Pay-As-You-Throw schemes in the Benelux countries[i]

Authors: Daniel Card (Eunomia) and Jean-Pierre Schweitzer (IEEP)

Brief summary of the case

Pay-As-You-Throw (PAYT) schemes are used by local authorities in Belgium, the Netherlands and Luxembourg in an effort to increase recycling and reduce residual waste collected from households. There are numerous different methods of applying PAYT schemes, with the part of the fee related to the choice / behaviour of residents linked either to:

1. The size of container chosen by the household;
2. The frequency of collection of a given container;
3. The application of a fee per sack used;
4. The weight of waste set out for collection; or
5. A combination of the above

In many cases, the variable element is applied only to residual waste collection. In others, the collection of biowaste may also be charged for, whilst some may also charge for the collection of recyclables, usually at a much lower rate than for residual waste. The fact that such a range of systems exist, and that some schemes are used more in some areas than others (e.g. sack-based collections might be a more likely choice in urban areas, or charged biowaste collections may be more likely in rural areas), leads to this case study providing a general discussion of PAYT rather than emphasising a specific scheme type. Schemes are generally applied locally at the scale at which collection systems are organised (which can be very small in some countries).

As a rule those areas which have introduced PAYT have seen an increase in recycling and a reduction in residual waste when compared to neighbouring regions with flat fees for waste services. However, not all schemes perform in the same way; for example schemes based solely on bin capacity do not bring about the same level of benefits as those based on weight or frequency of collection.

Despite concerns about public reactions to PAYT, both within the Benelux countries and subsequently in other regions considering switching to variable charging, there has been little evidence of discontent with PAYT. Indeed, studies suggest that populations which have been exposed to PAYT schemes are more likely to support them than counterparts with no experience of the system.

PAYT schemes are widely replicable, and indeed are already present in many other Member States, though some schemes are more suitable in some areas than others. There are also some general lessons to be learned in terms of the need for high-quality infrastructure to provide householders with an easy route to recycling, and the use of other economic instruments such as landfill taxes to properly enforce the waste hierarchy. Beyond those simple guidelines, the most suitable implementation of PAYT will depend on local conditions and objectives.

1 Description of the design, scope and effectiveness of the instrument

1.1 Design of the instrument

Pay-as-you-throw (PAYT) schemes in the Benelux countries are implemented primarily at a local or regional level, sometimes in response to guidance at a higher administrative level, which has given rise to a patchwork of different system designs in different jurisdictions (Linderhof et al., 2001; Hogg et al., 2002; Hill et al., 2002). In the Netherlands, a system was first introduced in Oostzaan in 1992; in Luxembourg, Koerich and Kopstal piloted a scheme from 1994 to 1997; and in Belgium pilot schemes took place in Flanders in the early 1990s, before more widespread adoption from 1995.

These schemes use different mechanisms and rates, but all systems aim to disincentivise the use of containers for residual waste. For example, the Ghent regional PAYT system in Flanders relies in urban and suburban areas on the differential pricing of residual waste, recyclable and biowaste collection sacks. In more rural areas, the charge is applied via a system of charging residents per waste collection, with higher rates for residual waste than biowaste bins (OECD, 2006). The pilot system in Koerich and Kopstal in Luxembourg took a slightly different focus; here, charges varied based on the weight of the waste collected and volume of the residual waste container used, whilst dry recyclables were collected free of charge (Hogg, 2002) and similar schemes can be found across Luxembourg today (OECD, 2010). In this manner, a differential cost between recycling and disposing waste is created for the householder.

It should be noted that as the study in Ghent showed, in order to avoid offering free residual waste collection to households, civic amenity sites / container parks should also be operated in such a way that residual waste is not received free of charge (OECD, 2006).

