

Practical comparison of alternatives for unit-based pricing of municipal waste. The experience of LIFE PAYT project

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Between 2017 and 2020 the LIFE PAYT project performed pilot experiences in five southern European municipalities – Aveiro, Condeixa-a-Nova and Lisbon in Portugal, Larnaka in Cyprus and Vrilissia in Greece – in order to test several different technological approaches to put in place a system for unit-based pricing (UBP) for municipal waste (MW), also commonly known as *pay-as-you-throw* (PAYT).

UBP schemes have been widely applied to MW tariff systems in developed countries (Sakai et al., 2008; Skumatz, 2008) in general with success, especially in Central Europe (Reichenbach, 2008; Šauer et al., 2008). However, with exception of Italy, PAYT policies have not yet been massively introduced in Southern Europe (Bio Intelligence Service, 2012). Aiming to overcome this gap, the EU-funded LIFE PAYT project intended to gain knowledge by practical means about the specific challenges faced by the introduction of PAYT policies in the Southern European countries targeted, and to find the respective answers to confront the problems encountered.

Each of the participant municipalities, attending to its own features and preferences, selected a particular area or population group where the pilot experience was to be implemented and thereafter chose a specific technological approach to put in practice the new collection scheme (Table 1). The range of options applied covered almost all the available alternatives for PAYT/UBP implementation, according to the classification made by Reichenbach (2008).

Table 1. Summary of cases in LIFE PAYT project

Location	Geographical profile	Population (2011)	Scope of pilot PAYT experience	Technological PAYT approach chosen
Aveiro	Medium sized city	78450	Residential neighbourhood comprising multi-storey apartment buildings and single detached houses.	Based on fixed volume/frequency; street containers with access controlled by electronic cards.
Condeixa	Town (rural)	17078	Non-domestic establishments.	Based on frequency, door-to-door collection with individually identified bins.
Larnaka	Medium sized city	51468	Residential neighbourhood comprising multi-storey apartment buildings and single detached houses.	Door-to-door (DtD) collection scheme with pre-paid marked bags.
Lisboa	Large city	552700	Large non-domestic establishments.	Door-to-door (DtD) collection scheme with fixed collection volume (number of bins contracted).
Vrilissia	Town (inserted in a large urban area)	30741	Residential neighbourhood comprising multi-storey apartment buildings.	Weight-based; street containers equipped with a weighing device, with access controlled by electronic cards

The results obtained in the pilot experiences were evaluated from various points of view – economic, environmental, political/social, and technical with the aim of establishing a comprehensive assessment of the practical experiences. Some of the constraints found were common to many of the cases analysed. For instance, the lack of legal support for changing the whole waste tariff framework from the previous scheme to PAYT constitutes an important political barrier which usually surpasses the municipal scope, since legislation regarding public fees is usually established at higher governance levels, making thus necessary a tough effort for raising awareness among political decision makers regarding the convenience of such a change.

Regarding the technical performance, in all cases where the implementation relied on technically complex systems, these were prone to malfunctions and failures. Unfortunately, a mature market for PAYT equipment does not exist yet within the countries involved in the project. Consequently, the waste equipment producers contacted lacked a sound know-how on the issue, so that they were required to develop – at high prices – new prototypes which, when tested on real conditions, showed expectable flaws – on the other hand, this allowed the companies involved to gain a valuable experience for future initiatives. These affected more the equipment based on weighing devices than that based on fixed volume, since the former is technically more delicate, as already shown in other similar PAYT experiences from different projects. The most negative consequence with troublesome equipment was the demoralisation of the participant population in view of the problems experienced. Notwithstanding, an increase of the amounts of recyclable materials for separate collection was observed in almost all of the locations, especially if the more personalised DtD collection was put in place for households. This confirms the ability of PAYT schemes in diverting resources for recycling, with the subsequent environmental benefits associated to it.

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References

- Reichenbach, J.: Status and prospects of pay-as-you-throw in Europe – A review of pilot research and implementation studies. *Waste Management*. 28, 2809–2814 (2008). doi: 10.1016/j.wasman.2008.07.008
- Sakai, S., Ikematsu, T., Hirai, Y., Yoshida, H.: Unit-charging programs for municipal solid waste in Japan. *Waste Management*. 28, 2815–2825 (2008). doi: 10.1016/j.wasman.2008.07.010
- Šauer, P., Pařízková, L., Hadrabová, A.: Charging systems for municipal solid waste: Experience from the Czech Republic. *Waste Management*. 28, 2772–2777 (2008). doi: 10.1016/j.wasman.2008.03.030
- Skumatz, L.A.: Pay as you throw in the US: Implementation, impacts, and experience. *Waste Management*. 28, 2778–2785 (2008). doi: 10.1016/j.wasman.2008.03.033