CASE STUDY

EC-LINK 中欧生态城

Case Study

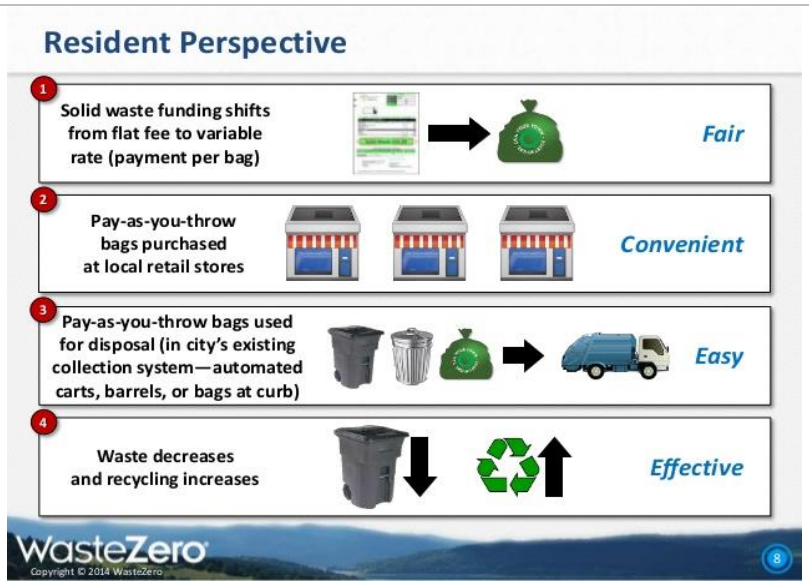
Solid Waste Management

Case 6:
Pay-As-You-Throw and waste incentive schemes

Problem to resolve: Conventional municipal waste collection systems applying a flat rate per container or household do not encourage avoidance of waste nor waste separation

Response: A collection system based on a fee system related o the waste collected encourage waste reduction at the source.

Concept:
Pay-As-You-Throw and waste incentive schemes in Europe



Pay-as-you-Throw in Plymouth (Mass.) [1]

The "pay-as-you-throw" (PAYT) scheme is looked at through the best practice example of the German County of Aschaffenburg (the County), spanning close to 20 years of implementation across 32 municipalities with 173,000 inhabitants. PAYT is an economic tool and application of the "polluter pays" principle that charges residents depending on the quantities of waste that they send off for third-party waste management. The technical application of the PAYT scheme is based on a three-pronged approach: identification of the waste producer, determination of the quantities of waste sent for treatment, and unit pricing.

‘Pay-As-You-Throw’ in Aschaffenburg, Germany

Background

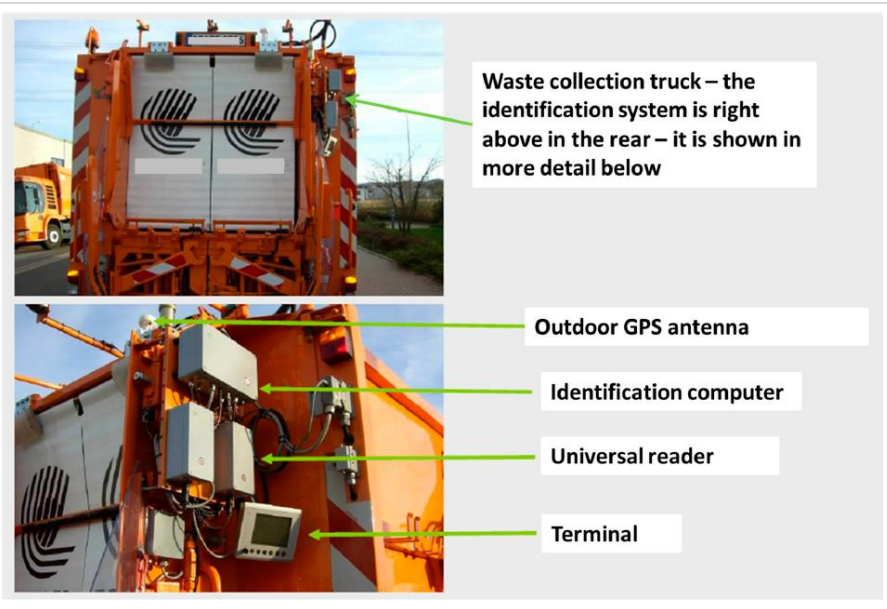
Until the early 1990s, untreated waste in the County was landfilled. Public pressure led to the County switching to a waste management system focused on preventing and recycling waste. A PAYT system was introduced in 1997 and has led to the County having one of the highest rates of recycling and lowest rates of residual waste generation per capita. The success of the system has led to it being replicated in other German counties, in Italy and Belgium.