1.2 Drivers and barriers of the instrument

PAYT schemes are generally driven by the need, or desire, to reduce the generation of waste, and in particular residual waste, as well as increasing waste sorting at a household level. For example in Flanders, PAYT schemes are partially regulated by the regional government, which sets (amongst other parameters) minimum and maximum tariffs that local authorities may charge for the collection of residual waste. The PAYT measures were introduced to combat the growing issue of waste management in the densely populated Flanders region, including a Ministerial decision to prevent the establishment of new landfills from 1993 (EEA, 2009) which helped them to gain public support. The regional focus also helped gain backing for PAYT, as it allowed several local authorities to adopt the new system simultaneously, increasing harmonisation across the area (interview with J Wante, 2016). In Flanders, as in other areas, PAYT has strong links to other fiscal instruments such as landfill taxes and incineration taxes, which together form a package of market based instruments designed to promote better waste management (Ibid). In Wallonia, several municipalities introduced PAYT schemes as a means to ensure that they were not required to pay a levy on excess residual waste, which was to apply to those municipalities where residual waste per inhabitant exceeded a specific quota. Schemes in all the Benelux nations also link in to extended producer responsibility (EPR) schemes (notably Fost Plus in Belgium, Valorlux in Luxembourg and Nedvang in the Netherlands), which collect a proportion of household waste for recycling.

In some areas, especially where regional co-ordination has been less strong than can be seen in Flanders, there have been more barriers to the implementation of PAYT. One element of this is a perceived rise in the illegal disposal of waste (Fullerton and Kinnaman, 1996), although other studies have found that this effect is over-stated (Hogg et al., 2006). Other barriers have included the avoidance of charges by individuals travelling to areas not implementing a PAYT scheme to dispose of waste, although again the scale of this behaviour is small compared to the overall positive impact of PAYT (Linderhof *et al.*, 2001). There can also be disagreement over the regulation of PAYT between national and regional authorities. For example, in Luxembourg, there were disagreements over the introduction of legislation transposing the revised EU Waste Framework Directive (2008/98/EC), which looked to introduce more regulations on waste charges. Syvicol (who represent Luxemburgish cities and communes) disagreed with the Government's intention to introduce new regulations mandating differential tariffs for waste management (Europaforum, 2011). Syvicol were concerned that the costs, to both Local Authorities and households, had not been considered properly in drawing up the legislation, and also objected to the imposition of a model of charging from central government. Nevertheless, the transposing legislation was passed, bringing in stricter rules on the basis for PAYT in Luxembourg, which stated that the 'charges placed on households must contain at least one variable component calculated according to the weight and/or volume of residual waste produced' (Journal Officiel du Grand-Duché de Luxembourg, 2012).

1.3 Revenue collection and use

PAYT schemes are properly seen not as taxes, but as mechanisms for (partial) cost recovery that incentivise the fee-payer to adopt more environmentally sound behaviour. The revenues raised through variable charges are usually lower than the costs of managing municipal waste, so revenues are usually supplemented by charges raised from fixed rate fees. For example the funds raised by PAYT in Flanders equate to only around 50% of the funds required for waste management (interview with J. Wante, 2016). Since service providers have to recover the costs of service provision, it can be a risk to rely solely on revenues from variable fees to generate the desired level of revenue. It is typical for the revenues from variable fees to cover around 30-50% of costs so as not to expose the service provider to the problem of revenue instability.

Across the Benelux countries, the public pay levies directly, either though purchasing sacks at a set price or by paying for the collection of their bins by weight, frequency or size directly to the local authority (Hogg et al., 2009). Waste vehicles and containers can be designed so that vehicles will not empty containers of households who have not kept up to date with bill payment. This reduces problems of unpaid debts and ensures that there are no free-riders in the scheme.

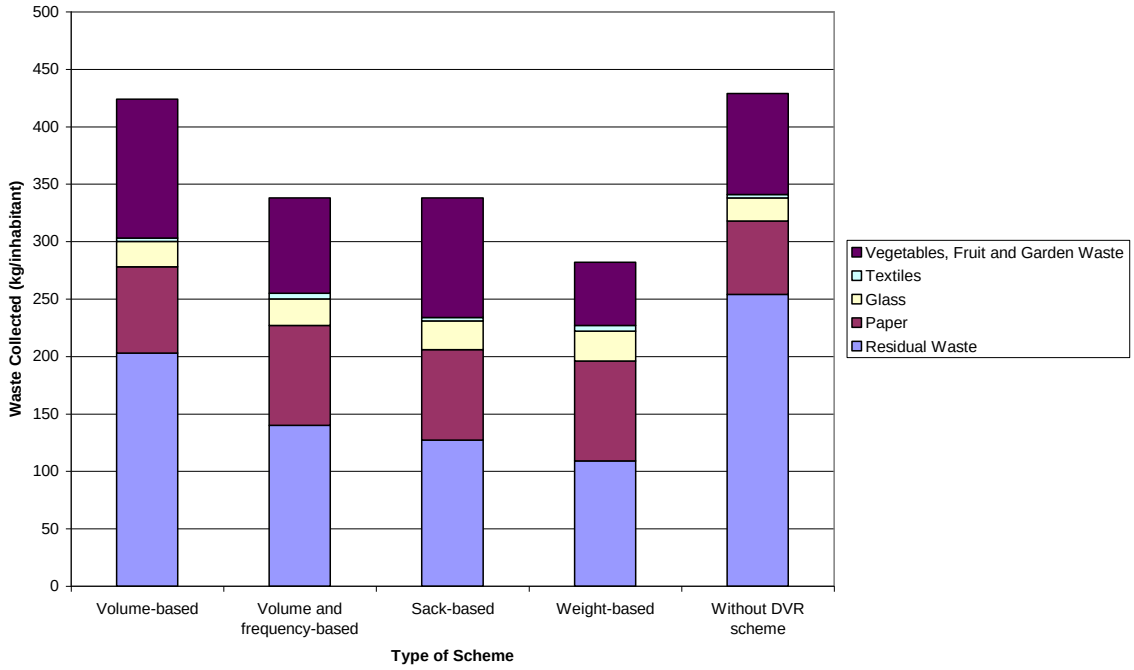
1.4 Environmental impacts and effectiveness

