



Pay-As-You-Throw program in the United States and lessons for Vietnam

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With the continuous increase in population and economic development, the amount of waste generated from societal activities has also significantly risen. This is not only an environmental issue but also affects community health and urban infrastructure. In this context, implementing a Pay-As-You-Throw (PAYT) or Volume-based waste fee model becomes more necessary than ever, as it not only encourages people to minimize waste generation but also motivates them to participate in recycling and reusing activities, thereby contributing positively to environmental protection and the building of a sustainable community.

Countries around the world such as the United States, Canada, Spain, Finland, South Korea, Japan, and Taiwan have implemented waste fee systems based on either volume or weight in various ways, depending on local conditions, legal regulations, and economic development. Volume-based or PAYT policies require households and businesses to pay based on the amount or waste volume generated.

In fact, PAYT has also been implemented in Vietnam for industrial or service waste generators (fees based on contracts between waste generators and collection/transportation and treatment companies based on the volume or weight of generation). However, for municipal solid waste (MSW), PAYT is a completely new approach regulated in the 2020 Environmental Protection Law.

This article will analyze the experience of implementing PAYT in the United States, one of the pioneering and successful countries in implementing this program.

1. PAY-AS-YOU-THROW IN THE UNITED STATES

Penetration of PAYT programs in the United States

In the United States, the PAYT system was first implemented in 1973 in Grand Rapids, Michigan. These programs grown from about 100 municipalities in the late 1980s to about 1,000 in 1993. In 2006, more than 7,100 municipalities had implemented PAYT, covering about 25% of communities in the US, including 30% of the largest cities in the country (US EPA, 2006). By 2011, nearly 9,000 municipalities had implemented PAYT programs (nerc.org, 2018). The PAYT program currently applying in the US leads to reduction of approximately 6.5 million tons of MSW per year in the United States (estimated reduction of 4.6 to 8.3 million tons of MSW from landfills annually). The largest number of programs is available in Minnesota, Iowa, Wisconsin, California, New York, Washington, and Pennsylvania, each with more than 200 municipalities. (US EPA, 2006).

The implementation of PAYT programs brings several benefits, such as minimizing waste generation rates and prolonging the lifetime of landfills. PAYT has shown effectiveness in encouraging households to dispose of less waste, with reduction rate ranging from 14% to 17%. The amount of recyclables in the United States has increased on average from 32% to 59% (epa.gov, 2016). The greatest strength of PAYT lies in its higher level of fairness, as individuals only pay for the amount of waste they generate rather than a flat fee as in conventional methods (such as per capita or per household charges). Additionally, applying this model helps localities forecast and ensure revenue from fee collection activities.



▲ Waste containersn Seattle, Washington



▲ Garbagebagin Waterville, Maine



The results of implementing PAYT in some municipalities

| Municipalities | PAYT Program Start Date | Waste fee | Success: save cost and reduce waste |
|------------------------|-------------------------|---|--|
| Grand Rapids, Michigan | 1973 | Prior to the 2012: the designated blue bags cost \$3 per 32-gallon bag, or subscribe to weekly curbside collection with variable prices for rubbish bins. Since 2012: households were offered an option of three sizes (32, 54 or 96 gallons) embedded with an RFID chip associated with the resident's account. | Period 2006-2013: 28% net reduction in municipal solid waste and 76% increase in recycling tonnage. |
| Binghamton, New York | 1991 | The retail prices of the bags in 2024: \$8.2/5 large bags (30-gallon), \$5.2/5 medium bags (20-gallon), \$2.5/5 small bags (10-gallon). Garbage bags placed for collection must weigh no more than 50 pounds. | In the first year: the amount of residential waste dropped to 13,389 tons, a reduction of over 48%. The recyclables recovered increased from 37% in 1991 to 41% in 2008. |
| Falmouth, Maine | 1992 | The retail prices of the bags: 64 cents/small bag (20-gallon), 91 cents/large bag (33-gallon). The 91 cents sticker is available for bulky items less than 35 pounds. The \$4.8 tag is used for large items such as mattresses and sofas. | The recycling rate: a jump from 12% before the program to 21%. The bid price for collection in the first year was \$116,000, compared to a bid of \$146,000 for a traditional collection contract. A reduction of 900 tons of waste disposal per year. |
| Gainesville, Florida | 1994 | Residents pay \$13.5, \$15.95, \$19.75 per month according to whether they place 35, 64, or 96 gallons of solid waste bins at the curb for collection. | The results of the first year of program: the amount of solid waste collected decreased 18%. The recyclables recovered increased 25%. The total disposal tonnage decreased from 22,120 to 18,116. |
| Seattle, Washington | 1981 | Monthly Residential Garbage Cart Rates in 2024: - Food and yard waste cart fee: Residents pay \$7.3; \$10.95; \$13.95 according to whether they use 13, 32, or 96 gallons of waste cart. Extra yard waste: \$7.05 per brown craft bags, bundle or 32-gallon cart. - Garbage Cart Fee: \$27.55, \$33.75, \$43.9, \$87.65, \$131.65 according to whether they place 12, 20, 32, 64 or 96 gallons of waste cart. Extra garbage: \$13.6 per extra bag, bundle, or 32-gallon cart. - Recycling service is included in the garbage rate. There is no additional cost for recycling service for residents. The maximum weight for extra garbage is 60 pounds per unit. | In 1996: municipal solid waste generation has decreased to 49 % compared to 1981. The recyclables recovered increased from 26,8% in 1998 to 56,9% in 2017. |