Previous studies have demonstrated the good performance of pre-paid sack schemes (whereby sacks are set out for collection) in terms of residual waste prevention and recycling, and the comparatively poor performance of volume-based schemes that use varying bin sizes. The best performance, however, has been recorded with weight-based systems that are supported by well-developed infrastructure and waste-aware citizens, such as in the case of Aschaffenburg.[2]

Implementation of the system

The County adopted a weight-based collection of residual, organic and bulky waste, in addition to the separate collection of paper from all households. The introduction of such a system for residual and organic waste was driven by the need to develop a fair system for domestic users, the introduction of centralized billing in the County in 1994, excessive incineration costs, limited composting capacity for organic waste, as well as ecological factors.

Bins and containers are equipped with chips that can be read by a transponder, while waste collection vehicles are equipped with a reading device and weighing device, the latter of which requires regular calibration and maintenance due to the vibrations arising during vehicle movements. Data is sent via telemetry in real time to a central processing facility, which processes the data and allows for accounting and billing of domestic users.



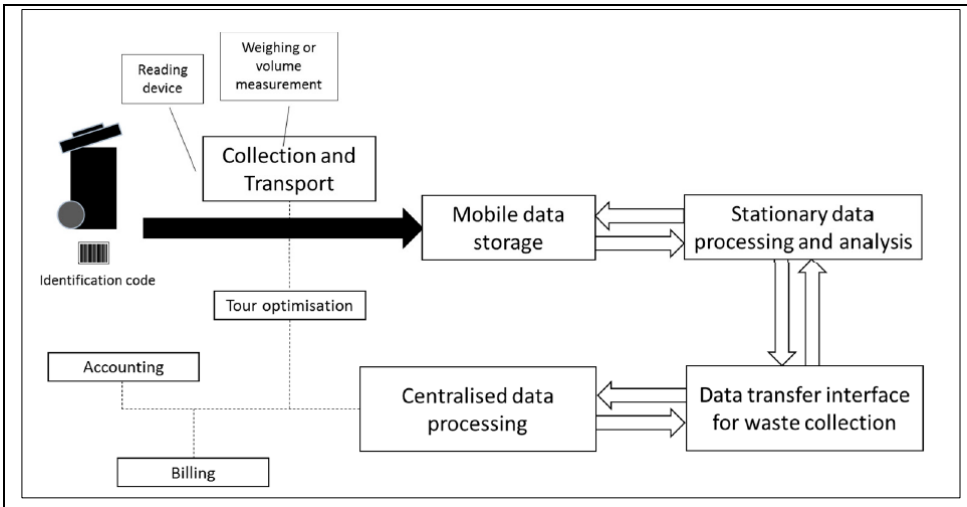
Waste collection truck equipped with a waste identification system

Waste collection vehicle in Aschaffenburg (Germany) capable of measuring the weight of waste peer household/house for differentiated charges of waste collection[3]

Outcome

The success of a PAYT system is reliant on well-developed infrastructure, the provision of convenient collection centers that accept other waste streams and the environmental awareness of inhab-

itants. The system in place in Aschaffenburg ticked all these boxes, and resulted in an overall collection rate of recyclables of up to 86%, which compares very favourably to other PAYT systems, with recycling rates typically approaching 70%. In 2013, the quantity of residual waste arising in the County was 55kg per capita per year, compared with 165kg in 1995 and 220kg per capita per year in Germany.



Data collection and processing scheme

Other types of waste collection systems have not been able to produce the same results in relation to landfill diversion and recycling. For instance, in Germany residual waste generation has been very steady over the last ten years. Though the implementation of the PAYT scheme was the primary reason for these excellent results, awareness raising and the development of better waste infrastructure for sorting and recycling also played a part. Taking into account numerous factors, GHG emissions savings were conservatively estimated to be 91kg of CO_2 per capita per year, therefore equating to 15,716 tons of CO_2 per year in the whole County.

There has been a steady decrease in the total annual waste management fee since 2000. The fee in 2013 was lower than that before 1997, despite the additional costs incurred due to PAYT implementation (including the construction of waste infrastructure, separate collection of different waste fractions, weighing and reading equipment etc.). Unrecovered costs were €44.5 per capita per year in 2013, a relatively low figure relative to other cities and municipalities, demonstrating that great environmental performance is not necessarily tied to high unrecovered costs.