In general, studies into the various PAYT schemes of the Benelux countries have found that the schemes have resulted in a reduction of overall waste generated, and in particular lower rates of residual waste disposed of (Dijkgraaf and Gradus, 2003; Hogg, 2002, Hill et al., 2002). However, not all schemes perform in the same way, and their impact depends also on the scheme that was in place prior to the implementation of PAYT. Schemes based solely on bin

capacity do not bring about the same level of benefits as those based on weight or frequency of collection.

Comparative results across the system types in the Netherlands are shown in Figure 1 (AOO, 2001)**Error! Reference source not found.**. These suggest that in terms of waste prevention, weight based schemes perform best, whilst schemes using sacks or based on frequency and volume of container are next best and broadly similar in performance. Schemes based only on choice of container size are least effective. Recycling rates are highest for the sack-based scheme, but this is partly explained by the greater amount of waste available for recycling.

Figure 1: Quantities of separated waste and residual waste by charge system type, 1999



Source: AOO (2001)
Note: DVR scheme = differential and variable rates scheme

This ranking is reinforced in the work of Dijkgraaf and Gradus (2003) (see Table 1**Error! Reference source not found.**), which shows that there is a tendency for the elasticity (for residual waste quantities) to increase moving through volume-based, to sack-based, to weight-based schemes.

Table 1: Estimated price elasticities under different charging schemes

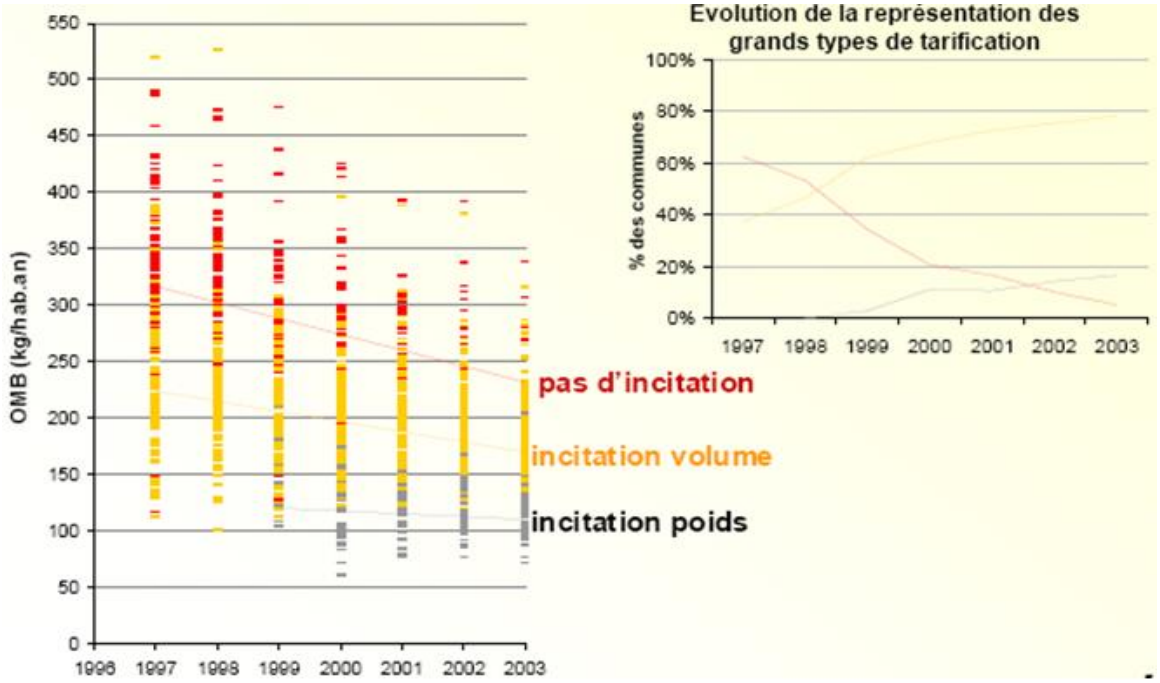
	Price	Total	Unsorted	Compostable	Recyclable
Standard model					
Weight	4.39	-0.47	-0.67	-0.92	0.16
Bag, refuse and compostable	2.02	-0.43	-0.66	-0.97	0.25
Bag, refuse	2.15	-0.14	-0.71	0.29	0.14
Frequency	3.91	-0.22	-0.28	-0.40	0.08
Volume	1.94	-0.06	-0.12	0.01	0.01