Source: US EPA (1997), John Abrashkin (2015), seattle.gov

PRICING SYSTEMS

Communities implementing PAYT need to select the type of pricing system they will use. There are three types of pricing systems used in a rate structure for PAYT program: proportional, variable rate, and multi-tiered pricing.

Proportional pricing

The proportional system creates the most direct relationship between waste amounts and price. Communities using this system charge residents a per-unit amount for each waste container they fill. For example, residents may pay \$1.25 for each 32-gallon bag they set out. These are usually bag-or tag-based systems, with the bags sold at local retail stores or municipal offices.



Variable-rate pricing

In a variable-rate system, the per-unit price varies. Residents are usually billed based on their choice of subscription container size. For garbage they discard above their subscription level, residents must pay an additional fee. The price of any subsequent containers may increase or decrease, depending on the community's PAYT program goals. For example, a household that pays \$1.50 per week for a 32 gallon bin subscription level might be charged \$2.00 for each additional 32 gallon bin it sets out in weekly collections. Alternatively, the price of the additional container might be set at \$1.00. Resident may pay the fee for extra garbage throwing away by purchasing bags or tags, or communities may count the additional set-outs at the time of collection and bill residents accordingly.

Multi-tiered pricing

Two-tiered or multi-tiered systems are sometimes used to help communities achieve revenue stability. Similar to the billing systems used by telephone and water utilities, residents subscribe to a base level of service, for which they pay a flat fee. These "first-tier" fees can be accessed through local taxes or through a regular monthly or quarterly charge, often included in a utility or other municipal bill. The fees can be used to cover the fixed portion of the cost of the community's solid waste program.

Residents then pay "second-tier" fees based on the amount of waste they throw away. Second tier fees may be priced in the same way as proportional or variable-rate systems. These fees are often used to cover the costs of collecting and disposing of additional amounts of waste. If the multi-tier fees are variable, they may increase or decrease for additional containers of waste.

ESTIMATING THE PER-CONTAINER PRICE

Planners review data on program costs and estimated amount of waste collected each year to calculate a price per container. Based on the approaches to rate structure design (looking at neighboring community's prices, preparing estimates, and using advanced rate-setting techniques) and the goals of the PAYT program (such as increasing recycling or keeping administrative costs to a minimum), the planners will decide which is best for their city or town.

Categories of program expenses could include: Administration costs (include public outreach, enforcement, and billing and customer service), collection costs (include collecting trash and recyclables, as well as labor and equipment costs and contract payments), and disposal and material handling costs (include fees for landfill disposal or waste combustion and costs for materials recovery facilities).

Planners will regulate waste fees through waste containers (variable bins, prepaid bags, and prepaid stickers or stamps). Collection crews are instructed to pick up only the amount of waste that is placed in the containers that have the appropriate tags or stickers attached to them.

