRANSITION and IMPLEMENTATION

- a. What were the Behavioral changes that consumers/citizens needed to make?
Compulsory sorting.
- b. What kind of outreach and education did the government do to ensure effective behavioral change? What ongoing education do they provide to support the success of the program?
Taiwan is a strong supporter of environmental education and one of the few countries in the world that has adopted a legislative act. Under the act, environmental education curriculum is incorporated into basic education curriculum. In addition to school systems, public servants are required to take 4 hours of EE classes a year, even the president of Taiwan. Through EE, the importance of recycling is taught to everyone. Quite a few recycling promotion events are also provided or finally supported by the RFMB from time to time.

3. MEASURING SUCCESS

- a. What was the diversion rate of recoverable streams before this program? What are the current diversion rates? How many years did it take to reach this high rate?
In 1998, 8.9 mt of waste was generated and only 0.11 mt was recycled, so the recycling rate was only 1.25%. In 2019, 9.8 mt was generated but 4.9 mt was recycled, bring recycling rate up to 56%.

4. OPERATIONAL DETAILS

- a. How do local municipalities participate?
 - i. Are municipalities or local groups getting subsidized from the government to maintain?
Local municipalities receive subsidies from RFMB to support waste collection and recycling.

- ii. How is the redemption calculated? By weight? What are the categories of waste?

Under Taiwan EPR, there are 13 product categories regulated by EPA, also known as Regulated Recyclable Wastes (RRW). Subsidies for these products are paid by weight or unit, as indicated below.

1. Waste iron containers (e.g. can goods), [weight]
2. Waste aluminum containers (e.g. soda cans), [weight]
3. Waste plastic containers (e.g. PET bottles, drink bottles), [weight]
4. Waste glass containers (e.g. glass bottles), [weight]
5. Waste paper containers (e.g. to go food containers), [weight]
6. Scrap motor vehicles (automobiles and motorcycles), [unit]
7. Waste pesticide containers, [weight]
8. Waste lead acid batteries, [unit]
9. Waste dry-cell batteries, [weight]
10. Waste home appliances (refrigerator, A/C, washer/dryer, TV), [unit]
11. Waste IT equipment (PC, laptop, monitors, printers, keyboards), [unit]
12. Waste tires, [unit]
13. Waste lighting equipment (lightbulbs, lighting fixtures), [weight]

- b. Does the system **include specific waste reduction requirements**?

Yes, each year RFMB sets target collection rates and recycling rates for these 13 product categories.

- c. **Does the system include residential and commercial waste?**

Yes, recycling subsidy is paid for RRW no matter from residential or commercial sources.

- d. What role do community groups and schools play?

The waste and recycling collection system in Taiwan is known as the 4-in-1 recycling program and involves 4 key players.

1. Resident and communities: waste is collected and sorted by the residents at this level
 2. Municipal collectors: collects waste and recyclables from the community.
 3. Recyclers: sorts and processes recyclables
 4. RFMB: collects recycling fees and provides subsidies.
- Communities and schools can encourage recycling through EE, also earn revenue from the recyclables.

- e. Who is responsible for sorting within the plastic category?

Everyone. Plastic is first sorted and separated at homes, offices, restaurants etc. then picked up by collectors and provided to the

recyclers. But at every level, correct sorting is ensured to prevent mixture of other material.

5. DESIGN CHANGE

- a. Did the industry streamline their plastic packaging materials? Was there a change in the design and materials content of their packaging as a result of these fees?

With the exception of plastic containers, plastic packaging is currently not under the EPR system in Taiwan. As for plastic containers, the material is relatively simple, consist of mainly single type of plastic. So there is very little need for improvement in materials. But yes, some producers are producing better-designed containers, such as no-seal in the cap of drink bottles, for easier recycling. Furthermore, plastic container is mainly used for food and beverage container, so for health reasons, PCR plastic cannot be used in its production at this moment. Even though plastic packaging is not under the EPR, it is still being recycled without particular subsidy.

- b. What are the latest trends in new material types due to the EPR?

The use of PCR plastics in manufacturing other products, e.g. appliance casing, PET fiber.

- c. Do you think that EPR in Taiwan has driven design innovation of packaging and new materials?

Yes, in order for company to pay less recycling fees, they have switch to a greener design or make the product easier to recycle.

- d. Have you noticed a shift in consumer behavior that may be driving change in packaging design?

Packaging design is probable not improved by consumers' behavior changes or market acceptance but more by the regulations or incentives that are leading to environmental design of products.

6. CHALLENGES

- a. Are there any operational details that this system is working to address?

Auditing on producers and recyclers is somehow costly. The secondary materials from the recycling process need good valuation status incorporating environmental benefits.

- b. Do you see a way to improve:

i. Collection/Diversion rates

Better and easier sorting schemes is the basic foundation to increase collection rates.

ii. Participation rates

iii. Plastic production rate reduction

Education and promotion