Model with environmental activism					
Weight	4.39	-0.40	-0.53	-0.81	0.12
Bag, refuse and compostable	2.02	-0.36	-0.51	-0.85	0.20
Bag, refuse	2.15	-0.07	-0.58	0.40	0.09
Frequency	3.91	-0.16	-0.16	-0.31	0.04
Volume	1.94	-0.00	0.01	0.09	-0.03

Source: Dijkgraaf and Gradus (2003)

The plot for the Walloon Region shown in Figure 2 highlights the change in residual waste quantities over time in the region's municipalities. It shows these figures for municipalities with no incentive charge ('*pas d'incitation*'), a volume based charge ('*incitation volume*') and weight based charges ('*incitation poids*'). It suggests that the residual waste quantities are lowest for those with weight-based schemes, slightly higher in municipalities with volume-based schemes and highest for schemes with no incentive in place. The figure also shows the progressive take up of different scheme types, with fewer and fewer municipalities using no incentive-based charge (around 5% in 2003 compared with over 60% in 1997).

Figure 2: Residual waste per inhabitant related to charge scheme



Source: Hogg et al *(2011). Note: OMB (kg/hab.an) = Residual Waste per Inhabitant per Year*

In Luxembourg, differential charges for waste collection were introduced in a piecemeal fashion across different areas of the country, allowing comparison between different communes. Improved performance was clearly seen when comparing communes with differentiated waste charges against their counterparts with flat charges (Commission du Développement durable, 2012) (Table 2Table 2).

Table 2: Residual waste production by waste collection system in Luxembourg, 2012

	Number of communes	Average residual waste production (kg/person/yr)
Communes without separate compostable waste collection bags or taxes as a function of waste production	85	233.8
Communes with separate compostable waste collection bags, but without taxes as a function of waste production	10	208.1
Communes with bags and taxes as a function of waste production	11	175.6
National average	116	221.1

Source: Commission du Développement durable, 2012

There was, however, criticism that systems in the less successful areas were not establishing a clear enough link between the overall objective of reducing disposal of waste and the policy instrument; for example by charging based on the volume of the chosen container alone rather than the weight of waste disposed of. In 2010, an OECD study determined that 15 communes which applied a harmonised system based on weight of waste collected had reduced residual waste by 50% in just two years, and saw a marked improvement in performance compared to schemes in other communes based solely on bin size, which remained a popular form of differentiated charging (OECD, 2010).

Overall, though, PAYT has achieved clear success in the Benelux countries. The lower impact of schemes which charge based on the choice of bin size only is related in part to the fact that once the bin choice has been made, the household has little incentive to reduce waste generation below the amount that fits in the chosen container. In such schemes, it is suggested that frequent revision of choice of bin size is important to allow households to choose the most appropriate bin size. Sack based schemes provide a greater incentive, at the margin, to reduce residual waste, because in principle only full sacks need to be set out and the household is free to purchase any number of sacks.

