

# Taipei City 2010 Total Recycling, Zero Landfill Policy Introduction

Taipei City Government

## Abstract :

In order to permanently solve the problem of waste disposal and to establish a material-recycling society, thereby protecting the environment and achieving the goal of sustainable development, in 2000, the Taipei City Government set a goal of “Total Recycling, Zero Landfill by 2020”, seeking to maximize resource recycling, to minimize waste incineration, and to eventually end the use of landfills. To date, the city has implemented waste reduction measures such as a Per-Bag Trash Collection Fee and household kitchen waste recycling, as well as resource recovery measures like renewal of old furniture and reuse of incinerator bottom ash, kitchen waste, ditch mud, and waste resulting from natural disasters. The Per-Bag Trash Collection Fee, especially, has motivated waste reduction and increased resource recycling. Taipei City has already achieved the goals of “Total Recycling, Zero Landfill” in 2010.

Taipei City, the capital of the R.O.C., is located at the northern end of Taiwan. The city covers a total area of 271.8 Km<sup>2</sup>, and its population is about 2.63 million people (approximately 12% of Taiwan's total population).



As centralized, massive population centers tend to generate larger volumes of waste, Taipei faced waste disposal problems early on. Until 1985, waste in Taipei was open dumped, forming a “trash mountain” beside the Keelung River in Neihu. After 1985, Taipei began to adopt sanitary landfill methods. Incineration was adopted in 1991, and today, over 99% of non-recyclable waste is incinerated.



Taipei began intensive recycling of waste in 1992. Previously, household waste was dumped on the ground at one of 3,765 waste collection points that was difficult to keep clean and sanitary. In order to solve this problem, in 1997 Taipei prohibited the dumping of waste on the ground and began a “3 in 1 Recycling Project”. Under this project, city residents must deposit their trash directly onto waste collection trucks for transport and disposal. Twice a week, waste trucks are followed by recycling trucks, integrating the functions of sorting, recycling, and transportation of waste. The program has dramatically enhanced the convenience and efficiency of recycling, leading to a cleaner environment overall.

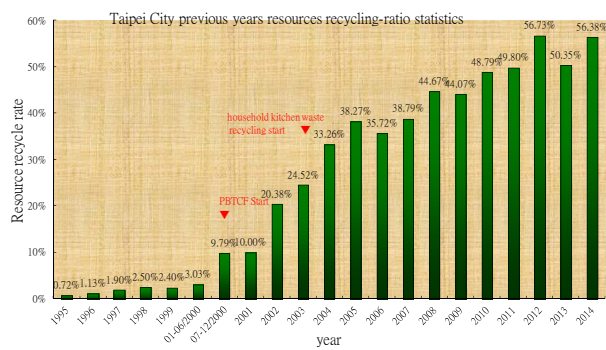
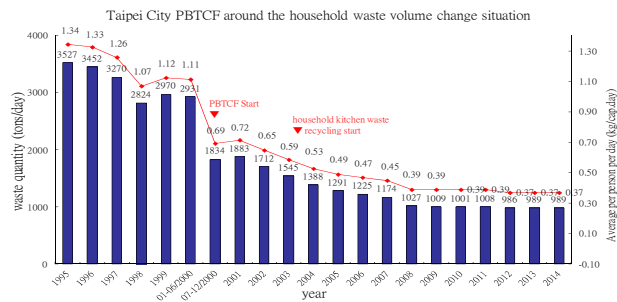


The implementation of Trash collection fees is one way to equitably share the costs of waste disposal (i.e., “make polluters pay”), so that Taipei began charging trash collection fees in 1991. Originally, the trash collection fee was assessed per household, based on the volume of water used, under the assumption that more water use indicated a larger household, and thus larger volumes of waste. However, as the fee was not linked to actual waste volume, it largely failed to motivate recycling or waste reduction. On July 1, 2000, the old trash collection fee based on water use was dropped in favor of a new fee assessed per bag of trash collected. Under the new policy, residents of Taipei must buy official trash bags sold by the TDEP (Taipei City Department of Environmental Protection) at convenience stores, and only those bags can be used for waste disposal (recyclables are exempted from this requirement). This pay-as-you-throw policy not only meets the principle of “polluter pays”, but also encourages city residents to separate their recyclables from non-recyclables and reduce the overall volume of waste.