However, despite the significant results that the PAYT scheme brought to the County, it is notable that this did not significantly impact the total quantity of waste generated. This has also been apparent for PAYT schemes in other countries, and reinforces the notion that for substantial waste prevention to be achieved with a PAYT system, this must be accompanied by other policies at the national and regional level (e.g. product policies, waste prevention plans, and tax regulations) in addition to targeted local initiatives such as awareness raising campaigns, reuse schemes, second-hand markets, repair stores etc.

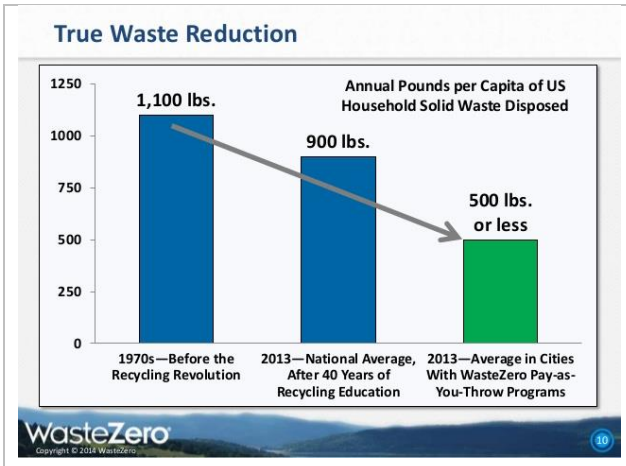
PAYT systems in other European countries

A pre-paid sack PAYT system was adopted in Flanders and helped to increase the recycling rate to 71% while decreasing residual waste generation to 149kg per capita per year. These systems deliver good results; though do not achieve the landfill diversion and recycling rates that weight-based PAYT systems are capable of achieving. In Italy, PAYT systems implemented in Treviso region and the municipality of Trento helped to achieve residual waste quantities of 55kg and 102kg per capita per year respectively.

It should be noted that geographical considerations may impact PAYT application; for instance, organic waste would need to be collected more regularly in hotter countries due to the hygiene implications which could lead to increased collection costs. However, this could be counterbalanced by the fact that increased organic waste collection would likely result in reduced collection frequency for residual waste.

Waste incentives in other European countries

In the UK, the legislative framework is not compatible with PAYT schemes. Recycling incentive schemes avoid legal barriers associated with the implementation of PAYT schemes and thus are more commonplace. In order to encourage recycling, these incentive schemes grant users payment or rewards, usually in the form of vouchers, or by refunding waste management fees. The difference in the behavioural aspect is notable when comparing the two schemes, as recycling incentive schemes appear to be more impactful on users with a high level of awareness, while PAYT addresses individuals with varying degrees of waste-awareness. For example, a recent incentive scheme in Bracknell Forest has increased the quantity of recyclables collected by 91kg per capita per year, increasing popularity among citizens as well as their perceptions of recycling. Best practice examples have also been observed in the Netherlands, where recycling incentive schemes have helped lower residual waste generation by 37%.



Impact of PAYT on Waste disposal[4]

Trash Talk: Incineration vs. the Circular Economy[5]

Credentials

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References

[1] Source: https://www.slideshare.net/Team_WasteZero/cut-trash-in-half-asheville-38422452?next_slideshow=1

[2] *Source: The Impact of Pay-As-You-Throw Schemes on Municipal Solid Waste Management: The Exemplar Case of the County of Aschaffenburg, Germany (2017).*
http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUKEwjpgNj50rPWAhWlBZoKHb38AiMQFgg2MAI&url=http%3A%2F%2Fwww.mdpi.com%2F2079-9276%2F6%2F1%2F8%2Fpdf&usg=AFQjCNED-67ObCVAeayEoT5oaE0M_Yz15Q

[3] _Source:http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUKEwjpgNj50rPWAhWlBZoKHb38AiMQFgg2MAI&url=http%3A%2F%2Fwww.mdpi.com%2F2079-9276%2F6%2F1%2F8%2Fpdf&usg=AFQjCNED-67ObCVAeayEoT5oaE0M_Yz15Q

[4] https://www.slideshare.net/Team_WasteZero/cut-trash-in-half-asheville-38422452?next_slideshow=1

[5] http://nocanberraincinerator.com/2017/09/19/trash-talk-incineration-vs-the-circular-economy/