Frequency based schemes have a similar effect, but the (operational) advantage of such schemes over sack-based schemes is that households only present bins for collection when they are full. This improves the efficiency of logistics and can help to reduce the number of collection staff required. Weight based schemes appear to give the greatest reduction in overall waste quantity, but the vehicles used in such schemes are more expensive as on-board weighing equipment is required. Furthermore, if there is no frequency component to the charge scheme, the logistics can be inefficient if vehicles collect bins on a fixed frequency that are relatively empty. A combination of frequency and weight based charging is therefore a good option to generate a continuous incentive through the weight-based element, whilst reducing the frequency of set-out and improving logistical efficiency.

This having been said, in areas constrained by space, sack based schemes may be the most appropriate. In addition, some operators still question the accuracy of on-vehicle weighing equipment, noting that calibration is not consistent at the start and end of what are often robust operations on a collection round. Hence, some jurisdictions prefer not to use weight-

based schemes, recognising that similar advantages can be gained through other means without incurring the cost of vehicles with on-board weighing mechanisms.

1.5 Other impacts

It is difficult to determine any further economic impacts stemming from the introduction of PAYT in the Benelux countries, not least because areas without PAYT still ordinarily include a waste management charge by local authorities within the general council or municipal tax rate, as well as combining PAYT with other waste management policies such as landfill restrictions and EPR (interview with J. Wante, 2016). Some have argued that PAYT represents a regressive tax that has a disproportionate impact on lower-income households, as an unvaried charge across all households, unable to distinguish and allow for low-income households (Hogg et al., 2006), although the same paper cites an example of a specific scheme in Leuven, Belgium working to combat this issue by providing low income households with 20 free sacks each year. Others, such as the Luxembourg Chambre des Salariés, have raised concerns that the charges have a disproportionate impact on large families or households regardless of their efforts to sort waste (Chambre des deputes, 2011). Generally, however, it might be assumed that although charging schemes can be designed to take account of social factors, it might be preferable to maintain the incentive of the variable element of the fee and to address distributional issues by lowering the fixed component of the fee, or through more general approaches to addressing social inequality.

2 Stakeholder engagement

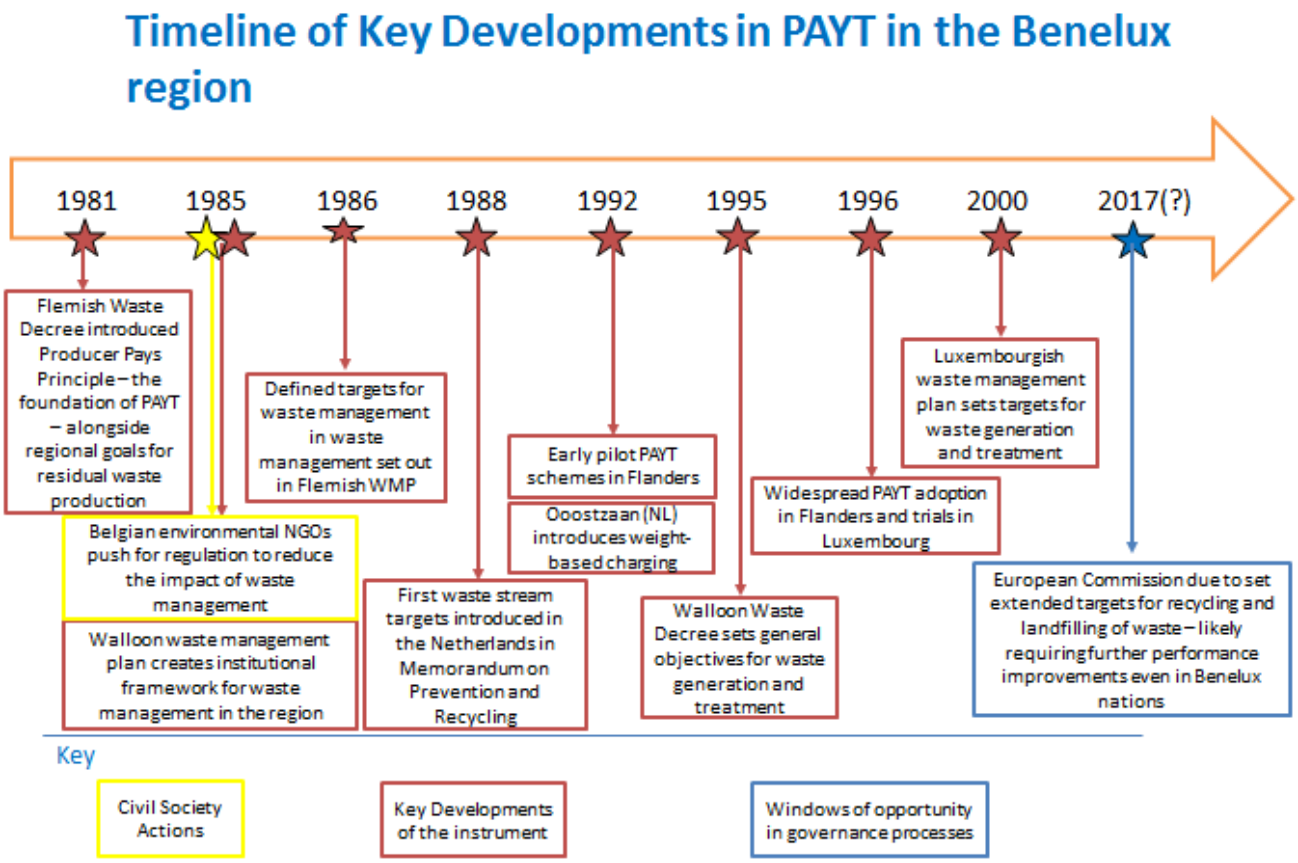
Various stakeholders have engaged with PAYT as it was introduced across the Benelux countries (Figure 3). The general public, as the target of the charges, are a key stakeholder for the instrument. In Flanders, targets were introduced after lobbying from environmental groups for Belgium to reduce the environmental and economic impacts associated with waste disposal, and enjoyed a large degree of public support given contemporary concerns over waste management in the Flanders region (interview with J.Wante, 2016).