CONTAINER OPTIONS

Variable bins

Under this system, the municipality offers households a set of standard, graduated bin sizes. These sizes range from approximately 10 to 90 gallons in capacity, although bins in the 30 to 60 gallon range are the most common. Typically, these systems operate on a subscription basis, under which residents choose in advance the size of the bin they wish to use (often called the subscription or service level). Bills based on service level or number of bins set out are then sent to households, usually monthly or quarterly.

Advantages: Greater revenue stability under subscription systems, since revenues vary only when residents change their service level. Compatibility with automated collection systems. Bins prevent litter from blowing and animals from scattering waste.

Disadvantages: Reduced waste reduction incentive, since residents are billed the same amount whether they fill their bin halfway or completely. Inventory and distribution system needed for bins. Requiring space to place bins at household. Billing system needed to collect revenues.

Prepaid bags

This system uses colored (or otherwise distinctively marked) standard-sized waste bags, usually 20 to 30 gallons in capacity. Residents purchase the bags from the solid waste agency through outlets such as municipal offices or retail stores.

Advantages: Residents save money whenever they put out fewer waste bags, creating a strong waste reduction incentive. Lower administrative costs, since residents pay directly for bags at municipal offices or local retailers. Lower implementation costs than bin systems; easy for residents to understand and use. The bags take up less space to put it at household than bins.

Disadvantages: Greater revenue uncertainty, since residents can buy many bags at once and then none for several weeks. Bags might not be compatible with automatic collection systems. Animals might tear bags and scatter waste.



Prepaid tags or stickers

Tags or stickers are designed to be used in tandem with different types of containers. Residents purchase tags or stickers from the solid waste agency through municipal offices or retail stores and attach them to their own garbage bags or bins. The tag or sticker specifies the size of the container it covers.

Advantages: Residents save money whenever they use fewer tags or stickers on their waste containers, creating a strong waste reduction incentive. Lower administrative costs, since residents pay directly for tags or stickers at municipal offices or local retailers. Lower implementation costs than bin systems. Residents can choose the types of containers they prefer.

Disadvantages: Greater revenue uncertainty, since residents can buy many tags or stickers at once and then none for several weeks. Need to establish and enforce size limits for each type of sticker. Tags and stickers may be stolen from waste containers. Need to offer residents stickers that will not fall off in rainy or cold weather.

In addition, the curbside municipal solid waste cart is embedded with an RFID chip associated with the resident's account. An RFID reader on the service arm of a semi automated truck records a curbside pickup every time the "smart cart" is collected, and the account is charged. Residents pre-pay for the service, and the city debits from their account each time the cart is emptied.

2. LESSONS FOR VIETNAM

In Vietnam, the 2020 Environmental Protection Law stipulates waste service charge based on volume or weight instead of the flat rate based on households or individuals. The PAYT program in the United States can provide some insights for Vietnam in facing waste management challenges and bringing about positive changes in waste collection, disposal, and recycling:

Firstly, develop and choose fee calculation methods and options. Three fee collection options (or a combination of them – or their combination) can be chosen for PAYT programs to collect fees for generated waste. The use of containers, designated bags, or pre-paid labels/tags should also be carefully selected to suit the specific conditions of each residential area.

Secondly, encourage waste reduction and recycling, especially in the context of population growth and the need for sustainable resource use.

Thirdly, improve the waste management system to enhance monitoring, supervision, and evaluation of waste management activities. PAYT requires an effective waste management system to monitor fee collection and waste disposal.

Fourthly, enhance cooperation and coordination between management levels to ensure the effective implementation of waste management programs, as PAYT often requires cooperation between local management levels.

Fifthly, support low-income groups. If not managed carefully, PAYT programs may increase costs for low-income households. Therefore, solutions should be considered to support low-income individuals (such as providing free waste bags or reducing bag prices for the elderly and low-income individuals) to reduce the negative impact on this group and ensure fairness for all social classes.

Sixthly, educate and raise awareness. In the United States, when PAYT programs were initially implemented, there were difficulties as residents perceived it as a new tax when it was separated and charged separately from the old fee system calculated along with rent or local property taxes. Therefore, PAYT is often combined with educational campaigns and communication to provide information and raise awareness about waste management. PAYT also requires active community participation, so Vietnam also needs to focus on educating the community about the importance of waste management and its impact on the environment, human health, as well as encouraging active participation from residents and stakeholders in building and implementing waste management program ■

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