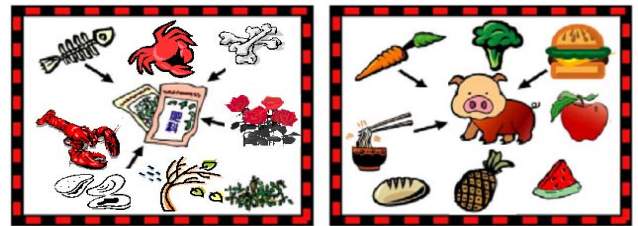
The Per-Bag Trash Collection Fee Policy has produced excellent results. In 1999, just before the policy went into effect, waste volume averaged 1.12 kg per person daily. As of 2014, waste volume averages 0.37 kg. Household waste volume has fallen 66%, and the total resource recycling ratio has risen from 2.4% to 56.38%. Average trash collection fees per household have also decreased, from 144 NT\$/month in 1999 to 27.9 NT\$/month in 2013. In recognition of these accomplishments, the Regional Institute of Environmental Technology (funded by the European Union and Singapore) honored Taipei with the “2001 Waste Management Excellence Award”.





Remarks: included the recyclables collected by the private recycling companies starting from 2002.

After the Per-Bag Trash Collection Fee went into effect, city residents requested an exemption for kitchen waste. In response, the municipal government developed a program to collect and to recycle household kitchen waste separately. The program was expanded in stages to gradually cover a larger area, and as of December 26, 2003, household kitchen waste is being recycled throughout the city. In Taipei, kitchen waste is classified into two categories: “pig-feed kitchen waste” and “compostable kitchen waste”, and sorted at the time of pickup. Compostable kitchen waste is sent to qualified composting factories to make fertilizer, which is later used in agriculture. Pig-feed kitchen waste is processed by steaming at high temperatures, and then sold to qualified pig farmers. In 2014, the average kitchen waste for the entire city reached 180 metric tons per day, and kitchen waste recycling has diverted about 15% of household waste volume from incineration.



In order to transform Taipei into an Eco-city, the city government embraces a broad range of strategies, like green production, green consumption, and green community. Furthermore, strategies such as conservation and environmental protection as well as public education have all implemented to achieve the goals of recycling resources, conserving energy, and protecting bio-diversity, that the city may achieve the ideals of sustainable development. As a key part of this initiative, the targets of the “Total Recycling, Zero Landfill” policy are hit by 2010. The eight areas identified for further work include: (1) cracking down on counterfeit bags, and improving the implementation of the Per-Bag Trash Collection Fee; (2) implementing mandatory waste sorting; (3) instituting organic waste recycling at restaurants and markets; (4) improving used furniture disposal and renewal, as well as sorting and recycling of bulky waste and construction waste; (5) promoting regional cooperation in waste handling to reduce overall volume of waste; (6) improving classification, recycling, and reuse of disaster waste; (7) recovering energy from non-recyclable waste; and (8) grading, solidification, or vitrification of incinerator ash. Progress in the above eight areas will gradually improve the quality of recycling and decrease the volume of waste sent to landfills, finally achieving the ultimate objective of “maximum resource recycling”, “minimum waste incineration” and “zero Landfill”.



Besides enacting the Per-Bag Trash Collect Fee and implementing kitchen waste recycling, Taipei has also adopted several other measures. Beginning in 2002, the city prohibited fresh garbage from being sent to landfills. In 2003, Taipei began using incinerator surplus capacity to help its neighbor, Keelung, incinerating some of Keelung's waste and returning incinerator bottom ash to Keelung for disposal. Because the overall volume of waste was reduced by incineration, the two cities could both save landfill capacity. In 18 months of cooperation, 113,522 metric tons of waste was treated, saving Taipei 120,000 m<sup>3</sup> of landfill capacity. However, in October 2005, Taipei began diverting bottom ash from landfills for reuse in road construction. And in 2007, the city also began to screen and treat ditch mud, reusing it as earth fill and soil for plants, rather than sending it to landfills.



Because typhoons are a frequent occurrence in Taipei, cleanup of waste resulting from the disaster is a serious concern. The city began classifying and recycling disaster waste in 2005, gradually sending less and less of it to landfills. Today, Taipei uses landfills only for stabilizing fly ash, and the city's

Department of Environmental Protection has promoted the reuse of incinerator ashes. TDEP has already finished the pre-washed fly ash factories and attempted to convince cement factories to use pre-washed fly ash into cement mixtures and sintering in cement manufacture. TDEP also searches for other techniques for using fly ash and creates multiple uses for fly ash in order to proceed in the goal of zero landfill.

Thanks to all these measures, utilization of Taipei's Shanchuku landfill has fallen from 2,501 metric tons per day in 1994 to 0 metric tons per day in 2011, a reduction of 100%. This dramatic decrease reflects Taipei's commitment to a policy of zero landfill, total recycling. Although some obstacles remain, the city government is confident that those obstacles can be overcome with innovative policies and broad public support, achieving the goal of "Total Recycling, Zero Landfill".