Political engagement may also be an important factor. In the Netherlands, the earliest adoption of PAYT was in Oostzaan, a region where a markedly higher share of the vote has been for the environmentally active Green Left party, which may have helped generate or sustain public support as well as providing political impetus (Diijkgraaf et al., 2008; Linderhof et al., 2001).

Finally, engagement with the system itself might well generate support. A study into regions with PAYT, including Benelux countries, found that acceptance of the schemes is generally higher amongst residents with experience of the system (Brown and Johnstone, 2014). Communications campaigns can be instrumental in this process. For example, in Luxembourg the SuperDrecksKëscht® programme, funded by the Ministry of Sustainable Development, provides a range of services aimed at helping citizens to reduce costs and increase the efficiency of their waste sorting and disposal (European Commission, 2016). In The Hague in the Netherlands, the initial introduction of a sack-based scheme (the *restzaak*) was supported by a tool showing households how their fee might change under different scenarios,

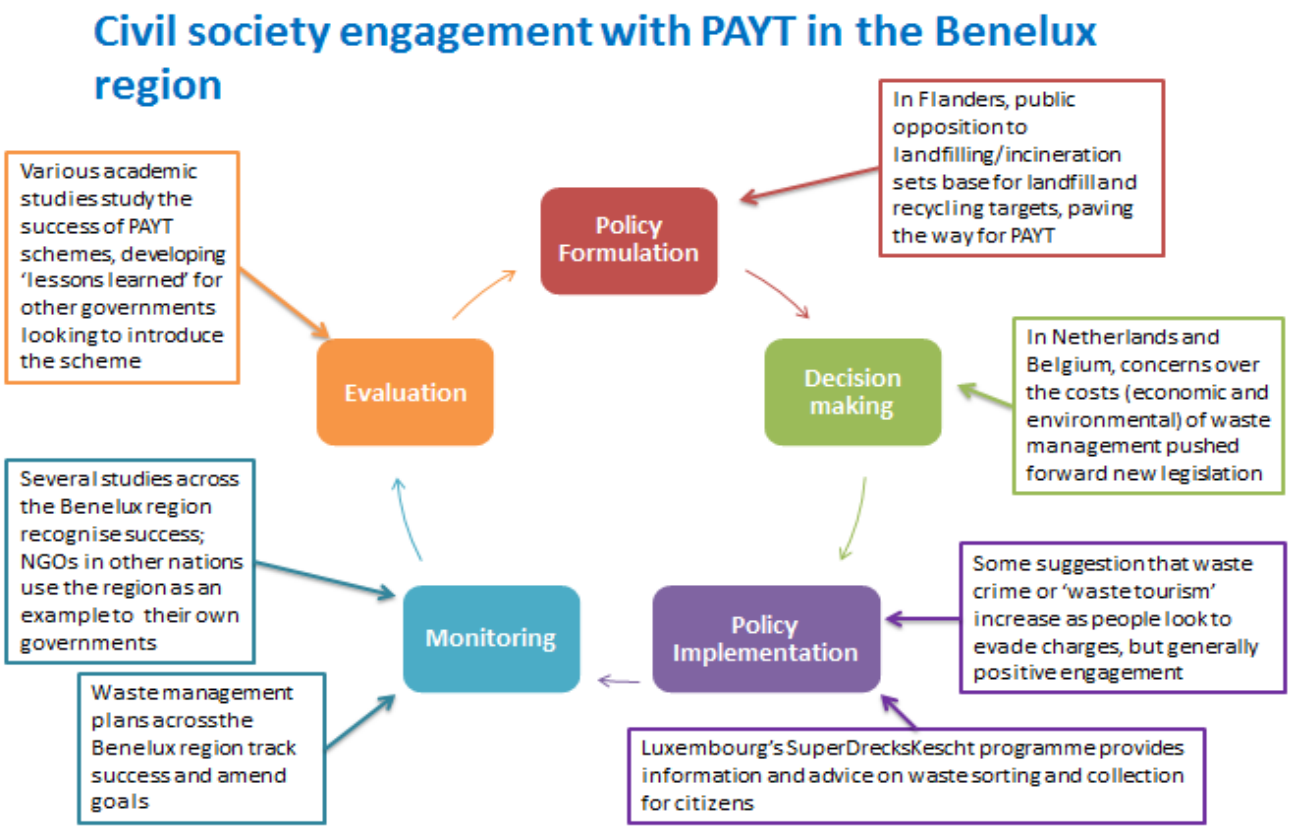
illustrating the potential to pay less than before the scheme was introduced if the household was sufficiently diligent in improving recycling.

Figure 3: Stakeholder engagement with PAYT in the Benelux countries



Concerns remain that some householders are looking to evade PAYT systems by means of 'waste tourism', i.e. by disposing of waste in locations where charges are not applied (Oosterhuis et al., 2009). However, evidence for this is limited, as is evidence for the hypothesised increase in waste crime as residents look to evade charges by illegally disposing of waste. This is another reason for not seeking to recover all costs through variable charges: such a scheme would raise the cost per emptying, or cost per sack, or cost per kg of residual waste, and increase the incentive to act illegally.

3 Windows of opportunity



4 Insights into future potential/reform

4.1 Actual Planned reforms and stakeholder engagement

The different authorities in charge of waste strategy across the Benelux countries are considering various potential additions and amendments to their PAYT systems in order to maintain and improve performance levels. Suggestions include reductions in the capacity of residual waste collection (such as smaller bins or less frequent collections) and positive incentives for household sorting of recyclable waste (de Baedts, 2015).

4.2 Suggestions for future reforms – instrument design and civil society engagement

Beyond the above, authorities will need to examine the potential for changes to be made which help them to attain the waste management targets expected to be set out in the European Commission's Circular Economy Package, which is under negotiation at the time of writing of this case study. This could include further amendments to PAYT schemes.

4.3 Suggestions for replicability

The PAYT systems used in the Benelux region are widely replicable, and indeed PAYT is in use in countries across the world. Moreover, the optimal system to be used is dependent on local conditions and objectives. However, there are certain lessons which can be taken from the experiences of the Benelux countries and from wider studies into existing PAYT schemes.

Common across all schemes is the need for high-quality collection infrastructure to allow residents to recycle easily, alongside other economic instruments such as landfill or incineration taxes to help properly incentivise application of the waste hierarchy (OECD, 2006). Different schemes have their advantages and disadvantages, but schemes based on the choice of bin size only are generally ineffective. It can be useful to include this as one element of the charging structure to reward those who choose smaller bins, though in operational terms the key issues relate to the ability to reduce total waste, and residual waste, whilst keeping any increases in the collection service to a sensible level. In this case, where bin-based schemes are possible, the main trade offs relate to:

1. The higher cost of vehicles related to weight-based schemes, and questions regarding the accuracy of the weighing schemes; and
2. The potentially improved reduction in residual waste quantities, reducing disposal costs.

The latter is influenced by the costs of managing residual waste, which varies across different situations, although they are known to be relatively high in the Benelux countries.

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